

Features and Benefits

- 0° to 360° absolute angular position sensing
- Robust non-contacting design
- Rugged nylon reinforced housing
- Choice of analog or PWM output
- Factory programmable analog transfer characteristics
- Reverse polarity protection
- Built-in transient & output short circuit protection
- 12 Bit angular resolution
- Operation from - 40°C to 80°C
- Customizable lead wires, cables, & connectors
- IP-67 Rated Design



Absolute Rotary Position Sensor

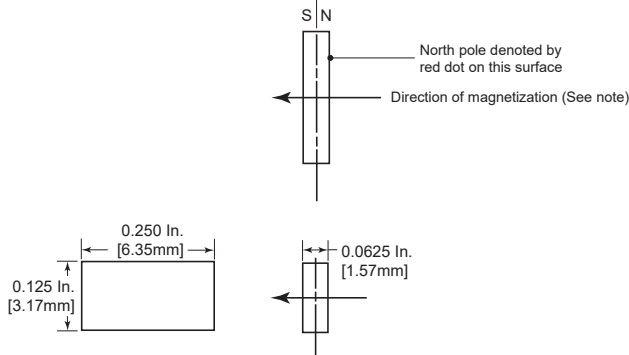
Absolute Rotary Position Sensor Description:

The R3 Series absolute rotary position sensors are cost-effective devices to accurately determine absolute positions of rotating shafts. The R3 Series sensors can be configured for analog or PWM output. The analog output mode provides a rail-to-rail ratiometric output with a push-pull output stage that allows the use of pull-up or pull-down resistors. The analog transfer characteristic is programmable for sensing any range of angles between 0° and 360°. In addition to numerous standard configurations, custom output slopes and functions are available. Being a non-contact device, the absolute rotary position sensor is very well suited to industrial environments. With sensing technology housed in a rugged, reinforced nylon housing, these sensors provide a low cost solution for demanding applications. Standard electrical protection includes reverse polarity, transient suppression and output short circuit.

Central to the R3 absolute rotary position sensors are magnetic hall effect sensors that are sensitive to the magnetic flux density applied coplanar to the sensor surface. When utilized with the correct diametrically magnetized target magnet, the R3 Series sensors are able to decode the absolute angular position of the magnet from 0 to 360 degrees.

Application Example: Customer Output Shaft- Modified for (M1) Rectangular Magnet Option

M1 Target Magnet Option - Magnet Dimensions

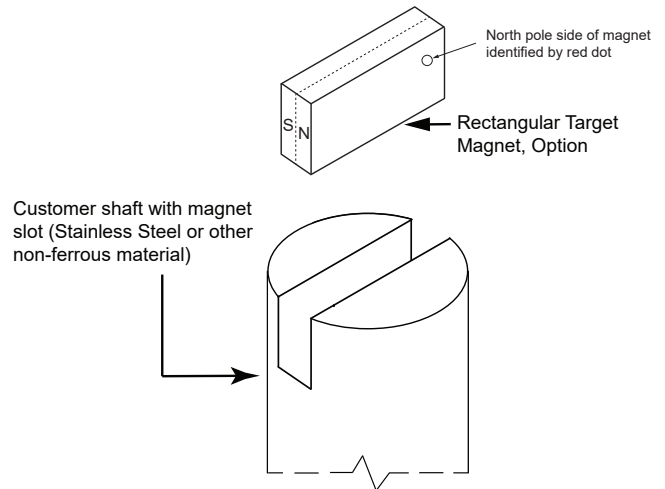


Note: Axially magnetized through the thickness of the magnet

(Note: Other magnet sizes available upon request)

Note: Drawing not to scale

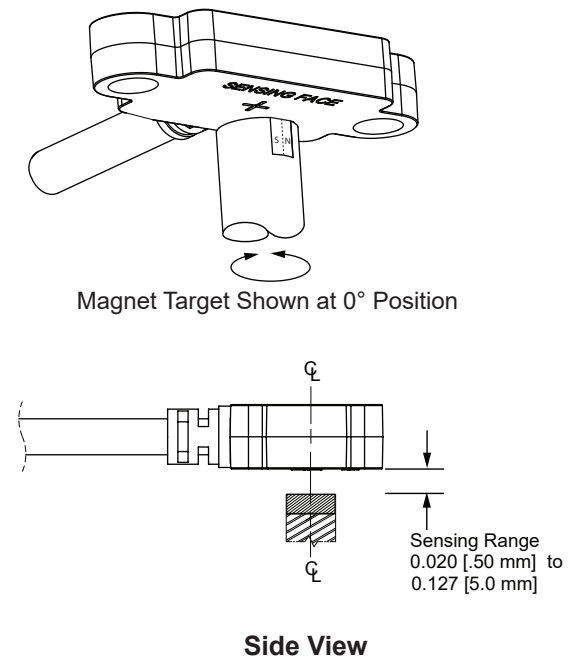
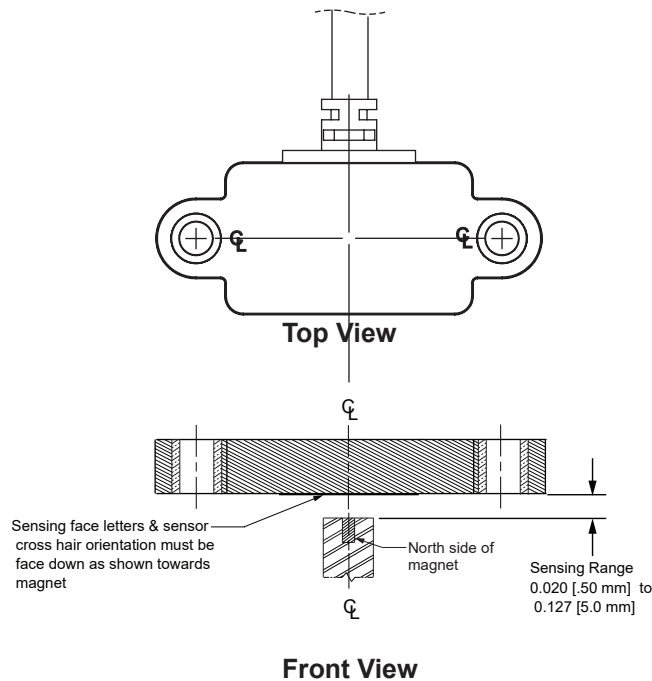
Shaft Modification Example - M1 Magnet Magnet



Note: Secure target magnet to shaft with adhesive compound (Locktite 648 Retaining compound or equivalent)

Note: Drawing not to scale

M1 Target Magnet Option - Front & Side View Sensor and Magnet Orientation

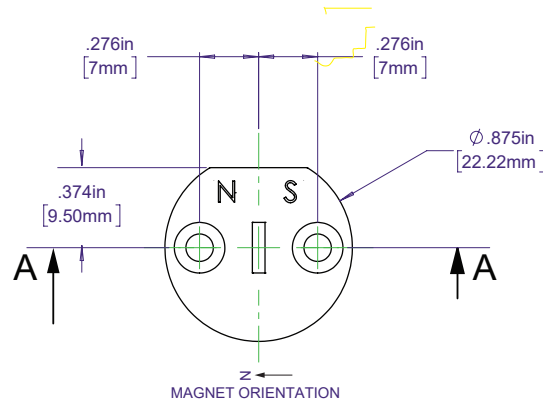


Note: Illustrations not to scale

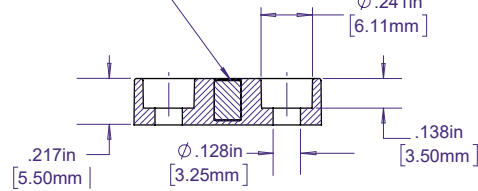
Page 2

Application Example

R3 Sensor Application with Optional (M2) Target Magnet Assembly



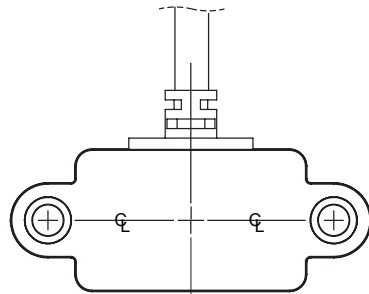
NeFeB N42H Neodymium Target Magnet with Overmolded Plastic



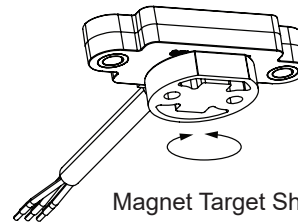
Section A-A

Note: Drawing not to scale

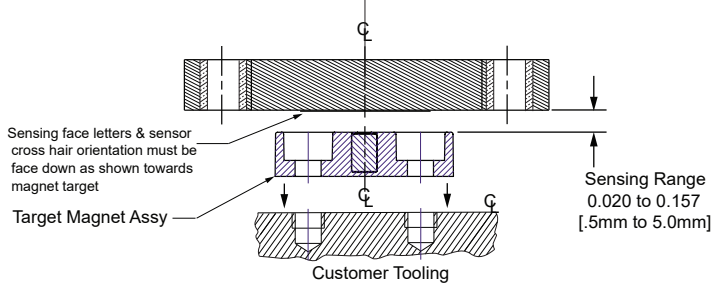
M2 Target Magnet Option - Front & Side View Sensor and Magnet Orientation



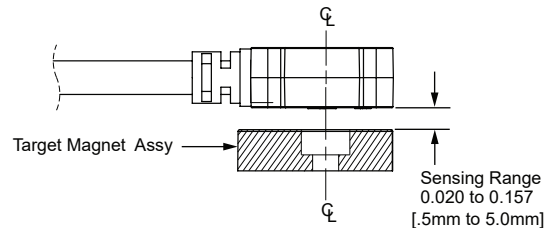
Top View



Magnet Target Shown at 0° Position



Front View



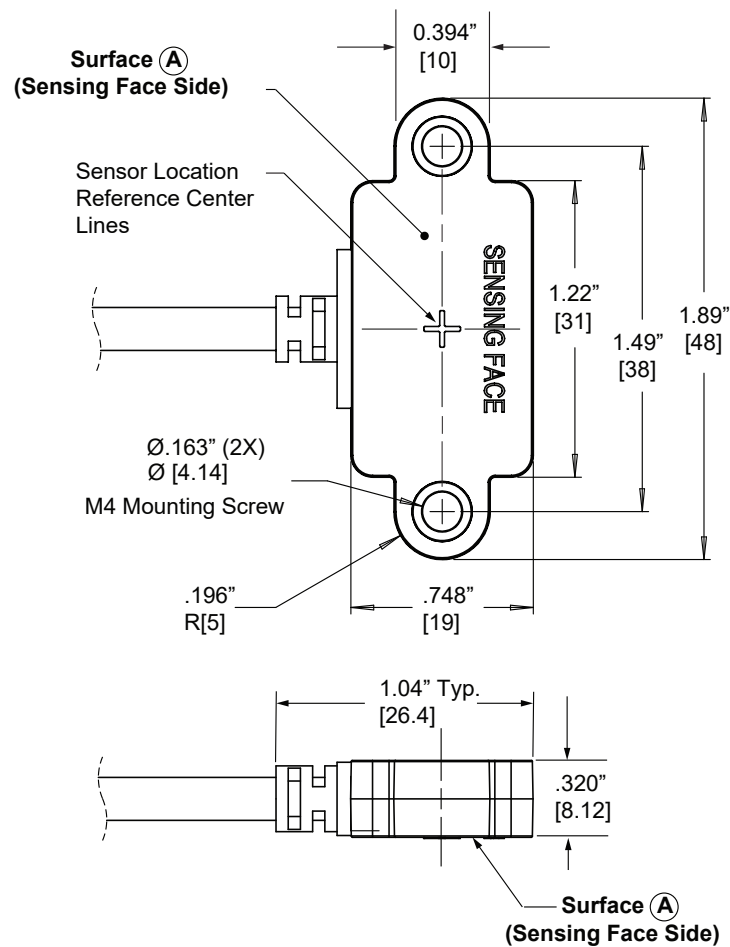
Side View

Note: Illustrations not to scale

Electrical Characteristics: (T = - 40 to 80°C)

Characteristics	Symbols	Test Condition	Limits			
			Min.	Typ.	Max.	Units
Supply Voltage	V_{CC}	Operating	4.5	5	5.5	VDC
Supply Current	I_S	Power Saving Mode		8.5	10	mA
		Normal Mode		13.5	16	mA
Output Current	I_{OUT}	Analog Output Mode	-8		8	mA
		PWM Output Mode	-20		20	mA
Output Load	R_L	Pull Down to Ground	4	10		k Ω
		Pull-up to 5V	4	5.6		k Ω
Clamped Output Level	Clamp_lo	Programmable	0		100	% V_{CC}
	Clamp_hi	Programmable	0		100	% V_{CC}
Linearity (Without misalignment)	_____	_____		±0.05		%
PWM Frequency	_____	_____		1000		Hz

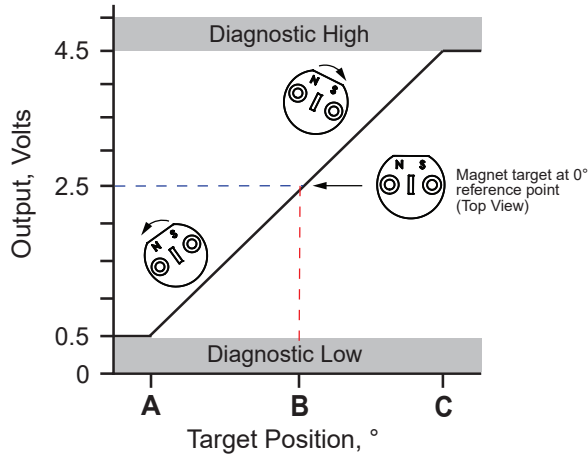
Physical Outline



Note: Drawing not to scale

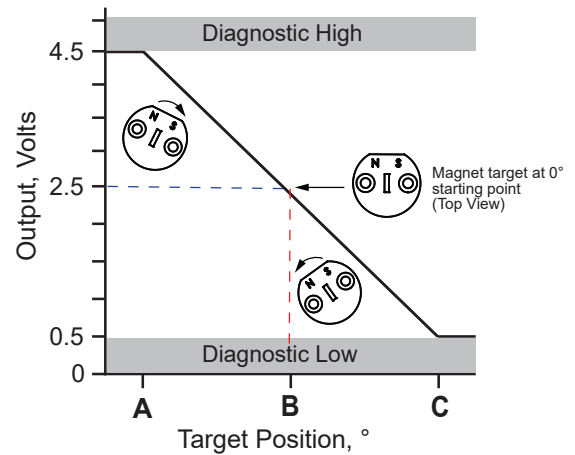
Output Curves for Factory Programmed Angles and Magnet Target Positions

Standard Output Curves



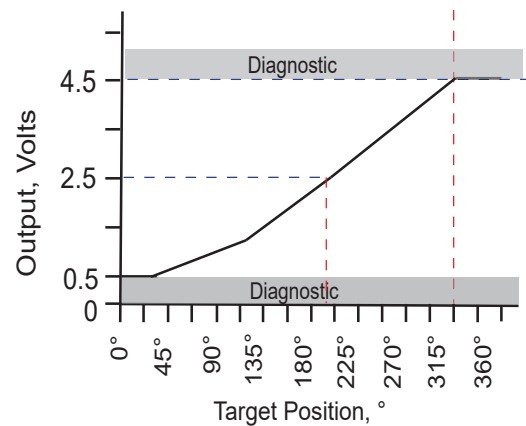
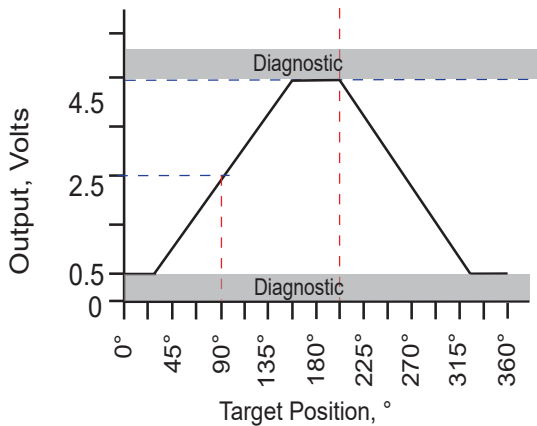
60° (±30°)	-30	0	+30
90° (±45°)	-45	0	+45
120° (±60°)	-60	0	+60
180° (±90°)	-90	0	+90
270° (±135°)	-135	0	+135
360° (±180°)	-180	0	+180

Inverted Output Curves



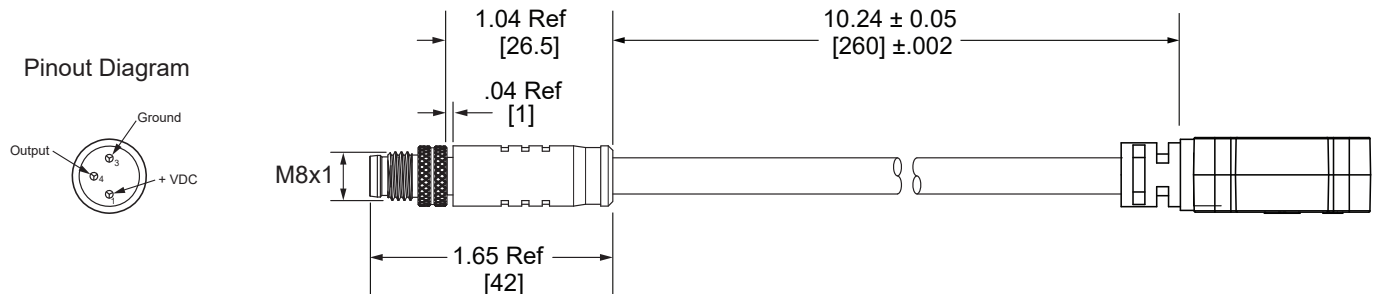
60° (±30°)	-30	0	+30
90° (±45°)	-45	0	+45
120° (±60°)	-60	0	+60
180° (±90°)	-90	0	+90
270° (±135°)	-135	0	+135
360° (±180°)	-180	0	+180

Custom and Multi-slope Output Curve Examples for Specific Applications



Please contact sales@phoenixamerica.com for your specific application requirements

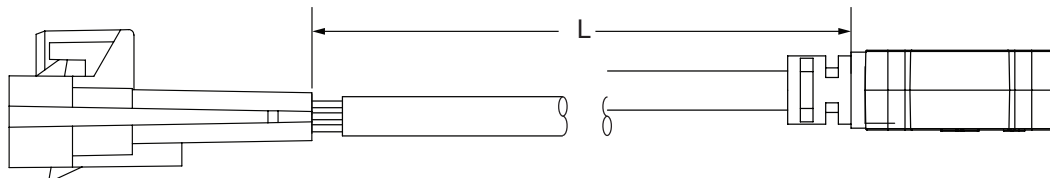
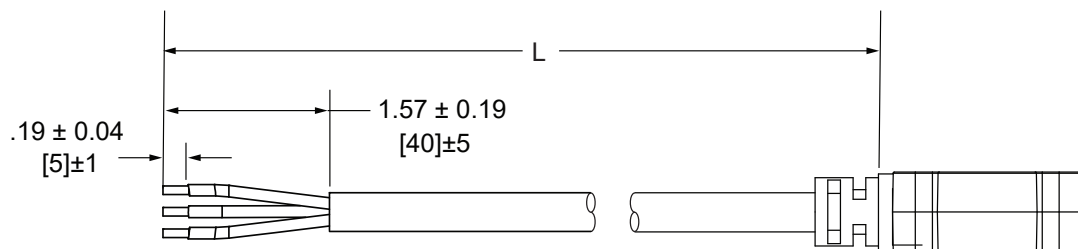
8mm Molded Threaded Connector Option



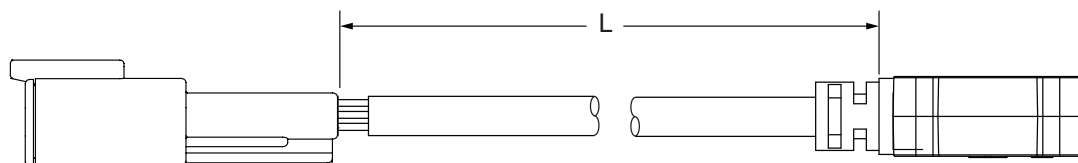
* Contact sales@phoenixamerica for alternative cable length options

Note: Drawing not to scale

Leaded Connector Options



Aptiv Metri-Pack 150 Male Connector



Deutsch DTM04-3P Male Connector

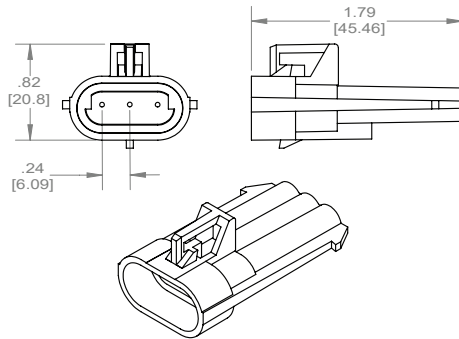
Cable Specifications: 24AWG, 3 Conductor, Voltage Rating: 300 Volts, Temperature Rating: 70° C
Jacket Pressure Extruded PUR-Flame Retardant, Conductor Insulation: PVC
Jacket Diameter: 0.177 Nominal, 0.170 Min / 0.184 Max, Color: Black

* Contact sales@phoenixamerica for alternative wire and cable options

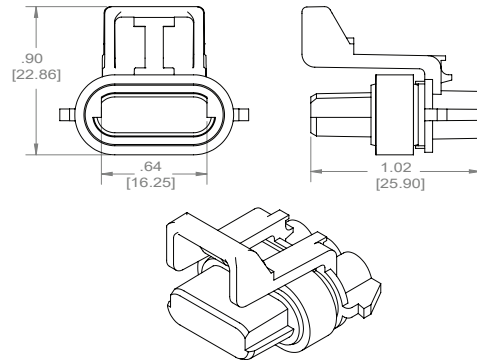
Note: Drawing not to scale

Aptiv Metri-Pack & Deutsch Connector Dimensions

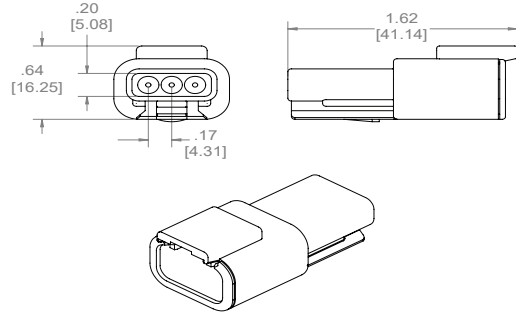
Aptiv (Delphi-Packard) Metri-Pack 150, Male Terminal



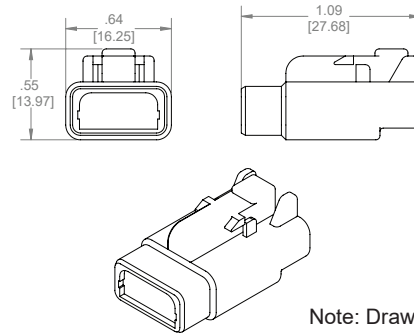
Aptiv (Delphi-Packard) Metri-Pack 150, Female Terminal



Deutsch DTM04-3P, Male Terminal



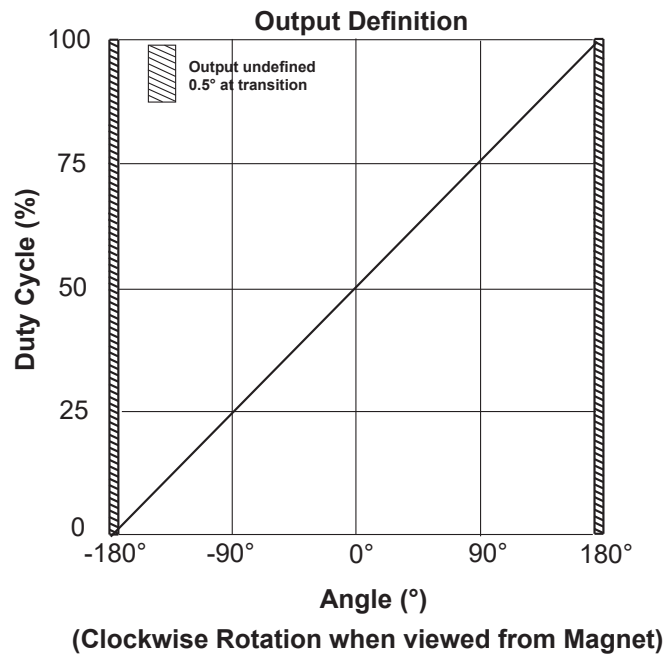
Deutsch DTM06-3S, Female Terminal



Note: Drawing not to scale

* Contact sales@phoenixamerica for alternative connector options

PWM Output Definition Reference Graph



Electrical Connection Color Code & Pinout Table

Function	Cable	Metri-Pack Connector	Deutsch Connector	8mm Threaded Connector
+VDC	Brown	A	1	Pin 1
Output	Black	B	2	Pin 4
Ground	Blue	C	3	Pin 3

Part Number Illustration

Series	Sensing Angle	Supply Voltage	Output Type	Wiring	Length (meters)	Connector	Target Magnet
R3	060 ±30° 090 ±45° 120 ±60° 180 ±90° 270 ±135° 360 ±180°	05 5 V (default)	A Analog P PWM	C Cable	A .5 (19.685") B .914 (36") C 1 (39.37") D 2 (78.74") E* .26 (10.24") *Applies only to M8 Connector Option	X None (Default) M8 8mm, 3 Pin Threaded Male Connector P1 Aptiv/Packard Metri-Pack 150 (Male) P2 Aptiv/Packard Metri-Pack 150 (Female) D1 Deutsch DTM04-3P (Male) D2 Deutsch DTM06-3S (Female)	X None (Default) M1 Rectangular Target Magnet M2 Overmolded Target Magnet Assy.

Example Part Numbers:

R3-06-05-A-C-A-X-X

R3-120-05-A-C-E-M8-M2

R3-360-05-P-C-B-X-X

* Contact sales@phoenixamerica for alternative options