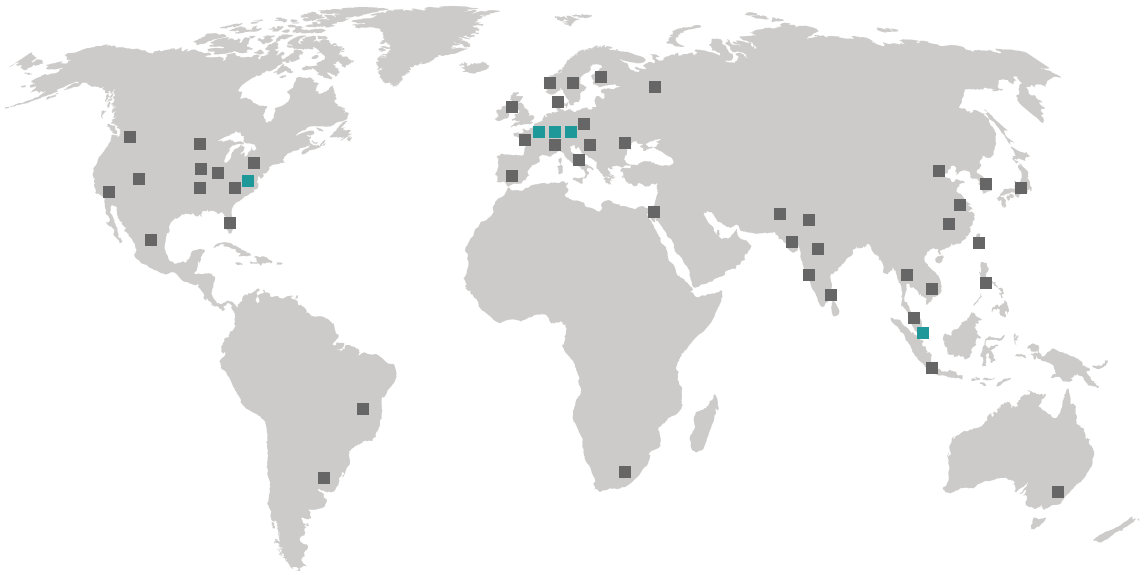
POSITAL
FRABA

POSITION AND MOTION SENSORS

50 YEARS ABSOLUTE ROTARY ENCODERS
POSITAL
FRABA
1963–2013

POSITAL
FRABA

FRABA WORLDWIDE



FRABA Group Located in

America
FRABA Inc.
Hamilton, NJ, USA

Asia
FRABA Pte. Ltd.
Singapore

Europe
FRABA AG
Cologne, Germany

R&D Center
CENTITECH GmbH
Aachen, Germany

Manufacturing
CONISTICS Sp. z o.o.
Slubice, Poland

CONISTICS Inc.
Hamilton, NJ, USA

Holding
FRABA B.V.
Heerlen, The Netherlands

POSITAL Sales Partners Located in

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Denmark
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Netherlands, The
Norway
Poland
Slovakia
Spain
Sweden
Switzerland
Ukraine
United Kingdom

Africa
South Africa

Australia

Please refer to our website for partner contacts in all countries as the list is constantly growing.

Over 50 Years Experience with Position Sensors

FRABA Group

FRABA is a group of enterprises focused on providing advanced products for the motion control and industrial automation markets. POSITAL has been a leading manufacturer of absolute rotary encoders for over 50 years and recently has expanded its business to to include tilt and linear motion sensors. Other FRABA Group subsidiaries include VITECTOR which focuses on protection sensors to guard doors and production machine covers.

History

FRABA was founded by Franz Baumgartner in 1918. Until the 1960s, FRABA's main product was mechanical relays. In 1963 FRABA started selling "brush" absolute encoders and in 1973, one the first non-contact, optical absolute rotary encoders was produced in the FRABA offices in Cologne. Today, FRABA companies specialize in innovative products that use advanced technologies to deliver exceptional performance and value.

Service

Absolute rotary encoders are sophisticated devices that can help solve a wide range of technical problems. However, realizing the full potential of these products may require specialized knowledge when selecting the device configuration and programming the operating parameters. To ensure that customers get what they need, POSITAL's development engineers in Europe, North America and Asia have direct responsibility for customer support. In addition, a growing global network of sales partners is providing expert guidance with knowledge about the local requirements.

Production

POSITAL products are manufactured in advanced production facilities. The computer-guided semi-automated production system tracks each device from order, through assembly and testing, to final delivery. Even with thousands of unique configurations available, standard products are ready to ship within five working days of receiving an order.

CONTENT

Catalog Overview

Version 20140715

Position and Motion Sensors

High Precision IXARC Rotary Encoders

Motion control applications – ranging from factory automation to mobile machinery – require accurate, realtime information about the location of mechanical components. The IXARC line of absolute rotary encoders provide precise and reliable measurement of the angular positions of joints, drive shafts, pulleys, etc... Available electronic connections range from simple analog outputs to sophisticated Fieldbus and Industrial Ethernet interfaces.

- **Absolute and Incremental Technology**
- **Optical and Magnetic Encoders up to 16bit**

Versatile LINARIX Linear Sensors

Many applications require linear motion to be monitored for system control or to ensure safety. With lengths ranging from 1 m to 10 m (3’ to 33’), LINARIX draw wire sensors are available in many configurations to meet an application’s requirements. Options include a wide variety of outputs (including analog, Fieldbus and Ethernet variants), heavy duty housings and compact designs.

- **Absolute Position Measurement with Resolutions up to 2 µm**
- **Variety of Materials**

Compact Industrial TILTIX Inclinometers

Accurate measurement of tilt or inclination is very important for motion control and safety systems. Inclinometers provide single or dual-axis angle measurement in an economical package. Relying on gravity for their measurement, these sensors have no exposed moving parts, resulting in easy installation and high environmental protection.

- **High Accuracy of 0.1° and Resolution of 0.01°**
- **Measurement Range ±80° (Dual Axis) or 360° (Single Axis)**

Wide Selection of Accessories

POSITAL offers a wide variety of accessories that simplify sensor installation. Mating connectors of different styles and lengths ensure proper electrical connections. Using appropriate mounting accessories minimize wear and tear on encoders and help to ensure a long and reliable life cycle. Interface modules and displays are also available to provide users with immediate access to measurements.

- **Different Cable Designs and Lengths**
- **Adapter Flanges for Precise Installation**

Power Generation and Water




Wind Energy

IXARC heavy duty absolute and incremental encoders provide precise angle measurement for pitch control systems that dynamically adjust the angle of wind turbine rotor blades. High resolution encoders are also ideal for yaw control ensuring optimal positioning of the nacelle with respect to wind direction.

- **Salt Resistant Sensors**
- **Increased Efficiency in Extreme Environments**

Solar Energy

For both photovoltaic systems and concentrated power plants (CSP, CPV), solar tracking systems increase energy efficiency. The compact and accurate IXARC encoders and TILTIX inclinometers are ideal for both single and two axis tracking systems which not only follow the sun from east to west but also have an adjusting elevation system.

- **Optimized Solar Panel Orientation**
- **Position Maintained even after Power Loss**

Water / Wastewater

Accurate monitoring of sluice gates for flood control, sewage and power plants, dams or irrigation facilities can be monitored remotely with IXARC rotary encoders and LINARIX linear sensors. The IXARC magnetic rotary encoders are also ideal for precise valve positioning.

- **Minimum Maintenance, Increased Reliability**
- **Easy Remote Control, Variety of Interfaces**

Oil and Gas

Whether it's offshore or onshore, an exploration platform or a refinery POSITAL explosion proof IECEx and ATEX certified products can provide accurate positioning and speed monitoring in pipe handling equipment or in blow out preventer (BOP) systems.

- **Certified Sensors for Explosive Environments**
- **Accurate Leveling for Subsea Systems**




Material Handling




Automated Storage Retrieval Systems

Increasing warehouse and labor costs make the use of automatic storage and retrieval systems economically attractive. IXARC rotary encoders and LINARIX linear sensors are used in these systems to give the position of the loading equipment with respect to the vertical racks where goods are stored.

- **Vertical and Horizontal Positioning of the Units**
- **Accurate Monitoring of the Arms**

Baggage Handling

Due to stringent security requirements, all airline baggage needs to be screened and distributed in a secure manner. A labyrinth of conveyors helps sort these in a correct fashion. Programmable Fieldbus IXARC rotary encoders help track the position of multiple baggage conveyors.

- **Diagnostics LED, Reduced System Installation**
- **Simplified Wiring, Decreased Time & Costs**

Overhead Conveyors

Assembly lines for automotive production have dedicated work stations for different processes. Typically the vehicle chassis is moved through a series of such work stations using overhead conveyors. IXARC absolute encoders help achieve this movement in a safe and controlled manner.

- **Fieldbus & Ethernet for Fast Communication**
- **SIL2, SIL3 Certified for Safe Operation**

Forklifts and Automated Guided Vehicles

For forklifts and AGV's that carry loads from one point to another, safety is of utmost importance. TILTIX inclinometers and LINARIX linear sensors help to avoid accidental contact and insure precise positioning of loads.

- **Simple Communication with Analog Interfaces**
- **Programmable Measurement by the User**




Mobile Machinery



Mining

Drill rigs, excavators and mobile hammering systems are complicated machines which must perform flawlessly under the harshest conditions. For these applications the ATEX certified IXARC rotary encoders can be used to provide precise positioning of drill heads and masts. Single and dual axis POSITAL TILTIX inclinometers further equip operators with essential information for platform leveling and arm positioning.

- **Certified Sensors for Explosive Environments**
- **Precise Positioning & Leveling**

Cranes

Cranes and other construction machinery are required to be safe, efficient and reliable. Positioning is of prime importance, and redundant systems are often used to eliminate errors. To address this requirement the IXARC SIL-2 encoders are an excellent fit, combining redundant measurement with an easy-to-integrate interface.

- **Sensors for High Levels of Shock & Vibration**
- **Increased Accuracy & Safety**

Arm / Boom Extension

Trucks with long boom extensions such as fire trucks or concrete pumps have to reach to high-rise buildings, often over large obstacles. IXARC rotary encoders can be mounted directly on the rotational joints to provide data for active damping systems. TILTIX single or dual axis inclinometers can be used to monitor the position of the boom arm or for base leveling.

- **IP69K Sensors, Pressure & Temperature Resistant**
- **Easy Communication, CAN & Analog Interfaces**

Scissor Lifts and Aerial Work Platforms

Scissor lifts need constant tilt monitoring to prevent tip-overs, an easy job for the dual axis TILTIX inclinometers. IXARC rotary encoders and LINARIX linear sensors are ideal for situations where the height of the lift needs to be known.

- **Compact & Economical Sensors**
- **SIL2, SIL3 Certified for Safe Operation**




Factory Automation

Packaging

High precision is needed in processes like form filling, sealing, palletizing, pick and place, cartoning and cardboard folding. The IXARC rotary encoders with Fieldbus or Ethernet interfaces can simplify wiring and keep costs down while their stainless steel housing can withstand high temperatures and pressure wash downs.

- **Precise and Fast Position Feedback**
- **Reliability at Maximum Work Speed**

Textile and Plastic

In both textile and plastic manufacturing the material used are changed periodically and constant adjustments need to be made in roll and nozzle positioning. IXARC absolute encoders and LINARIX linear sensors can help speed up these changes.

- **Reduced Downtime and Increased Efficiency**
- **Reliable Positioning in Hot & Humid Areas**

Food and Beverage

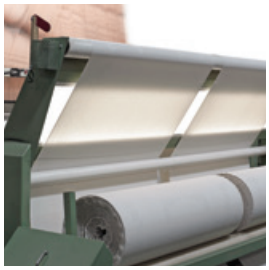
Filling bottles to the right level, accurate labeling and strict regulatory requirements are a few issues that manufactures have to deal with. IXARC rotary encoders and LINARIX linear sensors are used in the food and beverage industry to support efficient and hygienic food packaging.

- **Stainless Steel Version, Chemical Resistance**
- **Accurate Process Monitoring**

Industrial Robots

Industrial robots are used widely in manufacturing processes around the world. They carry out activities like welding, painting, assembling which all demand high accuracy. IXARC rotary encoders mounted on the joints of robots can measure and control their movements.

- **Compact Size, Ideal for Retrofitting**
- **Absolute & Incremental Measurement**



Healthcare and Elevators

Healthcare

Modern devices used in the healthcare industry demand advanced technology for precise positioning. TILTIX compact inclinometers provide accurate measurements and are built to last the life of the equipment. LINARIX linear sensors offer a solution for tracking the position of patient tables. For more complex applications, such as fluoroscopy or radiography tables or surgical C-arms, that require coordinated positioning of several components, IXARC absolute rotary encoders are an excellent option.

- **Precise Positioning of Patient & Scanner**
- **Simple Installation, Easier Calibration**

Elevators

Elevator cars need to be accurately positioned with respect to each floor they visit. IXARC absolute encoders help provide this information without the need of a ground reference. With IXARC absolute encoders, knowledge of the position of the elevator car is always retained, even during power failures. IXARC encoders supporting the CANopen Lift protocol help meet the high safety standards of this industry. Cost efficient LINARIX linear sensors are an excellent solution for door positioning.

- **Absolute & Incremental Positioning**
- **High Shaft Load, Increased Safety**

IXARC ROTARY ENCODERS

High Performance Absolute and Incremental Encoders

Magnetic Measurement Principles

Magnetic rotary encoders determine angular position using magnetic field sensor technology. A permanent magnet A fixed to the encoder's shaft creates a magnetic field which is sampled by a sensor B that generates an accurate absolute position reading.

Signal Processing is the Key to High Performance

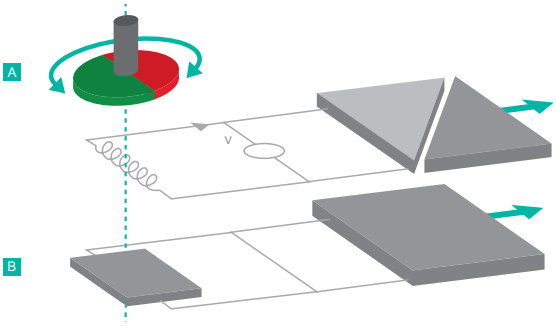
The technological leap that pushes POSITAL's IXARC magnetic encoders to the performance level of optical systems is based on a new generation of sensor systems. The combination of a custom Hall-effect sensor and complex signal processing algorithms running on a powerful 32 bit microprocessor results in a considerably improved resolution and accuracy, along with latency times of only a few microseconds. POSITAL has also implemented an incremental interface and can now offer a complete range of encoder solutions.

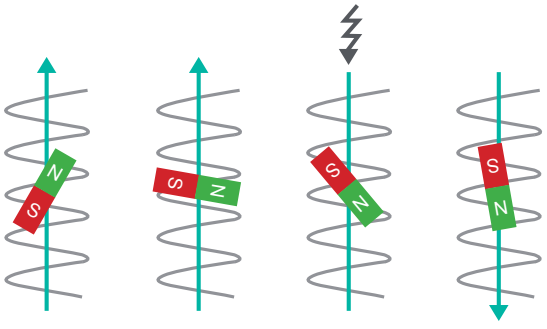
Multiturn Innovation

POSITAL can also provide absolute multiturn measurements by means of a revolution counter system that uses an energy harvesting system based on the Wiegand effect. This system requires no gears or batteries. Eliminating batteries brings about many advantages. Batteries have a limited lifespan, weigh a lot, and often contain harmful substances. Gear units have disadvantages of their own being large, complex, costly and vulnerable to shock and vibration. Regardless of the rotational speed, even at near-zero, the energy harvesting system generates short, powerful voltage pulses, sufficient to power the counting electronics. The result is a revolution counter that is independent of any external power supply. This technology, which has proven itself since 2005, enables maintenance-free reliable measurement of absolute positions, even in demanding environments, for years to come.

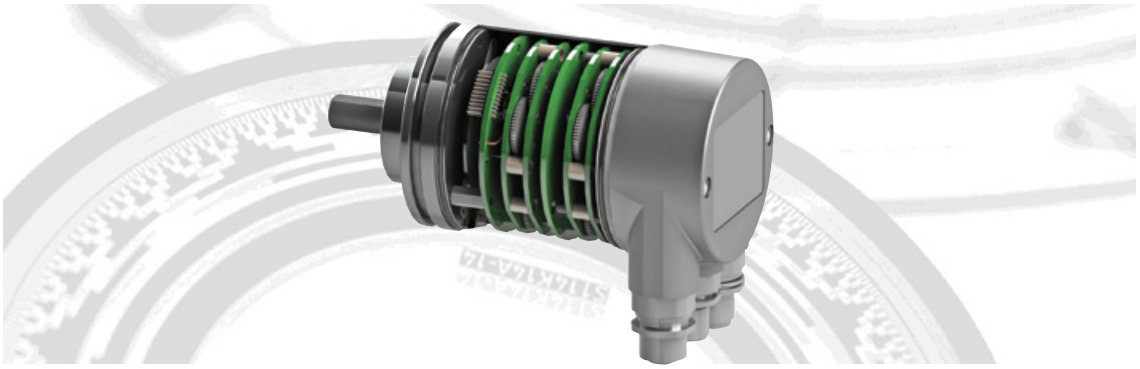
Advantages of Magnetic Encoders

- Robust and durable
- Mechanically simple and economical − no battery, no gear
- Compact design for installation in small spaces





Optical Measurement Principles



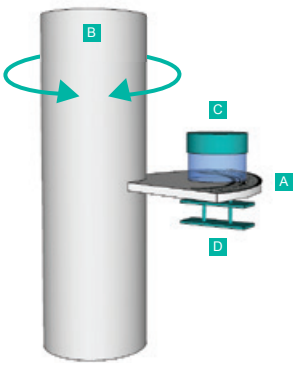
A key component of optical rotary encoders is a code disk A mounted on the encoder shaft B. This disk is made of unbreakable plastic that has a concentric pattern of transparent and opaque areas. Infrared light from an LED C shines through the code disk, onto an array of photoreceptors D. As the shaft turns, a unique combination of photoreceptors are illuminated or blocked from light by the pattern on the disk. For multiturn models, there is an additional set of code discs arranged in a gear train E. As the main encoder shaft rotates, these discs are geared together to turn like the wheels of an odometer. The rotational position of each disc is monitored optically and the output is a count of the net number of rotations of the encoder shaft.

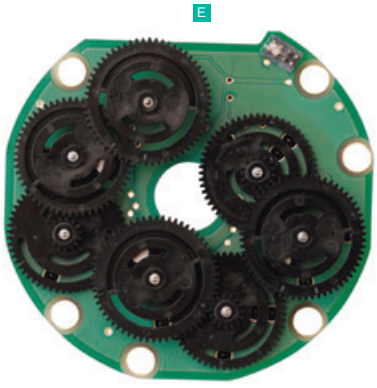
Functionality

POSITAL's IXARC optical absolute rotary encoders use highly integrated Opto-ASICs, providing a resolution up to 16 bits (65,536 steps) per turn. For multiturn models, the measuring range is extended by the mechanically geared code disks to as many as 16,384 (2^{14}) revolutions.

Advantages of Optical Encoders

- High resolution and accuracy along with excellent dynamic response
- For use in areas with high magnetic fields
- No risk of these devices losing track of their absolute position
- No backup batteries required





Absolute vs Incremental Rotary Encoders

Absolute Rotary Encoders

Absolute rotary encoders are capable of providing unique position values from the moment they are switched on. This is accomplished by detecting the position of a coded element. All positions in these systems correspond to a unique code. Even movements that occur while the system is without power are translated into accurate position values once the encoder is powered up again.

Advantages

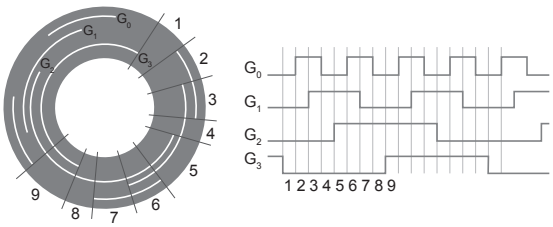
- Multiple Interface Options: Analog, Ethernet, Fieldbus, Parallel, Serial
- Singleturn and Multiturn Revolution
- Resolution up to 16 bit
- Optical an Magnetic Measuring Principle

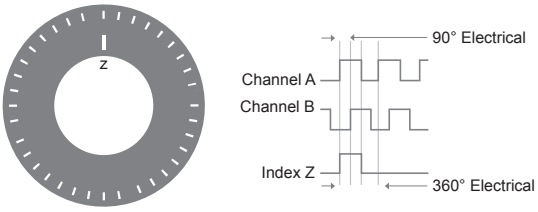
Incremental Rotary Encoders

Incremental encoders generate an output signal each time the shaft rotates a certain amount. (The number of pulses per turn defines the resolution of the device.) Each time the encoder is powered on it begins counting from zero, regardless of where the shaft is. Initial homing to a reference point is therefore inevitable in all positioning tasks, both upon start up of the control system and whenever power to the encoder has been interrupted.

Advantages

- A, B, Z, and Inverted Signals as HTL (Push-Pull) or TTL (RS422).
- Any Pulse Count up to 16384 Pulses per Revolution Available
- Flexible Scaling Functionality
- Magnetic Measuring Principle





PRODUCT OVERVIEW − IXARC ROTARY ENCODERS

Incremental Interfaces

		Max. Protecion Class	Pulses per Revolution	Accuracy (INL)	Accuracy (DNL)	Flange Size in mm [in]	Clamp Flange	Synchro Flange	Hollow Flange	Square Flange	Supply Voltage in V	Cable	Connector	Connection Cap	Shock / Vibration[1] in g	Max. RPM	Radial Shaft Load in N
	**Magnetic** **Incremental** **RS422**	IP69K IP68	Up to 16384	0.1°	0.003°	42 [1.65]		■			8−30	■	■		300 30	6000	300
	**Magnetic** **Incremental** **Push-Pull**	IP69K IP68	Up to 16384	0.1°	0.003°	42 [1.65]		■			4.75−30	■	■		300 30	6000	180
	**Magnetic** **Incremental** **RS422**	IP67	Up to 16384	0.1°	0.003°	36 [1.42] 58 [2.28]	■	■	■	■	4.75−5.5	■	■		100 10	12000	110
	**Magnetic** **Incremental** **RS422**	IP67	Up to 16384	0.1°	0.003°	36 [1.42] 58 [2.28]	■	■	■	■	4.75−5.5	■	■		100 10	12000	110
	**Magnetic** **Incremental** **Push-Pull**	IP67	Up to 16384	0.1°	0.003°	36 [1.42] 58 [2.28]	■	■	■	■	4.75−30	■	■		100 10	12000	110
	**Magnetic** **Incremental** **Push-Pull**	IP67	Up to 16384	0.1°	0.003°	36 [1.42] 58 [2.28]	■	■	■	■	4.75−30	■	■		100 10	12000	110

1) Shock and Vibration Based on (EN 60068-2-27) / (EN 60068-2-6), Operating Temperature: -40 to +85 °C [-40 to +185 °F]

Incremental encoders generate an output signal each time the shaft rotates a certain amount. The number of signals per turn defines the resolution of the device.

For More Information

Please refer to our website for the full range of our products.

www.posital.com/incremental

Related Industries




Analog and Parallel Interfaces

	CE UL	Max. Protecion Class	Max. Revolutions (Turns)	Max. Resolution in bit	Accuracy / Linearity (±)	Flange Size in mm [in]	Clamp Flange	Synchro Flange	Hollow Flange	Square Flange	Supply Voltage in V	Cable	Connector	Connection Cap	Shock / Vibration[1] in g	Max. RPM	Radial Shaft Load in N
	Magnetic Analog Current	IP69K IP68	32768	12	0.35° 0.05%	42 [1.65]		■			15–30	■	■		300 30	6000	300
	Magnetic Analog Voltage	IP69K IP68	32768	12	0.35° 0.05%	42 [1.65]		■			12–30	■	■		300 30	6000	300
	Magnetic Analog Voltage	IP65	32768	12	0.35° 0.05%	36 [1.42]	■	■	■	■	12–30	■	■		100 10	12000	110
	Magnetic Prog. Analog Current	IP54	32768	12	0.35° 0.05%	36 [1.42] 58 [2.28]	■	■	■	■	12–30	■	■		100 10	12000	110
	Magnetic Prog. Analog Voltage	IP54	32768	12	0.35° 0.05%	36 [1.42] 58 [2.28]	■	■	■	■	12–30	■	■		100 10	12000	110
	Optical Parallel Binary, Gray	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30	■	■		100 10	12000	110

1) Shock and Vibration Based on (EN 60068-2-27) / (EN 60068-2-6), Operating Temperature: -40 to +85 °C [-40 to +185 °F]

ANALOG A common standard with either a voltage or a current output.

PARALLEL All bits of the position output are transferred simultaneously using one line for each bit.

For More Information

Please refer to our website for the full range of our products.

www.posital.com/analog-parallel

Related Industries




SSI Interfaces

	CE UL	Max. Protecion Class	Max. Revolutions (Turns)	Max. Resolution in bit	Accuracy / Linearity (±)	Flange Size in mm [in]	Clamp Flange	Synchro Flange	Hollow Flange	Square Flange	Supply Voltage in V	Cable	Connector	Connection Cap	Shock / Vibration[1] in g	Max. RPM	Radial Shaft Load in N
	**Magnetic** **SSI** **Up to 16 bit**	IP69K IP68	65536	16	0.1°	42 [1.65]		■			4.75–30	■	■		300 30	6000	300
	**Magnetic** **SSI** **Up to 16 bit**	IP69K IP68	65536	16	0.1°	36 [1.42]		■			4.75–30	■	■		300 30	6000	180
	**Magnetic** **SSI** **Up to 16 bit**	IP65	65536	16	0.1°	36 [1.42] 58 [2.28]	■	■	■	■	4.75–30	■	■		100 10	12000	110
	**Optical** **SSI + Increm.** **Up to 16 bit**	IP65	16384	16	0.022°	58 [2.28]	■	■	■	■	4.5–30	■	■		100 10	12000	110
	**Optical** **SSI** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	4.5–30	■	■		100 10	12000	110
	**Optical** **SSi** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	4.5–30	■	■		100 10	12000	110

1) Shock and Vibration Based on (EN 60068-2-27) / (EN 60068-2-6), Operating Temperature: -40 to +85 °C [-40 to +185 °F]

SSI is a widely used serial interface with point-to-point connection between PLC/Master and encoder. It is based on the RS422 standard.

For More Information

Please refer to our website for the full range of our products.

www.posital.com/ssi

Related Industries




Bus Interfaces

		Max. Protecion Class	Max. Revolutions (Turns)	Max. Resolution in bit	Accuracy / Linearity (±)	Flange Size in mm [in]	Clamp Flange	Synchro Flange	Hollow Flange	Square Flange	Supply Voltage in V	Cable	Connector	Connection Cap	Shock / Vibration[1] in g	Max. RPM	Radial Shaft Load in N
	**Magnetic** **CANopen** **Up to 16 bit**	IP69K IP68	65536	16	0.35°	42 [1.65]		■			10–30	■	■		300 30	6000	300
	**Magnetic** **SAE J1939** **Up to 16 bit**	IP69K IP68	65536	16	0.1°	36 [1.42]		■			10–30	■	■		300 30	6000	180
	**Magnetic** **DeviceNet** **Up to 16 bit**	IP65	65536	16	0.1°	36 [1.42] 58 [2.28]	■	■	■	■	10–30	■	■		100 10	12000	110
	**Optical** **PROFIBUS** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30	■	■	■	100 10	12000	110
	**Optical** **Interbus** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30	■	■	■	100 10	12000	110
	**Optical** **CANopen** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30	■	■	■	100 10	12000	110

1) Shock and Vibration Based on (EN 60068-2-27) / (EN 60068-2-6), Operating Temperature: -40 to +85 °C [-40 to +185 °F]

PROFIBUS is available on many PLCs and one of the most common Fieldbus technologies in factory automation and other areas. It is based on RS485.

DeviceNet is a Fieldbus system based on CAN networks and CIP protocol, managed by ODVA, widely used in factory autamation and available on many PLCs.

SAE J1939 is a Fieldbus standard used for communication by the car and heavy-duty truck industry.

CANopen is a Fieldbus protocol using CAN networks and CANopen Lift is a protocol for elevator applications.

Interbus is a Fieldbus technology developed by Phoenix Contact

For More Information

Please refer to our website for the full range of our products.

www.posital.com/bus

Related Industries




Ethernet Interfaces

	CE UL	Max. Protecion Class	Max. Revolutions (Turns)	Max. Resolution in bit	Accuracy / Linearity (±)	Flange Size in mm [in]	Clamp Flange	Synchro Flange	Hollow Flange	Square Flange	Supply Voltage in V	Cable	Connector	Connection Cap	Shock / Vibration[1] in g	Max. RPM	Radial Shaft Load in N
	**Optical** **EtherNet/IP** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30		■		100 10	12000	110
	**Optical** **PROFINET** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30		■		100 10	12000	110
	**Optical** **EtherCAT** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30		■		100 10	12000	110
	**Optical** **Modbus/TCP** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30		■		100 10	12000	110
	**Optical** **POWERLINK** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30		■		100 10	12000	110
	**Optical** **EtherNet/IP** **Up to 16 bit**	IP67	16384	16	0.022°	58 [2.28]	■	■	■	■	10–30		■		100 10	12000	110

1) Shock and Vibration Based on (EN 60068-2-27) / (EN 60068-2-6), Operating Temperature: -40 to +85 °C [-40 to +185 °F]

PROFINET is an Industrial Ethernet standard from „PROFIBUS&PROFINET“ International“ designed for automation.

EtherNet/IP is an communication protocol developed by Rockwell Automation and managed by ODVA.

Modbus is a serial protocol managed by the Modbus Organization.

EtherCAT is an open high performance Ethernet-based Fieldbus system. EtherCAT require short data update times with low communication jitter and low hardware costs.

ETHERNET POWERLINK is a real-time communication system based on Ethernet networks and managed by EPSG.

For More Information

Please refer to our website for the full range of our products.

www.posital.com/ethernet

Related Industries




ATEX and SIL Certified

		Max. Protecion Class	Max. Revolutions (Turns)	Max. Resolution in bit	Accuracy / Linearity (±)	Flange Size in mm [in]	Clamp Flange	Synchro Flange	Hollow Flange	Square Flange	Supply Voltage in V	Cable	Connector	Connection Cap	Shock / Vibration[1] in g	Max. RPM	Radial Shaft Load in N
	**Zone 1 & 21** **CANopen** **Optical**	IP67	16384	16	0.022°	78 [3.07]	■	■	■	■	10–30			■	100 10	3000	50
	**Zone 1 & 21** **PROFIBUS** **Optical**	IP67	16384	16	0.022°	78 [3.07]	■	■	■	■	10–30			■	100 10	3000	50
	**Zone 1 & 21** **SSI** **Optical**	IP67	16384	16	0.022°	78 [3.07]	■	■	■	■	4.5–30			■	100 10	3000	50
	**Zone 1 & 21** **Ethernet/IP** **Optical**	IP67	16384	16	0.022°	78 [3.07]	■	■	■	■	10–30			■	100 10	3000	50
	**Zone 2 & 22** **All Common Interfaces**	IP67	16384	16	0.022°	58 [2.28]	■	■	■		4.5–30	■		■	100 10	12000	110
	**Safety Cert.** **CANSafe** **Optical**	IP67	16384	16	0.022°	58 [2.28]	■	■	■		12–30			■	100 10	6000	110

1) Shock and Vibration Based on (EN 60068-2-27) / (EN 60068-2-6), Operating Temperature: -40 to +85 °C [-40 to +185 °F]

ATEX and IECEx norms define essential requirements for equipment and protective systems intended for use in potentially explosive atmospheres.

SIL (Safety Integrity Level) is defined as a relative level of risk-reduction provided by a safety function in accordance with the requirements of IEC 61508/EN 62061, PL e and Cat.4 according to EN ISO 13849-1

For More Information

Please refer to our website for the full range of our products.

www.posital.com/atex-sil

Related Industries




IXARC Incremental Magnetic Encoders

					1		2	3		4					5			6		7		
U	C	D	–	I	N		0		–					–					–			

1 Communication Interface

INR RS422 (TTL), Supply Voltage 8 − 30 V

INS RS422 (TTL), Supply Voltage 4.75 − 5.5 V

INH Push-Pull (HTL), Supply Voltage 4.75 − 30 V

2 Pin Assignment

0 POSITAL Standard

3 4 Pulses per Revolution

X−XXXX

Choose any pulse count up to 16384

5 Mechanical Design

Please see technical drawings on page 23 − 25

6 Protection Class

A IP54

0 IP54 to IP65

S IP54 to IP67 (Only Clamping Flange)

D IP54 to IP69K

G IP54 to IP69K (Stainless Steel)

7 Connection Type

CAW Cable: Axial 1 m

2AW Cable: Axial 2 m

5AW Cable: Axial 5 m

AAW Cable: Axial 10 m

CRW Cable: Radial 1 m

2RW Cable: Radial 2 m

5RW Cable: Radial 5 m

ARW Cable: Radial 10 m

PAM Connector: Axial M12 (5 pin)

PAQ Connector: Axial M12 (8 pin)

PAL Connector: Axial M23 (12 pin)

PAP Connector: Axial M23 (16 pin)

PRM Connector: Radial M12 (5 pin)

PRQ Connector: Radial M12 (8 pin)

PRL Connector: Radial M23 (12 pin)

PRP Connector: Axial M23 (16 pin)

Please see technical drawings on page 23 − 25

For More Information

Please refer to our website for the full range of our products.

www.posital.com/incremental

IXARC Absolute Magnetic Encoders

1			2					3		4		5			6	7		
	C	D	–					–				–				–		

1 Technology

M ≤ 0.36°

U ≤ 0.09° (only available with SSI Interface)

2 Communication Interface

AV001 Voltage: 0 to 5 V

AVP01 Voltage: 0 to 5 V w. Pushbuttons

AV002 Voltage: 0 to 10 V

AVP02 Voltage: 0 to 10 V w. Pushbuttons

AV003 Voltage: 0.5 to 4.5 V

AVP03 Voltage: 0.5 to 4.5 V w. Pushbuttons

AV004 Voltage: 0.5 to 9.5 V

AVP04 Voltage: 0.5 to 9.5 V w. Pushbuttons

AC005 Current: 4 to 20 mA

ACP05 Current: 4 to 20 mA w. Pushbuttons

AC006 Current: 0 to 20 mA

ACP06 Current: 0 to 20 mA w. Pushbuttons

CA00B CANopen

CL00B CANopen Lift

D200B DeviceNet

C900B J1939

S101B SSI Binary

S101G SSI Gray

S100G SSI Gray (available with technology U)

S100B SSI Binary (available with technology U)

3 Revolution

00 Singleturn

04 Multiturn: 4 bit (16 rev)

08 Multiturn: 8 bit (256 rev)

12 Multiturn: 12 bit (4096 rev)

13 Multiturn: 13 bit (8192 rev)

14 Multiturn: 14 bit (16384 rev)

16 Multiturn: 16 bit (65536 rev)

4 Resolution

10 10 bit (1024 Steps / 0.35°)

12 12 bit (4096 Steps / 0.088°)

5 Mechanical Design

Please see technical drawings on page 23 − 25

6 Protection Class

A IP54

0 IP54 to IP65

S IP54 to IP67 (Only Clamping Flange)

D IP54 to IP69K

G IP54 to IP69K (Stainless Steel)

7 Connection Type

CAW Cable: Axial 1 m

2AW Cable: Axial 2 m

5AW Cable: Axial 5 m

AAW Cable: Axial 10 m

CRW Cable: Radial 1 m

2RW Cable: Radial 2 m

5RW Cable: Radial 5 m

ARW Cable: Radial 10 m

PAM Connector: Axial M12 (5 pin)

PAQ Connector: Axial M12 (8 pin)

PRM Connector: Radial M12 (5 pin)

PRQ Connector: Radial M12 (8 pin)

Please see technical drawings on page 23 − 25

For More Information

Please refer to our website for the full range of our products.

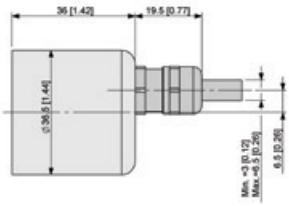
www.posital.com/absolute-magnetic

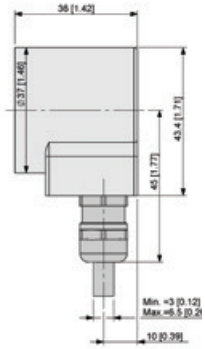
Technical Drawings

Ø 36 mm Housing

6 IP64, IP65 (Aluminum)

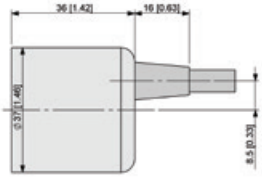
7 Connection Type: Connector and Cable (Axial and Radial)

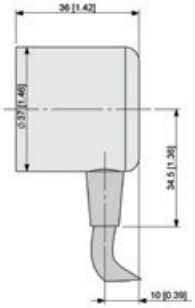




6 IP54 (Aluminum)

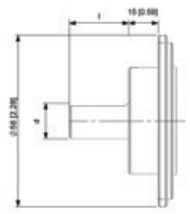
7 Connection Type: Grommet Cable (Axial and Radial)





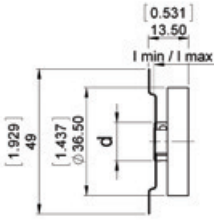
Mechanical Design for Ø 36 mm Housing

Aluminum Flanges



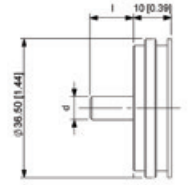
Ø 58 mm Clamp

	d	l
5 M06	6	6
5 M10	10	10
5 M12	12	12



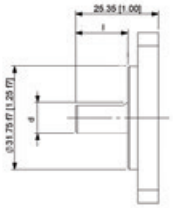
Ø 36 mm Blind Hollow

	d	l min/max
5 A06	6	11/14



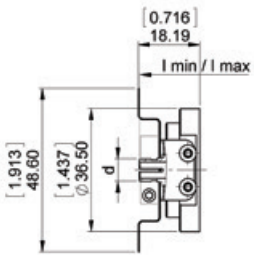
Ø 36 mm Synchro

	d	l
5 R06	6	10
5 R10	10	12



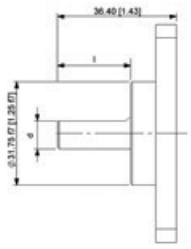
Ø 2“ Square

	d	l
6 3A7	9.52	14



Ø 36/42 mm Blind Hollow

	d	l min/max
5 V06	6	12/18
5 V08	8	12/18
5 V10	10	12/18
5 V12	12	12/18



Ø 2.5“ Square

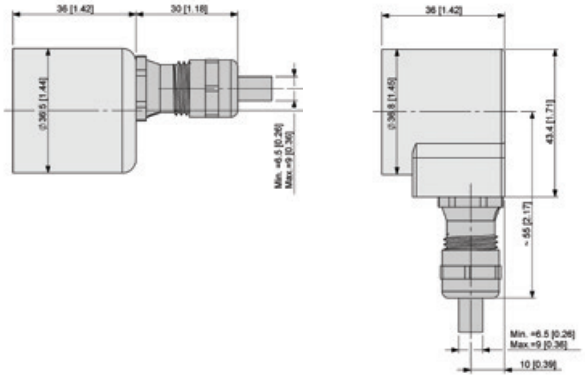
	d	l
6 4A7	9.52	20

Technical Drawings

Ø 36 mm Housing

6 **IP68, IP69K (Powder Coated Steel)**

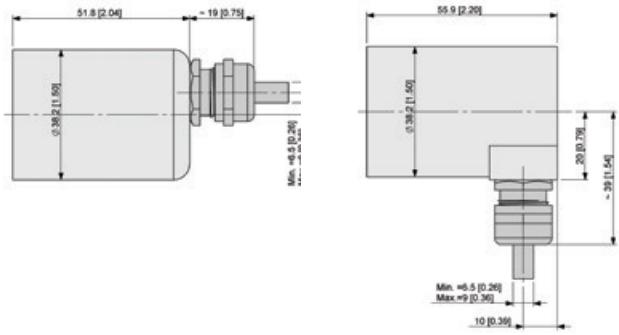
7 **Connection Type: Connector and Cable (Axial and Radial)**



Ø 42 mm Housing

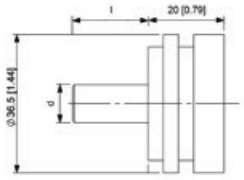
6 **IP68, IP69K (Stainless Steel)**

7 **Connection Type: Connector and Cable (Axial and Radial)**



Mechanical Design for Ø 36 mm Housing

Stainless Steel Flanges

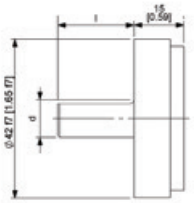


Ø 36 mm Synchro

	d	l
5 **D10**	10	20

Mechanical Design for Ø 42 mm Housing

Stainless Steel Flanges



Ø 42 mm Synchro

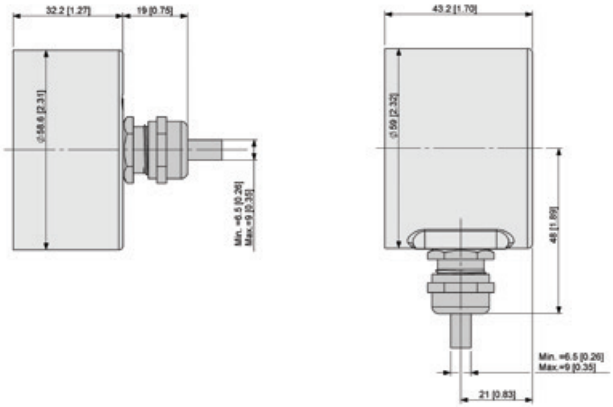
	d	l
5 **G10**	10	20

Technical Drawings

Ø 58 mm Housing

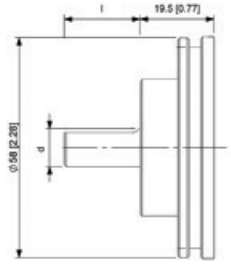
6 IP64, IP65, IP67 (Coated Steel)

7 Connection Type: Connector and Cable (Axial and Radial)



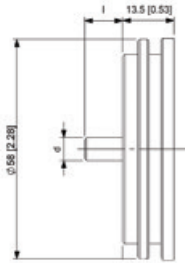
Mechanical Design for Ø 58 mm Housing

Aluminum Flanges



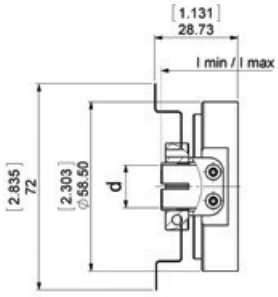
58 mm Clamp

	d	l
5 L06	6	10
5 L10	10	20
5 L12	12	20



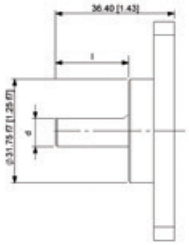
Ø 58 mm Synchro

	d	l min/max
5 Y06	6	10
5 Y10	10	20
5 Y12	12	20



Ø 58 mm Blind Hollow

	d	l
5 H06	6	15/30
5 H08	8	15/30
5 H10	10	15/30
5 H12	12	15/30
5 H14	14	15/30
5 H15	15	15/30



Ø 2.5“ Square

	d	l
5 4A7	9.52	20

IXARC Optical Encoders

1		2						3		4			5			6		7		
O	C		–						–				–					–			

1 Certificate

D CE/UL
E Zone 1 & 21 (Oil+Gas)
M Zone 1 & 21 (Mining)
S SIL
F Zone 2 & 22

2 Communication Interface

PPA1B Parallel Binary
PPA1G Parallel Gray
P1A1B Parallel Preset Binary
P1A1G Parallel Preset Gray
S101B SSI Binary
S101G SSI Gray
S401B SSI Binary w. Pushbuttons
S401G SSI Gray w. Pushbuttons
S5xxB SSI+Incremental Binary + A/B/Z (RS-422)
S6xxB SSI+Incremental Binary + A/B/Z (Push-Pull)
S5xxG SSI+Incremental Gray + A/B/Z (RS-422)
S6xxG SSI+Incremental Gray + A/B/Z (Push-Pull)
DPC1B PROFIBUS DP
CAA1B CANopen
CL00B CANopen Lift
D2B1B DeviceNet
IBA1B Interbus
EIB1B PROFINET IO
EEA1B EtherNet/IP
E2A2B POWERLINK
EC00B EtherCAT
EM00B Modbus/TCP

For More Information

Please refer to our website for the full range of our products.

www.posital.com/absolute-optical

3 Revolution

00 Singleturn
08 Multiturn: 8 bit (256 rev)
12 Multiturn: 12 bit (4096 rev)
14 Multiturn: 14 bit (16384 rev)

4 Resolution

12 12 bit (4096 Steps / 0.088°)
13 13 bit (8192 Steps / 0.044°)
16 16 bit (65536 Steps / 0.005°)

5 Mechanical Design

Please see technical drawings on page 27 – 28

6 Protection Class

0 IP54 to IP65
S IP54 to IP67 (with Shaft Sealing)
V IP54 to IP67 (Stainless Steel)
H IP54 to IP67 (Heavy Duty Design)

7 Connection Type

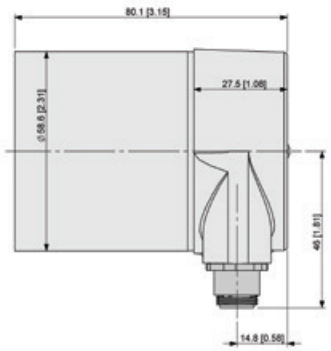
CAW Cable: Axial 1 m
2AW Cable: Axial 2 m
5AW Cable: Axial 5 m
AAW Cable: Axial 10 m
CRW Cable: Radial 1 m
2RW Cable: Radial 2 m
5RW Cable: Radial 5 m
ARW Cable: Radial 10 m
PAM Connector: Axial M12, 5 pin (CANopen, Analog)
PAQ Connector: Axial M12, 8 pin (SSI)
PAL Connector: Axial M23, 12 pin (SSI)
PAP Connector: Axial M23, 16 pin (Parallel, SSI)
PAT Connector: Axial M27, 26 pin (Parallel)
PRM Connector: Radial M12, 5 pin (CANopen, Analog)
PRQ Connector: Radial M12, 8 pin (SSI)
PRL Connector: Radial M23, 12 pin (SSI)
PRP Connector: Radial M23, 16 pin (Parallel, SSI)
PRT Connector: Radial M27, 26 pin (Parallel)
PRM Connector: Radial 2 x M12 (Modbus)
PRM Connector: Radial 3 x M12 (Ethernet/IP, PROFINET, POWERLINK, EtherCat)
PRI Connector: Radial 2 x M23, 9 pin (Interbus)
H3P Connection Cap: 3 Cable Glands
H2M Connection Cap: 2 x M20 Cable Glands (PROFIBUS, CANopen, DeviceNet)
H72 Connection Cap: 3 x M12 Connectors (PROFIBUS, CANopen, DeviceNet)
H2B Connection Cap: 2 x M12 Connectors (CANopen, DeviceNet)
H1B Connection Cap: 1 x M12 Connector (CANopen, DeviceNet)
H1C Connection Cap: 1 x M23 Connector (DeviceNet)
HCC Connection Cap: Without
HFZ Connection Cap: 2 x Radial Blind Plug (OCE / OCM)
HFE Connection Cap: 3 x Radial Blind Plug (OCE / OCM)
HFG Connection Cap: Axial Blind Plug (OCE / OCM)
H1E Connection Cap: 1 x Cable Gland (OCE)
H2E Connection Cap: 2 x Cable Glands (OCE)
H3E Connection Cap: 3 x Cable Glands (OCE)

Technical Drawings

Ø 58 mm Housing

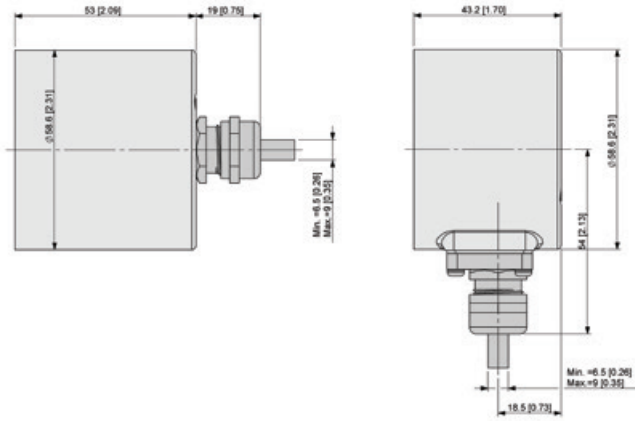
6 IP64, IP65, IP67 (Coated Steel)

7 Connection Type: Connection Cap (Fieldbus and Ethernet)



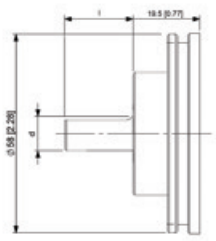
6 IP64, IP65, IP67 (Coated Steel)

7 Connection Type: Connector and Cable (Axial and Radial)



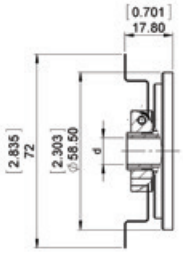
Mechanical Design for Ø 58 mm Housing

Aluminum Flanges



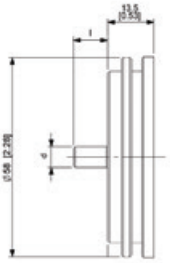
58 mm Clamp

	d	l
5 C06	6	10
5 C10	10	20
5 C12	12	20
5 CA7	9.5	20



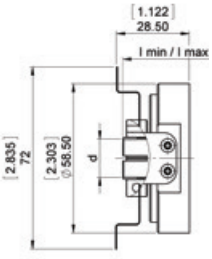
Ø 58 mm Through Hollow

	d	l
5 T08	8	17.8
5 T10	10	17.8
5 T12	12	17.8



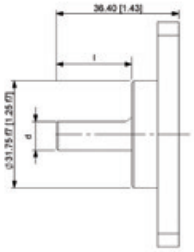
Ø 58 mm Synchro

	d	l
5 S06	6	10
5 S10	10	20
5 S12	12	20



Ø 58 mm Blind Hollow

	d	l min/max
5 B06	6	15/30
5 B08	8	15/30
5 B10	10	15/30
5 B11	11	15/30
5 B12	12	15/30
5 B14	14	15/30
5 B15	15	15/30



Ø 2.5“ Square

	d	l
5 9A7	9.52	20

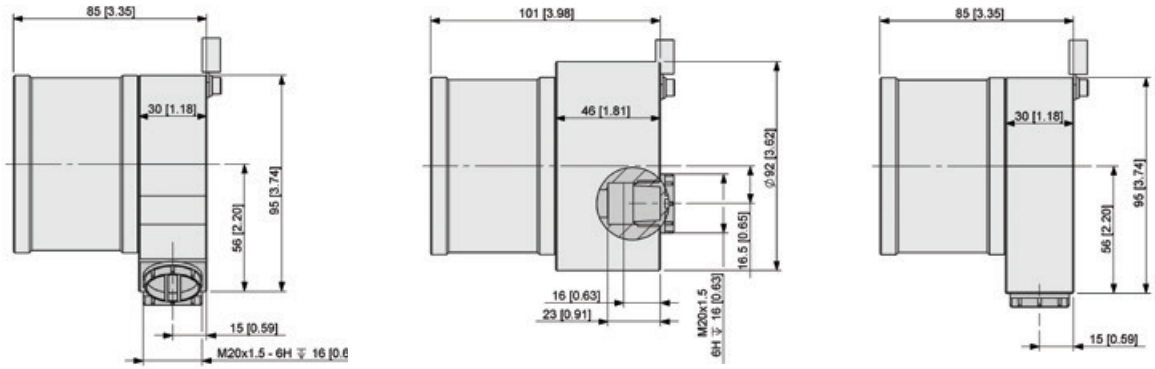
Technical Drawings

Ø 78 mm Housing

6 IP64, IP65, IP67 (Explosion Proof)

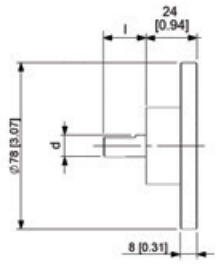
7 Connection Type: Connection Cap

(3 Radial Exits, 2 Axial Exits, 2 Radial Exits)



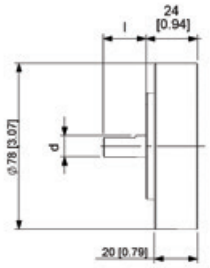
Mechanical Design for Ø 78 mm Housing

Aluminum / Steel Flanges



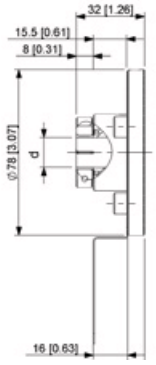
Ø 78 mm Clamp

	d	l
7 F10	10	20
7 F12	12	20



Ø 78 mm Synchro

	d	l
7 W10	10	20
7 W12	12	20



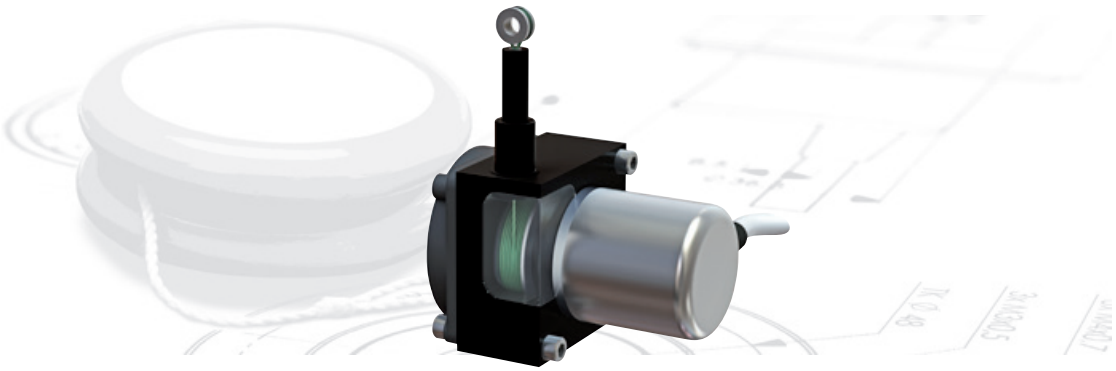
Ø 78 mm Blind Hollow

	d	l
7 E14	14	23.5

LINARIX LINEAR SENSORS

Robust Draw Wire Displacement Measurement

Repeatable Length Measurement

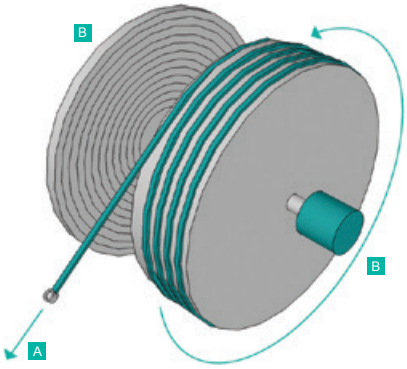


POSITAL's LINARIX draw wire sensors measure linear motion by displacing a retractable stainless steel wire A wound around a cable drum B that actuates the rotary encoder C coupled to it. The encoder then provides a proportional output. Measurements are highly accurate, reliable and the systems have very long lifetimes.

The LINARIX line offers a wide range of measurement lengths ranging from 1 m to 10 m (3 ft to 33 ft) and also provides position output in almost every available industrial interfaces both analog and digital.

Compared to conventional linear pots and linear measurement systems using multiple gears and encoders, the LINARIX line of sensors are more durable and can be used to replace them directly, avoiding the common problems of slippage and wear. Draw wire sensors from POSITAL provide extremely precise measurements because of the inherent accuracy of the encoders, while the rugged construction ensures reliable performance, even under extreme conditions.

The POSITAL products listed below are classified according to measurement range and level of robustness. This gives the customer the opportunity to select the right configuration for their application.



Linear Sensors up to 3 m [10 ft]	Measuring Range in m [in]	Accuracy in [±FSO%]	Wire Diameter in mm [in]	Wire Material	Max. Extension Force in N	Min. Retraction Force in N	Linear Resolution in µm[1]	Drum Circumference in mm [in]	Optical Encoder	Magnetic Encoder
 **Machined Metal** **Rectangular** **Enclosure: A**	1.25 [49]	0.04	Ø0.48 [0.018]	Nylon Coated Stainless Steel	2.34	1.26	24	Ø100 [3.9]		■
 **Plastic** **Compact Design** **Enclosure: N**	1.25 [49]	0.05	Ø0.36 [0.014]	Coated Polyamide Stainless Steel	1.50	1.00	31	Ø125 [4.9]		■
 **Machined Metal** **Cylindrical** **Enclosure: P**	1.74 [69]	0.02	Ø0.45 [0.017]	Coated Polyamide Stainless Steel	5.00	3.50	36	Ø149 [5.9]	■	■
 **Machined Metal** **Rectangular** **Enclosure: C**	2.00 [79]	0.02	Ø0.45 [0.017]	Plastic Coated Stainless Steel	2.00	1.20	24	Ø100 [3.9]		■
 **Plastic** **Compact Design** **Enclosure: M**	2.10 [83]	0.05	Ø0.45 [0.017]	Coated Polyamide Stainless Steel	5.00	3.50	52	Ø215 [8.5]		■
 **Machined Metal** **Rectangular** **Enclosure: B**	3.00 [118]	0.04	Ø0.45 [0.017]	Nylon Coated Stainless Steel	3.90	2.10	49	Ø200 [7.9]		■
 **Machined Metal** **Rectangular** **Enclosure: D**	3.00 [118]	0.01	Ø0.87 [0.034]	Plastic Coated Stainless Steel	3.00	2.50	49	Ø200 [7.9]	■	■

1) Linear Resolution based on an encoder with 12 bit resolution, Operating Temperature: -20 to +80 [-4 to 176]

LINARIX linear sensors are available with the following interfaces:

ANALOG · CANopen · EtherCAT · Modbus · ETHERNET POWERLINK · PROFINET · EtherNet/IP · SSI · DeviceNet · SAE J1939 · PROFIBUS

For More Information

Please refer to our website for the full range of our products.

www.posital.com/linearsensors

Related Industries




PRODUCT OVERVIEW – LINARIX LINEAR SENSORS

Linear Sensors up to 10 m [33 ft]	Measuring Range in m [in]	Accuracy in [±FSO%]	Wire Diameter in mm [in]	Wire Material	Max. Extension Force in N	Min. Retraction Force in N	Linear Resolution in µm[1]	Drum Circumference in mm [in]	Optical Encoder	Magnetic Encoder
 **Extruded Metal** **Compact Design** **Enclosure: F**	3.00 [118]	0.02	Ø0.80 [0.031]	Coated Polyamide Stainless Steel	9.0	5.5	63	Ø260 [10.2]	■	■
 **Extruded Metal** **Practical Mounting** **Enclosure: G**	5.00 [197]	0.02	Ø1.00 [0.039]	Nylon Coated Stainless Steel	16.0	4.0	77	Ø315 [12.4]	■	■
 **Die Cast Metal** **Rugged Housing** **Enclosure: K**	5.08 [200]	0.02	Ø0.86 [0.033]	Nylon Coated Stainless Steel	6.5	3.5	78	Ø320 [12.6]	■	■
 **Machined Metal** **Rectangular** **Enclosure: E**	6.00 [236]	0.01	Ø0.54 [0.021]	Stainless Steel	8.00	3.0	40	Ø200 [7.9]	■	■
 **Extruded Metal** **Long Lifetime** **Enclosure: H**	10.00 [394]	0.01	Ø1.00 [0.039]	Nylon Coated Stainless Steel	21.0	8.0	77	Ø315 [12.4]	■	■
 **Die Cast Metal** **Rugged Housing** **Enclosure: L**	10.16 [400]	0.02	Ø0.86 [0.033]	Nylon Coated Stainless Steel	6.5	3.5	78	Ø320 [12.6]	■	■

1) Linear Resolution based on an encoder with 12 bit resolution, Operating Temperature: -20 to +80 [-4 to 176]

LINARIX linear sensors are available with the following interfaces:

ANALOG · CANopen · EtherCAT · Modbus · ETHERNET POWERLINK · PROFINET · EtherNet/IP · SSI · DeviceNet · SAE J1939 · PROFIBUS

For More Information

Please refer to our website for the full range of our products.

www.posital.com/linearsensors

Related Industries




LINARIX Linear Sensors

1		2					3		4		5	6	7	8	9		
L		0	–					–			–				–			

1 Technology

D Optical

M Magnetic ≤ 0.36°

U Magnetic ≤ 0.09° (only available with SSI Interface)

2 Communication Interface

AV001 Voltage: 0 to 5 V

AVP01 Voltage: 0 to 5 V w. Pushbuttons

AV002 Voltage: 0 to 10 V

AVP02 Voltage: 0 to 10 V w. Pushbuttons

AC005 Current: 4 to 20 mA

ACP05 Current: 4 to 20 mA w. Pushbuttons

P100B Parallel Binary with Preset

P100G Parallel Gray with Preset

S101B SSI Binary

S101G SSI Gray

S5xxB SSI Binary + Incremental A/B/Z (RS-422)

S6xxB SSI Binary + Incremental A/B/Z (Push-Pull)

S5xxG SSI Gray + Incremental A/B/Z (RS-422)

S6xxG SSI Gray + Incremental A/B/Z (Push-Pull)

INxx Incremental

DPC1B PROFIBUS DP

CAA1B CANopen

CL00B CANopen Lift

D2B1B DeviceNet

IBA1B Interbus

EIB1B PROFINET IO

EEA0B EtherNet/IP

E2A1B POWERLINK

EM00B Modbus/TCP

3 Encoder Revolution

04 Multiturn: 4 bit (16 rev)

12 Multiturn: 12 bit (4096 rev)

For More Information

Please refer to our website for the full range of our products.

www.posital.com/linearsensors

4 Encoder Resolution

12 12 bit

13 13 bit

14 14 bit

16 16 bit

5 Measurement Range

1 1 m

2 2 m

3 3 m

5 5 m

6 6 m

A 10 m

6 Draw Wire Enclosure and

7 Encoder Connection Orientation

Please see technical drawings on page 34 – 36

8 Protection Class Encoder

A IP54

0 IP54 to IP65

9 Connection Type

000 Draw Wire Only

CRW Cable: Radial 1 m

ARW Cable: Radial 10 m

CAW Cable: Axial 1 m

AAW Cable: Axial 10 m

PRL Connector: Radial, M23 12 pin,

PRP Connector: Radial, M23 16 pin

PRT Connector: Radial, M26 26 pin

PRM Connector: Radial, M12 5 pin

PRN Connector: Radial, 2 x M12 5 pin

PRQ Connector: Radial, M12 8 pin

PAL Connector: Axial, M23 12 pin

PAP Connector: Axial, M23 16 pin

PAM Connector: Axial, M12 5 pin

PAQ Connector: Axial, M12 8 pin

H3P Cable Glands: M12 x 3

H1B Connector: M12 x 1

H2B Connector: M12 x 2

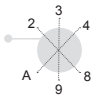
H1C Connector: M23 x 1

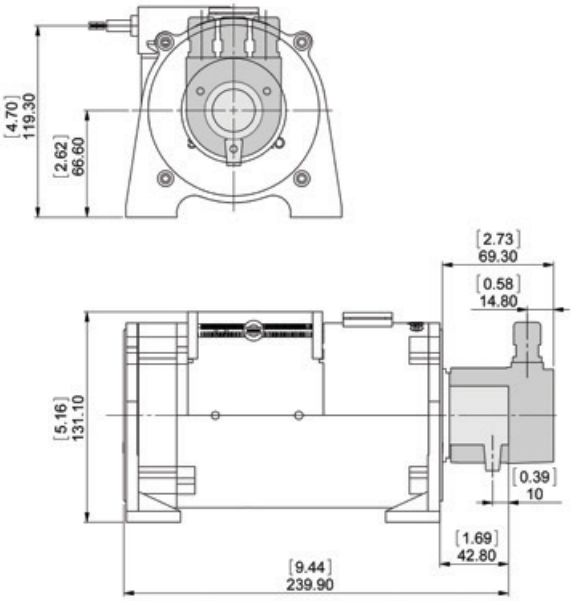
Technical Drawings

L _ _ – _ _ _ _ _ – _ _ _ _ – _ 6 7 _ – _ _ _

6 Draw Wire Enclosure L and K

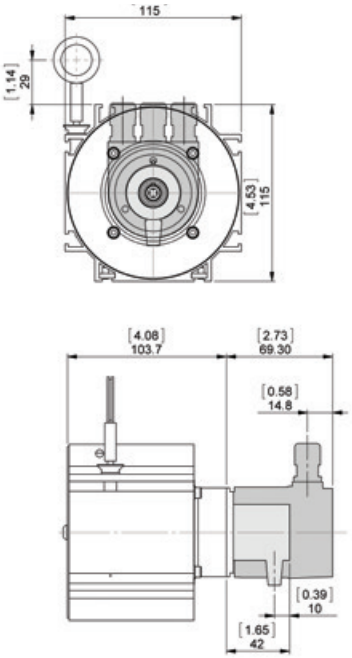
7 Encoder Connection Orientation





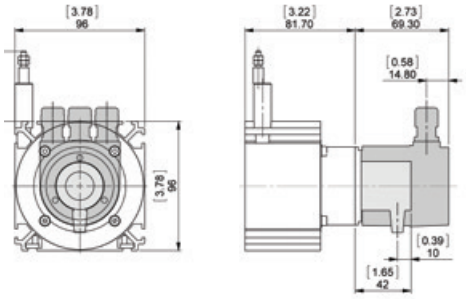
6 Draw Wire Enclosure G

7 Encoder Connection Orientation



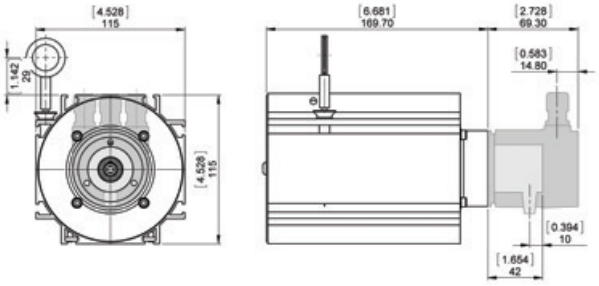
6 Draw Wire Enclosure F

7 Encoder Connection Orientation



6 Draw Wire Enclosure H

7 Encoder Connection Orientation

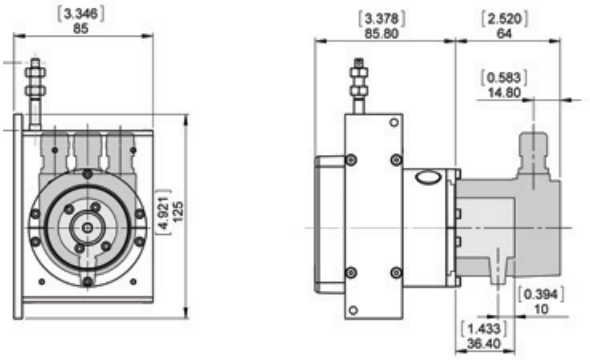


Technical Drawings

L _ _ – _ _ _ _ _ – _ _ _ _ – _ 6 7 _ – _ _ _

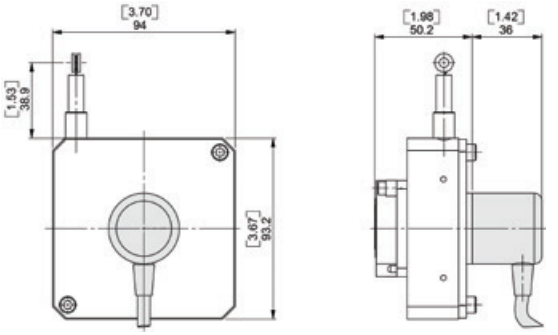
6 Draw Wire Enclosure E

7 Encoder Connection Orientation



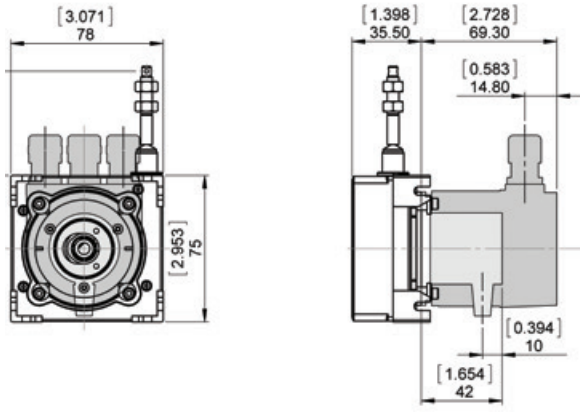
6 Draw Wire Enclosure B

7 Encoder Connection Orientation



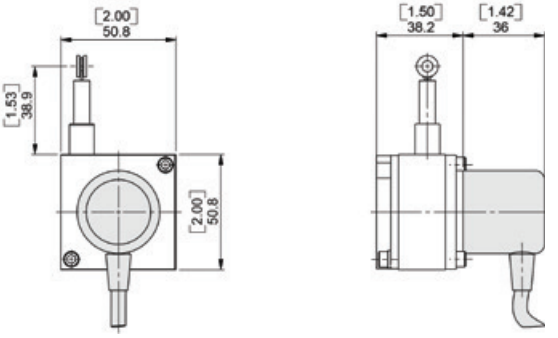
6 Draw Wire Enclosure D

7 Encoder Connection Orientation



6 Draw Wire Enclosure A

7 Encoder Connection Orientation

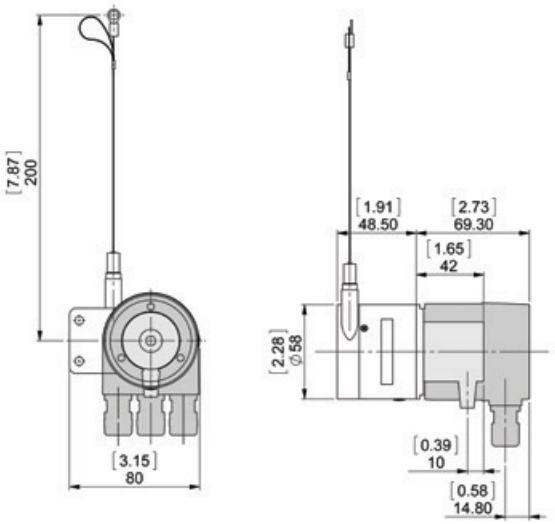


Technical Drawings

L _ _ – _ _ _ _ _ – _ _ _ _ – _ 6 7 _ – _ _ _

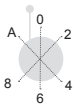
6 Draw Wire Enclosure C

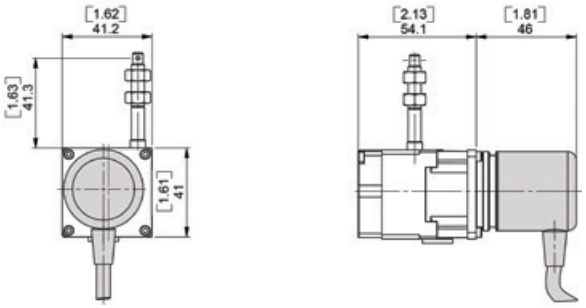
7 Encoder Connection Orientation



6 Draw Wire Enclosure P

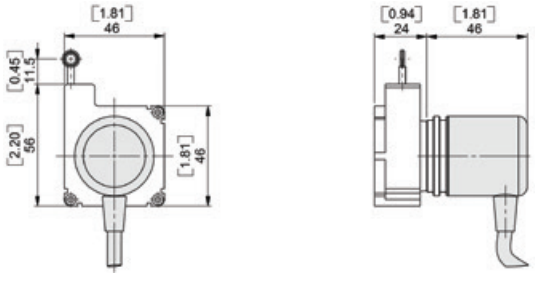
7 Encoder Connection Orientation





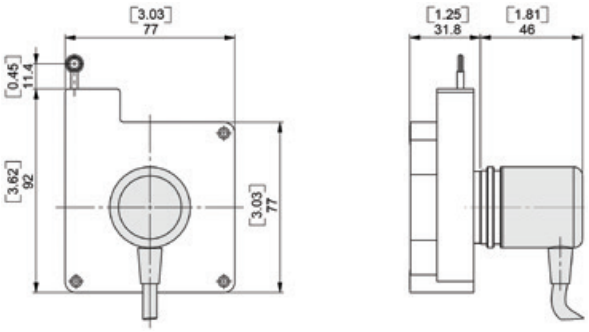
6 Draw Wire Enclosure N

7 Encoder Connection Orientation



6 Draw Wire Enclosure M

7 Encoder Connection Orientation



TILTIX INCLINOMETER

Precise Tilt Measurement

Highly Dynamic MEMS and High Precision Fluid Cell Technology

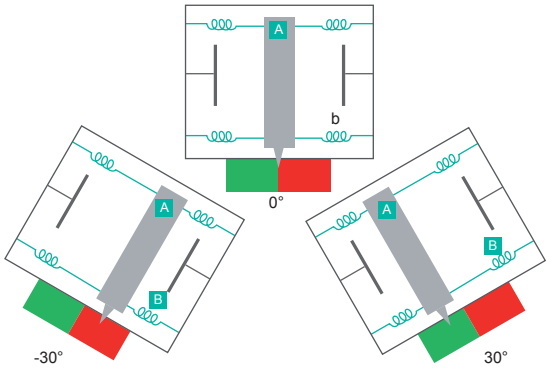
POSITAL's TILTIX Inclinometers are based on highly dynamic MEMS (Micro-Electro-Mechanical Systems) technology or on high precision fluid cell technology.

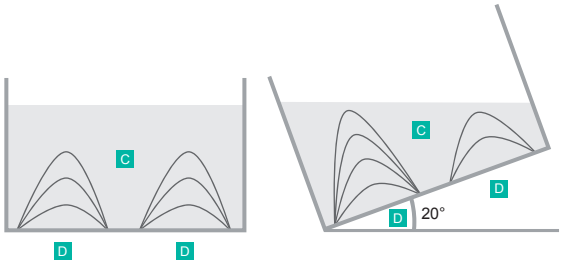
MEMS

In MEMS devices, a 'micro mass' A is suspended in a flexible support structure B. Any movement will induce a displacement of the mass, resulting in a change of capacitance between the mass and the supporting structure. Changes of inclination (tilt) are calculated from the changes in measured capacitance. These inclinometers have a measurement range of ±80° in two axes or 360° in one axis. The devices can withstand shock and vibration loadings of up to 100 g, as per EN 60068-2-27.

Fluid Cell

In fluid filled inclinometers, the sensor cell is partially filled with an electrolytic liquid C while the walls are covered with a pair of electrodes D. As the sensor tilts, the level of fluid covering the electrodes changes. This results in an increase or decrease in the conductivity between the electrodes. The degree of tilt can be calculated from this measurement. Fluid cell inclinometers are capable of measuring inclinations of up to ±30° with a very high levels of precision. The natural damping of the liquids makes these inclinometers stable as well as precise.





PRODUCT OVERVIEW – TILTIX INCLINOMETERS

MEMS Technology

	CE	Max. Protecion Class	Comunication Interface	1 Axis 0 to 360°	2 Axis ±80°	Resolution	Accuracy	Die Cast Aluminum	Fibre-Reinforced Plastic	Supply Voltage in V	Cable	Connector	Shock / Vibration[1] in g
	**MEMS** **Programmable Analog** **Rugged Housing**	IP69K IP68	Analog Voltage Current	■	■	0.01°	0.1°	■		10–30	■	■	100 20
	**MEMS** **Serial** **Rugged Housing**	IP69K IP68	SSI RS232	■		0.04°	0.1°	■		5–30	■	■	100 20
	**MEMS** **Bus Interface** **Rugged Housing**	IP69K IP68	CANopen DeviceNet SAE J1939	■	■	0.01°	0.1°	■		10–30	■	■	100 20
	**MEMS** **Programmable Analog** **Compact Design**	IP69K IP68	Analog Voltage Current	■	■	0.01°	0.1°		■	10–30	■	■	100 20
	**MEMS** **Serial** **Compact Design**	IP67	SSI RS232	■		0.04°	0.1°		■	5–30	■	■	100 20
	**MEMS** **Bus Interface** **Compact Design**	IP69K IP68	CANopen DeviceNet ModbusRTU	■	■	0.01°	0.1°		■	10–30	■	■	100 20
	**MEMS** **Cost Efficient** **Compact Design**	IP69K IP68	CANopen DeviceNet SAE J1939	■	■	0.01°	0.5°		■	10–30	■	■	100 20

Operating Temperature: -20 to +80 °C [-4 to 176 °F]

TILTIX inclinometers based on MEMS technology are available with the following interfaces:

ANALOG CANopen SSI DeviceNet RS232 Modbus SAE J1939

For More Information

Please refer to our website for the full range of our products.

www.posital.com/mems

Related Industries




Fluid Cell Technology

	CE	Max. Protecion Class	Comunication Interface	2 Axis ±5 to 40°	Resolution	Accuracy	Aluminum	Fibre-Reinforced Plastic	Supply Voltage in V	Cable	Connector	Shock / Vibration[1] in g
	**Fluid Cell** **Analog Voltage** **IP67**	IP67	Analog Voltage	■	0.001°	0.01°	■		10–30	■	■	30 5
	**Fluid Cell** **Analog Current** **IP67**	IP67	Analog Current	■	0.001°	0.01°	■		10–30	■	■	30 5
	**Fluid Cell** **Analog PWM** **IP67**	IP67	Analog PWM	■	0.001°	0.01°	■		10–30	■	■	30 5
	**Fluid Cell** **Analog Switch** **IP67**	IP67	Analog Switch	■	0.001°	0.01°	■		10–30	■	■	30 5
	**Fluid Cell** **RS232** **IP67**	IP67	RS232	■	0.001°	0.01°	■		10–30	■	■	30 5
	**Fluid Cell** **Bus Interfaces** **IP67**	IP67	CANopen	■	0.001°	0.01°	■		10–30	■	■	30 5

Operating Temperature: -20 to +80 °C [-4 to 176 °F]

TILTIX inclinometers based on Fluid Cell technology are available with the following interfaces

ANALOG CANopen RS232 PWM SWITCH

For More Information

Please refer to our website for the full range of our products.

www.posital.com/fluidcell

Related Industries




TILTIX Inclinometer

1				2				3		4					5			6			7		
A			–				–		–					–				–					

1 Technology

ACS MEMS, Accuracy 0.1°

ADS MEMS, Accuracy 0.5°

AGS Fluid Cell

2 Measurement Range

010 ±10° (ACS, ADS)

020 ±20° (ACS, ADS)

040 ±40° (ACS, ADS)

060 ±60° (ACS, ADS)

080 ±80° (ACS, ADS)

090 90° (ACS, ADS)

120 120° (ACS, ADS)

180 180° (ACS, ADS)

270 270° (ACS, ADS)

360 360° (ACS, ADS)

005 ±5° (AGS)

015 ±15° (AGS)

030 ±30° (AGS)

3 Number of Axis

1 Single Axis (ACS, ADS)

2 Dual Axis

4 Communication Interface

CA01 CANopen (ACS)

M100 Modbus (ACS)

D101 DeviceNet (ACS)

S101 SSI (ACS) Binary

S302 SSI (ACS) Gray

C901 J1939 (ACS)

SV00 Voltage 0.5 to 4.5 V + RS232 (ACS, ADS)

SV10 Voltage 0 to 5 V + RS232 (ACS, ADS)

SV20 Voltage 0 to 10 V + RS232 (ACS, ADS)

SV40 Voltage 0.5 to 9.5 V + RS232 (ACS, ADS)

SC00 Current 4 to 20 mA + RS232 (ACS, ADS)

SC00 Current + RS232 (ACS)

SC1 Current + RS232 (AGS)

SV1 Voltage + RS232 (AGS)

CA1 CANopen (AGS)

S01 RS232 (AGS)

SP1 PWM (AGS)

SS1 Switch (AGS)

5 Mounting

H Horizontal (Dual Axis)

V Vertical (Single Axis)

6 Housing Material

E2 Fibre-Reinforced Plastic (ACS, ADS)

H2 Aluminum (ACS, ADS)

0H Aluminum (AGS)

7 Connection Type

PM Connector: M12 (ACS, ADS)

CW Cable Exit: 1m (ACS, ADS)

2W Cable Exit: 2 m (ACS, ADS)

5W Cable Exit: 5 m (ACS, ADS)

AW Cable Exit: 10 m (ACS, ADS)

PL Connector: 2 x M12 Male (ACS)

PN Connector: 1 x M12 Male & 1 x M12 Female (ACS)

P8M Connector (AGS)

CRW Cable Exit (AGS)

For More Information

Please refer to our website for the full range of our products.

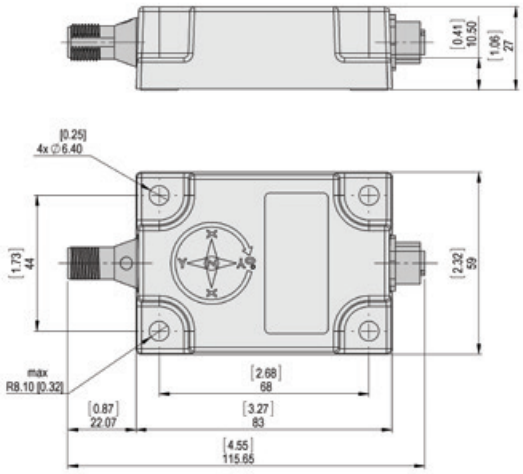
www.posital.com/inclinometer

Technical Drawings

1 A_S – _ _ _ – _ – _ _ _ _ – _ _ 6 – 7

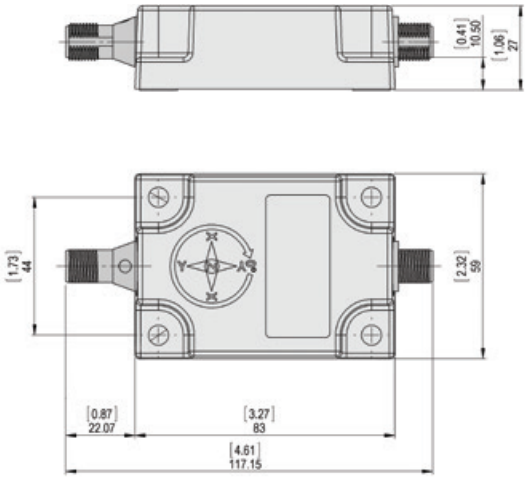
1 MEMS

1 Technology MEMS
6 Housing Material: Aluminum H2
7 Connection Type: Connector PN



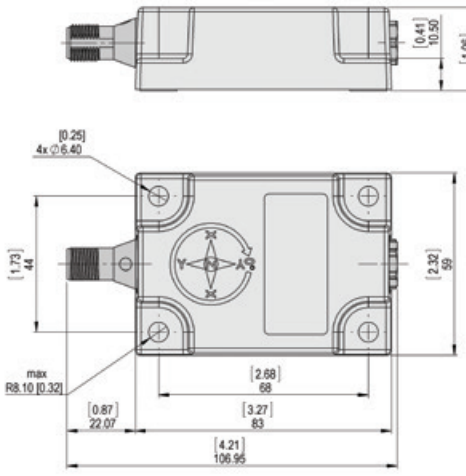
1 MEMS

1 Technology MEMS
6 Housing Material: Aluminum H2
7 Connection Type: Connector PL



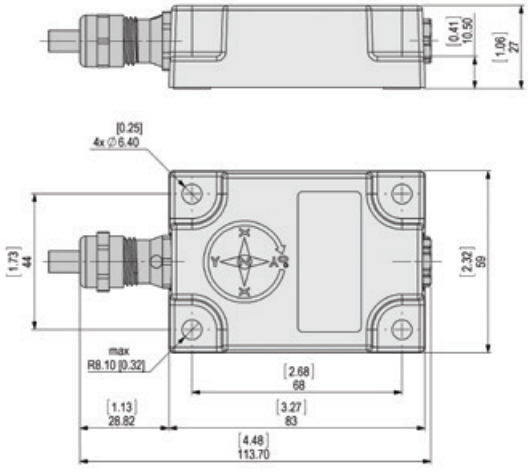
1 MEMS

1 Technology MEMS
6 Housing Material: Aluminum H2
7 Connection Type: Connector PM



1 MEMS

1 Technology MEMS
6 Housing Material: Aluminum H2
7 Connection Type: Cable



Technical Drawings

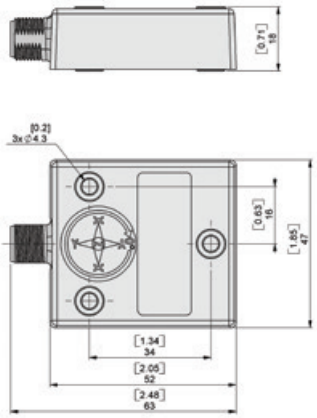
1 – _ _ _ – _ – _ _ _ _ – _ _ 6 – 7

1 MEMS

1 Technology MEMS

6 Housing Material: Fibre-Reinforced Plastic E2

7 Connection Type: Connector PM

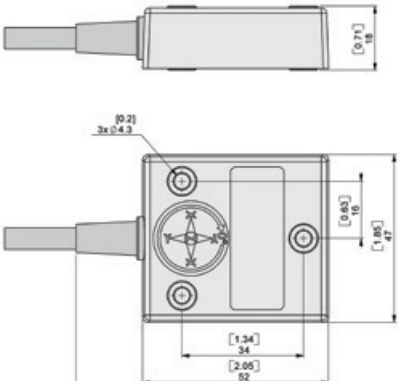


1 MEMS

1 Technology MEMS

6 Housing Material: Fibre-Reinforced Plastic E2

7 Connection Type: Cable

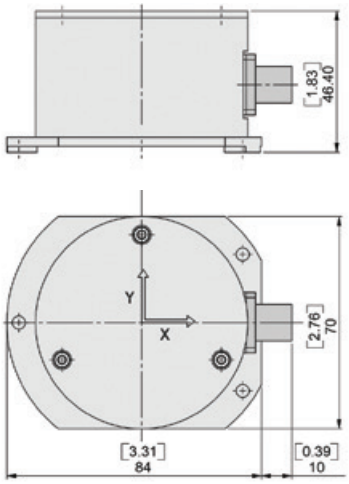


1 Fluid Cell

1 Technology: Fluid Cell

6 Housing Material: Aluminum 0H

7 Connection Type: Connector P8M

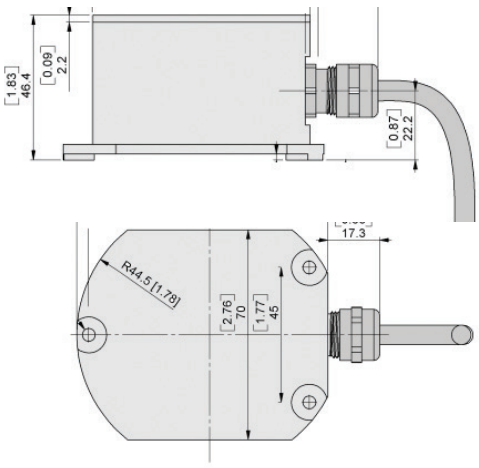


1 Fluid Cell

1 Technology: Fluid Cell

6 Housing Material: Aluminum 0H

7 Connection Type: Cable CRW



Mounting Fixtures

		Flange / Shaft Ø Dimensions in mm	Material	Compatible with Mechanical Design
	**Reducing Adapter** **Used in Hub Shaft** **Used in Throw Hollow Shaft**	15 to (6–14) 12 to (8–11)	Stainless Steel Brass	T, B, V Flanges
	**Coupling** **Bellow Type** **Flexible Design**	6 to 6, 6 to 8 6 to 10, 8 to 10, 10 to 10	Flange: Aluminum Membrane: Polyamide	All IXARC Solid Shafts
	**Coupling** **Disc Type** **High Speed Application**	6 to 6, 6 to 10 10 to 10, 10 to 12	Flange: Aluminum Membrane: Polyamide	All IXARC Solid Shafts
	**Coupling** **Jaw Type** **3 Part Coupling**	6 to 6, 6 to 8 6 to 10, 8 to 10 10 to 10, 10 to 12	Hub: Aluminum Spider: PUR	All IXARC Solid Shafts
	**Flange Adapter** **Used in Clamp Flange** **Used in Synchro Flange**	58 to (63.5, 78, 80, 90, 100)	Aluminum	All IXARC Clamp and Synchro Flanges 58 mm
	**Mounting Bracket** **MGY 58, MOWI 123** **Used in Solid Shaft**	58	Glass-fiber reinforced	All IXARC Clamp and Synchro Flanges 58 mm
	**Torque Support** **Includes Teathers** **Includes Clamping Ring**	36 58	Aluminum Stainless Steel	B150, B120, T120, V060, V120, A060
	**Clamp Discs** **Mount Encoder onto Surface** **Clamp Flange**	36 58	Aluminum	All IXARC Clamp Flanges

For More Information

Please refer to our website for the full range of our products.

www.posital.com/accessories

Connectors and Cables

		Length in m	Pins / Number of Cables	Cable Material	Connector Material	Protection Class	Compatible with Connection Type
	**Connector** **M12** **Male and Female**		4 pin D 5 pin A 8 pin A		Metal	IP67	IXARC: PRM, PAM, PRQ, PAQ TILTIX: PM
	**Connector** **M23** **Female**		9 12 16		Metal	IP67	IXARC: PRL, PAL, PRP, PAP, PRI
	**Connector** **M27** **Female**		26		Metal	IP67	IXARC: PAT, PRT
	**Cable** **M12 Connector** **Open Ends, RJ45**	2 5 10	4 pin D 5 pin A 8 pin A	PUR PVC	PBT Metal	IP69K	IXARC: PRM, PAM, PRQ, PAQ TILTIX: PM
	**Cable** **M23, M27 Connector** **Open Ends**	2 5 10	9 12 16, 26	PUR PVC	Metal	IP67	IXARC: PRL, PAL, PRP, PAP, PAT, PRT, PRI

Configuration and Interface Modules

SSI2USB Module

- Easy interface of SSI device to USB port of PC
- Graphical User Interface to view and store SSI Data
- Power Supply to SSI device (max 12 Volts) using USB Port
- Three independent tri-state outputs
- Could be used as a Virtual Com port device

Voltage Panel Display

- Measures voltage from 0 to 40 V DC
- 2.4” color TFT screen
- Use PanelPilot software, to setup and customize the display
- Programmable via the USB interface
- Simple panel mounting solution
- Wide operating voltage of 4 V to 30 V DC

GLOSSARY

Technical Terms

Analog	A common standard with either a voltage or a current output.
ATEX / IECEx	ATEX and IECEx norms define essential requirements for equipment and protective systems intended for use in potentially explosive atmospheres.
CANopen	CANopen is a Fieldbus protocol using CAN networks.
CANopen Lift	CANopen Lift is a Fieldbus protocol for elevator applications.
CE	With the CE marking POSITAL declares that the product conforms with essential requirements of the applicable EC directives.
DeviceNet	DeviceNet is a Fieldbus system based on CAN networks and CIP protocol, managed by ODVA, widely used in factory automation and available on many PLCs.
EtherNet/IP	EtherNet/IP is an industrial communication protocol developed by Rockwell Automation and managed by ODVA. It is based on CIP and TCP/IP.
ETHERNET POWERLINK	ETHERNET POWERLINK is a real-time communication system based on EtherNet networks and managed by EPSG.
Interbus	Interbus is a Fieldbus technology developed by Phoenix Contact.
IP54	Protected against dust and splash water from any direction.
IP65	Dust tight and protected against water jets from any direction.
IP67	Dust tight and protected against temporary immersion up to 1 m.
IP68	Dust tight and protected against long periods of immersion under pressure.
IP69K	Dust tight and protected against high temperature (steam) and high pressure water jets from any direction.
Modbus	Modbus is a serial protocol managed by the Modbus Organization.
Parallel	All bits of the position output are transferred simultaneously using one line for each bit.
PROFIBUS	PROFIBUS is available on many PLCs and one of the most common Fieldbus technologies in factory automation and other areas. It is based on RS485. There are different versions of PROFIBUS and different device profiles.
PROFINET	PROFINET is an Industrial Ethernet standard from „PROFIBUS&PROFINET International“ designed for automation.
SAE J1939	SAE J1939 is a Fieldbus standard used for communication by the car and heavy-duty truck industry.
SIL	SIL (Safety Integrity Level) is defined as a relative level of risk-reduction provided by a safety function. In accordance with the requirements of IEC 61508/EN 62061, PL e and Cat.4 according to EN ISO 13849-1.
SSI	SSI is a widely used serial interface with point-to-point connection between PLC/Master and encoder. It is based on the RS422 standard.
UL	UL (Underwriters Laboratories) is a US based consulting and certification company providing safety standards for electrical devices. UL marking confirms the compliance with applicable UL safety standards.

NOTES

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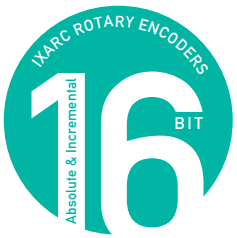

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