sales catalog

JORAL

Capture CREATIVITY

www.JORALLC.com • (262) 378-5500
640 Perkins Drive Mukwonago, WI 53149

We're ready to take your call.

PHONE 262.378.5500

DESIGNED AND MANUFACTURED IN MUKWONAGO, WISCONSIN

Contact Joral LLC

Joral is available around the USA and globally via international distribution.

Contact your local hydraulic or sensor provider for a quote or call 262.378.5500 to learn more.

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

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

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.

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

JORAL
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Joral products are designed and manufactured in the USA

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Capture CREATIVITY

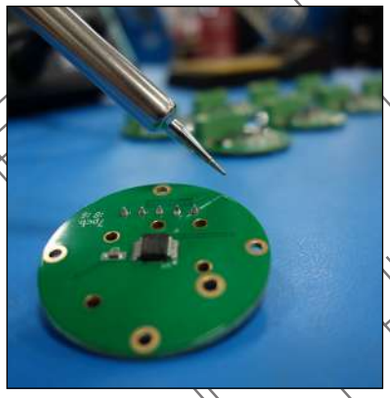
the beginnings

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.

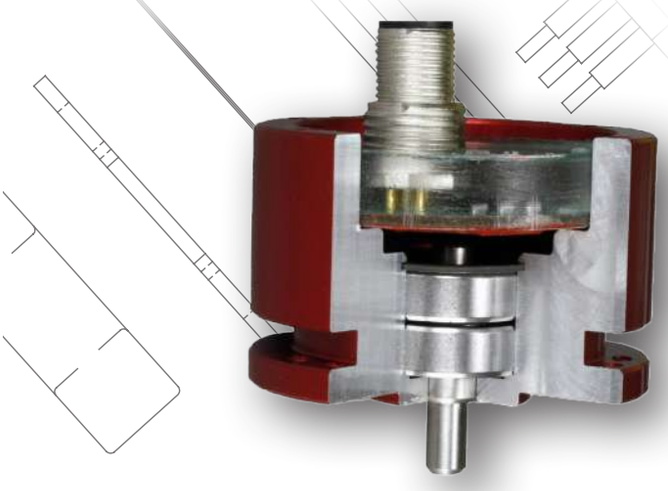
Linear position sensors are available in CAN J1939 incremental or absolute "zero power." The absolute zero power linear sensor can record linear motion without source power.

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

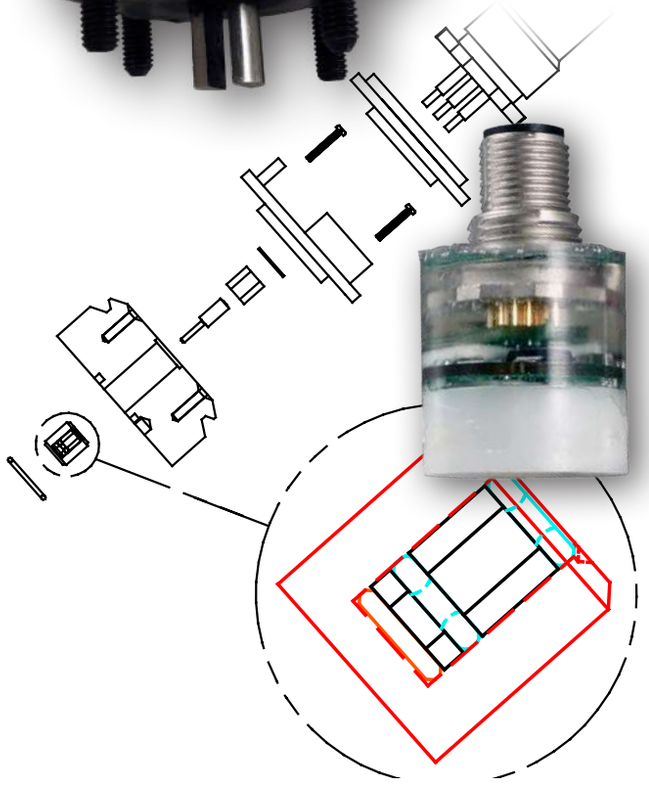
By nature, magnetic encoders are mechanically less complex than their optical encoder counterparts. Reliability is achieved by providing a sensor that does not depend on fragile interconnected components for sensing.

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.

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ROTARY ENCODERS
shafted

shafted rotary encoders evolved

Joral J1 series shafted magnetic encoders are built for dependable, long-term performance in demanding environments. The fully encapsulated electronics guard the sensor from moisture and contaminants, giving each unit an IP67 protection rating and reliable operation in the field.

Made in the USA and backed by dedicated mechanical and software support, these encoders deliver value without compromise.

The JZ series absolute multi-turn models record motion data even when power is lost, keeping machines on track during critical operations.

With both standard and custom form factors available, every Joral shafted encoder is designed for consistent performance, strong durability, and the best balance of quality and cost for your application.

J1 SERIES SHAFTED ROTARY ENCODERS

The J1 series encoders are listed by housing code below for analog, J1939, and quadrature output. Most common variants listed, contact Joral, LLC to customize shaft, connector and output options.

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

Housing Code	Dimensions (mm)
J130	30mm
J140	40mm
J150	50mm
J158	58mm

QUADRATURE P/N EXAMPLE J158 - A - (PPR) - SEPP - M12

VOLTAGE P/N EXAMPLE J140 - V1 - (A^1-A^2) - (V^1-V^2) - (DIRECTION) - M12

J1939 P/N EXAMPLE J150 - A - 1939 - M12

Stainless steel housings and shaft variants available.

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

JZ SERIES SHAFTED ROTARY ENCODERS

The JZ series absolute multi-turn shafted rotary encoders are listed below in the available various communicating configurations. 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. Contact Joral, LLC to customize shaft, connector, and output options.

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

Housing Code	Dimensions (mm)
JZ50	50mm
JZ58	58mm

J1939 P/N EXAMPLE JZ58 - G - 1939 - M12

Modicon TCP P/N EXAMPLE JZ58 - G - MTCP - M12

Ethernet IP P/N EXAMPLE JZ58 - G - ETIP - M12

Stainless steel housings and shaft variants available.

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. Contact Joral, LLC to customize shaft, connector, and output options.

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

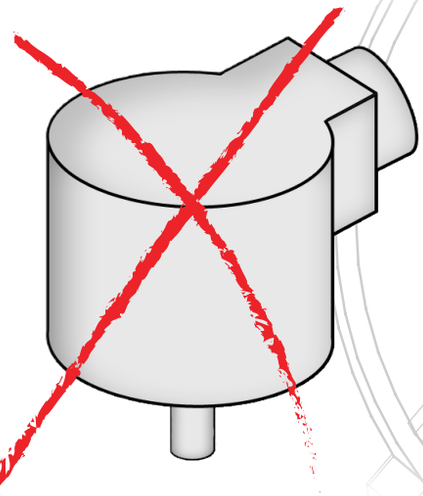
Housing Code	Dimensions (mm)
J340	40mm

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

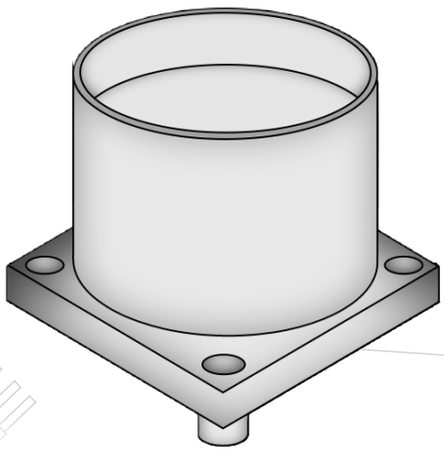
VOLTAGE P/N EXAMPLE J340 - V1 - (A^1-A^2) - (V^1-V^2) - (DIRECTION) - M12

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

DON'T WORK IN THE DARK



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 its LEDs for the correct signal.

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ROTARY ENCODERS
non-contact

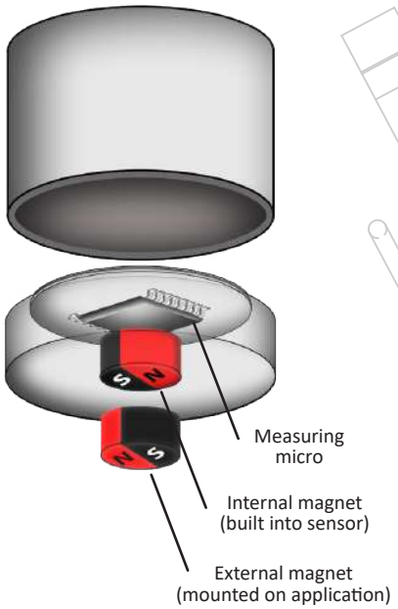
no compromise non-contact

Joral HP and PE rotary encoders operate where traditional shafted sensors can't. With no mechanical coupling, there's no alignment to maintain and no shaft wear.

Patented sensing technology captures motion from up to ½ inch away (even through non-ferrous barriers) while tolerating misalignment and vibration without loss of accuracy.

Fully encapsulated electronics deliver IP69K protection. These encoders survive high-pressure washdowns, extreme environments, and daily abuse without skipping a count.

HP offers a puck-style design. PE delivers a slim proximity-sensor form. Both are built in the USA and backed by Joral engineering support.



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. Contact Joral, LLC to customize housing, connector and output options.

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. Contact Joral, LLC to customize housing, connector, and output options.

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

Housing Code	Dimensions (mm)
PE30	30mm
HP58	58mm

QUADRATURE P/N EXAMPLE PE30 - A - (PPR) - SEPP - M12

VOLTAGE P/N EXAMPLE HP58 - V1 - (A^1-A^2) - (V^1-V^2) - (DIRECTION) - M12

J1939 P/N EXAMPLE HP58 - A - 1939 - M12

Stainless steel housings are available.

ENCODERS THAT BREAK BARRIERS

Seamless integration of non-contact rotary sensing

Joral non-contact encoders easily detect rotation through the wall of non-ferrous explosion proof housings.

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 more examples see motor encoder kits on page 14).

For explosion proof requirements a Joral non-contact sensor can be installed in a rate able 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 Joral, LLC to learn more about solutions.

PE18 Non-Contact Demo Kit

The PE18 Demo Kit gives you a quick, hands-on way to evaluate Joral's ProxEncoder® technology.

Each kit includes a working PE18 sensor with LED display, mounted in a 3D-printed housing.

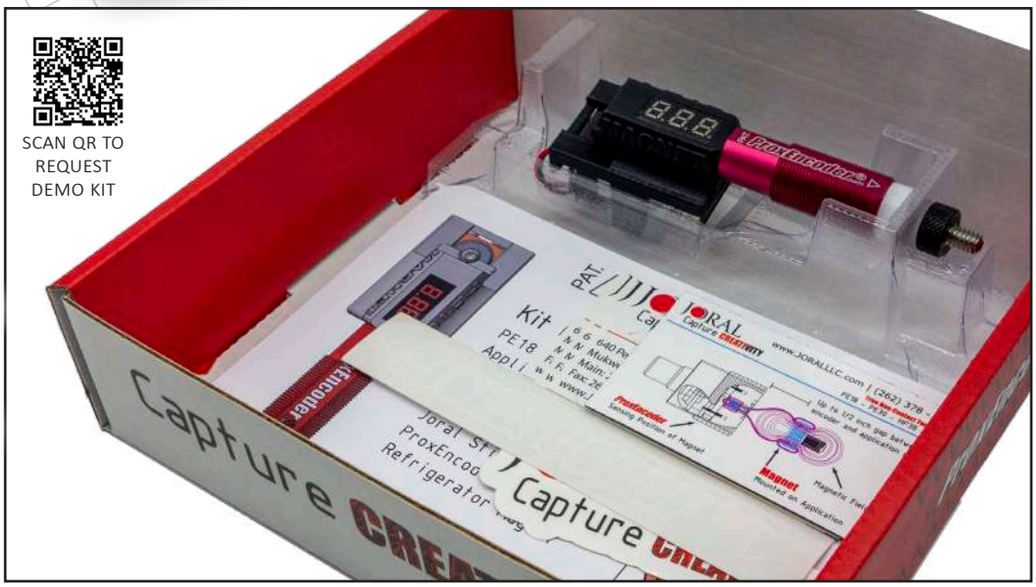
The demo allows experimenting with different magnet assemblies, giving you the flexibility to see how the PE18 responds to changes in spacing and alignment, even through non-ferrous barriers.

It is a completely self-contained demonstrator, not designed to be connected to a control system. The onboard electronics provide a 0–5 V output displayed digitally across 360 degrees of rotation, making it an all-in-one tool for direct testing and evaluation.

Scan the QR code to visit the PE18 Demo Kit page and request yours online through the quick quote form.

Request online or contact Joral, LLC by phone or E-mail.

SCAN QR TO REQUEST DEMO KIT



(above) PEBX ProxEncoder® with side exit sensing target

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

PE18 PROXENCODER® NON-CONTACT ROTARY ENCODER

The PE18 and PEBX bring Joral's true non-contact rotary sensing into compact packages. PE18 uses an industry-standard 18 mm body, while PEBX features a flush-mount box design with optional side-exit cable.

Both models deliver rotary encoder precision through a proximity-sensor form, allowing motion capture across a 0.5" gap, through non-ferrous barriers, and with tolerance for misalignment and tilt.

Available outputs include analog voltage, quadrature, and CAN J1939. Connector options range from M8 to flying-lead, giving flexibility for integration into new designs or retrofits.

Encapsulated to IP69K standards, these sensors resist oil, moisture, and debris. Their wear-free design ensures long life, even in environments that quickly destroy standard encoders.

Joral ProxEncoders® offer a unique blend of compact form, rugged construction, and versatile output options—ideal when space is limited, reliability is critical, and performance cannot be compromised.

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

Housing Code	Dimensions (mm)
PE18	18mm

QUADRATURE P/N EXAMPLE PE18 - A - (PPR) - SEPP - M8

TACHOMETER P/N EXAMPLE PE18 - T1 - (tachometer range) - M8

Stainless steel housings are available.

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.

Housing Code	Dimensions (mm)
HP38	38mm

QUADRATURE P/N EXAMPLE HP38 - A - (PPR) - SEPP - C36

VOLTAGE P/N EXAMPLE HP38 - V1 - (A^1-A^2) - (V^1-V^2) - (DIRECTION) - C36

J1939 P/N EXAMPLE HP38 - A - 1939 - C36

NO FEAR OF THE FISHES

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.

DANFOSS® / WHITE DRIVE MOTORS & STEERING® MOTORENCODER HZ68 NON-CONTACT ROTARY KIT

The HZ68 "Motorencoder" is a rugged, non-contact rotary encoder engineered to mount directly to the EMD sensor interface on Danfoss® LSHT orbital motors, including OMM, OMP, OMR, OMS, OMT, OMV, TMK, TMT, and TMV series, as well as White Drive Motors & Steering® EMD-ready equivalents.

Using the standard stainless EMD magnet housing already integrated into these motors, the HZ68 installs without mechanical modification, instantly upgrading the OEM speed-only sensor to deliver absolute angular position, direction, and turn count—even in the event of power loss.

By leveraging the existing EMD end-cover interface, OEMs and dealers can offer advanced feedback capability without changing the motor's hydraulic performance or footprint, simplifying retrofit and reducing integration cost.

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

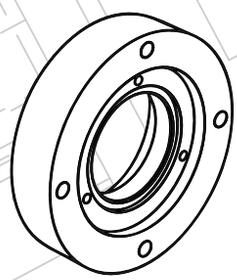
Housing Code	Dimensions (mm)
HZ68	68mm

QUADRATURE P/N EXAMPLE HP68 - A - (PPR) - SEPP - C36

VOLTAGE P/N EXAMPLE HP68 - V1 - (A^1-A^2) - (V^1-V^2) - (DIRECTION) - C36

J1939 P/N EXAMPLE HP68 - A - 1939 - C36

SAI® HYDRAULIC MOTOR WITH JB2 MOUNT AND JZ58/HZ58 NON-CONTACT ROTARY KIT

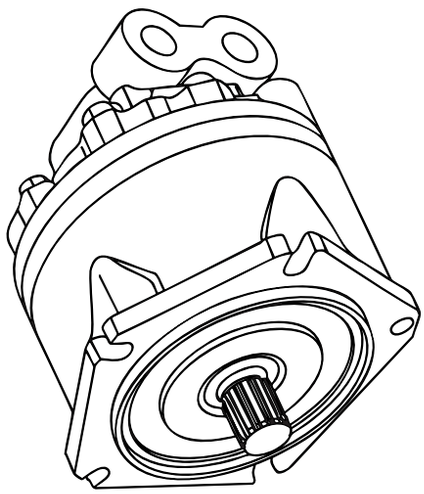


The JZ58/HZ58 Motorcoder can mount directly to the JB2 encoder interface on SAI® GM- and FS-series hydraulic motors, including GM2, GM3, GM4, GM5, and GM6, as well as FS-series JB2-equipped models.

Using Joral's taller JB2 adapter housing, the Motorcoder positions a magnetic collar on the rear motor shaft—eliminating mechanical couplings and delivering absolute angular position, direction, and turn count, even during power loss.

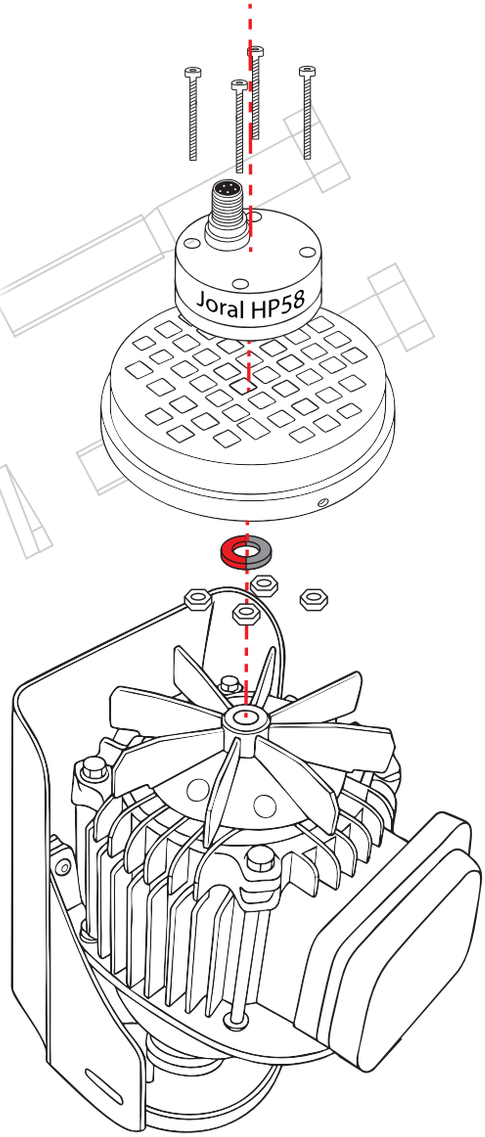
Built for harsh environments, the JZ58/HZ58 provides dependable position and direction feedback using the existing JB2 mount on SAI® motors.

The HZ58 JB2-compatible variant installs quickly, is easy to service, and delivers consistent accuracy with a non-contact design that resists wear and environmental damage, offering a more reliable, maintenance-friendly alternative to standard mechanical encoders.



CONTACT JORAL, LLC TO LEARN ABOUT JB2 ENCODER HARDWARE MOUNT ACCESSORIES

TEFC MOTOR ENCODER HP58/HZ58 NON-CONTACT ROTARY SOLUTION



Add Position, RPM, and Direction Feedback to Any TEFC Motor — Easily getting reliable motion feedback from a TEFC (Totally Enclosed, Fan-Cooled) motor is often more trouble than it's worth—mechanical couplings, custom housings, and tight clearances make retrofits a headache.

With Joral's HP58/HZ58 Motorcoder and our simple application magnet, you can add absolute position, RPM, and direction sensing directly to the motor in minutes, without touching the shaft coupling or altering the motor internals.

Typical applications include:

- Conveyors – maintain constant speed, detect jams, and sync with processes.
- Pumps – monitor flow correlation and detect dry-run or cavitation events.
- Winches and hoists – track drum turns, prevent over-travel, and ensure load safety.
- Mixers and agitators – maintain precise mixing speeds for repeatable product quality.

Following the process in Joral LLC's TEFC Installation Guide, a ring magnet mounts to the motor's rear shaft under the fan shroud, and the encoder fastens to the shroud itself, maintaining a clean, non-contact gap for accurate readings. The result is a rugged, IP-rated feedback system that's quick to install, tolerant of misalignment, and easy to service.

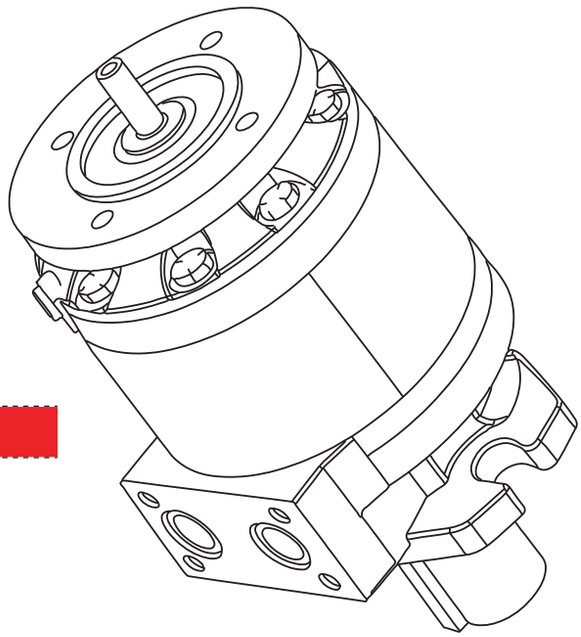
Points to consider when evaluating your application:

1. Could RPM or position feedback enable better process control or tighter automation?
2. Would knowing direction, cycles, or shaft turns improve safety or reduce downtime?
3. Is there a need to log machine activity for maintenance, compliance, or quality control?
4. Can you leverage feedback to optimize energy use or prevent mechanical wear?

With Joral's TEFC solution, you're not just adding an encoder—you're opening new control, monitoring, and optimization possibilities on the most common industrial motor type, without hassle or special tools.

CONTACT JORAL, LLC TO LEARN ABOUT TEFC MOTOR INSTALLATION AND INSTALLATION OPTIONS

PARKER® NICHOLS™ MOTOR ENCODER NON-CONTACT ROTARY ENCODER

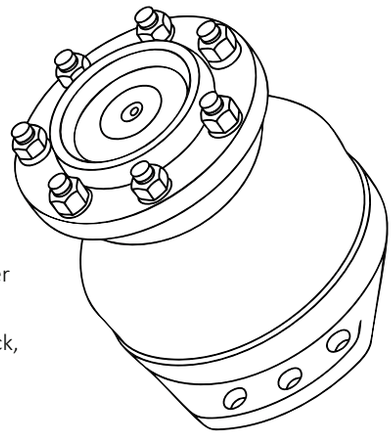


The Motorcoder is designed to be compatible with Parker® Nichols™ 110A orbital motors equipped with the through-shaft option, a rear shaft design that supports brake or feedback component mounting. By using the existing thru-shaft and rear cover, the Motorcoder adds position, RPM, and direction feedback without altering the motor's core mechanics or footprint.

On through-shaft configurations, the rear cover provides a clean pilot and bolt pattern for quick installation, making encoder retrofits precise, repeatable, and reliable. The result is a rugged, service-friendly feedback solution

CONTACT JORAL, LLC TO LEARN ABOUT TEFC MOTOR INSTALLATION AND INSTALLATION OPTIONS

POCLAIN® MOTORCODER RETROFIT WITH PE30/PZ30 HARDWARE KIT

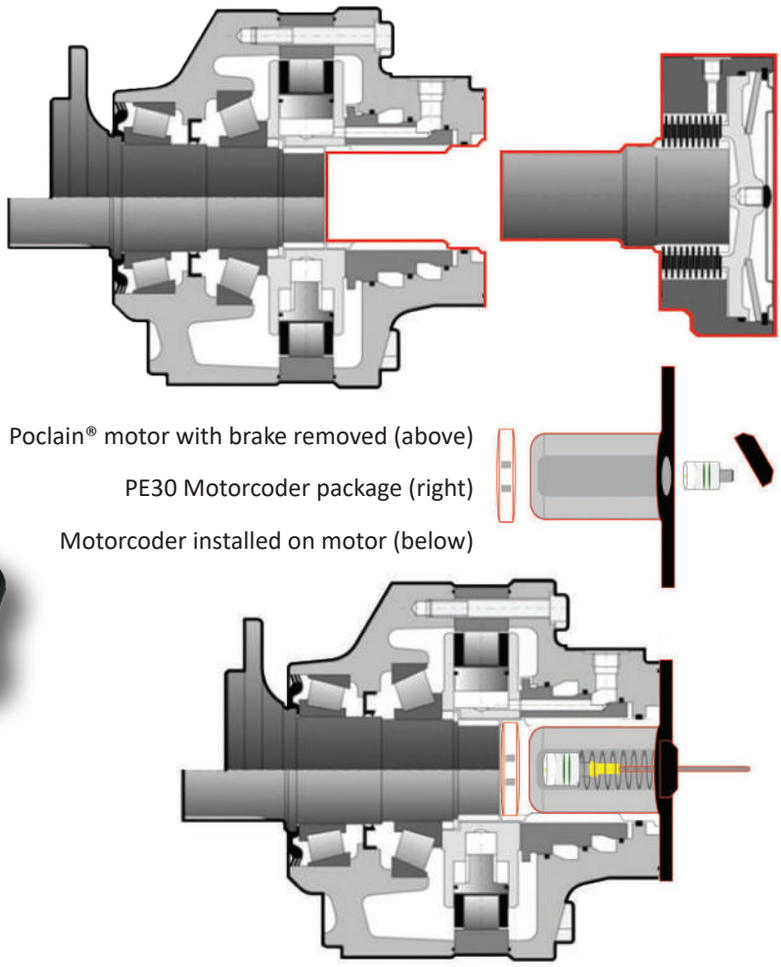


Joral's Motorcoder assembly adapts directly to the rear-shaft interface on Poclain® MS08, MS11, and MS18 shaft-motor variants. Using the motor's existing pilot and bolt circle, the system mounts a precision magnetic collar to the shaft end and aligns a non-contact encoder over it, no internal modifications required.

This configuration is ideal wherever the rear of the motor is accessible, offering a clean path to add high-resolution motion feedback without mechanical coupling wear or alignment sensitivity.

Advantages of retrofit PE/PZ non-contact encoder kit:

1. Absolute multi-turn feedback. Absolute angular position, RPM, direction, and total turns (even after power loss) via J1939, CANopen, Quadrature, or Analog for easy integration into advanced control systems.
2. Non-contact magnetic sensing. No mechanical coupling means no wear surfaces. Tolerates vibration, shock, and shaft movement common in radial-piston motor applications.
3. Easy, external serviceability. Encoder removal or replacement requires no hydraulic disassembly, keeping downtime and service costs low.
4. Flexible retrofit compatibility. Works on any MS08, MS11, or MS18 motor with an accessible rear-shaft configuration, perfect for both new builds and in-field upgrades.



Poclain® motor with brake removed (above)

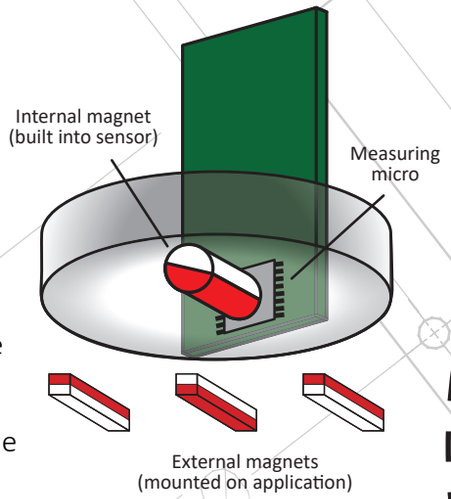
PE30 Motorcoder package (right)

Motorcoder installed on motor (below)

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 JORAL, LLC TO LEARN ABOUT COMPATIBILITY AND PACKAGE AVAILABILITY

rack n' pinion linear position



The Joral LP and LZ non-contact linear position sensors detect motion with an air gap up to 1/2" from track.

Made to replace the typical wire-reel found on booms and outriggers, the CAN J1939 capable linear sensors are IP69K and perform in the harshest environments.

The LP30 and LP30-X are the compact solutions, while the LZBM and LZXS provide alternative mounting solutions.

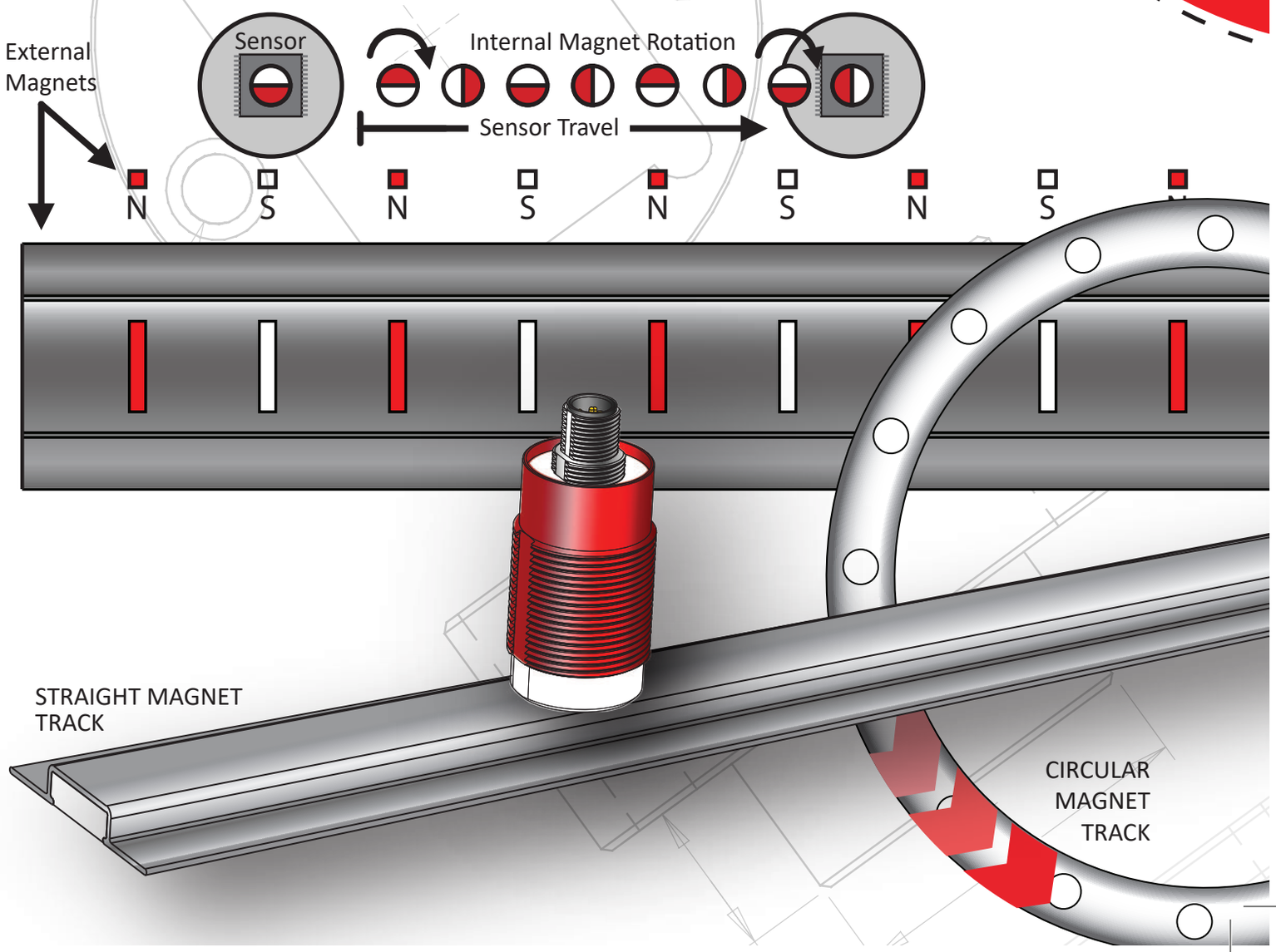
The hall sensor based LP30 provides 1/4" resolution. The “moving magnet” X version delivers 1/8" [3 mm] to 1/16" [1.5 mm] resolution with 1" application magnet spacing—a design Joral developed, manufactures, and holds U.S. Patent 11,846,529 (issued Dec. 26, 2023) for its unique non-contact linear measurement method.

Custom magnet packages enable curved or round travel including large platforms, rotating drums, and on-axis “through shaft” assemblies where conventional shafted encoder coupling is not possible.

JORAL

LINEAR POSITION
non-contact

The "Magnetic Rack and Pinion"



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.

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

Housing Code	Housing Type
LP30	30mm
LZXS	'BOX'
LZBM	'BOOM'

J1939 P/N EXAMPLE **LP30 - X - 1939 - M12**

Costs do not include magnet track.
Stainless steel housings are available.
Call: 262.378.5500

LP30 Linear Demo Kit

The LP30-X Demo Kit is a hands-on way to see Joral's patented non-contact linear measurement in action. The 3D-printed plastic track links together like a small train set, letting you slide the sensor and watch incremental counts appear on its built-in digital display.

The demo kit is not designed to connect to a control system—this is a visual demonstrator and proof of technology that's perfect for passing around in meetings, sparking ideas, and teaching how the LP30-X works. Scan the QR code to visit the LP30-X Demo Kit page and request yours online through the quick quote form.

Request online or contact Joral, LLC by phone or E-mail.

SCAN QR TO REQUEST DEMO KIT

WIRE REEL GETS THE CUT

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.

Pictured right, the Joral LZBM installed on a tow boom. The sensor is mounted on the stationary sheath of the boom while the track is mounted on the moving extension.

JORAL

Z SERIES
zero power sensors

no power, no problem

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.

HZ58 and PZ30 ABSOLUTE MULTI-TURN NON-CONTACT ROTARY ENCODER

The PZ30 (shown above) and the HZ58 are non-contact variants of the Z series absolute multi-turn shafted rotary encoders. Totally sealed and capable of Joral's patented non-contact position sensing the HZ and PZ rotary encoders are the only absolute multi-turn sensors of their kind.

JZ58 and JZ30 ABSOLUTE MULTI-TURN SHAFTED ROTARY ENCODER

The shafted absolute multi-turn Z series (shown below) detect motion without machine power, and in the event of application power loss or application drift during power down the sensor will record motion. Most common variants listed in the pricing table, contact 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.

Housing Code	Dimensions (mm)	Sensing Type
JZ30	30mm	Shafted
JZ58	58mm	Shafted
PZ30	30mm	Non-contact
HZ58	58mm	Non-contact

J1939 P/N EXAMPLE	PZ30 - G - 1939 - M12

Stainless steel housings are available. Call: 262.378.5500

POWER LOSS LOSES ITS POWER

Zero power absolute multi-turn rotary encoders

Shafted encoders struggle in hydraulic assemblies. Couplings transfer deflection and misalignment into the sensor. Bearings and shafts cannot absorb the movement common in hydraulic drives. Failures follow.

The HZ and PZ non-contact multi-turn encoders remove this weak point. No shaft connection. No mechanical load. Motion is measured magnetically, even through non-ferrous barriers.

In slew drives, precision is critical. Multiple shaft turns equal small platform movements. With zero-power technology, the encoder retains position during power loss. On restart, the system knows its exact location.

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.

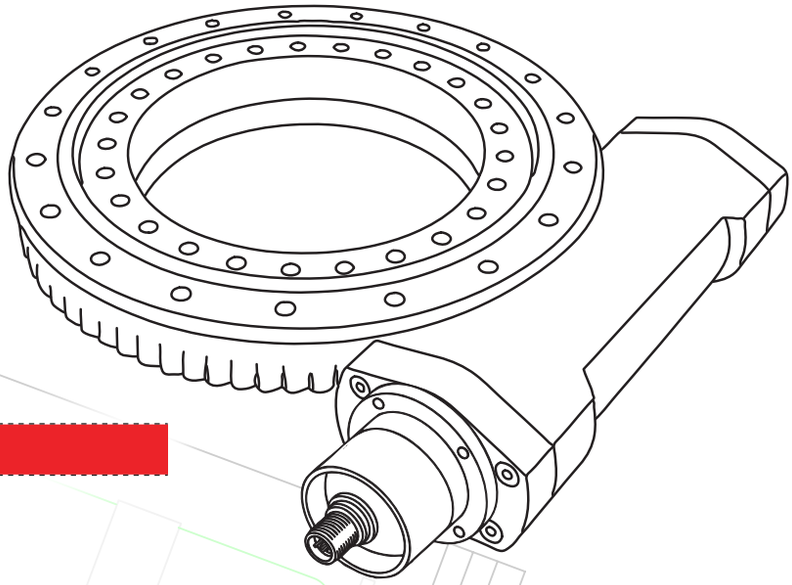
HZ50 ZERO POWER FLANGED ENCODER

The HZ50 is a non-contact replacement for shafted encoders in slew drives and hydraulic gearboxes. It eliminates the mechanical coupling, alignment issues, and wear points that limit service life.

The sensor detects rotation using Joral's moving magnet technology. A magnet is mounted inside the slew gear on the end of the shaft, aligned to the center of rotation. The HZ50 reads this motion either through a stainless steel or aluminum endcap, or when mounted directly in place of an endcap.

Zero-power multi-turn technology retains absolute position during power loss. In high turn slewing rings, where many shaft rotations equal small platform movements, this ensures the system restarts with full positional awareness.

Sealed to IP standards and designed for harsh mobile environments, the HZ50 delivers long-term accuracy and minimal maintenance in demanding applications.



CONTACT JORAL, LLC TO LEARN ABOUT COMPATIBILITY AND PACKAGE AVAILABILITY

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.

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

Housing Code	Housing Type	Sensing Type
LZXS	'BOX'	Linear
LZBM	'BOOM'	Linear
TZXS	'BOX'	Turn Counter

J1939 P/N EXAMPLE **LZXS - G - 1939 - M12**

Stainless steel housings are available. Call: 262.378.5500

TRACKING OUT OF THIS WORLD

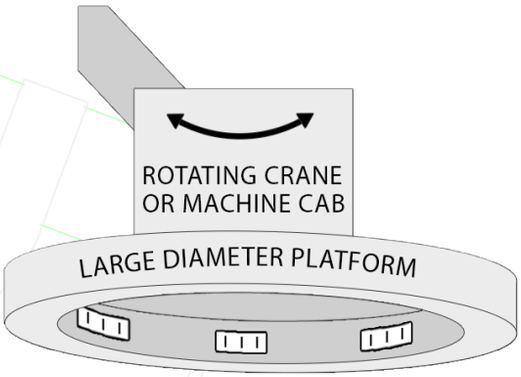
The Joral 'Saturn System' for large platform positioning

The Saturn System brings Joral's magnetic rack-and-pinion technology to large-diameter rotation and platform tracking. Built for shafts over 1" and structural pivots, it maintains accurate counts across air gaps up to 1/2".

Signal integrity remains stable even with changes in spacing between the magnet assembly and sensor. Standard magnet collars are available, or we can engineer custom-diameter tracks to suit your application.

Track layouts can be engineered for more than simple circles—arcs, compound curves, and mixed travel paths allow sensing along motion profiles that traditional encoders cannot accommodate. This makes it ideal for complex, non-linear mechanical movements.

Tracks can be supplied by the user or produced by Joral, with rapid-prototype versions in FDM or SLA 3D printing available for proof-of-concept before moving into molded or machined production.



Pictured above, LP30-X magnet packs spread among a large diameter platform

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.

JORAL

INCLINE SENSORS

a little math for x, y and z

The Joral 3-Axis Inclinometer delivers accurate tilt data. Unlike typical 3-axis units that only output raw X, Y, and Z, the SINC and DINC perform full 3D vector math internally to resolve your true angle to gravity—even with simultaneous tilts or full 360° rotation.

Available as the single-module SINC or dual-module DINC, these IP69K-sealed, fully potted sensors run from-40 °C to +85 °C, withstand MIL-STD-202 shock/vibration, and update every 50 ms.

Outputs include CAN J1939 or analog, with onboard “Electronic Bubble” LEDs for quick visual leveling. The DINC combines two sensors into one CAN node for direct boom-to-base measurement.

With ±0.3° accuracy, 0.1° resolution, and no controller math required, Joral inclinometers simplify integration while delivering precise, ready-to-use tilt data.

SINC: SINGLE 3-AXIS INCLINOMETER

The SINC is a CAN J1939 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 while using one addressed sensor. Contact Joral, LLC to customize connector and output options.

SINC and DINC now available with motion stabilized features as SGAM or DGAM

SLMI: MOTION STABILIZED TILT SENSOR

The SLMI Motion-Stabilized Inclinometer is a dual-axis, IMU-based tilt sensor for high-vibration environments. Built on the industry-standard two-bolt M6 floor-mount pattern (56.0 mm ± 0.25 mm centers), making it ideal for new designs or replacements.

By fusing accelerometer and gyroscope data, the SLMI rejects false tilt from vibration or sudden movement, delivering stable, accurate readings in real time. Available with CANopen, J1939, or analog outputs, it integrates easily into both modern and legacy systems.

The sealed housing resists dust, water, and wear, ensuring dependable operation in demanding mobile and industrial applications. With drop-in compatibility, vibration immunity, and rugged construction, the SLMI is a long-term, maintenance-friendly inclinometer solution.

Developed in house and manufactured by Joral, LLC. Customizable output and connector options available.

Housing Code	Sensor Type
SINC	Accelerometer
SGAM	Motion Stable IMU
DINC	Accelerometer
DGAM	Motion Stable IMU
SLMI	Motion Stable IMU

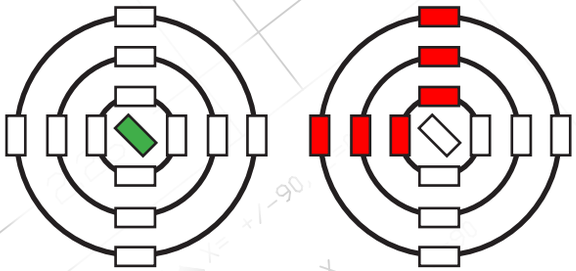
Build part number by selecting [Housing Style] [vvOutput] and [Connection]. Add [Unique Modifiers] to part number end.

J1939 P/N EXAMPLE **SINC - B - 1939 - M12**

LED BUBBLES AND DIGITAL VISCOSITY

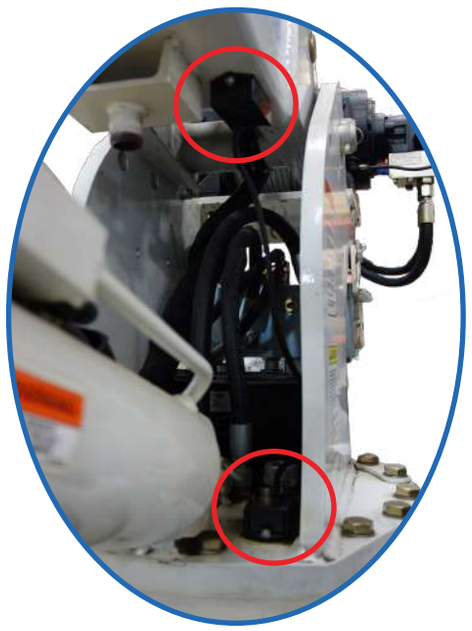
Joral inclinometers with LEDs display change from home

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.



JORAL

TEMPERATURE CONTROL

combining sense and control

All-in-one or modular: Designed and manufactured by Joral, LLC, the FCX1 integrates the sensor, controller, and 70 amp relay in one unit that threads directly into your cooler. The FCM1 uses a remote probe linked to a separate controller for flexible mounting.

Simple, rugged, ready: Only three wires—power, ground, fan output. Built for 12 or 24 V systems with auto-voltage detection. Epoxy-sealed to IP69K to survive shock, vibration, and washdowns.

Smart control: Standard units use a hall effect sensor for setpoint selection. An optional push button is available. Six preset temperatures or a fixed setpoint keep fan control simple and accurate.

Service-friendly: LED indicators show power, setpoint, and temperature status. A manual override forces the fan on for quick diagnostics.

Key advantages

- 70A relay drives large fans directly
- Auto matches input voltage
- Hall effect or push button programming
- Remote probe option for tight spaces
- Built for harsh mobile equipment use

Learn more online at OEMFANCONTROL.com or contact Joral for pricing and delivery.

FCX1 FAN CONTROLLER

The FCX1 combines a temperature probe, controller, and 70 A relay in one IP69K-rated unit. It threads directly into hydraulic coolers for quick installation and automatic fan control.

Six preset temperatures or a fixed setpoint are selected with the built-in hall effect sensor. Three-wire hookup and LED status indicators make it fast to install and simple to operate.

FCM1 FAN CONTROLLER

The FCM1 fan controller by Joral is a modular unit designed to separate the temperature sensing unit from the mated control package. The FCM1 features all the same functions of the FCX1 but the controller can be mounted away from the cooler installation for operator readout and interface.

SENSING ACCESSORIES AND MORE!

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.

Joral Part Number Assembly Guide

Build part number first by selecting **[Housing Style]** (code 1), **[MagElec]** (code 2), and **[Connection]** (code 3).

Add **[Unique Modifiers]** (code 4) to the end of the Joral part number.

Part numbers are constructed first with the **[Housing Style]**. Housing style dictates compatible electrical outputs.

After selecting housing style, choose **[MagElec]** (electrical output). Most common **[MagElec]** (electrical output) are listed in the general pricing guide. Contact Joral for unique output requests.

[Connector] style and **[Unique Modifiers]** are listed after **[Housing]** and **[MagElec]** item identifiers. **[Connector]** conductor count is determined by specified electrical output. Special connector requests available, contact Joral.

Append **[Unique Modifiers]** to the end of the Joral P/N. If no unique modifier is used the sensor is built to standard specifications. Unique modifiers override standard specification. It does not matter if modifier listed is same as standard build (such as listing redundant modifier 51, red aluminum, for *PE30-1939-M12-51*).

Examples:

Quadrature	-	**[HOUSING] - [BIT CODE] - [PPR] - [DRIVER] - [CONNECTOR] - [MODIFIERS]**
J1939	-	**[HOUSING] - [BIT CODE] - J1939 - [CONNECTOR] - [MODIFIERS]**
MODBUS	-	**[HOUSING] - A - MOD1 - [CONNECTOR] - [MODIFIERS]**
SSI	-	**[HOUSING] - A - SSI - [CONNECTOR] - [MODIFIERS]**
Voltage Out	-	**[HOUSING] - [MAGELEC] - [ANGLE RANGE] - [VOLTAGE RANGE] - [DIRECTION] - [CONNECTOR] - [MODIFIERS]**

PE18 - 18mm Prox Encoder™ Non-contact Rotary Position	**ITEM DESCRIPTION**
PE18-B-[PPR]-SEPP-M8	Quadrature single ended output, 256 PPR Max
PE18-B-1939-M8	Absolute Single-turn J1939 output up to 1024 counts
PE18-B-SSI1-M8	SSI Absolute Pos SSI @ 1024 counts/rotation
PE18-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M8	Analog output *[VOLTAGE CODE] specific pricing below*
	V1 = 5 VDC IN, 0-5 VDC OUT
	V2 = 6-36 VDC IN. 0-5 VDC OUT
	I1 = 0-24 VDC IN, 4-20 mA OUT
PEBX – Box Prox Encoder™ Non-contact Rotary Position	**ITEM DESCRIPTION**
PEBX-B-[PPR]-SEPP-M8	Quadrature single ended output, 256 PPR Max
PEBX-B-1939-M8	Absolute Single-turn J1939 output up to 1024 counts
PEBX-B-SSI1-M8	SSI Absolute Pos SSI @ 1024 counts/rotation
PEBX-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M8	Analog output *[VOLTAGE CODE] specific pricing below*
	V1 = 5 VDC IN, 0-5 VDC OUT
	V2 = 6-36 VDC IN. 0-5 VDC OUT
	I1 = 0-24 VDC IN, 4-20 mA OUT
PE30 - 30mm Prox Encoder™ Non-contact Rotary Position	**ITEM DESCRIPTION**
PE30-A-[PPR]-[DRIVER]-M12	Quadrature output *(single ended or differential),* 2048 PPR Max
PE30-A-1939-M12	Absolute Single-turn J1939 output @ 1000 counts
PZ30-G-1939-M12	Absolute Multi-turn J1939 output @ 1000 counts
PE30-A-SSI1-M12	SSI Absolute Pos SSI @ 8192 counts/rotation
PE30-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M12	Analog output *[VOLTAGE CODE] specific pricing below*
	V1 = 5 VDC IN, 0-5 VDC OUT
	V2 = 6-36 VDC IN. 0-5 VDC OUT
	I1 = 0-24 VDC IN, 4-20 mA OUT

Additional outputs available:
Contact Joral to modify form factor, communication type, or connector style.

HP58 - 58mm Hockey Puck™ Non-contact Rotary Position	ITEM DESCRIPTION
HP58-A-[PPR]-[DRIVER]-M12	Quadrature output *(single ended or differential)*
HP58-A-1939- M12	Absolute Single-turn J1939 output @1000 counts
HZ58-G-1939-M12	Absolute Multi-turn J1939 output @ 1000 counts
HP58-A-MOD1- M12	Modbus RTU output @8192 counts
HP58-A-SSI1- M12	SSI Absolute Pos SSI @ 8192 counts
HP58-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M12	Analog output *[VOLTAGE CODE] specific pricing below*
	V1 = 5 VDC IN, 0-5 VDC OUT
	V2 = 6-36 VDC IN. 0-5 VDC OUT
	V3 = 5 VDC IN, 0-5 VDC OUT x2 (REDUNTANT)
	I1 = 0-24 VDC IN, 4-20 mA OUT
	I2 = 0-24 VDC IN, 4-20 mA OUT x2 (REDUNTANT)
HP38 - 38mm Hockey Puck™ Non-contact Rotary Position	**ITEM DESCRIPTION**
HP38-B-[PPR]-SEPP-C36	10 bit quadrature output *(single ended or differential)*
HP38-B-1939-C36	Absolute Single-turn J1939 output @512 counts
HP38-B-SSI1-C36	10 bit SSI Absolute Pos SSI @ 512 counts
HP38-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-C36	Analog output *[VOLTAGE CODE] specific pricing below*
	V1 = 5 VDC IN, 0-5 VDC OUT
	V2 = 6-36 VDC IN. 0-5 VDC OUT
	I1 = 0-24 VDC IN, 4-20 mA OUT

Additional outputs available:

Contact Joral to modify form factor, communication type, or connector style.

J1 LINE - 30mm, 40mm Shafted Position Sensors	ITEM DESCRIPTION
J130-A-[PPR]-[DRIVER]-M12	13 bit quadrature output *(single ended or differential)*
J140-A-[PPR]-[DRIVER]-M12	
J130-A-1939-M12	Absolute Single-turn J1939 output @1000 counts
J140-A-1939-M12	
J130-A-SSI1-M12	13 bit SSI Absolute Pos SSI @ 8192 counts
J140-A-SSI1-M12	
J130-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M12	Analog output *[VOLTAGE CODE] specific pricing below*
J140-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M12	
	V1 = 5 VDC IN, 0-5 VDC OUT
	V2 = 6-36 VDC IN. 0-5 VDC OUT
	V3 = 5 VDC IN, 0-5 VDC OUT x2 (REDUNTANT)
J1 LINE - 58mm, 50mm Shafted Position Sensors	**ITEM DESCRIPTION**
J150-A-[PPR]-[DRIVER]-M12	13 bit quadrature output *(single ended or differential)*
J158-A-[PPR]-[DRIVER]-M12	
J150-A-1939-M12	Absolute Single-turn J1939 output @1000 counts
J158-A-1939-M12	
JZ50-G-1939-M12	Absolute Multi-turn J1939 output @ 1000 counts
JZ58-G-1939-M12	
J150-A-MOD1-M12	13 bit Modbus RTU output @ 8192 counts
J158-A-MOD1-M12	
J150-A-SSI1-M12	13 bit SSI Absolute Pos SSI @ 8192 counts
J158-A-SSI1-M12	
J150-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M12	Analog output *[VOLTAGE CODE] specific pricing below*
J158-[VOLTAGE CODE]-[A1-A2]-[V1-V2]-[DIRECTION]-M12	
	V1 = 5 VDC IN, 0-5 VDC OUT
	V2 = 6-36 VDC IN. 0-5 VDC OUT
	V3 = 5 VDC IN, 0-5 VDC OUT x2 (REDUNTANT)
	I1 = 0-24 VDC IN, 4-20 mA OUT
	I2 = 0-24 VDC IN, 4-20 mA OUT x2 (REDUNTANT)

Additional outputs available:

Contact Joral to modify form factor, communication type, or connector style.

LP & LZ - Non-Contact Linear Position	ITEM DESCRIPTION
LP30-A-1939-M12	1/2” linear in 30mm “PROX” housing w/ J1939 output
LP30-X-1939-M12	1/8” linear in 30mm “PROX” housing w/ J1939 output
LZ30-X-1939-M12	1/8” Zero Power linear in 30mm “PROX” housing w/ J1939 output
LZXS-X-1939-M12	1/8” Zero Power linear in “BOX” housing w/ J1939 output
LZBM-X-1939-M12	1/8” Zero Power linear in “BOOM” housing w/ J1939 output
MAG-STRP-0048	48” magnet track accessory for LP / LZ linear sensor
Z Series - Absolute Position; Rotary and Through Shaft	**ITEM DESCRIPTION**
JZ58-G-1939-M12	Zero Power Absolute Multi-Turn Shafted Rotary
PZ30-G-1939-M12	Absolute Multi-turn J1939 output @ 1000 counts
HZ58-G-1939-M12	Absolute Multi-turn J1939 output @ 1000 counts
TZXS-G-1939-M12	Absolute Zero Power Turn Counter in “BOX” Housing w/ J1939 output
MAG-TZRN-8/4-06	2” Inner Diameter Absolute Magnet Ring w/ Six (6) Packs
MAG-TZPK	Individual 1” Magnet Pack for Modular Turn Count Install
Incline Sensors - Two or Three Axis; J1939, and Analog	**ITEM DESCRIPTION**
SINC-C-1939-M12	Accelerometer J1939 Inclinometer w/ M12 connector
DINC-C-1939-M12	Accelerometer Boom Angle Sensor w/ M12 connector
SGAM-C-1939-M12	Motion Stabalized J1939 Inclinometer w/ M12 connector
DGAM-C-1939-M12	Motion Stabalized J1939 Boom Angle Sensor w/ M12 connector
SLMI-C-ANAG-C36	Motion Stabalized J1939 Boom Angle Sensor w/ M12 connector
Fan Control Units	**ITEM DESCRIPTION**
FCX1	Fan Control Unit - All-in-one - 3/4-16 SAE thread
FCM1	Fan Control Unit - Modular - 3/4-16 SAE thread

Additional outputs available:
Contact Joral to modify form factor, communication type, or connector style.

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JORAL

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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.