

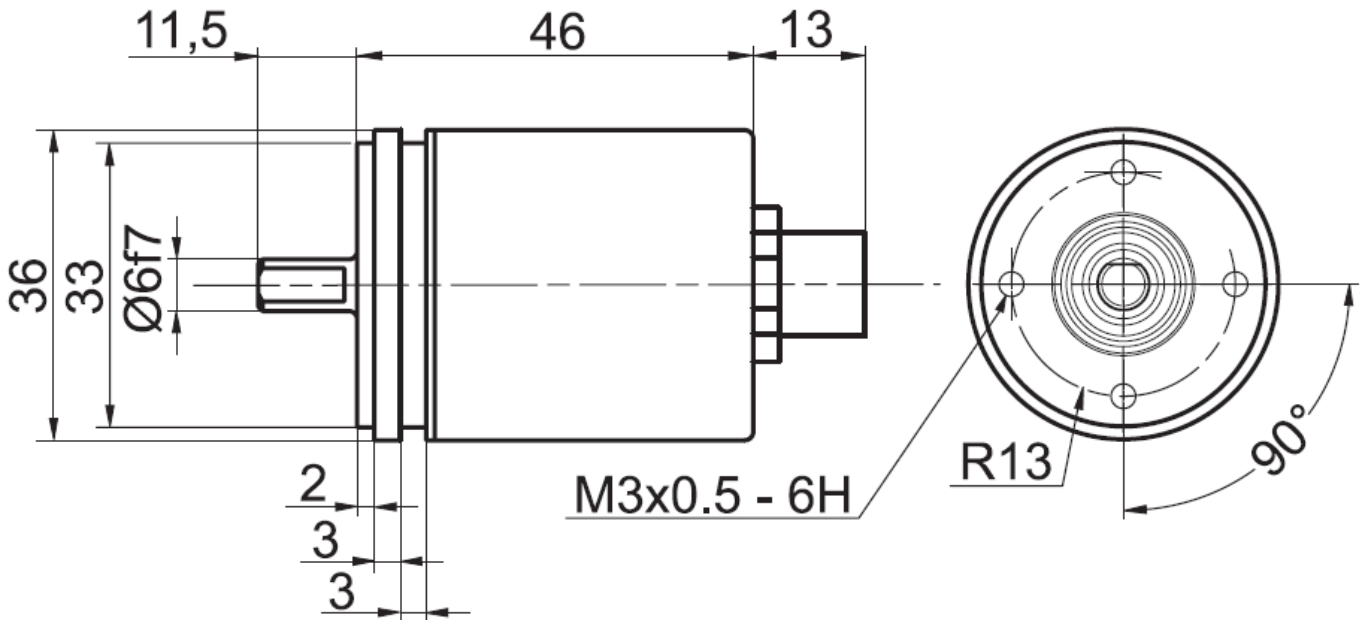
MAGNETIC ANALOG ABSOLUTE MULTI-TURN ENCODERS - SERIE THM4

THM4, Ø36mm multi-turn encoder with analog output :

- Robust and compact conception.
- Ø 6 mm solid shaft version.
- Precision ball bearings with seal.
- High temperature performances -40°C to 85°C.
- Magnetic technology encoder.
- Patented battery backup free counter.
- Analog output 4-20mA, 0-20mA, 0.5-5Vdc, 0-5Vdc or 0-10Vdc.
- Analog output calibration possibility (minimum angle 22.5°).
- Resolution : 12 bits over entire measuring range.
- Polarity inversion and over-voltage-peak protection.
- Highly integrated circuit in SMD-technology.



DIMENSIONS: THM4_06 AXIAL M12



MECHANICAL CHARACTERISTICS

Material	Cover : nickel, plated steel	Vibrations (EN 60068-2-6)	≤ 10 g (10Hz... 1 000Hz)		
	Body : aluminium	Weight (approx.)	150 g		
	Shaft: stainless steel	Operating temperature	- 40 ... + 85°C		
Maximal loads	Axial : 20 N	Storage temperature	- 40 ... + 85°C		
	Radial : 80 N	Humidity	98 % without condensation		
Shaft inertia	≤ 20 g.cm ²	Protection class	Cover: IP64		
Torque	≤ 2 N.cm		Body: IP64		
Continuous max. speed	12 000 min ⁻¹	Lifetime in 10 ⁸ revolutions with F _a / F _r (axial/radial)			
Shocks (EN 60068-2-27)	≤ 100 g (half-sine, 6 ms)	20 N / 20 N	20 N / 40 N	20 N / 80 N	
Shocks (EN 60028-2-29)	≤ 10 g (half-sine, 16ms)	224	28	3	

Changes possible without further notice - Version 100301

ELECTRICAL CHARACTERISTICS

Single turn technology	Magnetic 2 axis Hall sensor	Cycle period	< 600 μ s
Resolution of output	Max 12 bits over entire measuring range	Turn on time	< 1 s
Multiturn technology	Self supplied magnetic pulse counter	Current consumption	Typical: 50mA
Max. number of turns	Programmable	Electrical life-time	> 10 ⁵ h
Single turn accuracy	+/- 0,35°	EMC	EN 61000-6-4 EN 61000-6-2
Linearity	0.15 %	Load resistance	Current: <500Ohms
Supply voltage	12 – 30Vdc		Voltage: >10kOhms

ANALOG CONNECTION

Reference	Type	1	2	3	4	5	Ground
00	M12 5 pinouts	Analog output	+Vcc	GND	SET 2	SET 1	Connector body

INPUTS

Set 2	Set 1	Function
0 (N.C. or GND)	0 (N.C. or GND)	Normal operation
0 (N.C. or GND)	1 (> 12Vdc)	Preset zero point (non turning shaft)
1 (> 12Vdc)	0 (N.C. or GND)	Preset max point (non turning shaft)
1 (> 12Vdc)	1 (> 12Vdc)	Pdefault scale (non turning shaft)

ORDERING REFERENCE (Contact the factory for special versions, ex:special flanges, connections...)

THM4_	06	//	5	L3	0	//	00B00	//	00A
Absolute multi-turn encoder	6mm Solid shaft encoder		Power supply: 12 to 30Vdc	L3 : 4-20mA L4 : 0-20mA L1 : 0-10Vdc	Programmable encoder		Absolute multi-turn encoder Standard configuration: 16 turns		Axial M12 5 pinouts

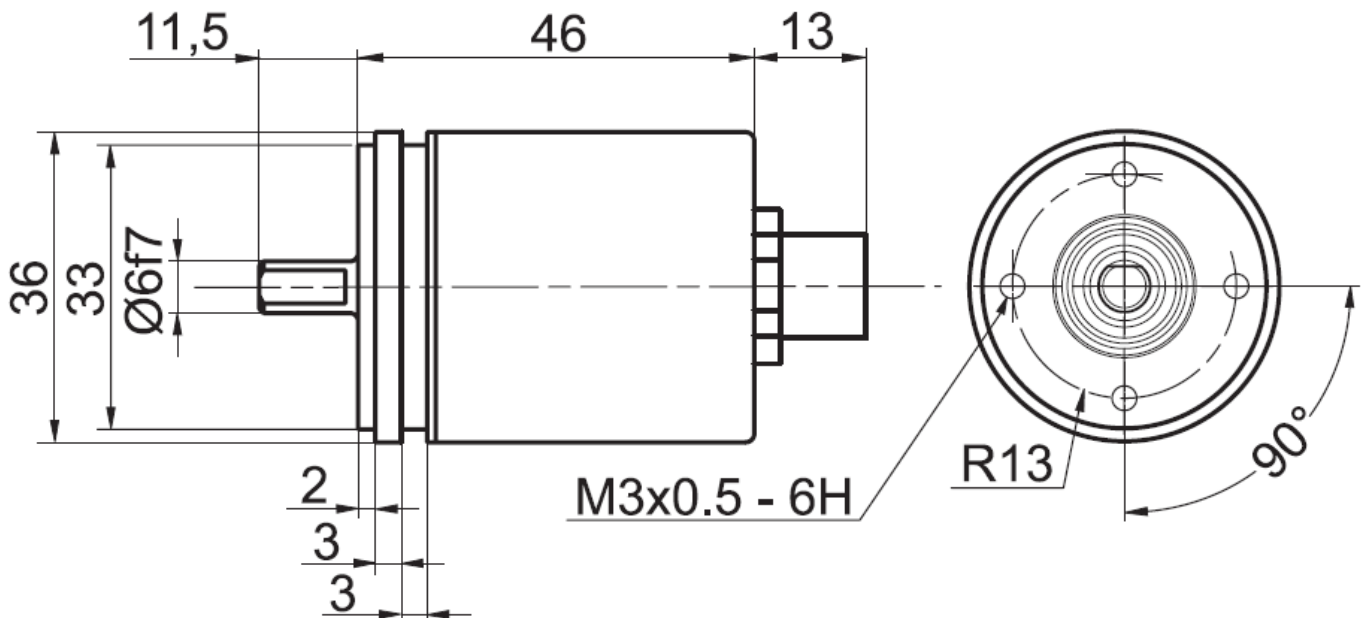
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THM4 is a Ø36mm multiturn encoder with CANopen interface :

- Compact and robust design.
- Solid shaft Ø 6 mm version.
- Precision sealed bearings.
- High temperature performance -30°C to 70°C.
- Hall effect technology.
- Multiturn encoding based on magnetic pulse counter. No batteries used.
- CANopen interface, binary code.
- 12 bits resolution = 4096 steps / turn.
- Number of turns : 12 bits = 4096 turns.
- Polarity inversions and surges protections.
- High integration SMD technology.



DIMENSIONS THM4S10 M12 AXIAL



MECHANICAL CHARACTERISTICS

Material	Cover : nickel, steel plated	Vibrations (EN 60068-2-6)	≤ 10 g (10Hz... 1 000Hz)		
	Body : aluminum	Weight	150 g		
	Shaft: stainless steel	Operating temperature	- 30 ... + 70°C		
Max. shaft loading	Axial : 40 N	Storage temperature	- 30 ... + 70°C		
	Radial : 110 N	Humidity	98 % without condensation		
Shaft Inertia	≤ 30 g.cm ²	Protection class (EN 60529)	IP 54: body		
Torque	≤ 3 N.cm		IP 54: shaft		
RPM (continuous operation)	12 000 rpm	Lifetime in 10 ⁸ revolutions with F _a / F _r (axial / radial)			
Shock (EN 60068-2-27))	≤ 100 g (half-sine, 6 ms)	40 N / 60 N	40 N / 80 N	40 N / 110 N	
Shock (EN 60028-2-29)	≤ 10 g (half-sine, 16ms)	216	91	35	

Changes possible without further notice 090820

ELECTRICAL CHARACTERISTICS

Interface	According to ISO 11898	Consumption	max 0,5W
Transmission	Max 1 MBauds	Accuracy	+/- 1,5°
Internal cycle time	<600 µs	EMC	EN 61000-6-4 EN 61000-6-2
Supply	10 – 30Vdc	Electrical life-time	> 10 ⁵ h

TRANSMISSION MODES

POLLED mode	By a remote-transmission-request telegram the connected host calls for the current process value. The absolute rotary encoder reads the current position value, calculates eventually set-parameters and sends back the obtained process value by the same identifier
CYCLIC mode	The absolute rotary encoder transmits cyclically - without being called by the host - the current process value. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms
SYNC mode	After receiving a sync telegram by the host, the absolute rotary encoder answers with the current process value. If more than one node number (encoder) shall answer after receiving a sync telegram, the answer telegrams of the nodes will be received by the host in order of their node numbers. The programming of an offset-time is not necessary. If a node should not answer after each sync telegram on the CAN network, the parameter sync counter can be programmed to skip a certain number of sync telegrams before answering again.

PROGRAMMABLE PARAMETERS

Operating Parameters	This parameter determines the counting direction, in which the output code increases or decreases. As an important operating parameter the code sequence (complement) can be programmed
Resolution per turn	Value between 1 and 4096 can be programmed
Total resolution "Max range"	This parameter is used to program the desired number of measuring units over the total measuring range. This value may not exceed the total resolution of the absolute rotary encoder.
Preset Value	The preset value is the desired position value, which should be reached at a certain physical position of the axis
Limit Switch, Min. and Max	Two position values can be programmed as limit switches. By reaching these values one bit of the 32 bit process value is set to high level

CONFIGURATION

The standard configuration is : node number = 32 and Baurate = 125kBaud. These configurations can be modified with SDO frames. The Baudrate can be modified from 20kBaud to 1MBaud. The node number can be programmed between 0 and 89.

CANopen CONNECTION

Type	GND	+Ub = 10-30Vdc	CAN-High	CAN-Gnd	CAN-Low
B7	3	2	4	1	5

ORDERING REFERENCE (specific manufacture on demand. ex: flange / specific connection...)

THM4_	06	//	5	BB	B	//	12B12	//	B7A
Absolute multiturn encoder	Solid shaft Ø6mm		Supply : 11 to 30Vdc	CANopen	Binary code		12bits : resolution 13 bits : number of turns		M12 5 pinouts axial output

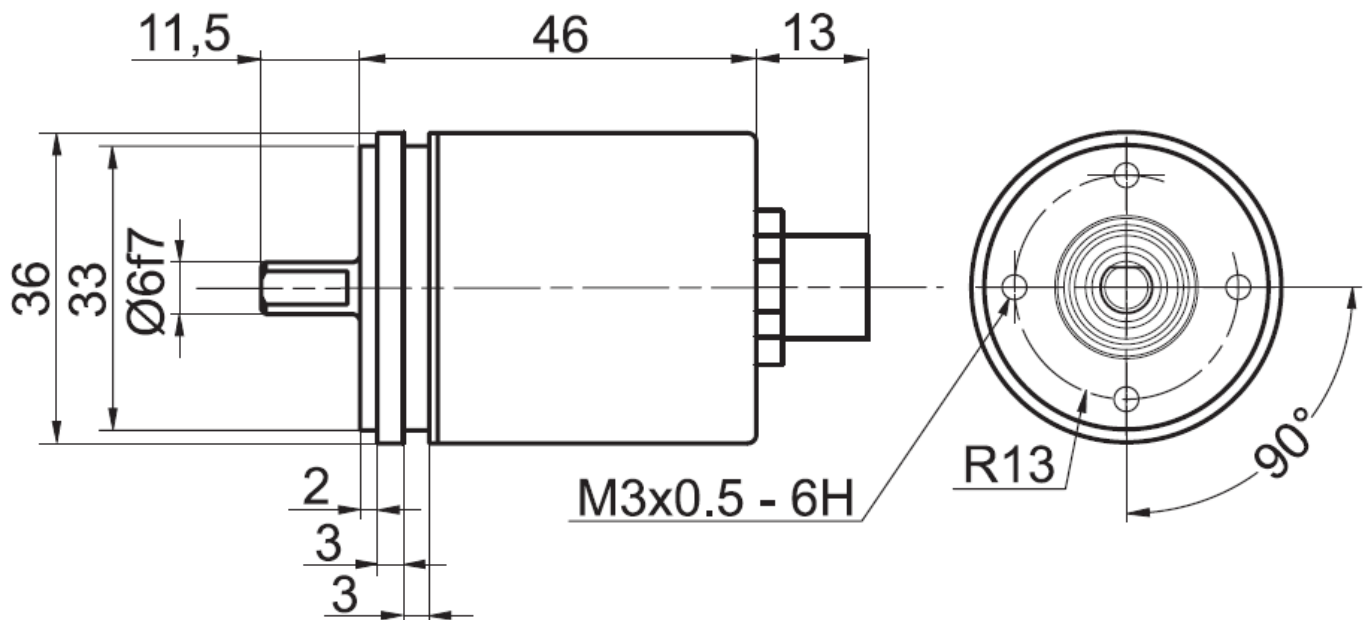
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THM4 is a Ø36mm multiturn encoder with SSI interface :

- Compact and robust design.
- Solid shaft Ø 6 mm version.
- Precision sealed bearings.
- High temperature performance -30°C to 70°C.
- Hall effect technology.
- Multiturn encoding based on magnetic pulse counter. No batteries used.
- SSI interface, GRAY code.
- 12 bits resolution = 4096 steps / turn (max 14 bits).
- Number of turns : 13 bits = 8192 turns.
- Polarity inversions and surges protections.
- High integration SMD technology.



THM4 M12 AXIAL DIMENSIONS



MECHANICAL CHARACTERISTICS

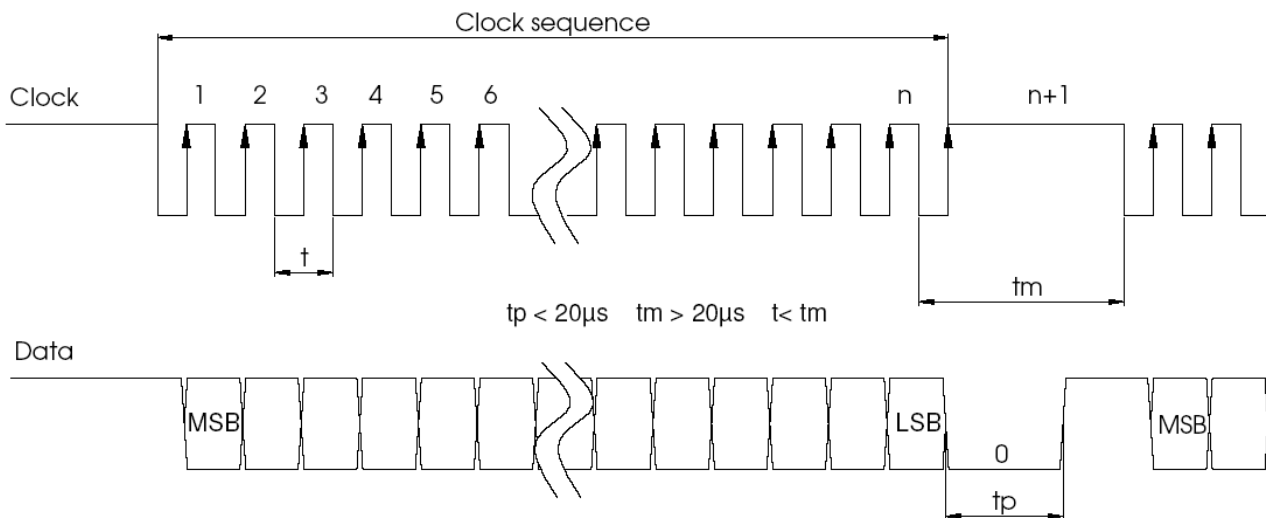
Material	Cover : nickel, steel plated	Vibrations (EN 60068-2-6)		≤ 10 g (10Hz... 1 000Hz)	
	Body : aluminum	Weight		150 g	
	Shaft: stainless steel	Operating temperature		- 30 ... + 70°C	
Max. shaft loading	Axial : 40 N	Storage temperature		- 30 ... + 70°C	
	Radial : 110 N	Humidity		98 % without condensation	
Shaft Inertia	≤ 30 g.cm ²	Protection class (EN 60529)		IP 54: body	
Torque	≤ 3 N.cm			IP 54: shaft	
RPM (continuous operation)	12 000 rpm	Lifetime in 10 ⁸ revolutions with F _a / F _r (axial / radial)			
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Changes possible without further notice 090820

ELECTRICAL CHARACTERISTICS

Single turn technology	Effet Hall, 2 axis	Accuracy	+/- 1,5°
Single turn resolution	Up to 14 bits	Supply	10 – 30Vdc
Multi turn technology	Auto-supplied, magnetic count	Cycle time	< 600 µs
Multi turn resolution	Up to 200 millions of turns	Introduction	< 1 s
Input signal clock CLK	Per optocoupler	Consumption	Max : 2W
Output signal DATA	line - driver RS422	Electrical life-time	> 10 ⁵ h
Clock frequency CLK	100kHz – 2MHz	EMC	EN 61000-6-4 EN 61000-6-2

SSI COMMUNICATION



Driver	Data according to RS422 standard ; transmission up to 10 Mbits/s
Transmission	Up to 1 200m
Safety	Signals transmission
Cable	High security of transmission by using shielded cable and twisted pairs

SSI CONNECTION

Reference	Type	+ Vcc	0 V	Clk+	Data+	RAZ	Data-	Clk-	Direction	Ground
SC	M12 8 pinouts	2	1	3	5	7	6	4	8	Connector body

INPUTS

Count when encoder's shaft rotates clockwise, view from body (flange) side (input resistance 10kOhms)	Increasing count	Sent data reset (input resistance 10kOhms)	Position
0 (input = NC or GND)	Decreasing count	0 (input = NC or GND)	Reset after 1 second
1 (input = +Ub or ≥ 10V)		1 (input = +Ub or ≥ 10V)	

ORDERING REFERENCE (specific manufacture on demand. ex: flange / specific connection...)

Ex : THM4_	06	//	5	SS	G	//	12B13D5	//	SCA
Absolute multi turn encoder	Solid shaft 6mm	Supply : 11 to 30Vdc	SSI without parity	Gray code	12B13D5 : 12 bits : resolution 13 bits : number of turns D5 25 bits SSI data	M12 8 pinouts axial output			