

# Data Sheet for Angle Sensors

Hall-Effect Singleturn Rotary Encoder with serial output

Series ETS25



ETS25 - R



ETS25 - F



ETS25 - L



ETS25 - K

- Serial micro controller interface (SER) or Serial Peripheral Interface (SPI) available
- Redundant SPI version
- Versatile electrical connections on demand: Solder- or clamping terminals, flat ribbon or round cable
- Compact Ø25 mm design
- Simple and time-saving bushing design

The high reliable Hall-Effect technology provides a constant signal quality over the whole life cycle..

## Electrical Data

Effective electrical angle of rotation 1.)	360°	
Independent linearity (best straight line) 1.)	±0,4 % @ 360°	
Absolute linearity 1.)	±0,8 % @ 360°	
Output signal	SER	SPI
Resolution	12 Bit	14 Bit
Update rate	96 µs	600 µs
Supply voltage	5 VDC ±10 %	
Power consumption (no load)	≤ 14 mA	standard ≤ 12 mA redundant ≤ 24 mA
Insulation voltage 1.)	1000 VAC @ 50 Hz, 1 min	
Insulation resistance 1.)	2 MOhm @ 500 VDC, 1 min	

## Mechanical and Environmental Data

Mechanical angle of rotation 1.)	Endless
Lifetime 2.)	> 100 Mio. shaft rotating movements For Option D (with shaft sealing) the sealing is at least working up to 200 000 shaft rotating movements
Bearing	Sleeve bearing
Max. operational speed	100 rpm (< 1 min 800 rpm short time)
Operational torque without / with X-Ring	0,1 ≤ M ≤ 0,6 Ncm / 0,3 ≤ M ≤ 1,3 Ncm (@ RT, 10 rev./min)
Operating temperature range	-40..+85 °C (fixed cable)
Storage temperature range	-40..+105 °C
Protection grade front side (IEC 60529)	
Standard	IP40
Option D (with shaft sealing)	IP55M, IP66S
Protection grade rear side (IEC 60529)	
Solder- and clamping terminals	IP50 (solder pads and connectors excluded)
Flat ribbon - and round cable	IP66 (end of cable excluded)
Vibration (IEC 68-2-6, Test Fc)	±1,5 mm / 20 g / 10 bis 2000 Hz / 16 frequency cycles (3x4 h)
Mechanical shock (IEC 68-27, Test Ea)	50 g / 11 ms / half-sine (3x6 shocks)

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## Mechanical and Environmental Data

Max. radial load	1 N
Mass (product with option L)	Approx. 26 g
Fastening parts included in delivery	Hex nut (AF14) and tooth washer, if option D is ordered then an additional O-Ring is part of delivery as sealing between mounting panel and rotary encoder.
Fastening torque mounting nut	$\leq 3$ Nm
Material shaft	Stainless steel
Material housing	Plastic / Bronze

## Immunity

EN 61000-4-2 ESD	Class B
EN 61000-4-3 RF sine wave	Class A
EN 61000-4-6 Conducted sine wave	Class A
EN 61000-4-8 Power frequency magnetic fields	Class A

1.) According IEC 60393

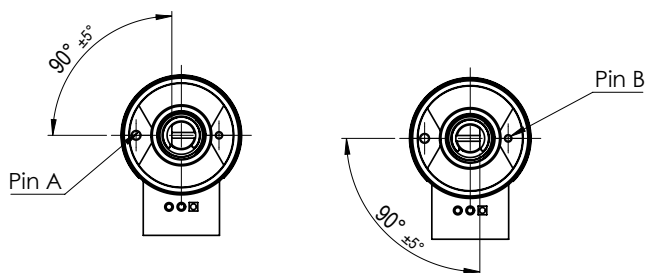
2.) Determined by climatic conditions according to IEC 68-1, para. 5.3.1 without load collectives

## Relationship between anti rotation pin and effective electrical angle

Option anti rotation pin A    Option 05SPI:  
If shaft flattening is facing antirotation pin A then output signal is 0% FS (FS=Fullscale).

Option anti rotation pin B    Option 05SPI:  
If shaft flattening is facing antirotation pin B then output signal is 0% FS (FS=Fullscale).

For option 05SER no zero point alignment is available ex works.



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## Order Code

<b>Description:</b> Effective electrical angle: 360° Sense of rotation: CW (by rotating the shaft clockwise the output signal rises)	Selection: standard=black/bold, possible options=grey/cursive						
<b>Series ETS25</b>	<b>ETS25</b>						
<b>Shaft diameter, shaft length:</b> <b>Shaft diameter Ø 6 mm, shaft length 22mm</b> Option: Shaft diameter Ø 6.35 mm, shaft length 22 mm Option: User defined shaft [mm] Ø ≤6.35mm		<b>6x22</b> <i>6.35x22</i>  <i>XxXX</i>					
<b>Supply voltage / Output signal:</b> <b>14 Bit / 5 VDC ± 10% / SPI</b> 12 Bit / 5 VDC ± 10% / SER			<b>05SPI</b> <i>05SER</i>				
<b>Shaft sealing (standard without shaft sealing):</b> Option: D with shaft sealing				<i>D</i>			
<b>Electrical connection, cable length, anti rotation pin (according drawing): (Standard)</b> <b>Flat ribbon cable standard length 0.15 m</b> (anti rotation pin compatible to former series ENA22)						<b>F0.15B</b>	
<b>Electrical connection, cable length, anti rotation pin (according drawing): (Options)</b> <b>Electrical connection:</b> Option: solder pads (available for option 12 Bit / 5 VDC / SER) Option: clamping Terminals (available for option 12 Bit / 5 VDC / SER) Option: flat ribbon cable (available for option 14Bit / 5 VDC / SPI) Option: round cable (available for option 14Bit / 5 VDC / SPI) <b>Cable length:</b> Option: cable length in user defined length [x.XX m] (for option F und R, max. allowed cable length 1m) <b>Anti rotation pin:</b> Option: anti rotation pin A (anti rotation pin compatible to former series MAB25) Option: anti rotation pin B (anti rotation pin compatible to former series ENA22A)					<i>L</i> <i>K</i> <i>F</i> <i>R</i>	<i>X,XX</i>	<i>A</i>  <i>B</i>

## Order example ETS25

**Requirement:**  
 Shaft Ø 6.00 mm, shaft length 22 mm, 14Bit/5VDC/SPI, no shaft sealing, flat ribbon cable 0.15 m, anti rotation pin B

**Example for order code:**  
 ETS25 6x22 05SPI F0.15B

# Data Sheet for Angle Sensors

Hall-Effect Singleturn Rotary Encoder with serial output

Series ETS25

## Order Code (electric redundant version)

### Description:

Effective electrical angle: 360°  
Sense of rotation: CW (by rotating the shaft clockwise the output signal rises for both signal outputs)

Selection: standard=black/bold, possible options=grey/cursive

<b>Series ETS25X (X=electric redundant)</b>	<b>ETS25X</b>						
<b>Shaft diameter, shaft length:</b> <b>Shaft diameter Ø 6 mm, shaft length 22 mm</b> Option: Shaft diameter Ø 6,35 mm, shaft length 22 mm Option: User defined shaft dimensions [mm]		<b>6x22</b> <i>6,35x22</i> <i>XxXX</i>					
<b>Supply voltage / Output signal:</b> <b>14 Bit / 5 VDC ± 10% / SPI</b>			<b>05SPI</b>				
<b>Shaft sealing: (standard without shaft sealing)</b> Option: D with shaft sealing				<i>D</i>			
<b>Electrical connection:</b> <b>Two 5 pol. flat ribbon cables arranged one above the other</b>					<b>F</b>		
<b>Cable length, anti rotation pin (according drawing): Standard</b> <b>Two 5 pol. flat ribbon cables arranged one above the other, standard cable length of each flat ribbon cable 0.15 m</b> <b>Anti rotation pin B</b> (anti rotation pin compatible to former series ENA22A)						<b>0,15B</b>	
<b>Cable length, anti rotation pin (according drawing): Options</b> <b>Cable length:</b> Option: two 5 pol. flat ribbon cables in user defined length [x,XX m] (maximum permissible cable length for each flat ribbon cable is 1 m, the cable length for both flat ribbon cables is identical) <b>Anti rotation pin:</b> Option: anti rotation pin A (anti rotation pin compatible to former series MAB25A) Option: anti rotation pin B (anti rotation pin compatible to former series ENA22A)						<i>X,XX</i>	<i>A</i> <i>B</i>

## Order example ETS25X (electric redundant version)

### Requirement:

Shaft Ø 6.00 mm, shaft length 22 mm, 14Bit/5VDC/SPI, no shaft sealing, signal 1 sense of rotation CW, signal 2 sense of rotation CW, 360° effective electrical angle of rotation for signal 1 and 2, two 5 pol. flat ribbon cables arranged one above the other with cable length 0.15 m for each flat ribbon cable, anti rotation pin B

### Example for order code:

ETS25X 6x22 05SPI F0,15B

## For higher quantities or on-going demand, additional options are available as described below on request

For example:

- 3,3 V supply voltage
- Special shaft design
- Special cable and connection design

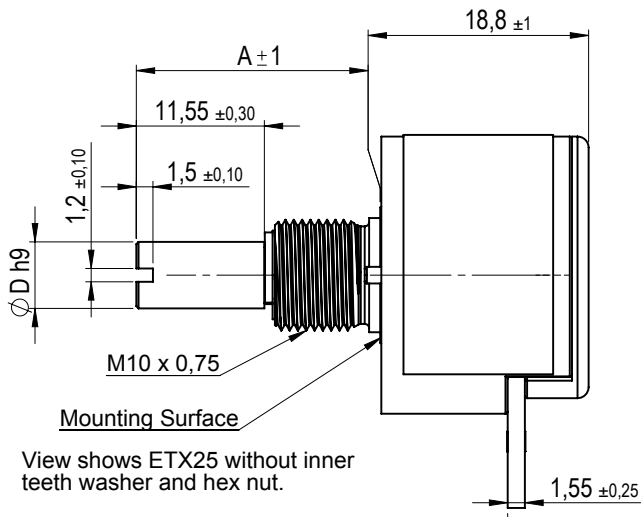
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Hall-Effect Singleturn Rotary Encoder with serial output

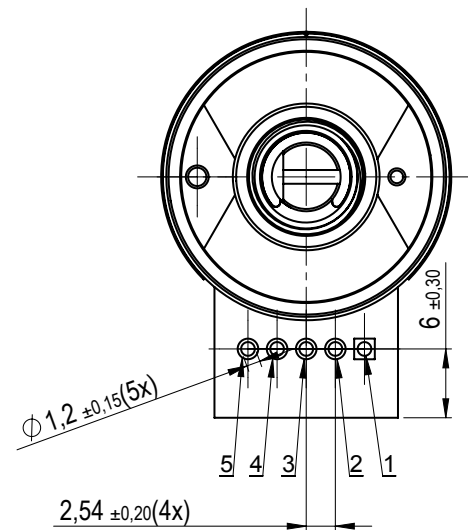
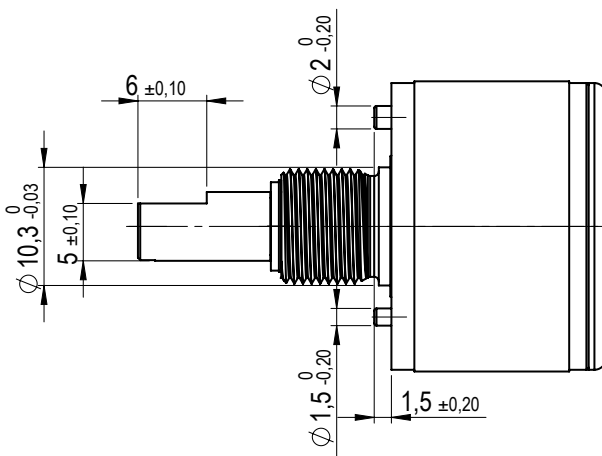
Series ETS25

## Drawing

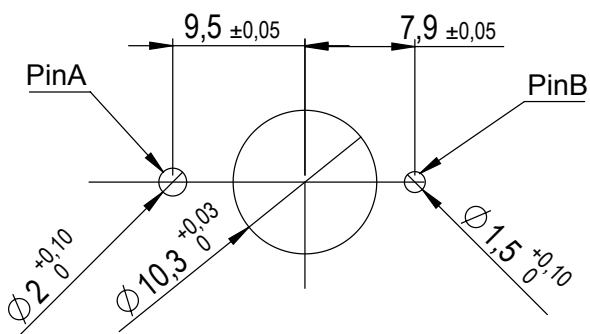
Option L



Standard shaft dimensions	
Shaft length A	22 mm
Shaft diameter D	6 mm



### Pattern of Drilling



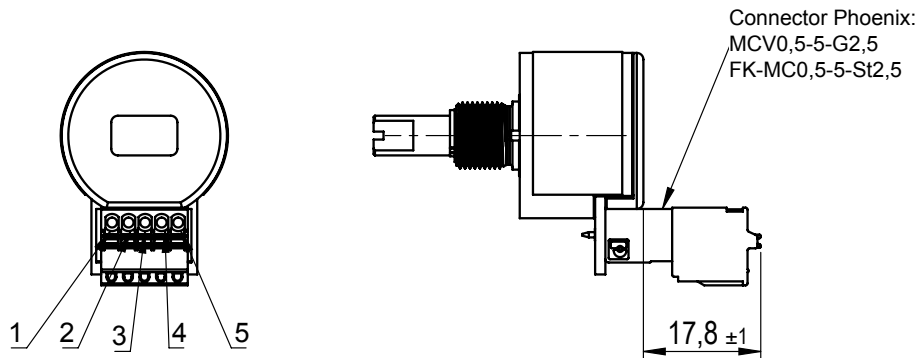
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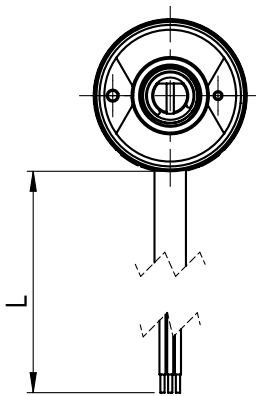
Series ETS25

## Drawing

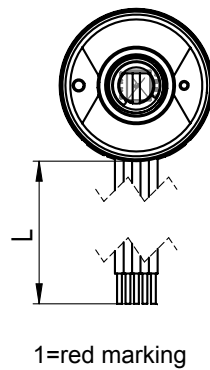
Option K



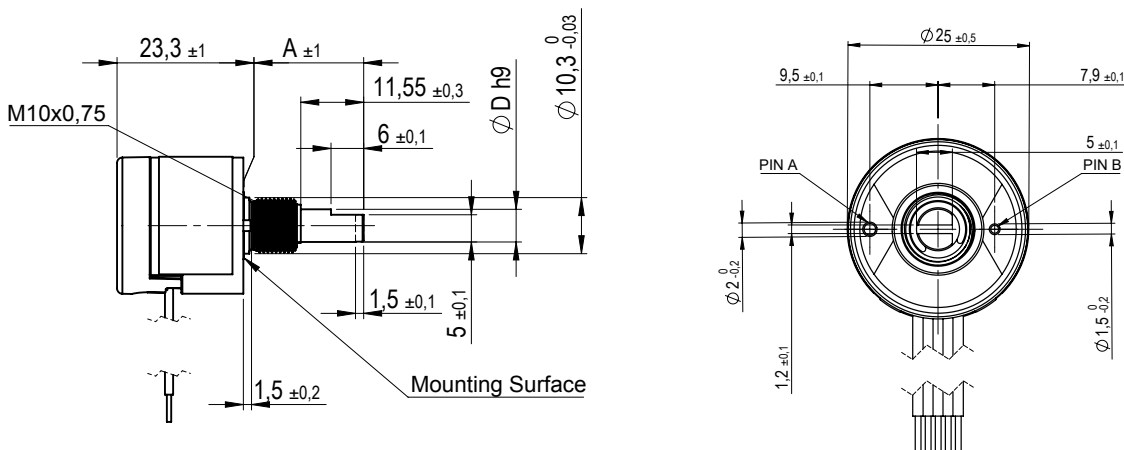
Option R



Option F



Series	Option	Standard Cable Length L	Cable Cross Section	Allowed Tolerance
ETS25	R	1000 mm	AWG26	-20 mm...+40 mm
ETS25	F	150 mm	AWG26	-10 mm...+25 mm
ETS25X	F	150 mm	AWG26	-25 mm...+25 mm



Drawing is applicable for option F and R

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## Cable and pin assignment

Function:	Option L and K:	Function:	Option F	Option R
VSUP	PIN 1	VSUP	Lead 1 (red)	red
Chipselect	PIN 2	GND	Lead 2	black
Clock	PIN 3	Data	Lead 3	brown
Data out	PIN 4	Clock	Lead 4	yellow
Ground	PIN 5	Chipselect	Lead 5	green

## Cable and pin assignment ETS25X (redundant version)

Function:	Option F:	Explanation:
VSUP 1	Lead 1 (red)	5 pol. flat ribbon cable No. 1
GND 1	Lead 2	5 pol. flat ribbon cable No. 1
Data 1	Lead 3	5 pol. flat ribbon cable No. 1
Clock 1	Lead 4	5 pol. flat ribbon cable No. 1
Chipselect 1	Lead 5	5 pol. flat ribbon cable No. 1
VSUP 2	Lead 1 (red)	5 pol. flat ribbon cable No. 2
GND 2	Lead 2	5 pol. flat ribbon cable No. 2
Data 2	Lead 3	5 pol. flat ribbon cable No. 2
Clock 2	Lead 4	5 pol. flat ribbon cable No. 2
Chipselect 2	Lead 5	5 pol. flat ribbon cable No. 2

For details of the communication of the interfaces please have a look at the data sheets of the chip producer.

### SER-Interface

Producer: ams  
 Type: AS5045  
 web: www.ams.com

### SPI-Interface

Producer: Melexis  
 Type: MLX90316EDC (ETS25 standard version)  
 MLX90316EDC DUAL (ETS25X redundant version)  
 web: www.melexis.com