

The NITRA CPS Series of cylinder position switches offers a robust, yet cost-effective interface between pneumatic or hydraulic actuators and electrical control systems. Using state-of-the-art AMR magnetic sensing technology, these switches are designed for use with cylinders that have a magnet incorporated in the cylinder piston. They can be used to provide cylinder position indication, cycle count or to confirm operation.

NITRA cylinder position switches are now available in two styles with accessories to fit three different styles of cylinders or actuators. The CPS Series switches are designed for general purpose applications on cylinders with T-slot channels. They are also easily mounted on round body cylinders using CPSB Series mounting bands or on tie rod cylinders using CPSA Series adapters. The CPSF Series switches are T-slot switches for harsh duty applications and will fit in CPSA Series adapters or the stainless steel version of mounting bands, CPSS Series.

NITRA cylinder position switches are available in 3-wire DC, PNP normally open, PNP normally closed, and NPN normally open electronic solid state configurations with either an M8 or M12 wiring connector or wire leads. Integral LED indication provides switch status for speedy switch positioning and troubleshooting. Pre-tested for use with NITRA pneumatic cylinders, these switches are also suitable for use with other brands of cylinders with magnetic pistons.

## Features

- Electronic switch output, PNP (normally open or normally closed) or NPN (normally open)
- Solid state reliability, no moving parts for longer life
- AMR sensing technology with small hysteresis for precise sensing
- Compact and easy to mount on round body, tie rod, and T-slot cylinders
- LED switch status indication
- Available with M8 or M12 wiring connector or 2-meter integral cable with wire leads
- Electronic switch performance at reed switch prices
- 3-Year warranty



CPSB Band Assembly



CPSA Adapter Assembly

## Technology Comparison

Reed Switch vs. AutomationDirect CPS Series Electronic Switch			
	Mechanical Reed Switch	AutomationDirect CPS Series Electronic Switch	Details
<b>Durability</b>	low (1-2 million cycles typical)	high (virtually unlimited number of cycles)	Reed switches can stick, break, bounce and are prone to wear
<b>Repeatability</b>	low	high	Mechanical wear of reed switches can lead to switch point drift
<b>Response time</b>	low	high	Reed switches have a slower response time than electronic switches resulting in lower switch accuracy
<b>Sensitivity to magnetic fields</b>	low	high	Electronic sensors, more sensitive than reed switches, operate reliably even with weak magnetic fields
<b>Temperature stability</b>	high	high	Both switch technologies are extremely stable over the entire temperature range
<b>Longevity</b>	low	high	Electronic sensors are insensitive to long term effects of magnetic fields. Reed switches can become permanently magnetized over time.
<b>Response sensitivity</b>	medium	high	Electronic sensors have small hysteresis and are exceptional for short stroke cylinders
<b>Price</b>	low	low	Reed switches are usually much less expensive than electronic switches. The AutomationDirect CPS Series offers all the advantages of an electronic cylinder position switch at reed switch prices.

## AMR vs. GMR Technology

Two solid state magnetic sensing technologies used for pneumatic cylinder position are GMR (Giant Magnetoresistive) and AMR (Anisotropic Magnetoresistive). Both sensing technologies consist of layers of ferromagnetic material that change in electrical resistance when exposed to an external magnetic field. NITRA CPS Series pneumatic cylinder position switches use AMR sensing

technology which provides higher sensitivity, better repeatability and lower hysteresis than GMR based switches. These exceptional performance characteristics make the NITRA CPS Series ideal for pneumatic cylinder position switch applications, especially for cylinders with short strokes.

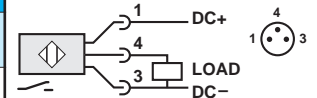
NITRA CPS Series cylinder position switches are general purpose switches for use with cylinders having a magnetic piston. The switches are designed to mount on cylinders with a T-Slot channel. Using CPSA adapters or CPSB mounting bands, they can be used with tie rod or round body style cylinders.



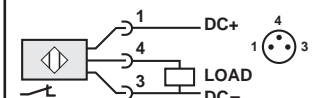
Switches include switch stop and wire retainer for t-slot mounting

NITRA CPS Series Cylinder Position Switches				
Part No.	Description	Price	Weight (lbs)	Cable Assemblies
CPS-AP-F	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, normally open, 3-wire, 10-30 VDC, electronic PNP transistor output, status LED, 0.3 meter (1 ft) pigtail with M8 snap-fit connector. Can be mounted on cylinders with T-slots or round body cylinders using a CPSB series mounting band or on tie rod cylinders using a CPSA series rod adapter.	<--->	0.1	CD08-0A-020-A1 CD08-0A-020-C1 CD08-0C-050-A1 CD08-0C-050-C1
CPS-CP-F	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, normally closed, 3-wire, 10-30 VDC, electronic PNP transistor output, status LED, 0.3 meter (1 ft) pigtail with M8 snap-fit connector. Can be mounted on cylinders with T-slots or round body cylinders using a CPSB series mounting band or on tie rod cylinders using a CPSA series rod adapter.	<--->	0.1	CD08-0A-050-A1 CD08-0A-050-C1 CD08-0A-070-A1 CD08-0A-070-C1
CPS-AN-F	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, normally open, 3-wire, 10-30 VDC, electronic NPN transistor output, status LED, 0.3 meter (1 ft) pigtail with M8 snap-fit connector. Can be mounted on cylinders with T-slots or round body cylinders using a CPSB series mounting band or on tie rod cylinders using a CPSA series rod adapter.	<--->	0.1	CDP08-0A-010-AA CDP08-0A-030-AA CDP08-0A-010-BB CDP08-0A-030-BB
CPS-AP-A	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, normally open, 3-wire, 10-30 VDC, electronic PNP transistor output, status LED, 2 meter (6.56 ft) pigtail with wire leads. Can be mounted on cylinders with T-slots or round body cylinders using a CPSB series mounting band or on tie rod cylinders using a CPSA series rod adapter.	<--->	0.1	-
CPS-CP-A	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, normally closed, 3-wire, 10-30 VDC, electronic PNP transistor output, status LED, 2 meter (6.56 ft) pigtail with wire leads. Can be mounted on cylinders with T-slots or round body cylinders using a CPSB series mounting band or on tie rod cylinders using a CPSA series rod adapter.	<--->	0.1	-
CPS-AN-A	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, normally open, 3-wire, 10-30 VDC, electronic NPN transistor output, status LED, 2 meter (6.56 ft) pigtail with wire leads. Can be mounted on cylinders with T-slots or round body cylinders using a CPSB series mounting band or on tie rod cylinders using a CPSA series rod adapter.	<--->	0.1	-

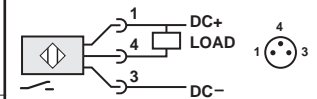
## Wiring



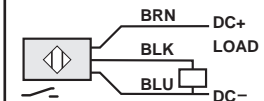
CPS-AP-F



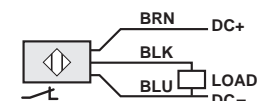
CPS-CP-F



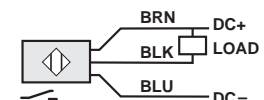
CPS-AN-F



CPS-AP-A



CPS-CP-A



CPS-AN-A

NITRA CPS Series Cylinder Switch Specifications	
Operating Voltage	10-30 VDC
Voltage Drop	< 2.5 V
Current Rating	100 mA (built-in overload protection)
Short Circuit Protection	Yes
Reverse Polarity Protection	Yes
Overload Protection	Yes
Leakage Current	none
Hysteresis	< 1 mm
Function Display	Switching status yellow
Switching Frequency	> 6,000 Hz for 3-wire
Magnetic Sensitivity	2 millitesla (20 gauss)
Housing Materials	polyamide and stainless steel
Operating Temperature	-13°F to 185°F (-25°C to 85°C)
Protection Rating	IP 67
Agency Approvals	CE, cULus (Class 2 source required), file E328811

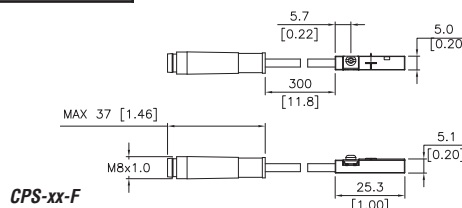
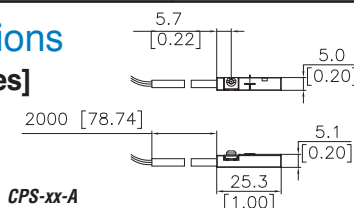
### Cable Assembly Wiring Colors:

- Pin 1 - Brown
- Pin 3 - Blue
- Pin 4 - Black

Note: wiring colors are based on AutomationDirect CDD8 3-pole cable assemblies.

## Dimensions

mm [inches]





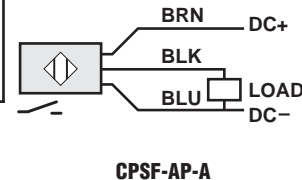
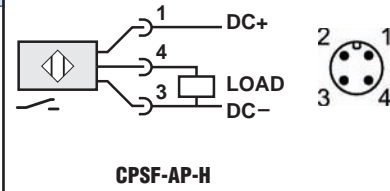
# CPSF Series Cylinder Position Switches

NITRA CPSF Series cylinder position switches are designed for food and beverage or washdown applications. The switches are designed to mount on cylinders with a T-slot channel. Using CPSS adapters or CPSS all stainless steel mounting bands, they can be used with tie rod or round body style cylinders.



NITRA CPSF Series Cylinder Position Switches				
Part No.	Description	Price	Weight (lbs)	Cable Assemblies
<b>CPSF-AP-H</b>	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, IP69K, normally open, 3-wire, 10-30 VDC, electronic PNP transistor output, status LED, 0.3 meter (1 ft) pigtail with M12 connector. Can be mounted on cylinders with T-slots or round body cylinders using a CPSS series mounting band or on tie rod cylinders using a CPSS series rod adapter.	<--->	0.1	EVT221 EVT222 EVT223 EVT224 EVT225 EVT226 EVT227 EVT228 EVT229 EVT230 EVT231 EVT232 EVT233 EVT234
<b>CPSF-AP-A</b>	Magnetic cylinder switch for position sensing of pneumatic or hydraulic cylinders, IP69K, normally open, 3-wire, 10-30 VDC, electronic PNP transistor output, status LED, 2 meter (6.56 ft) pigtail with wire leads. Can be mounted on cylinders with T-slots or round body cylinders using a CPSS series mounting band or on tie rod cylinders using a CPSS series rod adapter.	<--->	0.1	-

## Wiring



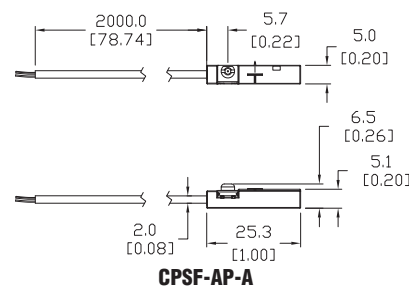
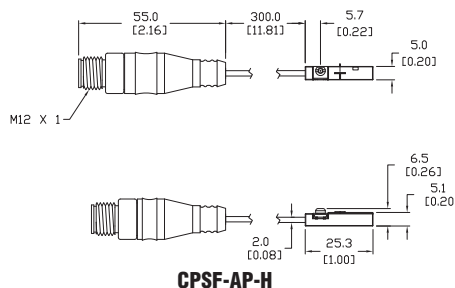
NITRA CPSF Cylinder Switch Specifications	
<b>Operating Voltage</b>	10-30 VDC
<b>Voltage Drop</b>	< 2.5 V
<b>Current Rating</b>	100 mA (built-in overload protection)
<b>Short Circuit Protection</b>	Yes
<b>Reverse Polarity Protection</b>	Yes
<b>Overload Protection</b>	Yes
<b>Leakage Current</b>	none
<b>Hysteresis</b>	< 1 mm
<b>Function Display</b>	Switching status yellow
<b>Switching Frequency</b>	> 6,000 Hz for 3-wire
<b>Magnetic Sensitivity</b>	2 millitesla (20 gauss)
<b>Housing Materials</b>	polyamide and stainless steel
<b>Operating Temperature</b>	-13°F to 185°F (-25°C to 85°C)
<b>Protection Rating</b>	IP 69K
<b>Agency Approvals</b>	CE, cULus (Class 2 source required), file E328811

**Cable Assembly Wiring Colors:**  
**Pin 1 - Brown**  
**Pin 2 - White**  
**Pin 3 - Blue**  
**Pin 4 - Black**

**Note: Wiring colors are based on AutomationDirect EVT 4-pole cable assemblies.**

## Dimensions

mm [inches]





# CPSA Series Cylinder Position Switches - Mounting Adapter

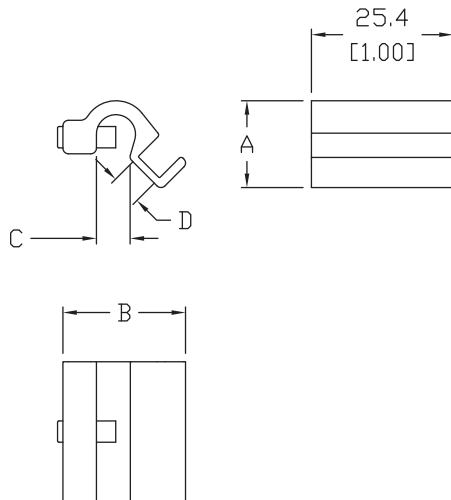
NITRA Pneumatics mounting adapters are made of extruded aluminum. They are used to mount CPS or CPSF series T-slot switches to tie rod style cylinders. They come in five sizes to fit tie rods from 1/8 inch [3mm] to 3/4 inch [20mm].

NITRA Cylinder Switch Mounting Adapters			
Part No.	Description	Price	Weight (lbs)
<b>CPSA-03</b>	Adapter bracket to secure a T-slot cylinder position switch to a 1/8 to 3/16 inch (3 to 5 mm) diameter tie rod	<--->	0.1
<b>CPSA-04</b>	Adapter bracket to secure a T-slot cylinder position switch to a 3/16 to 1/4 inch (5 to 7mm) diameter tie rod	<--->	0.1
<b>CPSA-07</b>	Adapter bracket to secure a T-slot cylinder position switch to a 3/16 to 7/16 inch (5 to 11 mm) diameter tie rod	<--->	0.1
<b>CPSA-09</b>	Adapter bracket to secure a T-slot cylinder position switch to a 3/8 to 9/16 inch (9 to 15 mm) diameter tie rod	<--->	0.1
<b>CPSA-12</b>	Adapter bracket to secure a T-slot cylinder position switch to a 9/16 to 3/4 inch (14 to 20 mm) diameter tie rod	<--->	0.1



Assembly photo shows CPSA mounting adapter with T-slot cylinder position switch.

## Dimensions mm [inches]



Cylinder Switch Mounting Adapter Selector*			
Nitra Cylinder Bore Size	CPSA-04	CPSA-07	CPSA-09
1-1/2"	✓	✓	
2"		✓	
2-1/2"		✓	
3-1/4"		✓	✓
4"		✓	✓

\* CPSA-03 and CPSA-12 mounting adapters are for cylinder sizes that are not currently available.

CYLINDER POSITION SWITCHES				
	DIM A	DIM B	DIM C	DIM D
CPSA-03	15.5 [0.61]	22.0 [0.86]	6.0 [0.24]	5.4 [0.21]
CPSA-04	18.5 [0.73]	24.5 [0.96]	7.5 [0.30]	5.5 [0.22]
CPSA-07	22.8 [0.90]	30.2 [1.19]	11.3 [0.44]	6.6 [0.26]
CPSA-09	25.9 [1.02]	34.2 [1.35]	15.3 [0.60]	6.6 [0.26]
CPSA-12	31.1 [1.22]	39.6 [1.56]	20.3 [0.80]	6.6 [0.26]

**CPSA-XX**

# CPSB and CPSS Series Cylinder Position Switches - Mounting Bands

NITRA Cylinder Switch Mounting Bands			
Part No.	Description	Price	Weight (lbs)
<b>CPSB-07</b>	Mounting band to secure a T-slot cylinder position switch to a 5/16 or 7/16 inch (8 or 10 mm) bore round body cylinder.	<--->	0.1
<b>CPSB-14</b>	Mounting band to secure a T-slot cylinder position switch to a 9/16, 3/4 or 7/8 inch (12, 16 or 20 mm) bore round body cylinder.	<--->	0.1
<b>CPSB-20</b>	Mounting band to secure a T-slot cylinder position switch to a 1-1/16 or 1-1/4 inch (25 or 32 mm) bore round body cylinder.	<--->	0.1
<b>CPSB-24</b>	Mounting band to secure a T-slot cylinder position switch to a 1-1/2 inch (40 mm) bore round body cylinder.	<--->	0.1
<b>CPSB-32</b>	Mounting band to secure a T-slot cylinder position switch to a 2 inch (50 mm) bore round body cylinder.	<--->	0.1
<b>CPSB-40</b>	Mounting band to secure a T-slot cylinder position switch to a 1-3/4 or 2-1/2 inch (63 mm) bore round body cylinder	<--->	0.1
<b>CPSB-52</b>	Mounting band to secure a T-slot cylinder position switch to a 3 or 3-1/4 inch (80 mm) bore round body cylinder	<--->	0.1
<b>CPSB-64</b>	Mounting band to secure a T-slot cylinder position switch to a 4 inch (100 mm) bore round body cylinder	<--->	0.1



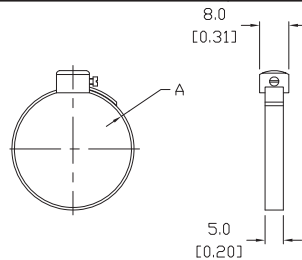
**CPSB-20**

NITRA Cylinder Switch All Stainless Steel Mounting Bands			
Part No.	Description	Price	Weight (lbs)
<b>CPSS-07</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 5/16 or 7/16 inch (8 or 10 mm) bore round body cylinder	<--->	0.1
<b>CPSS-14</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 9/16, 3/4 or 7/8 inch (12, 16 or 20 mm) bore round body cylinder	<--->	0.1
<b>CPSS-20</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 1-1/16 or 1-1/4 inch (25 or 32 mm) bore round body cylinder	<--->	0.1
<b>CPSS-24</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 1-1/2 inch (40 mm) bore round body cylinder	<--->	0.1
<b>CPSS-32</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 2 inch (50 mm) bore round body cylinder	<--->	0.1
<b>CPSS-40</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 1-3/4 or 2-1/2 inch (63 mm) bore round body cylinder	<--->	0.1
<b>CPSS-52</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 3 or 3-1/4 inch (80 mm) bore round body cylinder	<--->	0.1
<b>CPSS-64</b>	Stainless steel mounting band to secure a T-slot cylinder position switch to a 4 inch (100 mm) bore round body cylinder	<--->	0.1



**CPSS-52**

## Dimensions mm [inches]



CYLINDER POSITION SWITCHES			
PART #	DIM A	PART #	DIM A
CPSX-07	ø11.0-ø19.0 [ø0.43-ø0.75]	CPSX-32	ø48.0-ø59.0 [ø1.89-ø2.32]
CPSX-14	ø18.0-ø29.0 [ø0.71-ø1.14]	CPSX-40	ø58.0-ø69.0 [ø2.28-ø2.72]
CPSX-20	ø28.0-ø39.0 [ø1.10-ø1.54]	CPSX-52	ø78.0-ø89.0 [ø3.07-ø3.50]
CPSX-24	ø38.0-ø49.0 [ø1.50-ø1.93]	CPSX-64	ø98.0-ø109.0 [ø3.86-ø4.29]

**CPSX-XX**

# Sensors Accessories – IP69K-rated Cables

## Cables with quick-disconnect plugs

- Industry standard axial and right-angle M12 or 1/2" micro connectors with open leads
- 5m and 10m cable lengths

- PVC (polyvinyl chloride) jacket for food and beverage industrial applications
- IP69K rated for food and beverage industrial applications
- 316L stainless steel coupling nut
- EPDM o-ring



M12 Quick-Disconnect Cables (Euro, Micro DC-Single Key)							
Part Number	Price	Length	Poles	Connector	LED	Jacket	Dimensions
<b>M12 Quick-Disconnects</b>							
EVT221	<--->	5m (16.4ft)	4	Axial	No	Orange PVC	Figure 4
EVT222	<--->	5m (16.4ft)	4	Right-angle	No	Orange PVC	Figure 1
EVT223	<--->	10m (32.8ft)	4	Axial	No	Orange PVC	Figure 4
EVT224	<--->	10m (32.8ft)	4	Right-angle	No	Orange PVC	Figure 1
<b>Micro AC Volt 1/2 Inch - 20UNF Cables</b>							
<b>1/2" Quick-Disconnects</b>							
E18446	<--->	5m (16.4ft)	3	Axial	No	Yellow PVC	Figure 6
E18447	<--->	5m (16.4ft)	3	Right-angle	No	Yellow PVC	Figure 5
E18448	<--->	10m (32.8ft)	3	Axial	No	Yellow PVC	Figure 6
E18449	<--->	10m (32.8ft)	3	Right-angle	No	Yellow PVC	Figure 5

## Patch cables with quick-disconnect plugs on each end

Available patch cables include:

- Industry standard M12 screw-lock connectors
- One male and one female connector

- Axial and right-angle connector models
- 0.3m, 0.6m, 1m, 2m and 5m cable lengths
- PVC (polyvinyl chloride) jacket for food and beverage industrial applications
- IP69K rating, suitable for food and beverage industrial applications
- 316L stainless steel coupling nut
- EPDM o-ring



M12 Patch Cables with Quick-Disconnect on Each End (Euro, Micro DC-Single Key)						
Part Number	Price	Length	Poles	Connectors	Jacket	Dimensions
<b>M12 Quick-Disconnect Patch Cables</b>						
EVT225	<--->	0.3m (0.98ft)	4	Axial female plug to axial male plug	Orange PVC	Figure 3
EVT226	<--->	0.3m (0.98ft)	4	Right angle female plug to axial male plug	Orange PVC	Figure 2
EVT227	<--->	0.6m (1.97ft)	4	Axial female plug to axial male plug	Orange PVC	Figure 3
EVT228	<--->	0.6m (1.97ft)	4	Right angle female plug to axial male plug	Orange PVC	Figure 2
EVT229	<--->	1m (3.3ft)	4	Axial female plug to axial male plug	Orange PVC	Figure 3
EVT230	<--->	1m (3.3ft)	4	Right angle female plug to axial male plug	Orange PVC	Figure 2
EVT231	<--->	2m (6.6ft)	4	Axial female plug to axial male plug	Orange PVC	Figure 3
EVT232	<--->	2m (6.6ft)	4	Right angle female plug to axial male plug	Orange PVC	Figure 2
EVT233	<--->	5m (16.4ft)	4	Axial female plug to axial male plug	Orange PVC	Figure 3
EVT234	<--->	5m (16.4ft)	4	Right angle female plug to axial male plug	Orange PVC	Figure 2



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Safety

Appendix

Product Index

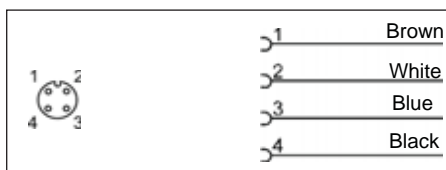
Part # Index

# Sensors Accessories – IP69K-rated Cables

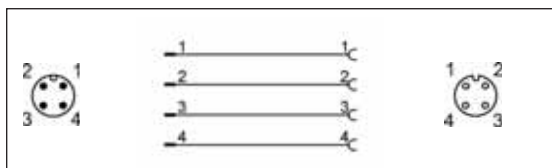
Cable Specifications		
Specification	M12	1/2"
<b>Length</b>	0.3m (0.98ft), 0.6m (1.97ft), 1m (3.3ft), 2m (6.6ft), 5m (16.4ft), 10m (32.8ft)	5m (16.4ft), 10m (32.8ft)
<b>Nominal Voltage</b>	250 VAC/300 VDC	300 VAC/VDC
<b>Max Current</b>	4A	4A
<b>Protection Degree</b>	IEC IP67 / IP68 / IP69K	IEC IP67 / IP68 / IP69K
<b>Material Nut</b>	316L Stainless steel	316L Stainless steel
<b>Jacket Material</b>	PolyVinyl Chloride (PVC)	PolyVinyl Chloride (PVC)
<b>Housing Material</b>	PolyVinyl Chloride (PVC)	PolyVinyl Chloride (PVC)
<b>Contacts Material</b>	Gold plated	Gold plated
<b>Tightening Torque</b>	0.6 to 1.5 Nm	
<b>Conductors Cross Section (AWG)</b>	22 AWG	22 AWG
<b>Ø Outer Cable</b>	4.9 mm	4.5 mm
<b>Temperature Range</b>	-25° to 100°C (-13° to 212°F)	-10° to 100°C (14° to 212°F)
<b>Environmental</b>	Halogen free, Silicone free	Halogen free, Silicone free
<b>Bending Radius</b>	min. 10 x cable diameter	
<b>Agency Approvals</b>	UL E191684	UL E177636

## Wiring - M12 DC

EVT221, EVT222, EVT223, EVT224

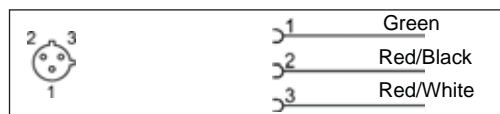


EVT225, EVT226, EVT227, EVT228, EVT229,  
EVT230, EVT231, EVT232, EVT233, EVT234



## Wiring - 1/2" Micro AC

E18446, E18447, E18448, E18449



## UL Reference

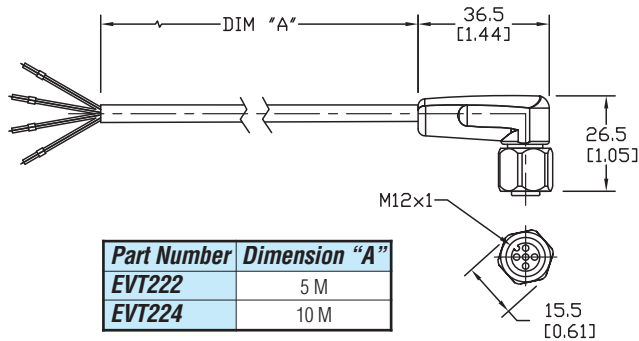
Part Number	UL Catalog Number
<b>EVT221</b>	ADOGH040VAS0005E04
<b>EVT222</b>	ADOAH040VAS0005E04
<b>EVT223</b>	ADOGH040VAS0010E04
<b>EVT224</b>	ADOAH040VAS0010E04
<b>EVT225</b>	VDOGH040VAS00.3E04STGH040VAS
<b>EVT226</b>	VDOAH040VAS00.3E04STGH040VAS
<b>EVT227</b>	VDOGH040VAS00.6E04STGH040VAS
<b>EVT228</b>	VDOAH040VAS00.6E04STGH040VAS
<b>EVT229</b>	VDOGH040VAS0001E04STGH040VAS
<b>EVT230</b>	VDOAH040VAS0001E04STGH040VAS
<b>EVT231</b>	VDOGH040VAS0002E04STGH040VAS
<b>EVT232</b>	VDOAH040VAS0002E04STGH040VAS
<b>EVT233</b>	VDOGH040VAS0005E04STGH040VAS
<b>EVT234</b>	VDOAH040VAS0005E04STGH040VAS

# Sensors Accessories – IP69K-rated Cables

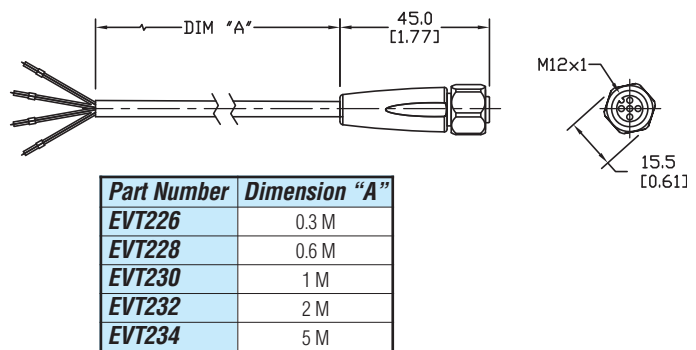
## Dimensions

mm [inches]

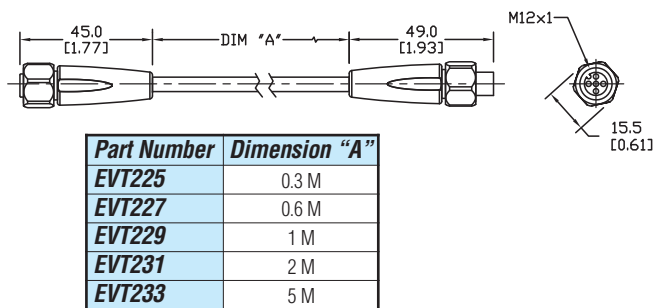
**Figure 1**



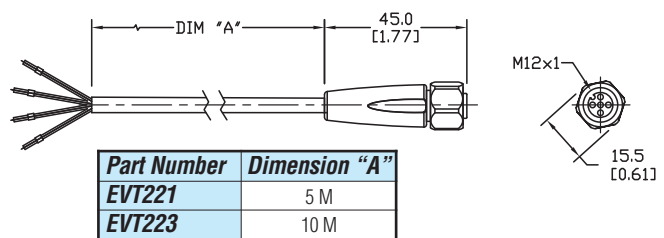
**Figure 2**



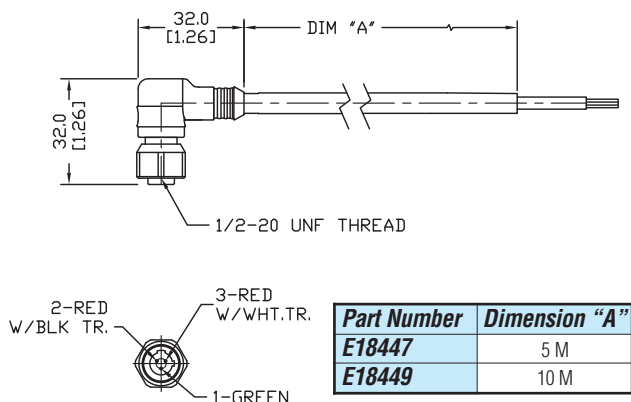
**Figure 3**



**Figure 4**



**Figure 5**



**Figure 6**

