

### PATENTED NON-CONTACT TECHNOLOGY

Joral true non-contact position sensors utilize patented technology developed in-house by Joral, LLC. Rare earth magnets take the place of physical shaft coupling for true non-contact installation. Proven in mobile hydraulics Joral non-contact position sensing enables fast installation, extreme tolerances, and exceptional durability.

- True non-contact technology for extreme installation tolerances
- Watertight, totally encapsulated electronics (IP69K)
- Rugged-duty, bullet-proof hardware
- Standard housings as well as application specific pages (*standard housings 18mm, 30mm, 38mm, 58mm*)
- LED indicators provide live feedback for power and output

### NON-CONTACT GENERAL OPERATION

A magnetic coupling is made between an *internal rotating magnet* (built into the position sensor) and an *external rotating magnet* (mounted on the application).

The non-contact sensor's *internal rotating magnet* couples with the *external rotating magnet* installed on the application.

The *external rotating magnet* (mounted on the application) and the *internal rotating magnet* (built into the encoder) magnetically couple and track as if they were physically connected.

### AT-A-GLANCE SPECIFICATIONS

**Installation Tolerances:**

<b>GAP</b>	0.5" (12mm) between application magnet and encoder
<b>AXIAL</b>	0.10" (2.5mm) center alignment
<b>PLANAR</b>	30° tilt

**Connection options include but not limited to:** M12, M12 Pigtail, M8, Terminal Block, Flying Lead Cable, and various Deutsch connectors

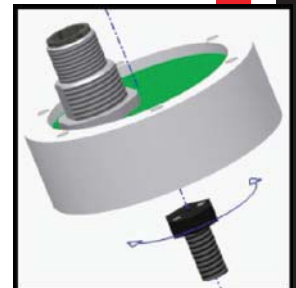
**Available Incremental Outputs:**

- Quadrature Single Ended
- Quadrature Differential
- Step and Direction
- J1939 CAN Bus

**Available Absolute Position Outputs:**

- SSI (Synchronous serial interface)
- Analog or Current Output
- PWM (Pulse width modulation)
- J1939 CAN Bus
- Modicon MODBUS

**ZERO POWER Multi-turn Capable** Contact Joral for available Zero Power options



## NON-CONTACT POSITION SENSORS

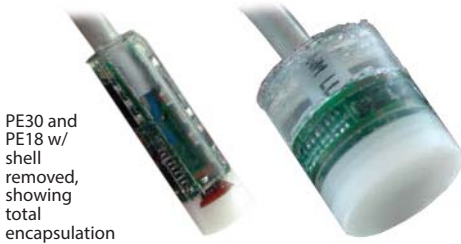
### TRUE NON-CONTACT POSITION SENSING

Joral true non-contact position sensors compensate for variations in distance, tilt, and off-center positioning of the magnet.

- Tolerances of 0.5" (12mm) gap, 30° tilt, and 0.1" (2.5mm) axial
- True non-contact limits mechanical wear
- Magnetic coupling makes for flexible installation



HP58 showing sensor internal magnet and application magnet



PE30 and PE18 w/ shell removed, showing total encapsulation

### TOTALLY ENCAPSULATED ELECTRONICS

Automotive grade transparent potting compound protects electronic components and ensures a complete seal from external forces.

- Protection from shock, vibration, and direct impact
- IP69K protection for total moisture resistance
- Clear compound allows for LED indicators to be viewed

### STANDARD PACKAGING STYLES

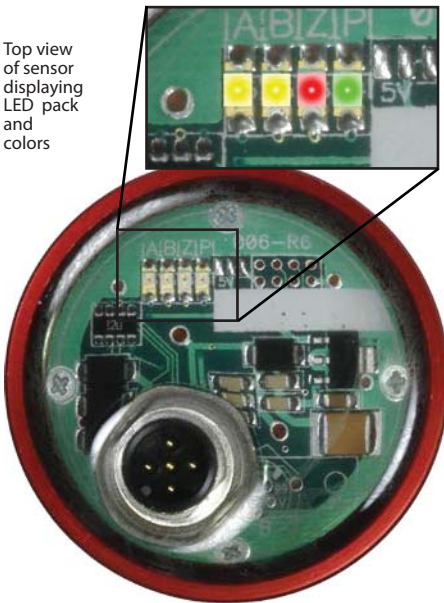
Joral non-contact sensors available in prox-style and puck-style housings; 18mm & 30mm housings make for compact rotary position sensing.

- Small, standard, and convenient housing options
- Standard diameter and thread patterns
- Uses standard prox mounting hardware



PE18 ProxEncoder™ non-contact rotary position sensor displaying compact proximity sensor housing

Top view of sensor displaying LED pack and colors



### LED INDICATORS FOR LIVE FEEDBACK

LED indicators allow for constant monitoring of the sensor's operation.

- Power LED displays the status of sensor's power connections
- Channel and index LEDs relay the status of encoder output
- LEDs make for simple in-field troubleshooting and diagnostics

### RUGGED-DUTY HARDWARE

Additional protection from electrical surges and mis-wiring are built into Joral non-contact rotary position sensors.

- Surge protectors for every input/output
- Reverse voltage protection provided against mis-wiring
- Internal auto-resettable fuse for extreme protection



## STANDARD OPERATING CHARACTERISTICS

ENCODER OUTPUT	RESOLUTION	CHARACTERISTICS
<b>Quadrature Single Ended</b> Incremental Output	<b>8 to 2048 PPR</b> - Standard Resolutions: 8, 10, 16, 20, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048	<b>Format:</b> Two channel quadrature A and B outputs with index pulse Z <b>Driver:</b> 7272 push-pull driver
<b>Quadrature Differential</b> Incremental Output	<b>8 to 2048 PPR</b> - Standard Resolutions: 8, 10, 16, 20, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048	<b>Format:</b> Two channel quadrature A and B outputs with index pulse Z and complementary outputs A', B', and Z' <b>Driver:</b> 7272 push-pull driver
<b>Step and Direction</b> Incremental Output	<b>16 to 512 PPR</b> - Standard Resolutions: 16, 32, 64, 128, 256, 512	<b>Format:</b> One channel STEP output and one channel DIRECTION output with Index pulse Z <b>Driver:</b> 7272 push-pull driver
<b>SSI Absolute Position Output</b> Absolute Output	<b>8192 Positions</b> 0.0439 degrees per position	<b>Format:</b> Clock and data output <b>Driver:</b> Differential Output
<b>PWM Absolute Position Output</b> Absolute Output	<b>1024 or 2048 Positions</b>	<b>Format:</b> Pulse Width Modulation in 1 μsec increments <b>Driver:</b> 7272 push-pull driver
<b>Analog Voltage Absolute Position</b> Absolute Output	<b>0 to 5 VDC</b> -OR- <b>4 to 20 mA</b> 10 bit internal resolution	<b>Format:</b> Output Voltage/Current proportional to 0-360 degrees <b>Output Loading:</b> 10mA max
<b>J1939 CAN Bus</b> Absolute or Incremental Output	<b>1000 or 8192 Positions</b> - see J1939 output pages for message information	<b>Format:</b> Standard SAE J1939 CAN Bus - One message for status, one message for settings

## ELECTRICAL SPECIFICATIONS

<b>Input Power</b>	6 to 30 VDC at approximately 60mA max, not including output loads
<b>Electrical Protection</b>	Over-voltage, Reserve-voltage, Output short-circuit protected
<b>LED Indicators</b>	Power and output channel status
<b>Connection Types</b>	M8, M12, M12 on pigtail, Terminal block, Flying lead cable, Deutsch - 4 or 6 pin

## ENVIRONMENTAL SPECIFICATIONS

<b>Operating Temperature</b>	-30 to +80 degrees C
<b>Storage Temperature</b>	-40 to +100 degrees C
<b>Humidity</b>	100%
<b>Vibration</b>	5 to 3000 Hz, 20g
<b>Shock</b>	400g 6msec (MIL STD 202)
<b>Sensor Sealing</b>	IP69K (connector dependent) <i>**Terminal block not IP rated**</i>

## MECHANICAL SPECIFICATIONS

<b>Housing Diameter</b>	18mm, 30mm, 38mm, and 58mm			
<b>Housing Material</b>	Aluminum, Stainless Steel, or Delrin™			
<b>Max Speed</b>	3000 RPM			
MODEL	HOUSING DIAMETER	WEIGHT	HEIGHT	HEIGHT w/ M12
PE18	18mm	1 oz	1.87 inches (47.5mm)	N/A
PE30	30mm	1.5 oz	1.2 inches (30.5mm)	1.75 inches (44.5mm)
HP38	38mm	1.3 oz	0.69 inches (17.5mm)	N/A
HP58	58mm	2 oz	0.75 inches (19.1mm)	1.5 inches (38.1mm)



**PE30 Prox Encoder™** non-contact rotary position sensor

- Extremely compact, J1939 capable
  - Shell body 1.2" (30.5mm) tall w/o connector
- Patented true non-contact position sensing
  - 0.5" (12mm) gap between sensor and application
  - 0.10" (2.5mm) center alignment
  - 30° planar tilt
- Totally sealed IP69K (*connector dependent*)
- LED indicators for power and output feedback
- Incremental or Absolute position
- Outputs: Quadrature, Step and Direction, SSI, PWM, Analog, Modicon MODBUS, & J1939 Can Bus



**STANDARD OPERATING CHARACTERISTICS**

<b>ELECTRICAL</b>	<b>Outputs</b>	<b>A - [PPR] - SEPP</b> Incremental 13 bit Quadrature w/ Single Ended Output   A B Z
		<b>A - [PPR] - DIPP</b> Incremental 13 bit Quadrature w/ Differential Output   A B Z & A' B' Z'
	<b>A - 1939</b> J1939 13 bit @ 1000 positions (8192 positions max)	
	<b>B - PWM</b> PWM absolute position	
	<b>A - SSI1</b> SSI absolute position @ 8192 positions	
	<b>V1</b> Voltage Out / 5 VDC IN, 0-5 VDC OUT	
	<b>V2</b> Voltage Out / 6-36 VDC IN, 0-5 VDC OUT	
	<b>I1</b> Current Out / 0-24 VDC IN, 4-20 mA OUT	
	<b>Input Power</b> 6 to 30 VDC at approx 60 mA max, <i>not including output loads</i>	
	<b>Electrical Protection</b> Over-voltage, reserve-voltage, output short-circuit protected	
	<b>LED Indicators</b> Power and output channels	
	<b>Connections</b> Terminal Plug, M8, M12, M12 Pigtail, Flying Lead Cable, Shielded Flying Lead, or Deutsch - 4 or 6 pin	
	<b>Resolution</b> 0.3°	
	<b>Repeatability</b> 0.30%	
	<b>Nonlinearity</b> <1%	
<b>MECHANICAL</b>	<b>Housing Diameter</b>	30mm
	<b>Housing Material</b>	Aluminum or Stainless Steel ( <i>corrosion resistant</i> )
	<b>Housing Height</b>	1.2" (30.5mm) body; 1.86" (47.2mm) w/ M12 connector
	<b>Mounting</b>	30mm thread ( <i>standard proximity switch thread style</i> )
	<b>Weight</b>	1.0 oz w/o mounting nuts; 2.2 oz w/ recommended mounting nuts
	<b>Magnet / sensor gap*</b>	Standard 0.5" (12mm) ( <i>Max w/ custom mag assembly up to 1" [30mm]</i> )
	<b>Rated planar tilt / axial gap*</b>	Planar 30° ( <i>Max 45°</i> ) / Axial 0.1" (2.5mm) ( <i>Max 0.16" [4mm]</i> )
	<b>Speed</b>	3000 RPM max
<b>ENVIRONMENTAL</b>	<b>Operating Temperature</b>	-30° to +80° C
	<b>Storage Temperature</b>	-40° to +90° C
	<b>Humidity</b>	100%
	<b>Shock</b>	400g/6ms ( <i>MIL STD 202</i> )
	<b>Vibration</b>	5 to 3000 Hz, 20g ( <i>MIL STD 202</i> )
	<b>Protection Class</b>	IP69K ( <i>connection dependent</i> )

\* Non-contact tolerances rated using MAGH-RING 1/4x20 magnet accessory.

General ordering guide found on next page (S2 ; I3 / 2)



**PE30 GENERAL ORDERING GUIDE**

Build part number first by selecting **Housing Style** (code 1), **MagElec** (code 2), and **Connection** (code 3). Add **Special Codes** (code 4) to the end of the Joral part number. Refer to 'Special Part Number Information' for explanation of modifiers.

**Examples:** PE30-A-1024-SEPP-M12-54 - Stainless Steel (PE30, modifier 54), M12 Connector (M12), 13 bit incremental quadrature @ 1024 PPR

PE30-A-1939-SC72-61 - Red aluminum (PE30), Extended thread (modifier 61), 72" Shielded cable (SC72)

PE30-V1-0-180-0-5-CW-C72 - Red aluminum (PE30), 72" Cable (C72), 0-5v out (V1) @ 0-180°, 0v to 5v out, clockwise direction (CW)

Code 1: Housing Style	Code 2: MagElec (Sensor Output)	Code 3: Connection	Code 4: Special Codes	
<b>PE30</b> PE30 red aluminum, For stainless steel housing add <b>special code 54</b> to Joral P/N.  <b>Modifier Extended Thread:            Special Code - 61</b> Extended thread on PE30 housing increases available thread length by 0.5" (12.7mm).  <i>* More outputs and connection            options available, contact Joral if            desired configuration is not listed</i>	<b>A - _____ - SEPP</b>	13 bit single ended quadrature - A B Z	<b>TRM</b> Pluggable Terminal block <b>INS</b> Wire insertion terminal	
	<b>A - _____ - DIPP</b>	13 bit differential quadrature - A B Z, A' B' Z'	<b>M8</b> M8 male <b>M12</b> M12 male	
	<b>A - 1939</b>	13 bit J1939 @ 1000 positions	<b>M12P</b> M12 male on 18' pigtail <b>CXX</b> Flying lead cable (enter XX as inches)	
	<b>B - PWM</b>	Absolute position PWM	<b>SCXX</b> Shielded cable (enter XX as inches)	
	<b>A - SSI1</b>	Absolute position SSI @ 8192 positions	<b>CSP</b> Cable with custom end <b>DE4</b> DT04 - 4 pin male Deutsch <b>DE6</b> DT04 - 6 pin male Deutsch	
	<b>V1</b>	5 VDC IN, 0-5 VDC OUT		
	<b>V2</b>	6-36 VDC IN, 0-5 VDC OUT		
	<b>I1</b>	0-24 VDC IN, 4-20 mA OUT		
				<b>51</b> Red Aluminum <b>53</b> Black Aluminum <b>54</b> Stainless Steel <b>61</b> Extended Thread <b>71</b> Roller <b>72</b> Spindle <b>90</b> 13 bit @ 8192 counts per rotation (Typical J1939 option)

**Special Part Number Information** Review below code sections for important P/N build information

**Code 1: Housing Style**

- **Modifier 54** - PE30 Stainless steel housing for corrosive applications.
- **Modifier 61** - Add 61 to P/N for extended thread. Standard shell length w/o M12 1.2" (30mm), Extended length w/o M12 1.7" (43mm). Code 61 adds 0.5" (12.7mm) length to thread for more access in threaded mounting.

**Code 2: MagElec**

(A - \_\_\_\_\_ - SEPP) or  
 (A - \_\_\_\_\_ - DIPP)

- Enter Quadrature PPR in place of \_\_\_\_\_
- A = 13 bit PPR
- **Available 13 bit PPR:** 0008, 0010, 0016, 0020, 0025, 0032, 0040, 0050, 0064, 0080, 0100, 0125, 0128, 0200, 0250, 0256, 0400, 0500, 1024, 2048

**A - 1939**

- Standard J1939 output is 1000 positions
- A = 13 bit
- **MODIFIER 90** - for 8192 positions (max resolution) add code 90 to end of PE30 P/N

**V1, V2, and I1** (Analog MagElec P/N Guide)

- First select MagElec code (**V1, V2 or I1**) then Angle Range (**A1-A2**), Voltage Range (**VR1-VR2**) and Signal Direction (**Clockwise [CW] or Counter [CCW]**)
- **PART NUMBER FORMULA** (MagElec)-(A1-A2)-(VR1-VR2)-(CW or CCW)
- **EXACT V1, V2, and I1 EXAMPLES**  
 PE30 - **V1 - 0-360 - 0.5-4.5 - CW - C72**  
 PE30 - **V2 - 0-180 - 0-5 - CCW - DE4**  
 PE30 - **I1 - 180-270 - 4-20 - CW - M12**

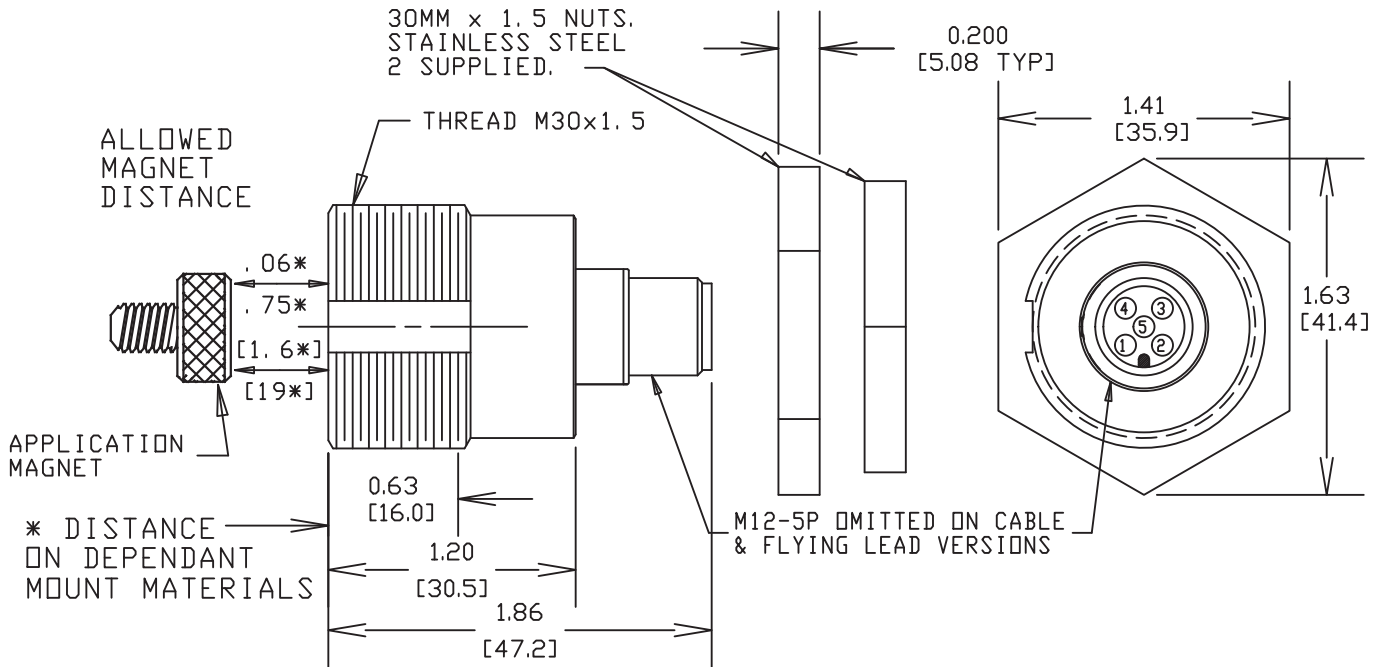
**Code 3: Connections**

- **All Outputs, All Connections** - Connector exit back exit only (sensor epoxy side) for housing style PE30
- **J1939 Output** - Addressing via varying value resistor in connection requires at least five conductors (M12, DE6 and Cables addressing compatible)
- **All Outputs w/ Deutsch** - DE4 and DE6 connection Deutsch connectors add \$20 to PE30 list





**PE30 DIMENSIONS & GENERAL PIN OUTS**

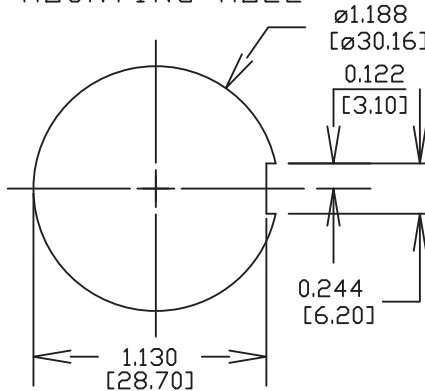


**STANDARD MAGNET**  
MAG-H-RING-ASSM.  
1/4-20 X .47

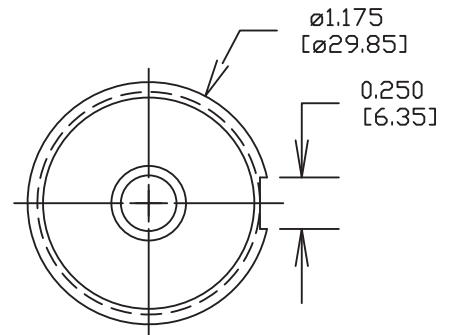


**MAGNET NOTE:**  
STANDARD MAGNET INCLUDED AS  
ACCESSORY WITH PURCHASE OF  
NON-CONTACT SENSOR

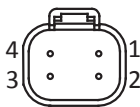
**RECOMMENDED  
MOUNTING HOLE**



**SENSOR FACE**



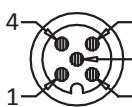
**DT04-4P MALE  
FACE VIEW**



**DT04-4P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = COMMON/GROUND

**M12-5P MALE  
FACE VIEW**



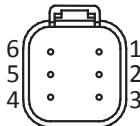
**M12-5P/CABLE/FLYING LEAD  
QUADRATURE OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CHANNEL B
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CHANNEL A
- 5 = GRY = CHANNEL Z

**M12-5P/CABLE/FLYING LEAD  
PROPORTIONAL (ANALOG) OUTPUT**

- 1 = BRN = +VDC (VIN)
  - 2 = WHT = DIG. LIMIT OUT\*
  - 3 = BLUE = COMMON/GROUND
  - 4 = BLK = PROP. VDC OUTPUT
  - 5 = GRY = NOT USED
- \*OPTION CONSULT FACTORY

**DT04-6P MALE  
FACE VIEW**



**DT04-6P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = ADDRESS GROUND
- 5 = WHT = ADDRESS PROG. RESISTOR
- 6 = BLK = COMMON/GROUND

**M12-5P AND 5 CONDUCTOR  
CABLE J1939 OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CAN HIGH
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CAN LOW
- 5 = GRY = OPTIONAL ADDRESS PROGRAMMING RESISTOR

Dimensions informative only  
For most recent dimensions please consult factory



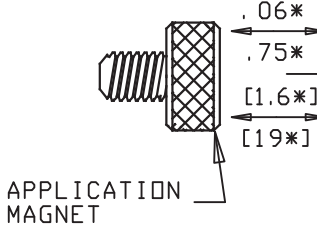
**PE30 EXTENDED THREAD DIMENSIONS & GENERAL PIN OUTS**

**NOTE:**

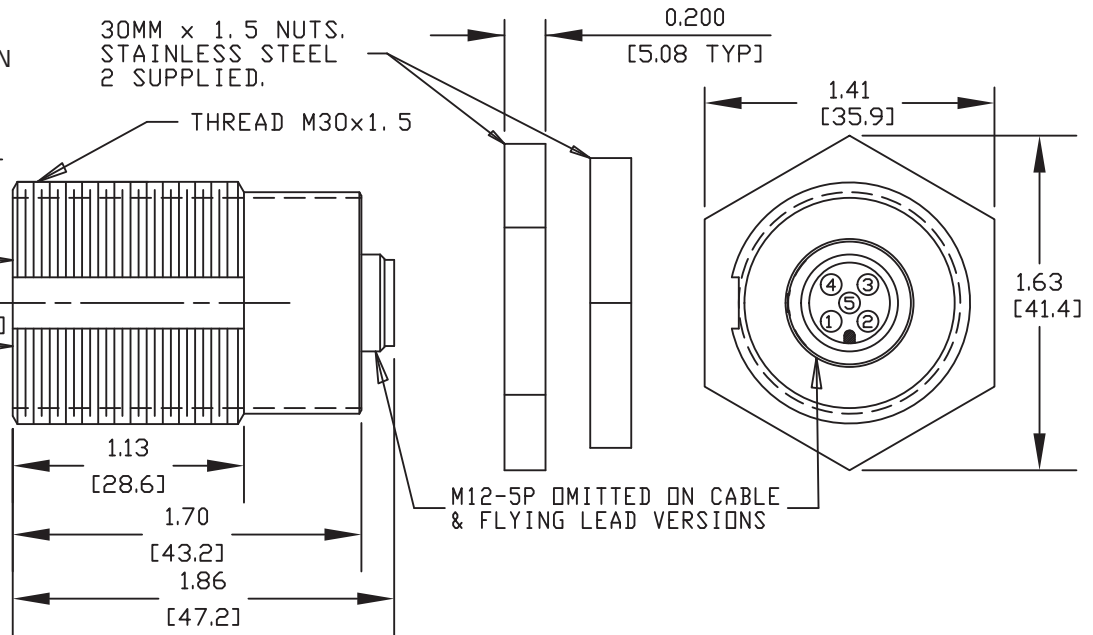
ADD 61 TO END OF PE30 P/N  
FOR EXTENDED THREAD

30MM x 1.5 NUTS.  
STAINLESS STEEL  
2 SUPPLIED.

ALLOWED MAGNET  
DISTANCE



\* DISTANCE  
DEPENDANT  
ON MOUNT  
MATERIALS



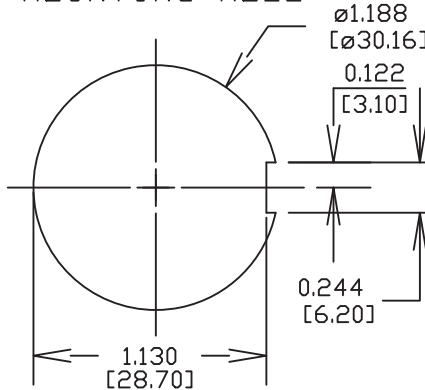
STANDARD MAGNET  
MAG-H-RING-ASSM.  
1/4-20 X .47



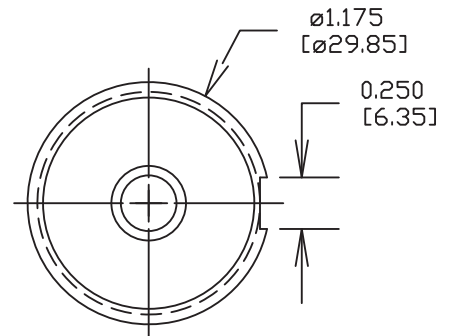
**MAGNET NOTE:**

STANDARD MAGNET INCLUDED AS  
ACCESSORY WITH PURCHASE OF  
NON-CONTACT SENSOR

RECOMMENDED  
MOUNTING HOLE



SENSOR FACE



DT04-4P MALE  
FACE VIEW



**DT04-4P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = COMMON/GROUND

M12-5P MALE  
FACE VIEW



**M12-5P/CABLE/FLYING LEAD  
QUADRATURE OUTPUT**

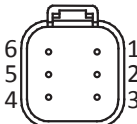
- 1 = BRN = +VDC (VIN)
- 2 = WHT = CHANNEL B
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CHANNEL A
- 5 = GRY = CHANNEL Z

**M12-5P/CABLE/FLYING LEAD  
PROPORTIONAL (ANALOG) OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = DIG. LIMIT OUT\*
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = PROP. VDC OUTPUT
- 5 = GRY = NOT USED

\*OPTION CONSULT FACTORY

DT04-6P MALE  
FACE VIEW



**DT04-6P J1939 OUTPUT**

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- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = ADDRESS GROUND
- 5 = WHT = ADDRESS PROG. RESISTOR
- 6 = BLK = COMMON/GROUND

**M12-5P AND 5 CONDUCTOR  
CABLE J1939 OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CAN HIGH
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CAN LOW
- 5 = GRY = OPTIONAL ADDRESS  
PROGRAMMING RESISTOR

Dimensions informative only  
For most recent dimensions please consult factory



**HP38 Hockey Puck™** *non-contact rotary position sensor*

- OEM driven solution with minimum order quantities
- Compact bare bones non-contact rotary encoder
  - Body only 0.69" (17.5mm) tall
- Patented true non-contact position sensing
  - 0.5" (12mm) gap between sensor and application
  - 0.10" (2.5mm) center alignment
  - 30° planar tilt
- Totally sealed IP69K (*connector dependent*)
- LED indicators for power and output feedback
- Outputs: Quadrature, SSI, Analog, & J1939 Can Bus



**STANDARD OPERATING CHARACTERISTICS**

ELECTRICAL	Outputs	<b>B - [PPR] - SEPP</b> Incremental 10 bit Quadrature w/ Single Ended Output   A B Z <b>B - 1939</b> J1939 10 bit @ 512 positions <b>B - PWM</b> PWM absolute position <b>B - SSI1</b> SSI absolute position @ 512 positions
	<b>V1</b>	Voltage Out / 5 VDC IN, 0-5 VDC OUT
	<b>V2</b>	Voltage Out / 6-36 VDC IN, 0-5 VDC OUT
	<b>Input Power</b>	6 to 30 VDC at approx 60 mA max, <i>not including output loads</i>
	<b>Electrical Protection</b>	Over-voltage, reserve-voltage, output short-circuit protected
	<b>LED Indicators</b>	Power and output channels
	<b>Connections</b>	M8, M12 Pigtail, Terminal Block, Flying Lead Cable, or Deutsch (4 or 6 pin)
	<b>Resolution</b>	0.3°
	<b>Repeatability</b>	0.30%
	<b>Nonlinearity</b>	<1%
MECHANICAL	<b>Housing Diameter</b>	38mm
	<b>Housing Material</b>	Black Delrin™ (standard)
	<b>Housing Height</b>	0.69" (17.5mm) body
	<b>Mounting</b>	32mm (.884) spacing w/ 4mm diameter screws
	<b>Weight</b>	1.3 oz
	<b>Magnet / sensor gap*</b>	Standard 0.5" (12mm) (Max w/ custom mag assembly up to 1" [30mm])
	<b>Rated planar tilt / axial gap*</b>	Planar 30° (Max 45°) / Axial 0.1" (2.5mm) (Max 0.16" [4mm])
	<b>Speed</b>	3000 RPM max
ENVIRONMENTAL	<b>Operating Temperature</b>	-30° to +80° C
	<b>Storage Temperature</b>	-40° to +90° C
	<b>Humidity</b>	100%
	<b>Shock</b>	400g/6ms (MIL STD 202)
	<b>Vibration</b>	5 to 3000 Hz, 20g (MIL STD 202)
	<b>Protection Class</b>	IP69K ( <i>connection dependent</i> )

\* Non-contact tolerances rated using MAGH-RING 1/4x20 magnet accessory.

General ordering guide found on next page (S2; I4 / 2)





## HP38 GENERAL ORDERING GUIDE

Build part number first by selecting **Housing Style** (code 1), **MagElec** (code 2), and **Connection** (code 3). Add **Special Codes** (code 4) to the end of the Joral part number. Refer to '**Special Part Number Information**' for explanation of modifiers.

**Examples:** **HP38-B-0256-SEPP-M12P** - Black Delrin™ (HP38), M12 pigtail (M12P), 10 bit incremental quadrature @ 256 ppr

**HP38-B-1939-SC72** - Black Delrin™ (HP38), 72" Shielded cable, 10 bit J1939 @ 512 positions

**HP38-V1-0-360-0.5-4.5-CW-C72** - Black Delrin™ (HP38), 72" Cable (SC72), 0-5v Voltage Out (V1) @ 0-360°, 0.5-4.5v out, clockwise signal

Code 1: Housing Style	Code 2: MagElec (Sensor Output)	Code 3: Connection	Code 4: Special Codes
<b>HP38</b> HP38 material black Delrin™, connector orientation SIDE EXIT. For REAR EXIT connector on HP38 add code 33 to end of P/N.	<b>B - _____ - SEPP</b>	10 bit single ended quadrature - A B Z	<b>TRM</b> Pluggable Terminal block <b>M8</b> M8 male
	<b>B - 1939</b>	10 bit J1939 @ 512 positions	<b>M12P</b> M12 male on 18' pigtail <b>CXX</b> Flying lead cable (enter XX as inches)
	<b>B - SSI1</b>	Absolute position SSI @ 512 positions	<b>SCXX</b> Shielded cable (enter XX as inches)
	<b>B - PWM</b>	PWM absolute position	<b>DE4</b> DT04 - 4 pin male Deutsch <b>DE6</b> DT04 - 6 pin male Deutsch
	<b>V1</b>	5 VDC IN, 0-5 VDC OUT	
	<b>V2</b>	6-36 VDC IN, 0-5 VDC OUT	
			<b>31</b> Side Exit (housing wall) <b>33</b> Back Exit (epoxy side) <b>71</b> Roller <b>72</b> Spindle
* More outputs and connection options available, contact Joral if desired configuration is not listed			

## Special Part Number Information *Review below code sections for important P/N build information*

### Code 1: Housing Style

- **Modifier 33** - For BACK EXIT connector orientation on HP38 add 33 to end of Joral P/N
- **HP38** - Handles ALL back exit and CABLE ONLY side exit connections

### Code 2: MagElec

#### (B - \_\_\_\_\_ - SEPP)

- Enter Quadrature PPR in place of \_\_\_\_\_
- B = 10 bit PPR
- **Available 10 bit PPR:** 0032, 0064, 0128, 0256

#### B - 1939

- 10 bit J1939 output is 512 positions
- B = 10 bit

#### V1, V2, and I1 (Analog MagElec P/N Guide)

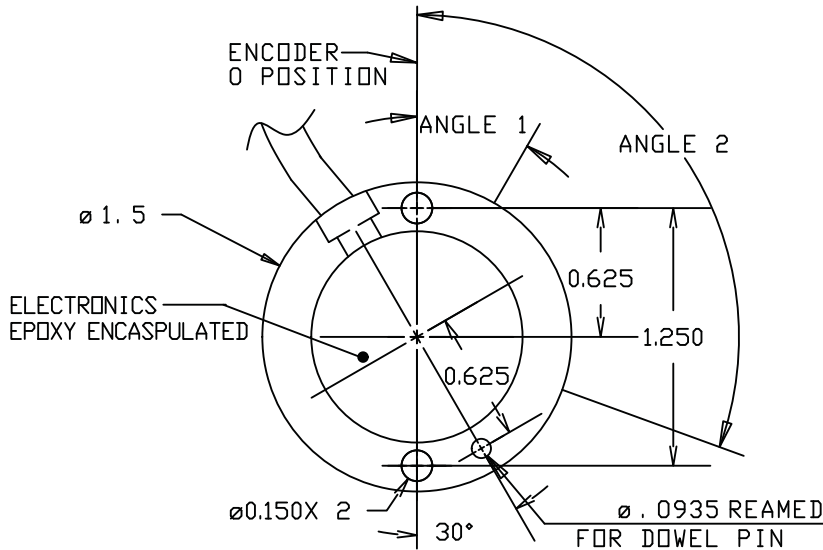
- First select MagElec code (**V1, V2 or I1**) then Angle Range (**A1-A2**), Voltage Range (**VR1-VR2**) and Signal Direction (**Clockwise [CW] or Counter [CCW]**)
- **PART NUMBER FORMULA**  
(MagElec)-(A1-A2)-(VR1-VR2)-(CW or CCW)
- **EXACT V1, V2, and I1 EXAMPLES**  
 HP38 - **V1 - 0-360 - 0.5-4.5 - CW - C72**  
 HP38 - **V2 - 0-180 - 0-5 - CCW - C72**  
 HP38 - **I1 - 180-270 - 4-20 - CW - C72**

### Code 3: Connections

- **All Outputs, All Connections** - Standard connection orientation SIDE EXIT. For BACK EXIT connector on HP38 add 33 to end of Joral HP38 P/N
- **J1939 Output** - Addressing via varying value resistor in connection requires at least five conductors (*M12, DE6 and Cables addressing compatible*)
- **All Outputs w/ Deutsch** - DE4 and DE6 connection Deutsch connectors add \$20 to HP38 list



**HP38 DIMENSIONS & GENERAL PIN OUTS**

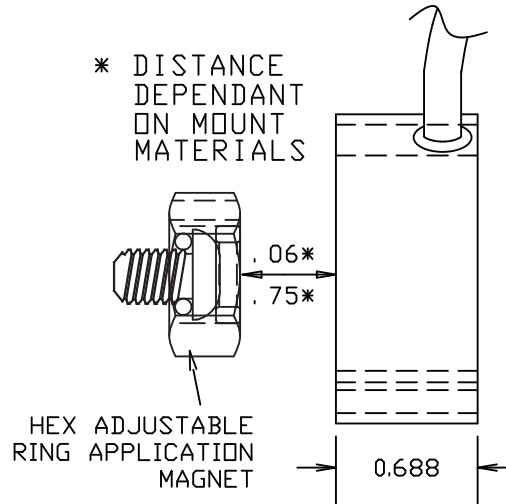


**HOUSING/INSTALL NOTES:**  
MAGNET MOUNT MATERIALS  
MUST HAVE Ø1.0 [25.4]  
HOLE CENTERED ON SENSOR  
CENTERLINE

NON-MAGNETIC MOUNT  
MATERIAL, MAY BE SOLID

MOUNT WITH 316 STAINLESS  
STEEL 4-40 SCREWS

\* DISTANCE  
DEPENDANT  
ON MOUNT  
MATERIALS

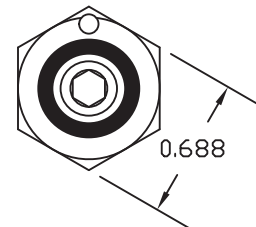


**STANDARD MAGNET**  
MAG-H-RING-ASSM.  
1/4-20 X .47



**MAGNET NOTE:**  
STANDARD MAGNET INCLUDED AS  
ACCESSORY WITH PURCHASE OF  
NON-CONTACT SENSOR

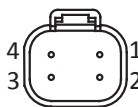
**V1, V2, I1**  
HEX ADJUSTABLE  
MAGNET DETAIL  
(FACE VIEW)



**HEX ADJUSTABLE MAGNET NOTE:**  
ADJUSTABLE RING MAGNET INCLUDED  
AS ACCESSORY WITH PURCHASE OF  
ANALOG/VOLTAGE NON-CONTACT  
SENSOR (OUPUTS V1, V2, I1)

FOR ZERO/HOME POSITION CAPABILITY  
WITH ALL ANALOG ABSOLUTE NON-  
CONTACT POSITION SENSORS

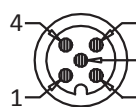
**DT04-4P MALE  
FACE VIEW**



**DT04-4P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = COMMON/GROUND

**M12-5P MALE  
FACE VIEW**



**M12-5P/CABLE/FLYING LEAD  
QUADRATURE OUTPUT**

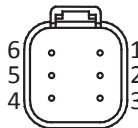
- 1 = BRN = +VDC (VIN)
- 2 = WHT = CHANNEL B
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CHANNEL A
- 5 = GRY = CHANNEL Z

**M12-5P/CABLE/FLYING LEAD  
PROPORTIONAL (ANALOG) OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = DIG. LIMIT OUT\*
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = PROP. VDC OUTPUT
- 5 = GRY = NOT USED

\*OPTION CONSULT FACTORY

**DT04-6P MALE  
FACE VIEW**



**DT04-6P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = ADDRESS GROUND
- 5 = WHT = ADDRESS PROG. RESISTOR
- 6 = BLK = COMMON/GROUND

**M12-5P AND 5 CONDUCTOR  
CABLE J1939 OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CAN HIGH
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CAN LOW
- 5 = GRY = OPTIONAL ADDRESS  
PROGRAMMING RESISTOR

*Dimensions informative only  
For most recent dimensions please consult factory*



**HP58 Hockey Puck™** non-contact rotary position sensor

- Patented true non-contact position sensing
  - 0.5" (12mm) gap between sensor and application
  - 0.10" (2.5mm) center alignment
  - 30° planar tilt
- Totally sealed IP69K (*connector dependent*)
- LED indicators for power and output feedback
- Incremental or Absolute position
- Outputs: Quadrature, Step and Direction, SSI, PWM, Analog, Modicon MODBUS, & J1939 Can Bus
- Detects rotation through non-ferrous barriers; Special applications include use in explosion proof housings, high PSI zone separation, and enclosed rotational measurement



**STANDARD OPERATING CHARACTERISTICS**

ELECTRICAL	Outputs	A - [PPR] - SEPP	Incremental 13 bit Quadrature w/ Single Ended Output   A B Z
		A - [PPR] - DIPP	Incremental 13 bit Quadrature w/ Differential Output   A B Z & A' B' Z'
		A - 1939	J1939 13 bit @ 1000 positions (8192 positions max)
		A - MOD1	Modicon MODBUS @ 8192 positions
		B - PWM	PWM absolute position
		A - SSI1	SSI absolute position @ 8192 positions
	V1	Voltage Out / 5 VDC IN, 0-5 VDC OUT ( <i>code V3 for 2x redundant output</i> )	
	V2	Voltage Out / 6-36 VDC IN, 0-5 VDC OUT	
	I1	Current Out / 0-24 VDC IN, 4-20 mA OUT ( <i>code I1 for 2x redundant output</i> )	
	Input Power	6 to 30 VDC at approx 60 mA max, <i>not including output loads</i>	
	Electrical Protection	Over-voltage, reserve-voltage, output short-circuit protected	
	LED Indicators	Power and output channels	
	Connections	Terminal Plug, M8, M12, M12 Pigtail, Flying Lead Cable, Shielded Flying Lead, or Deutsch - 4 or 6 pin	
	Resolution	0.3°	
	Repeatability	0.30%	
	Nonlinearity	<1%	
MECHANICAL	Housing Diameter	58mm	
	Housing Material	HP58 Black Delrin™ ( <i>standard</i> ) or White Delrin™; HP58SE Red Aluminum	
	Housing Height	0.75" (19mm) body; 1.5" (38.1mm) w/ M12 connector	
	Mounting	60.128 mounting holes	
	Weight	2.6 oz	
	Magnet / sensor gap*	Standard 0.5" (12mm) ( <i>Max w/ custom mag assembly up to 1" [30mm]</i> )	
	Rated planar tilt / axial gap*	Planar 30° ( <i>Max 45°</i> ) / Axial 0.1" (2.5mm) ( <i>Max 0.16" [4mm]</i> )	
	Speed	3000 RPM max	
ENVIRONMENTAL	Operating Temperature	-30° to +80° C	
	Storage Temperature	-40° to +90° C	
	Humidity	100%	
	Shock	400g/6ms ( <i>MIL STD 202</i> )	
	Vibration	5 to 3000 Hz, 20g ( <i>MIL STD 202</i> )	
	Protection Class	IP69K ( <i>connection dependent</i> )	

\* Non-contact tolerances rated using MAGH-RING 1/4x20 magnet accessory.

General ordering guide found on next page (S2 ; I5 / 2)



## HP58 GENERAL ORDERING GUIDE

Build part number first by selecting **Housing Style** (code 1), **MagElec** (code 2), and **Connection** (code 3). Add **Special Codes** (code 4) to the end of the Joral part number. Refer to '**Special Part Number Information**' for explanation of modifiers.

- Examples:** **HP58-A-0080-SEPP-SC72-31** - Black Delrin™ (HP58), Side exit (31), 72" shielded cable (SC72), 13 bit incremental quadrature @ 80 PPR  
**HP58-A-1939-M12-90** - Black Delrin™ (HP58), Back exit (standard), M12 connector (M12), J1939 @ 8192 positions (modifier 90 for 8192)  
**HP58SE-V1-0-180-0.5-4.5-CW-C72-31** - Red Aluminum (HP58SE), Side exit (31), 0-5v Out (V1) @ 0-180°, 0.5-4.5v out, clockwise signal

Code 1: Housing Style	Code 2: MagElec (Sensor Output)	Code 3: Connection	Code 4: Special Codes
<b>HP58</b> HP58 material Black Delrin™, connector orientation BACK EXIT standard. To designate SIDE EXIT connection use special code 31. (Side exit for HP58 CABLE ONLY)	<b>A - _____ - SEPP</b> 13 bit single ended quadrature - A B Z	<b>TRM</b> Pluggable Terminal block	<b>31</b> Side (housing wall)
	<b>A - _____ - DIPP</b> 13 bit differential quadrature - A B Z, A' B' Z'	<b>INS</b> Wire insertion terminal	<b>32</b> Front (magnet side)
		<b>M8</b> M8 male	<b>33</b> Back (epoxy side)
	<b>A - 1939</b> 13 bit J1939 @ 1000 positions	<b>M12</b> M12 male	<b>50</b> White Delrin
		<b>M12P</b> M12 male on 18' pigtail	<b>51</b> Red Aluminum
<b>B - PWM</b> Absolute position PWM	<b>CXX</b> Flying lead cable (enter XX as inches)	<b>71</b> Roller	
<b>HP58SE</b> HP58SE made out of Red Aluminum, connector orientation BACK EXIT standard. To designate SIDE EXIT connection use special code 31.	<b>A - MOD1</b> 13 bit Modicon MODBUS @8192 positions	<b>SCXX</b> Shielded cable (enter XX as inches)	<b>90</b> 13 bit @ 8192 counts per rotation (Typical J1939 option)
	<b>A - SS11</b> Absolute position SSI @ 8192 positions	<b>CSP</b> Cable with custom end	
	<b>V1</b> 5 VDC IN, 0-5 VDC OUT	<b>DE4</b> DT04 - 4 pin male Deutsch	<b>91</b> 13 bit @ 1000 counts per rotation (Typical MODBUS option)
	<b>V2</b> 6-36 VDC IN, 0-5 VDC OUT	<b>DE6</b> DT04 - 6 pin male Deutsch	
	<b>V3</b> 0-24 VDC IN, 4-20 mA OUT x2 (Redundant output)		
	<b>I1</b> 0-24 VDC IN, 4-20 mA OUT		
	<b>I2</b> 0-24 VDC IN, 4-20 mA OUT x2 (Redundant output)		
* More outputs and connection options available, contact Joral if desired configuration is not listed			

## Special Part Number Information *Review below code sections for important P/N build information*

### Code 1: Housing Style

- **Modifier 31** - For side exit connector on HP58 and HP58SE add 31 to end of Joral P/N
- **HP58** - Handles all back exit connections and CABLE ONLY side exit connections (*M12P, CXX, SCXX, DE4 & DE6*)
- **HP58SE** - Handles ALL back and side exit connections (*including M12 leaded side exit*)

### Code 2: MagElec

(A - \_\_\_\_\_ - SEPP) or  
 (A - \_\_\_\_\_ - DIPP)

- Enter Quadrature PPR in place of \_\_\_\_\_
- A = 13 bit PPR
- **Available 13 bit PPR:** 0008, 0010, 0016, 0020, 0025, 0032, 0040, 0050, 0064, 0080, 0100, 0125, 0128, 0200, 0250, 0256, 0400, 0500, 1024, 2048

#### A - 1939

- Standard J1939 output is 1000 positions
- A = 13 bit
- **MODIFIER 90** - for 8192 positions (max resolution) add code 90 to end of HP58 P/N

#### A - MOD1

- Standard MOD1 output is 8192 positions
- A = 13 bit
- **MODIFIER 91** - for 1000 positions add code 90 to end of HP58 P/N

#### V1, V2, and I1 (Analog MagElec P/N Guide)

- First select MagElec code (**V1, V2 or I1**) then Angle Range (**A1-A2**), Voltage Range (**VR1-VR2**) and Signal Direction (**Clockwise [CW] or Counter [CCW]**)
- **PART NUMBER FORMULA**  
 (MagElec)-(A1-A2)-(VR1-VR2)-(CW or CCW)
- **EXACT V1, V2, and I1 EXAMPLES**  
 HP58 - **V1 - 0-360 - 0.5-4.5 - CW - C72**  
 HP58 - **V2 - 0-180 - 0.5 - CCW - DE4**  
 HP58 - **I1 - 180-270 - 4-20 - CW - M12**

### Code 3: Connections

- **All Outputs, All Connections** - Connector exit standard is BACK EXIT (sensor epoxy side) for housing HP58 and HP58SE (*for SIDE EXIT use modifier 31*)
- **J1939 Output** - Addressing via varying value resistor in connection requires at least five conductors (*M12, DE6 and Cables addressing compatible*)
- **All Outputs w/ Deutsch** - DE4 and DE6 connection Deutsch connectors add \$20 to HP58 list



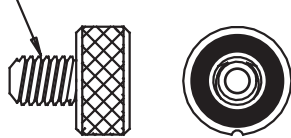
**HP58 DIMENSIONS & GENERAL PIN OUTS** DIMENSIONS 1 OF 2

**MAGNET NOTE:**

STANDARD MAGNET INCLUDED AS ACCESSORY WITH PURCHASE OF NON-CONTACT SENSOR

**STANDARD MAGNET**

MAG-H-RING-ASSM.  
1/4-20 X .47



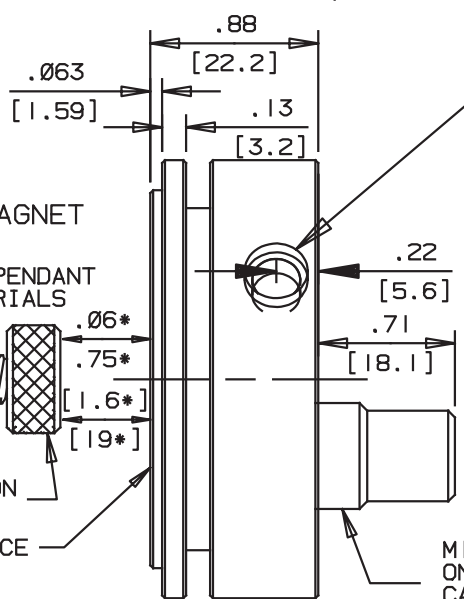
**HOUSING/INSTALL NOTES:**

MAGNET MOUNT MATERIALS MUST HAVE Ø1.0 [25.4] HOLE CENTERED ON SENSOR CENTERLINE

NON-MAGNETIC MOUNT MATERIAL, MAY BE SOLID

MOUNT WITH 316 STAINLESS STEEL 4-40 SCREWS

OPTIONAL CABLE SIDE OUTLET  
CABLE WITH FLYING LEADS  
OR CABLE WITH M12-5



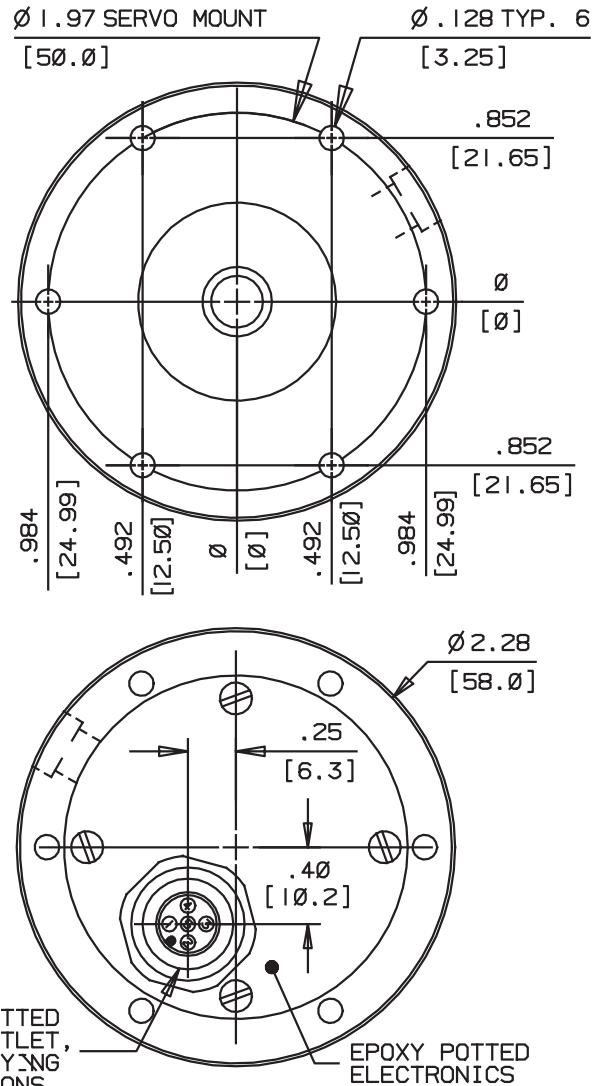
ALLOWED MAGNET DISTANCE

\* DISTANCE DEPENDANT ON MOUNT MATERIALS

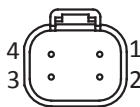
APPLICATION MAGNET  
SENSOR FACE

M12-5P OMITTED ON SIDE OUTLET, CABLE & FLYING LEAD VERSIONS.

**SENSOR FACE**



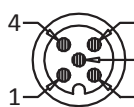
**DT04-4P MALE FACE VIEW**



**DT04-4P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = COMMON/GROUND

**M12-5P MALE FACE VIEW**



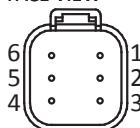
**M12-5P/CABLE/FLYING LEAD QUADRATURE OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CHANNEL B
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CHANNEL A
- 5 = GRY = CHANNEL Z

**M12-5P/CABLE/FLYING LEAD PROPORTIONAL (ANALOG) OUTPUT**

- 1 = BRN = +VDC (VIN)
  - 2 = WHT = DIG. LIMIT OUT\*
  - 3 = BLUE = COMMON/GROUND
  - 4 = BLK = PROP. VDC OUTPUT
  - 5 = GRY = NOT USED
- \*OPTION CONSULT FACTORY

**DT04-6P MALE FACE VIEW**



**DT04-6P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = ADDRESS GROUND
- 5 = WHT = ADDRESS PROG. RESISTOR
- 6 = BLK = COMMON/GROUND

**M12-5P AND 5 CONDUCTOR CABLE J1939 OUTPUT**

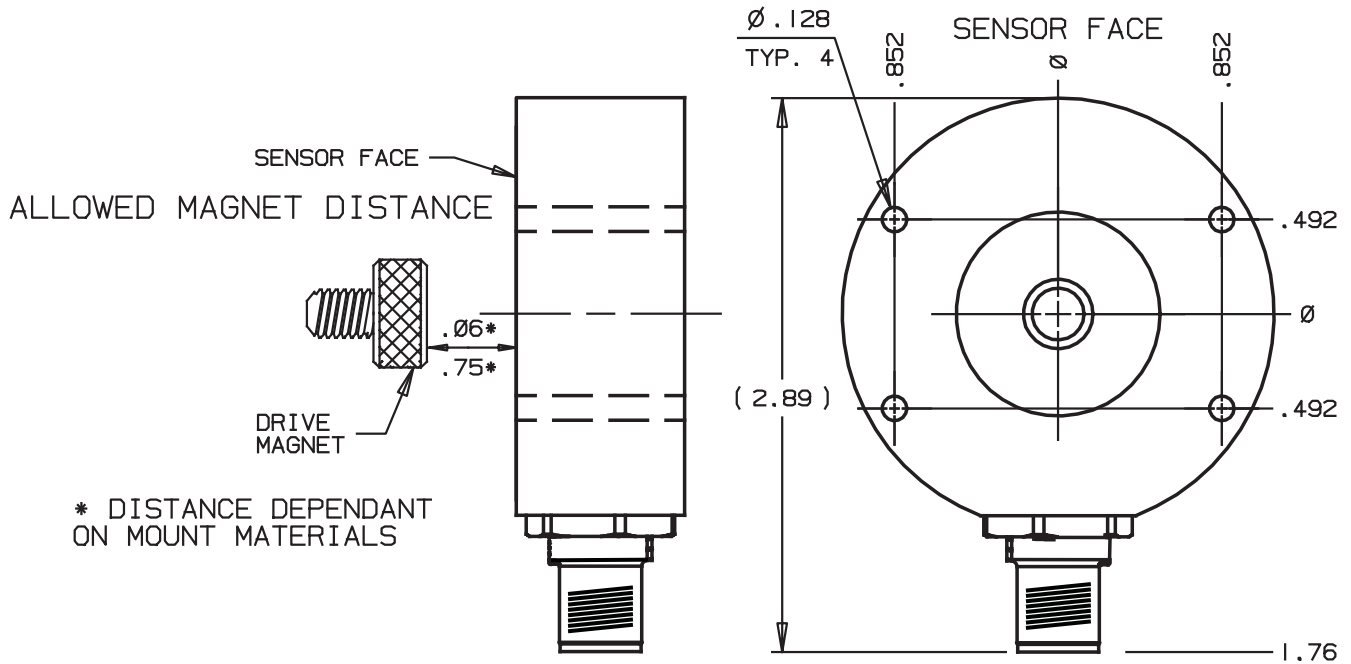
- 1 = BRN = +VDC (VIN)
- 2 = WHT = CAN HIGH
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CAN LOW
- 5 = GRY = OPTIONAL ADDRESS PROGRAMMING RESISTOR

Dimensions informative only  
For most recent dimensions please consult factory





**HP58SE DIMENSIONS & GENERAL PIN OUTS** DIMENSIONS 2 OF 2



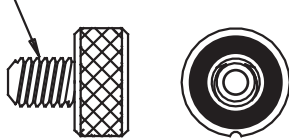
\* DISTANCE DEPENDANT ON MOUNT MATERIALS

**MAGNET NOTE:**

STANDARD MAGNET INCLUDED AS ACCESSORY WITH PURCHASE OF NON-CONTACT SENSOR

**STANDARD MAGNET**

MAG-H-RING-ASSM.  
1/4-20 X .47

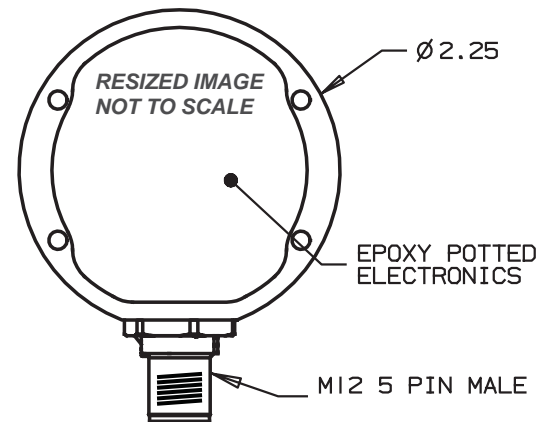


**HOUSING/INSTALL NOTES:**

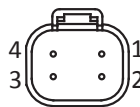
MAGNET MOUNT MATERIALS MUST HAVE Ø1.0 [25.4] HOLE CENTERED ON SENSOR CENTERLINE

NON-MAGNETIC MOUNT MATERIAL, MAY BE SOLID

MOUNT WITH 316 STAINLESS STEEL 4-40 SCREWS



**DT04-4P MALE FACE VIEW**



**DT04-4P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = COMMON/GROUND

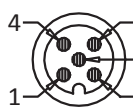
**DT04-6P MALE FACE VIEW**



**DT04-6P J1939 OUTPUT**

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = ADDRESS GROUND
- 5 = WHT = ADDRESS PROG. RESISTOR
- 6 = BLK = COMMON/GROUND

**M12-5P MALE FACE VIEW**



**M12-5P/CABLE/FLYING LEAD QUADRATURE OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CHANNEL B
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CHANNEL A
- 5 = GRY = CHANNEL Z

**M12-5P AND 5 CONDUCTOR CABLE J1939 OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CAN HIGH
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CAN LOW
- 5 = GRY = OPTIONAL ADDRESS PROGRAMMING RESISTOR

**M12-5P/CABLE/FLYING LEAD PROPORTIONAL (ANALOG) OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = DIG. LIMIT OUT\*
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = PROP. VDC OUTPUT
- 5 = GRY = NOT USED

\*OPTION CONSULT FACTORY

Dimensions informative only  
For most recent dimensions please consult factory

