

## PART K-01 ~ K-27

Diameter
● Shielded      ○ non-shielded
Sensing Distance Sn mm
Housing Material
● With LED      ○ Without LED
Dimensions (Unit: mm)
Supply Voltage
Max. Ripple
No Load Current
Output Voltage/Load Resistor
Output Current/Load Resistor
Linearity
Repeat Accuracy
Ambient Temperature
Temperature Drift
Short Circuit Protection
Reverse Polarity Protection
Protection Degree
Output Signal
Switch Frequency Max.
Time Delay Before Availability
EMC
Shock / Vibration
Material Active Face
Characteristics
Inductive Voltage Output
Inductive Current Output
Inductive Voltage & Current output
Capacitive Voltage Output
Capacitive Current output
Capacitive Voltage & Current Output
Remark
Cable 2M (PVC)
Weight

## ANALOG SENSORS

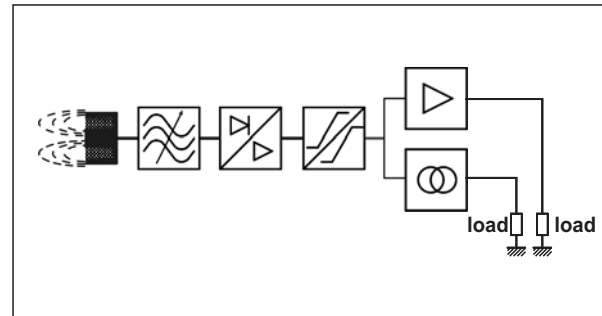
### ■ Features

- Analog sensors give a signal output which is proportional to sensing distance.
- Analog sensors give both a voltage signal 0-10V, and current signal 0-20mA.
- Analog sensors may be used for distance, thickness control of conveyor belts, detection of unevenness, positioning, continuous level-control, max-control with variable hysteresis as well as for counting and control, to name but a few, they are particularly suited for use in measuring techniques and control systems and are PLC-compatible.

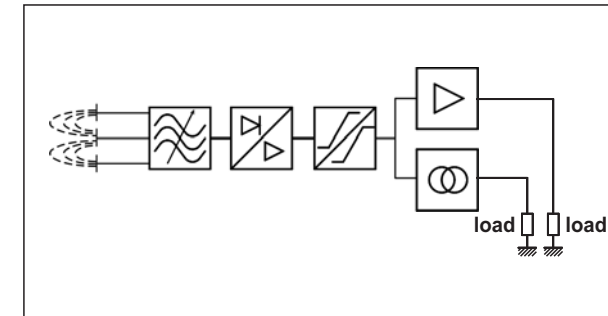
### ■ General

In common with capacitive and inductive sensors the analog sensor also consists of a transistor oscillator. The oscillator current will be influenced by the approach of metals and electric conductive media to the inductive analog sensors or by metals and all non-metals.

#### ● Inductive analog sensor



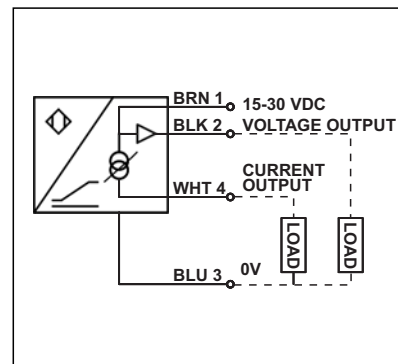
#### ● Capacitive analog sensor



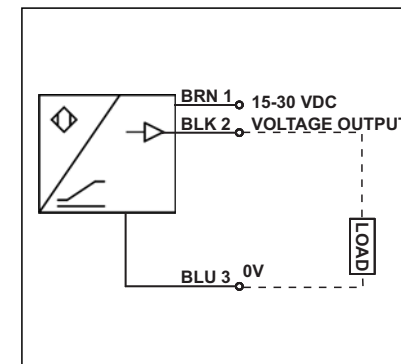
### ■ Control Output

The measured signal will give a voltage output of 0-10V to a load of >4.7kΩ or a current output of 0-20mA to a load of 0-200Ω. The control outputs of the analog sensor are short circuit proof.

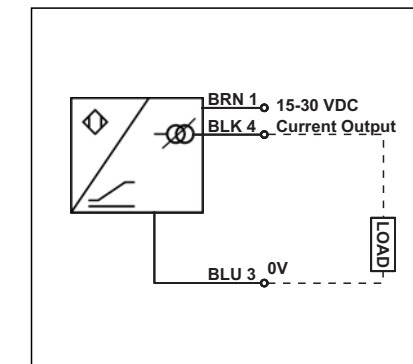
\*: Current and Voltage Output



\*: Voltage Output



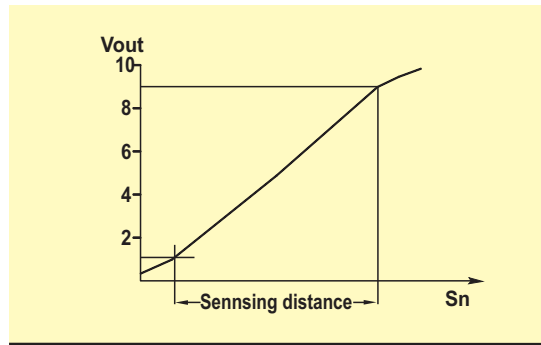
\*: Current Output



# ANALOG SENSORS

## ■ Measurement Range

The measurement range determines over which sensing range a proportional output signal can be given. The measurement range is shown for operation of the analog sensor with a mild steel(ST 37) actuator. The sides of this actuator are equal in length to the diameter of the sensor being utilized. Actuation of an analog sensor with metals other than mild steel will result in a reduced measurement range.



## ■ Linearity

The linearity error of the output characteristic shows the deviation from an ideal straight line between starting and ending values. The linearity is expressed as a percentage error of the measured range final value.

## ■ Reproduceability/Resolution

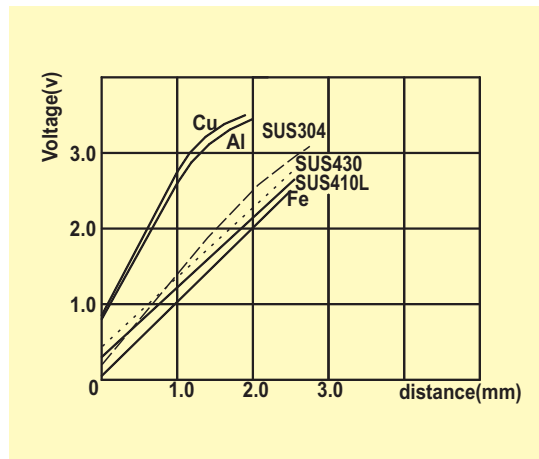
The reproduceability is the deviation between consecutive measurements when the same measurement point is utilized repeatedly. The reproduceability is referenced to constant temperature and supply voltage conditions.

## ■ Temperature Error

The temperature error gives the deviation of the output signal with a constant sensing distance but with varying ambient temperatures. The temperature error is expressed as a percentage of the final value.

## ■ Output Characteristic Graph for Non-ferrous Metals

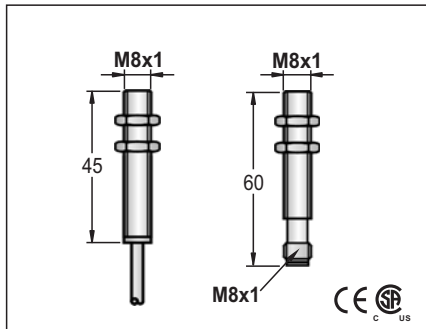
The standard sensing object is iron. Note the use of non-ferrous metals may alter the characteristic. Special sensors for non-ferrous metals are also available. For more information please contact factory.



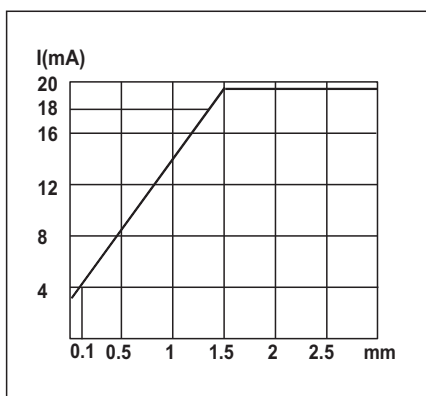
## INDUCTIVE CURRENT OUTPUT ANALOG SENSOR

INDUCTIVE CURRENT OUTPUT ANALOG SENSOR

<b>M 8</b>
●
0.1-1.5 mm
Nickel plated brass
○



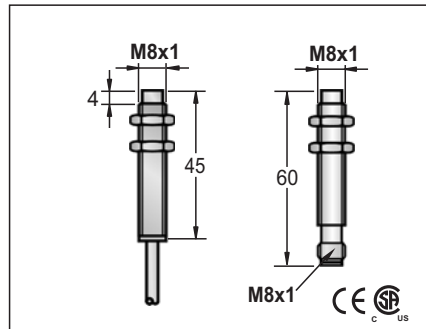
18-30VDC
<10%
<35mA
-
4-20mA/400 Ω Max.
<5%
0.02mm
0°C ~ +50°C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



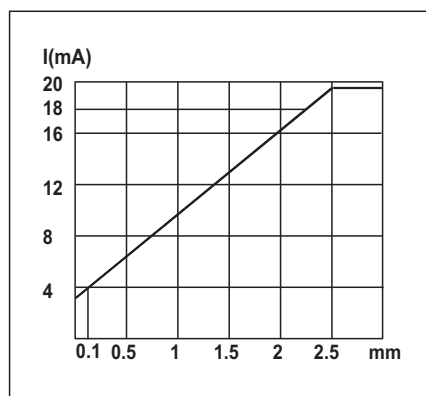
FCM1-081.5G-I3U2	19	FCM1-081.5G-ICU3	82

4 φ 3x0.15	—
approx.40g	approx.15g

<b>M 8</b>
○
0.1-2.5mm
Nickel plated brass
○



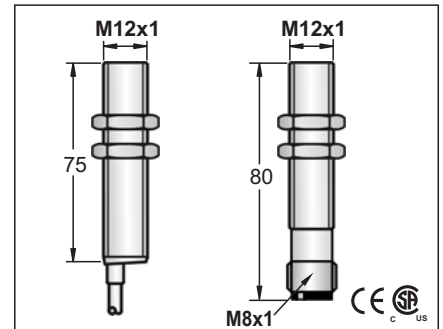
18-30VDC
<10%
<35mA
-
4-20mA/400 Ω Max.
<5%
0.02mm
0°C ~ +50°C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



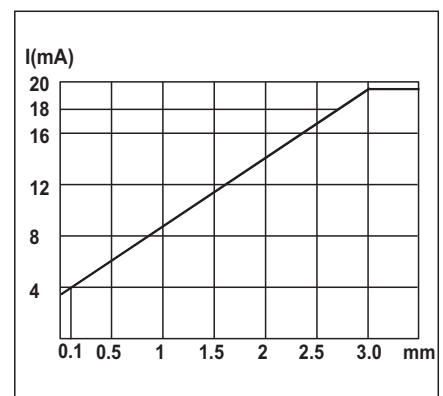
FCM2-082.5G-I3U2	19	FCM2-082.5G-ICU3	82

4 φ 3x0.15	—
approx.40g	approx.15g

<b>M 12</b>
●
0.1-2.5mm
Nickel plated brass
○



18-30VDC
<10%
<35mA
-
4-20mA/400 Ω Max.
<5%
0.02mm
0°C ~ +50°C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT

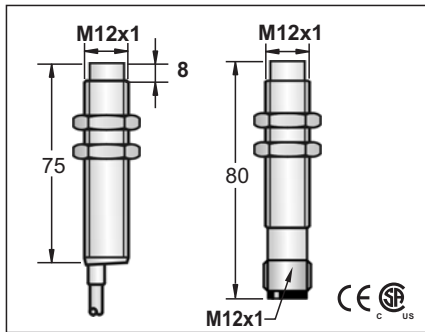


FCM1-122.5G-I3U2	19	FCM1-122.5G-IRU4	85

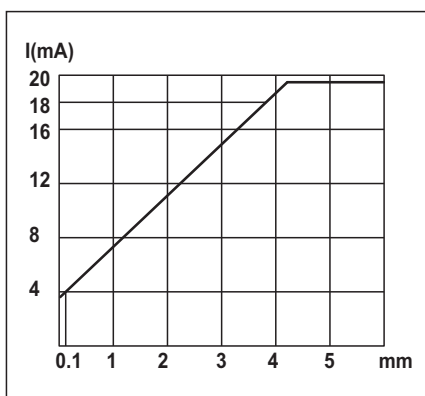
4 φ 3x0.15	—
approx.67g	approx.30g

## INDUCTIVE CURRENT OUTPUT ANALOG SENSOR

M 12
○
0.1-4 mm
Nickel plated brass
○



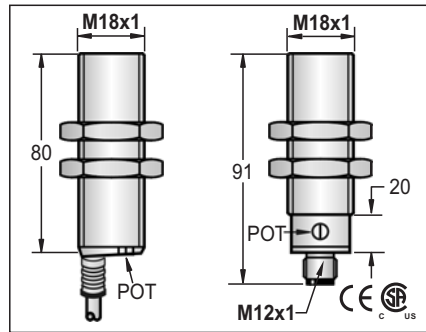
18-30VDC
<10%
<35mA
-
4-20mA/400 Ω Max.
<5%
0.02mm
0°C ~ +50°C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



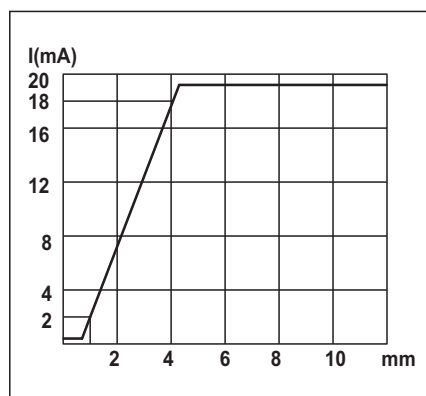
FCM2-1204G-I3U2	19	FCM2-1204G-IRU4	85

4 φ 3x0.15	—
approx.67g	approx.30g

M 18
●
1-4 mm
Nickel plated brass
○



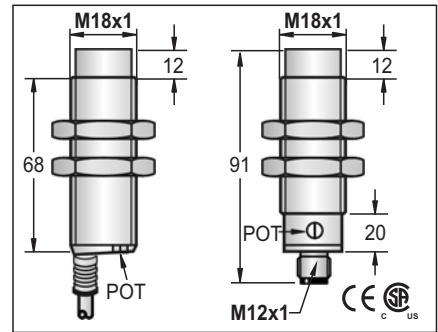
18-30VDC
<10%
15mA
-
0-20mA/200 Ω Max.
<10%(Sr)
0.02mm
0°C-70°C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



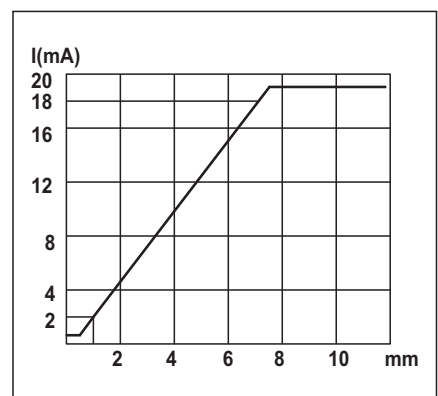
FCM1-1804G-I3U2	19	FCM1-1804G-IRU4	85

5.0 φ 44x0.1	—
approx.142g	approx.69g

M 18
○
1-7 mm
Nickel plated brass
○



18-30VDC
<10%
15mA
-
0-20mA/200 Ω Max.
<10%(Sr)
0.02mm
0°C-70°C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



FCM2-1807G-I3U2	19	FCM2-1807G-IRU4	85

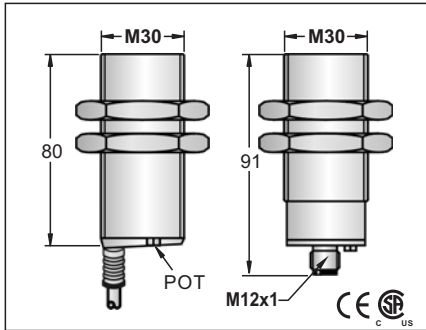
5.0 φ 44x0.1	—
approx.142g	approx.69g

INDUCTIVE CURRENT OUTPUT ANALOG SENSOR

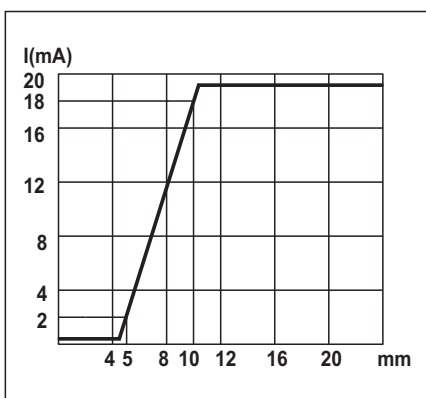
## INDUCTIVE CURRENT OUTPUT ANALOG SENSOR

INDUCTIVE CURRENT OUTPUT ANALOG SENSOR

<b>M 30</b>
●
5-10 mm
Nickel plated brass
○



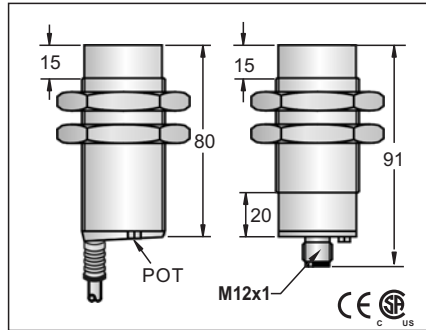
<b>18-30VDC</b>
<10%
15mA
-
0-20mA/200 Ω Max.
<10%(Sr)
0.02mm
0°C-70°C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



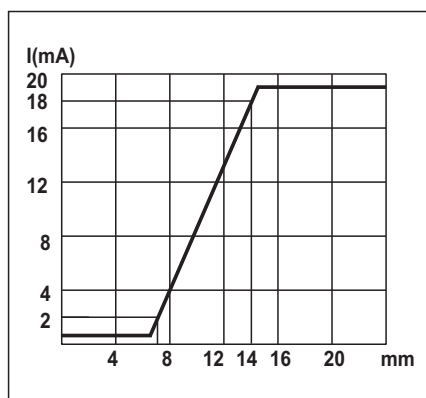
FCM1-3010G-I3U2	19	FCM1-3010G-IRU4	85

5.8φ3x0.5	—
approx.252g	approx.187g

<b>M 30</b>
○
7-14 mm
Nickel plated brass
○



<b>18-30VDC</b>
<10%
15mA
-
0-20mA/200 Ω Max.
<10%(Sr)
0.02mm
0°C-70°C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT

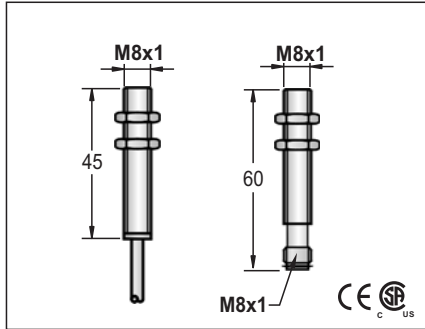


FCM2-3014G-I3U2	19	FCM2-3014G-IRU4	85

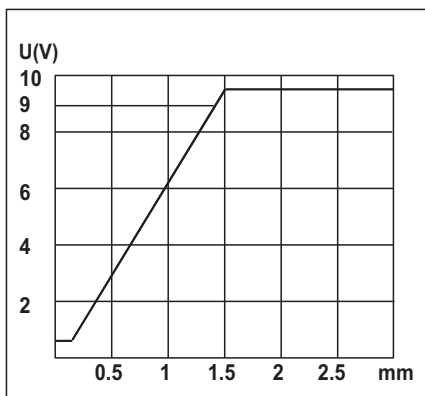
5.8φ3x0.5	—
approx.252g	approx.187g

## INDUCTIVE VOLTAGE OUTPUT ANALOG SENSOR

M 8
●
0.1-1.5 mm
Nickel plated brass
○



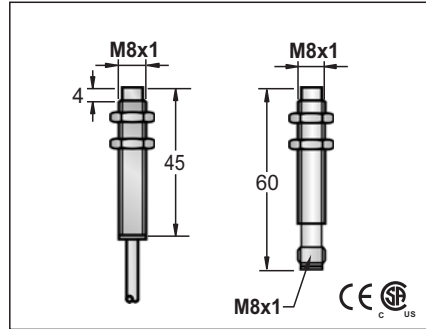
18-30VDC
<10%
<35mA
0-10VDC / ≥2KΩ
-
<5%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



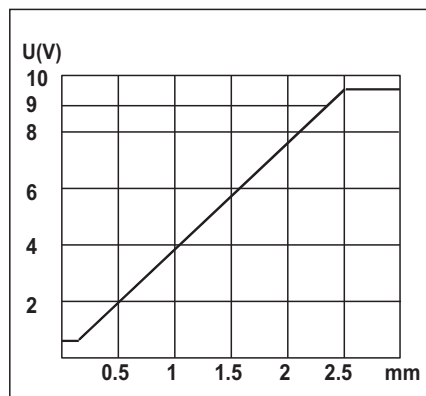

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3φ 3x0.15	—
approx.40g	approx.15g

M 8
○
0.1-2.5 mm
Nickel plated brass
○



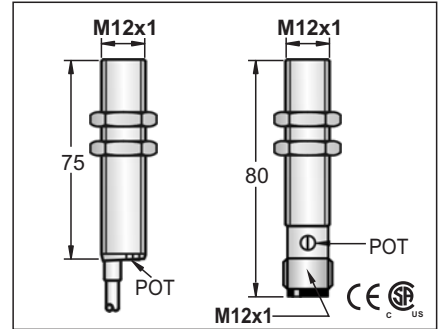
18-30VDC
<10%
<35mA
0-10VDC / ≥2K
-
<5%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



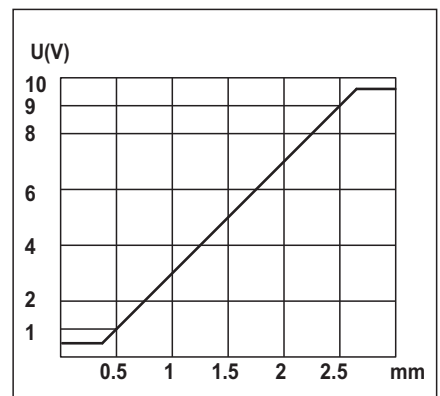

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3φ 3x0.15	—
approx.40g	approx.15g

M 12
●
0.3-2.5 mm
Nickel plated brass
○



18-30VDC
<10%
<35mA
0-10VDC / ≥2K
-
<5%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



FCM1-122.5G-V3U2	20	FCM1-122.5G-VRU4	84

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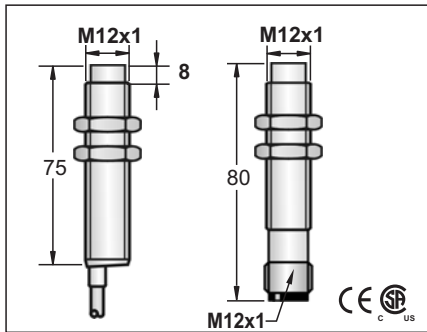
4φ 3x0.15	—
approx.67g	approx.30g

INDUCTIVE VOLTAGE OUTPUT ANALOG SENSOR

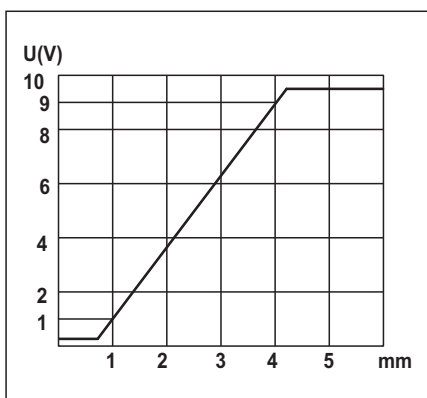
# M12、M18

## INDUCTIVE VOLTAGE OUTPUT ANALOG SENSOR

M 12
○
1-4 mm
Nickel plated brass
○



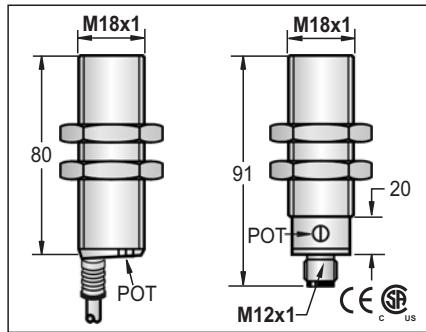
18-30VDC
<10%
<35mA
0-10VDC / $\geq 2K\Omega$
-
<5%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



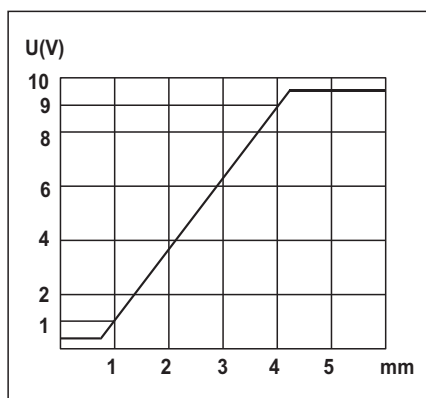
FCM2-1204G-V3U2	20	FCM2-1204G-VRU4	81

4 $\phi$ 3x0.15	—
approx.67g	approx.30g

M 18
●
1-4 mm
Nickel plated brass
○



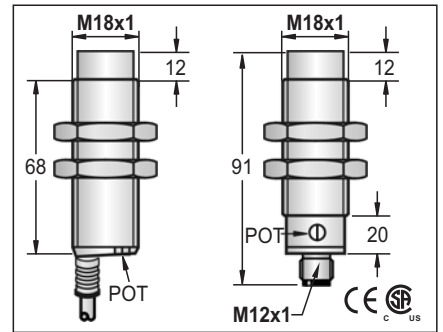
18-30VDC
<10%
15mA
0-10VDC / $\geq 4.7K\Omega$
-
<10%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



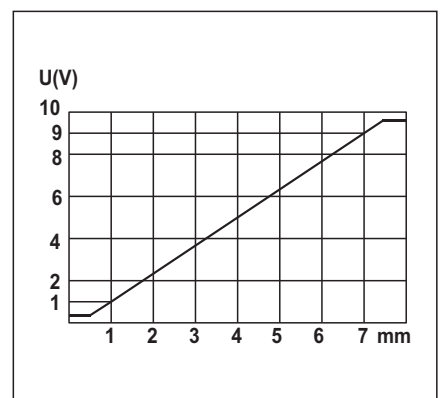
FCM1-1804G-V3U2	20	FCM1-1804G-VRU4	81

5.0 $\phi$ 44x0.1	—
approx.142g	approx.60g

M 18
○
1-7 mm
Nickel plated brass
○



18-30VDC
<10%
15mA
0-10VDC / $\geq 4.7K\Omega$
-
<10%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



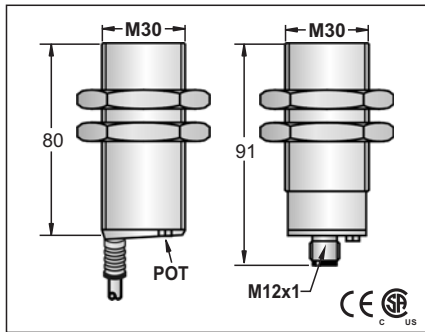
FCM2-1807G-V3U2	20	FCM2-1807G-VRU4	81

5.0 $\phi$ 44x0.1	—
approx.142g	approx.60g

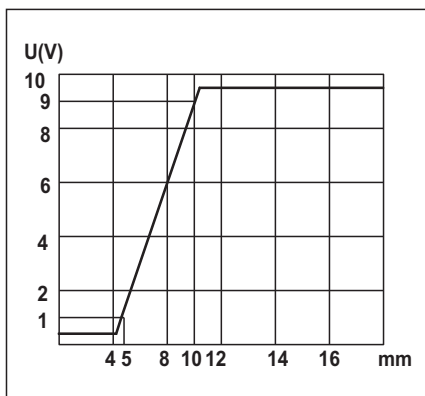
INDUCTIVE VOLTAGE OUTPUT ANALOG SENSOR

## INDUCTIVE VOLTAGE OUTPUT ANALOG SENSOR

M 30
●
5-10mm
Nickel plated brass
○



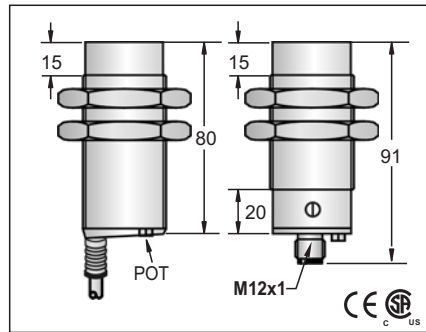
18-30VDC
<10%
15mA
0-10VDC / $\geq 4.7K\Omega$
-
<10%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



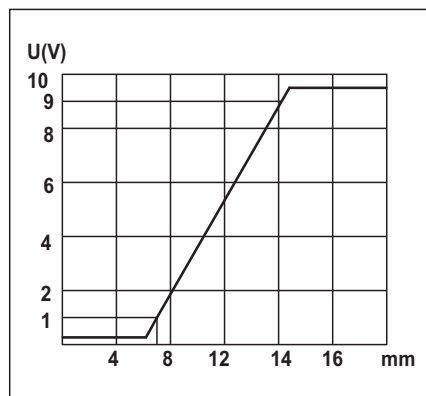
FCM1-3010G-V3U2	20	FCM1-3010G-VRU4	81


5.8 $\phi$ 3x0.5	-
approx.252g	approx.110g

M 30
○
7-14mm
Nickel plated brass
○



18-30VDC
<10%
15mA
0-10VDC / $\geq 4.7K\Omega$
-
<10%(Sr)
0.02mm
0 °C-70 °C
5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



FCM2-3014G-V3U2	20	FCM2-3014G-VRU4	81


5.8 $\phi$ 3x0.5	-
approx.246g	approx.110g

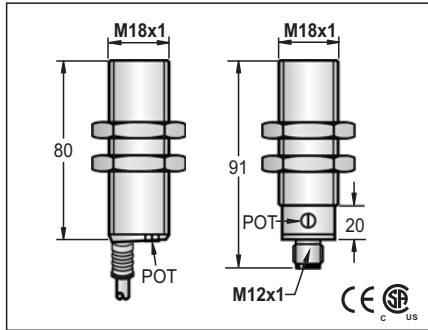
INDUCTIVE VOLTAGE OUTPUT ANALOG SENSOR



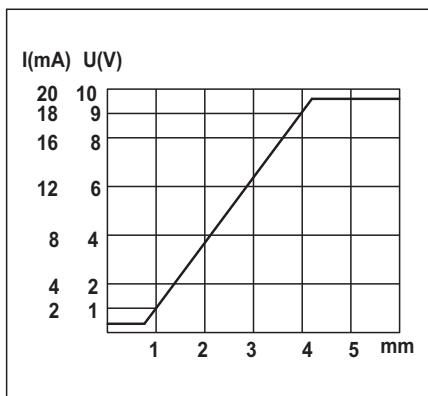
## INDUCTIVE VOLTAGE AND CURRENT OUTPUT ANALOG SENSOR

INDUCTIVE VOLTAGE & CURRENT OUTPUT ANALOG SENSOR

<b>M 18</b>
●
1-4 mm
Nickel plated brass
○



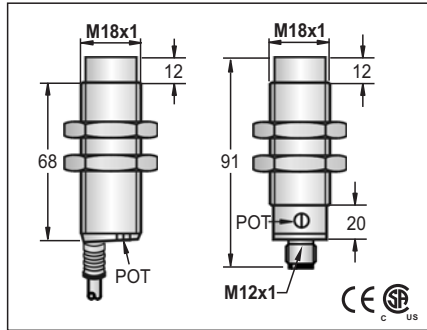
18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 °C-70 °C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



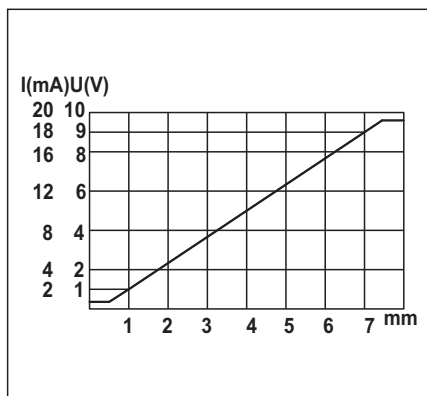
FCM1-1804G-M4U2	17	FCM1-1804G-MRU4	86
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5.0 $\phi$ 44x0.1	—
approx.142g	approx.60g

<b>M 18</b>
○
1-7 mm
Nickel plated brass
○



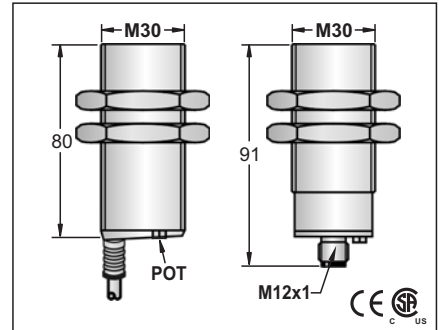
18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 °C-70 °C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
30Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



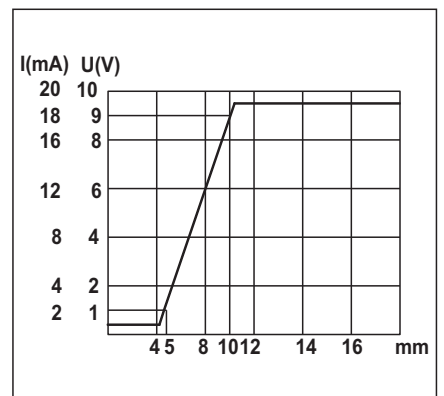
FCM2-1807G-M4U2	17	FCM2-1807G-MRU4	86
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5.0 $\phi$ 44x0.1	—
approx.138g	approx.58g

<b>M 30</b>
●
5-10mm
Nickel plated brass
○



18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 °C-70 °C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT

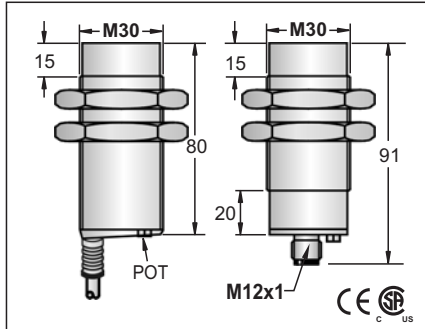


FCM1-3010G-M4U2	17	FCM1-3010G-MRU4	86
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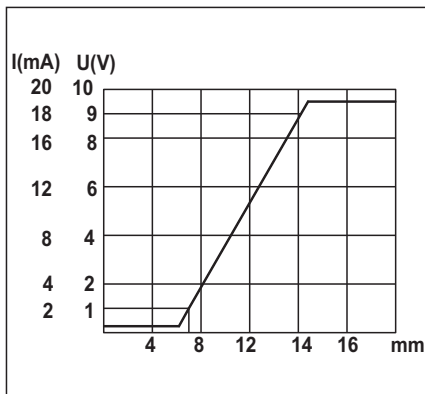
5.8 $\phi$ 4x0.5	—
approx.252g	approx.110g

## INDUCTIVE VOLTAGE AND CURRENT OUTPUT ANALOG SENSOR

M 30
○
7-14mm
Nickel plated brass
○



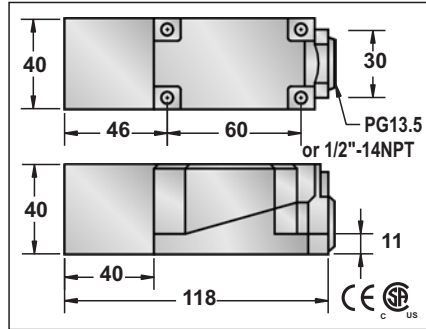
18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 °C-70 °C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
30Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



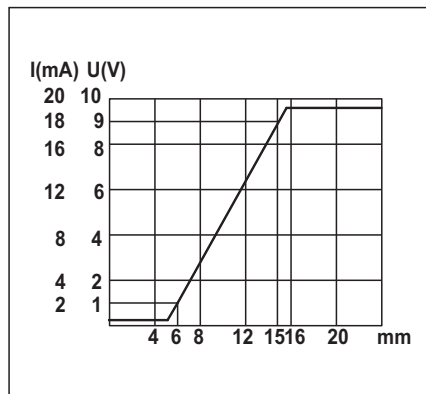
FCM2-3014G-M4U2	17	FCM2-3014G-MRU4	86
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5.8φ4x0.5	-
approx.246g	approx.110g

Q 40
●
6-15mm
PBT
○



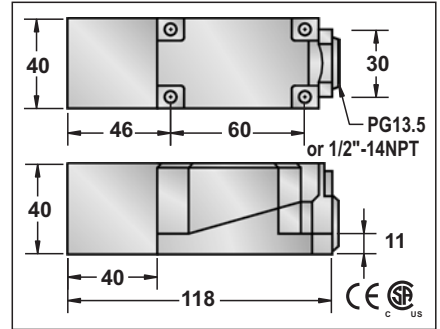
18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 °C-70 °C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



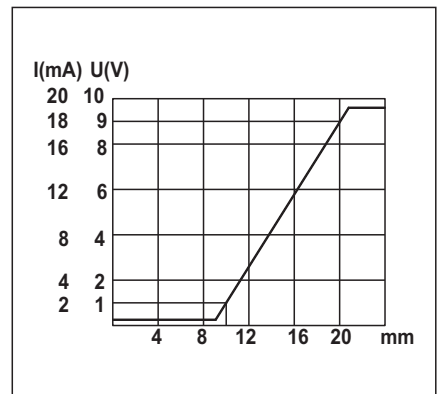
FQP1-4015G-M4U	17
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approx.242g
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Q 40
○
7-20mm
PBT
○



18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 ° C-70 ° C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
30Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



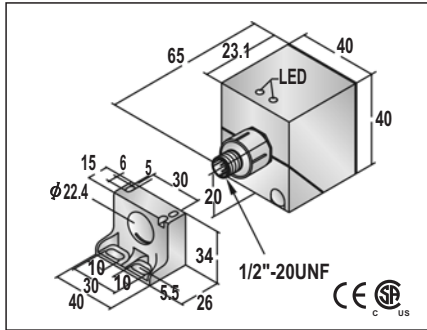
FQP2-4020G-M4U	17
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approx.242g
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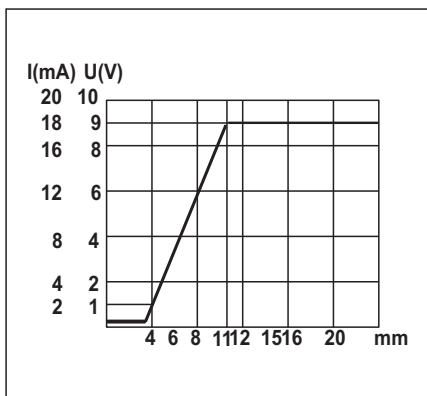
INDUCTIVE VOLTAGE & CURRENT OUTPUT ANALOG SENSOR

## INDUCTIVE 5 WAY ROTATABLE ANALOG SENSOR

Q 40s
●
4-11mm
PBT
○



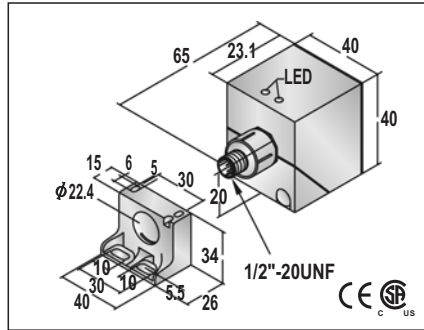
18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 °C-70 °C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
100Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



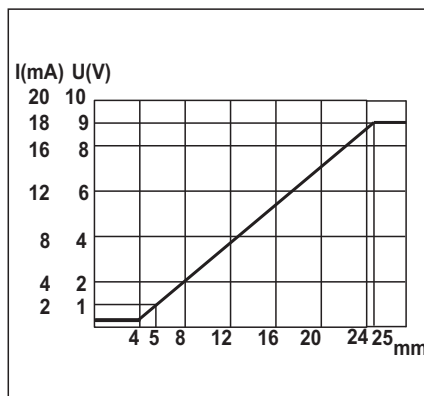
FQP1-4011G-MRS4	17
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approx.242g
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Q 40s
○
5-25mm
PBT
○



18-30VDC
<10%
15mA
0-10VDC/ $\geq 4.7K\Omega$
0-20mA/0-200
<10%(Sr)
0.02mm
0 °C-70 °C
<5%(Sr)
NO
YES
IP67
PNP-ANALOG
30Hz
-
RFI>3V/m / EFT>1KV / ESD>4KV (contact)
IEC 60947-5-2,Part 7.4.1 / IEC 60947-5-2,Part 7.4.2
PBT



FQP2-4025G-MRS4	17
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approx.242g
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INDUCTIVE 5 WAY ROTATABLE ANALOG SENSOR