

# HTM electronics

## INDUCTIVE & CAPACITIVE PROXIMITY SENSORS



[WWW.HTMSENSORS.COM](http://WWW.HTMSENSORS.COM)

# **HTM** electronics

## **MetalHead**

### **with SpatterGuard**

**Proximity Sensors  
with a Stainless  
Steel Face and a  
PTFE coating.**

**Ideal for rugged  
applications  
around weld  
spatter.**



**[www.htmsensors.com](http://www.htmsensors.com)**



# OUR SENSORS DON'T JUST WORK, THEY WORK HARDER



## LONG RANGE INDUCTIVE PROXIMITY SENSORS

**HTM** LONG RANGE inductive proximity sensors can achieve sensing ranges up to three times greater than ordinary inductive proximity sensors with a maximum range of 40mm.

Our most popular 12mm sensor has a 6mm shielded range! This allows you to mount the sensor further away from the target to be sensed, thus reducing the likelihood of damage due to impact and abrasion.

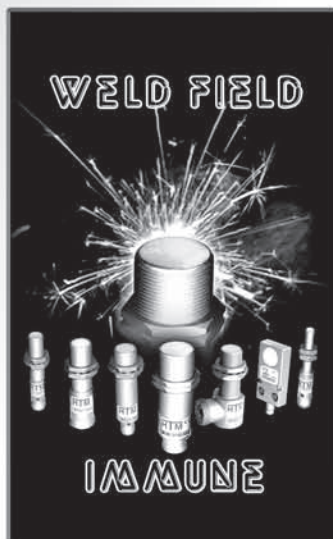
The **HTM** LONG RANGE sensors are available in sizes from 6mm to 30mm, and are available either pre-wired or quick disconnect..



## METALHEAD™ INDUCTIVE PROXIMITY SENSORS

The **HTM** MetalHead series are manufactured from a solid piece of stainless steel. This ultra-rugged series provides extreme protection against abuse due to contact, abrasion, chips, wash-down, corrosion, and shock. Double range versions further extend the life of these reliable, long-lasting sensors.

**HTM** MetalHead sensors are available in PNP, NPN, DC 2-wire, AC, and AC/DC configurations. M8, M12, M18 and M30 sizes are available with quick-disconnect, pre-wired cable, or custom length pigtail connections.



## WELD FIELD IMMUNE PROXIMITY SENSORS

**HTM** Weld Field Immune Sensors are designed for use in welding facilities or where strong DC and AC magnetic fields are present.

The sensors have a PTFE coating to prevent slag build-up and an ETFE face to prevent flash burn-in. The sensors are highly reliable in high current applications due to a special circuit and core configuration.

The **HTM** Weld Field Immune series are available in standard 8mm, 12mm, 18mm and 30mm diameters, as well as several square type sizes for every application. PNP, NPN, and AC/DC models are available in either pre-wired or quick disconnect.

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## MODEL SELECTION GUIDE

| FEATURE # | 1 | 2 | 3 | 4 | 5  | 6  | 7 | 8 | 9 | 10 | 11 |
|-----------|---|---|---|---|----|----|---|---|---|----|----|
| MODEL #   | F | C | M | 1 | 12 | 02 | N | A | 3 | U  | 2  |

### 1. TYPE:

F: INDUCTIVE    C: CAPACITIVE    L: LONG RANGE  
E: EXTENDED RANGE    I: 5-36 VDC    W: WELD FIELD IMMUNE

### 2. HOUSINGS:

C: CYLINDRICAL    Q: SQUARE

### 3. HOUSING MATERIAL:

M: CHROME-PLATED BRASS    U: STAINLESS STEEL  
P: PLASTIC    S: STAINLESS STEEL FACE

### 4. MOUNTING:

1: SHIELDED    2: NON-SHIELDED

### 5. HOUSING STYLE:

NUMERAL ONLY: THREADED BODY DIAMETER  
D + NUMERAL: SMOOTH BODY DIAMETER

### 6. SENSING DISTANCE:

RANGE IN MILLIMETERS (EG. 02 = 2MM)

### 7. OUTPUT FUNCTION:

N: NPN    P: PNP    A: AC    C: 2 WIRE DC  
K: OPEN COLLECTOR    U: AC/DC

### 8. OUTPUT:

A: NORMALLY OPEN    B: NORMALLY CLOSED  
C: AC OR AC/DC (NO OR NC SELECTABLE)  
S: CHANGEOVER (NO AND NC)    I: CURRENT OUTPUT (0-20 MA)  
V: VOLTAGE OUTPUT (0-10 VDC)  
M: BOTH CURRENT & VOLTAGE OUTPUT (0-20MA/0-10 VDC)

### 9. CONNECTION:

2: 2 WIRE    3: 3 WIRE    4: 4 WIRE    5: 5 WIRE  
C: CONNECTOR (8MM PICO)    R: CONNECTOR (12MM DC MICRO)  
B: CONNECTOR (4 PIN AC MICRO)  
U: CONNECTOR (3 PIN AC MICRO)    Z: MINI

### 10. PROTECTION:

S: SHORT BODY, SHORT-CIRCUIT PROTECTED  
L: NO SHORT CIRCUIT PROTECTION  
U: SHORT CIRCUIT PROTECTED

### 11. CABLE LENGTH OR NUMBER OF CONNECTOR PINS:

CABLE TYPE: 2 = 2 METERS,    5 = 5 METERS  
CONNECTOR TYPE: 2 = 2 PIN,    3 = 3 PIN,    4 = 4 PIN,    5 = 5 PIN

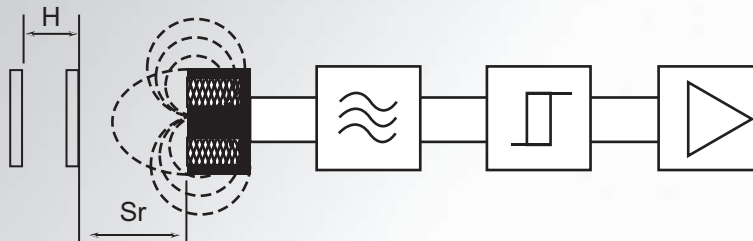
NOTE: NOT ALL MODEL COMBINATIONS ARE POSSIBLE. IF YOU NEED ASSISTANCE, PLEASE CALL OUR TECHNICAL DEPARTMENT (1-800-644-1756).



## INDUCTIVE PROXIMITY SENSORS

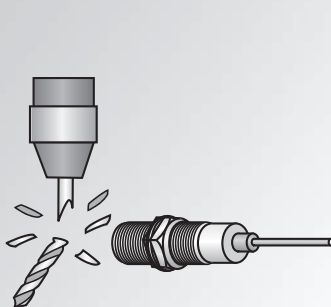
The inductive sensor's circuit consists of a coil of copper wire wrapped on a ferrite core and a transistorized circuit. A small amount of energy is supplied to the coil and the transistorized circuit uses this coil to produce an oscillation. The inductive sensors operate on a "kill oscillator" principle. When the conductive material (metals) are brought into the Radio Frequency field, eddy current losses draw energy from the coil to run along the surface of the metal (skin effect). Since there is little energy in the coil, the amplitude of the oscillation decreases as more of the target metal enters the field. When enough metal enters the field, the losses become so great that the circuit is unable to keep the oscillator running. When the oscillation is killed, a detector produces an output signal that is used to operate a relay or to switch another electronic circuit.

Since the signal is Radio Frequency, ferrous metal is not attracted to the sensor head. These new generation proximity sensors resemble their ancestors mostly in the operating principal only. With the development of stable integrated circuits, the oscillator driver and amplifier can now be located in the detector head itself. This removes the troublesome shielded cable from the circuit and drastically improves the detector's noise immunity. The only wire used with the detector is now the power supply and a low impedance output signal that does not have to be shielded since it is not in the detectors circuit.



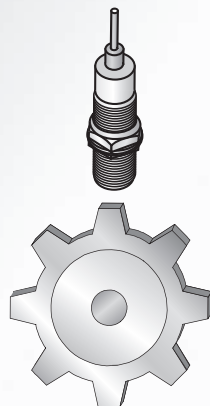
**Inductive Switch Block Diagram**

## APPLICATIONS FOR INDUCTIVE PROXIMITY SENSORS



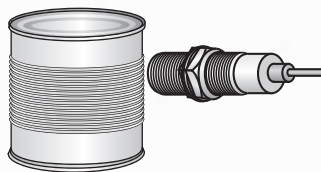
**BROKEN TOOL  
DETECTION**

Inductive Proximity Sensors are ideal for detecting broken drill bits, tooling or other moving parts that can otherwise go unnoticed and slow down production.



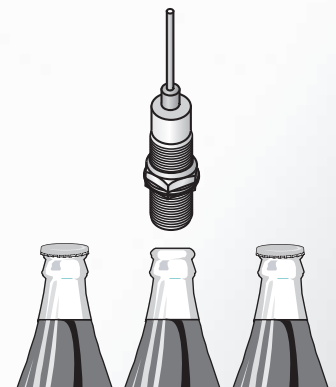
**CAM FOLLOWER**

The high switching speed of our inductive sensors allows you to monitor any variation in cam or gear rotation speed.



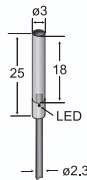
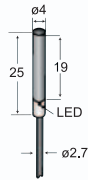
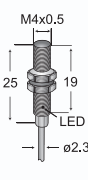
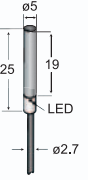
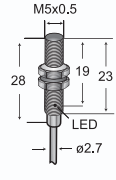
**PART & PRODUCT  
DETECTION**

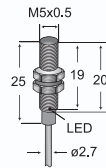
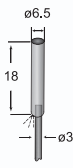
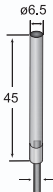
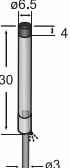
Inductive Sensors can be used for detecting any metal part or product to allow for perfect positioning in filling, labelling or batch counting applications



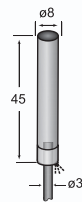
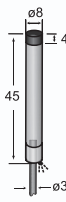
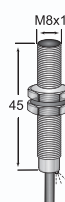
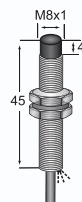
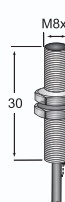
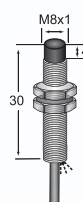
**BOTTLE CAP  
DETECTION**

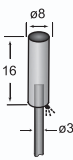
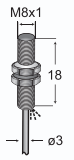
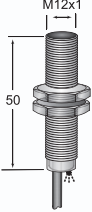
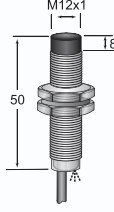
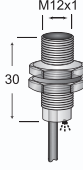
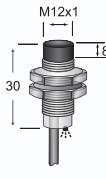
Use Inductive Sensors to ensure quality control in packaged or bottled food and drink production.

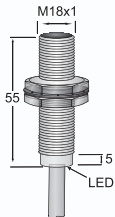
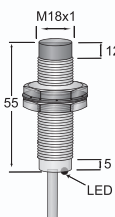
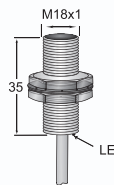
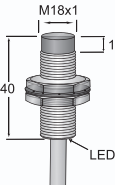
|                                 | ø3                                                                                  | ø4                                                                                  | M4                                                                                   | ø5                                                                                    | M5                                                                                    |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |     |    |    |
| Sensing Distance                |                                                                                     |                                                                                     | 0.8 mm                                                                               |                                                                                       |                                                                                       |
| Operating Voltage               |                                                                                     |                                                                                     | 10-30 VDC                                                                            |                                                                                       |                                                                                       |
| Ripple                          |                                                                                     |                                                                                     | <10%                                                                                 |                                                                                       |                                                                                       |
| No Load Current                 |                                                                                     |                                                                                     | <10mA                                                                                |                                                                                       |                                                                                       |
| Max. Load Current               |                                                                                     |                                                                                     | 200mA                                                                                |                                                                                       |                                                                                       |
| Leakage Current                 |                                                                                     |                                                                                     | <0.01mA                                                                              |                                                                                       |                                                                                       |
| Surge Current                   |                                                                                     |                                                                                     | -                                                                                    |                                                                                       |                                                                                       |
| Min. Load Current               |                                                                                     |                                                                                     | -                                                                                    |                                                                                       |                                                                                       |
| Voltage Drop                    |                                                                                     |                                                                                     | <1.5V                                                                                |                                                                                       |                                                                                       |
| Switching Frequency             |                                                                                     |                                                                                     | 2 KHz                                                                                |                                                                                       |                                                                                       |
| Response Time                   |                                                                                     |                                                                                     | 0.1ms/0.1ms                                                                          |                                                                                       |                                                                                       |
| Switching Hysteresis            |                                                                                     |                                                                                     | <15% (Sr)                                                                            |                                                                                       |                                                                                       |
| Repeat Accuracy                 |                                                                                     |                                                                                     | <1.0% (Sr)                                                                           |                                                                                       |                                                                                       |
| Protection Category             |                                                                                     |                                                                                     | IP67                                                                                 |                                                                                       |                                                                                       |
| Operating Temperature           |                                                                                     |                                                                                     | -25°C - +70°C                                                                        |                                                                                       |                                                                                       |
| Temperature Drift               |                                                                                     |                                                                                     | <10% (Sr)                                                                            |                                                                                       |                                                                                       |
| Short Circuit Protection        |                                                                                     |                                                                                     | Yes                                                                                  |                                                                                       |                                                                                       |
| Overload Trip Point             |                                                                                     |                                                                                     | 220mA                                                                                |                                                                                       |                                                                                       |
| Time Delay Before Availability  |                                                                                     |                                                                                     | <10ms                                                                                |                                                                                       |                                                                                       |
| Shock / Vibration               |                                                                                     |                                                                                     | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                    |                                                                                       |                                                                                       |
| Material Active Face            |                                                                                     |                                                                                     | POM                                                                                  |                                                                                       |                                                                                       |
| Housing Material                |                                                                                     |                                                                                     | Stainless Steel                                                                      |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Shielded                                                                            | Shielded                                                                             | Shielded                                                                              | Shielded                                                                              |
| DC 3 wire 10-30V NPN N.O.       | FCU1-D030.8N-A3U2                                                                   | FCU1-D0401N-A3U2                                                                    | FCU1-040.8N-A3U2                                                                     | FCU1-D0501N-A3U2                                                                      | FCU1-0501N-A3U2                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FCU1-D030.8N-B3U2                                                                   | FCU1-D0401N-B3U2                                                                    | FCU1-040.8N-B3U2                                                                     | FCU1-D0501N-B3U2                                                                      | FCU1-0501N-B3U2                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FCU1-D030.8P-A3U2                                                                   | FCU1-D0401P-A3U2                                                                    | FCU1-040.8P-A3U2                                                                     | FCU1-D0501P-A3U2                                                                      | FCU1-0501P-A3U2                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FCU1-D030.8P-B3U2                                                                   | FCU1-D0401P-B3U2                                                                    | FCU1-040.8P-B3U2                                                                     | FCU1-D0501P-B3U2                                                                      | FCU1-0501P-B3U2                                                                       |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.O.        |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.C.        |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.O.        |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.C.        |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover NPN  |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover PNP  |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
|                                 |  |  |  |  |  |
|                                 |  |  |  |  |  |

|                                 | M5                                                                                                                                                                      | ø6.5                                                                                                                                                                    | ø6.5                                                                                                                                                                    | ø6.5                                                                                                                                                                       | ø6.5                                                                                                                                                                        | ø6.5                                                                                                                                                                        |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                        |                                                                                        |                                                                                        |                                                                                         |                                                                                          |                                                                                          |
| Sensing Distance                | 0.8 mm                                                                                                                                                                  | 1.0 mm                                                                                                                                                                  | 1mm                                                                                                                                                                     | 2 mm                                                                                                                                                                       | 1mm                                                                                                                                                                         | 2 mm                                                                                                                                                                        |
| Operating Voltage               | 10-30 VDC                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Ripple                          | <10%                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| No Load Current                 | <10mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Max. Load Current               | 200mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Leakage Current                 | <0.01mA                                                                                                                                                                 |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Surge Current                   | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Min. Load Current               | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Voltage Drop                    | <1.5V                                                                                                                                                                   |                                                                                                                                                                         | <1.5V (10-30V) or <1.0V (5-36V)                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Frequency             | 2 KHz                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Response Time                   | 0.1ms/0.1ms                                                                                                                                                             |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Hysteresis            | <15% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Repeat Accuracy                 | <1.0% (Sr)                                                                                                                                                              |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Protection Category             | IP67                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Operating Temperature           | -25°C - +70°C                                                                                                                                                           |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Temperature Drift               | <10% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Short Circuit Protection        | Yes                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Overload Trip Point             | 220mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Time Delay Before Availability  | <10ms                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Material Active Face            | POM                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Housing Material                | Stainless Steel                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Part Numbers                    | Shielded                                                                                                                                                                | Shielded                                                                                                                                                                | Shielded                                                                                                                                                                | Unshielded                                                                                                                                                                 | Shielded                                                                                                                                                                    | Unshielded                                                                                                                                                                  |
| DC 3 wire 10-30V NPN N.O.       | FCU1-0501N-A3S2                                                                                                                                                         | FCU1-D0601N-A3R2                                                                                                                                                        | FCU1-D0601N-A3U2                                                                                                                                                        | FCU2-D0602N-A3U2                                                                                                                                                           | FCU1-D0601N-A3S2                                                                                                                                                            | FCU2-D0602N-A3S2                                                                                                                                                            |
| DC 3 wire 10-30V NPN N.C.       | FCU1-0501N-B3S2                                                                                                                                                         | FCU1-D0601N-B3R2                                                                                                                                                        | FCU1-D0601N-B3U2                                                                                                                                                        | FCU2-D0602N-B3U2                                                                                                                                                           | FCU1-D0601N-B3S2                                                                                                                                                            | FCU2-D0602N-B3S2                                                                                                                                                            |
| DC 3 wire 10-30V PNP N.O.       | FCU1-0501P-B3S2                                                                                                                                                         | FCU1-D0601P-B3R2                                                                                                                                                        | FCU1-D0601P-A3U2                                                                                                                                                        | FCU2-D0602P-A3U2                                                                                                                                                           | FCU1-D0601P-A3S2                                                                                                                                                            | FCU2-D0602P-A3S2                                                                                                                                                            |
| DC 3 wire 10-30V PNP N.C.       | FCU1-0501P-B3S2                                                                                                                                                         | FCU1-D0601P-B3R2                                                                                                                                                        | FCU1-D0601P-B3U2                                                                                                                                                        | FCU2-D0602P-B3U2                                                                                                                                                           | FCU1-D0601P-B3S2                                                                                                                                                            | FCU2-D0602P-B3S2                                                                                                                                                            |
| DC 4 wire 10-30V Changeover NPN |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 4 wire 10-30V Changeover PNP |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 2 wire 10-60V N.O.           |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 2 wire 10-60V N.C.           |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.O.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.C.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 3 wire 5-36V PNP N.O.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 3 wire 5-36V PNP N.C.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 4 wire 5-36V Changeover NPN  |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 4 wire 5-36V Changeover PNP  |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Diagrams (units in mm)          |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
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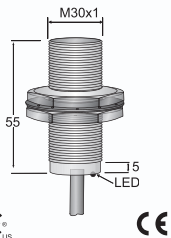
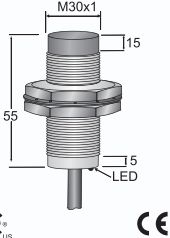
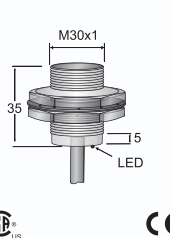
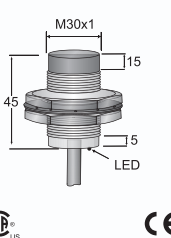


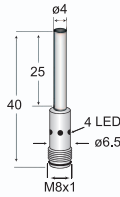
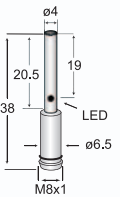
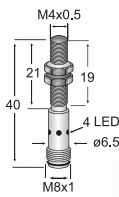
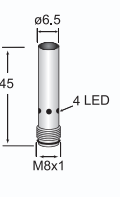
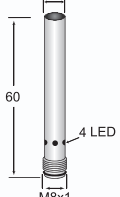
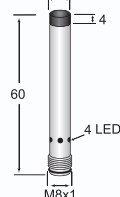
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|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                        |                                                                                        |                                                                                        |                                                                                         |                                                                                          |                                                                                          |
| Sensing Distance                | 1 mm, 1.5 mm                                                                                                                                                            | 2 mm, 2.5 mm                                                                                                                                                            | 1mm, 1.5mm                                                                                                                                                              | 2 mm, 2.5mm                                                                                                                                                                | 1mm, 1.5mm                                                                                                                                                                  | 2 mm, 2.5mm                                                                                                                                                                 |
| Operating Voltage               | 10-30 VDC or 5-36 VDC or 10-60 VDC                                                                                                                                      |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            | 10-30 VDC or 5-36 VDC                                                                                                                                                       |                                                                                                                                                                             |
| Ripple                          | <10%                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| No Load Current                 | <10mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Max. Load Current               | 200mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Leakage Current                 | <0.01mA                                                                                                                                                                 |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Surge Current                   | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Min. Load Current               | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Frequency             | 2 KHz                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Response Time                   | 0.1ms/0.1ms                                                                                                                                                             |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Hysteresis            | <15% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Repeat Accuracy                 | <1.0% (Sr)                                                                                                                                                              |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Protection Category             | IP67                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Operating Temperature           | -25°C - +70°C                                                                                                                                                           |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Temperature Drift               | <10% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Short Circuit Protection        | Yes                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Overload Trip Point             | 220mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Time Delay Before Availability  | <10ms                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Material Active Face            | POM                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Housing Material                | Stainless Steel                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Part Numbers                    | Shielded                                                                                                                                                                | Unshielded                                                                                                                                                              | Shielded                                                                                                                                                                | Unshielded                                                                                                                                                                 | Shielded                                                                                                                                                                    | Unshielded                                                                                                                                                                  |
| DC 3 wire 10-30V NPN N.O.       | FCU1-D0801N-A3U2                                                                                                                                                        | FCU2-D0802N-A3U2                                                                                                                                                        | FCU1-0801N-A3U2                                                                                                                                                         | FCU2-0802N-A3U2                                                                                                                                                            | FCU1-0801N-A3S2                                                                                                                                                             | FCU2-0802N-A3S2                                                                                                                                                             |
| DC 3 wire 10-30V NPN N.C.       | FCU1-D0801N-B3U2                                                                                                                                                        | FCU2-D0802N-B3U2                                                                                                                                                        | FCU1-0801N-B3U2                                                                                                                                                         | FCU2-0802N-B3U2                                                                                                                                                            | FCU1-0801N-B3S2                                                                                                                                                             | FCU2-0802N-B3S2                                                                                                                                                             |
| DC 3 wire 10-30V PNP N.O.       | FCU1-D0801P-A3U2                                                                                                                                                        | FCU2-D0802P-A3U2                                                                                                                                                        | FCU1-0801P-A3U2                                                                                                                                                         | FCU2-0802P-A3U2                                                                                                                                                            | FCU1-0801P-A3S2                                                                                                                                                             | FCU2-0802P-A3S2                                                                                                                                                             |
| DC 3 wire 10-30V PNP N.C.       | FCU1-D0801P-B3U2                                                                                                                                                        | FCU2-D0802P-B3U2                                                                                                                                                        | FCU1-0801P-B3U2                                                                                                                                                         | FCU2-0802P-B3U2                                                                                                                                                            | FCU1-0801P-B3S2                                                                                                                                                             | FCU2-0802P-B3S2                                                                                                                                                             |
| DC 4 wire 10-30V Changeover NPN |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 4 wire 10-30V Changeover PNP |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 2 wire 10-60V N.O.           | FCU1-D0801C-A2U2                                                                                                                                                        | FCU2-D0802C-A2U2                                                                                                                                                        | FCU1-0801C-A2U2                                                                                                                                                         | FCU2-0802C-A2U2                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 2 wire 10-60V N.C.           | FCU1-D0801C-B2U2                                                                                                                                                        | FCU2-D0802C-B2U2                                                                                                                                                        | FCU1-0801C-B2U2                                                                                                                                                         | FCU2-0802C-B2U2                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.O.        | ICU1-D081.5N-A3U2                                                                                                                                                       | ICU2-D082.5N-A3U2                                                                                                                                                       | ICU1-081.5N-A3U2                                                                                                                                                        | ICU2-082.5N-A3U2                                                                                                                                                           | ICU1-081.5N-A3S2                                                                                                                                                            | ICU2-082.5N-A3S2                                                                                                                                                            |
| DC 3 wire 5-36V NPN N.C.        | ICU1-D081.5N-B3U2                                                                                                                                                       | ICU2-D082.5N-B3U2                                                                                                                                                       | ICU1-081.5N-B3U2                                                                                                                                                        | ICU2-082.5N-B3U2                                                                                                                                                           | ICU1-081.5N-B3S2                                                                                                                                                            | ICU2-082.5N-B3S2                                                                                                                                                            |
| DC 3 wire 5-36V PNP N.O.        | ICU1-D081.5P-A3U2                                                                                                                                                       | ICU2-D082.5P-A3U2                                                                                                                                                       | ICU1-081.5P-A3U2                                                                                                                                                        | ICU2-082.5P-A3U2                                                                                                                                                           | ICU1-081.5P-A3S2                                                                                                                                                            | ICU2-082.5P-A3S2                                                                                                                                                            |
| DC 3 wire 5-36V PNP N.C.        | ICU1-D081.5P-B3U2                                                                                                                                                       | ICU2-D082.5P-B3U2                                                                                                                                                       | ICU1-081.5P-B3U2                                                                                                                                                        | ICU2-082.5P-B3U2                                                                                                                                                           | ICU1-081.5P-B3S2                                                                                                                                                            | ICU2-082.5P-B3S2                                                                                                                                                            |
| DC 4 wire 5-36V Changeover NPN  |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 4 wire 5-36V Changeover PNP  |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
| Diagrams (units in mm)          |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                            |                                                                                                                                                                             |                                                                                                                                                                             |
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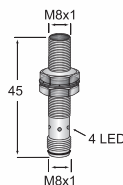
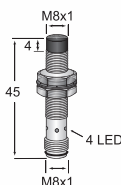
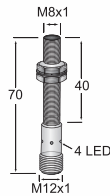
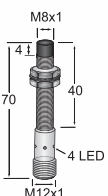
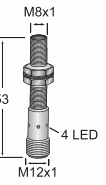
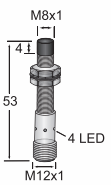
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|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |    |    |
| Sensing Distance                | 1 mm                                                                                | 1 mm                                                                                | 2 mm                                                                                | 4 mm                                                                                  | 2 mm                                                                                  | 4 mm                                                                                  |
| Operating Voltage               | 10-30 VDC                                                                           |                                                                                     | 10-30 VDC or 5-36 VDC or 10-60 VDC                                                  |                                                                                       |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     | <10mA                                                                               | <20mA                                                                                 | <10mA                                                                                 | <20mA                                                                                 |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V                                                                               |                                                                                     | <1.5V or <1.0V or <2.0V                                                             |                                                                                       |                                                                                       |                                                                                       |
| Switching Frequency             | 2 KHz                                                                               | 2 KHz                                                                               | 2 KHz                                                                               | 1 KHz                                                                                 | 2 KHz                                                                                 | 1 KHz                                                                                 |
| Response Time                   | 0.1ms/0.1ms                                                                         | 0.1ms/0.1ms                                                                         | 0.1ms/0.1ms                                                                         | 0.2ms/0.2ms                                                                           | 0.1ms/0.1ms                                                                           | 0.2ms/0.2ms                                                                           |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Material Active Face            | POM                                                                                 |                                                                                     | POM                                                                                 | PBT                                                                                   | POM                                                                                   | PBT                                                                                   |
| Housing Material                | Stainless Steel                                                                     |                                                                                     | Chrome-plated Brass                                                                 |                                                                                       |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Shielded                                                                            | Shielded                                                                            | Unshielded                                                                            | Shielded                                                                              | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | FCU1-0801N-A3R2                                                                     | FCU1-08101N-A3R2                                                                    | FCM1-1202N-A3U2                                                                     | FCM2-1204N-A3U2                                                                       | FCM1-1202N-A3S2                                                                       | FCM2-1204N-A3S2                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FCU1-0801N-B3R2                                                                     | FCU1-08101N-B3R2                                                                    | FCM1-1202N-B3U2                                                                     | FCM2-1204N-B3U2                                                                       | FCM1-1202N-B3S2                                                                       | FCM2-1204N-B3S2                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FCU1-0801P-A3R2                                                                     | FCU1-08101P-A3R2                                                                    | FCM1-1202P-A3U2                                                                     | FCM2-1204P-A3U2                                                                       | FCM1-1202P-A3S2                                                                       | FCM2-1204P-A3S2                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FCU1-0801P-B3R2                                                                     | FCU1-08101P-B3R2                                                                    | FCM1-1202P-B3U2                                                                     | FCM2-1204P-B3U2                                                                       | FCM1-1202P-B3S2                                                                       | FCM2-1204P-B3S2                                                                       |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     | FCM1-1202N-S4U2                                                                     | FCM2-1204N-S4U2                                                                       |                                                                                       |                                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     | FCM1-1202P-S4U2                                                                     | FCM2-1204P-S4U2                                                                       |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     | FCM1-1202C-A2U2                                                                     | FCM2-1204C-A2U2                                                                       | FCM1-1202C-A2S2                                                                       | FCM2-1204C-A2S2                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     | FCM1-1202C-B2U2                                                                     | FCM2-1204C-B2U2                                                                       | FCM1-1202C-B2S2                                                                       | FCM2-1204C-B2S2                                                                       |
| DC 3 wire 5-36V NPN N.O.        |                                                                                     |                                                                                     | ICM1-1202N-A3U2                                                                     | ICM2-1204N-A3U2                                                                       | ICM1-1202N-A3S2                                                                       | ICM2-1204N-A3S2                                                                       |
| DC 3 wire 5-36V NPN N.C.        |                                                                                     |                                                                                     | ICM1-1202N-B3U2                                                                     | ICM2-1204N-B3U2                                                                       | ICM1-1202N-B3S2                                                                       | ICM2-1204N-B3S2                                                                       |
| DC 3 wire 5-36V PNP N.O.        |                                                                                     |                                                                                     | ICM1-1202P-A3U2                                                                     | ICM2-1204P-A3U2                                                                       | ICM1-1202P-A3S2                                                                       | ICM2-1204P-A3S2                                                                       |
| DC 3 wire 5-36V PNP N.C.        |                                                                                     |                                                                                     | ICM1-1202P-B3U2                                                                     | ICM2-1204P-B3U2                                                                       | ICM1-1202P-B3S2                                                                       | ICM2-1204P-B3S2                                                                       |
| DC 4 wire 5-36V Changeover NPN  |                                                                                     |                                                                                     | ICM1-1202N-S4U2                                                                     | ICM2-1204N-S4U2                                                                       | ICM1-1202N-S4S2                                                                       | ICM2-1204N-S4S2                                                                       |
| DC 4 wire 5-36V Changeover PNP  |                                                                                     |                                                                                     | ICM1-1202P-S4U2                                                                     | ICM2-1204P-S4U2                                                                       | ICM1-1202P-S4S2                                                                       | ICM2-1204P-S4S2                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
|                                 |  |  |  |  |  |  |
|                                 |  |  |  |   |  |  |

|                                 | M18                                                                                 | M18                                                                                 | M18                                                                                   | M18                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |
| Sensing Distance                | 5 mm                                                                                | 8 mm                                                                                | 5 mm                                                                                  | 8 mm                                                                                  |
| Operating Voltage               | 10-30 VDC or 5-36 VDC                                                               |                                                                                     |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                     |                                                                                     |                                                                                       |                                                                                       |
| Switching Frequency             | 1 KHz                                                                               | 500 Hz                                                                              | 1 KHz                                                                                 | 500 Hz                                                                                |
| Response Time                   | 0.2ms/0.2ms                                                                         | 0.5ms/0.5ms                                                                         | 0.2ms/0.2ms                                                                           | 0.5ms/0.5ms                                                                           |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                       |                                                                                       |
| Material Active Face            | PBT                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Housing Material                | Chrome-plated Brass                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Unshielded                                                                          | Shielded                                                                              | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | FCM1-1805N-A3U2                                                                     | FCM2-1808N-A3U2                                                                     | FCM1-1805N-A3S2                                                                       | FCM2-1808N-A3S2                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FCM1-1805N-B3U2                                                                     | FCM2-1808N-B3U2                                                                     | FCM1-1805N-B3S2                                                                       | FCM2-1808N-B3S2                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FCM1-1805P-A3U2                                                                     | FCM2-1808P-A3U2                                                                     | FCM1-1805P-A3S2                                                                       | FCM2-1808P-A3S2                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FCM1-1805P-B3U2                                                                     | FCM2-1808P-B3U2                                                                     | FCM1-1805P-B3S2                                                                       | FCM2-1808P-B3S2                                                                       |
| DC 4 wire 10-30V Changeover NPN | FCM1-1805N-S4U2                                                                     | FCM2-1808N-S4U2                                                                     | FCM1-1805N-S4S2                                                                       | FCM2-1808N-S4S2                                                                       |
| DC 4 wire 10-30V Changeover PNP | FCM1-1805P-S4U2                                                                     | FCM2-1808P-S4U2                                                                     | FCM1-1805P-S4S2                                                                       | FCM2-1808P-S4S2                                                                       |
| DC 2 wire 10-60V N.O.           | FCM1-1805C-A2U2                                                                     | FCM2-1808C-A2U2                                                                     | FCM1-1805C-A2S2                                                                       | FCM2-1808C-A2S2                                                                       |
| DC 2 wire 10-60V N.C.           | FCM1-1805C-B2U2                                                                     | FCM2-1808C-B2U2                                                                     | FCM1-1805C-B2S2                                                                       | FCM2-1808C-B2S2                                                                       |
| DC 3 wire 5-36V NPN N.O.        | ICM1-1805N-A3U2                                                                     | ICM2-1808N-A3U2                                                                     | ICM1-1805N-A3S2                                                                       | ICM2-1808N-A3S2                                                                       |
| DC 3 wire 5-36V NPN N.C.        | ICM1-1805N-B3U2                                                                     | ICM2-1808N-B3U2                                                                     | ICM1-1805N-B3S2                                                                       | ICM2-1808N-B3S2                                                                       |
| DC 3 wire 5-36V PNP N.O.        | ICM1-1805P-A3U2                                                                     | ICM2-1808P-A3U2                                                                     | ICM1-1805P-A3S2                                                                       | ICM2-1808P-A3S2                                                                       |
| DC 3 wire 5-36V PNP N.C.        | ICM1-1805P-B3U2                                                                     | IICM2-1808P-B3U2                                                                    | ICM1-1805P-B3S2                                                                       | IICM2-1808P-B3S2                                                                      |
| DC 4 wire 5-36V Changeover NPN  | ICM1-1805N-S4U2                                                                     | ICM2-1808N-S4U2                                                                     | ICM1-1805N-S4S2                                                                       | ICM2-1808N-S4S2                                                                       |
| DC 4 wire 5-36V Changeover PNP  | ICM1-1805P-S4U2                                                                     | ICM2-1808P-S4U2                                                                     | ICM1-1805P-S4S2                                                                       | ICM2-1808P-S4S2                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                 |  |  |  |  |
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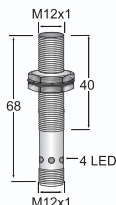
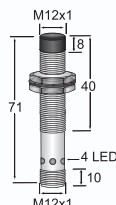
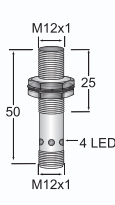
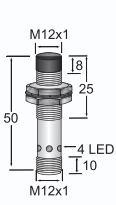


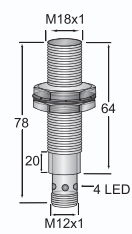
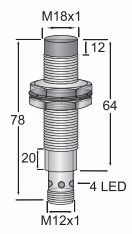
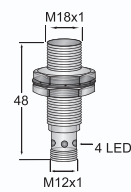
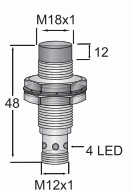
|                                 | M30                                                                                                                                                                     | M30                                                                                                                                                                     | M30                                                                                                                                                                         | M30                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                        |                                                                                        |                                                                                          |                                                                                          |
| Sensing Distance                | 10 mm                                                                                                                                                                   | 15 mm                                                                                                                                                                   | 10 mm                                                                                                                                                                       | 15 mm                                                                                                                                                                       |
| Operating Voltage               | 10-30 VDC or 5-36 VDC                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Ripple                          | <10%                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| No Load Current                 | <10mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Max. Load Current               | 200mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Leakage Current                 | <0.01mA                                                                                                                                                                 |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Surge Current                   | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Min. Load Current               | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Frequency             | 1 KHz                                                                                                                                                                   | 500 KHz                                                                                                                                                                 | 1 KHz                                                                                                                                                                       | 500 KHz                                                                                                                                                                     |
| Response Time                   | 0.2ms/0.2ms                                                                                                                                                             | 0.5ms/0.5ms                                                                                                                                                             | 0.2ms/0.2ms                                                                                                                                                                 | 0.5ms/0.5ms                                                                                                                                                                 |
| Switching Hysteresis            | <15% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Repeat Accuracy                 | <1.0% (Sr)                                                                                                                                                              |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Protection Category             | IP67                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Operating Temperature           | -25°C - +70°C                                                                                                                                                           |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Temperature Drift               | <10% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Short Circuit Protection        | Yes                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Overload Trip Point             | 220mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Time Delay Before Availability  | <10ms                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Material Active Face            | PBT                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Housing Material                | Chrome-plated Brass                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Part Numbers                    | Shielded                                                                                                                                                                | Unshielded                                                                                                                                                              | Shielded                                                                                                                                                                    | Unshielded                                                                                                                                                                  |
| DC 3 wire 10-30V NPN N.O.       | FCM1-3010N-A3U2                                                                                                                                                         | FCM2-3015N-A3U2                                                                                                                                                         | FCM1-3010N-A3S2                                                                                                                                                             | FCM2-3015N-A3S2                                                                                                                                                             |
| DC 3 wire 10-30V NPN N.C.       | FCM1-3010N-B3U2                                                                                                                                                         | FCM2-3015N-B3U2                                                                                                                                                         | FCM1-3010N-B3S2                                                                                                                                                             | FCM2-3015N-B3S2                                                                                                                                                             |
| DC 3 wire 10-30V PNP N.O.       | FCM1-3010P-A3U2                                                                                                                                                         | FCM2-3015P-A3U2                                                                                                                                                         | FCM1-3010P-A3S2                                                                                                                                                             | FCM2-3015P-A3S2                                                                                                                                                             |
| DC 3 wire 10-30V PNP N.C.       | FCM1-3010P-B3U2                                                                                                                                                         | FCM2-3015P-B3U2                                                                                                                                                         | FCM1-3010P-B3S2                                                                                                                                                             | FCM2-3015P-B3S2                                                                                                                                                             |
| DC 4 wire 10-30V Changeover NPN | FCM1-3010N-S4U2                                                                                                                                                         | FCM2-3015N-S4U2                                                                                                                                                         | FCM1-3010N-S4S2                                                                                                                                                             | FCM2-3015N-S4S2                                                                                                                                                             |
| DC 4 wire 10-30V Changeover PNP | FCM1-3010P-S4U2                                                                                                                                                         | FCM2-3015P-S4U2                                                                                                                                                         | FCM1-3010P-S4S2                                                                                                                                                             | FCM2-3015P-S4S2                                                                                                                                                             |
| DC 2 wire 10-60V N.O.           | FCM1-3010C-A2U2                                                                                                                                                         | FCM2-3015C-A2U2                                                                                                                                                         | FCM1-3010C-A2S2                                                                                                                                                             | FCM2-3015C-A2S2                                                                                                                                                             |
| DC 2 wire 10-60V N.C.           | FCM1-3010C-B2U2                                                                                                                                                         | FCM2-3015C-B2U2                                                                                                                                                         | FCM1-3010C-B2S2                                                                                                                                                             | FCM2-3015C-B2S2                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.O.        | ICM1-3010N-A3U2                                                                                                                                                         | ICM2-3015N-A3U2                                                                                                                                                         | ICM1-3010N-A3S2                                                                                                                                                             | ICM2-3015N-A3S2                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.C.        | ICM1-3010N-B3U2                                                                                                                                                         | ICM2-3015N-B3U2                                                                                                                                                         | ICM1-3010N-B3S2                                                                                                                                                             | ICM2-3015N-B3S2                                                                                                                                                             |
| DC 3 wire 5-36V PNP N.O.        | ICM1-3010P-A3U2                                                                                                                                                         | ICM2-3015P-A3U2                                                                                                                                                         | ICM1-3010P-A3S2                                                                                                                                                             | ICM2-3015P-A3S2                                                                                                                                                             |
| DC 3 wire 5-36V PNP N.C.        | ICM1-3010P-B3U2                                                                                                                                                         | ICM2-3015P-B3U2                                                                                                                                                         | ICM1-3010P-B3S2                                                                                                                                                             | ICM2-3015P-B3S2                                                                                                                                                             |
| DC 4 wire 5-36V Changeover NPN  | ICM1-3010N-S4U2                                                                                                                                                         | ICM2-3015N-S4U2                                                                                                                                                         | ICM1-3010N-S4S2                                                                                                                                                             | ICM2-3015N-S4S2                                                                                                                                                             |
| DC 4 wire 5-36V Changeover PNP  | ICM1-3010P-S4U2                                                                                                                                                         | ICM2-3015P-S4U2                                                                                                                                                         | ICM1-3010P-S4S2                                                                                                                                                             | ICM2-3015P-S4S2                                                                                                                                                             |
| Diagrams (units in mm)          |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
|                                 |                                                                                      |                                                                                      |                                                                                        |                                                                                        |
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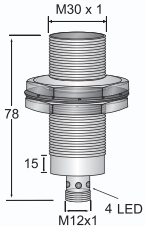
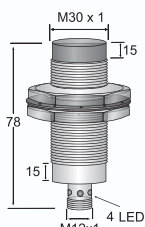
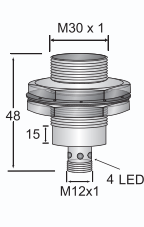
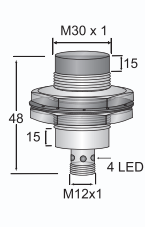
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|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                        |                                                                                        |                                                                                        |                                                                                          |                                                                                          |                                                                                          |
| Sensing Distance                | 0.8 mm                                                                                                                                                                  | 0.8mm                                                                                                                                                                   | 0.8mm                                                                                                                                                                   | 1.0 mm                                                                                                                                                                      | 1 mm, 1.5 mm                                                                                                                                                                | 2mm, 2.5 mm                                                                                                                                                                 |
| Operating Voltage               | 10-30 VDC                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                         | 10-30 VDC or 5-36 VDC                                                                                                                                                       |                                                                                                                                                                             |                                                                                                                                                                             |
| Ripple                          |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | <10%                                                                                                                                                                        |                                                                                                                                                                             |                                                                                                                                                                             |
| No Load Current                 |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | <10mA                                                                                                                                                                       |                                                                                                                                                                             |                                                                                                                                                                             |
| Max. Load Current               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | 200mA                                                                                                                                                                       |                                                                                                                                                                             |                                                                                                                                                                             |
| Leakage Current                 |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | <0.01mA                                                                                                                                                                     |                                                                                                                                                                             |                                                                                                                                                                             |
| Surge Current                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | -                                                                                                                                                                           |                                                                                                                                                                             |                                                                                                                                                                             |
| Min. Load Current               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | -                                                                                                                                                                           |                                                                                                                                                                             |                                                                                                                                                                             |
| Voltage Drop                    | <1.5V                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                         | <1.5V (10-30V) or <1.0V (5-36V)                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Frequency             |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | 2 KHz                                                                                                                                                                       |                                                                                                                                                                             |                                                                                                                                                                             |
| Response Time                   |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | 0.1ms/0.1ms                                                                                                                                                                 |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Hysteresis            |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | <15% (Sr)                                                                                                                                                                   |                                                                                                                                                                             |                                                                                                                                                                             |
| Repeat Accuracy                 |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | <1.0% (Sr)                                                                                                                                                                  |                                                                                                                                                                             |                                                                                                                                                                             |
| Protection Category             |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | IP67                                                                                                                                                                        |                                                                                                                                                                             |                                                                                                                                                                             |
| Operating Temperature           |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | -25°C - +70°C                                                                                                                                                               |                                                                                                                                                                             |                                                                                                                                                                             |
| Temperature Drift               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | <10% (Sr)                                                                                                                                                                   |                                                                                                                                                                             |                                                                                                                                                                             |
| Short Circuit Protection        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | Yes                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Overload Trip Point             |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | 220mA                                                                                                                                                                       |                                                                                                                                                                             |                                                                                                                                                                             |
| Time Delay Before Availability  |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | <10ms                                                                                                                                                                       |                                                                                                                                                                             |                                                                                                                                                                             |
| Shock / Vibration               |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                                                                                                           |                                                                                                                                                                             |                                                                                                                                                                             |
| Material Active Face            |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | POM                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Housing Material                |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         | Stainless Steel                                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| Part Numbers                    | Shielded                                                                                                                                                                | Unshielded                                                                                                                                                              | Shielded                                                                                                                                                                | Unshielded                                                                                                                                                                  | Shielded                                                                                                                                                                    | Unshielded                                                                                                                                                                  |
| DC 3 wire 10-30V NPN N.O.       | FCU1-D0401N-ACU3                                                                                                                                                        | FCU1-D0401N-ACU3/SN                                                                                                                                                     | FCU1-0501N-ACU3                                                                                                                                                         | FCU1-D0601N-ACR3                                                                                                                                                            | FCU1-D0601N-ACU3                                                                                                                                                            | FCU2-D0601N-ACU3                                                                                                                                                            |
| DC 3 wire 10-30V NPN N.C.       | FCU1-D0401N-BCU3                                                                                                                                                        | FCU1-D0401N-BCU3/SN                                                                                                                                                     | FCU1-0501N-BCU3                                                                                                                                                         | FCU1-D0601N-BCR3                                                                                                                                                            | FCU1-D0601N-BCU3                                                                                                                                                            | FCU2-D0601N-BCU3                                                                                                                                                            |
| DC 3 wire 10-30V PNP N.O.       | FCU1-D0401P-ACU3                                                                                                                                                        | FCU1-D0401P-ACU3/SN                                                                                                                                                     | FCU1-0501P-ACU3                                                                                                                                                         | FCU1-D0601P-ACR3                                                                                                                                                            | FCU1-D0601P-ACU3                                                                                                                                                            | FCU2-D0601P-ACU3                                                                                                                                                            |
| DC 3 wire 10-30V PNP N.C.       | FCU1-D0401P-BCU3                                                                                                                                                        | FCU1-D0401P-BCU3/SN                                                                                                                                                     | FCU1-0501P-BCU3                                                                                                                                                         | FCU1-D0601P-BCR3                                                                                                                                                            | FCU1-D0601P-BCU3                                                                                                                                                            | FCU2-D0601P-BCU3                                                                                                                                                            |
| DC 4 wire 10-30V Changeover NPN |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 4 wire 10-30V Changeover PNP |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 2 wire 10-60V N.O.           |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 2 wire 10-60V N.C.           |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.O.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             | ICU1-D061.5N-ACU3                                                                                                                                                           | ICU2-D061.5N-ACU3                                                                                                                                                           |
| DC 3 wire 5-36V NPN N.C.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             | ICU1-D061.5N-BCU3                                                                                                                                                           | ICU2-D061.5N-BCU3                                                                                                                                                           |
| DC 3 wire 5-36V PNP N.O.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             | ICU1-D061.5P-ACU3                                                                                                                                                           | ICU2-D061.5P-ACU3                                                                                                                                                           |
| DC 3 wire 5-36V PNP N.C.        |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             | ICU1-D061.5P-BCU3                                                                                                                                                           | ICU2-D061.5P-BCU3                                                                                                                                                           |
| DC 4 wire 5-36V Changeover NPN  |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| DC 4 wire 5-36V Changeover PNP  |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |                                                                                                                                                                             |
| Diagrams (units in mm)          |                                                                                      |                                                                                      |                                                                                      |                                                                                        |                                                                                        |                                                                                        |
|                                 |   |   |   |   |   |   |

|                                 | M8                                                                                  | M8                                                                                  | M8                                                                                  | M8                                                                                    | M8                                                                                    | M8                                                                                    |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |    |    |
| Sensing Distance                | 1 mm, 1.5 mm                                                                        | 2mm, 2.5 mm                                                                         | 1 mm, 1.5 mm                                                                        | 2mm, 2.5 mm                                                                           | 1 mm, 1.5 mm                                                                          | 2mm, 2.5 mm                                                                           |
| Operating Voltage               | 10-30 VDC or 5-36 VDC                                                               |                                                                                     | 10-30 or 10-60 or 5-36 VDC                                                          |                                                                                       | 10-30 VDC or 5-36 VDC                                                                 |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Switching Frequency             | 2 KHz                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Response Time                   | 0.1ms/0.1ms                                                                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Material Active Face            | POM                                                                                 |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Housing Material                | Stainless Steel                                                                     |                                                                                     | Chrome-plated Brass                                                                 |                                                                                       |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Unshielded                                                                          | Shielded                                                                            | Unshielded                                                                            | Shielded                                                                              | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | FCU1-0801N-ACS3                                                                     | FCU2-0802N-ACS3                                                                     | FCM1-0801N-ARU4                                                                     | FCM2-0802N-ARU4                                                                       | FCM1-0801N-ARS4                                                                       | FCM2-0802N-ARS4                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FCU1-0801N-BCS3                                                                     | FCU2-0802N-BCS3                                                                     | FCM1-0801N-BRU4                                                                     | FCM2-0802N-BRU4                                                                       | FCM1-0801N-BRS4                                                                       | FCM2-0802N-BRS4                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FCU1-0801P-ACS3                                                                     | FCU2-0802P-ACS3                                                                     | FCM1-0801P-ARU4                                                                     | FCM2-0802P-ARU4                                                                       | FCM1-0801P-ARS4                                                                       | FCM2-0802P-ARS4                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FCU1-0801P-BCS3                                                                     | FCU2-0802P-BCS3                                                                     | FCM1-0801P-BRU4                                                                     | FCM2-0802P-BRU4                                                                       | FCM1-0801P-BRS4                                                                       | FCM2-0802P-BRS4                                                                       |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     | FCM1-0801N-SRU4                                                                     | FCM2-0802N-SRU4                                                                       |                                                                                       |                                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     | FCM1-0801P-SRU4                                                                     | FCM2-0802P-SRU4                                                                       |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     | FCM1-0801C-ARU4                                                                     | FCM2-0802C-ARU4                                                                       |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     | FCM1-0801C-BRU4                                                                     | FCM2-0802C-BRU4                                                                       |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.O.        |                                                                                     |                                                                                     | ICM1-081.5N-ARU4                                                                    | ICM2-082.5N-ARU4                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.C.        |                                                                                     |                                                                                     | ICM1-081.5N-BRU4                                                                    | ICM2-082.5N-BRU4                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.O.        | ICU1-081.5P-ACS3                                                                    | ICU2-082.5P-ACS3                                                                    | ICM1-081.5P-ARU4                                                                    | ICM2-082.5P-ARU4                                                                      | ICM1-081.5P-ARS4                                                                      | ICM2-082.5P-ARS4                                                                      |
| DC 3 wire 5-36V PNP N.C.        | ICU1-081.5P-BCS3                                                                    | ICU2-082.5P-BCS3                                                                    | ICM1-081.5P-BRU4                                                                    | ICM2-082.5P-BRU4                                                                      | ICM1-081.5P-BRS4                                                                      | ICM2-082.5P-BRS4                                                                      |
| DC 4 wire 5-36V Changeover NPN  | ICU1-081.5N-SCS4                                                                    | ICU2-082.5N-SCS4                                                                    | ICM1-081.5N-SRU4                                                                    | ICM2-082.5N-SRU4                                                                      | ICM1-081.5N-SRS4                                                                      | ICM2-082.5N-SRS4                                                                      |
| DC 4 wire 5-36V Changeover PNP  | ICU1-081.5P-SCS4                                                                    | ICU2-082.5P-SCS4                                                                    | ICM1-081.5P-SRU4                                                                    | ICM2-082.5P-SRU4                                                                      | ICM1-081.5P-SRS4                                                                      | ICM2-082.5P-SRS4                                                                      |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
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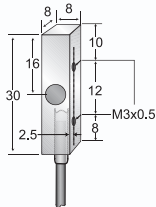
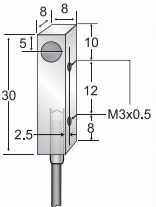
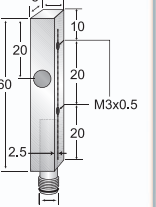
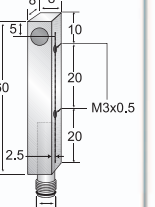
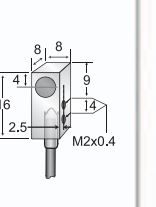
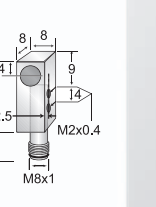


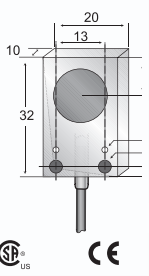
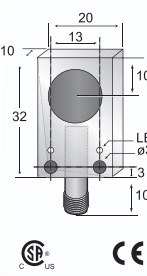
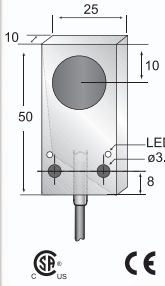
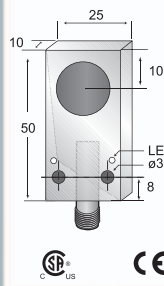
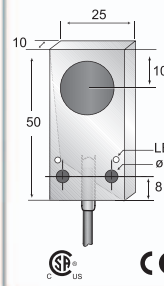
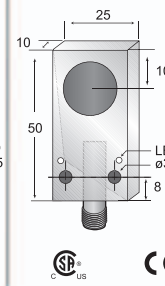
|                                 | M12                                                                                 | M12                                                                                 | M12                                                                                   | M12                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |
| Sensing Distance                | 2 mm                                                                                | 4 mm                                                                                | 2 mm                                                                                  | 4 mm                                                                                  |
| Operating Voltage               | 10-30 VDC or 10-60 VDC or 5-36 VDC                                                  |                                                                                     |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                     |                                                                                     |                                                                                       |                                                                                       |
| Switching Frequency             | 2 KHz                                                                               | 1 KHz                                                                               | 2 KHz                                                                                 | 1 KHz                                                                                 |
| Response Time                   | 0.1ms/0.1ms                                                                         | 0.2ms/0.2ms                                                                         | 0.1ms/0.1ms                                                                           | 0.2ms/0.2ms                                                                           |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                       |                                                                                       |
| Material Active Face            | POM                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Housing Material                | Chrome-plated Brass                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Unshielded                                                                          | Shielded                                                                              | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | FCM1-1202N-ARU4                                                                     | FCM2-1204N-ARU4                                                                     | FCM1-1202N-ARS4                                                                       | FCM2-1204N-ARS4                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FCM1-1202N-BRU4                                                                     | FCM2-1204N-BRU4                                                                     | FCM1-1202N-BRS4                                                                       | FCM2-1204N-BRS4                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FCM1-1202P-ARU4                                                                     | FCM2-1204P-ARU4                                                                     | FCM1-1202P-ARS4                                                                       | FCM2-1204P-ARS4                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FCM1-1202P-BRU4                                                                     | FCM2-1204P-BRU4                                                                     | FCM1-1202P-BRS4                                                                       | FCM2-1204P-BRS4                                                                       |
| DC 4 wire 10-30V Changeover NPN | FCM1-1202N-SRU4                                                                     | FCM2-1204N-SRU4                                                                     | FCM1-1202N-SRS4                                                                       | FCM2-1204N-SRS4                                                                       |
| DC 4 wire 10-30V Changeover PNP | FCM1-1202P-SRU4                                                                     | FCM2-1204P-SRU4                                                                     | FCM1-1202P-SRS4                                                                       | FCM2-1204P-SRS4                                                                       |
| DC 2 wire 10-60V N.O.           | FCM1-1202C-ARU4                                                                     | FCM2-1204C-ARU4                                                                     | FCM1-1202C-ARS4                                                                       | FCM2-1204C-ARS4                                                                       |
| DC 2 wire 10-60V N.C.           | FCM1-1202C-BRU4                                                                     | FCM2-1204C-BRU4                                                                     | FCM1-1202C-BRS4                                                                       | FCM2-1204C-BRS4                                                                       |
| DC 3 wire 5-36V NPN N.O.        | ICM1-1202N-ARU4                                                                     | ICM2-1204N-ARU4                                                                     | ICM1-1202N-ARS4                                                                       | ICM2-1204N-ARS4                                                                       |
| DC 3 wire 5-36V NPN N.C.        | ICM1-1202N-BRU4                                                                     | ICM2-1204N-BRU4                                                                     | ICM1-1202N-BRS4                                                                       | ICM2-1204N-BRS4                                                                       |
| DC 3 wire 5-36V PNP N.O.        | ICM1-1202P-ARU4                                                                     | ICM2-1204P-ARU4                                                                     | ICM1-1202P-ARS4                                                                       | ICM2-1204P-ARS4                                                                       |
| DC 3 wire 5-36V PNP N.C.        | ICM1-1202P-BRU4                                                                     | ICM2-1204P-BRU4                                                                     | ICM1-1202P-BRS4                                                                       | ICM2-1204P-BRS4                                                                       |
| DC 4 wire 5-36V Changeover NPN  | ICM1-1202N-SRU4                                                                     | ICM2-1204N-SRU4                                                                     | ICM1-1202N-SRS4                                                                       | ICM2-1204N-SRS4                                                                       |
| DC 4 wire 5-36V Changeover PNP  | ICM1-1202P-SRU4                                                                     | ICM2-1204P-SRU4                                                                     | ICM1-1202P-SRS4                                                                       | ICM2-1204P-SRS4                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                 |  |  |  |  |
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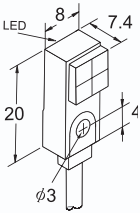
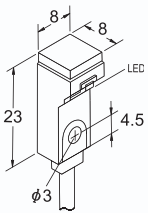
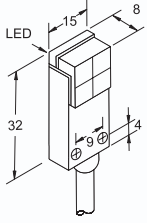
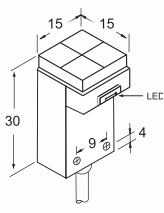
|                                 | M18                                                                                 | M18                                                                                 | M18                                                                                   | M18                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |
| Sensing Distance                | 5 mm                                                                                | 8 mm                                                                                | 5 mm                                                                                  | 8 mm                                                                                  |
| Operating Voltage               | 10-30 VDC or 10-60 VDC or 5-36 VDC                                                  |                                                                                     |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                     |                                                                                     |                                                                                       |                                                                                       |
| Switching Frequency             | 1 KHz                                                                               | 500 Hz                                                                              | 1 KHz                                                                                 | 500 Hz                                                                                |
| Response Time                   | 0.2ms/0.2ms                                                                         | 0.5ms/0.5ms                                                                         | 0.2ms/0.2ms                                                                           | 0.5ms/0.5ms                                                                           |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                       |                                                                                       |
| Material Active Face            | POM                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Housing Material                | Chrome-plated Brass                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Unshielded                                                                          | Shielded                                                                              | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | FCM1-1805N-ARU4                                                                     | FCM2-1808N-ARU4                                                                     | FCM1-1805N-ARS4                                                                       | FCM2-1808N-ARS4                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FCM1-1805N-BRU4                                                                     | FCM2-1808N-BRU4                                                                     | FCM1-1805N-BRS4                                                                       | FCM2-1808N-BRS4                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FCM1-1805P-ARU4                                                                     | FCM2-1808P-ARU4                                                                     | FCM1-1805P-ARS4                                                                       | FCM2-1808P-ARS4                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FCM1-1805P-BRU4                                                                     | FCM2-1808P-BRU4                                                                     | FCM1-1805P-BRS4                                                                       | FCM2-1808P-BRS4                                                                       |
| DC 4 wire 10-30V Changeover NPN | FCM1-1805N-SRU4                                                                     | FCM2-1808N-SRU4                                                                     | FCM1-1805N-SRS4                                                                       | FCM2-1808N-SRS4                                                                       |
| DC 4 wire 10-30V Changeover PNP | FCM1-1805P-SRU4                                                                     | FCM2-1808P-SRU4                                                                     | FCM1-1805P-SRS4                                                                       | FCM2-1808P-SRS4                                                                       |
| DC 2 wire 10-60V N.O.           | FCM1-1805C-ARU4                                                                     | FCM2-1808C-ARU4                                                                     | FCM1-1805C-ARS4                                                                       | FCM2-1808C-ARS4                                                                       |
| DC 2 wire 10-60V N.C.           | FCM1-1805C-BRU4                                                                     | FCM2-1808C-BRU4                                                                     | FCM1-1805C-BRS4                                                                       | FCM2-1808C-BRS4                                                                       |
| DC 3 wire 5-36V NPN N.O.        | ICM1-1805N-ARU4                                                                     | ICM2-1808N-ARU4                                                                     | ICM1-1805N-ARS4                                                                       | ICM2-1808N-ARS4                                                                       |
| DC 3 wire 5-36V NPN N.C.        | ICM1-1805N-BRU4                                                                     | ICM2-1808N-BRU4                                                                     | ICM1-1805N-BRS4                                                                       | ICM2-1808N-BRS4                                                                       |
| DC 3 wire 5-36V PNP N.O.        | ICM1-1805P-ARU4                                                                     | ICM2-1808P-ARU4                                                                     | ICM1-1805P-ARS4                                                                       | ICM2-1808P-ARS4                                                                       |
| DC 3 wire 5-36V PNP N.C.        | ICM1-1805P-BRU4                                                                     | ICM2-1808P-BRU4                                                                     | ICM1-1805P-BRS4                                                                       | ICM2-1808P-BRS4                                                                       |
| DC 4 wire 5-36V Changeover NPN  | ICM1-1805N-SRU4                                                                     | ICM2-1808N-SRU4                                                                     | ICM1-1805N-SRS4                                                                       | ICM2-1808N-SRS4                                                                       |
| DC 4 wire 5-36V Changeover PNP  | ICM1-1805P-SRU4                                                                     | ICM2-1808P-SRU4                                                                     | ICM1-1805P-SRS4                                                                       | ICM2-1808P-SRS4                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                 |  |  |  |  |
|                                 |  |  |  |  |

|                                 | M30                                                                                                                                                                     | M30                                                                                                                                                                     | M30                                                                                                                                                                         | M30                                                                                                                                                                         |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                        |                                                                                        |                                                                                          |                                                                                          |
| Sensing Distance                | 10 mm                                                                                                                                                                   | 15 mm                                                                                                                                                                   | 10 mm                                                                                                                                                                       | 15 mm                                                                                                                                                                       |
| Operating Voltage               | 10-30 VDC or 10-60 VDC or 5-36 VDC                                                                                                                                      |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Ripple                          | <10%                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| No Load Current                 | <10mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Max. Load Current               | 200mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Leakage Current                 | <0.01mA                                                                                                                                                                 |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Surge Current                   | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Min. Load Current               | -                                                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Switching Frequency             | 300 Hz                                                                                                                                                                  | 150 Hz                                                                                                                                                                  | 300 Hz                                                                                                                                                                      | 150 Hz                                                                                                                                                                      |
| Response Time                   | 0.5ms/0.5ms                                                                                                                                                             | 1ms/1ms                                                                                                                                                                 | 0.5ms/0.5ms                                                                                                                                                                 | 1ms/1ms                                                                                                                                                                     |
| Switching Hysteresis            | <15% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Repeat Accuracy                 | <1.0% (Sr)                                                                                                                                                              |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Protection Category             | IP67                                                                                                                                                                    |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Operating Temperature           | -25°C - +70°C                                                                                                                                                           |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Temperature Drift               | <10% (Sr)                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Short Circuit Protection        | Yes                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Overload Trip Point             | 220mA                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Time Delay Before Availability  | <10ms                                                                                                                                                                   |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                                                                                                       |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Material Active Face            | POM                                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Housing Material                | Chrome-plated Brass                                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
| Part Numbers                    | Shielded                                                                                                                                                                | Unshielded                                                                                                                                                              | Shielded                                                                                                                                                                    | Unshielded                                                                                                                                                                  |
| DC 3 wire 10-30V NPN N.O.       | FCM1-3010N-ARU4                                                                                                                                                         | FCM2-3015N-ARU4                                                                                                                                                         | FCM1-3010N-ARS4                                                                                                                                                             | FCM2-3015N-ARS4                                                                                                                                                             |
| DC 3 wire 10-30V NPN N.C.       | FCM1-3010N-BRU4                                                                                                                                                         | FCM2-3015N-BRU4                                                                                                                                                         | FCM1-3010N-BRS4                                                                                                                                                             | FCM2-3015N-BRS4                                                                                                                                                             |
| DC 3 wire 10-30V PNP N.O.       | FCM1-3010P-ARU4                                                                                                                                                         | FCM2-3015P-ARU4                                                                                                                                                         | FCM1-3010P-ARS4                                                                                                                                                             | FCM2-3015P-ARS4                                                                                                                                                             |
| DC 3 wire 10-30V PNP N.C.       | FCM1-3010P-BRU4                                                                                                                                                         | FCM2-3015P-BRU4                                                                                                                                                         | FCM1-3010P-BRS4                                                                                                                                                             | FCM2-3015P-BRS4                                                                                                                                                             |
| DC 4 wire 10-30V Changeover NPN | FCM1-3010N-SRU4                                                                                                                                                         | FCM2-3015N-SRU4                                                                                                                                                         | FCM1-3010N-SRS4                                                                                                                                                             | FCM2-3015N-SRS4                                                                                                                                                             |
| DC 4 wire 10-30V Changeover PNP | FCM1-3010P-SRU4                                                                                                                                                         | FCM2-3015P-SRU4                                                                                                                                                         | FCM1-3010P-SRS4                                                                                                                                                             | FCM2-3015P-SRS4                                                                                                                                                             |
| DC 2 wire 10-60V N.O.           | FCM1-3010C-ARU4                                                                                                                                                         | FCM2-3015C-ARU4                                                                                                                                                         | FCM1-3010C-ARS4                                                                                                                                                             | FCM2-3015C-ARS4                                                                                                                                                             |
| DC 2 wire 10-60V N.C.           | FCM1-3010C-BRU4                                                                                                                                                         | FCM2-3015C-BRU4                                                                                                                                                         | FCM1-3010C-BRS4                                                                                                                                                             | FCM2-3015C-BRS4                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.O.        | ICM1-3010N-ARU4                                                                                                                                                         | ICM2-3015N-ARU4                                                                                                                                                         | ICM1-3010N-ARS4                                                                                                                                                             | ICM2-3015N-ARS4                                                                                                                                                             |
| DC 3 wire 5-36V NPN N.C.        | ICM1-3010N-BRU4                                                                                                                                                         | ICM2-3015N-BRU4                                                                                                                                                         | ICM1-3010N-BRS4                                                                                                                                                             | ICM2-3015N-BRS4                                                                                                                                                             |
| DC 3 wire 5-36V PNP N.O.        | ICM1-3010P-ARU4                                                                                                                                                         | ICM2-3015P-ARU4                                                                                                                                                         | ICM1-3010P-ARS4                                                                                                                                                             | ICM2-3015P-ARS4                                                                                                                                                             |
| DC 3 wire 5-36V PNP N.C.        | ICM1-3010P-BRU4                                                                                                                                                         | ICM2-3015P-BRU4                                                                                                                                                         | ICM1-3010P-BRS4                                                                                                                                                             | ICM2-3015P-BRS4                                                                                                                                                             |
| DC 4 wire 5-36V Changeover NPN  | ICM1-3010N-SRU4                                                                                                                                                         | ICM2-3015N-SRU4                                                                                                                                                         | ICM1-3010N-SRS4                                                                                                                                                             | ICM2-3015N-SRS4                                                                                                                                                             |
| DC 4 wire 5-36V Changeover PNP  | ICM1-3010P-SRU4                                                                                                                                                         | ICM2-3015P-SRU4                                                                                                                                                         | ICM1-3010P-SRS4                                                                                                                                                             | ICM2-3015P-SRS4                                                                                                                                                             |
| Diagrams (units in mm)          |                                                                                                                                                                         |                                                                                                                                                                         |                                                                                                                                                                             |                                                                                                                                                                             |
|                                 |                                                                                      |                                                                                      |                                                                                        |                                                                                        |
|                                 |   |   |   |   |

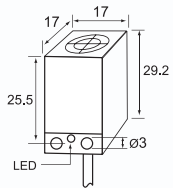
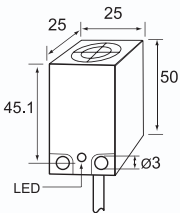
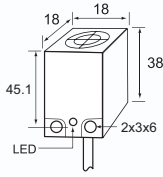
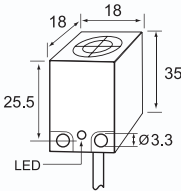


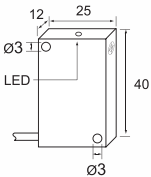
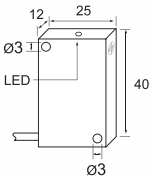
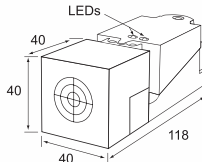
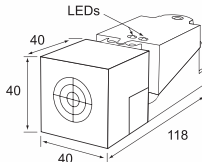
|                                 | Q8                                                                                  | Q8                                                                                  | Q8                                                                                  | Q8                                                                                    | Q8                                                                                    | Q8                                                                                    |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |    |    |
| Sensing Distance                | 1.0 mm                                                                              | 1.0 mm                                                                              | 1.0 mm                                                                              | 1.0 mm                                                                                | 1.0 mm                                                                                | 1.0 mm                                                                                |
| Operating Voltage               | 10-30 VDC                                                                           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V (10-30V)                                                                      |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Switching Frequency             | 2 KHz                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Response Time                   | 0.1ms/0.1ms                                                                         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Material Active Face            | POM                                                                                 |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Housing Material                | Nickel-plated Brass                                                                 |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Shielded                                                                            | Shielded                                                                            | Shielded                                                                              | Shielded                                                                              | Shielded                                                                              |
| DC 3 wire 10-30V NPN N.O.       | FQM1-8801N-A3S2M                                                                    | FQM1-8801N-A3S2T                                                                    | FQM1-8801N-ACU3M                                                                    | FQM1-8801N-ACU3T                                                                      | FQM1-8801N-A3R2T                                                                      | FQM1-8801N-ACR3T                                                                      |
| DC 3 wire 10-30V NPN N.C.       | FQM1-8801N-B3S2M                                                                    | FQM1-8801N-B3S2T                                                                    | FQM1-8801N-BCU3M                                                                    | FQM1-8801N-BCU3T                                                                      | FQM1-8801N-B3R2T                                                                      | FQM1-8801N-BCR3T                                                                      |
| DC 3 wire 10-30V PNP N.O.       | FQM1-8801P-A3S2M                                                                    | FQM1-8801P-A3S2T                                                                    | FQM1-8801P-ACU3M                                                                    | FQM1-8801P-ACU3T                                                                      | FQM1-8801P-A3R2T                                                                      | FQM1-8801P-ACR3T                                                                      |
| DC 3 wire 10-30V PNP N.C.       | FQM1-8801P-B3S2M                                                                    | FQM1-8801P-B3S2T                                                                    | FQM1-8801P-BCU3M                                                                    | FQM1-8801P-BCU3T                                                                      | FQM1-8801P-B3R2T                                                                      | FQM1-8801P-BCR3T                                                                      |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.O.        |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.C.        |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.O.        |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.C.        |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover NPN  |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover PNP  |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| Diagrams (units in mm)          |  |  |  |  |  |  |
|                                 |  |  |  |  |  |  |

|                                 | Q32                                                                                 | Q32                                                                                 | Q2505                                                                               | Q2505                                                                                | Q2508                                                                                 | Q2508                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |   |    |    |
| Sensing Distance                | 5.0 mm                                                                              | 5.0 mm                                                                              | 5.0 mm                                                                              | 5.0 mm                                                                               | 8.0 mm                                                                                | 8.0 mm                                                                                |
| Operating Voltage               | 10-30 VDC or 10-60 VDC or 5-36 VDC                                                  |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V (10-30VDC) or <1.0V (5-36VDC)                                                 |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Switching Frequency             | 2 KHz                                                                               |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Response Time                   | 0.1ms/0.1ms                                                                         |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Material Active Face            | POM                                                                                 |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Housing Material                | Nickel-plated Brass                                                                 |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Shielded                                                                            | Shielded                                                                            | Shielded                                                                             | Shielded                                                                              | Shielded                                                                              |
| DC 3 wire 10-30V NPN N.O.       | FQM1-Q3205N-A3U2T                                                                   | FQM1-Q3205N-ACU3                                                                    | FQM1-2505N-A3U2T                                                                    | FQM1-2505N-ACU3                                                                      | EQM1-2508N-A3U2T                                                                      | EQM1-2508N-ACU3                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FQM1-Q3205N-B3U2T                                                                   | FQM1-Q3205N-BCU3                                                                    | FQM1-2505N-B3U2T                                                                    | FQM1-2505N-BCU3                                                                      | EQM1-2508N-B3U2T                                                                      | EQM1-2508N-BCU3                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FQM1-Q3205P-A3U2T                                                                   | FQM1-Q3205P-ACU3                                                                    | FQM1-2505P-A3U2T                                                                    | FQM1-2505P-ACU3                                                                      | EQM1-2508P-A3U2T                                                                      | EQM1-2508P-ACU3                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FQM1-Q3205P-B3U2T                                                                   | FQM1-Q3205P-BCU3                                                                    | FQM1-2505P-B3U2T                                                                    | FQM1-2505P-BCU3                                                                      | EQM1-2508P-B3U2T                                                                      | EQM1-2508P-BCU3                                                                       |
| DC 4 wire 10-30V Changeover NPN | FQM1-Q3205N-S4U2T                                                                   | FQM1-Q3205N-SCU4                                                                    | FQM1-2505N-S4U2T                                                                    | FQM1-2505N-SCU3                                                                      | EQM1-2508N-S4U2T                                                                      | EQM1-2508N-SCU3                                                                       |
| DC 4 wire 10-30V Changeover PNP | FQM1-Q3205P-S4U2T                                                                   | FQM1-Q3205P-SCU4                                                                    | FQM1-2505P-S4U2T                                                                    | FQM1-2505P-SCU3                                                                      | EQM1-2508P-S4U2T                                                                      | EQM1-2508P-SCU3                                                                       |
| DC 2 wire 10-60V N.O.           | FQM1-Q3205C-A2U2T                                                                   | FQM1-Q3205C-ACU3                                                                    | FQM1-2505C-A2U2T                                                                    | FQM1-2505C-ACU3                                                                      | EQM1-2508C-A2U2T                                                                      | EQM1-2508C-ACU3                                                                       |
| DC 2 wire 10-60V N.C.           | FQM1-Q3205C-B2U2T                                                                   | FQM1-Q3205C-BCU3                                                                    | FQM1-2505C-B2U2T                                                                    | FQM1-2505C-BCU3                                                                      | EQM1-2508C-B2U2T                                                                      | EQM1-2508C-BCU3                                                                       |
| DC 3 wire 5-36V NPN N.O.        | IQM1-Q3205N-A3U2T                                                                   | IQM1-Q3205N-ACU3                                                                    | IQM1-2505N-A3U2T                                                                    | IQM1-2505N-ACU3                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.C.        | IQM1-Q3205N-B3U2T                                                                   | IQM1-Q3205N-BCU3                                                                    | IQM1-2505N-B3U2T                                                                    | IQM1-2505N-BCU3                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.O.        | IQM1-Q3205P-A3U2T                                                                   | IQM1-Q3205P-ACU3                                                                    | IQM1-2505P-A3U2T                                                                    | IQM1-2505P-ACU3                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.C.        | IQM1-Q3205P-B3U2T                                                                   | IQM1-Q3205P-BCU3                                                                    | IQM1-2505P-B3U2T                                                                    | IQM1-2505P-BCU3                                                                      |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover NPN  | IQM1-Q3205N-S4U2T                                                                   | IQM1-Q3205N-SCU4                                                                    | IQM1-2505N-S4U2T                                                                    | IQM1-2505N-SCU3                                                                      |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover PNP  | IQM1-Q3205P-S4U2T                                                                   | IQM1-Q3205P-SCU4                                                                    | IQM1-2505P-S4U2T                                                                    | IQM1-2505P-SCU3                                                                      |                                                                                       |                                                                                       |
| Diagrams (units in mm)          |  |  |  |  |  |  |

|                                 | 8mm                                                                                 | 8mm                                                                                 | 15mm                                                                                  | 15mm                                                                                  |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |
| Sensing Distance                | 2.5 mm                                                                              | 2.5 mm                                                                              | 4 mm                                                                                  | 4 mm                                                                                  |
| Operating Voltage               | 10-30 VDC                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V (10-30V) or <1.0V (5-36V)                                                     |                                                                                     |                                                                                       |                                                                                       |
| Switching Frequency             | 500 Hz                                                                              | 500 Hz                                                                              | 250 Hz                                                                                | 250 Hz                                                                                |
| Response Time                   | 0.5ms/0.5ms                                                                         | 0.5ms/0.5ms                                                                         | 1.0ms/1.0ms                                                                           | 1.0ms/1.0ms                                                                           |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                       |                                                                                       |
| Material Active Face            | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Housing Material                | Polycarbonate                                                                       |                                                                                     |                                                                                       |                                                                                       |
| Part Numbers                    | Unshielded                                                                          | Unshielded                                                                          | Unshielded                                                                            | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | MQP2-882.5N-A3U5F                                                                   | MQP2-882.5N-A3U5T                                                                   | MQP2-1504N-A3U5F                                                                      | MQP2-1504N-A3U5T                                                                      |
| DC 3 wire 10-30V NPN N.C.       | MQP2-882.5N-B3U5F                                                                   | MQP2-882.5N-B3U5T                                                                   | MQP2-1504N-B3U5F                                                                      | MQP2-1504N-B3U5T                                                                      |
| DC 3 wire 10-30V PNP N.O.       | MQP2-882.5P-A3U5F                                                                   | MQP2-882.5P-A3U5T                                                                   | MQP2-1504P-A3U5F                                                                      | MQP2-1504P-A3U5T                                                                      |
| DC 3 wire 10-30V PNP N.C.       | MQP2-882.5P-B3U5F                                                                   | MQP2-882.5P-B3U5T                                                                   | MQP2-1504P-B3U5F                                                                      | MQP2-1504P-B3U5T                                                                      |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.O.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.C.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.O.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.C.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover NPN  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover PNP  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                 |  |  |  |  |



|                                 | Q16                                                                                 | Q25                                                                                 | Q18A                                                                                  | Q18                                                                                   |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |
| Sensing Distance                | 4 mm                                                                                | 10 mm                                                                               | 4 mm                                                                                  | 4 mm                                                                                  |
| Operating Voltage               | 10-30 VDC                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Switching Frequency             | 500 Hz                                                                              | 300 Hz                                                                              | 500 Hz                                                                                | 500 Hz                                                                                |
| Response Time                   | 0.5ms/0.5ms                                                                         | 1.0ms/1.0ms                                                                         | 0.5ms/0.5ms                                                                           | 0.5ms/0.5ms                                                                           |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                       |                                                                                       |
| Material Active Face            | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Housing Material                | ABS Resin                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Part Numbers                    | Unshielded                                                                          | Shielded                                                                            | Unshielded                                                                            | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | FQP2-1604N-A3U2                                                                     | FQP1-2510N-A3U2F                                                                    | FQP2-18A04N-A3U2                                                                      | FQP2-1804N-A3U2                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FQP2-1604N-B3U2                                                                     | FQP1-2510N-B3U2F                                                                    | FQP2-18A04N-B3U2                                                                      | FQP2-1804N-B3U2                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FQP2-1604P-A3U2                                                                     | FQP1-2510P-A3U2F                                                                    | FQP2-18A04P-A3U2                                                                      | FQP2-1804P-A3U2                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FQP2-1604P-B3U2                                                                     | FQP1-2510P-B3U2F                                                                    | FQP2-18A04P-B3U2                                                                      | FQP2-1804P-B3U2                                                                       |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.O.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.C.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.O.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.C.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover NPN  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover PNP  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Diagrams (units in mm)          |  |  |  |  |

|                                 | Q25x40x12                                                                           | Q25x40x12                                                                           | 5-Way                                                                                 | 5-Way                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |    |    |
| Sensing Distance                | 2 mm                                                                                | 4mm                                                                                 | 15mm                                                                                  | 30mm                                                                                  |
| Operating Voltage               | 10-30 VDC                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Ripple                          | <10%                                                                                |                                                                                     |                                                                                       |                                                                                       |
| No Load Current                 | <10mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Max. Load Current               | 200mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Leakage Current                 | <0.01mA                                                                             |                                                                                     |                                                                                       |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Min. Load Current               | -                                                                                   |                                                                                     |                                                                                       |                                                                                       |
| Voltage Drop                    | <1.5V                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Switching Frequency             | 300 Hz                                                                              | 100 Hz                                                                              | 100 Hz                                                                                | 100 Hz                                                                                |
| Response Time                   | 0.5ms/0.5ms                                                                         | 1.0ms/1.0ms                                                                         | 1.0ms/1.0ms                                                                           | 1.0ms/1.0ms                                                                           |
| Switching Hysteresis            | <15% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                       |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                       |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                       |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                       |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                       |                                                                                       |
| Overload Trip Point             | 220mA                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Time Delay Before Availability  | <10ms                                                                               |                                                                                     |                                                                                       |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & 7.4.2                                                   |                                                                                     |                                                                                       |                                                                                       |
| Connection                      | 2 meter cable                                                                       |                                                                                     | 1/2"-14 NPT or PG13.5                                                                 |                                                                                       |
| Housing Material                | ABS                                                                                 |                                                                                     | PBT                                                                                   |                                                                                       |
| Part Numbers                    | Shielded                                                                            | Unshielded                                                                          | Shielded                                                                              | Unshielded                                                                            |
| DC 3 wire 10-30V NPN N.O.       | FQP1-4002N-A3U2                                                                     | FQP2-4004N-A3U2                                                                     | FQP1-4015N-A3U                                                                        | FQP2-4030N-A3U2                                                                       |
| DC 3 wire 10-30V NPN N.C.       | FQP1-4002N-B3U2                                                                     | FQP2-4004N-B3U2                                                                     | FQP1-4015N-B3U                                                                        | FQP2-4030N-B3U2                                                                       |
| DC 3 wire 10-30V PNP N.O.       | FQP1-4002P-A3U2                                                                     | FQP2-4004P-A3U2                                                                     | FQP1-4015P-A3U                                                                        | FQP2-4030P-A3U2                                                                       |
| DC 3 wire 10-30V PNP N.C.       | FQP1-4002P-B3U2                                                                     | FQP2-4004P-B3U2                                                                     | FQP1-4015P-B3U                                                                        | FQP2-4030P-B3U2                                                                       |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     |                                                                                       | FQP2-4030N-SRU4                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     |                                                                                       | FQP2-4030P-SRU4                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.O.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V NPN N.C.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.O.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 3 wire 5-36V PNP N.C.        |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover NPN  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| DC 4 wire 5-36V Changeover PNP  |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Diagrams (units in mm)          |  |  |  |  |

22

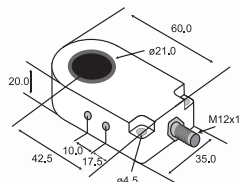
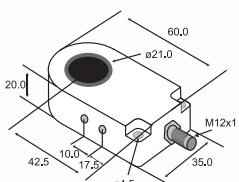
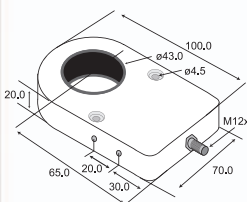
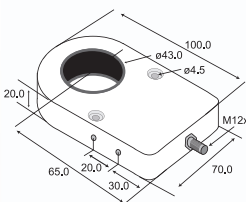


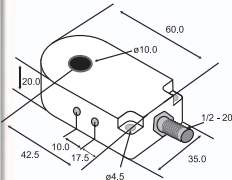
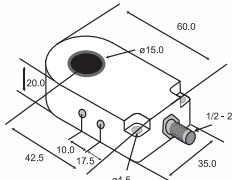
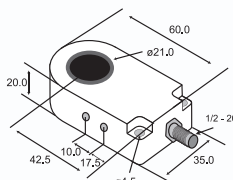
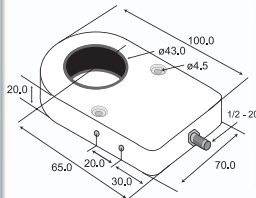


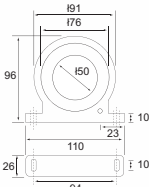
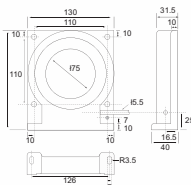
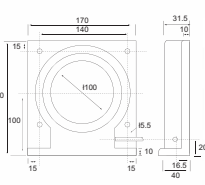
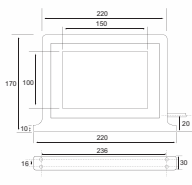
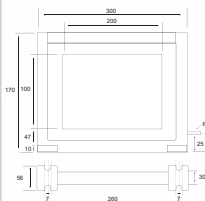
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|                                 | 21mm                                                                                | 21mm                                                                                | 43mm                                                                                 | 43mm                                                                                  |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |   |    |
| Min. Target Size                | D=6mm; L=12mm                                                                       | D=6mm; L=12mm                                                                       | D=9mm; L=18mm                                                                        | D=9mm; L=18mm                                                                         |
| Operating Voltage & Ripple      | 10-60 VDC (Ripple ≤ 10%)                                                            | 10-30 VDC (Ripple ≤ 10%)                                                            | 10-60 VDC (Ripple ≤ 10%)                                                             | 10-30 VDC (Ripple ≤ 10%)                                                              |
| No Load Current                 | ≤1.8mA                                                                              | ≤15mA                                                                               | ≤1.8mA                                                                               | ≤15mA                                                                                 |
| Max. Load Current               | ≤100mA                                                                              | ≤200mA                                                                              | ≤100mA                                                                               | ≤200mA                                                                                |
| Leakage Current                 | ≤1.2mA                                                                              | ≤10µA                                                                               | ≤1.2mA                                                                               | ≤10µA                                                                                 |
| Min. Load Current               | 3mA                                                                                 | -                                                                                   | 3mA                                                                                  | -                                                                                     |
| Voltage Drop                    | <6V at 100mA                                                                        | ≤1.5V at 200mA                                                                      | <6V at 100mA                                                                         | ≤1.5V at 200mA                                                                        |
| Overload Trip Point             | 120-150mA                                                                           | 220-280mA                                                                           | 120-150mA                                                                            | 220-280mA                                                                             |
| Switching Frequency             | 1KHz                                                                                |                                                                                     | 500Hz                                                                                |                                                                                       |
| Surge Current                   | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| Min. Time Between Objects       | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| Pulse Duration                  | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| Switching Hysteresis            | 15%                                                                                 |                                                                                     |                                                                                      |                                                                                       |
| Repeat Accuracy                 | ≤ 2% of rated operating distance                                                    |                                                                                     |                                                                                      |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                      |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                      |                                                                                       |
| Temperature Drift               | ±10% (sr)                                                                           |                                                                                     |                                                                                      |                                                                                       |
| Reverse Polarity Protection     | Yes                                                                                 |                                                                                     |                                                                                      |                                                                                       |
| Short Circuit Protection        | Yes                                                                                 |                                                                                     |                                                                                      |                                                                                       |
| EMC                             | RFI>3V/m / EFT>1KV / ESD>4KV (contact)                                              |                                                                                     |                                                                                      |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     |                                                                                      |                                                                                       |
| Housing Material                |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| Part Numbers                    |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 3 wire 10-30V NPN N.O.       |                                                                                     | RRP2-R2120N-ARU4                                                                    |                                                                                      | RRP2-R4320N-ARU4                                                                      |
| DC 3 wire 10-30V NPN N.C.       |                                                                                     | RRP2-R2120N-BRU4                                                                    |                                                                                      | RRP2-R4320N-BRU4                                                                      |
| DC 3 wire 10-30V PNP N.O.       |                                                                                     | RRP2-R2120P-ARU4                                                                    |                                                                                      | RRP2-R4320P-ARU4                                                                      |
| DC 3 wire 10-30V PNP N.C.       |                                                                                     | RRP2-R2120P-BRU4                                                                    |                                                                                      | RRP2-R4320P-BRU4                                                                      |
| DC 4 wire 10-30V Changeover NPN |                                                                                     | RRP2-R2120N-SRU4                                                                    |                                                                                      | RRP2-R4320N-SRU4                                                                      |
| DC 4 wire 10-30V Changeover PNP |                                                                                     | RRP2-R2120P-SRU4                                                                    |                                                                                      | RRP2-R4320P-SRU4                                                                      |
| DC 2 wire 10-60V N.O.           | RRP2-R2120C-ARU4                                                                    |                                                                                     | RRP2-R4320C-ARU4                                                                     |                                                                                       |
| DC 2 wire 10-60V N.C.           | RRP2-R2120C-BRU4                                                                    |                                                                                     | RRP2-R4320C-BRU4                                                                     |                                                                                       |
| AC 2 wire 20-250V N.O.          |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| AC 2 wire 20-250V N.C.          |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| NAMUR                           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|                                 |  |  |  |  |

|                                 | 10mm                                                                                | 15mm                                                                                | 21mm                                                                                 | 43mm                                                                                  |
|---------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                 |    |    |   |    |
| Min. Target Size                | D=2.5mm; L=4mm                                                                      | D=3mm; L=6mm                                                                        | D=6mm; L=12mm                                                                        | D=9mm; L=18mm                                                                         |
| Operating Voltage & Ripple      | 10-250 VAC                                                                          |                                                                                     |                                                                                      |                                                                                       |
| Min. Time Between Objects       | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| No Load Current                 | ≤1.8mA                                                                              |                                                                                     |                                                                                      |                                                                                       |
| Max. Load Current               | ≤400mA                                                                              |                                                                                     |                                                                                      |                                                                                       |
| Leakage Current                 | ≤1.8mA                                                                              |                                                                                     |                                                                                      |                                                                                       |
| Surge Current                   | 5mA (20ms)                                                                          |                                                                                     |                                                                                      |                                                                                       |
| Min. Load Current               | 5mA                                                                                 |                                                                                     |                                                                                      |                                                                                       |
| Voltage Drop                    | <8 VAC at 400mA                                                                     |                                                                                     |                                                                                      |                                                                                       |
| Switching Frequency             | 8Hz                                                                                 |                                                                                     |                                                                                      |                                                                                       |
| Pulse Duration                  | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| Switching Hysteresis            | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| Repeat Accuracy                 | <1.0% (Sr)                                                                          |                                                                                     |                                                                                      |                                                                                       |
| Protection Category             | IP67                                                                                |                                                                                     |                                                                                      |                                                                                       |
| Operating Temperature           | -25°C - +70°C                                                                       |                                                                                     |                                                                                      |                                                                                       |
| Temperature Drift               | <10% (Sr)                                                                           |                                                                                     |                                                                                      |                                                                                       |
| Reverse Polarity Protection     | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| Short Circuit Protection        | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| Overload Trip Point             | -                                                                                   |                                                                                     |                                                                                      |                                                                                       |
| EMC                             | RFI>3V/m / EFT>1KV / ESD>4KV (contact)                                              |                                                                                     |                                                                                      |                                                                                       |
| Shock / Vibration               | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     |                                                                                      |                                                                                       |
| Housing Material                |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| Part Numbers                    |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 3 wire 10-30V NPN N.O.       |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 3 wire 10-30V NPN N.C.       |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 3 wire 10-30V PNP N.O.       |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 3 wire 10-30V PNP N.C.       |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 4 wire 10-30V Changeover NPN |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 4 wire 10-30V Changeover PNP |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 2 wire 10-60V N.O.           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| DC 2 wire 10-60V N.C.           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| AC 2 wire 20-250V N.O.          | RRP2-R1020A-AUL3                                                                    | RRP2-R1520A-AUL3                                                                    | RRP2-R2120A-AUL3                                                                     | RRP2-R4320A-AUL3                                                                      |
| AC 2 wire 20-250V N.C.          | RRP2-R1020A-BUL3                                                                    | RRP2-R1520A-BUL3                                                                    | RRP2-R2120A-BUL3                                                                     | RRP2-R4320A-BUL3                                                                      |
| NAMUR                           |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
| Diagrams (units in mm)          |                                                                                     |                                                                                     |                                                                                      |                                                                                       |
|                                 |  |  |  |  |

|                          |         | MDS-D050                                                                            | MDS-D075                                                                            | MDS-D100                                                                             | MSR-150                                                                               | MSR-200                                                                               |
|--------------------------|---------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Image                    |         |    |    |     |    |    |
| Detection Area           |         | ø50mm                                                                               | ø75mm                                                                               | ø100                                                                                 | ø150                                                                                  | ø200                                                                                  |
| Detectin Object          |         | Moving Ferrous Metal                                                                |                                                                                     |                                                                                      | Magnetic Metal                                                                        |                                                                                       |
| Min. Target (steel Ball) |         | ø2.0mm                                                                              | ø2.5mm                                                                              | ø3.0mm                                                                               | ø5.0mm                                                                                | ø7.0mm                                                                                |
| Operating Temperature    |         | -25°C...+70°C (-13°F...+158°F) without icing                                        |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Operating Humidity       |         | 35...90%RH                                                                          |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Isolate Resistance       |         | Except for exposed head and isolate wire with connection                            |                                                                                     |                                                                                      | 50 MΩ                                                                                 |                                                                                       |
| Voltage Resistance       |         | Except for exposed head and isolate wire with connection                            |                                                                                     |                                                                                      | AC1,000V/1min.                                                                        |                                                                                       |
| Vibration Resistance     |         | 10 to 55Hz, 1.5mm double amplitude in X, Y and Z directions, 2 hours respectively   |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Shock Immunity           |         | 50G in X, Y and Z directions, 3 times respectively                                  |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Cable                    |         | 3m coacial cable                                                                    |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Weight                   |         | 430g                                                                                | 800g                                                                                | 1200g                                                                                | 1300g                                                                                 | 2100g                                                                                 |
| Protection Category      |         | IP67                                                                                |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Material                 | Housing | Aluminum                                                                            |                                                                                     |                                                                                      | ABS                                                                                   | Aluminum                                                                              |
|                          | Face    | ABS                                                                                 |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| Diagram                  |         |  |  |  |  |  |

**Control Unit**

| Image                                                                               | Power Supply               | Output                                                                                | Part #  |
|-------------------------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------|---------|
|  | AC 110 / 220V<br>50 / 60Hz | Relay Contacts: SPDT AC250V 2A / DC 30V 3A<br>Solid State: Open-Collect or 100mA Max. | MDA-001 |



## CAPACITIVE PROXIMITY SENSORS

Capacitive Proximity Sensors detect all materials, including liquids, powders and metallic and non-metallic solids. These sensors are often used to control the levels of pellets, liquids and powders in production control.

Like their inductive counterparts, they are manufactured in shielded and non-shielded configurations and are available in both AC and DC power formats. The shielded models are used to detect solid products such as cartons, stacks of paper, wood or liquids through the wall of a non-metallic container. The non-shielded models are used to detect liquids or powders where the product flows around the sensor. Shielded models have a shorter detection range since part of the field is lost in the shielding process.

All detection ranges given on the following pages are for a steel target which is equal to, or larger than the diameter of the sensor. Non-conductive products, such as wood or plastic, will be detected at a reduced detection range. The range at which a product is detected is directly related to the dielectric constant of the material; the greater the dielectric constant, the greater the detection range.

### SHIELDED CONFIGURATION:



Shielded sensors have a straight-line electrical field. They scan for the presence of solids (e.g. wafers, components, PCB's, hybrids, cartons, bottles, plastic blocks and stacks of paper) at a distance. Shielded capacitive sensors can also detect liquids through a separating wall (glass or plastic up to a maximum of 4mm thick).

### NON-SHIELDED CONFIGURATION:



Non-shielded sensors have a spherical electrical field. They are designed to touch the product with their active surface. They are used to detect mainly bulk goods or liquids (e.g. granulate, sugar, flour, corn, sand, oil, water or pastes).

### SENSITIVITY ADJUSTMENT

All capacitive models have an adjustable sensitivity that allows the calibration to be made in the field. This allows the sensitivity to be set for the target desired; for example, the sensitivity can be reduced to ignore a glass container but still detect the liquid inside the container. Similarly, the sensitivity can be reduced to ignore a build-up of a viscous product such as honey while still detecting the level when a large amount of the product reaches the sensor.

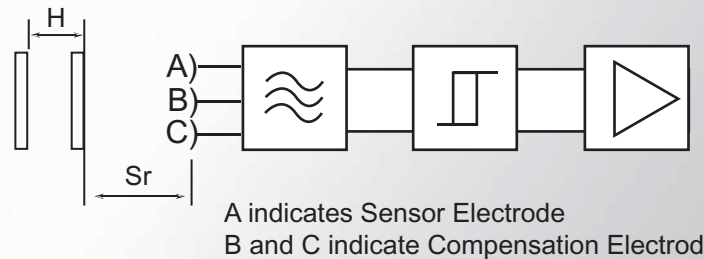
To adjust the sensitivity on a Capacitive Proximity Sensor, mount the sensor in the working position. Allow the target material to reach the position where detection should take place. If the material has not been detected, rotate the sensitivity potentiometer clockwise, with the screwdriver provided, until detection first occurs (LED will illuminate). Continue to rotate the potentiometer for another 1/4 turn. Remove the target material and ensure that the sensor turns OFF (LED will turn off). If the sensor turns OFF, leave the sensitivity at that position. If the sensor remains ON, decrease the sensitivity (counterclockwise rotation) until the sensor turns OFF. For best results, position the sensitivity potentiometer half way between these two points.

## CAPACITIVE SENSOR OSCILLATOR CIRCUIT

Capacitive proximity sensors consist of an RC-oscillator with a special multi-part sensing electrode. The electrode and the oscillator circuit have a tube connected with earth potential for lateral shielding. This enables flush mounting of sensor in metal, since the electrical field is only present in front of the sensing electrode. This field is the active zone of the sensor.

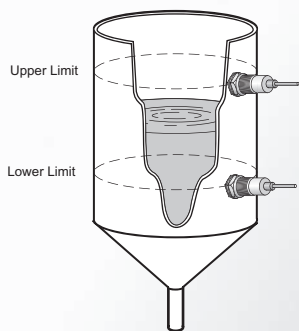
When the conductive material is removed from the active zone, the oscillator is undamped and the oscillation amplitude decreases. The amplifier of the oscillator voltage and the sensitivity of the sensor can be altered by the built-in potentiometer.

The middle electrode together with the built-in re-coupling gives very effective compensation under conditions of humidity, dust or icing. Special circuitry automatically compensates for these influences. The preset sensing distance remains nearly constant. The electrode design, along with the compensating circuitry of capacitive sensors, is a unique design, and provides performance advantages far superior to other capacitive sensors.



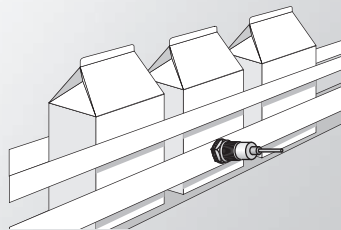
**Capacitive Switch Block Diagram**

## APPLICATIONS FOR CAPACITIVE PROXIMITY SENSORS



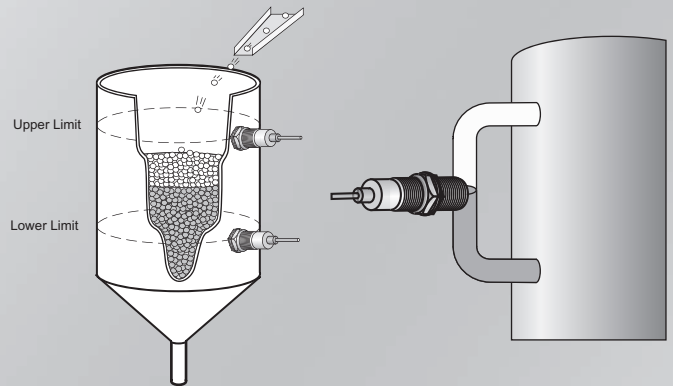
### Liquid Level Control

Capacitive Proximity Sensors reliably detect liquid levels.



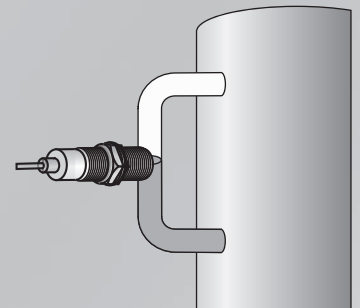
### Carton Detection

The packaging industry relies on Capacitive sensors to detect paper and cardboard cartons.



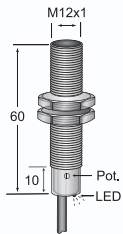
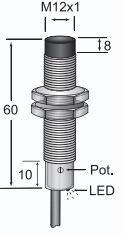
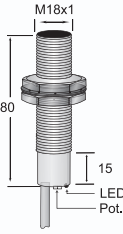
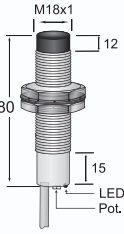
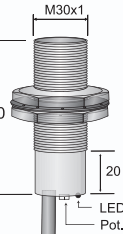
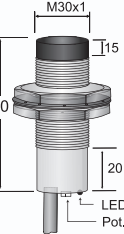
### Bin Level Control

Capacitive Sensors can detect liquids, powders, plastic pellets and pastes for level control.

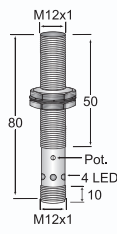
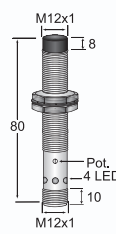
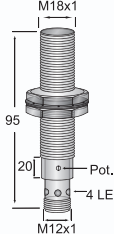
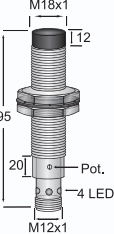
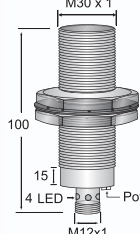
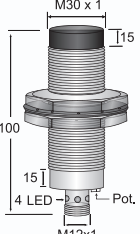


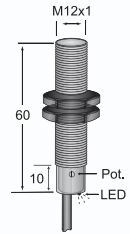
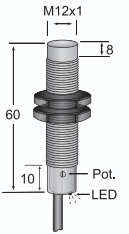
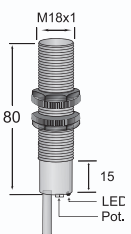
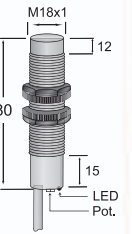
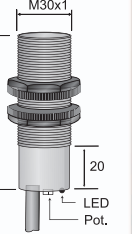
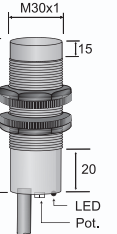
### Resist Liquid Level

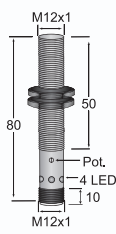
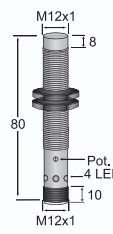
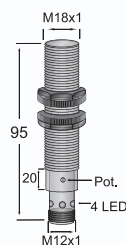
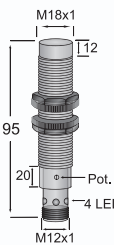
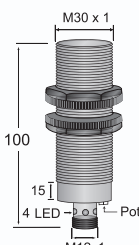
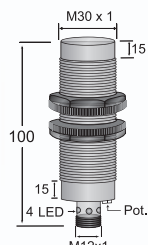
Use Capacitive Sensors to monitor resist liquid levels in pipes.

|                                    | M12                                                                                 |                                                                                     | M18                                                                                 |                                                                                       | M30                                                                                   |                                                                                       |
|------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                    |    |    |    |    |    |    |
| Sensing Distance                   | 1-4mm adjustable                                                                    | 1-8mm adjustable                                                                    | 2-8mm adjustable                                                                    | 2-15mm adjustable                                                                     | 2-20mm adjustable                                                                     | 2-30mm adjustable                                                                     |
| Operating Voltage                  | 10-30 VDC                                                                           |                                                                                     | 10-30 VDC                                                                           |                                                                                       | 10-30 VDC                                                                             |                                                                                       |
| Ripple                             | <10%                                                                                |                                                                                     | <10%                                                                                |                                                                                       | <10%                                                                                  |                                                                                       |
| No Load Current                    | <10mA                                                                               |                                                                                     | <10mA                                                                               |                                                                                       | <10mA                                                                                 |                                                                                       |
| Max. Load Current                  | 200mA                                                                               |                                                                                     | 300mA                                                                               |                                                                                       | 300mA                                                                                 |                                                                                       |
| Leakage Current                    | 0.01mA                                                                              |                                                                                     | 0.01mA                                                                              |                                                                                       | 0.01mA                                                                                |                                                                                       |
| Surge Current                      | -                                                                                   |                                                                                     | -                                                                                   |                                                                                       | -                                                                                     |                                                                                       |
| Min. Load Current                  | -                                                                                   |                                                                                     | -                                                                                   |                                                                                       | -                                                                                     |                                                                                       |
| Voltage Drop                       | <2 VDC                                                                              |                                                                                     | <2 VDC                                                                              |                                                                                       | <2 VDC                                                                                |                                                                                       |
| Switching Frequency                | 100Hz                                                                               |                                                                                     | 100Hz                                                                               |                                                                                       | 100Hz                                                                                 |                                                                                       |
| Response Time                      | 1.5ms/1.5ms                                                                         |                                                                                     | 1.5ms/1.5ms                                                                         |                                                                                       | 1.5ms/1.5ms                                                                           |                                                                                       |
| Switching Hysteresis               | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                           |                                                                                       | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                    | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                            |                                                                                       | <5% (Sr)                                                                              |                                                                                       |
| Protection Category                | IP67                                                                                |                                                                                     | IP67                                                                                |                                                                                       | IP67                                                                                  |                                                                                       |
| Operating Temperature              | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                         |                                                                                       | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift                  | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                           |                                                                                       | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection           | Yes                                                                                 |                                                                                     | Yes                                                                                 |                                                                                       | Yes                                                                                   |                                                                                       |
| Overload Trip Point                | 220mA                                                                               |                                                                                     | 350mA                                                                               |                                                                                       | 220mA                                                                                 |                                                                                       |
| Time Delay Before Availability     | <25ms                                                                               |                                                                                     | <25ms                                                                               |                                                                                       | <25ms                                                                                 |                                                                                       |
| EMC                                | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                       | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration                  | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                       | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material               | PBT                                                                                 |                                                                                     | PBT                                                                                 |                                                                                       | PBT                                                                                   |                                                                                       |
| Housing Material                   | Chrome-plated Brass                                                                 |                                                                                     | Chrome-plated Brass                                                                 |                                                                                       | Chrome-plated Brass                                                                   |                                                                                       |
| Part Numbers                       |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 3 wire 10-30V NPN N.O.          | CCM1-1204N-A3U2                                                                     | CCM2-1208N-A3U2                                                                     | CCM1-1808N-A3U2                                                                     | CCM2-1815N-A3U2                                                                       | CCM1-3020N-A3U2                                                                       | CCM2-3030N-A3U2                                                                       |
| DC 3 wire 10-30V NPN N.C.          | CCM1-1204N-B3U2                                                                     | CCM2-1208N-B3U2                                                                     | CCM1-1808N-B3U2                                                                     | CCM2-1815N-B3U2                                                                       | CCM1-3020N-B3U2                                                                       | CCM2-3030N-B3U2                                                                       |
| DC 3 wire 10-30V PNP N.O.          | CCM1-1204P-A3U2                                                                     | CCM2-1208P-A3U2                                                                     | CCM1-1808P-A3U2                                                                     | CCM2-1815P-A3U2                                                                       | CCM1-3020P-A3U2                                                                       | CCM2-3030P-A3U2                                                                       |
| DC 3 wire 10-30V PNP N.C.          | CCM1-1204P-B3U2                                                                     | CCM2-1208P-B3U2                                                                     | CCM1-1808P-B3U2                                                                     | CCM2-1815P-B3U2                                                                       | CCM1-3020P-B3U2                                                                       | CCM2-3030P-B3U2                                                                       |
| DC 4 wire 10-30V NPN (N.O. & N.C.) |                                                                                     |                                                                                     | CCM1-1808N-S4U2                                                                     | CCM2-1815N-S4U2                                                                       | CCM1-3020N-S4U2                                                                       | CCM2-3030N-S4U2                                                                       |
| DC 4 wire 10-30V PNP (N.O. & N.C.) |                                                                                     |                                                                                     | CCM1-1808P-S4U2                                                                     | CCM2-1815P-S4U2                                                                       | CCM1-3020P-S4U2                                                                       | CCM2-3030P-S4U2                                                                       |
| Diagrams (Units in mm)             |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
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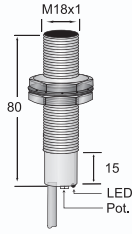
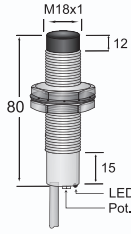
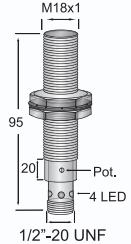
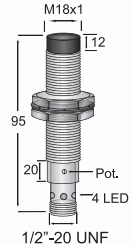


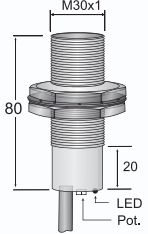
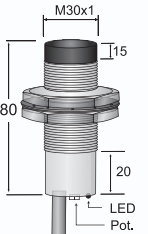
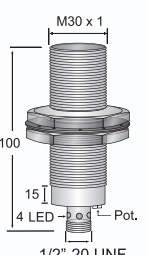
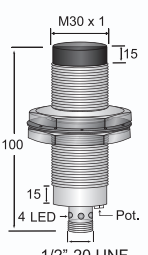
|                                    | M12                                                                                 |                                                                                     | M18                                                                                 |                                                                                      | M30                                                                                   |                                                                                       |
|------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                    |    |    |    |   |    |    |
| Sensing Distance                   | 1-4mm adjustable                                                                    | 1-8mm adjustable                                                                    | 2-8mm adjustable                                                                    | 2-15mm adjustable                                                                    | 2-20mm adjustable                                                                     | 2-30mm adjustable                                                                     |
| Operating Voltage                  | 10-30 VDC                                                                           |                                                                                     | 10-30 VDC                                                                           |                                                                                      | 10-30 VDC                                                                             |                                                                                       |
| Ripple                             | <10%                                                                                |                                                                                     | <10%                                                                                |                                                                                      | <10%                                                                                  |                                                                                       |
| No Load Current                    | <10mA                                                                               |                                                                                     | <10mA                                                                               |                                                                                      | <10mA                                                                                 |                                                                                       |
| Max. Load Current                  | 200mA                                                                               |                                                                                     | 300mA                                                                               |                                                                                      | 300mA                                                                                 |                                                                                       |
| Leakage Current                    | 0.01mA                                                                              |                                                                                     | 0.01mA                                                                              |                                                                                      | 0.01mA                                                                                |                                                                                       |
| Surge Current                      | -                                                                                   |                                                                                     | -                                                                                   |                                                                                      | -                                                                                     |                                                                                       |
| Min. Load Current                  | -                                                                                   |                                                                                     | -                                                                                   |                                                                                      | -                                                                                     |                                                                                       |
| Voltage Drop                       | <2 VDC                                                                              |                                                                                     | <2 VDC                                                                              |                                                                                      | <2 VDC                                                                                |                                                                                       |
| Switching Frequency                | 100Hz                                                                               |                                                                                     | 100Hz                                                                               |                                                                                      | 100Hz                                                                                 |                                                                                       |
| Response Time                      | 1.5ms/1.5ms                                                                         |                                                                                     | 1.5ms/1.5ms                                                                         |                                                                                      | 1.5ms/1.5ms                                                                           |                                                                                       |
| Switching Hysteresis               | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                           |                                                                                      | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                    | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                            |                                                                                      | <5% (Sr)                                                                              |                                                                                       |
| Protection Category                | IP67                                                                                |                                                                                     | IP67                                                                                |                                                                                      | IP67                                                                                  |                                                                                       |
| Operating Temperature              | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                         |                                                                                      | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift                  | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                           |                                                                                      | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection           | Yes                                                                                 |                                                                                     | Yes                                                                                 |                                                                                      | Yes                                                                                   |                                                                                       |
| Overload Trip Point                | 220mA                                                                               |                                                                                     | 350mA                                                                               |                                                                                      | 220mA                                                                                 |                                                                                       |
| Time Delay Before Availability     | <25ms                                                                               |                                                                                     | <25ms                                                                               |                                                                                      | <25ms                                                                                 |                                                                                       |
| EMC                                | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                      | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration                  | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                      | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material               | PBT                                                                                 |                                                                                     | PBT                                                                                 |                                                                                      | PBT                                                                                   |                                                                                       |
| Housing Material                   | Chrome-plated Brass                                                                 |                                                                                     | Chrome-plated Brass                                                                 |                                                                                      | Chrome-plated Brass                                                                   |                                                                                       |
| Part Numbers                       |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 10-30V NPN N.O.          | CCM1-1204N-ARU4                                                                     | CCM2-1208N-ARU4                                                                     | CCM1-1808N-ARU4                                                                     | CCM2-1815N-ARU4                                                                      | CCM1-3020N-ARU4                                                                       | CCM2-3030N-ARU4                                                                       |
| DC 3 wire 10-30V NPN N.C.          | CCM1-1204N-BRU4                                                                     | CCM2-1208N-BRU4                                                                     | CCM1-1808N-BRU4                                                                     | CCM2-1815N-BRU4                                                                      | CCM1-3020N-BRU4                                                                       | CCM2-3030N-BRU4                                                                       |
| DC 3 wire 10-30V PNP N.O.          | CCM1-1204P-ARU4                                                                     | CCM2-1208P-ARU4                                                                     | CCM1-1808P-ARU4                                                                     | CCM2-1815P-ARU4                                                                      | CCM1-3020P-ARU4                                                                       | CCM2-3030P-ARU4                                                                       |
| DC 3 wire 10-30V PNP N.C.          | CCM1-1204P-BRU4                                                                     | CCM2-1208P-BRU4                                                                     | CCM1-1808P-BRU4                                                                     | CCM2-1815P-BRU4                                                                      | CCM1-3020P-BRU4                                                                       | CCM2-3030P-BRU4                                                                       |
| DC 4 wire 10-30V NPN (N.O. & N.C.) |                                                                                     |                                                                                     | CCM1-1808N-SRU4                                                                     | CCM2-1815N-SRU4                                                                      | CCM1-3020N-SRU4                                                                       | CCM2-3030N-SRU4                                                                       |
| DC 4 wire 10-30V PNP (N.O. & N.C.) |                                                                                     |                                                                                     | CCM1-1808P-SRU4                                                                     | CCM2-1815P-SRU4                                                                      | CCM1-3020P-SRU4                                                                       | CCM2-3030P-SRU4                                                                       |
| Diagrams (Units in mm)             |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
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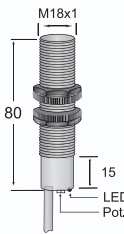
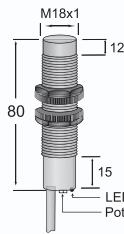
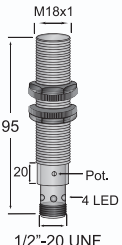
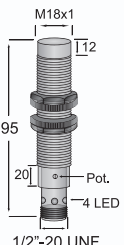
|                                    | M12                                                                                 |                                                                                     | M18                                                                                 |                                                                                       | M30                                                                                   |                                                                                       |
|------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                    |    |    |    |    |    |    |
| Sensing Distance                   | 1-4mm adjustable                                                                    | 1-8mm adjustable                                                                    | 2-8mm adjustable                                                                    | 2-15mm adjustable                                                                     | 2-20mm adjustable                                                                     | 2-30mm adjustable                                                                     |
| Operating Voltage                  | 10-30 VDC                                                                           |                                                                                     | 10-30 VDC                                                                           |                                                                                       | 10-30 VDC                                                                             |                                                                                       |
| Ripple                             | <10%                                                                                |                                                                                     | <10%                                                                                |                                                                                       | <10%                                                                                  |                                                                                       |
| No Load Current                    | <10mA                                                                               |                                                                                     | <10mA                                                                               |                                                                                       | <10mA                                                                                 |                                                                                       |
| Max. Load Current                  | 200mA                                                                               |                                                                                     | 300mA                                                                               |                                                                                       | 300mA                                                                                 |                                                                                       |
| Leakage Current                    | 0.01mA                                                                              |                                                                                     | 0.01mA                                                                              |                                                                                       | 0.01mA                                                                                |                                                                                       |
| Surge Current                      | -                                                                                   |                                                                                     | -                                                                                   |                                                                                       | -                                                                                     |                                                                                       |
| Min. Load Current                  | -                                                                                   |                                                                                     | -                                                                                   |                                                                                       | -                                                                                     |                                                                                       |
| Voltage Drop                       | <2 VDC                                                                              |                                                                                     | <2 VDC                                                                              |                                                                                       | <2 VDC                                                                                |                                                                                       |
| Switching Frequency                | 100Hz                                                                               |                                                                                     | 100Hz                                                                               |                                                                                       | 100Hz                                                                                 |                                                                                       |
| Response Time                      | 1.5ms/1.5ms                                                                         |                                                                                     | 1.5ms/1.5ms                                                                         |                                                                                       | 1.5ms/1.5ms                                                                           |                                                                                       |
| Switching Hysteresis               | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                           |                                                                                       | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                    | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                            |                                                                                       | <5% (Sr)                                                                              |                                                                                       |
| Protection Category                | IP67                                                                                |                                                                                     | IP67                                                                                |                                                                                       | IP67                                                                                  |                                                                                       |
| Operating Temperature              | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                         |                                                                                       | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift                  | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                           |                                                                                       | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection           | Yes                                                                                 |                                                                                     | Yes                                                                                 |                                                                                       | Yes                                                                                   |                                                                                       |
| Overload Trip Point                | 220mA                                                                               |                                                                                     | 350mA                                                                               |                                                                                       | 220mA                                                                                 |                                                                                       |
| Time Delay Before Availability     | <25ms                                                                               |                                                                                     | <25ms                                                                               |                                                                                       | <25ms                                                                                 |                                                                                       |
| EMC                                | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                       | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration                  | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                       | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material               | PBT                                                                                 |                                                                                     | PBT                                                                                 |                                                                                       | PBT                                                                                   |                                                                                       |
| Housing Material                   | PBT                                                                                 |                                                                                     | PBT                                                                                 |                                                                                       | PBT                                                                                   |                                                                                       |
| Part Numbers                       |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
| DC 3 wire 10-30V NPN N.O.          | CCP1-1204N-A3U2                                                                     | CCP2-1208N-ARU4                                                                     | CCP1-1808N-A3U2                                                                     | CCP2-1815N-A3U2                                                                       | CCP1-3020N-A3U2                                                                       | CCP2-3030N-A3U2                                                                       |
| DC 3 wire 10-30V NPN N.C.          | CCP1-1204N-B3U2                                                                     | CCP2-1208N-BRU4                                                                     | CCP1-1808N-B3U2                                                                     | CCP2-1815N-B3U2                                                                       | CCP1-3020N-B3U2                                                                       | CCP2-3030N-B3U2                                                                       |
| DC 3 wire 10-30V PNP N.O.          | CCP1-1204P-A3U2                                                                     | CCP2-1208P-ARU4                                                                     | CCP1-1808P-A3U2                                                                     | CCP2-1815P-A3U2                                                                       | CCP1-3020P-A3U2                                                                       | CCP2-3030P-A3U2                                                                       |
| DC 3 wire 10-30V PNP N.C.          | CCP1-1204P-B3U2                                                                     | CCP2-1208P-BRU4                                                                     | CCP1-1808P-B3U2                                                                     | CCP2-1815P-B3U2                                                                       | CCP1-3020P-B3U2                                                                       | CCP2-3030P-B3U2                                                                       |
| DC 4 wire 10-30V NPN (N.O. & N.C.) |                                                                                     |                                                                                     | CCP1-1808N-S4U2                                                                     | CCP2-1815N-S3U2                                                                       | CCP1-3020N-S4U2                                                                       | CCP2-3030N-SRU4                                                                       |
| DC 4 wire 10-30V PNP (N.O. & N.C.) |                                                                                     |                                                                                     | CCP1-1808P-S4U2                                                                     | CCP2-1815P-S3U2                                                                       | CCP1-3020P-S4U2                                                                       | CCP2-3030P-S3U2                                                                       |
| Diagrams (Units in mm)             |                                                                                     |                                                                                     |                                                                                     |                                                                                       |                                                                                       |                                                                                       |
|                                    |  |  |  |  |  |  |

|                                    | M12                                                                                 |                                                                                     | M18                                                                                 |                                                                                      | M30                                                                                   |                                                                                       |
|------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                    |    |    |    |   |    |    |
| Sensing Distance                   | 1-4mm adjustable                                                                    | 1-8mm adjustable                                                                    | 2-8mm adjustable                                                                    | 2-15mm adjustable                                                                    | 2-20mm adjustable                                                                     | 2-30mm adjustable                                                                     |
| Operating Voltage                  | 10-30 VDC                                                                           |                                                                                     | 10-30 VDC                                                                           |                                                                                      | 10-30 VDC                                                                             |                                                                                       |
| Ripple                             | <10%                                                                                |                                                                                     | <10%                                                                                |                                                                                      | <10%                                                                                  |                                                                                       |
| No Load Current                    | <10mA                                                                               |                                                                                     | <10mA                                                                               |                                                                                      | <10mA                                                                                 |                                                                                       |
| Max. Load Current                  | 200mA                                                                               |                                                                                     | 300mA                                                                               |                                                                                      | 300mA                                                                                 |                                                                                       |
| Leakage Current                    | 0.01mA                                                                              |                                                                                     | 0.01mA                                                                              |                                                                                      | 0.01mA                                                                                |                                                                                       |
| Surge Current                      | -                                                                                   |                                                                                     | -                                                                                   |                                                                                      | -                                                                                     |                                                                                       |
| Min. Load Current                  | -                                                                                   |                                                                                     | -                                                                                   |                                                                                      | -                                                                                     |                                                                                       |
| Voltage Drop                       | <2 VDC                                                                              |                                                                                     | <2 VDC                                                                              |                                                                                      | <2 VDC                                                                                |                                                                                       |
| Switching Frequency                | 100Hz                                                                               |                                                                                     | 100Hz                                                                               |                                                                                      | 100Hz                                                                                 |                                                                                       |
| Response Time                      | 1.5ms/1.5ms                                                                         |                                                                                     | 1.5ms/1.5ms                                                                         |                                                                                      | 1.5ms/1.5ms                                                                           |                                                                                       |
| Switching Hysteresis               | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                           |                                                                                      | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                    | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                            |                                                                                      | <5% (Sr)                                                                              |                                                                                       |
| Protection Category                | IP67                                                                                |                                                                                     | IP67                                                                                |                                                                                      | IP67                                                                                  |                                                                                       |
| Operating Temperature              | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                         |                                                                                      | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift                  | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                           |                                                                                      | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection           | Yes                                                                                 |                                                                                     | Yes                                                                                 |                                                                                      | Yes                                                                                   |                                                                                       |
| Overload Trip Point                | 220mA                                                                               |                                                                                     | 350mA                                                                               |                                                                                      | 220mA                                                                                 |                                                                                       |
| Time Delay Before Availability     | <25ms                                                                               |                                                                                     | <25ms                                                                               |                                                                                      | <25ms                                                                                 |                                                                                       |
| EMC                                | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                      | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration                  | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                      | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material               | PBT                                                                                 |                                                                                     | PBT                                                                                 |                                                                                      | PBT                                                                                   |                                                                                       |
| Housing Material                   | PBT                                                                                 |                                                                                     | PBT                                                                                 |                                                                                      | PBT                                                                                   |                                                                                       |
| Part Numbers                       |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
| DC 3 wire 10-30V NPN N.O.          | CCP1-1204N-A3U2                                                                     | CCP2-1208N-A3U2                                                                     | CCP1-1808N-A3U2                                                                     | CCP2-1815N-A3U2                                                                      | CCP1-3020N-A3U2                                                                       | CCP2-3030N-A3U2                                                                       |
| DC 3 wire 10-30V NPN N.C.          | CCP1-1204N-B3U2                                                                     | CCP2-1208N-B3U2                                                                     | CCP1-1808N-B3U2                                                                     | CCP2-1815N-B3U2                                                                      | CCP1-3020N-B3U2                                                                       | CCP2-3030N-B3U2                                                                       |
| DC 3 wire 10-30V PNP N.O.          | CCP1-1204P-A3U2                                                                     | CCP2-1208P-A3U2                                                                     | CCP1-1808P-A3U2                                                                     | CCP2-1815P-A3U2                                                                      | CCP1-3020P-A3U2                                                                       | CCP2-3030P-A3U2                                                                       |
| DC 3 wire 10-30V PNP N.C.          | CCP1-1204P-B3U2                                                                     | CCP2-1208P-B3U2                                                                     | CCP1-1808P-B3U2                                                                     | CCP2-1815P-B3U2                                                                      | CCP1-3020P-B3U2                                                                       | CCP2-3030P-B3U2                                                                       |
| DC 4 wire 10-30V NPN (N.O. & N.C.) |                                                                                     |                                                                                     | CCP1-1808N-S4U2                                                                     | CCP2-1815N-S4U2                                                                      | CCP1-3020N-S4U2                                                                       | CCP2-3030N-S4U2                                                                       |
| DC 4 wire 10-30V PNP (N.O. & N.C.) |                                                                                     |                                                                                     | CCP1-1808P-S4U2                                                                     | CCP2-1815P-S4U2                                                                      | CCP1-3020P-S4U2                                                                       | CCP2-3030P-S4U2                                                                       |
| Diagrams (Units in mm)             |                                                                                     |                                                                                     |                                                                                     |                                                                                      |                                                                                       |                                                                                       |
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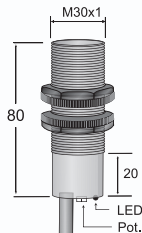
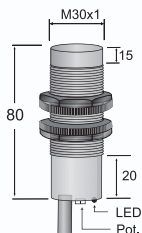
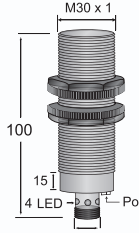
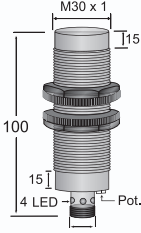


|                                | M18                                                                                 |                                                                                     | M18                                                                                   |                                                                                       |
|--------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                |    |    |    |    |
| Sensing Distance               | 8mm                                                                                 | 15mm                                                                                | 8mm                                                                                   | 15mm                                                                                  |
| Operating Voltage              | 20-250 VAC                                                                          |                                                                                     | 20-250 VAC                                                                            |                                                                                       |
| Ripple                         | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| No Load Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Max. Load Current              | 300mA                                                                               |                                                                                     | 300mA                                                                                 |                                                                                       |
| Leakage Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Surge Current                  | 5A                                                                                  |                                                                                     | 5A                                                                                    |                                                                                       |
| Min. Load Current              | 5mA                                                                                 |                                                                                     | 5mA                                                                                   |                                                                                       |
| Voltage Drop                   | <9VAC @ 300mA                                                                       |                                                                                     | <9VAC @ 300mA                                                                         |                                                                                       |
| Switching Frequency            | 25Hz                                                                                |                                                                                     | 25Hz                                                                                  |                                                                                       |
| Response Time                  | 10ms/10ms                                                                           |                                                                                     | 10ms/10ms                                                                             |                                                                                       |
| Switching Hysteresis           | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                              |                                                                                       |
| Protection Category            | IP67                                                                                |                                                                                     | IP67                                                                                  |                                                                                       |
| Operating Temperature          | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift              | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection       | No                                                                                  |                                                                                     | No                                                                                    |                                                                                       |
| Overload Trip Point            | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| Time Delay Before Availability | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| EMC                            | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration              | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material           | PBT                                                                                 |                                                                                     | PBT                                                                                   |                                                                                       |
| Housing Material               | Chrome-plated Brass                                                                 |                                                                                     | Chrome-plated Brass                                                                   |                                                                                       |
| Part Numbers                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| AC 2 wire 20-250 VAC N.O.      | CCM1-1808A-A3L2                                                                     | CCM2-1815A-A3L2                                                                     | CCM1-1808A-AUL3                                                                       | CCM2-1815A-AUL3                                                                       |
| AC 2 wire 20-250 VAC N.C.      | CCM1-1808A-B3L2                                                                     | CCM2-1815A-B3L2                                                                     | CCM1-1808A-BUL3                                                                       | CCM2-1815A-BUL3                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Diagrams (Units in mm)         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |  |  |  |  |

|                                | M30                                                                                 |                                                                                     | M30                                                                                   |                                                                                       |
|--------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                |    |    |    |    |
| Sensing Distance               | 2 - 20mm                                                                            | 2 - 30mm                                                                            | 2 - 20mm                                                                              | 2 - 30mm                                                                              |
| Operating Voltage              | 20-250 VAC                                                                          |                                                                                     | 20-250 VAC                                                                            |                                                                                       |
| Ripple                         | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| No Load Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Max. Load Current              | 300mA                                                                               |                                                                                     | 300mA                                                                                 |                                                                                       |
| Leakage Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Surge Current                  | 5A                                                                                  |                                                                                     | 5A                                                                                    |                                                                                       |
| Min. Load Current              | 5mA                                                                                 |                                                                                     | 5mA                                                                                   |                                                                                       |
| Voltage Drop                   | <9VAC @ 300mA                                                                       |                                                                                     | <9VAC @ 300mA                                                                         |                                                                                       |
| Switching Frequency            | 25Hz                                                                                |                                                                                     | 25Hz                                                                                  |                                                                                       |
| Response Time                  | 10ms/10ms                                                                           |                                                                                     | 10ms/10ms                                                                             |                                                                                       |
| Switching Hysteresis           | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                              |                                                                                       |
| Protection Category            | IP67                                                                                |                                                                                     | IP67                                                                                  |                                                                                       |
| Operating Temperature          | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift              | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection       | No                                                                                  |                                                                                     | No                                                                                    |                                                                                       |
| Overload Trip Point            | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| Time Delay Before Availability | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| EMC                            | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration              | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material           | PBT                                                                                 |                                                                                     | PBT                                                                                   |                                                                                       |
| Housing Material               | Chrome-plated Brass                                                                 |                                                                                     | Chrome-plated Brass                                                                   |                                                                                       |
| Part Numbers                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| AC 2 wire 20-250 VAC N.O.      | CCM1-3020A-A3L2                                                                     | CCM2-3030A-A3L2                                                                     | CCM1-3020A-AUL3                                                                       | CCM2-3030A-AUL3                                                                       |
| AC 2 wire 20-250 VAC N.C.      | CCM1-3020A-B3L2                                                                     | CCM2-3030A-B3L2                                                                     | CCM1-3020A-BUL3                                                                       | CCM2-3030A-BUL3                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Diagrams (Units in mm)         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |  |  |  |  |

|                                | M18                                                                                 |                                                                                     | M18                                                                                   |                                                                                       |
|--------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                |    |    |    |    |
| Sensing Distance               | 2 - 8mm                                                                             | 2 - 15mm                                                                            | 2 - 8mm                                                                               | 2 - 15mm                                                                              |
| Operating Voltage              | 20-250 VAC                                                                          |                                                                                     | 20-250 VAC                                                                            |                                                                                       |
| Ripple                         | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| No Load Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Max. Load Current              | 300mA                                                                               |                                                                                     | 300mA                                                                                 |                                                                                       |
| Leakage Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Surge Current                  | 5A                                                                                  |                                                                                     | 5A                                                                                    |                                                                                       |
| Min. Load Current              | 5mA                                                                                 |                                                                                     | 5mA                                                                                   |                                                                                       |
| Voltage Drop                   | <9VAC @ 300mA                                                                       |                                                                                     | <9VAC @ 300mA                                                                         |                                                                                       |
| Switching Frequency            | 25Hz                                                                                |                                                                                     | 25Hz                                                                                  |                                                                                       |
| Response Time                  | 10ms/10ms                                                                           |                                                                                     | 10ms/10ms                                                                             |                                                                                       |
| Switching Hysteresis           | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                              |                                                                                       |
| Protection Category            | IP67                                                                                |                                                                                     | IP67                                                                                  |                                                                                       |
| Operating Temperature          | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift              | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection       | No                                                                                  |                                                                                     | No                                                                                    |                                                                                       |
| Overload Trip Point            | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| Time Delay Before Availability | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| EMC                            | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration              | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material           | PBT                                                                                 |                                                                                     | PBT                                                                                   |                                                                                       |
| Housing Material               | PBT                                                                                 |                                                                                     | PBT                                                                                   |                                                                                       |
| Part Numbers                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| AC 2 wire 20-250 VAC N.O.      | CCP1-1808A-A2L2                                                                     | CCP2-1815A-A2L2                                                                     | CCP1-1808A-AUL3                                                                       | CCP2-1815A-AUL3                                                                       |
| AC 2 wire 20-250 VAC N.C.      | CCP1-1808A-B2L2                                                                     | CCP2-1815A-B2L2                                                                     | CCP1-1808A-BUL3                                                                       | CCP2-1815A-BUL3                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Diagrams (Units in mm)         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |  |  |  |  |



|                                | M30                                                                                 |                                                                                     | M30                                                                                   |                                                                                       |
|--------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                |    |    |    |    |
| Sensing Distance               | 20mm                                                                                | 30mm                                                                                | 20mm                                                                                  | 30mm                                                                                  |
| Operating Voltage              | 20-250 VAC                                                                          |                                                                                     | 20-250 VAC                                                                            |                                                                                       |
| Ripple                         | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| No Load Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Max. Load Current              | 300mA                                                                               |                                                                                     | 300mA                                                                                 |                                                                                       |
| Leakage Current                | <2.5mA                                                                              |                                                                                     | <2.5mA                                                                                |                                                                                       |
| Surge Current                  | 5A                                                                                  |                                                                                     | 5A                                                                                    |                                                                                       |
| Min. Load Current              | 5mA                                                                                 |                                                                                     | 5mA                                                                                   |                                                                                       |
| Voltage Drop                   | <9VAC @ 300mA                                                                       |                                                                                     | <9VAC @ 300mA                                                                         |                                                                                       |
| Switching Frequency            | 25Hz                                                                                |                                                                                     | 25Hz                                                                                  |                                                                                       |
| Response Time                  | 10ms/10ms                                                                           |                                                                                     | 10ms/10ms                                                                             |                                                                                       |
| Switching Hysteresis           | <15% (Sr)                                                                           |                                                                                     | <15% (Sr)                                                                             |                                                                                       |
| Repeat Accuracy                | <5% (Sr)                                                                            |                                                                                     | <5% (Sr)                                                                              |                                                                                       |
| Protection Category            | IP67                                                                                |                                                                                     | IP67                                                                                  |                                                                                       |
| Operating Temperature          | -25°C-+70°C                                                                         |                                                                                     | -25°C-+70°C                                                                           |                                                                                       |
| Temperature Drift              | <10% (Sr)                                                                           |                                                                                     | <10% (Sr)                                                                             |                                                                                       |
| Short Circuit Protection       | No                                                                                  |                                                                                     | No                                                                                    |                                                                                       |
| Overload Trip Point            | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| Time Delay Before Availability | -                                                                                   |                                                                                     | -                                                                                     |                                                                                       |
| EMC                            | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                              |                                                                                     | RFI>3V/m / EFT>1KV / ESD>4KV (Contact)                                                |                                                                                       |
| Shock / Vibration              | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                              |                                                                                     | IEC 60947-5-2, Part 7.4.1 & Part 7.4.2                                                |                                                                                       |
| Active Face Material           | PBT                                                                                 |                                                                                     | PBT                                                                                   |                                                                                       |
| Housing Material               | PBT                                                                                 |                                                                                     | PBT                                                                                   |                                                                                       |
| Part Numbers                   |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| AC 2 wire 20-250 VAC N.O.      | CCP1-3020A-A2L2                                                                     | CCP2-3030A-A2L2                                                                     | CCP1-3020A-AUL3                                                                       | CCP2-3030A-AUL3                                                                       |
| AC 2 wire 20-250 VAC N.C.      | CCP1-3020A-B2L2                                                                     | CCP2-3030A-B2L2                                                                     | CCP1-3020A-BUL3                                                                       | CCP2-3030A-BUL3                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
| Diagrams (Units in mm)         |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|                                |  |  |  |  |

## CABLES & BOXES



**DC - MICRO**

**AC - MICRO**

**M8 - PICO**

**MINI**

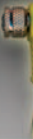
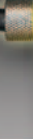
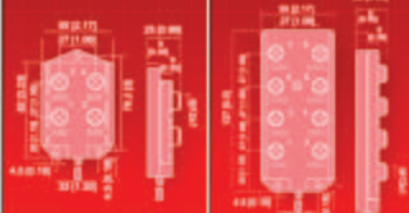
**STRAIGHT & 90°**

**PVC & PUR**

**YELLOW, GREY OR BLACK**

**DOUBLE-ENDED CABLES**

## SELECTION & ORDERING INFORMATION

| Cables       |                                                                                     |                                                                                    |                                                                                     |                                                                                    | Boxes                                                                                 |                                                                                      |
|--------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|              | C Series - M8 Pico                                                                  |                                                                                    | R Series - M12 DC Micro                                                             |                                                                                    | 4 Port                                                                                | 8 Port                                                                               |
|              |   |  |   |  |   |  |
| Part Numbers |                                                                                     |                                                                                    |                                                                                     |                                                                                    |                                                                                       |                                                                                      |
| 3 Poles      | C-FS3TZ-V075                                                                        | C-FA3TZ-V075                                                                       |                                                                                     |                                                                                    |                                                                                       |                                                                                      |
| 4 Poles      | C-FS4TZ-V075                                                                        | C-FA4TZ-V075                                                                       | R-FS4TZ-V075                                                                        | R-FA4TZ-V075                                                                       |                                                                                       |                                                                                      |
| 4 Port PNP   |                                                                                     |                                                                                    |                                                                                     |                                                                                    | ASTR4-5/4PA-1005                                                                      |                                                                                      |
| 4 Port NPN   |                                                                                     |                                                                                    |                                                                                     |                                                                                    | ASTR-5/4NA-1005                                                                       |                                                                                      |
| 8 Port PNP   |                                                                                     |                                                                                    |                                                                                     |                                                                                    |                                                                                       | DSTR8-5/4PA-1205                                                                     |
| 8 Port NPN   |                                                                                     |                                                                                    |                                                                                     |                                                                                    |                                                                                       | DSTR8-5/4NA-1205                                                                     |
| Diagrams     |  |                                                                                    |  |                                                                                    |  |                                                                                      |

| Field Connectors       |                                                                                     |                                                                                     |                                                                                       |                                                                                       |
|------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                        |  |  |  |  |
| Part Number            | R-FS4KZPG7                                                                          | R-FA4KZPG7                                                                          | R-MS4KZPG7                                                                            | R-MA4KZPG7                                                                            |
| Poles                  | 4 (female)                                                                          | 4 (female)                                                                          | 4 (male)                                                                              | 4 (male)                                                                              |
| Max. Wire Section      | 18 AWG                                                                              | 18 AWG                                                                              | 18 AWG                                                                                | 18 AWG                                                                                |
| Screw Joint for Cables | PG7 (Φ4.0-6.0mm)                                                                    | PG7 (Φ4.0-6.0mm)                                                                    | PG7 (Φ4.0-6.0mm)                                                                      | PG7 (Φ4.0-6.0mm)                                                                      |





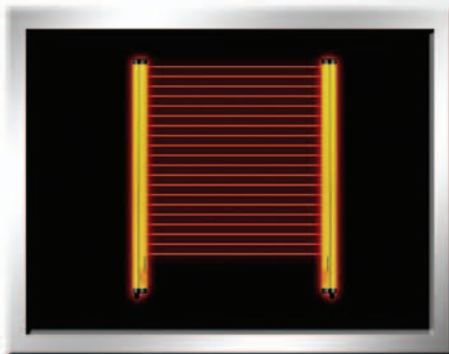
## SENSOR SOLUTIONS MADE SIMPLE

### PROXIMITY SENSORS



Wide Variety At Low Prices  
Long Range  
Metal Faced  
Weld Field Immune  
Miniature Proximity

### SAFETY LIGHT CURTAINS



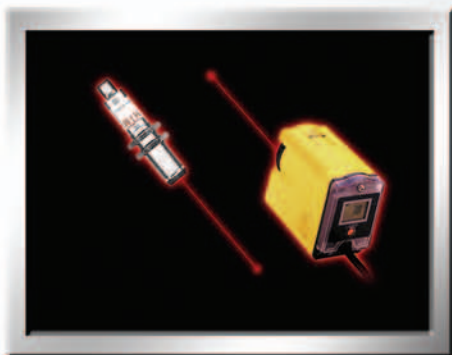
Category 4 Safety  
Category 2 Safety  
Finger Protection (14mm)  
Hand Protection (30mm)  
Body Protection (Access)

### PHOTOELECTRIC SENSORS



Through Beam  
Retro-reflective  
Diffuse / Distance / Contrast  
Background Suppression  
Polarized / Clear Object

### LASER SENSORS



Diffuse  
Push Button Set-up  
Retro-reflective  
Through Beam  
Temperature Sensors

### CABLES & BOXES



M12 Micro & AC 1/2 20  
M8 Pico & 7/8" x 16 Mini  
Double Ended Cables  
Distribution Boxes

### SENSOR ACCESSORIES



NPN / PNP Sensor Tester  
Mounting Brackets  
Spring Mounts  
Contact Adapters  
Connectors

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