JORAL

J1 Line

RUGGED-DUTY SHAFTED ENCODERS

FEATURES

- Rugged Duty
- Fully Sealed Electronics
- Unique Captive Shaft Design
- LED Indicators
- Bullet-Proof Electronics
- Incremental and Absolute Position

DESCRIPTION

Joral has developed a line of rugged-duty shafted rotary encoders designed to meet the demanding needs of the controls, power equipment, hydraulics, and off-road vehicle markets.

The encoder marries a unique mechanical design with the latest in magnetic sensing technologies to provide an extremely durable and versatile productline.

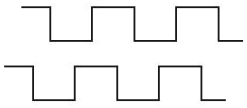
A wide range of sizes, output features and connector choices are available for both incremental and absolute position sensing.

APPLICATION

Joral rugged-duty encoders are perfect for use in harsh applications where dirt, moisture, vibration and shock are factors, such as off-road vehicles, conveyors, food processing, motion control, agricultural systems, hydraulic controls, rotary position, factory automation, and forestry.

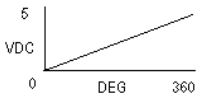
Incremental encoders generate pulses as the shaft rotates and can be used to measure speed, position, or distance. Joral has several choices for incremental output:

- Quadrature, single ended
- Quadrature, differential output
- Step and Direction



Absolute encoders provide signals directly proportional to the position of the shaft. Joral has several choices for absolute position output:

- SSI (Synchronous Serial Interface)
- Analog Voltage, 0 to 5 VDC
- PWM (Pulse Width Modulation)
- J1939 CAN Bus



Housings: Joral housings are built from solid aluminum and are designed to withstand harsh environments. They are available in several sizes:

- 30mm
- 40mm
- 50mm
- 50mm flange mount
- 58mm

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The Joral Advantage

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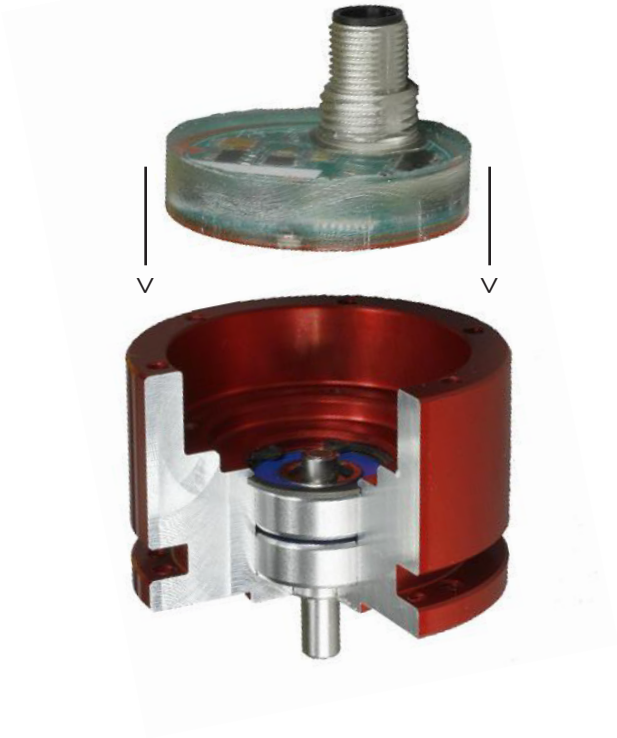
FULLY SEALED ELECTRONICS

The Joral encoders have all electronic components sealed in high-grade potting compound.

- Protects from shock, vibration, and direct impact.
- Protects from contaminants and moisture.
- Clear compound allows the LED indicators to be seen.



UNIQUE SHAFT DESIGN

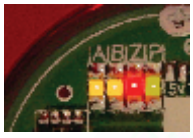
The Joral encoders have a shaft and bearing design that provide mechanical strength and stability.

- Solid aluminum body design.
- Dual chrome steel ball bearing shaft support.
- Simple design uses fewer components.
- Withstands high shaft push out forces.

LED INDICATORS

The Joral encoders have LED indicators so you can see them working.

- Power LED shows your power connections are good.
- Channel and index LEDs show the status of the encoder output.
- Great for troubleshooting and diagnostics.



Magnified Inset

BULLET-PROOF ELECTRONICS

The Joral encoders have an electronic interface that protects the encoder from electrical surges and mis-wiring. Our use of clear potting compound allows you to see the LEDS and circuit protection.

- Spike protection is present on every putput and input.
- Reverse voltage protection is provided against power mis-wiring.
- Extreme protection is in place with an internal auto-resetable fuse.

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General Specifications

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STANDARD OPERATING CHARACTERISTICS

Encoder Output	Resolution	Characteristics
Quadrature Incremental Single Ended Output	8 to 2048 PPR. Standard resolutions are: 8, 10, 16, 20, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048	Format: Two channel quadrature A and B outputs with Index pulse Z. Driver: 7272 push-pull driver
Quadrature Incremental Differential Output	8 to 2048 PPR. Standard resolutions are: 8, 10, 16, 20, 32, 40, 50, 64, 80, 100, 125, 128, 200, 250, 256, 400, 500, 512, 1024, 2048	Format: Two channel quadrature A and B outputs with Index pulse Z, and complementary outputs A', B' and Z'. Driver: 7272 push-pull driver
Step and Direction Incremental Output	16 to 512 PPR. Standard resolution are: 16, 32, 64, 128, 256, 512	Format: One channel STEP output and one channel DIR output with Index pulse Z. Driver: 7272 push-pull driver
SSI Absolute Position Output	8192 positions (0.0439 degrees per position)	Format: Clock and data output. Driver: Differential Output
PWM Absolute Position Output	1024 or 2048 positions	Format: Pulse Width Modulation in 1 usec increments. Driver: 7272 push-pull driver
Analog Voltage Absolute Position Output	0 to 5 VDC (10 bit internal resolution)	Format: 0 to 5 VDC proportional to 0 to 360 degrees. Output Loading: 10mA max
J1939 CAN Bus Incremental and Absolute Position Output	Message includes 1000 counts per rotation as 10 bit position data, .32 bit incremental counter, and 10 bit RPM data.	Format: Standard CAN Bus. One message for status, one message for settings

ELECTRICAL

Input Power: 6 to 30 VDC at approximately 60mA max, not including output loads
Outputs: 7272 Push-pull driver, 40mA sink or source
Electrical Protection: Over-voltage, reserve-voltage, output short-circuit protected
LED Indicators: Power and output channel status
Connection Types: 4 pin M8, 5 pin M12, 5 pin M12 on pigtail, 5 pin terminal, 5 pin flying lead cable, 8 pin M12, 8 pin M12 on pigtail, 8 pin flying lead cable, 4 pin Deutsch

ENVIRONMENTAL

Operating Temperature: -40 to +80 degrees C
Storage Temperature: -40 to +100 degrees C
Humidity: 100%
Vibtation: 5 to 3000 Hz, 20g
Shock: 400g, 6msec (MIL STD 202)
Enclosure Rating: IP67 (5 pin terminal connection gas no IP ratings)

MECHANICAL

Housing Diameter: 30mm, 40mm, 50mm, 58mm
Housing Material: Aluminum
Shaft Diameter: 6mm (with flat spot)
Shaft Length: 0.411 inches (10.44mm)
Shaft Material: Non-magnetic stainless steel
Shaft Speed: 6000 rpm
Bearings: Dual chrome ball-bearings

HOUSINGS

Housing Diameter	Weight	Height	Height w/M12
30mm	4 oz	1.49 inches (3.78mm)	2.15 inches (5.46mm)
40mm	4 oz	1.7 inches (4.32mm)	2.13 inches (5.41mm)
50mm	6 oz	1.53 inches (3.87mm)	2.08 inches (5.27mm)
50mm w/flange	7 oz	1.53 inches (3.87mm)	2.08 inches (5.27mm)
58mm	8 oz	1.53 inches (3.87mm)	2.1 inches (5.33mm)

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30mm Housing

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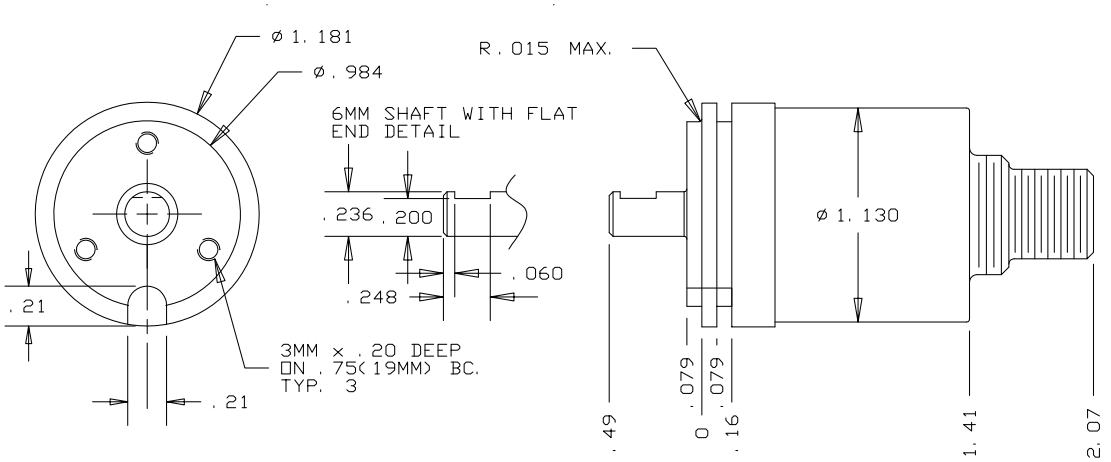
GENERAL INFORMATION

The Joral 30mm housing is designed to provide a rugged-duty encoder in a small package. The housing design provides for a fully sealed electronics cavity to protect the encoder from the harsh environment. Our unique dual ball bearing shaft design locks the shaft in place to provide high strength for axial and radial shaft loads.

MECHANICAL DIMENSIONS



SPECIFICATIONS

Weight	4 oz.
Body Material	Aluminum (Billet 6160)
Body Surface Finish	Anodized
Shaft	6mm Diameter with flat spot
Shaft material	Stainless Steel
Bearing Material	Chrome Steel
Mounting	Mounting Holes or Servo Groove

Fully Sealed Electronics

The Joral housing is designed so that all the electronics are sealed and secure. The above cut-away shows the inside electronics safe within the potting compound.

ORDERING INFORMATION

Use the following table to configure the encoder according to your needs. Select the housing style, an output, and a connection option. Most, but not all, possible configurations are available (see Configuration Notes below).

Code1: Housing Style	Code 2: Resolution / Output	Code 3: Connection
J130 (30mm) J140 (40mm) J150 (50mm) J15F (50mm Flange mount) J158 (58mm)	(Quadrature PPR resolutions) 0008 0050 0250 0010 0064 0256 0016 0080 0400 0020 0100 0500 0025 0125 0512 0032 0128 1024 0040 0200 2048 1939 (J1939 CAN Bus) APWM (Absolute position PWM) ASSI (Absolute position SSI) 5VDC (Absolute position 0-5 vdc) STP5 (Step and Direction 512 pulse)	5 TRM (5 pin terminal) 5M12 (5 pin M12) 5M2P (5 pin M12 on 18" pigtail 5C72 (5 pin flying lead cable 72") 8M12 (8 pin M12) 8M2P (8 pin M12 on 18" pigtail) 8C72 (8 pin flying lead cable 72") 04M8 (4 pin M8) DT04 (4 pin Deutsch)

Example: J140-0512-5M12 40mm housing with 512 incremental outputs with 5 pin M12 connector with single ended output driver

Example: J140-0512-8M12 40mm housing with 512 incremental outputs with 8 pin M12 connector with differential output driver

Example: J150-5VDC-5TRM 50mm housing with 0 to 5 vdc output with 5 pin terminal connector

Example: J158-1939-DT04 58mm housing with J1939 CAN Bus output with 4 pin Deutsch connector

Configuration Notes:

Quadrature: Single-ended output driver is indicated by selecting a 5 pin connection
Differential output driver is indicated by selecting an 8 pin connection

J1939: Only available with 5M12, 5M2P, 5C72, or DT04 connections

APWM: Only available with 5TRM, 5M12, 5M2P, or 5C72 connections

ASSI: Only available in 30mm and 40mm housing styles
Only available with 8M12, 8M2P, or 8C72 connections

5VDC: Only available with 58mm housing style
Only available with 5TRM connection

STP5: Only available with 5TRM, 5M12, 5M2P, or 5C72 connections

04M8: Only available for quadrature single ended output

J130: 5 TRM Connection not available
5 VDC Output not available