series PS

c3controls has a full range of inductive and capacitive proximity sensors for non-contact presence sensing of metallic and non-metallic objects. Our sensors are available in nickel-plated, stainless steel, and non-metallic cylindrical and rectangular housings; include short circuit, reverse polarity, false pulse, and transient noise protection to prevent damage; and each includes an LED indicator for status monitoring.

PROXIMITY SENSORS

NOTE: The scope (range, description, price, specifications, dimensions, etc.) of the product featured in this section is subject to change without notice. Refer to www.c3controls.com for product updates.

Conformity to Standards:

UL 508
CSA C22.2 No. 14
IEC 60947-1, 60947-5-1, 60947-5-2, 60947-5-3

Certifications:

UL File #: E244858 (Guide NRKH, NRKH7)

Visit www.c3controls.com to download product certifications.

Revision 08.31.09

IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Miniature Stainless Steel Cylindrical Proximity Sensors (3-Wire DC)

IPS – S ____ ____ ____ ____ **– ZC** ____ ____

I II III IV V VI VII VIII IX

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + S + III + IV + V + VI + ZC + VIII + IX or IPS-S08TCS-ZCP10

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
S	Stainless Steel

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
04	4mm Diameter	$50.00
05	5mm Diameter	$50.00
06	6mm Diameter	$34.00
08	8mm Diameter	$20.00

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical NOTE: Only Available in 8mm Housing.
S	Smooth Cylindrical NOTE: Only Available in 4mm, 5mm and 6mm Housings.

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Micro Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush) NOTE: Only Available in 8mm Housing.

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
P	PNP
N	NPN

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

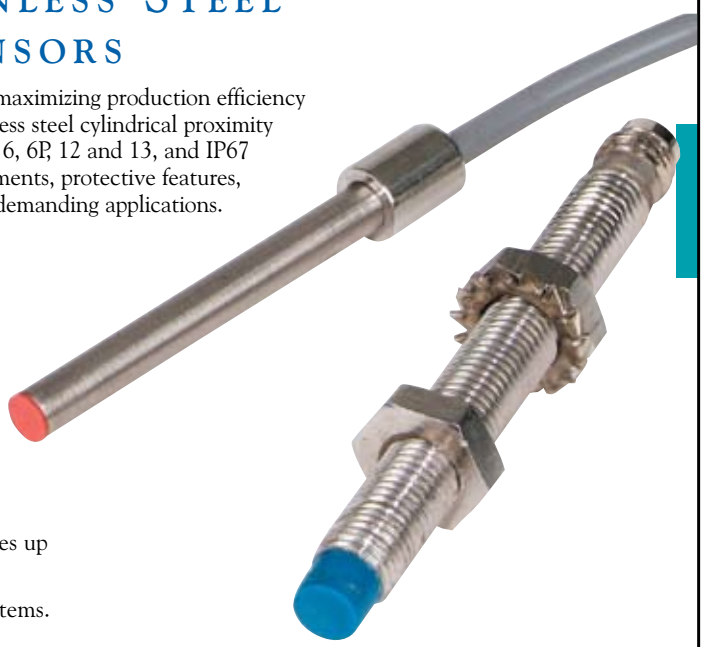
DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

INDUCTIVE MINIATURE STAINLESS STEEL CYLINDRICAL PROXIMITY SENSORS – 3 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-S04SCS-ZCN10	4mm Diameter Shielded Sensor with Cable Connector and NPN 1 NO Output	$50.00
IPS-S05SCS-ZCN10	5mm Diameter Shielded Sensor with Cable Connector and NPN 1 NO Output	$50.00
IPS-S06SCS-ZCN10	6mm Diameter Shielded Sensor with Cable Connector and NPN 1 NO Output	$34.00
IPS-S08TCU-ZCN10	8mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO Output	$20.00
IPS-S08TMU-ZCN10	8mm Diameter Unshielded Sensor with Micro Quick-Connector and NPN 1 NO Output	$20.00

Inductive Miniature Stainless Steel Cylindrical Proximity Sensors



c3controls proximity sensors offer high switching frequency, up to 3000Hz, maximizing production efficiency with targets moving at high speed. All c3controls inductive miniature stainless steel cylindrical proximity sensors are UL Listed, CE Marked, and are rated for Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67 applications. Small size, environmental ratings for severe industrial environments, protective features, and superior sensing performance make these devices suitable for the most demanding applications.

Product features include:

- Small size for installation in applications where space is limited – 4mm, 5mm, 6mm and 8mm diameters.
- Reverse polarity, short circuit, false pulse, and transient noise protection prevents damage to the sensor due to incorrect installation or fault conditions and ensures reliable operation.
- Bounce free operation eliminates false signals.
- High repeat accuracy with output currents up to 100mA.
- Shielded and unshielded constructions with standard sensing distances up to 2.0mm.
- 2 and 3-wire DC versions available for easy integration in control systems.
- PNP or NPN outputs.
- Normally Open (NO) and Normally Closed (NC) outputs for control circuit application flexibility.
- Solid-state design with no mechanical moving parts that can wear out, providing long life.

UNIQUE PRODUCT FEATURES

1. 304 Stainless steel housing for superior corrosion resistance in harsh environments. Withstands dust, water, lubricants, and cutting oils.
2. 2m (6.56 ft.) PVC cable or metallic micro quick-connectors for fast and easy installation and exchange of sensors when necessary.
3. Color coded visual LED indication for energized outputs.
4. Color coded sensor face for quick and easy sensor identification: green for PNP devices, red for NPN devices, and blue for 2-wire DC devices.

SPECIFICATIONS:

INDUCTIVE MINIATURE STAINLESS STEEL CYLINDRICAL PROXIMITY SENSORS – 3 WIRE DC

	4mm	5mm	6mm	8mm	
CONSTRUCTION/MECHANICAL					
Diameter	4mm	5mm	6mm	8mm	
Thread Pitch	—	—	—	1mm	
Housing Material	304 Stainless Steel				
Connections 2m (6.56 ft) PVC Cable	3 Conductor, 24 AWG (0.2mm²) Outer Diameter 3mm			3 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm	
Quick-Connector	M8 with 3 Pins				
Weight	10g, 0.3 oz.	15g, 0.5 oz.	20g, 0.6 oz.	50g, 1.6 oz.	
Sensing Head	Shielded	Shielded	Shielded	Shielded	Unshielded
SENSING PERFORMANCE					
Sensing Distance, Sn	0.5mm	0.8mm	1.0mm	1.5mm	2.0mm
Sensing Range Tolerance	+/- 10%				
Operating Frequency	3000Hz	3000Hz	1500Hz	1500Hz	
Hysteresis	Up to 10% of Sn				
Repeatability	≤2%				
Visual Indication Output Energized	LED (Green for PNP and Red for NPN)				
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	• • w/NPN • •	• • w/NPN • •	• • w/NPN • •	• • w/NPN • •	
ELECTRICAL					
Operating Voltage	10 ~ 30V DC				
Maximum Output Current	100mA				
Utilization Category	DC-13				
Voltage Drop Across Switch	1.5V at 100mA				
Leakage Current (Load)	Maximum 10μA				
Current Consumption	Maximum 10mA at 30V DC				
ENVIRONMENTAL					
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67				
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)				
Shock	30g, 11ms				
Vibration	55Hz, 1mm Amplitude, 3 Planes				
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.				

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

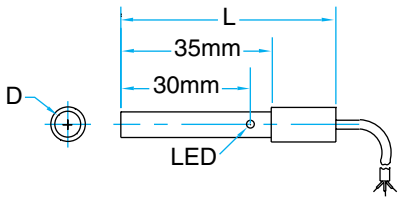
	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

2 & 3 WIRE DC SENSORS WITH CABLE CONNECTIONS

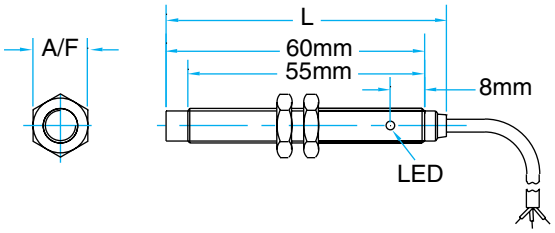
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		4	5	6	8
A/F		—	—	—	13
Length (L)	Shielded	50	50	50	55
	Unshielded	—	—	—	65
Length (L2)	Shielded	—	—	—	—
	Unshielded	—	—	—	5
Thread Pitch		—	—	—	1

4mm, 5mm, or 6mm
Smooth Cylindrical



8mm Threaded Cylindrical

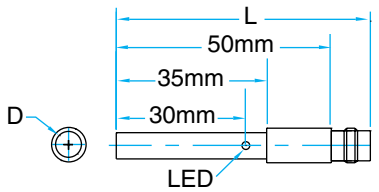


2 & 3 WIRE DC SENSORS WITH QUICK-CONNECTORS

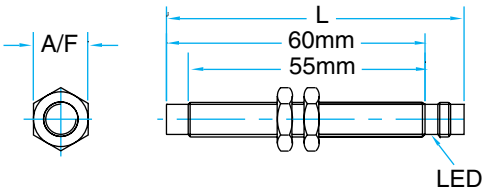
SENSORS WITH QUICK-CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		4	5	6	8
A/F		—	—	—	13
Length (L)	Shielded	59	59	59	59
	Unshielded	—	—	—	69
Length (L2)	Shielded	—	—	—	—
	Unshielded	—	—	—	5
Thread Pitch		—	—	—	1

4mm, 5mm, or 6mm
Smooth Cylindrical



8mm Threaded Cylindrical



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IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Miniature Stainless Steel Cylindrical Proximity Sensors (2-Wire DC)

IPS – S ____ ____ ____ ____ – ZC D ____

I II III IV V VI VII VIII IX

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + S + III + IV + V + VI + ZC + D + IX or **IPS-S08TCS-ZCD01**

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
S	Stainless Steel

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
04	4mm Diameter	$50.00
05	5mm Diameter	$50.00
06	6mm Diameter	$50.00
08	8mm Diameter	$20.00

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical NOTE: Only Available in 8mm Housing.
S	Smooth Cylindrical NOTE: Only Available in 4mm, 5mm and 6mm Housings.

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Micro Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush) NOTE: Only Available in 8mm Housing.

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
D	2-Wire DC

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

DISCOUNT SCHEDULE C

SOME OF OUR POPULAR CONFIGURATIONS:

INDUCTIVE MINIATURE STAINLESS STEEL CYLINDRICAL PROXIMITY SENSORS – 2 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-S04SCS-ZCD10	4mm Diameter Shielded Sensor with Cable Connector and 1 NO Output	$50.00
IPS-S05SCS-ZCD10	5mm Diameter Shielded Sensor with Cable Connector and 1 NO Output	$50.00
IPS-S06SCS-ZCD10	6mm Diameter Shielded Sensor with Cable Connector and 1 NO Output	$50.00
IPS-S08TCU-ZCD10	8mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$20.00
IPS-S08TMU-ZCD10	8mm Diameter Unshielded Sensor with Micro Quick-Connector and 1 NO Output	$20.00

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

Specifications:

INDUCTIVE MINIATURE STAINLESS STEEL CYLINDRICAL PROXIMITY SENSORS – 2 WIRE DC

	4mm	5mm	6mm	8mm	
CONSTRUCTION/MECHANICAL					
Diameter	4mm	5mm	6mm	8mm	
Thread Pitch	—	—	—	1mm	
Housing Material	304 Stainless Steel				
Connections 2m (6.56 ft) PVC Cable	2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3mm			2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm	
Quick-Connector	M8 with 3 Pins				
Weight	10g, 0.3 oz.	15g, 0.5 oz.	20g, 0.6 oz.	50g, 1.6 oz.	
Sensing Head	Shielded	Shielded	Shielded	Shielded	Unshielded
SENSING PERFORMANCE					
Sensing Distance, Sn	0.5mm	0.8mm	1.0mm	1.5mm	2.0mm
Sensing Range Tolerance	+/- 10%				
Operating Frequency	3000Hz	3000Hz	1500Hz	1500Hz	
Hysteresis	Up to 10% of Sn				
Repeatability	≤2%				
Visual Indication Output Energized	LED (Green for NC and Red for NO)				
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	• • •	• • •	• • •	• • • •	
ELECTRICAL					
Operating Voltage	10 ~ 30V DC				
Maximum Output Current	100mA				
Utilization Category	DC-13				
Voltage Drop Across Switch	7.5V at 100mA				
Leakage Current (Load)	NA				
Current Consumption	Maximum 2mA at 30V DC				
ENVIRONMENTAL					
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67				
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)				
Shock	30g, 11ms				
Vibration	55Hz, 1mm Amplitude, 3 Planes				
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.				

See Page 451 for Cable Connections and Quick Connector Dimensions.

IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Nickel Plated Brass Cylindrical Proximity Sensors (3-Wire DC)

IPS – N ____ T ____ ____ – ZC ____ ____

I II III IV V VI VII VIII IX

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + N + III + T + V + VI + ZC + VIII + IX or IPS-N18TCS-ZCN10

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$20.00
18	18mm Diameter	$20.00
30	30mm Diameter	$28.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
P	PNP
N	NPN

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 3 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-N12TCU-ZCN10	12mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO Output	$20.00
IPS-N12TMU-ZCN10	12mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO Output	$20.00
IPS-N18TCU-ZCN10	18mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO Output	$20.00
IPS-N18TMU-ZCN10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO Output	$20.00
IPS-N30TCU-ZCN10	30mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO Output	$28.00
IPS-N30TMU-ZCN10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO Output	$28.00

Inductive Nickel Plated Brass Cylindrical Proximity Sensors

A wide variety of operating voltages: 10 ~ 30V DC, 90 ~ 250V AC, and 24 ~ 240V AC/DC make c3controls proximity sensors suitable for use in almost any control system. Switching frequency up to 1000Hz maximizes production efficiency with targets moving at high speed. All c3controls inductive nickel plated brass cylindrical proximity sensors are UL Listed, CE Marked, and are rated Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67 applications. Environmental ratings for severe industrial environments, protective features, a wide variety of output configurations, and superior sensing performance make these devices suitable for the most demanding applications.

Product features include:

- 12mm, 18mm, and 30mm diameters for installation in applications where space is limited.
- Reverse polarity, short circuit, false pulse, and transient noise protection prevents damage to the sensor due to incorrect installation or fault conditions and ensures reliable operation.
- Bounce free operation eliminates false signals.
- High repeat accuracy with output currents up to 400mA.
- Shielded and unshielded constructions with standard sensing distances up to 15.0mm.
- 2-wire AC, 2-, 3- and 4-wire DC, and 2-wire AC/DC versions available for easy integration in control systems.
- PNP or NPN outputs.
- Normally Open (NO), Normally Closed (NC), and complementary Normally Open and Normally Closed (NO + NC) outputs for control circuit application flexibility.
- Solid-state design with no mechanical moving parts that can wear out, providing long life.

UNIQUE PRODUCT FEATURES

1. Nickel-plated brass housing for superior corrosion resistance in harsh environments. Withstands dust, water, lubricants, and cutting oils.
2. 2m (6.56 ft.) PVC cable or metallic mini quick-connectors for fast and easy installation and exchange of sensors when necessary.
3. Color coded visual LED indication for energized outputs.
4. Color coded sensor face for quick and easy sensor identification: green for PNP devices, red for NPN devices, yellow for AC and AC/DC devices, and blue for 2-wire DC devices.

SPECIFICATIONS:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 3 WIRE DC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	3 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				3 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	2.5mm	4.0mm	5.0mm	8.0mm	10.0mm	15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	1000Hz		500Hz		200Hz	
Hysteresis	Up to 10% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for PNP and Red for NPN)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	• • • •		• • • •		• • • •	
ELECTRICAL						
Operating Voltage	10 ~ 30V DC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	DC-13					
Voltage Drop Across Switch	1.5V at 200mA		1.5V at 400mA		1.5V at 400mA	
Leakage Current (Load)	Maximum 10µA					
Current Consumption	Maximum 10mA at 30V DC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

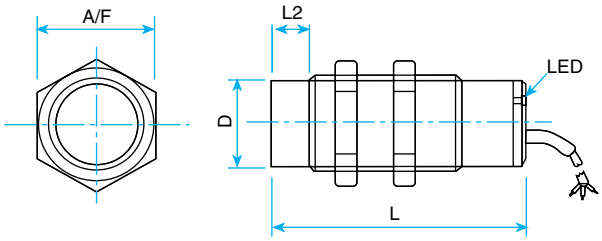
Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

3 WIRE DC SENSORS WITH CABLE CONNECTIONS

SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

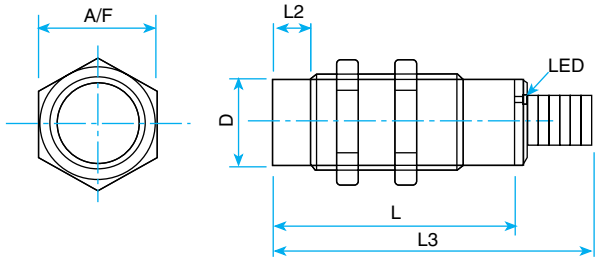
DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	72	72	72
	Unshielded	72	72	72
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



3 WIRE DC SENSORS WITH QUICK-CONNECTORS

SENSORS WITH QUICK-CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	65	65	65
	Unshielded	65	65	65
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	78	78	78
	Unshielded	78	78	78
Thread Pitch		1	1	1.5



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IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Nickel Plated Brass Cylindrical Proximity Sensors (4-Wire DC)

IPS	–	N		T			–	ZC		11
I		II	III	IV	V	VI		VII	VIII	IX

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + N + III + T + V + VI + ZC + VIII + 11 or IPS-N12TMU-ZCP11

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$32.00
18	18mm Diameter	$32.00
30	30mm Diameter	$40.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
P	PNP
N	NPN

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
11	1 Normally Open and 1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 4 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-N12TCU-ZCN11	12mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO + 1 NC Output	$32.00
IPS-N12TMU-ZCN11	12mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO + 1 NC Output	$32.00
IPS-N18TCU-ZCN11	18mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO + 1 NC Output	$32.00
IPS-N18TMU-ZCN11	18mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO + 1 NC Output	$32.00
IPS-N30TCU-ZCN11	30mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO + 1 NC Output	$40.00
IPS-N30TMU-ZCN11	30mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO + 1 NC Output	$40.00

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

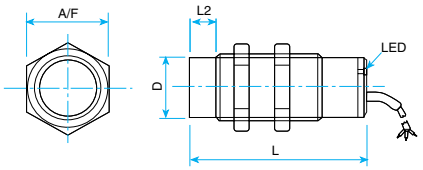
Specifications:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 4 WIRE DC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	4 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				4 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	2.5mm	4.0mm	5.0mm	8.0mm	10.0mm	15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	1000Hz		500Hz		200Hz	
Hysteresis	Up to 10% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for PNP and Red for NPN)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	•		•		•	
ELECTRICAL						
Operating Voltage	10 ~ 30V DC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	DC-13					
Voltage Drop Across Switch	1.5V at 200mA		1.5V at 400mA		1.5V at 400mA	
Leakage Current (Load)	Maximum 10µA					
Current Consumption	Maximum 10mA at 30V DC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

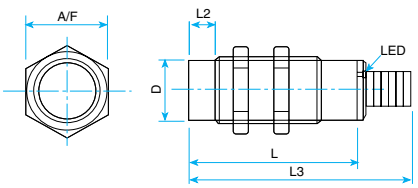
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	72	72	72
	Unshielded	72	72	72
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	65	65	65
	Unshielded	65	65	65
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	78	78	78
	Unshielded	78	78	78
Thread Pitch		1	1	1.5



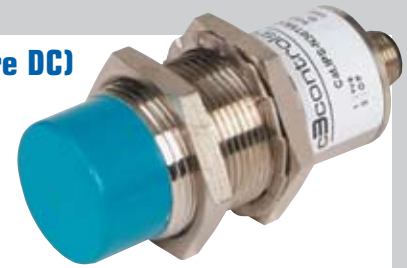
IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Nickel Plated Brass Cylindrical Proximity Sensors (2-Wire DC)

IPS – N ____ T ____ ____ – ZC D ____
I II III IV V VI VII VIII IX

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + N + III + T + V + VI + ZC + D + IX or **IPS-N30TMU-ZCD10**



I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$20.00
18	18mm Diameter	$20.00
30	30mm Diameter	$28.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
D	2-Wire DC

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

SOME OF OUR POPULAR CONFIGURATIONS:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-N12TCU-ZCD10	12mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$20.00
IPS-N12TMU-ZCD10	12mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$20.00
IPS-N18TCU-ZCD10	18mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$20.00
IPS-N18TMU-ZCD10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$20.00
IPS-N30TCU-ZCD10	30mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$28.00
IPS-N30TMU-ZCD10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$28.00

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

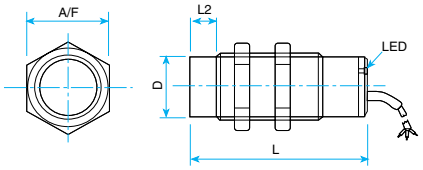
Specifications:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE DC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				2 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	2.5mm	4.0mm	5.0mm	8.0mm	10.0mm	15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	1000Hz		500Hz		200Hz	
Hysteresis	Up to 10% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for NC and Red for NO)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	•		•		•	
ELECTRICAL						
Operating Voltage	10 ~ 30V DC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	DC-13					
Voltage Drop Across Switch	7.5V at 200mA		7.5V at 400mA		7.5V at 400mA	
Leakage Current (Load)	Maximum 10µA					
Current Consumption	Maximum 2mA at 30V DC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

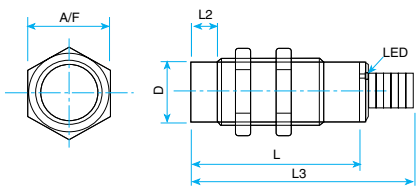
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	72	72	72
	Unshielded	72	72	72
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	65	65	65
	Unshielded	65	65	65
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	78	78	78
	Unshielded	78	78	78
Thread Pitch		1	1	1.5



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Nickel Plated Brass Cylindrical Proximity Sensors (2-Wire AC)

IPS	–	N		T			–	F	A	
I		*II*	*III*	*IV*	*V*	*VI*		*VII*	*VIII*	*IX*

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + N + III + T + V + VI + F + A + IX or IPS-N30TCU-FA10

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$28.00
18	18mm Diameter	$28.00
30	30mm Diameter	$36.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
F	90 ~ 250V AC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
A	2-Wire AC

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-N12TCU-FA10	12mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$28.00
IPS-N12TMU-FA10	12mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$28.00
IPS-N18TCU-FA10	18mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$28.00
IPS-N18TMU-FA10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$28.00
IPS-N30TCU-FA10	30mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$36.00
IPS-N30TMU-FA10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$36.00

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

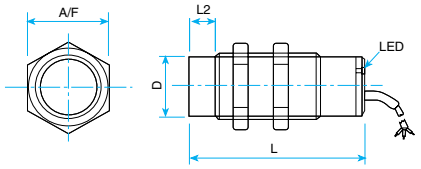
Specifications:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				2 Conductor, 21 AWG Outer Diameter 4.5mm (0.4mm²)	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	2.5mm	4.0mm	5.0mm	8.0mm	10.0mm	15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	15Hz					
Hysteresis	Up to 10% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for NC and Red for NO)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	NA • •		NA • •		NA • •	
ELECTRICAL						
Operating Voltage	90 ~ 250V AC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	AC-14					
Voltage Drop Across Switch	10V at 250V AC					
Leakage Current (Load)	NA					
Current Consumption	Maximum 2mA at 250V AC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

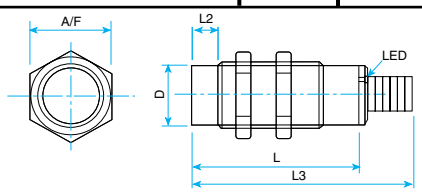
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	83	87	87
	Unshielded	83	87	87
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	80	80	80
	Unshielded	80	80	80
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	93	93	93
	Unshielded	93	93	93
Thread Pitch		1	1	1.5



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Nickel Plated Brass Cylindrical Proximity Sensors (2-Wire AC/DC)

IPS	–	N		T			–	M	A	
I		II	III	IV	V	VI		VII	VIII	IX

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + N + III + T + V + VI + M + A + IX or IPS-N18TCS-MA10

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
18	18mm Diameter	$38.00
30	30mm Diameter	$46.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
M	24 ~ 240V AC/DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
A	2-Wire AC/DC

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

SOME OF OUR POPULAR CONFIGURATIONS:

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC/DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-N18TCU-MA10	18mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$38.00
IPS-N18TMU-MA10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$38.00
IPS-N30TCU-MA10	30mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$46.00
IPS-N30TMU-MA10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$46.00

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

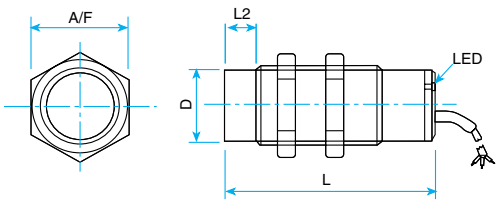
	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

INDUCTIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC/DC

	18mm		30mm	
CONSTRUCTION/MECHANICAL				
Diameter	18mm		30mm	
Thread Pitch	1mm		1.5mm	
Housing Material	Nickel Plated Brass			
Connections 2m (6.56 ft) Cable	2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm		2 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins			
Weight	100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE				
Sensing Distance, Sn	5.0mm	8.0mm	10.0mm	15.0mm
Sensing Range Tolerance	+/- 10%			
Operating Frequency	15Hz			
Hysteresis	Up to 10% of Sn			
Repeatability	≤2%			
Visual Indication Output Energized	LED (Green for NC and Red for NO)			
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	NA • •		NA • •	
ELECTRICAL				
Operating Voltage	24 ~ 240V AC or DC			
Maximum Output Current	200mA			
Utilization Category	AC-14, DC-13			
Voltage Drop Across Switch	10V at 200mA			
Leakage Current (Load)	NA			
Current Consumption	Maximum 2mA at 240V AC			
ENVIRONMENTAL				
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67			
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)			
Shock	30g, 11ms			
Vibration	55Hz, 1mm Amplitude, 3 Planes			
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.			

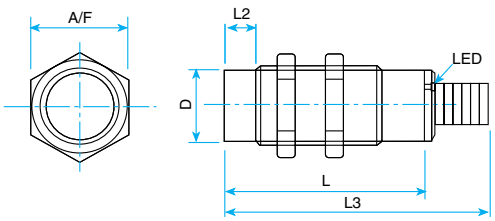
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		18	30
A/F		22	35
Length (L)	Shielded	87	87
	Unshielded	87	87
Length (L2)	Shielded	—	—
	Unshielded	8	15
Thread Pitch		1	1.5



SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		18	30
A/F		22	35
Length (L)	Shielded	80	80
	Unshielded	80	80
Length (L2)	Shielded	—	—
	Unshielded	8	15
Length (L3)	Shielded	93	93
	Unshielded	93	93
Thread Pitch		1	1.5



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Plastic Rectangular Proximity Sensors (3-Wire DC)

IPS –	P	20	R		U		– ZC		
I	II	III	IV	V	VI	VII	VIII	IX	X

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + P + 20 + R + V + U + VII + ZC + IX + X or **IPS-P20RCUY-ZCP10**

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
P	Non-Metallic (Plastic)

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
20	20mm x 20mm x 38mm	$26.00

IV. FORM FACTOR

CODE	DESCRIPTION
R	Rectangular

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Micro Quick-Connector

VI. UNSHIELDED

CODE	DESCRIPTION
U	Unshielded (Non-Flush)

VII. SENSING FACE

CODE	DESCRIPTION
Y	Y Plane
Z	Z Plane

VIII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

IX. OUTPUT TYPE

CODE	DESCRIPTION
P	PNP
N	NPN

X. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

SOME OF OUR POPULAR CONFIGURATIONS:

INDUCTIVE PLASTIC RECTANGULAR PROXIMITY SENSORS – 3 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-P20RCUZ-ZCN10	Rectangular Sensor with Cable Connector, Z Plane Sensing Face and NPN 1 NO Output	$26.00
IPS-P20RMUZ-ZCN10	Rectangular Sensor with Micro Quick-Connector, Z Plane Sensing Face and NPN 1 NO Output	$26.00
IPS-P20RCUY-ZCN10	Rectangular Sensor with Cable Connector, Y Plane Sensing Face and NPN 1 NO Output	$26.00
IPS-P20RMUY-ZCN10	Rectangular Sensor with Micro Quick-Connector, Y Plane Sensing Face and NPN 1 NO Output	$26.00

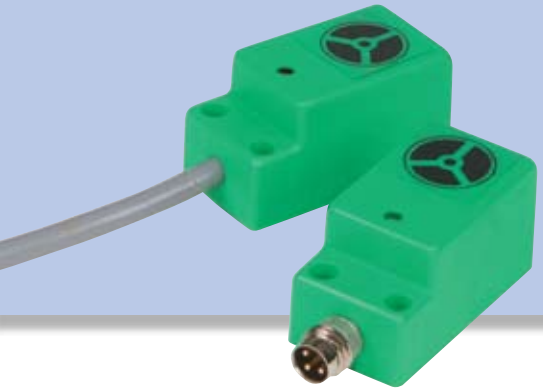
Inductive Plastic Rectangular Proximity Sensors

Rectangular housing, environmental ratings for severe industrial environments, protective features, a wide variety of output configurations, and superior sensing performance make these devices suitable for the most demanding applications. 500Hz switching frequency maximizes production efficiency with targets moving at high speed. All c3controls inductive rectangular plastic proximity sensors are UL Listed, CE Marked, and are rated for Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67 applications.

Product features include:

- Rectangular housing 20mm x 20mm x 38mm for installation in applications where space is limited and a cylindrical housing just won't fit.
- Reverse polarity, short circuit, false pulse and transient noise protection prevents damage to the sensor due to incorrect installation or fault conditions and ensures reliable operation.
- Bounce free operation eliminates false signals.
- High repeat accuracy with output currents up to 200mA.
- Standard sensing distances up to 5.0mm.
- 2, 3 and 4-wire DC versions available for easy integration in control systems.
- PNP or NPN outputs.
- Normally Open (NO), Normally Closed (NC), and complementary Normally Open and Normally Closed (NO + NC) outputs for control circuit application flexibility.
- Solid-state design with no mechanical moving parts that can wear out, providing long life.

UNIQUE PRODUCT FEATURES



1. Plastic ABS housing for superior corrosion resistance in harsh environments. Withstands dust, water, lubricants, and cutting oils.
2. 2m (6.56 ft.) PVC cable or metallic micro quick-connectors for fast and easy installation and exchange of sensors when necessary.
3. Color coded visual LED indication for energized outputs.

SPECIFICATIONS:

INDUCTIVE PLASTIC RECTANGULAR PROXIMITY SENSORS – 3 WIRE DC	
CONSTRUCTION/MECHANICAL	
Dimensions	20mm x 20mm x 38mm
Housing Material	ABS Grade 300
Connections 2m (6.56 ft) Cable	3 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm
Quick-Connector	M8 with 3 Pins
Weight	65g, 2.1 oz.
Sensing Head	Unshielded
SENSING PERFORMANCE	
Sensing Distance, Sn	5.0mm
Sensing Range Tolerance	+/- 10%
Operating Frequency	500Hz
Hysteresis	Up to 10% of Sn
Repeatability	≤2%
Visual Indication Output Energized	LED (Green for PNP and Red for NPN)
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	 • • • •
ELECTRICAL	
Operating Voltage	10 ~ 30V DC
Maximum Output Current	200mA
Utilization Category	DC-13
Voltage Drop Across Switch	1.5V at 200mA
Leakage Current (Load)	Maximum 10µA
Current Consumption	Maximum 10mA at 30V DC
ENVIRONMENTAL	
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)
Shock	30g, 11ms
Vibration	55Hz, 1mm Amplitude, 3 Planes
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.

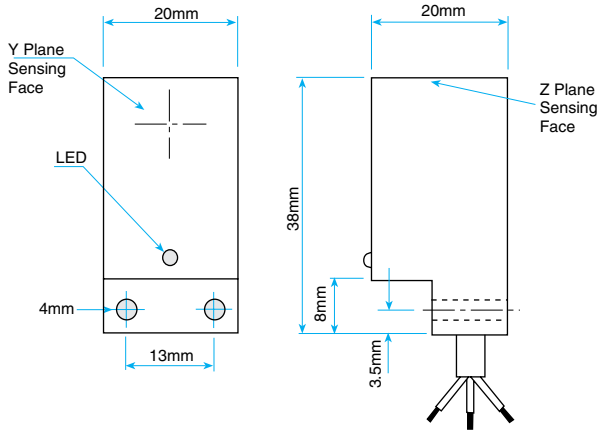
CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

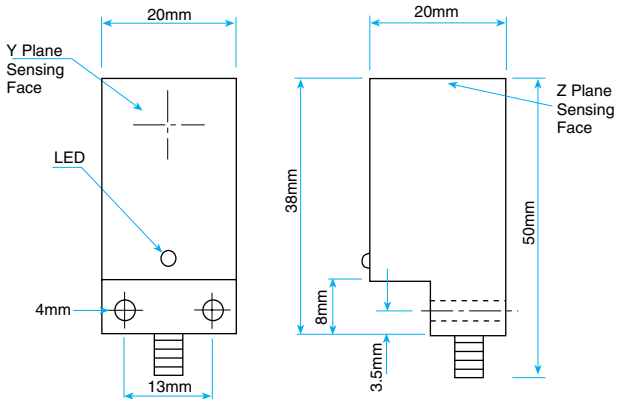
Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

3 WIRE DC SENSORS WITH CABLE CONNECTIONS – DIMENSIONS (MM)



3 WIRE DC SENSORS WITH QUICK CONNECTORS – DIMENSIONS (MM)



VISIT WWW.C3CONTROLS.COM TO DOWNLOAD CAD DRAWINGS

IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Plastic Rectangular Proximity Sensors (4-Wire DC)

IPS – P 20 R _____ U _____ – ZC N 11
I II III IV V VI VII VIII IX X

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + P + 20 + R + V + U + VII + ZC + N + 11 or IPS-P20RCUY-ZCN11

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
P	Non-Metallic (Plastic)

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
20	20mm x 20mm x 38mm	$38.00

IV. FORM FACTOR

CODE	DESCRIPTION
R	Rectangular

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Micro Quick-Connector

VI. UNSHIELDED

CODE	DESCRIPTION
U	Unshielded (Non-Flush)

VII. SENSING FACE

CODE	DESCRIPTION
Y	Y Plane
Z	Z Plane

VIII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

IX. OUTPUT TYPE

CODE	DESCRIPTION
N	NPN

X. OUTPUT CONFIGURATION

CODE	DESCRIPTION
11	1 Normally Open and 1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

SOME OF OUR POPULAR CONFIGURATIONS:

INDUCTIVE PLASTIC RECTANGULAR PROXIMITY SENSORS – 4 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-P20RCUZ-ZCN11	Rectangular Sensor with Cable Connector, Z Plane Sensing Face, and NPN 1 NO and 1 NC Output	$38.00
IPS-P20RMUZ-ZCN11	Rectangular Sensor with Micro Quick-Connector, Z Plane Sensing Face, and NPN 1 NO and 1 NC Output	$38.00
IPS-P20RCUY-ZCN11	Rectangular Sensor with Cable Connector, Y Plane Sensing Face, and NPN 1 NO and 1 NC Output	$38.00
IPS-P20RMUY-ZCN11	Rectangular Sensor with Micro Quick-Connector, Y Plane Sensing Face, and NPN 1 NO and 1 NC Output	$38.00

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

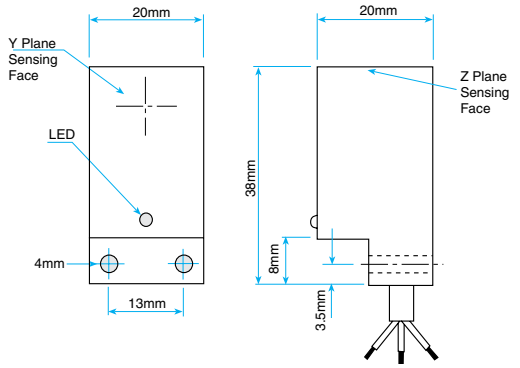
Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

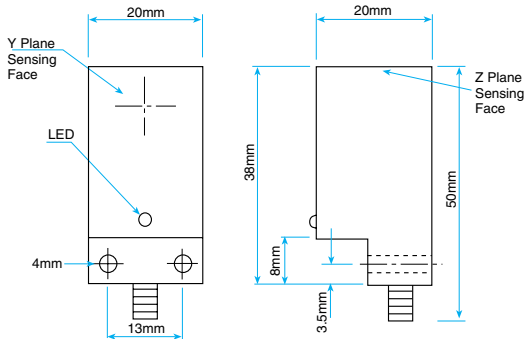
Specifications:

Inductive Plastic Rectangular Proximity Sensors – 4 Wire DC	
CONSTRUCTION/MECHANICAL	
Dimensions	20mm x 20mm x 38mm
Housing Material	ABS Grade 300
Connections 2m (6.56 ft) Cable	4 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm
Quick-Connector	M12 with 4 Pins
Weight	65g, 2.1 oz.
Sensing Head	Unshielded
SENSING PERFORMANCE	
Sensing Distance, Sn	5.0mm
Sensing Range Tolerance	+/- 10%
Operating Frequency	500Hz
Hysteresis	Up to 10% of Sn
Repeatability	≤2%
Visual Indication Output Energized	LED (Red)
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	• • • •
ELECTRICAL	
Operating Voltage	10 ~ 30V DC
Maximum Output Current	200mA
Utilization Category	DC-13
Voltage Drop Across Switch	1.5V at 200mA
Leakage Current (Load)	Maximum 10µA
Current Consumption	Maximum 10mA at 30V DC
ENVIRONMENTAL	
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)
Shock	30g, 11ms
Vibration	55Hz, 1mm Amplitude, 3 Planes
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.

4 Wire DC Sensors With Cable Connections – Dimensions (mm)



4 Wire DC Sensors With Quick Connectors – Dimensions (mm)



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Inductive Plastic Rectangular Proximity Sensors (2-Wire DC)

IPS –	P	20	R		U		– ZC	D	
I	II	III	IV	V	VI	VII	VIII	IX	X

Example: To build one of our most popular Proximity Sensors, the part number would be IPS + P + 20 + R + V + U + VII + ZC + D + X or IPS-P20RCUY-ZCD10

I. SENSOR TYPE

CODE	DESCRIPTION
IPS	Inductive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
P	Non-Metallic (Plastic)

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
20	20mm x 20mm x 38mm	$26.00

IV. FORM FACTOR

CODE	DESCRIPTION
R	Rectangular

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Micro Quick-Connector

VI. UNSHIELDED

CODE	DESCRIPTION
U	Unshielded (Non-Flush)

VII. SENSING FACE

CODE	DESCRIPTION
Y	Y Plane
Z	Z Plane

VIII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

IX. OUTPUT TYPE

CODE	DESCRIPTION
D	2-Wire DC

X. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

SOME OF OUR POPULAR CONFIGURATIONS:

INDUCTIVE PLASTIC RECTANGULAR PROXIMITY SENSORS – 2 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
IPS-P20RCUZ-ZCD10	Rectangular Sensor with Cable Connector, Z Plane Sensing Face and 1 NO Output	$26.00
IPS-P20RMUZ-ZCD10	Rectangular Sensor with Micro Quick-Connector, Z Plane Sensing Face and 1 NO Output	$26.00
IPS-P20RCUY-ZCD10	Rectangular Sensor with Cable Connector, Y Plane Sensing Face and 1 NO Output	$26.00
IPS-P20RMUY-ZCD10	Rectangular Sensor with Micro Quick-Connector, Y Plane Sensing Face and 1 NO Output	$26.00

CORRECTION FACTORS

The operating distance for targets of materials other than mild steel will in general, be reduced. Exact reductions cannot be predicted as they depend upon the specific alloy and purity.

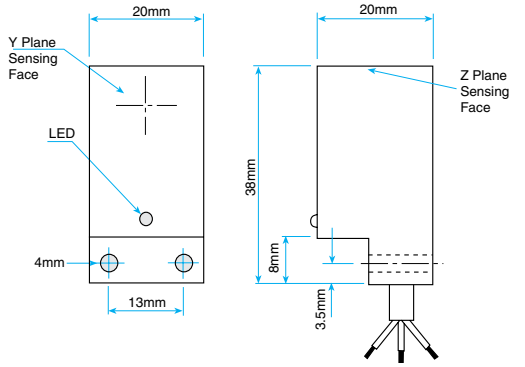
Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

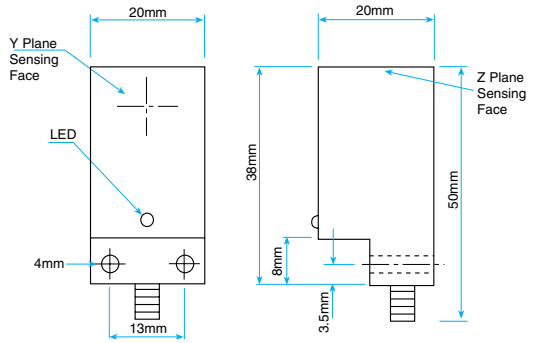
Specifications:

INDUCTIVE PLASTIC RECTANGULAR PROXIMITY SENSORS – 2 WIRE DC	
CONSTRUCTION/MECHANICAL	
Dimensions	20mm x 20mm x 38mm
Housing Material	ABS Grade 300
Connections 2m (6.56 ft) Cable	2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm
Quick-Connector	M8 with 3 Pins
Weight	65g, 2.1 oz.
Sensing Head	Unshielded
SENSING PERFORMANCE	
Sensing Distance, Sn	5.0mm
Sensing Range Tolerance	+/- 10%
Operating Frequency	500Hz
Hysteresis	Up to 10% of Sn
Repeatability	≤2%
Visual Indication Output Energized	LED (Green for NC and Red for NO)
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	• • • •
ELECTRICAL	
Operating Voltage	10 ~ 30V DC
Maximum Output Current	200mA
Utilization Category	DC-13
Voltage Drop Across Switch	7.5V at 200mA
Leakage Current (Load)	NA
Current Consumption	Maximum 2mA at 30V DC
ENVIRONMENTAL	
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)
Shock	30g, 11ms
Vibration	55Hz, 1mm Amplitude, 3 Planes
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.

2 Wire DC Sensors With Cable Connections – Dimensions (mm)



2 Wire DC Sensors With Quick Connectors – Dimensions (mm)



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Capacitive Nickel Plated Brass Cylindrical Proximity Sensors (3-Wire DC)

CPS – N ____ T ____ ____ – ZC ____ ____

I II III IV V VI VII VIII IX

Example: To build one of our most popular Proximity Sensors, the part number would be CPS + N + III + T + V + VI + ZC + VIII + IX or CPS-N18TCU-ZCP10

I. SENSOR TYPE

CODE	DESCRIPTION
CPS	Capacitive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$46.00
18	18mm Diameter	$46.00
30	30mm Diameter	$54.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
P	PNP
N	NPN

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 3 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
CPS-N12TCU-ZCN10	12mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO Output	$46.00
CPS-N12TMU-ZCN10	12mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO Output	$46.00
CPS-N18TCU-ZCN10	18mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO Output	$46.00
CPS-N18TMU-ZCN10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO Output	$46.00
CPS-N30TCU-ZCN10	30mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO Output	$54.00
CPS-N30TMU-ZCN10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO Output	$54.00

Capacitive Nickel Plated Brass Cylindrical Proximity Sensors

Environmental ratings for severe industrial environments, protective features, a wide variety of output configurations and superior sensing performance make these devices suitable for the most demanding applications. The capacitive design can sense the presence of metallic and non-metallic targets including liquids, rubber, paper, cardboard and bulk materials. A wide variety of operating voltages are available: 10 ~ 30V DC, 90 ~ 250V AC, and 24 ~ 240V AC/DC making them suitable for use in almost any control system. All c3controls capacitive nickel plated brass cylindrical proximity sensors are UL Listed, CE Marked, and rated for Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67 applications.

Product features include:

- 12mm, 18mm, and 30mm diameters for installation in applications where space is limited.
- Reverse polarity, short circuit, false pulse, and transient noise protection prevents damage to the sensor due to incorrect installation or fault conditions and ensures reliable operation.
- Bounce free operation eliminates false signals.
- High repeat accuracy with output currents up to 400mA.
- Shielded and unshielded constructions with standard sensing distances up to 15.0mm.
- 2-wire AC, 2-, 3- and 4-wire DC, and 2-wire AC/DC versions available for easy integration in control systems.
- PNP or NPN outputs.
- Normally Open (NO), Normally Closed (NC), and complementary Normally Open and Normally Closed (NO + NC) outputs for control circuit application flexibility.
- Solid-state design with no mechanical moving parts that can wear out, providing long life.

UNIQUE PRODUCT FEATURES

1. Nickel-plated brass housing for superior corrosion resistance in harsh environments. Withstands dust, water, lubricants, and cutting oils.
2. 2m (6.56 ft.) PVC cable or metallic mini quick-connectors for fast and easy installation and exchange of sensors when necessary.
3. Color coded visual LED indication for energized outputs.
4. Color coded sensor face for quick and easy sensor identification: green for PNP devices, red for NPN devices, yellow for AC and AC/DC devices, and blue for 2-wire DC devices.

SPECIFICATIONS:

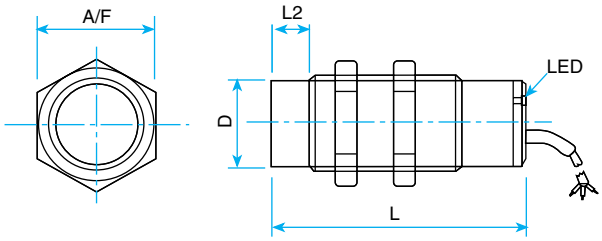
CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 3 WIRE DC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	3 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				3 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	3.0mm	5.0mm	2.0 to 5.0mm	2.0 to 10.0mm	2.0 to 10.0mm	2.0 to 15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	25Hz					
Hysteresis	Up to 15% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for PNP and Red for NPN)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	• • • •		• • • •		• • • •	
ELECTRICAL						
Operating Voltage	10 ~ 30V DC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	DC-13					
Voltage Drop Across Switch	1.5V at 200mA		1.5V at 400mA		1.5V at 400mA	
Leakage Current (Load)	Maximum 10µA					
Current Consumption	Maximum 15mA at 30V DC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

3 WIRE DC SENSORS WITH CABLE CONNECTIONS

SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

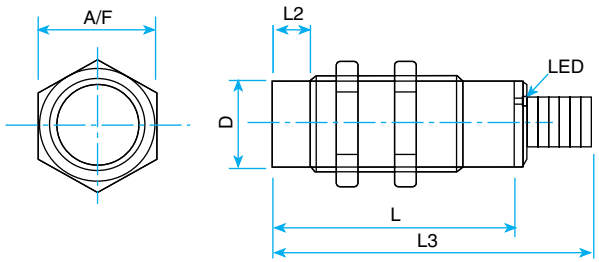
DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	83	83	83
	Unshielded	83	83	83
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



3 WIRE DC SENSORS WITH QUICK-CONNECTORS

SENSORS WITH QUICK-CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	80	80	80
	Unshielded	80	80	80
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	93	93	93
	Unshielded	93	93	93
Thread Pitch		1	1	1.5



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Capacitive Nickel Plated Brass Cylindrical Proximity Sensors (4-Wire DC)

CPS –	N		T			–	ZC		11
I	II	III	IV	V	VI		VII	VIII	IX

Example: To build one of our most popular Proximity Sensors, the part number would be CPS + N + III + T + V + VI + ZC + VIII + 11 or CPS-N18TMU-ZCN11

I. SENSOR TYPE

CODE	DESCRIPTION
CPS	Capacitive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$58.00
18	18mm Diameter	$58.00
30	30mm Diameter	$66.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
P	PNP
N	NPN

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
11	1 Normally Open and 1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 4 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
CPS-N12TCU-ZCN11	12mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO + 1 NC Output	$58.00
CPS-N12TMU-ZCN11	12mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO + 1 NC Output	$58.00
CPS-N18TCU-ZCN11	18mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO + 1 NC Output	$58.00
CPS-N18TMU-ZCN11	18mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO + 1 NC Output	$58.00
CPS-N30TCU-ZCN11	30mm Diameter Unshielded Sensor with Cable Connector and NPN 1 NO + 1 NC Output	$66.00
CPS-N30TMU-ZCN11	30mm Diameter Unshielded Sensor with Mini Quick-Connector and NPN 1 NO + 1 NC Output	$66.00

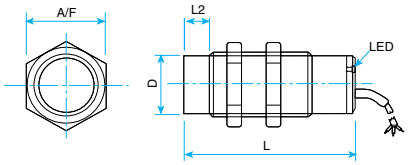
Specifications:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 4 WIRE DC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	4 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				4 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	3.0mm	5.0mm	2.0 to 5.0mm	2.0 to 10.0mm	2.0 to 10.0mm	2.0 to 15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	25Hz					
Hysteresis	Up to 15% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for PNP and Red for NPN)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	• • • •		• • • •		• • • •	
ELECTRICAL						
Operating Voltage	10 ~ 30V DC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	DC-13					
Voltage Drop Across Switch	1.5V at 200mA		1.5V at 400mA		1.5V at 400mA	
Leakage Current (Load)	Maximum 10µA					
Current Consumption	Maximum 15mA at 30V DC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

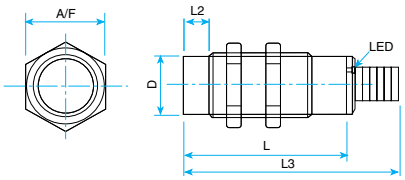
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	83	83	83
	Unshielded	83	83	83
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	80	80	80
	Unshielded	80	80	80
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	93	93	93
	Unshielded	93	93	93
Thread Pitch		1	1	1.5



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Capacitive Nickel Plated Brass Cylindrical Proximity Sensors (2-Wire DC)

CPS –	N		T			– ZC	D	
I	II	III	IV	V	VI	VII	VIII	IX

Example: To build one of our most popular Proximity Sensors, the part number would be CPS + N + III + T + V + VI + ZC + D + IX or CPS-N18TCU-ZCD01

I. SENSOR TYPE

CODE	DESCRIPTION
CPS	Capacitive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$46.00
18	18mm Diameter	$46.00
30	30mm Diameter	$54.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
ZC	10 ~ 30V DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
D	2-Wire DC

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE DC

CATALOG NUMBER	DESCRIPTION	PRICE
CPS-N12TCU-ZCD10	12mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$46.00
CPS-N12TMU-ZCD10	12mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$46.00
CPS-N18TCU-ZCD10	18mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$46.00
CPS-N18TMU-ZCD10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$46.00
CPS-N30TCU-ZCD10	30mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$54.00
CPS-N30TMU-ZCD10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$54.00

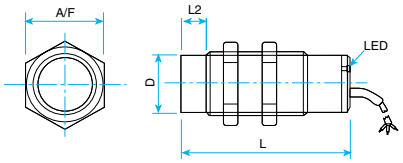
Specifications:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE DC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				2 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	3.0mm	5.0mm	2.0 to 5.0mm	2.0 to 10.0mm	2.0 to 10.0mm	2.0 to 15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	25Hz					
Hysteresis	Up to 15% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for NC and Red for NO)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	•		•		•	
ELECTRICAL						
Operating Voltage	10 ~ 30V DC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	DC-13					
Voltage Drop Across Switch	7.5V at 200mA		7.5V at 400mA		7.5V at 400mA	
Leakage Current (Load)	NA					
Current Consumption	Maximum 2mA at 30V DC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

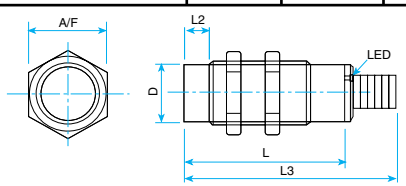
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	83	83	83
	Unshielded	83	83	83
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	80	80	80
	Unshielded	80	80	80
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	93	93	93
	Unshielded	93	93	93
Thread Pitch		1	1	1.5



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Capacitive Nickel Plated Brass Cylindrical Proximity Sensors (2-Wire AC)

CPS –	N		T			–	F	A	
I	*II*	*III*	*IV*	*V*	*VI*		*VII*	*VIII*	*IX*

Example: To build one of our most popular Proximity Sensors, the part number would be CPS + N + III + T + V + VI + F + A + IX or CPS-N30TMU-FA10

I. SENSOR TYPE

CODE	DESCRIPTION
CPS	Capacitive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
12	12mm Diameter	$60.00
18	18mm Diameter	$60.00
30	30mm Diameter	$68.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
F	90 - 250V AC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
A	2-Wire AC

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC

CATALOG NUMBER	DESCRIPTION	PRICE
CPS-N12TCU-FA10	12mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$60.00
CPS-N12TMU-FA10	12mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$60.00
CPS-N18TCU-FA10	18mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$60.00
CPS-N18TMU-FA10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$60.00
CPS-N30TCU-FA10	30mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$68.00
CPS-N30TMU-FA10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$68.00

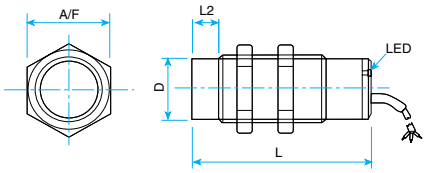
Specifications:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC

	12mm		18mm		30mm	
CONSTRUCTION/MECHANICAL						
Diameter	12mm		18mm		30mm	
Thread Pitch	1mm		1mm		1.5mm	
Housing Material	Nickel Plated Brass					
Connections 2m (6.56 ft) Cable	2 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm				2 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins					
Weight	65g, 2.1 oz.		100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE						
Sensing Distance, Sn	3.0mm	5.0mm	2.0 to 5.0mm	2.0 to 10.0mm	2.0 to 10.0mm	2.0 to 15.0mm
Sensing Range Tolerance	+/- 10%					
Operating Frequency	15Hz					
Hysteresis	Up to 15% of Sn					
Repeatability	≤2%					
Visual Indication Output Energized	LED (Green for NC and Red for NO)					
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	NA • •		NA • •		NA • •	
ELECTRICAL						
Operating Voltage	90 ~ 250V AC					
Maximum Output Current	200mA		400mA		400mA	
Utilization Category	AC-14					
Voltage Drop Across Switch	10V at 200mA		10V at 400mA		10V at 400mA	
Leakage Current (Load)	NA					
Current Consumption	Maximum 2mA at 250V AC					
ENVIRONMENTAL						
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67					
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)					
Shock	30g, 11ms					
Vibration	55Hz, 1mm Amplitude, 3 Planes					
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.					

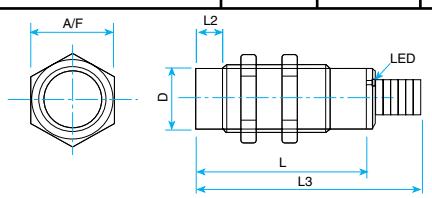
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	83	83	83
	Unshielded	83	83	83
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Thread Pitch		1	1	1.5



SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		12	18	30
A/F		17	22	35
Length (L)	Shielded	80	80	80
	Unshielded	80	80	80
Length (L2)	Shielded	—	—	—
	Unshielded	5	8	15
Length (L3)	Shielded	93	93	93
	Unshielded	93	93	93
Thread Pitch		1	1	1.5



IT'S EASY TO BUILD YOUR OWN PROXIMITY SENSOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 6 for more detailed directions.

Capacitive Nickel Plated Brass Cylindrical Proximity Sensors (2-Wire AC/DC)

CPS – N ____ T ____ ____ – M A ____

I II III IV V VI VII VIII IX

Example: To build one of our most popular Proximity Sensors, the part number would be CPS + N + III + T + V + VI + M + A + IX or CPS-N30TCU-MA01

I. SENSOR TYPE

CODE	DESCRIPTION
CPS	Capacitive Proximity Sensor

II. HOUSING MATERIAL

CODE	DESCRIPTION
N	Nickel Plated Brass

III. HOUSING DIMENSION

CODE	DESCRIPTION	PRICE
18	18mm Diameter	$70.00
30	30mm Diameter	$78.00

IV. FORM FACTOR

CODE	DESCRIPTION
T	Threaded Cylindrical

V. CONNECTION

CODE	DESCRIPTION
C	2m (6.56 ft.) Cable
M	Mini Quick-Connector

VI. SHIELDED/UNSHIELDED

CODE	DESCRIPTION
S	Shielded (Flush)
U	Unshielded (Non-Flush)

VII. VOLTAGE

CODE	DESCRIPTION
M	24 ~ 240V AC/DC

VIII. OUTPUT TYPE

CODE	DESCRIPTION
A	2-Wire AC/DC

IX. OUTPUT CONFIGURATION

CODE	DESCRIPTION
10	1 Normally Open
01	1 Normally Closed

SEE PAGES 486-487 FOR A COMPLETE SELECTION OF ACCESSORIES.

DISCOUNT SCHEDULE C

Some of Our Popular Configurations:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC/DC

CATALOG NUMBER	DESCRIPTION	PRICE
CPS-N18TCU-MA10	18mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$70.00
CPS-N18TMU-MA10	18mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$70.00
CPS-N30TCU-MA10	30mm Diameter Unshielded Sensor with Cable Connector and 1 NO Output	$78.00
CPS-N30TMU-MA10	30mm Diameter Unshielded Sensor with Mini Quick-Connector and 1 NO Output	$78.00

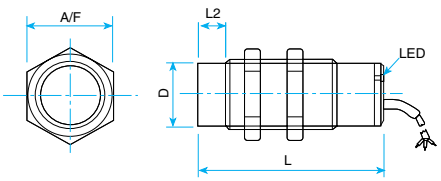
Specifications:

CAPACITIVE NICKEL PLATED BRASS CYLINDRICAL PROXIMITY SENSORS – 2 WIRE AC/DC

	18mm		30mm	
CONSTRUCTION/MECHANICAL				
Diameter	18mm		30mm	
Thread Pitch	1mm		1.5mm	
Housing Material	Nickel Plated Brass			
Connections 2m (6.56 ft) Cable	3 Conductor, 24 AWG (0.2mm²) Outer Diameter 3.5mm		3 Conductor, 21 AWG (0.4mm²) Outer Diameter 4.5mm	
Quick-Connector	M12 with 4 Pins			
Weight kg (lbs.)	100g, 3.2 oz.		200g, 6.4 oz.	
Sensing Head	Shielded	Unshielded	Shielded	Unshielded
SENSING PERFORMANCE				
Sensing Distance, Sn	2.0 to 5.0mm	2.0 to 10.0mm	2.0 to 10.0mm	2.0 to 15.0mm
Sensing Range Tolerance	+/- 10%			
Operating Frequency	10Hz			
Hysteresis	Up to 15% of Sn			
Repeatability	≤ 2%			
Visual Indication Output Energized	LED (Green for NC and Red for NO)			
Protection Reverse Polarity Short Circuit False Pulse Transient Noise	NA • •		NA • •	
ELECTRICAL				
Operating Voltage	24 ~ 240V AC or DC			
Maximum Output Current	400mA			
Utilization Category	AC-14, DC-13			
Voltage Drop Across Switch	10V at 400mA			
Leakage Current (Load)	NA			
Current Consumption	Maximum 2mA at 240V AC			
ENVIRONMENTAL				
Ingress Protection	Type 1, 2, 3, 3R, 4/4X, 6, 6P, 12 and 13, and IP67			
Ambient Operating Temperature	-25 to 70° C (-13 to 158° F)			
Shock	30g, 11ms			
Vibration	55Hz, 1mm Amplitude, 3 Planes			
RoHS Compliance	For RoHS compliance documentation by product, refer to www.c3controls.com.			

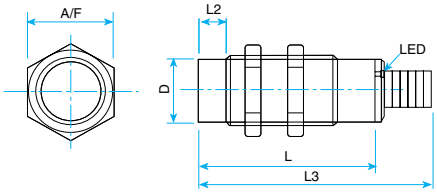
SENSORS WITH CABLE CONNECTIONS — DIMENSIONS (MM)

DIAMETER (D)		18	30
A/F		22	35
Length (L)	Shielded	83	83
	Unshielded	83	83
Length (L2)	Shielded	—	—
	Unshielded	8	15
Thread Pitch		1	1.5



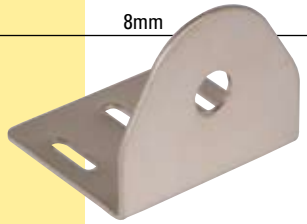
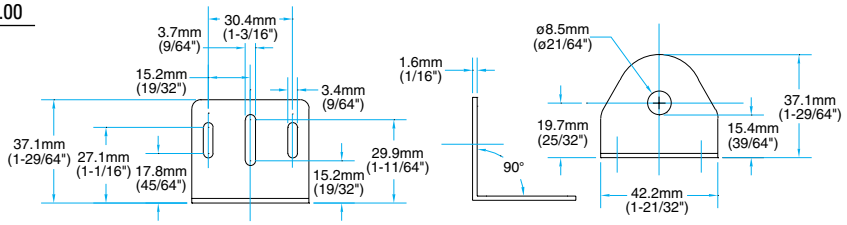
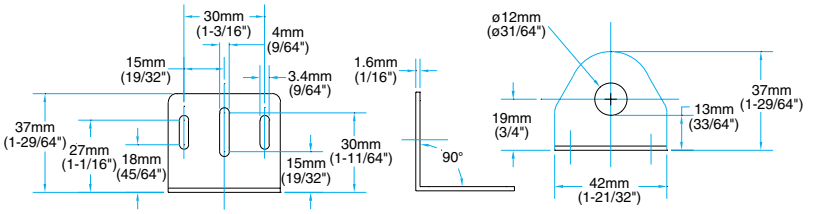
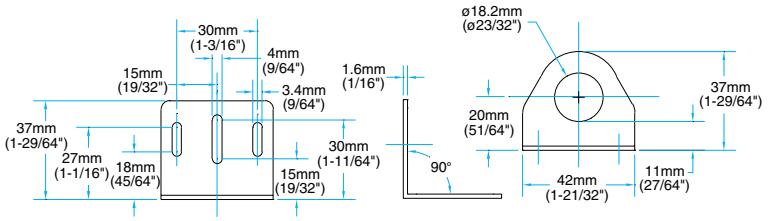
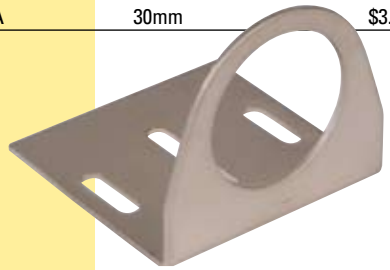
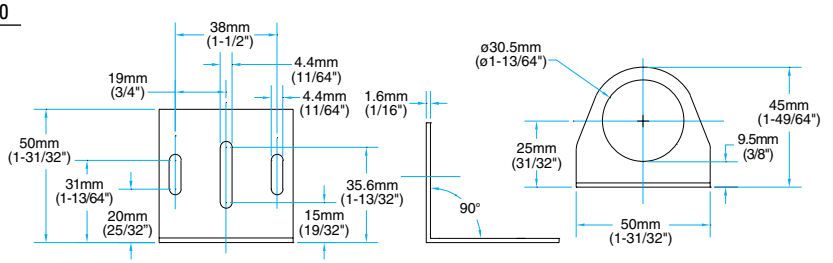
SENSORS WITH QUICK CONNECTORS — DIMENSIONS (MM)

DIAMETER (D)		18	30
A/F		22	35
Length (L)	Shielded	80	80
	Unshielded	80	80
Length (L2)	Shielded	—	—
	Unshielded	8	15
Length (L3)	Shielded	93	93
	Unshielded	93	93
Thread Pitch		1	1.5



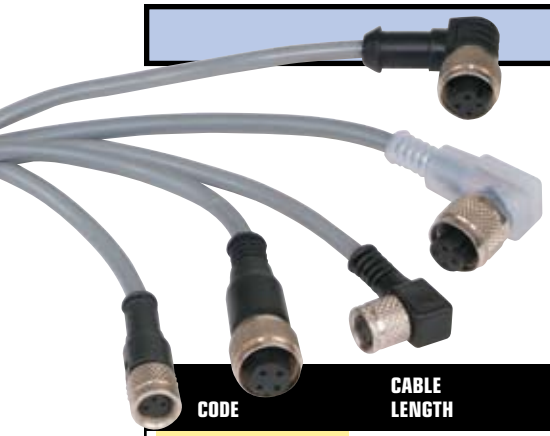
MOUNTING BRACKETS

A variety of right-angle chrome plated steel mounting brackets are available for simple, convenient installation and adjustable positioning of cylindrical proximity sensors. For RoHS compliance documentation by product, refer to www.c3controls.com.

CODE	PROXIMITY SENSOR DIAMETER	PRICE	DIMENSIONS
MB08A	8mm	$3.00	 
MB12A	12mm	$3.00	 
MB18A	18mm	$3.00	 
MB30A	30mm	$3.00	 

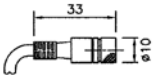
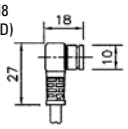
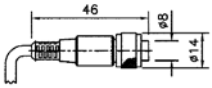
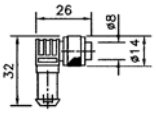
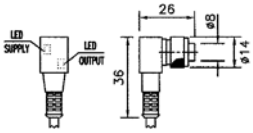
DISCOUNT SCHEDULE C

CORDSETS



A variety of cordsets are available for convenient, simple and speedy installation of proximity sensors. The cordsets feature industry standard 3- and 4-pin, straight and right-angle female connectors on one end, and flying leads on the other end. Connectors are physically keyed to guard against incorrect wiring. Connectors with LEDs are available to provide visual sensor status indication. For RoHS compliance documentation by product, refer to www.c3controls.com.

DISCOUNT SCHEDULE C

CODE	CABLE LENGTH	CABLE WIRE SIZE	TYPE	CONNECTIONS	PRICE
FM08S02A	2m (6.56 ft.)	0.2mm² (24 AWG)	STRAIGHT TYPE - M8 (WITHOUT LED) 	 1 – Brown 2 – Blue 3 – Black	$ 9.50
FM08S05A	5m (16.40 ft.)				$14.00
FM08L02A	2m (6.56 ft.)	0.2mm² (24 AWG)	"L" TYPE - M8 (WITHOUT LED) 	 1 – Brown 2 – Blue 3 – Black	$ 9.50
FM08L05A	5m (16.40 ft.)				$14.00
FM12S02A	2m (6.56 ft.)	0.2mm² (24 AWG)	STRAIGHT TYPE - M12 (WITHOUT LED) 	 1 – Brown 2 – White 3 – Blue 4 – Black	$ 9.50
FM12S05A	5m (16.40 ft.)				$14.00
FM12L02A	2m (6.56 ft.)	0.2mm² (24 AWG)	"L" TYPE - M12 (WITHOUT LED) 	 1 – Brown 2 – White 3 – Blue 4 – Black	$ 9.50
FM12L05A	5m (16.40 ft.)				$14.00
FM12LL02A[1]	2m (6.56 ft.)	0.2mm² (24 AWG)	"L" TYPE - M12 (WITH LED) 	 1 – Brown 2 – White 3 – Blue 4 – Black	$11.50
FM12LL05A[1]	5m (16.40 ft.)				$14.00

[1] Cordsets with LED indication are for use with 3- or 4-wire DC PnP output sensors only. For more information, see Table "Connections and Wire Color Configuration on page 489.

REPLACEMENT MOUNTING NUTS

Replacement mounting nuts are available for all cylindrical threaded barrel proximity sensors. The materials of the mounting nuts match the respective housing material. The 8mm is 304 stainless steel. The 12mm, 18mm, and 30mm are nickel plated brass.

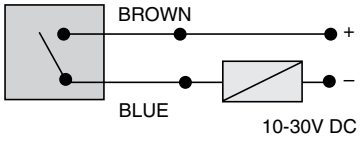
CODE	PROXIMITY SENSOR DIAMETER	PKG. QTY.	PRICE/PC.
IPS-LN08	8mm	5	$0.70
IPS-LN12	12mm	5	$0.70
IPS-LN18	18mm	5	$0.70
IPS-LN30	30mm	5	$0.90

REPLACEMENT LOCK WASHERS

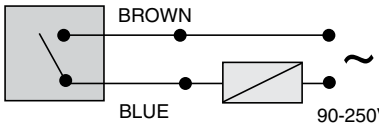
Replacement lock washers are available for all cylindrical threaded barrel proximity sensors. The materials of the lock washers match the respective housing material. The 8mm is 304 stainless steel. The 12mm, 18mm, and 30mm are nickel plated brass.

CODE	PROXIMITY SENSOR DIAMETER	PKG. QTY.	PRICE/PC.
IPS-LW08	8mm	5	$0.30
IPS-LW12	12mm	5	$0.30
IPS-LW18	18mm	5	$0.30
IPS-LW30	30mm	5	$0.40

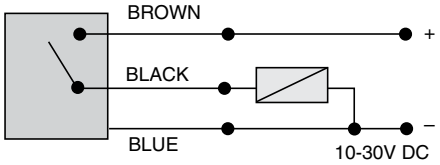
DC-Standard (2-Wire), NO or NC



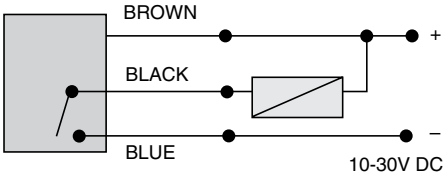
AC (2-Wire), NO or NC



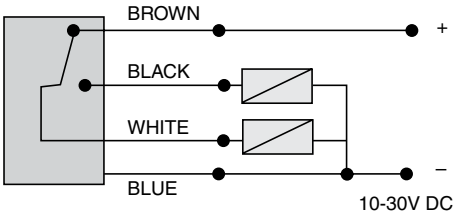
DC-PNP (3-Wire), NO or NC



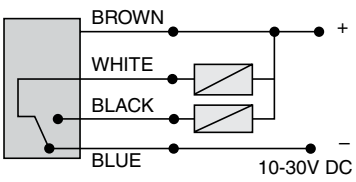
DC-NPN (3-Wire), NO or NC



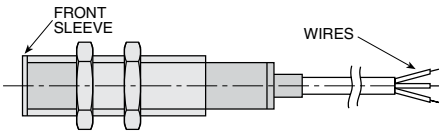
DC-PNP (4-Wire), NO+NC



DC-NPN (4-Wire), NO+NC



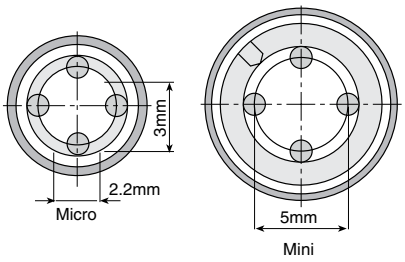
Color Coding



FRONT SLEEVE COLORS	
PNP	Green
NPN	Red
AC and AC/DC	Yellow
2 Wire DC	Blue

WIRE COLORS	
DC - 2 WIRES	
Negative Wire	Blue
Positive Wire	Brown
DC - 3 WIRES, PNP/NPN	
Positive Wire	Brown
Negative Wire	Blue
Output Wire	Black
DC - 4 WIRES, NPN/PNP/NO+NC	
Positive Wire	Brown
Negative Wire	Blue
'NO' Output Wire	Black
'NC' Output Wire	White
AC - 2 WIRES	
Phase Wire	Brown
Load Wire	Blue

OUTPUT CONFIGURATION	
DC 2-Wire	NO or NC
DC 3-Wire	PNP + NO or NPN + NO PNP + NC or NPN + NC
DC 4-Wire	PNP + (NO + NC) or NPN + (NO + NC)
AC 2-Wire	NO or NC
AC/DC 2-Wire	NO or NC



TIGHTENING TORQUE RECOMMENDATIONS FOR THREADED BARREL TYPE PROXIMITY SENSORS

DIAMETER	TORQUE (Nm [Lb-in.]
8mm	2.3 - 3.4 [20 - 30]
12mm	5.1 - 6.2 [45 - 55]
18mm	6.2 - 7.3 [55 - 65]
30mm	10.7 - 11.9 [95 - 105]

Caution: Exceeding the recommended installation torque values may result in damage to the sensor.

CONNECTIONS AND WIRE COLOR CONFIGURATION

Catalog Series Code	Function	Inner Wire Color	Terminal No.	Connector Type for 12mm, 18mm, 30mm			Connector Type for 8mm or 20mm Rectangular		
				Straight	Angled	Angled+LED	Straight	Angled	Angled+LED
4 W DC									
IPS-N12…N30		+ Brown	1	FM12S02A	FM12L02A	FM12LL02A	NA	NA	NA
CPS-N12…N30	PNP	- Blue	3	FM12S05A	FM12L05A	FM12LL05A			
IPS-P20R	NO/NC	NO O/p Black	4						
		NC O/p White	2						
		+ Brown	1	FM12S02A	FM12L02A	NA			NA
	NPN	- Blue	3	FM12S05A	FM12L05A		FM08S02A	FM08L02A	
	NO/NC	NO O/p Black	4				FM08S05A	FM08L05A	
		NC O/p White	2						
3 W DC									
IPS-S08		+ Brown	1	FM12S02A	FM12L02A	FM12LL02A	FM08S02A	FM08L02A	
IPS-N12…N30	PNP NO	- Blue	3	FM12S05A	FM12L05A	FM12LL05A	FM08S05A	FM08L05A	NA
CPS-N12…N30		O/p Black	4						
IPS-P20R		+ Brown	1	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
	NPN NO	- Blue	3	FM12S05A	FM12L05A		FM08S05A	FM08L05A	
		O/p Black	4						
		+ Brown	1	FM12S02A	FM12L02A	FM12LL02A	FM08S02A	FM08L02A	
	PNP NC	- Blue	3	FM12S05A	FM12L05A	FM12LL05A	FM08S05A	FM08L05A	NA
		O/p Black	2						
		+ Brown	1	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
	NPN NC	- Blue	3	FM12S05A	FM12L05A		FM08S05A	FM08L05A	
		O/p Black	2						
2 W DC									
IPS-N12…N30	NO	+ Brown	1	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
CPS-N12…N30		O/p Blue	4	FM12S05A	FM12L05A		FM08S05A	FM08L05A	
IPS-P20R	NC	+ Brown	1	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
		O/p Blue	2	FM12S05A	FM12L05A		FM08S05A	FM08L05A	
2 W AC/DC									
IPS-N18…N30	NO	Ph/+ Brown	1	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
CPS-N18…N30		O/p Blue	4	FM12S05A	FM12L05A		FM08S05A	FM08L05A	
	NC	Ph/+ Brown	1	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
		O/p Blue	2	FM12S05A	FM12L05A		FM08S05A	FM08L05A	
2 W AC									
IPS-N12…N30	NO	Brown	3	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
CPS-N12…N30		Blue	4	FM12S05A	FM12L05A		FM08S05A	FM08L05A	
	NC	Brown	1	FM12S02A	FM12L02A	NA	FM08S02A	FM08L02A	NA
		Blue	2	FM12S05A	FM12L05A		FM08S05A	FM08L05A	NA

Active Surface: The surface of the proximity sensor from which the electromagnetic or electrostatic field emerges.

Assured Operating Distance (Sa): The distance from the active surface within which the correct operation of the proximity switch (under specified conditions) is assured.

Axial Approach: The approach of the target with its center maintained on the sensor's reference axis.

Capacitive Proximity Sensor: A device that detects the presence of metal or non-metallic (ex. wood, plastic, cardboard, rubber, liquid, etc.) targets without physical contact.

Complementary Outputs (NO + NC): A proximity sensor with two outputs, one output that is normally open (NO) and one output that is normally closed (NC). Similar in function to a single pole, double throw (SPDT) switch.

Correction Factors: Multiplication factors that take into account variations in the target material composition that will effect the actual sensing distance. To calculate the actual sensing distance, the rated sensing distance (Sn) is multiplied by the correction factor.

Current Consumption: The current consumed by the proximity sensor when the output is in the OFF state.

Damping Material: A material, which has an influence on the characteristics of a proximity switch.

Effective Operating Distance (Sr): The operating distance of a proximity switch, measured at stated temperature, voltage, and mounting conditions.

False Pulse: An undesired change in the state of an output (NO or NC) of a proximity switch.

Ferrous Material: Any metal containing iron.

Four-Wire Proximity Switch: A DC proximity sensor with four leads, two of the leads supply power to the sensor, one of the leads switches the load through the NO output, and one of the leads switches the load through the NC output.

Free Zone: A volume around a proximity switch, which must be kept free from any material capable of affecting the characteristics of the proximity switch.

Hysteresis: The difference between the operating point (switch ON) as the target approaches the active surface of the sensor, and the release point (switch OFF) when the target moves away from the active surface. Stated as a percentage of Sn.

Inductive Proximity Sensor: A device that detects the presence of a metal target without physical contact.

Lateral Approach: The approach of the target perpendicular to the sensor's reference axis.

Leakage Current: The current that flows through the load circuit when the sensor output is in the OFF state (de-energized).

LED: Light Emitting Diode used to indicate the sensor status (ex. power supply present, output energized, etc.).

Load: A device or circuit that is operated by the output of a proximity sensor

Maximum Load Current: The maximum allowable current that can flow continuously through the sensor output in the ON state.

Minimum Load Current: The minimum current that is required by the sensor to operate reliably.

Non-Ferrous Metal: Any metal that does not contain iron.

Normally Closed (NC) Output: An output that is closed allowing current to flow when a target is not present, and is open and does not allow current to flow when a target is present.

Normally Open (NO) Output: An output that is open and does not allow current to flow when a target is not present, and is closed allowing current to flow when a target is present.

NPN Output (Current Sinking): A transistor output of a sensor that switches the load to the negative lead (common) of the supply voltage. The load is connected between the sensor output and the positive lead of the supply voltage.

Operating Distance (S): A distance at which the target approaching the active surface along the reference axis causes the output signal to change.

PNP Output (Current Sourcing): A transistor output of a sensor that switches the load to the positive lead of the supply voltage. The load is connected between the sensor output and negative lead (common) of the supply voltage.

Quiescent Current (Current Consumption): The current consumed by the proximity sensor when the output is in the OFF state.

Reference Axis: The axis perpendicular to the active surface and passing through the center of the active surface.

Repeatability: The variation, expressed as a percentage (%) of the rated operating distance (Sn), of the effective operating distance (Sr) measured at constant temperature and voltage.

Response Time: The time required for the sensor switching element to respond after the target enters or exists the sensing zone.

Reverse Polarity Protection: Proximity sensors that are protected by internal components to prevent damage to the sensor by the incorrect polarity connection to the power supply.

Sensing Distance (Sn): A conventional quantity used to designate the operating distance. It does not take into account either manufacturing tolerances or variations due to external conditions such as voltage and temperature.

Shielded (Flush): A sensor, which can be flush mounted in any damping material up to the plane of the active surface of the sensor without influencing its characteristics.

Short Circuit Protection: The ability of a sensor to withstand a shorted condition (no current-limiting load connected) without damage.

Sinking: See NPN Output.

Sourcing: See PNP Output.

Switching Frequency: The maximum number of times per second that the sensor can change state (ON and OFF). Usually expressed in Hertz (Hz).

Target: An object, which actuates the sensor when it approaches the active surface.

Three-Wire Proximity Switch: An AC or DC proximity sensor with three leads, two of the leads supply power to the sensor, and the third lead switches the load.

Two-Wire Proximity Switch: A proximity sensor, which switches a load connected in series with the power supply. Power for the proximity sensor is obtained through the load at all times.

Unshielded (Non-Flush): A sensor, which must be mounted with a specified free zone around its active surface in order not to influence its characteristics.

Voltage Drop: The voltage measured across the output of the proximity sensor when a specified current flows through the load.

PRINCIPLES OF OPERATION FOR INDUCTIVE PROXIMITY SENSORS

Inductive proximity sensors operate by generating a concentrated high frequency electromagnetic field, which emerges from the active surface of the sensor. The sensor construction consists of a coil on a ferrite conductor, an oscillator, a trigger-signal level detector, and an output circuit including an amplifier (Fig. 1). When a metal target (or other electrically conductive material) enters the field, eddy currents are induced in the field, causing a loss of energy and a smaller amplitude of oscillation (the resonating oscillator is damped) (Fig. 2). The associated electronic circuitry detects the damping of the oscillator, triggers the switching action (turning the solid-state output ON or OFF), and amplifies the output to actuate devices such as relays, counters, etc. When the target is removed from the sensing field, the reverse action takes place, the undamping of the oscillator is detected and the switch is returned to its original state.

Figure 1

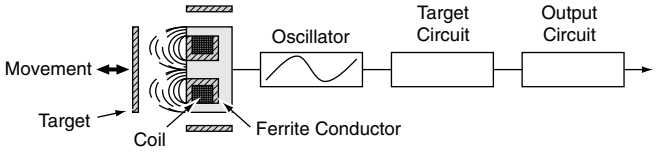
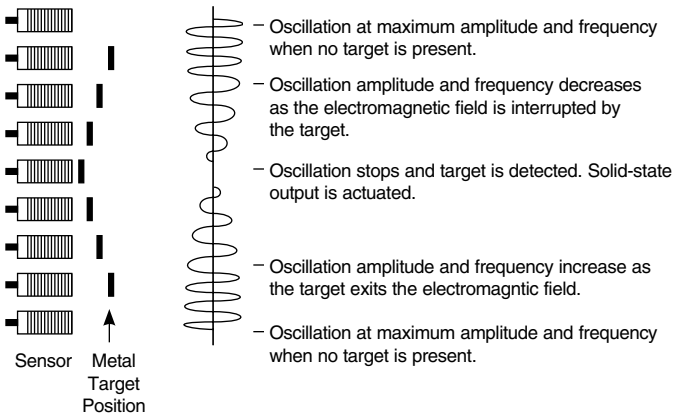


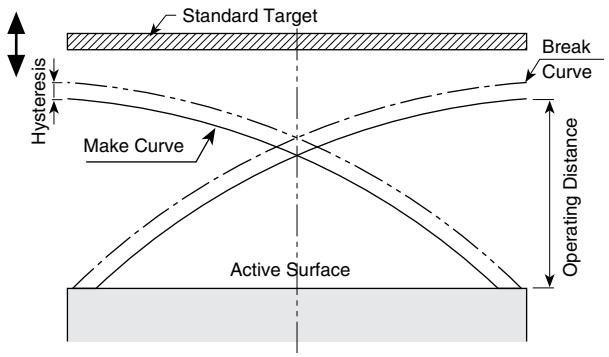
Figure 2



HYSTERESIS (DIFFERENTIAL TRAVEL)

To ensure that target speed or distance does not cause output noise or chatter (the output turning on and off rapidly), hysteresis (differential travel) is built into the circuit of the switches. Hysteresis is the difference between the operate and the release points (Fig. 3).

Figure 3



OPERATING DISTANCE "S"

Operating distances are determined with square test targets of mild steel, 1mm thick and dimensions as per the diameter of the tube. The rated or standard operating distance "Sn" is the designed distance from the active surface to the target to cause switching. The effective operating distance "Sr" for any given switch at a constant temperature and constant voltage will be within ±10% of "Sn": Sr = Sn ±10%.

The usable operating distance "Su" will not vary from "Sr" by more than ±10% over the voltage and temperature limits listed in the technical data: Su = Sr ±10%.

TARGET CORRECTION FACTORS FOR INDUCTIVE PROXIMITY SENSORS

The composition of the target has a large effect on the sensing distance of inductive proximity sensors. Operating distance for targets of materials other than mild steel will in general, be reduced. To determine the sensing distance for these materials, a correction factor is used. If a target constructed from one of the materials listed is used, the correction factors listed below can be used as a general guideline. Multiply the nominal sensing distance by the correction factor listed in order to determine the actual sensing distance for that target.

CORRECTION FACTORS

Nominal Sensing Distance (Sn) x Correction Factor = Actual Sensing Distance

	MILD STEEL	STAINLESS STEEL	BRASS	ALUMINUM	COPPER
Correction Factor	1.0	0.80	0.50	0.45	0.40

DC PROXIMITY SWITCHES (3- AND 4-WIRE)

DC proximity switches require a separate voltage supply. Therefore, the loads cannot be connected in series with the switch. With a single switching function output (either NO or NC), one additional conductor is required for the load, resulting in a three wire connection (Fig. 4A and 4B). With two complementary switching function outputs (one NO and one NC) two extra conductors are required, resulting in a four wire connection (Fig. 5A and 5B). The output transistor of DC switches can be either PNP (P-Type) or NPN (N-Type). With PNP transistors, switching is in the sourcing mode, and the loads must be connected between the output and the negative side of the supply. Conversely, with NPN transistors, switching is in the sinking mode, and the loads must be connected between the output and the positive side of the supply.

DC PROXIMITY SWITCH - 3-WIRE

Figure 4A

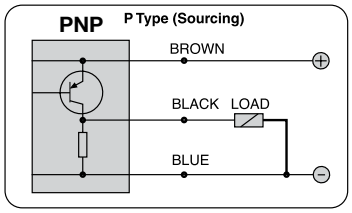
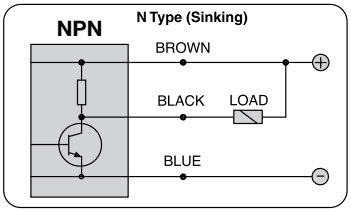


Figure 4B



DC PROXIMITY SWITCH - 4-WIRE

Figure 5A

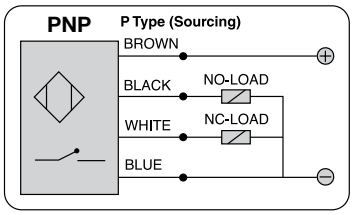
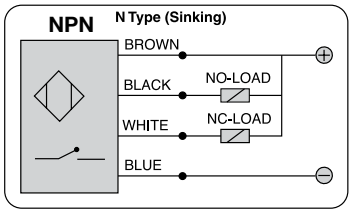


Figure 5B

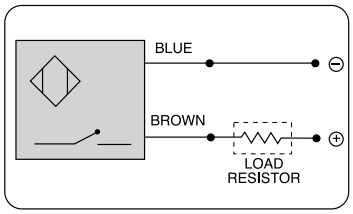


DC PROXIMITY SWITCHES – 2 WIRE

In DC 2-wire switches, the resistor (1k ohm to 2.7k ohm) is connected in series with the positive side of the supply (Fig. 6). When a metal target is present, the circuit operates and draws current greater than 3mA and in the absence of the target, the switch draws less than 1mA current. This current variation can be connected to the PLC amplifier or any other related circuitry.

DC PROXIMITY SWITCH - 2-WIRE

Figure 6

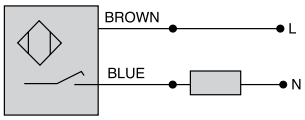


AC PROXIMITY SWITCHES (2-WIRE)

The AC switches are designed for two conductor connections and operate on full line voltage (Fig. 7). The loads are installed in series with the switches in a similar manner to mechanical limit switches (and may be in either line). However, since proximity switches require power in order to operate even when they are "OFF" (open contacts), a small current flows through the sensor and their loads. This "OFF STATE" current (no load current) is 2mA (maximum). Care must be exercised in the application of AC proximity switches to ensure that the "DROP OUT" currents of relays or other loads are greater than the off-state currents of the Proximity Switches. When AC proximity switches are "ON" (carrying load current) there will be a voltage drop of across the switch.

AC - 2-WIRE

Figure 7



PRINCIPLES OF OPERATION FOR CAPACITIVE PROXIMITY SENSORS

Capacitive proximity switches work on the principle of a resonant oscillator circuit. The sensor construction consists of a pair of brass/copper discs that form the electrode of a capacitor (dielectric plate), a trigger-signal level detector, and an output circuit including an amplifier (Fig. 8).
When a target enters the sensing field, the change in capacitance value causes the oscillator frequency and amplitude to increase. The associated precision circuitry, detects the frequency and amplitude increase, triggers the switching action (turning the solid-state output ON or OFF), and amplifies the output to actuate devices such as relays, counters, etc.
When the target is removed from the sensing field, the reverse action takes place, the oscillator frequency and amplitude decreases and the switch is returned to its original state.

Figure 8

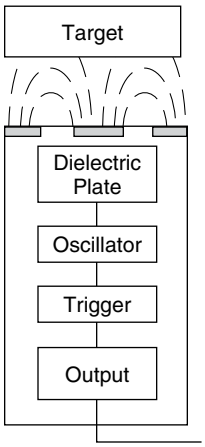
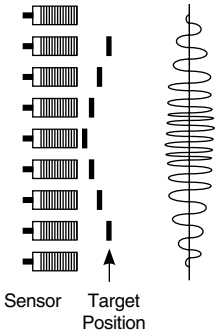


Figure 9



— Oscillation stops when no target is present.

— Oscillation starts and increases in amplitude and frequency as the electrostatic field is interrupted by the target.

— Oscillation at maximum amplitude and frequency when the target is detected. Solid-state output is actuated.

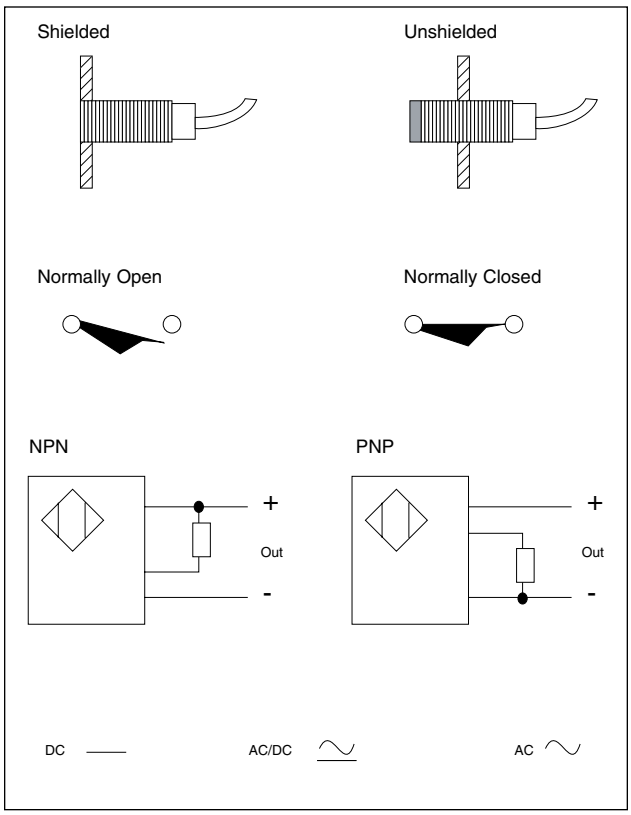
— Oscillation at maximum amplitude and frequency decrease as the target exits the electrostatic field.

— Oscillation stops when no target is present.

CAPACITIVE PROXIMITY SENSOR SENSING DISTANCE

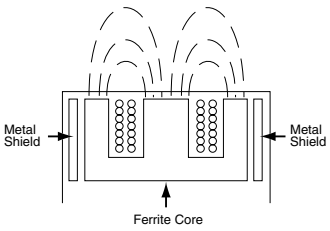
The sensing distance of any diameter of switch is specified with water as the object and is tested at 25°C. Depending upon the material of an object to be detected, the sensing distance varies from 2mm to 15mm.

SYMBOLS



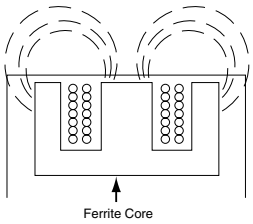
SHIELDED VS. UNSHIELDED SENSORS

SHIELDED SENSOR



Shielded construction includes a metal band which surrounds the ferrite core and coil arrangement.

UNSHIELDED SENSOR



Unshielded sensors do not have this metal band.