ENCODER SELECTION GUIDE

ROTARY OR LINEAR – QUICKLY FIND THE RIGHT ENCODER FOR YOUR APPLICATION HERE

Encoders

SICK
Sensor Intelligence.

WHAT IS THE DIFFERENCE BETWEEN INCREMENTAL AND ABSOLUTE MEASUREMENT?
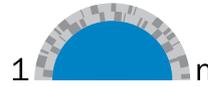
Incremental measurement

1   n

- 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

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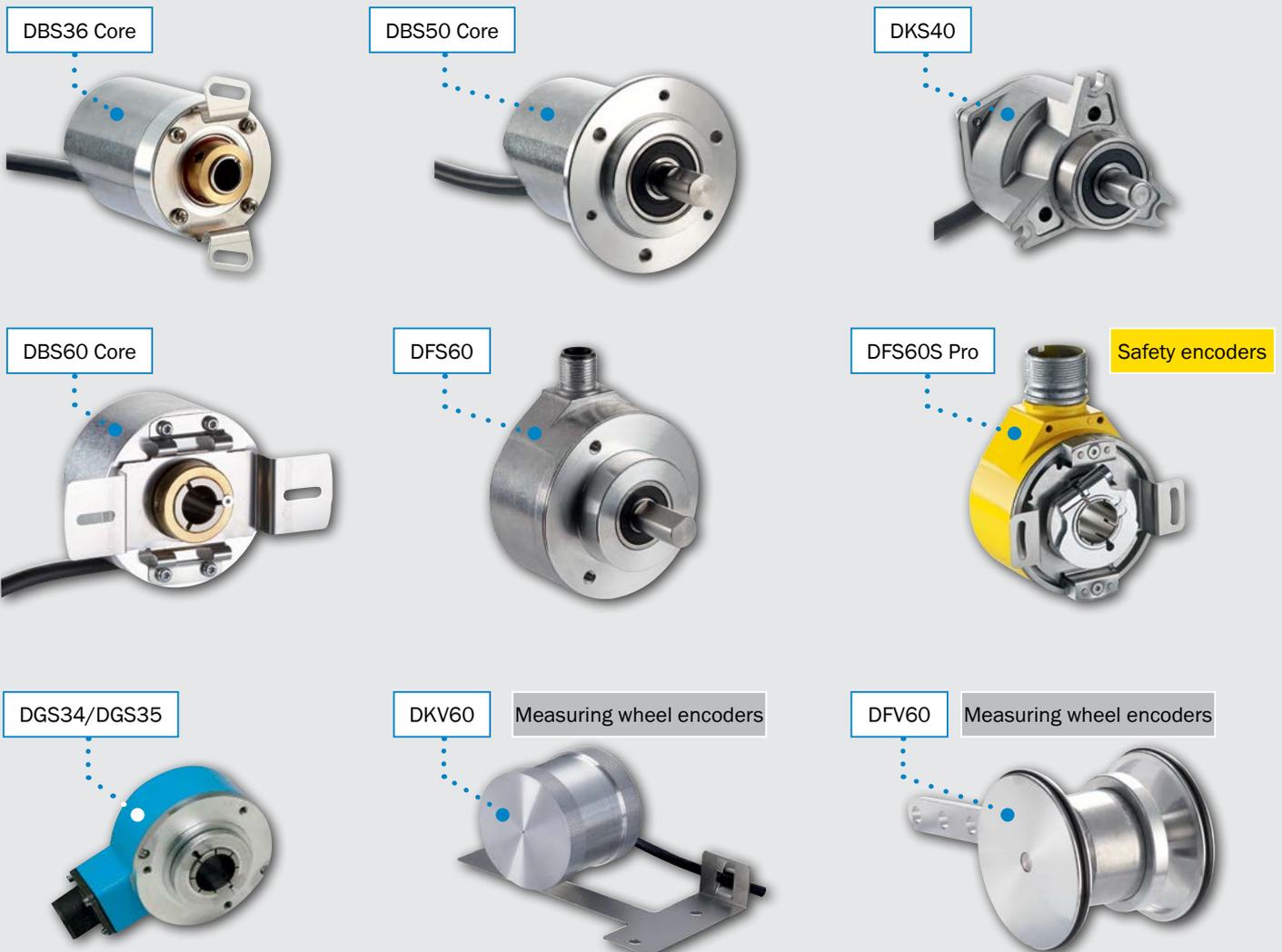
Absolute measurement

1   n

- 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

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

Incremental encoders

DBS36 Core

DBS50 Core

DKS40

DBS60 Core

DFS60

DFS60S Pro   Safety encoders

DGS34/DGS35

DKV60   Measuring wheel encoders

DFV60   Measuring wheel encoders

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

Incremental encoders	DBS36 Core	DBS50 Core	DKS40	DBS60 Core	DFS60	DFS60S Pro	DGS34/ DGS35	DKV60	DFV60
Which interface connection is required?									
TTL	■	■	■	■	■		■	■	■
HTL	■	■	■	■	■		■	■	■
TTL/HTL Universal				■	■				■
Open Collector	■	■	■				■		
Sin/Cos					■	■			
What is the maximum amount of space available for installation (diameter)?									
Up to 37 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				■	■	■	■		
Measuring wheel system								■	■
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)									
Up to 2500	■	■	■	■	■		■	■	■
Up to 5000				■	■		■		■
Up to 8192					■		■		■
Up to 16,384					■		■		■
> 16,384					■				■
1024 sin/cos periods					■	■			
Should programming/configuration be performed by the customer?									
Yes, using a hand-held device					■				■
Yes, using software and PC tool					■				■
Yes, via RS-485					■				■
No	■	■	■	■	■	■	■	■	■
Is a safety certificate required for the encoder?									
Yes						■			
No	■	■	■	■	■		■	■	■

WHAT IS THE DIFFERENCE BETWEEN SINGLETURN AND MULTITURN?

Singleturn

1 n

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

Multiturn

1 n

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

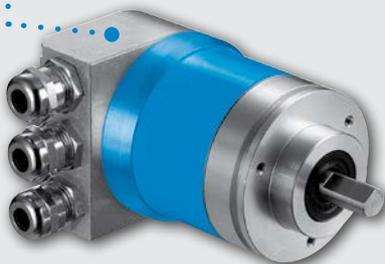## Absolute encoders

ACS36/ACM36

AFS60/AFM60

AHS36/AHM36

reddot award 2014
winner

ARS60

A3M60

ACM60

ATM60

ATM90

Fieldbus/Ethernet interfaces

PROFIBUS PROCESS FIELD BUS

PROFINET INDUSTRIAL ETHERNET

DeviceNet

EtherNet/IP

CANopen

EtherCAT

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

| Absolute encoders	Singleturn									Multiturn														
	ACS36	AFS60				AHS36		ARS60		A3M60	ACM36	ACM60	AFM60				AHM36		ATM60				ATM90	
	Analog	SSI	EtherNet/IP	EtherCAT®	PROFINET	SSI	CANopen	SSI	Parallel	PROFIBUS	Analog	Analog	SSI	EtherNet/IP	EtherCAT®	PROFINET	SSI	CANopen	SSI	PROFIBUS	CANopen	DeviceNet	SSI	PROFIBUS
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	■[1]										■[1]	■[1]												
Up to 2500	■[1]	■	■	■	■	■	■	■	■	■	■[1]	■[1]	■	■	■	■	■	■	■	■	■	■	■	■
Up to 5000	■[1]	■	■	■	■	■	■	■	■	■	■[1]	■[1]	■	■	■	■	■	■	■	■	■	■	■	■
Up to 8192	■[1]	■	■	■	■	■	■	■	■	■	■[1]	■[1]	■	■	■	■	■	■	■	■	■	■	■	■
Up to 16,384	■[1]	■	■	■	■	■	■	■	■	■	■[1]	■[1]	■	■	■	■	■	■	■	■	■			
> 16,384	■[1]	■	■	■	■			■	■	■	■[1]	■[1]	■	■			■	■	■	■				
Should programming/configuration be performed by the customer?																								
Yes, using a hand-held device		■				■							■				■							
Yes, using software and PC tool		■											■							■				
Yes, via RS-485		■				■							■				■							
Yes, via BUS (fieldbus or Ethernet)			■	■	■		■			■				■	■	■		■		■	■	■		■
Yes, via a web server			■											■										
Yes, using the teach-in function on the encoder	■										■	■												
No	■[2]	■	■[2]	■[2]	■[2]	■	■[2]	■	■[2]	■[2]	■[2]	■[2]	■	■[2]	■[2]	■[2]	■	■[2]	■[2]	■[2]	■[2]	■[2]	■[2]	■[2]

[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.
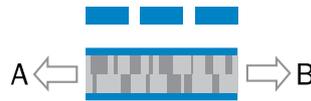
WHAT IS THE DIFFERENCE BETWEEN WIRE DRAW ENCODERS AND LINEAR ENCODERS?
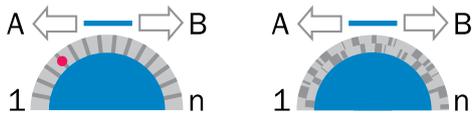
Wire draw encoders

- 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
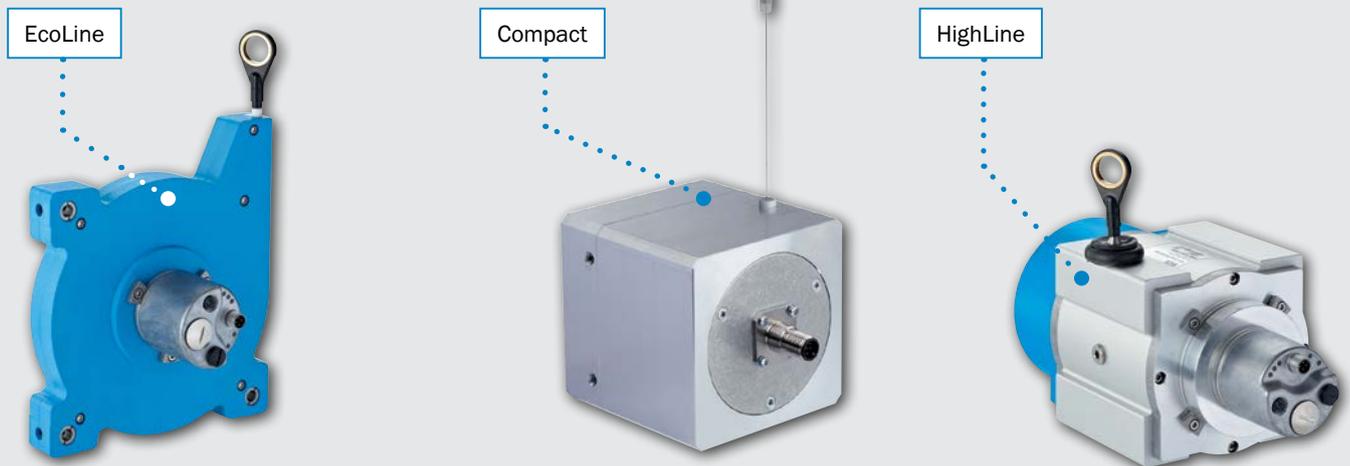- The encoder is stationary

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

Wire draw encoders

EcoLine

Compact

HighLine

Linear encoders with measurement element or magnetic tape

KH53/KH53A

TTK70

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

	Wire draw encoders			Linear encoders with measurement element or magnetic tape		
	EcoLine	Compact	HighLine	KH53	KH53A	TTK70
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®	■ [1]	■	■ [1]			■
SSI	■	■	■	■	■	■
SSI + Sin/Cos	■ [1]		■ [1]			■
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	■ [1]					■
Medium		■	■			
Large			■	■	■	

[1] Available upon request.

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 6,500 employees and over 50 subsidiaries and equity investments as well as numerous representative offices worldwide, we are always close to our customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

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

For us, that is "Sensor Intelligence."

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Australia, Austria, Belgium/Luxembourg, Brazil, Czech Republic, Canada, China, Denmark, Finland, France, Germany, Great Britain, Hungary, India, Israel, Italy, Japan, Mexico, Netherlands, Norway, Poland, Romania, Russia, Singapore, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, United Arab Emirates, USA

Detailed addresses and additional representatives ➜ **www.sick.com**

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