sales catalog
We're ready to take your call.
PHONE 262.378.5500
Contact Joral LLC

Joral is available around the globe via US and international distribution.

Contact your local hydraulic or sensor provider for a quote or call 262.378.5500 to discover where to buy.

Joral representatives are available from 7:30 am to 6:30 pm CST and covers all time zones in the US.

Orders are shipped regular ground service, for faster delivery we offer 2-day or next day delivery, just let us know when you place your order.

Rush processing is available upon request. Customer service representatives are available for technical support and more.

Contact 262.378.5500 for information on sensing solutions and guides on the best methods for control.

PHONE: 262.378.5500
WEB: www.JORALLLC.com/ContactUs.html
MAIL: 926 Perkins Drive
Mukwonago, WI 53149
the beginnings

Joral, LLC develops sensing solutions that cater to some of the toughest commercial environments. Established in 1995 as a producer of controllers for timber harvesters, Joral has become a market pioneer, manufacturing rotary encoders, linear position sensors, inclinometers, and temperature modules.

to build a better encoder

Providing controllers for timber harvesters gave insight into producing a shafted magnetic encoder. Joral's first encoder was developed in the field with equipment operators. Joral's new sensors were a better encoder that replaced failing sensors originally supplied on the timber harvester.

Soon after release harvester operators were calling equipment dealers requesting to only be sent the "better encoder" Joral had developed.

selling yourself out

Joral's sealed shafted magnetic encoder worked well, too well for Joral to continue selling sensors only for timber harvesters. The J1 rotary encoders were not failing in one of the harshest operating environments available and operators no longer needed replacement encoders.

Joral expanded, trying to find other harsh environment applications and quickly discovered the expansive world of mobile hydraulics. From custom non-contact gearbox solutions on cranes, to high PSI housings on underwater submersibles, and to explosion proof absolute multi-turn encoders on oil platforms, Joral has sought to create pioneering sensor solutions that survive all harsh conditions.

creating the family

The family of Joral encoders are backed by a full offering of electrical outputs including the most recently developed J1939 absolute multi-turn. From shafted and non-contact rotary encoders Joral expanded into inclinometers and linear position sensing.

Three axis inclinometers are fully CAN J1939 capable and communicate their true angle to home regardless of orientation.

Linear position sensors are available in CAN J1939 incremental or absolute "zero power." The absolute zero power linear sensor can record linear motion without source power.

joining forces

In 2009 Joral paired with GS Global Resources (GSGR), a hydraulic distributor and solutions provider located in Mukwonago, Wisconsin. As a sister company to GSGR, Joral has had the opportunity to work with an industry leader in mobile hydraulic controls to develop new sensors that cater to the evolving market.

Today Joral partners with hydraulic providers across the globe, replicating the model initially forged with GSGR. Working hand in hand with distribution and equipment manufacturers Joral provides sensors to capture motion so the world can create.
building a better encoder

MAKE IT SIMPLE

By nature magnetic encoders are mechanically less complex than their optical encoder counterparts. Reliability is achieved by providing a sensor that does not depend on fragile interconnected components for sensing.

When compared to the optical encoder Joral’s magnetic encoders have no sensitive optical eye or breakable internal encoder disk. Joral’s sensor returns rotary position with a solid-state embedded microchip.

MAKE IT STRONG

Solid-state embedded measuring allows maximum opportunity to seal the encoder with an automotive grade plastic epoxy. The shafted encoder body maintains a base protection class of IP67. All Joral electronics packages are rated to IP69k, with a properly sealed connector.

The Joral shafted encoder utilizes oversized bearings and a captive billet aluminum housing to prevent shaft push through. Rated MIL SPEC 202 for shock and vibration Joral magnetic rotary encoders are rated to handle extreme machine conditions.

MAKE IT SUPERIOR

The development of the magnetic rotary encoder reached a new level when it eliminated the need for a shaft and bearings. Shafted encoders, no matter how robust, still faulted from the requirement for physical coupling to the application itself.

The Joral non-contact magnetic encoder exceeds the limitation of a physical shaft by allowing up to 1/2 inch gap between the sensor and machine. A patented magnet package enables the Joral non-contact rotary encoder to detect rotation off axis and is able to handle 30° planar tilt.
shafted rotary encoders evolved

Joral J1 series shafted magnetic encoders are a solid-state alternative to optical encoders. The fully encapsulated electronics defend the sensor from moisture, ensuring a base protection rating of IP67.

The family of shafted encoders now feature the JZ series absolute multi-turn variant that detects motion during power down. The zero power technology enables users to capture machine motion even during application power interruption.

Available in standard and custom form factors, Joral shafted encoders are fully adaptable to application demands.

**J1 SERIES SHAFTED ROTARY ENCODERS**

The J1 series encoders are listed by housing code below with prices for analog, J1939, and quadrature output. Most common variants listed, call 262.378.5500 to customize shaft, connector and output options.

<table>
<thead>
<tr>
<th>Housing Code</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J130</td>
<td>30mm</td>
</tr>
<tr>
<td>J140</td>
<td>40mm</td>
</tr>
<tr>
<td>J150</td>
<td>50mm</td>
</tr>
<tr>
<td>J158</td>
<td>58mm</td>
</tr>
</tbody>
</table>

**Quadrature**
P/N example: J158 - A - (PPR) - SEPP - M12

**Voltage**
P/N example: J140 - V1 - (V1-V2) - (V3-V4) - (DIRECTION) - M12

**J1939**
P/N example: J150 - A - 1939 - M12

Stainless steel housings are available. Call: 262.378.5500v
STRENGTH BY DESIGN

• IP67 BASE PROTECTION CLASS
• LED INDICATORS ON POWER AND OUTPUT
• RATED MILSPEC 202 FOR SHOCK AND VIBRATION
• BILLET HOUSING WITH CAPTIVE BEARINGS
Stainless steel housings are available.
Call: 262.378.5500

J3 SERIES SHAFTED ROTARY ENCODERS

The J3 series shafted rotary encoder is an economic sensor built with a bearing-less housing made of machined delrin plastic. The J340 is a 40mm shafted sensor with a protection rating of IP69k when paired with a properly rated connector.

Available in analog, quadrature and J1939, the J340 is the perfect simple solution for harsh duty applications. Call 262.378.5500 to customize shaft, connector, and output options.

Build part number by selecting [Housing Style] [Output] and [Connection]. Add [Unique Modifiers] to part number end.

<table>
<thead>
<tr>
<th>Housing Code</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J340</td>
<td>40mm</td>
</tr>
</tbody>
</table>

P/N EXAMPLE J340 - A - (PPR) - SEPP - M12

VOLTAGE
P/N EXAMPLE J340 - V1 - (A'-A') - (V'-V') - [DIRECTION] - M12

J1939
P/N EXAMPLE J340 - A - 1939 - M12

JZ SERIES SHAFTED ROTARY ENCODERS

The JZ series absolute multi-turn shafted rotary encoders are listed below in the available J1939 configuration. The absolute multi-turn JZ series encoders detect motion without machine power.

In the event of application power loss or application drift during power down the sensor will record motion and return an accurate position after power is reapplied. Call 262.378.5500 to customize shaft, connector, and output options.

Stainless steel housings are available.
Call: 262.378.5500

Build part number by selecting [Housing Style] [Output] and [Connection]. Add [Unique Modifiers] to part number end.

<table>
<thead>
<tr>
<th>Housing Code</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JZ30</td>
<td>30mm</td>
</tr>
<tr>
<td>JZ58</td>
<td>58mm</td>
</tr>
</tbody>
</table>

P/N EXAMPLE JZ58 - G - 1939 - M12
Conventional encoders require a seal and cap to protect fragile components, blocking diagnostic LEDs. Joral's encoders have no fragile components and a fully potted electronic package allows a viewing window to diagnostic LEDs built into the sensor.

Joral rotary encoders provide operators LED feedback

- Output LEDs Analog: Varying brightness LED shows signal
- Output LEDs Quadrature: Stepping A B channel and Z marker pulse LEDs
- Output LEDs J1939: Heartbeat LED indicates sensor communication
- In addition to output LEDs, a green indication LED shines solid displaying sensor power

Joral's diagnostic LEDs make troubleshooting the sensor a one man job. Conventional sensors require a user to watch a control display while activating the sensor, usually a two man job. Joral diagnostic LED testing is easy, operators can rotate the sensor's shaft and check it's LEDs for the correct signal.
no compromise
non-contact

The Joral HP and PE family of non-contact rotary encoders can be installed where mechanical forces have in the past, limited application of the typical shafted sensor.

Maximize machine operation by utilizing a sensor that requires no mechanical shaft coupling to align or maintain. The PE and HP family of non-contact rotary encoders sense rotation up to 1/2 inch from the sensor with patented technology developed in house by Joral.

With no shaft to seal and a fully potted electronic package Joral non-contact rotary encoders operate in high pressure environments, detect through non-ferrous barriers, and handle daily wash down without skipping a count.

PE30 PROXENCODER®
NON-CONTACT ROTARY ENCODER

The PE30 ProxEncoder® is compact and available in most outputs, including an absolute multi-turn variant. Most common outputs listed in ordering table, call 262.378.5500 to customize housing, connector and output options.

HP58 NON-CONTACT
ROTARY ENCODER

The HP58 non-contact encoders are the most capable rotary encoders available from Joral. The HP58 series is available in custom housings including a high PSI housing rated to handle 600 Psi. Call 262.378.5500 to customize housing, connector and output options.
Developed to detect through non-ferrous barriers, the Joral HP and PE non-contact rotary sensors can be built directly into application hardware for a low footprint installation.

For explosion proof requirements a Joral non-contact sensor can be installed in a rateable housing. The explosion proof assembly can be sealed to application requirements, and the Joral sensor will detect through the housing wall of the enclosure.

Joral does not offer a rated explosion proof enclosure. Any modified rated enclosure must be re-evaluated to application required explosion proof standards. Contact 262.378.5500 to learn more about Joral explosion proof offerings.

The PE30 MotorCoder hardware allows for the direct installation of an absolute multi-turn J1939 rotary encoder directly into hydraulic motors.

The Joral MotorCoder provides various hydraulic motors with the option to integrate a non-contact rotary encoder directly into the hydraulic motor. The MotorCoder hardware maintains separation between internal high pressure oil and the sensor. Contact 262.378.5500 for compatibility and package availability.
**PE18 PROXENCODER® NON-CONTACT ROTARY ENCODER**

The PE18 ProxEncoder® has been developed to fit in locations that the typical rotary encoder has been too large to service. The smallest true non-contact rotary encoder available the Joral PE18 ProxEncoder® is capable of capturing motion in tight tolerances and bad environments. Call 262.378.5500 to customize housing, connector and output options.

Stainless steel housings are available. Call: 262.378.5500

---

**HP38 NON-CONTACT ROTARY ENCODER**

The HP38 non-contact rotary encoder is an economic offering from Joral. Designed to be a compact, IP69k protected sensor, the HP38 is available in analog, quadrature and J1939. Call 262.378.5500 to customize shaft, connector, and output options.

Build part number by selecting [Housing Style] [Output] and [Connection]. Add [Unique Modifiers] to part number end.

<table>
<thead>
<tr>
<th>Housing Code</th>
<th>Dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE18</td>
<td>18mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUADRATURE P/N EXAMPLE</th>
<th>HP38 - A - (PPR) - SEPP - M8</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLTAGE P/N EXAMPLE</td>
<td>HP38 - V1 - (A&lt;sup&gt;-&lt;/sup&gt;-A&lt;sup&gt;+&lt;/sup&gt;) - (V&lt;sup&gt;-&lt;/sup&gt;-V&lt;sup&gt;+&lt;/sup&gt;) - (Direction) - C36</td>
</tr>
<tr>
<td>J1939</td>
<td>HP38 - A - 1939 - C36</td>
</tr>
</tbody>
</table>

---

(above) PE18 ProxEncoder® with side exit sensing target

(right) PE18 ProxEncoder® with prox style sensing target and standard application magnet

(above) PE18 ProxEncoder® with side exit sensing target

(right) PE18 ProxEncoder® with prox style sensing target and standard application magnet
The Joral HP and PE ProxEncoder® non-contact rotary encoders carry an IP69k protection class and function fully submerged.

Rated for 600 PSI Joral’s non-contact encoder has been utilized from deep sea salt-water submersibles to corrosive wash down conveyors.
solid state linear position

The Joral LP and LZ non-contact linear position sensors are designed to detect linear motion in up to 1/4” increments. Made to replace the typical wire-reel found on booms and outriggers, the CAN J1939 linear sensors are IP69k and perform in the harshest environments.

The LP30 is the compact incremental solution, while the LZBM and LZXS provide an absolute J1939 solution. The absolute LZ sensors are able to detect motion while powered down and upon restart reports absolute change from defined homed position.

LP30 INCREMENTAL NON-CONTACT LINEAR POSITION SENSOR

With an incremental J1939 output, the LP30 is a rugged non-contact replacement to wire reel solutions. Using a magnet track installed on application, the IP69k sensor returns incremental position at 1/2” resolution. Call 262.378.5500 to customize accessory, housing, and connector options.

LZBM ABSOLUTE NON-CONTACT LINEAR POSITION SENSOR

The zero power ‘boom’ linear position sensor, or LZBM, is an absolute variant of the LP30. The absolute J1939 LZBM tracks location when powered down and returns position to the controller when turned on. Call 262.378.5500 to customize accessory, housing, and connector options.
IP69k non-contact linear position sensors

The Joral L series of sensors have been developed to be a robust replacement to the traditional wire reel method of linear measurement. Eliminate service time on conventional extension methods with a solid state Joral non-contact linear solution.

The L series non-contact linear position sensor utilizes a sealed magnetic track to detect position and will not bind, snap, or tangle like fragile cable reel assemblies.
The Joral Z series zero power position sensors have been developed in multiple form factors for absolute sensing. Available in rotary, linear and turn counter variants the Z series absolute position sensors are able to track motion while powered down.

While disconnected from machine power the Z series sensor wakes up from sleep, writes position to memory and returns to a no power state. The absolute zero power function is accomplished with an internally sealed battery that can be supplemented with an in line serviceable backup.

The internal battery used by the Z series is a 10 year extreme temperature cell that enables the sensors to detect machine motion during total power loss or drift during power down.
Zero power absolute multi-turn rotary encoders

Joral Z series absolute multi-turn rotary position sensors are available in both shafted and non-contact. Customizable housings enable the multi-turn sensors to seamlessly work with the application to provide motion control that push systems to a new level.

The HZ and PZ non-contact absolute multi-turn encoders have been seamlessly integrated into gearboxes, hydraulic motors and steering systems. Available in stainless steel and with standard connector options the HZ and PZ absolute multi-turn non-contact encoders defy limitation.

Pictured left, the HZ58 in flanged housing or a hydraulic gearbox. The hydraulic gearbox is sealed by the non-contact sensor’s housing and provides absolute multi-turn position for utility crane control.
**LZBM and LZXS**  
**ABSOLUTE NON-CONTACT LINEAR POSITION SENSOR**

The absolute J1939 linear position sensor tracks location when powered down and returns position to the host controller when turned on. The LZXS (shown below) is provided in Joral’s standard box housing while the LZBM (page 14) is designed to mount on the sheath of extending boom assemblies. Call 262.378.5500 to customize accessory, housing, and connector options.

<table>
<thead>
<tr>
<th>Housing Code</th>
<th>Housing Type</th>
<th>Sensing Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>LZXS</td>
<td>'BOX'</td>
<td>Linear</td>
</tr>
<tr>
<td>LZBM</td>
<td>'BOOM'</td>
<td>Linear</td>
</tr>
<tr>
<td>TZXS</td>
<td>'BOX'</td>
<td>Turn Counter</td>
</tr>
</tbody>
</table>

Stainless steel housings are available. Call: 262.378.5500

**TZXS ZERO POWER TURN COUNTER**

The TZXS is an absolute turn counter designed for through shaft and large rotation platform applications. With a modular magnet pack and non-contact detection the TZXS is capable of detecting rotation where conventional on axis measurement is not possible. Call 262.378.5500 to learn about custom magnet assemblies and output options.
Non-contact turn counter for large platform positioning

Designed to capture motion where traditional on-axis rotary position sensors cannot be installed, the TZXS is a modular turn counting sensor. The TZXS turn counter delivers resolutions based on the custom magnet ring and application dimensions.

Used in cab positioning, large drum turn counting, and hose reel safety systems, the TZXS is an IP69k rotary turn counter that can easily integrate into any application for simple J1939 turn count control.

NEVER TOO MANY TURNS

Pictured above, TZ magnet packs spread among a large diameter platform used to illustrate rough 10° to 30° positioning.

Pictured above, the Joral TZXS installed on a hose reel. The sensor is installed on the reel base and the TZ magnet accessory is placed on the axis of the turning reel.
a little math for x, y and z

The three axis incline sensors are available as a stand alone unit, the SINC, or two units tethered together that communicate as one, the DINC.

Solid-state accelerometer technology allows true position sensing regardless of orientation to programmed zero. J1939 standard message contains angular position for X, Y, and Z.

The Joral 3-axis inclinometer can be mounted to fit the requirements of the application, installed orientation does not influence output.

SINC: SINGLE 3-AXIS INCLINOMETER

The SINC is a CAN J1939 communicating 3-axis inclinometer that carries an IP69k protection. The SINC features a digital level, a set of LED lights, which display level and varying degrees of offset from home.

DINC: DUAL 3-AXIS INCLINOMETER

The DINC inclinometer consists of two SINC sensors tethered together that communicate as one sensor on the CAN network. Used for base and boom measurement, the DINC inclinometer is a robust solution for measuring two incline positions on one application. Call 262.378.5500 to customize housing and connector options.
Joral inclinometers with LEDs display change from home

Joral SINC and DINC inclinometers feature two unique J1939 commands, the first is digital viscosity and the second is LED weight. LED weight changes the rate which the digital LED bubble steps through indication. The digital viscosity is used to dampen the sensor to accommodate for application vibration.

LED display for installation and at a glance level check. Red LEDs display level condition and green LED shows sensor is level.

Shown above is the DINC dual 3-axis inclinometer. To the right is the DINC mounted on a crane providing 3-axis position via J1939 for base and boom measurement.
combining sense and control

The Joral TCM1 temperature sensor/controller is built in a single package that threads directly into cooling systems to provide a total control solution.

The Joral temperature controllers are rated to handle up to 25 amps at 12 VDC or 12.5 amps at 24 VDC. The sensors have been engineered to regulate the electrical stresses generated from operating powerful cooling fans.

Totally sealed and rated IP69k the T series temperature control sensors utilize a magnet wand to engage a fail safe programming interface. Using the magnet wand operators are able to use a switch encapsulated in the sensor to select operating modes.

For pricing and availability call 262.378.5500.
Magnet packs, brackets and mating cables

Joral manufactures and provides magnet packages, mounting brackets and mating cables. Non-contact encoders are shipped with free non-contact magnet accessory with purchase.

Contact 262.378.5500 to learn more about Joral's sensing accessories.
Capture CREATIVITY

Joral, LLC has provided motion capture devices to the off road mobile hydraulic market since 2005. With thousands of sensors sold, Joral has actively engaged design teams to create industry leading motion capture solutions.

As the drive for maximum efficiency on the site has translated to better machine controls, Joral has catered to the harsh environments common to off road equipment. Through mechanical simplicity, solid state components, and plastic encapsulation the Joral family of sensors come out of the box ready for the job.