ENCODER SELECTION GUIDE
ROTARY OR LINEAR – QUICKLY FIND THE RIGHT ENCODER FOR YOUR APPLICATION HERE
WHAT IS THE DIFFERENCE BETWEEN INCREMENTAL AND ABSOLUTE MEASUREMENT?

Incremental measurement

- Counts pulses from 1 to n
- A reference point (zero impulse) must be approached in order to determine the position
- Number of impulses = degree of resolution

Absolute measurement

- Measures the absolute position of 1 to n
- Each step is allocated a defined code pattern, and thus a defined (absolute) position
- Number of steps = degree of resolution

Incremental encoders: page 2–3
Wire draw encoders/linear encoders: page 6–7

Absolute encoders: page 4–5
Wire draw encoders/linear encoders: page 6–7

The figures only illustrate one possible variant from each product family.
## Incremental Encoders

### Which Interface Connection is Required?

<table>
<thead>
<tr>
<th></th>
<th>DBS36 Core</th>
<th>DBS50 Core</th>
<th>DBS40</th>
<th>DBS60 Core</th>
<th>DF60</th>
<th>DF640S Pro</th>
<th>DDS34/DDS35</th>
<th>DV60</th>
<th>DV60</th>
</tr>
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<tbody>
<tr>
<td>TTL</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
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<td></td>
</tr>
<tr>
<td>HTL</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
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<tr>
<td>TTL/HTL Universal</td>
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<td>✔</td>
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<td></td>
<td>✔</td>
<td>✔</td>
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<td></td>
</tr>
<tr>
<td>Open Collector</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sin/Cos</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
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</table>

### What is the Maximum Amount of Space Available for Installation (Diameter)?

<table>
<thead>
<tr>
<th></th>
<th>DBS36 Core</th>
<th>DBS50 Core</th>
<th>DBS40</th>
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<th>DV60</th>
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<tbody>
<tr>
<td>Up to 37 mm</td>
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<td>✔</td>
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<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
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<tr>
<td>Up to 40 mm</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
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<tr>
<td>Up to 50 mm</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
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<tr>
<td>Up to 60 mm</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
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<td></td>
</tr>
<tr>
<td>Up to 90 mm</td>
<td>✔</td>
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<td></td>
<td>✔</td>
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### Which Type of Flange or Shaft is Required?

<table>
<thead>
<tr>
<th></th>
<th>DBS36 Core</th>
<th>DBS50 Core</th>
<th>DBS40</th>
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<th>DF640S Pro</th>
<th>DDS34/DDS35</th>
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<th>DV60</th>
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</thead>
<tbody>
<tr>
<td>Face mount flange</td>
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<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
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<tr>
<td>Servo flange</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blind hollow shaft</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through hollow shaft</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring wheel system</td>
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<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
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### What Hollow Shaft Diameter is Required?

<table>
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<tr>
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<th>DBS36 Core</th>
<th>DBS50 Core</th>
<th>DBS40</th>
<th>DBS60 Core</th>
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<th>DDS34/DDS35</th>
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<th>DV60</th>
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</thead>
<tbody>
<tr>
<td>Up to 8 mm</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 10 mm</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
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</tr>
<tr>
<td>Up to 12 mm</td>
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<td></td>
<td>✔</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Up to 15 mm</td>
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<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 5/8”</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 5/8”</td>
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<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
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</table>

### What Resolution is Required? (Pulses per Revolution/Steps per Revolution)

<table>
<thead>
<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td>Up to 2500</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
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<td></td>
</tr>
<tr>
<td>Up to 5000</td>
<td>✔</td>
<td>✔</td>
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<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 8192</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 16,384</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 16,384</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1024 sin/cos periods</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
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</table>

### Should Programming/Configuration be Performed by the Customer?

<table>
<thead>
<tr>
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<th>DV60</th>
<th>DV60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, using a hand-held device</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, using software and PC tool</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes, via RS-485</td>
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<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>✔</td>
<td>✔</td>
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<td></td>
<td>✔</td>
<td>✔</td>
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</tbody>
</table>

### Is a Safety Certificate Required for the Encoder?

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
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</tr>
</tbody>
</table>
WHAT IS THE DIFFERENCE BETWEEN SINGLETURN AND MULTITURN?

Singleturn

- Variant of absolute encoders
- Measures the absolute position of 1 to n within one revolution

Multiturn

- Variant of absolute encoders
- Measures the absolute position of 1 to n within one revolution
- Also measures the number of revolutions

Absolute encoders

- ACS36/ACM36
- AFS60/AFM60
- AHS36/AHM36
- ARS60
- A3M60
- ACM60
- ATM60
- ATM90

Fieldbus/Ethernet interfaces

The figures only illustrate one possible variant from each product family.
### Rotary Absolute Encoders

<table>
<thead>
<tr>
<th>Absolute encoders</th>
<th>Singleturn</th>
<th>Multiturn</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACS-36</td>
<td>A36/60</td>
</tr>
<tr>
<td></td>
<td>AHS-36</td>
<td>A2M-60</td>
</tr>
<tr>
<td></td>
<td>A3M-60</td>
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<td></td>
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<td>A3M-90</td>
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<tr>
<td></td>
<td>AHM-36</td>
<td>A3M-90</td>
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<td>AEM-60</td>
<td>A3M-90</td>
</tr>
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<td></td>
<td>AcM-36</td>
<td>A3M-90</td>
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<td>A3M-90</td>
</tr>
<tr>
<td></td>
<td>AtM-90</td>
<td>A3M-90</td>
</tr>
</tbody>
</table>

#### How many revolutions are to be absolutely measured?
- ≤ 1
- > 1

#### Which interface connection is required?
- Analog 4 to 20 mA / Analog 0 to 10 V
- Parallel SSI
- SSI + Incremental
- SSI + Sin/Cos
- Fieldbus/Ethernet

#### What is the maximum amount of space available for installation (diameter)?
- Up to 36 mm
- Up to 40 mm
- Up to 50 mm
- Up to 60 mm
- Up to 90 mm

#### Which type of flange or shaft is required?
- Face mount flange
- Servo flange
- Blind hollow shaft
- Through hollow shaft

#### What hollow shaft diameter is required?
- Up to 8 mm
- Up to 10 mm
- Up to 12 mm
- Up to 15 mm
- Up to 5/8"
- > 5/8"

#### What resolution is required? (pulses per revolution/steps per revolution)
- 1024
- Up to 2500
- Up to 5000
- Up to 8192
- Up to 16,384
- > 16,384

#### Should programming/configuration be performed by the customer?
- Yes, using a hand-held device
- Yes, using software and PC tool
- Yes, RS-485
- Yes, via fieldbus or Ethernet
- Yes, via a web server
- Yes, using the teach-in function on the encoder
- No

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1. Analog resolution dependent on programmed measuring range.
2. Encoders can in principle be programmed/configured, but can also be used with the default factory settings without configuration.
**WHAT IS THE DIFFERENCE BETWEEN WIRE DRAW ENCODERS AND LINEAR ENCODERS?**

**Wire draw encoders**

- Encoder counts from 1 to n and converts the figure into a measurement signal
- Consists of an encoder and a wire draw
- The wire draw travels the distance from A to B
- The encoder is stationary

**Linear encoders with material measure or magnetic tape**

- Measures distance from A to B
- Consists of read head and material measure
- The read head travels the distance from A to B
- The material measure with permanent magnets is stationary
### Wire Draw Encoders and Linear Encoders

#### How many measuring cycles are needed?
- **Up to 1,000,000**
- **Unlimited**

#### What kind of position measurement is required?
- **Absolute**
- **Incremental**

#### Which interface connection is required?
- **TTL**
- **HTL**
- **Analog**
- **HIPERFACE®**
- **SSI**
- **SSI + Sin/Cos**
- **PROFIBUS**
- **CANopen**
- **DeviceNet**
- **EtherNet/IP**
- **PROFINET**
- **EtherCAT®**

#### Is a consistent mounting surface available over the measuring distance?
- **Yes**
- **No**

#### What are the mounting tolerances like?
- **Low**
- **Medium**
- **High**

#### What measuring length is required?
- **≤ 4 m**
- **≤ 5 m**
- **≤ 10 m**
- **≤ 50 m**
- **≤ 548 m**
- **≤ 1700 m**

#### What resolution is required?
- **≤ 0.1 mm**
- **≤ 0.05 mm**
- **≤ 1 µm**

#### How reliable does the measuring system need to be?
- **Low**
- **Medium**
- **High**

#### Which installation size can be used?
- **Small**
- **Medium**
- **Large**

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*Available upon request.*
SICK AT A GLANCE

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Comprehensive services round out our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

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Detailed addresses and additional representatives → www.sick.com