

# ENCODERS BUYING GUIDE



## WHAT DO THEY DO?

Encoders convert mechanical motion into electronic signals for precise measurement and control in automation systems. Two common types are rotary and linear-style encoders, each suited for specific motion feedback applications.

### Encoder Basics

- **Signal Conversion:** Encoders translate physical position or movement into electrical signals for processing by control systems. They provide critical feedback to automate machinery precisely.
- **Rotary Measurement:** Rotary encoders measure angular position by detecting shaft rotation, enabling accurate tracking of rotational movement.
- **Linear Encoders:** A readhead moves back and forth over a coded strip to determine position and velocity in a straight line.
- **Linear Tracking:** Draw wire encoders measure linear motion by extending and retracting a cable, ideal for measuring length or distance on a budget.
- **Position Feedback:** All encoder types supply position data that helps control motion, speed, and direction in automated equipment.
- **High Precision:** Encoders provide high-resolution feedback, which is essential for applications that require precise positioning and speed control.

## Topics

- » [What do they do?](#)
- » [Applications](#)
- » [Output Types](#)
- » [Incremental vs Absolute](#)
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- **Versatile Use:** Rotary encoders are widely used in motors, conveyors, and robotics, while linear and draw wire encoders are suited for linear measurement in tight spaces or difficult-to-measure linear travel.
- **Durability:** Encoders are built to withstand industrial environments, with robust housings and components to resist dust, moisture, and vibration. IP69K models can withstand high temps, and high-pressure washdown (including acidic and alkaline cleaning agents, salt mist and high-pressure steam).
- **Real-Time Monitoring:** Encoders enable continuous monitoring of equipment status, improving reliability and reducing downtime.

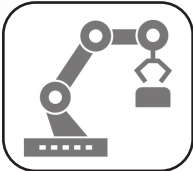
### How Do They Work?

An encoder works by converting a physical motion, like rotation or linear movement, into an electrical signal. This is typically done using a coded disk with a specific pattern, which is read by sensors to create a series of pulses or a unique code. The type of encoder and its pattern determine if it provides incremental position data (like a counter) or absolute position data (a unique value for each position), which is then used to measure speed, direction, and position.

Choosing the right encoder depends on your application's motion type and precision needs. Both rotary and draw wire encoders play vital roles in automation feedback systems.

# APPLICATIONS

Encoders convert mechanical motion into electronic signals, essential for precise control and positioning in automation. This section explores practical applications of rotary and draw wire encoders used in industrial environments.



**Rotary Encoders in Robotics:** They provide exact position feedback for robot arms, enabling accurate and repeatable movements during assembly and welding tasks.



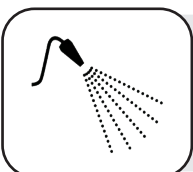
**Rotary Encoders in Conveyor Systems:** Used to monitor speed and position of conveyor belts, ensuring synchronized material handling and reducing downtime in production lines.



**Draw Wire Encoders in Material Handling:** Measure linear displacement in lifts and cranes, offering reliable feedback for load positioning and safety compliance.



**Draw Wire Encoders in Testing Equipment:** Measure extension or compression in test rigs, providing precise data for product durability and performance evaluation.



**IP69K Encoders in Food Processing and Packaging:** Measure position, speed and distance in high-pressure, high-temperature, washdown environments; essential for sanitation compliance, to protect against dust and intense, close-range liquid jets.



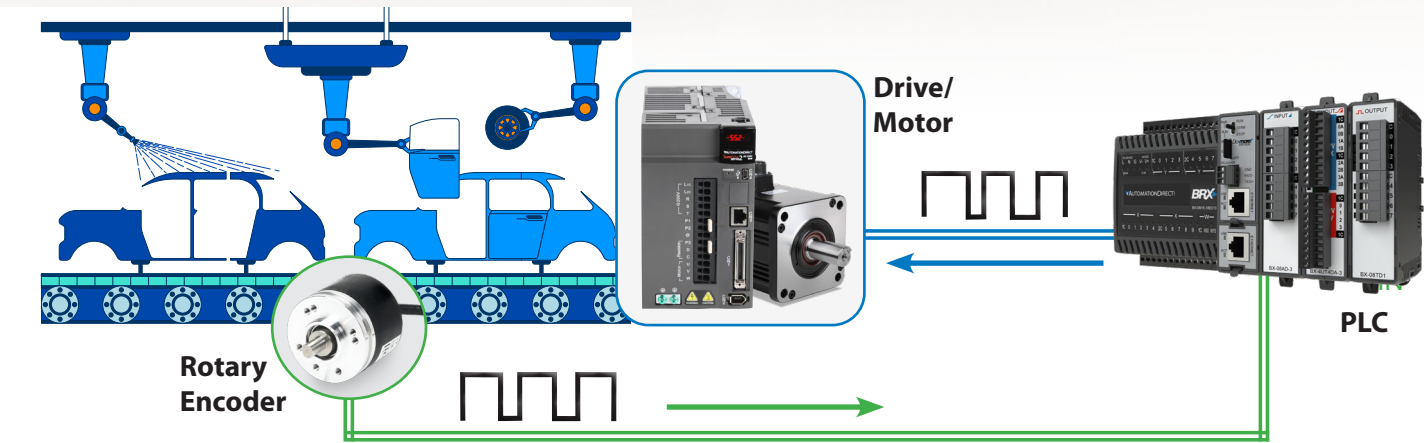
**Rotary Encoders in CNC Machines:** Monitor spindle and axis positions for high-precision machining, optimizing cutting accuracy and reducing waste.



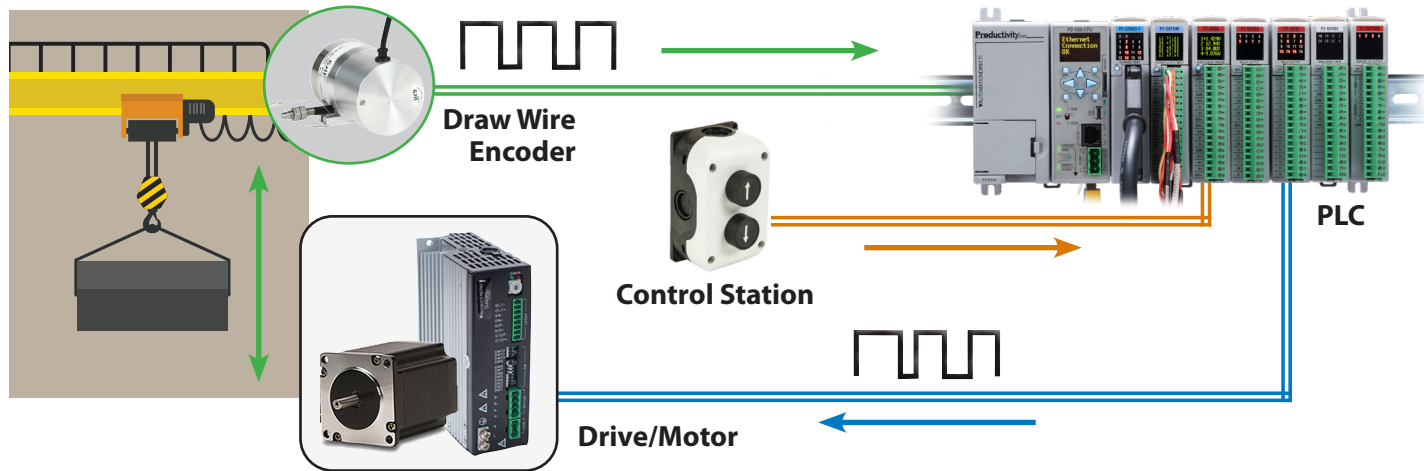
**Linear Encoders in PCB Assembly:** Ensure correct placement of components by monitoring linear travel distances, improving operational efficiency.

# APPLICATION EXAMPLES

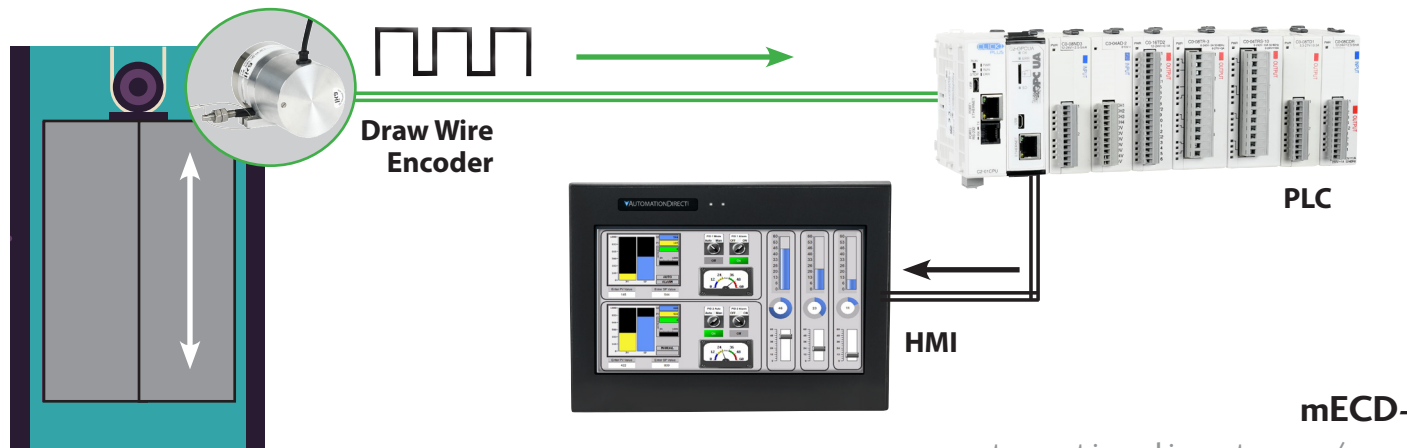
- **Assembly Line Positioning:** Rotary encoders accurately track the position of moving parts on automated assembly lines. This ensures components are aligned precisely for efficient production and quality control.



- **Crane Load Measurement:** Draw wire encoders measure cable length to monitor crane hook height. This helps operators maintain safe lifting parameters and avoid overloading.



- **Elevator Shaft Monitoring:** Draw wire encoders track elevator car position within the shaft. This data enables safe floor leveling, HMI visualization, and smooth ride control.



## OUTPUT TYPES

Encoders provide various signals essential for accurate position and speed feedback in industrial automation. Their output type and electrical interface determine compatibility with controllers and systems, which in turn impact performance and integration.



### Output Types

- **Quadrature Signals:** Incremental encoders provide two pulse output channels 90 degrees out of phase, enabling direction detection and position tracking with high resolution.
- **Parallel Outputs:** Traditional absolute encoders provide a binary Gray code to indicate shaft position, allowing immediate position read without counting pulses. Generally limited for use within a single revolution of the encoder shaft.
- **Comms Outputs:** More advanced absolute encoders use communication protocols like EtherNet/IP, EtherCAT, or Modbus to transmit absolute position data digitally over few wires, reducing wiring complexity. Output data includes “turns” to track multiple revolutions of the shaft.

### Electrical Interface Signals

- **Universal Outputs:** An encoder interface that is compatible with push-pull, open collector, line driver, and HTL and TTL inputs.
- **Push-Pull (Totem Pole) Outputs:** These offer fast switching and can directly drive many digital inputs, suitable for standard industrial interfaces. Works with sinking or sourcing inputs (without external circuitry) on PLCs and other controllers.
- **NPN Open-Collector Outputs:** Standard/general-purpose circuitry, offering excellent performance at low cost. This output type works natively with sourcing (PNP) inputs. They require pull-up resistors when used with sinking (NPN) inputs.
- **Line Driver Outputs:** These differential signals extend transmission distances and offer protection from electromagnetic fields (EMF), ideal for harsh industrial environments.
- **HTL (High Threshold Logic):** Outputs operate at higher voltage levels, offering improved noise immunity and longer cable runs.
- **TTL (Transistor-Transistor Logic):** Low-voltage outputs can only be used in control circuits requiring short cable lengths.
- **Analog Voltage Outputs:** Deliver continuous voltage (+/-10V, 0-10V, 0-5V, etc.). proportional to position, useful for legacy systems and simple integration.
- **Analog Current Outputs:** Transmit position as a current signal (0-20mA, 4-20mA), providing noise resistance over long distances.

## INCREMENTAL vs ABSOLUTE

Encoders provide position feedback using two primary signal types: incremental and absolute. Each type suits different industrial automation needs depending on accuracy, data retention, and application environment. Understanding their distinctions ensures optimal encoder selection for control and monitoring tasks.

### Incremental Signal Basics:

Incremental encoders produce signals representing position changes, not absolute position, which requires counting of pulses from a reference point.

### Absolute Basics:

Absolute encoders deliver a unique digital code for each shaft position, or via a communications protocol, providing exact position on power-up without needing a reference move.

- Single-turn absolute encoders (Gray code models) provide the angular position of the encoder shaft.
- Multi-turn absolute encoders also track how many times the encoder shaft has rotated (called “turns”).

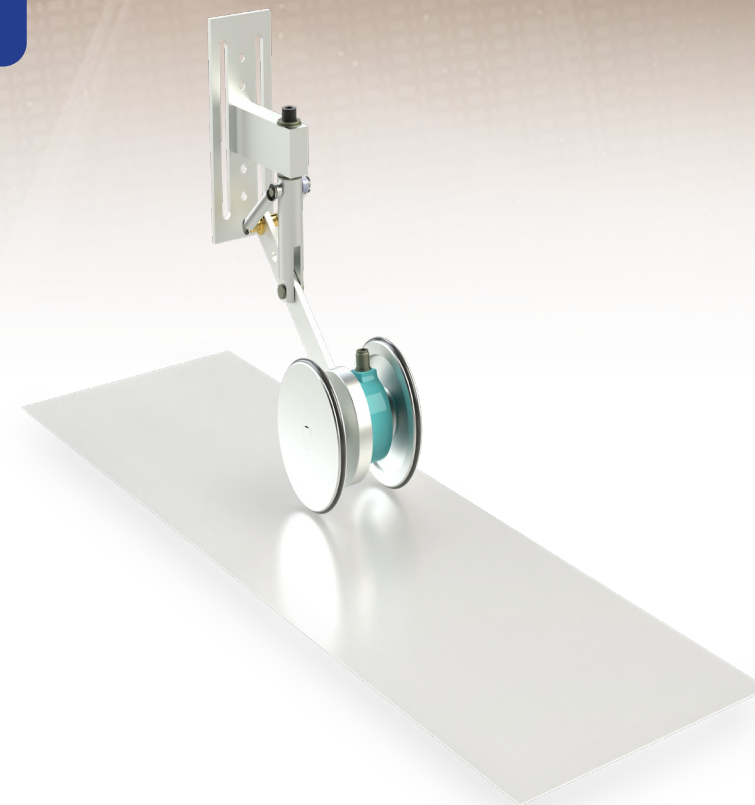
### Differences:

1. Output: Incremental encoders output pulses that a separate controller must track to determine position (and speed) incrementally.

Absolute encoders output multi-bit digital signals or utilize a communication protocol to directly indicate the shaft position for precise location.

2. Data Retention: Systems reliant on pulse information can lose track of position if power is interrupted; position must be re-established on restart (via homing).

Absolute encoders can read position data at any time, providing immediate and accurate angular position data on system startup. Some absolute encoders can even track turns while power is off.



3. Cost/Complexity: Incremental systems are generally simpler and less expensive than absolute systems due to their pulse-based operation.

Absolute encoders typically cost more because of their complex internal electronics.

4. Installation and Setup: Incremental encoders require homing or zeroing during startup.

Absolute encoders may not need homing.

5. Resolution: Incremental encoder resolution is measured in pulses per revolution.

Absolute encoder resolution is based on the number of bits in their digital output.

6. Application Flexibility: Incremental encoders suit relative position control and speed measurement.

Absolute encoders excel in multi-axis, absolute positioning applications.

# ADVANCED FEATURES

Advanced encoders feature high-tech capabilities, including integrated communication protocols and energy harvesting, which enhance system efficiency and connectivity.

## Communication Capabilities

Advanced encoders support communication networks like EtherNet/IP, EtherCAT, and Modbus TCP/RTU for seamless integration with control systems. These encoders provide several advantages, including:

- **Anytime Data Transfer:** Unlike traditional encoders, “comms” encoders provide position information whenever it is requested from the control device. No need to maintain a count of pulses up and down to track position (incremental encoders) or tie up 8, 10, or more discrete inputs (absolute encoders).
- **Remote Configuration:** Some models allow parameter adjustments over the network, minimizing downtime and on-site intervention.
- **Diagnostics and Alerts:** Integrated diagnostics can report encoder faults, and help detect performance issues for proactive maintenance.
- **Multi-device Networking:** Encoders can be daisy-chained or connected in networks, simplifying wiring and enabling synchronized operations.
- **Standardized Protocol Support:** Support for standard industrial protocols ensures compatibility across different vendor equipment, enhancing flexibility.

## Energy Harvesting

Encoders with energy harvesting convert mechanical motion into electrical energy using the Wiegand effect, a physical phenomenon in which a special Wiegand wire generates an electrical pulse in response to changes in a magnetic field. This happens when the encoder’s rotor moves, generating the energy required to power the encoder’s interface. Several benefits are attained from these encoders including:

- **Self-Sustaining Power:** The harvested energy enables the encoder to maintain and update its position information indefinitely, eliminating the need for a battery or capacitor.
- **Position Reporting:** The DC input power is only needed to power the communication interface, which allows the encoder to report its position to the machine’s controller. As soon as DC power is available, the encoder can report it’s position.
- **No Homing Required:** Since the encoder constantly knows its position, a machine using this technology might never need to be “homed” (after initial commissioning), which can save time and improve efficiency.



Rear view of connectors, DIP switch access, and LEDs

# HOW TO CHOOSE

Select encoders by matching the environmental rating, feedback type, and mechanical interface to your motion system; prioritize reliability and serviceability in industrial applications.

1. **Application Needs:** Define the movement or position measurement required to pick the encoder type and model.
  - **Rotary Encoders:** Utilized for precise measurement of shaft angle or speed in rotary motion.
  - **Draw Wire Encoders:** Opt for draw wire encoders where linear displacement measurement over large distances is necessary.
  - **Linear Encoders:** Used for extremely accurate linear measurements when measuring the position or velocity of an object moving in a straight line.
  - **Measuring Wheel Encoders:** Preferred when you need a gimbaled encoder and wheel assembly to ride on a web, or to roll along a belt or a continuous product to track its movement.
2. **Controller Interface:** Can the controller track the pulse train input (may require a high-speed input card)? Are multiple address lines available for Gray code input? Or is a communications protocol such as Modbus, EtherNet/IP, or EtherCAT preferred?
3. **Accuracy Requirements:** Determine the precision and resolution necessary for your control system to ensure proper performance. A good rule-of-thumb: spec an encoder with 4x the resolution required, to prevent issues with rounding error.
4. **Resolution vs Pulse Rate:** Higher resolution provides finer position feedback but may increase cost and processing/bandwidth needs. Ensure encoder pulse output frequency stays within PLC or drive input limits at maximum RPM to avoid missed counts.
5. **Multi-turn Applications:** While most controllers can track “turns” when using incremental encoders, this does increase complexity. Homing (with multi-turn setups) can also be time-consuming. Multi-turn, absolute encoders track the “turns” themselves, simplifying the task and possibly eliminating homing with some machines.
6. **Electrical Interface:** Confirm input voltage and signal output type: push-pull, open-collector, differential line driver, HTL, or TTL — to match controller inputs or receiver modules.
7. **Mounting Space:** Measure available space for the encoder and ensure the size and shaft style fit your equipment.
8. **Environment Considerations:** Consider how vibration, shock, and mounting orientation may affect encoder operation. Assess exposure to dust, moisture, temperature extremes, chemical agents, and washdown requirements that may affect encoder durability. Check the IP rating of each model you are considering.
9. **Shaft Type and Size:** Select a solid-shaft or hollow-shaft encoder variant that matches the mechanical interface of your application. Encoder couplings (for solid shaft encoders) and reducer bushings (for hollow shaft encoders) can accommodate differences between the encoder shaft and its desired attachment point.
10. **Operating Speed:** Ensure the encoder can handle the maximum shaft speed without signal loss or damage. Check the specifications for the max speed the encoder can endure mechanically as well as the max output frequency of the pulse train at that speed.
11. **Cable Length and Flexibility:** Choose cable length with some reserve and cable type suitable for environmental conditions.



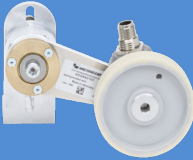
SELECTION GUIDE

Rotary Encoders

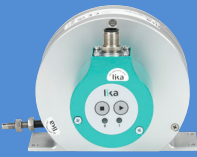
| Features                                          | lika®                    |                          |                          |                          |                                                      | WACHENDORFF              |                          | JTEKT<br>Formerly Koyo Encoders |                          |                          |                          |                          |                                            |
|---------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------------------------------------|--------------------------|--------------------------|---------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------------------------|
|                                                   | A41 Series               | A50 Series               | A80 Series               | AQ5 Series               | AM5 Series                                           | 36J Series               | 58V Series               | TRD-SR Series                   | TRDA-20 Series           | TRDA-25 Series           | TRD-N Series             | TRD-GK Series            | TRD-NA Series                              |
| Encoder Type                                      | Incremental (Quadrature) | Incremental (Quadrature) | Incremental (Quadrature) | Incremental (Quadrature) | Absolute Multi-Turn (Communications)                 | Incremental (Quadrature) | Incremental (Quadrature) | Incremental (Quadrature)        | Incremental (Quadrature) | Incremental (Quadrature) | Incremental (Quadrature) | Incremental (Quadrature) | Absolute (Gray code)                       |
| Body Size                                         | 41mm                     | 50mm                     | 80mm                     | 58 or 59mm               | 58mm                                                 | 36mm                     | 58mm                     | 38 or 40mm                      | 2in                      | 2in (2.5in flange)       | 50mm                     | 78mm                     | 50mm                                       |
| Shaft Type                                        | solid or hollow          | hollow                   | hollow                   | solid or hollow          | solid or hollow                                      | solid                    | solid                    | solid or hollow                 | solid                    | solid                    | solid or hollow          | solid                    | solid                                      |
| Push Pull Output (Totem Pole)                     | ✓                        | ✓                        | ✓                        | ✓                        | ---                                                  | ✓                        | ✓                        | ---                             | ---                      | ---                      | ---                      | ✓                        | ---                                        |
| Open Collector Output (HTL)                       | ✓                        | ✓                        | ✓                        | ✓                        | ---                                                  | ✓                        | ✓                        | ✓                               | ---                      | ---                      | ---                      | ---                      | ✓                                          |
| Line Driver Output (Differential TTL)             | ✓                        | ✓                        | ✓                        | ✓                        | ---                                                  | ✓                        | ✓                        | ✓                               | ✓                        | ✓                        | ✓                        | ---                      | ---                                        |
| Comms Encoder (EtherNet, EtherCAT, ModbusTCP/RTU) | ---                      | ---                      | ---                      | ---                      | ✓                                                    | ---                      | ---                      | ---                             | ---                      | ---                      | ---                      | ---                      | ---                                        |
| Resolution (PPR)                                  | Fixed 100 up to 4096     | Fixed 360 up to 2048     | Fixed 1024               | Programmable 1 to 16,384 | Programmable up to 8192 Multi-turn up to 16384 turns | Fixed 60 up to 5000      | Fixed 60 up to 5000      | Fixed 100 up to 2500            | Fixed 100 up to 2500     | Fixed 100 up to 2500     | Fixed 3 up to 5000       | Fixed 30 up to 5000      | Gray Code 5 up to 11 bits (32 to 2048 ppr) |
| Protection Rating                                 | IP64                     | IP65                     | IP64                     | IP65                     | IP65                                                 | IP67 and IP69K           | IP67 and IP69K           | IP50 or IP65                    | IP50                     | IP65                     | IP65                     | IP65                     | IP65                                       |
| Duty Rating                                       | Light                    | Medium                   | Medium                   | Medium                   | Medium                                               | Heavy                    | Heavy                    | Light                           | Medium                   | Medium                   | Medium                   | Heavy                    | Medium                                     |
| Starting Price                                    | \$103.00                 | \$118.00                 | \$167.00                 | \$163.00                 | \$266.00                                             | \$134.00                 | \$549.00                 | \$103.00                        | \$169.00                 | \$267.00                 | \$176.00                 | \$348.00                 | \$394.00                                   |

SELECTION GUIDE

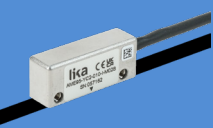
Measuring Wheel Encoders

| Features                              | lika®                                                                             | WACHENDORFF                                                                       |                                                                                    |
|---------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                       | AR01 Series                                                                       | 58V Series                                                                        | 36J Series                                                                         |
|                                       |  |  |  |
| Encoder Type                          | Incremental (Quadrature)                                                          | Incremental (Quadrature)                                                          | Incremental (Quadrature)                                                           |
| Sold As                               | Preamsembled unit                                                                 | Components (encoder, wheel, & mount sold separately)                              | Components (encoder, wheel, & mount sold separately)                               |
| Body Size                             | 58mm                                                                              | 58mm                                                                              | 36mm                                                                               |
| Shaft Type/Size                       | Solid dual-shaft 15mm                                                             | Solid shaft 10mm                                                                  | Solid shaft 10mm                                                                   |
| Measuring Wheel Circumference         | 12.5" Standard or 250mm optional                                                  | 200mm or 500mm                                                                    | 200mm or 500mm                                                                     |
| Push Pull Output (Totem Pole)         | ✓                                                                                 | ✓                                                                                 | ✓                                                                                  |
| Line Driver Output (Differential TTL) | ✓                                                                                 | ✓                                                                                 | ✓                                                                                  |
| Open Collector Output (HTL)           | ✓                                                                                 | ✓                                                                                 | ✓                                                                                  |
| Connection                            | M12 cables (sold separately)                                                      | Integral 2m pigtail cable                                                         | M12 cables (sold separately)                                                       |
| Linear Resolution                     | As low as 0.05mm/count                                                            | As low as 0.01 mm/count                                                           | As low as 0.01 mm/count                                                            |
| Protection Rating                     | IP65                                                                              | IP67 & IP69K                                                                      | IP67 & IP69K                                                                       |
| Duty Rating                           | Medium                                                                            | Heavy                                                                             | Heavy                                                                              |
| Starting Price                        | \$335.00                                                                          | \$834.00 <sup>1</sup>                                                             | \$398.00 <sup>1</sup>                                                              |

Draw Wire Encoders

| Features                              | lika®                                                                               |                                                                                     |                                                                                     |
|---------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                       | DWP Series                                                                          | DWI Series                                                                          | DWA Series                                                                          |
|                                       |  |  |  |
| Technology Type                       | Potentiometer-based                                                                 | Incremental (Quadrature) Encoder                                                    | Encoder to Analog (16-bit conversion)                                               |
| Output Type                           | Smooth & Stepless                                                                   | Fixed                                                                               | Programmable                                                                        |
| Measuring Distance                    | 2 Meters                                                                            | 2, 5, or 10 Meters                                                                  | 5 or 10 Meters                                                                      |
| Draw Wire Material                    | Stainless Steel                                                                     | Stainless Steel                                                                     | Stainless Steel                                                                     |
| Analog Output                         | ✓                                                                                   | ---                                                                                 | ✓                                                                                   |
| Push Pull Output (Totem Pole)         | ---                                                                                 | ✓                                                                                   | ---                                                                                 |
| Line Driver Output (Differential TTL) | ---                                                                                 | ✓                                                                                   | ---                                                                                 |
| Open Collector Output (HTL)           | ---                                                                                 | ✓                                                                                   | ---                                                                                 |
| Connection                            | Integral 2m pigtail cable                                                           | Integral 2m pigtail cable                                                           | M12 cables (sold separately)                                                        |
| Linear Resolution                     | 2mm/mV or 0.125mm/μA                                                                | As low as 0.025 mm/count                                                            | User scalable 0.153 mV/step or 0.336 μA/step                                        |
| Protection Rating                     | IP64                                                                                | IP64 (2m)<br>IP65 (5m & 10m)                                                        | IP65                                                                                |
| Duty Rating                           | Light                                                                               | Light/Medium                                                                        | Medium                                                                              |
| Starting Price                        | \$320.00                                                                            | \$266.00                                                                            | \$588.00                                                                            |

Linear Encoders

| Features                              | lika®                                                                               |                                                                                     |
|---------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                       | AME95 Series                                                                        | AMIG Series                                                                         |
|                                       |  |  |
| Encoder Type                          | Incremental (Quadrature)                                                            | Incremental (Quadrature)                                                            |
| Mounting                              | Floating (maintain <2.5mm gap)                                                      | Captive Slide                                                                       |
| Measuring Distance                    | Cut to length up to 20m                                                             | Six lengths 195 to 650mm                                                            |
| Tape/Rail Material                    | Elastomer Tape<br>Stainless Steel Cover                                             | Aluminum Rail                                                                       |
| Travel Speed                          | Up to 20m/s                                                                         | Up to 1m/s                                                                          |
| Push Pull Output (Totem Pole)         | ✓                                                                                   | ✓                                                                                   |
| Line Driver Output (Differential TTL) | ✓                                                                                   | ✓                                                                                   |
| Encoder Body Material                 | Die Cast Zinc                                                                       | Nylon                                                                               |
| Connection                            | Integral 2m pigtail cable or M12 Cables (sold separately)                           |                                                                                     |
| Linear Resolution                     | 0.01 mm/count                                                                       | 0.05 mm/count                                                                       |
| Protection Rating                     | IP67                                                                                | IP65                                                                                |
| Duty Rating                           | Medium                                                                              | Medium                                                                              |
| Starting Price                        | \$207.00 <sup>2</sup>                                                               | \$297.00 <sup>2</sup>                                                               |

1: Price of three piece assembly (encoder+wheel+mount)

2: Price of readhead only. Tape/rail sold separately

## PRODUCT LINEUP

lika®

### ENCODERS

**JTEKT**  
Formerly Koyo Encoders

**WACHENDORFF**  
The Encoder Experts



#### LIKA LIGHT DUTY INCREMENTAL ENCODERS STARTING AT \$103.00

The Lika A41 series offers compact, versatile incremental encoders suitable for general industrial applications. Available in both solid and hollow shaft versions, these Lika encoders provide high resolution up to 4096 PPR and feature a universal output circuit for broad compatibility. Their IP64 environmental rating ensures reliable operation in many environments.

- Compact 41mm body diameter for space-constrained installations
- Universal output circuit supports Push-Pull, NPN/PNP open collector, or Line Driver
- Quadrature output signals with index pulse for direction sensing and home position
- Wide 5-30 VDC input voltage range

#### LIKA MEDIUM DUTY INCREMENTAL ENCODERS STARTING AT \$118.00

The Lika A50 and A80 series provide robust incremental encoding solutions for more demanding industrial environments. These Lika encoders are well-suited for motor feedback and applications requiring larger shaft diameters, offering extended temperature ranges and high resolution (up to 2048ppr). Their durable construction ensures reliable performance.

- A50 series features small hollow shafts (1/4" and 3/8") ideal for direct motor mounting
- A50 series also have an extended operating temperature range from -40°C to 100°C
- A80 series feature a large hollow shaft for 19mm, 20mm, 30mm, 7/8", 5/8", or 1" motor shafts
- Precise optical sensing delivers accurate feedback
- IP64 or IP65 environmental ratings provide protection against dust and water



mECD-12

#### LIKA PROGRAMMABLE INCREMENTAL ENCODERS STARTING AT \$163.00

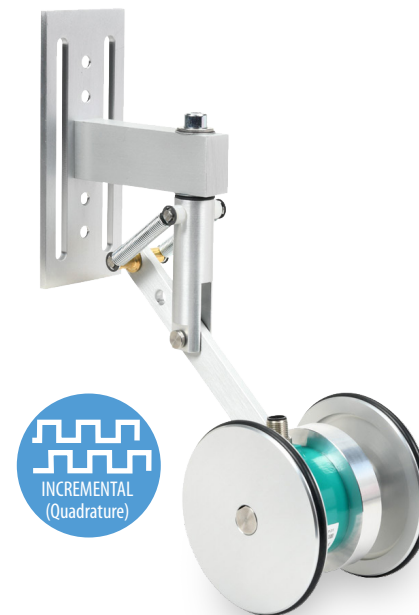
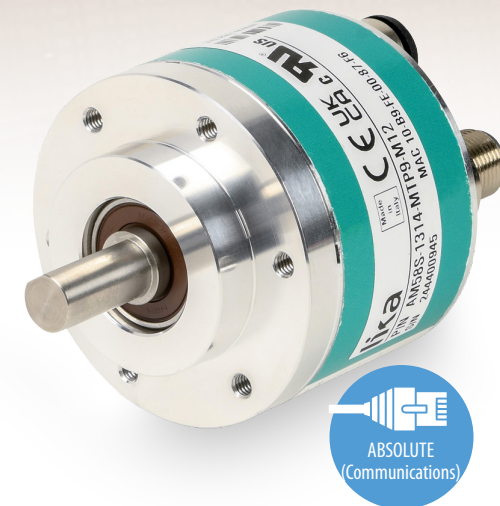
The Lika AQ5 series offers highly flexible programmable incremental encoders, allowing users to configure resolution, index length, and counting direction. These IP65 Lika encoders simplify inventory and provide adaptable solutions for diverse applications, ensuring precise and customizable feedback. They are easily configured via USB and free software.

- Resolution is configurable from 1 to an impressive 16,384 PPR
- Counting direction can be programmed for clockwise or counter-clockwise
- Free, downloadable software (LIKA-IP-IQ) simplifies setup
- Features an M12 male connector for robust electrical connections
- 3/8" solid or 15mm hollow shaft models
- Hollow shaft reducers for 6mm, 8mm, 10mm, 11mm, 12mm, 1/4", 3/8", or 1/2"

#### LIKA MULTI-TURN ABSOLUTE COMMS ENCODERS STARTING AT \$266.00

These AM5-series multi-turn, absolute encoders use Ethernet or serial communication to provide position and velocity information. Lika Electronic 'comms encoders' simplify wiring and reduce processing overhead, while providing high-resolution, non-volatile tracking (without batteries or capacitors). Energy harvesting allows these encoders to track changes in turns even when system power is off.

- Models available for: EtherNet/IP, EtherCAT®, Modbus TCP, or Modbus RTU
- Programmable resolution up to 8192 pulses per revolution (13-bit)
- Programmable 'turns' up to 16384 turns (14-bit)
- 3/8" solid or 15mm hollow shaft models
- Hollow shaft reducers for 6mm, 8mm, 10mm, 11mm, 12mm, 1/4", 3/8", or 1/2"
- Splash proof (IP65) rating



#### LIKA INCREMENTAL ROTARY MEASURING WHEEL ENCODERS STARTING AT \$335.00

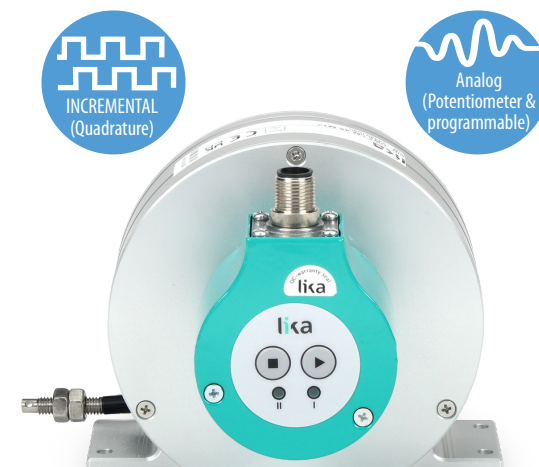
The Lika AR01 series provides specialized measuring wheel encoders for linear distance applications. These Lika encoders offer accurate feedback for conveyor speed control, cut-to-length systems, and object positioning. They feature metric and US/imperial wheel sizes with a spring-loaded arm for consistent surface contact.

- Available with standard 4-inch (12.5-inch circumference) or optional 80mm (250mm circumference) wheels
- Rugged, spring-loaded arm provides up to 30mm of deflection for consistent contact with widely varying product measurements
- Ideal for linear measurement applications, converting rotary motion to linear distance
- IP65 environmental rating ensures durability in various conditions
- Offers linear resolution down to 0.0025 inches per count

#### LIKA DRAW WIRE ENCODERS STARTING AT \$266.00

The Lika DW series of draw wire encoders provides accurate linear position feedback using a retractable stainless steel cable. This range includes incremental (DWI), analog potentiometer (DWP), and programmable analog (DWA) outputs, offering versatile solutions for linear measuring, vertical lift, and cylinder stroke applications.

- Available in measuring lengths up to 10,000mm (10 meters)
- DWI models provide quadrature output for precise digital position
- DWP models offer smooth, stepless 0-10V or 4-20mA analog output
- DWA models feature programmable analog outputs with teach mode and overrun alarms
- Robust designs with IP64 or IP65 protection ratings



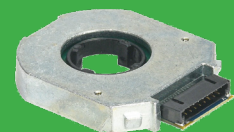
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## LIKA MEDIUM DUTY LINEAR ENCODERS

**STARTING AT \$207.00**

The LIKA medium duty incremental linear encoders combine a sliding encoder body and a magnetically coded strip to provide extremely accurate linear position over distances up to 20 meters. Quadrature output results in accuracy up to 0.01mm, with single-increment repeatability (0.01mm/count) at speeds up to 20 m/s.

- AME95-series IP67 encoder bodies are user-positioned above adhesive-backed elastomer tape
  - » ATI-series tape is available in lengths up to 20 meters and can be cut to length
  - » Stainless-steel cover material is provided to protect the tape
  - » End clamps are available to protect the ends and provide additional mounting security
- AMIG-series IP65 encoder bodies are captive to and slide along a rigid rail
  - » ATIG-series aluminum rails contain and protect the magnetically coded material
  - » Sliding arrangement maintains proper positional gap
  - » Single bolt mounting provides alignment flexibility
  - » Rails are available in six lengths, from 195mm to 650mm
- Supports both line driver (differential) or push-pull (totem) output types
- Available with integrated two-meter pigtail cables or 8-pin M12 quick disconnects
- M12 cables are available in two-meter, shielded, continuous-flexing variants for use in cable-carrier drag chain



**Need a Modular Kit Encoder for a stepper motor?**  
[Click here](#) for more info about our SureStep® and Same Sky® modular kit encoders.

## JTEKT MEDIUM DUTY INCREMENTAL ENCODERS

**STARTING AT \$169.00**

The JTEKT medium duty incremental encoders, encompassing the TRDA-20, TRDA-25, and TRD-N series, deliver high-quality performance with flexible configuration options. These JTEKT encoders are splash-proof (IP50 or IP65) and available with solid or hollow shafts, offering a wide range of resolutions up to 5000 PPR for various industrial needs.

- TRD-N(H) series provides metric dimensions with an 8mm solid or hollow shaft
- TRDA-20 and TRDA-25 series provide SAE dimensions with a 3/8" solid shaft
- TRDA-25 series features a military-style connector for rugged connections
- Supports both Totem-pole (push-pull) and Line Driver output types
- Continuous operating speeds up to 3000 rpm
- Solid and hollow shaft options with couplings available to match application requirements
- Designed for robust performance with moderate shaft loading



## JTEKT HEAVY DUTY INCREMENTAL ENCODERS

**STARTING AT \$350.00**

The JTEKT TRD-GK series represents the most rugged incremental encoders available, designed for extreme durability. These JTEKT encoders feature top-of-the-line bearings, ensuring an exceptional service life of 12 billion revolutions. Their robust construction and high resolution make them ideal for demanding industrial applications.

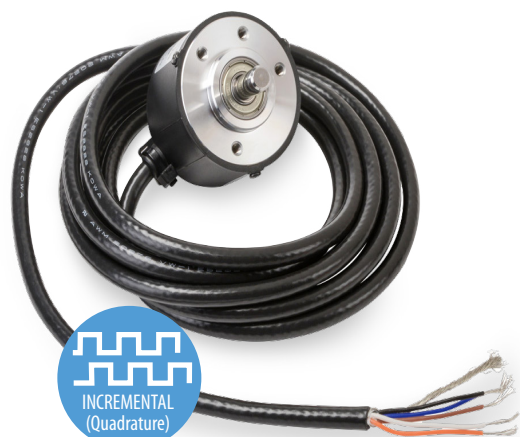
- Large 10mm solid shaft for heavy-duty applications
- Robust 78mm diameter body with a 60mm depth
- Wide resolution range from 30 to 5000 pulses per revolution
- Splash-proof IP65 environmental rating for harsh conditions
- High allowable shaft loads: 100N radial and 50N axial

## JTEKT LIGHT DUTY INCREMENTAL ENCODERS

**STARTING AT \$103.00**

The JTEKT TRD-SR series light duty incremental encoders offer cost-effective solutions for smaller applications. These compact JTEKT encoders provide resolutions up to 2500 PPR with open collector or line driver outputs for diverse system integration.

- TRD-SR series offers both solid and hollow shaft options with IP50 or IP65 ratings
- 8mm hollow shaft and 6mm solid shaft options with couplings available to match application requirements
- Max response frequencies up to 200 kHz for quick and accurate readings
- Integrated two-meter pigtail cables for easy connection



## JTEKT ABSOLUTE ENCODERS (GRAY CODE)

**STARTING AT \$394.00**

The JTEKT TRD-NA series of absolute encoders provides continuous, precise position feedback, retaining their exact position even after power loss. These JTEKT encoders are crucial for applications where maintaining accurate position knowledge is paramount, offering various Gray code resolutions in a compact, splash-proof design.

- Each rotary shaft position outputs a unique binary code, which can eliminate the need for homing of some machines
- Available with resolutions from 32 to 2048 counts per revolution (Gray code)
- Compact 50mm body diameter with an 8mm solid shaft
- Splash-proof IP65 environmental rating
- Low power consumption, typically 70mA maximum



## WACHENDORFF 36J HEAVY DUTY INCREMENTAL ENCODERS PRICED AT \$134.00

The Wachendorff 36J series heavy duty incremental encoders offer IP67 and IP69K protection for harsh environments and food and beverage applications (including resistance to high pressure fluids and steam). These 36mm diameter encoders with solid shafts provide resolutions up to 5000 PPR with universal, open collector, or line driver outputs for flexible connectivity.

- Withstand shaft loads up to 300 N for reliability and longevity in demanding industrial environments (can even double as idler pulleys in certain applications)
- Service life of 30 billion revs allows reduced maintenance, enhanced uptime, and long-term cost efficiency
- M12 connectors for modular layouts and fast replacement
- Couplings, brackets, and clamps available to match application requirements



## WACHENDORFF 58V HEAVY DUTY INCREMENTAL ENCODERS PRICED AT \$549.00

The Wachendorff 58V series heavy duty incremental encoders offer IP67 and IP69K protection for harsh environments and food and beverage applications (including resistance to acidic/alkaline solutions, salt mist, and high pressure fluids and steam). These 58mm diameter, solid-shaft encoders provide resolutions up to 5000 PPR with universal, open collector, or line driver outputs for flexible connectivity.

- Withstand shaft loads up to 100 N for reliability and longevity in demanding industrial environments
- Service life of 10 billion revs allows reduced maintenance, enhanced uptime, and long-term cost efficiency
- Integrated five-meter pigtail cables for easy connection
- Couplings, brackets, and clamps available to match application requirements

## WACHENDORFF HEAVY DUTY MEASURING WHEEL SYSTEMS STARTING AT \$398.00 (encoder+wheel+arm)

Combine a Wachendorff 58V or 36J heavy-duty encoder with a measuring wheel and a spring-loaded swing arm to easily create a measuring wheel system. WDGM spring-loaded mounts are available with clockwise or counter-clockwise arms, as well as a straight-sliding version (WDGD) to fit any measuring wheel application. A wide range of mounting angles and orientations is possible.

- Measuring wheels designed to fit the 10mm shafts on 58V and 36J encoders
- Measuring wheels are available with 200mm or 500mm circumferences
- Spring mounts include mounting brackets for the encoder
- Precise tension adjustment: from 5 - 30 N in 5 N increments
- All hardware is included for simple, straightforward assembly
- Robust design complements the heavy duty encoders
- Separate systems for the 58V and 36J models



## ENCODER ACCESSORIES

### SPARE PARTS & ACCESSORIES

Encoder accessories include mounting brackets, flanges, clamps, replacement encoders, measuring wheels, encoder magnetic tape and rails. Flexible couplings and bushings, in metric and inch sizes, connect encoders to rotating shafts. Programming cables, signal/extension cables and connectors enable configuration and wiring of encoders.



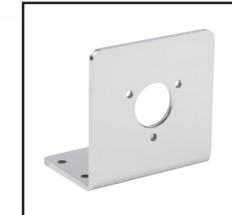
Couplings



Reducer bushings



Flanges



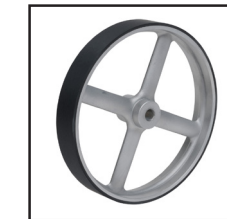
Mounting Brackets



Flexible Mounts



Linear Coded  
Tape and Rails



Measuring Wheels



Spring-loaded Arms

### Free Configuration Software:

- LIKA-IP-IQ software is used to program the resolution of the AQ58/AQ59 programmable encoders
- LIKA-MODBUS-RTU is optional programming software to program the MODBUS RTU absolute encoders. These encoders can also be configured over the MODBUS RTU network.

