**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:**
- GAP 0.5” (12mm) between application magnet and encoder
- AXIAL 0.10” (2.5mm) center alignment
- PLANAR 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

**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

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- LED indicators provide live feedback for power and output
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

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

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

<table>
<thead>
<tr>
<th>Encoder Output</th>
<th>Resolution</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrature Single Ended Incremental</td>
<td>8 to 2048 PPR - Standard Resolutions:</td>
<td>Format: Two channel quadrature A and B outputs with index pulse Z</td>
</tr>
<tr>
<td>Quadrature Differential Incremental</td>
<td>8 to 2048 PPR - Standard Resolutions:</td>
<td>Format: Two channel quadrature A and B outputs with index pulse Z and complementary outputs A', B', and Z'</td>
</tr>
<tr>
<td>Step and Direction Incremental</td>
<td>16 to 512 PPR - Standard Resolutions:</td>
<td>Format: One channel STEP output and one channel DIRECTION output with Index pulse Z</td>
</tr>
<tr>
<td>SSI Absolute Position Output Absolute</td>
<td>8192 Positions</td>
<td>Format: Clock and data output</td>
</tr>
<tr>
<td>PWM Absolute Position Output Absolute</td>
<td>1024 or 2048 Positions</td>
<td>Format: Pulse Width Modulation in 1 µsec increments</td>
</tr>
<tr>
<td>Analog Voltage Absolute Position Absolute Output</td>
<td>0 to 5 VDC - OR - 4 to 20 mA 10 bit internal resolution</td>
<td>Format: Output Voltage/Current proportional to 0-360 degrees</td>
</tr>
<tr>
<td>J1939 CAN Bus Absolute or Incremental</td>
<td>1000 or 8192 Positions - see J1939 output pages</td>
<td>Format: Standard SAE J1939 CAN Bus - One message for status, one message for settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## ELECTRICAL SPECIFICATIONS

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

## ENVIRONMENTAL SPECIFICATIONS

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

## MECHANICAL SPECIFICATIONS

- **Housing Diameter**: 18mm, 30mm, 38mm, and 58mm
- **Housing Material**: Aluminum, Stainless Steel, or Delrin™
- **Max Speed**: 3000 RPM

<table>
<thead>
<tr>
<th>Model</th>
<th>Housing Diameter</th>
<th>Weight</th>
<th>Height</th>
<th>Height w/ M12</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE18</td>
<td>18mm</td>
<td>1 oz</td>
<td>1.87 inches (47.5mm)</td>
<td>N/A</td>
</tr>
<tr>
<td>PE30</td>
<td>30mm</td>
<td>1.5 oz</td>
<td>1.2 inches (30.5mm)</td>
<td>1.75 inches (44.5mm)</td>
</tr>
<tr>
<td>HP38</td>
<td>38mm</td>
<td>1.3 oz</td>
<td>0.69 inches (17.5mm)</td>
<td>N/A</td>
</tr>
<tr>
<td>HP58</td>
<td>58mm</td>
<td>2 oz</td>
<td>0.75 inches (19.1mm)</td>
<td>1.5 inches (38.1mm)</td>
</tr>
</tbody>
</table>
**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

#### ELECTRICAL

<table>
<thead>
<tr>
<th>Outputs</th>
<th>A - [PPR] - SEPP</th>
<th>Incremental 13 bit Quadrature w/ Single Ended Output</th>
<th>A B Z</th>
</tr>
</thead>
</table>

| A - 1939 | J1939 13 bit @ 1000 positions (8192 positions max) |
| B - PWM  | PWM absolute position |
| A - SSI1 | SSI absolute position @ 8192 positions |

| V1 | Voltage Out / 5 VDC IN, 0-5 VDC OUT |
| V2 | Voltage Out / 6-36 VDC IN, 0-5 VDC OUT |

| Current | 1 | Current Out / 0-24 VDC IN, 4-20 mA OUT |

**Input Power**
- 6 to 30 VDC at approx 60 mA max, *not including output loads*

**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**: 30mm
- **Housing Material**: Aluminum or Stainless Steel (corrosion resistant)
- **Housing Height**: 1.2” (30.5mm) body; 1.86” (47.2mm) w/ M12 connector
- **Mounting**: 30mm thread (standard proximity switch thread style)
- **Weight**: 1.0 oz w/o mounting nuts; 2.2 oz w/ recommended mounting nuts
- **Magnet / sensor gap***: Standard 0.5” (12mm) (Max w/ custom mag assembly up to 1” [30mm])
- **Rated planar tilt / axial gap**
  - Planar 30° (Max 45°) / Axial 0.1” (2.5mm) (Max 0.16” [4mm])
- **Speed**: 3000 RPM max

#### ENVIRONMENTAL

- **Operating Temperature**: -30°C to +80°C
- **Storage Temperature**: -40°C to +90°C
- **Humidity**: 100%
- **Shock**: 400g/6ms (MIL STD 202)
- **Vibration**: 5 to 3000 Hz, 20g (MIL STD 202)
- **Protection Class**: IP69K (connection dependent)

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)

<table>
<thead>
<tr>
<th>Code 1: Housing Style</th>
<th>Code 2: MagElec (Sensor Output)</th>
<th>Code 3: Connection</th>
<th>Code 4: Special Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PE30</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - ____ - SEPP</td>
<td>13 bit single ended quadrature</td>
<td>TRM Pluggable Terminal block</td>
<td>51 Red Aluminum</td>
</tr>
<tr>
<td></td>
<td>- A B Z</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - ____ - DIPP</td>
<td>13 bit differential quadrature</td>
<td>IN5 Wire insertion terminal</td>
<td>53 Black Aluminum</td>
</tr>
<tr>
<td></td>
<td>- A B Z, A’ B’ Z</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Modifier Extended Thread:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Special Code - 61</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - 1939</td>
<td>13 bit J1939 @ 1000 positions</td>
<td>M12P M12 male on 18’ pigtail</td>
<td>71 Roller</td>
</tr>
<tr>
<td>B - PWM</td>
<td>Absolute position PWM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - SS11</td>
<td>Absolute position S51 @ 8192 positions</td>
<td>SCXX Shielded cable (enter XX as inches)</td>
<td>90 13 bit @ 8192 counts per rotation (Typical J1939 option)</td>
</tr>
</tbody>
</table>

* 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 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

**Dimensions informative only**

For most recent dimensions please consult factory

---

**MAGNET NOTE:**

Standard magnet included as accessory with purchase of non-contact sensor

---

**Tech Total**

6 of 14

Joral, LLC • 5050 South Towne Drive • New Berlin, WI 53151 • (262)522-3266 • www.JORALLLC.com
PE30 EXTENDED THREAD DIMENSIONS & GENERAL PIN OUTS

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

ALLOWED MAGNET DISTANCE

30MM x 1.5 NUTS. STAINLESS STEEL 2 SUPPLIED.

M12-5P OMITTED ON CABLE & FLYING LEAD VERSIONS

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

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

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

PROGRAMMING RESISTOR

OPTIONAL ADDRESS PROGRAMMING RESISTOR

PE30 Dimensions & General Pin-outs

Non-contact; PE30 / 4 of 4
Joral REF S2:13 / 4

NON-CONTACT POSITION SENSORS
## 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

<table>
<thead>
<tr>
<th>Outputs</th>
<th>B - [PPR] - SEPP</th>
<th>Incremental 10 bit Quadrature w/ Single Ended Output</th>
<th>A B Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B - 1939</td>
<td>J1939 10 bit @ 512 positions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B - PWM</td>
<td>PWM absolute position</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B - SSI1</td>
<td>SSI absolute position @ 512 positions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>V1 Voltage Out / 5 VDC IN, 0-5 VDC OUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V2 Voltage Out / 6-36 VDC IN, 0-5 VDC OUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input Power</td>
<td>6 to 30 VDC at approx 60 mA max, not including output loads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Protection</td>
<td>Over-voltage, reserve-voltage, output short-circuit protected</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED Indicators</td>
<td>Power and output channels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections</td>
<td>M8, M12 Pigtail, Terminal Block, Flying Lead Cable, or Deutsch (4 or 6 pin)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution</td>
<td>0.3°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>0.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonlinearity</td>
<td>&lt;1%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MECHANICAL

- Housing Diameter 38mm
- Housing Material Black Delrin™ (standard)
- Housing Height 0.69” (17.5mm) body
- Mounting 32mm (.884) spacing w/ 4mm diameter screws
- Weight 1.3 oz
- Magnet / sensor gap* Standard 0.5” (12mm) (Max w/ custom mag assembly up to 1” [30mm])
- Rated planer tilt / axial gap* Planar 30° (Max 45°) / Axial 0.1” (2.5mm) (Max 0.16” [4mm])
- Speed 3000 RPM max

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

### ENVIRONMENTAL

- Operating Temperature -30° to +80° C
- Storage Temperature -40° to +90° C
- Humidity 100%
- Shock 400g/6ms (MIL STD 202)
- Vibration 5 to 3000 Hz, 20g (MIL STD 202)
- Protection Class IP69K (connection dependent)

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**
- **HP38**
  - HP38 material black Delrin™, connector orientation SIDE EXIT. For REAR EXIT connector on HP38 add code 33 to end of P/N.

**Code 2: MagElec (Sensor Output)**
- **B - SEPP**
  - 10 bit single ended quadrature - A B Z
- **B - 1939**
  - 10 bit J1939 @ 512 positions
- **B - SSI1**
  - Absolute position SSI @ 512 positions
- **B - PWM**
  - PWM absolute position

**Code 3: Connection**
- **TRM**
  - Pluggable Terminal block
- **M8**
  - M8 male
- **M12P**
  - M12 male on 18’ pigtail
- **CXX**
  - Flying lead cable (enter XX as inches)
- **SCXX**
  - Shielded cable (enter XX as inches)

**Code 4: Special Codes**
- **31**
  - Side Exit (housing wall)
- **33**
  - Back Exit (epoxy side)
- **71**
  - Roller
- **72**
  - 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)
- **B - 1939**
  - 10 bit J1939 output is 512 positions
  - B = 10 bit
  - 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.

**Encoders Position:**
- Distance dependent on mount materials.

**Encoder 0 Position:**
- Angle 1
- Angle 2
- Ø1.5
- Ø0.150 x 2
- 30°
- Ø 0.935 reamed for dowel pin

**Electronics:**
- Epoxy encapsulated.

**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)
- 0.688

**Hex Adjustable Magnet Note:**
- Adjustable ring magnet included as accessory with purchase of analog/voltage non-contact sensor (outputs V1, V2, I1).
- For zero/home position capability with all analog absolute non-contact position sensors.

**Pin Outs:**
- DT04-4P J1939 Output:
  1 = YEL = CAN HIGH
  2 = GRN = CAN LOW
  3 = RED = +VDC (VIN)
  4 = BLK = COMMON/GROUND

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

- M12-5P/Cable/Flying Lead Quadrature Output:
  1 = BRN = +VDC (VIN)
  2 = WHT = CAN HIGH
  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 = CAN HIGH
  3 = BLUE = COMMON/GROUND
  4 = BLK = CAN LOW
  5 = GRY = NOT USED

*Option consult factory

---

**Dimensions:**
- Informative only.
- For most recent dimensions please consult factory.
# Standard Operating Characteristics

## Electrical

<table>
<thead>
<tr>
<th>Outputs</th>
<th>A - [PPR] - SEPP</th>
<th>Incremental 13 bit Quadrature w/ Single Ended Output</th>
<th>A B Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - 1939</td>
<td>J1939 13 bit @ 1000 positions (8192 positions max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - MOD1</td>
<td>Modicon MODBUS @ 8192 positions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B - PWM</td>
<td>PWM absolute position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A - SSI</td>
<td>SSI absolute position @ 8192 positions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>Voltage Out / 5 VDC IN, 0-5 VDC OUT (code V3 for 2x redundant output)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V2</td>
<td>Voltage Out / 6-36 VDC IN, 0-5 VDC OUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I1</td>
<td>Current Out / 0-24 VDC IN, 4-20 mA OUT (code I1 for 2x redundant output)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Input Power**: 6 to 30 VDC at approx 60 mA max, not including output loads

**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

<table>
<thead>
<tr>
<th>Housing Diameter</th>
<th>58mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Material</td>
<td>HP58 Black Delrin™ (standard) or White Delrin™; HP58SE Red Aluminum</td>
</tr>
<tr>
<td>Housing Height</td>
<td>0.75” (19mm) body; 1.5” (38.1mm) w/ M12 connector</td>
</tr>
<tr>
<td>Mounting</td>
<td>60.128 mounting holes</td>
</tr>
<tr>
<td>Weight</td>
<td>2.6 oz</td>
</tr>
</tbody>
</table>

**Magnet / sensor gap**: Standard 0.5” (12mm) (Max w/ custom mag assembly up to 1” [30mm])

**Rated planer tilt / axial gap**: Planar 30” (Max 45°) / Axial 0.1” (2.5mm) (Max 0.16” [4mm])

**Speed**: 3000 RPM max

## Environmental

<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th>-30° to +80° C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Temperature</td>
<td>-40° to +90° C</td>
</tr>
</tbody>
</table>

**Humidity**: 100%

**Shock**: 400g/6ms (MIL STD 202)

**Vibration**: 5 to 3000 Hz, 20g (MIL STD 202)

**Protection Class**: IP69K (connection dependent)

General ordering guide found on next page (S2 ; IS / 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
- **HP58**
  - Housing Style: Black Delrin™ (A - _ _ _ _ - SEPP), connector orientation BACK EXIT standard. To designate SIDE EXIT connection use special code 31. (Side exit for HP58 CABLE ONLY)
  - **A** - 13 bit single ended quadrature - A B Z
  - **A** - 13 bit differential quadrature - A B, A’ B’
  - **A** - 13 bit J1939 @ 1000 positions
- **HP58SE**
  - Housing Style: Red Aluminum (A - _ _ _ _ - DIPP), connector orientation BACK EXIT standard. To designate SIDE EXIT connection use special code 31.
  - **A** - Mod1: 13 bit Modicon MODBUS @ 8192 positions
  - **A** - SS1: Absolute position SS1 @ 8192 positions

### Code 2: MagElec
- **A** - 1939
- **A** - MOD1
- **A** - 1393

### Code 3: Connection
- **V1** 5 VDC IN, 0-5 VDC OUT
- **V2** 6-36 VDC IN, 0-5 VDC OUT
- **V3** 0-24 VDC IN, 4-20 mA OUT x2 (Redundant output)
- **I1** 0-24 VDC IN, 4-20 mA OUT
- **I2** 0-24 VDC IN, 4-20 mA OUT x2 (Redundant output)

### Code 4: Special Codes
- **TRM** Pluggable Terminal block
- **INS** Wire insertion terminal
- **M8** M8 male
- **M12** M12 male
- **M12P** M12 male on 18’ pigtail
- **CXX** Flying lead cable (enter XX as inches)
- **DE4** DT04 - 4 pin male Deutsch
- **DE6** DT04 - 6 pin male Deutsch
- **SCXX** Shielded cable (enter XX as inches)
- **CSP** Cable with custom end
- **DE4** DT04 - 4 pin male Deutsch
- **DE6** DT04 - 6 pin male Deutsch
- **Roller**
- **Spindle**

### 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
  - **A** - MOD1
  - **V1, V2, and I1** (Analog MagElec P/N Guide)

- **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

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### Tech Total
12 of 14
**Magnet Note:**
Standard magnet included as accessory with purchase of non-contact sensor.

**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.

**Dimensions:**
- Ø1.97 Servo Mount
- Ø1.28 Typ. 6
- Ø0.984 [24.99]
- Ø0.492 [12.50]
- Ø0.492 [12.50]
- Ø0.984 [24.99]
- Ø0.852 [21.65]

**Sensor Face:**
- Epoxy potted electronics
- M12-5P omitted on side outlet, cable & flying lead versions.

**Optional Cable Side Outlet:**
- Cable with flying leads or cable with M12-5.

**Allowed Magnet Distance:**
Distance dependent on mount materials.

**M12-5P Male Face View:**
- DT04-4P Male
- DT04-6P Male
- 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
  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 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

Dimensions informative only
For most recent dimensions please consult factory
Hockey Puck™
Non-contact rotary position sensor
HP58 Dimensions & General Pin-outs
Non-contact; HP58SE / 4 of 4

**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

Dimensions informative only
For most recent dimensions please consult factory