RELIABLE, ESTABLISHED, AND MODULAR



Product description

The ATM90 with SSI data interface complements the through hollow shaft variants in the ATM60 product family. The ATM90 operates reliably even under harsh ambient conditions. Its rugged mechanical design ensures maximum reliability and a long service life. Magnetic singleturn scanning allows a maximum resolution of up to 13 bits within one revolution. The number of revolutions, maximum of 13 bit, is output and recorded using a mechanical and almost completely wear-free transmission. This means that the ATM90 can be operated without a battery. A shallow installation depth of 60 mm combined with high shock and vibration resistance enable the ATM90 to be used in applications with high mechanical stress and distinct climate fluctuations

At a glance

- Extremely rugged, tried-and-tested absolute multiturn encoder with a resolution of up to 26 bits
- Mechanical interface: through hollow shaft with shallow installation depth
- Zero-set and preset functions via hardware or software
- Electrical interface: SSI with gray or binary code type
- Electronically adjustable, configurable resolution
- Magnetic scanning

Your benefits

- Fewer variants are required since one freely programmable encoder offers all singleturn and multiturn resolutions
- Easy setup due to various electrical connection adapters (cable, M23)
- Maintenance-free encoder, long service life
- Quick commissioning using the zero set/preset function either at the press of the button on the device or via software
- Increased productivity due to highly reliable shock and vibration resistance
- Worldwide availability and service ensure quick and reliable customer service

More information

Fields of application G-437
Detailed technical data. G-437
Type code. G-438
Ordering information. G-439
Dimensional drawings G-440
PIN assignment. G-441
Recommended accessories. G-442

G

8015560/2015-09-01
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Fields of application

- Measurement of absolute position in various machines and system such as wind power and solar plants, material transport equipment, textile machines, packaging systems, rollers, harbor facilities, printing machines

Detailed technical data

Performance

Max. number of steps per revolution	≤ 8,192
Max. number of revolutions	≤ 8,192
Resolution	13 x 12 or 12 x 13 bit
Error limits	± 0.25 °
Repeatability	0.1 °
Measurement step	0.043 °
Initialization time	1,050 ms [1]

[1] Valid positional data can be read once this time has elapsed.

Interfaces

Electrical interface	SSI
Signal wire	Potential-free with a 12-pin M23 male connector for the housing or a 12-wire cable
Interface signals	Clock +, Clock -, Data +, Data- [1] Programming interface: RS-422
Clock frequency	1 MHz [2]
Set (electronic adjustment)	H active (L = 0 - 4.7 V, H = 10 - Us V)
CW/CCW (counting sequence when turning)	L active (L = 0 - 1.5 V, H = 2.0 - Us V)
Configuration data	Number of steps per revolution Number of revolutions Code type Electronic adjustment

[1] For higher clock frequencies, choose synchronous SSI.

[2] Min. LOW level (Clock +): 500 ns.

Electrical data

Operating voltage range	10 V ... 32 V
Max. power consumption without load	≤ 0.8 W
Code type	Gray, binary
Code sequence	CW/CCW
Reverse polarity protection	✔
MTTFd: mean time to dangerous failure	150 years (EN ISO 13849-1) [1]

[1] This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of devices, average ambient temperature 40 °C, frequency of use 8,760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

Mechanical data

Shaft diameter Through hollow shaft	12, 16 mm and 1/2"
Shaft material	Stainless steel
Flange material	Aluminum
Housing material	Aluminum
Mass [1]	0.8 kg
Start up torque at 20 °C	0.5 Ncm
Operating torque at 20 °C	0.4 Ncm
Max. angular acceleration	≤ 600,000 rad/s²
Max. operating speed [2]	2,000 rpm
Rotor moment of inertia	152.77 gcm²
Bearing lifetime	3.6 x 10^9 revolutions

[1] Relates to devices with cable outlet.

[2] Take into account self-warming of 3.3 K per 1,000 rpm when designing operating temperature range

Ambient data

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP 65 with shaft seal (acc. to IEC 60529) [1]
Permissible relative humidity	98%
Operating temperature range	–20 °C ... +70 °C
Storage temperature range	–40 °C ... +100 °C, without packaging
Resistance to shocks	100 g/6 ms (according to EN 60068-2-27)
Resistance to vibrations	20 g / 10 Hz - 2,000 Hz (according to EN 60068-2-6)

[1] When mating connector is inserted.

Type code

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Electrical interface

A 10 V...32 V, SSI/RS422

Mechanical design

T Through hollow shaft, Ø 12 mm

U Through hollow shaft Ø 1/2"

X Through hollow shaft, Ø 16 mm

Connection type

A Male connector M23, 12-pin, radial outlet

K Cable, 12-wire, radial outlet, 1.5 m

L Cable, 12-wire, radial outlet, 3.0 m

M Cable, 12-wire, radial outlet, 5.0 m

Resolution can be programmed by the customer using the programming tool PGT 01 [1),2)]

Factory setting:12 bit singleturn x 12 bit multiturn

A	T	M	9	0	–	A			1	2	x	1	2

[1] Ex-works configuration: 4,096 steps x 4,096 revolutions, Gray-Code, Set = 0. Other configurations on request.

[2] Maximum permissible resolution: 25 bit (12 bit singleturn x 13 bit multiturn or 13 bit singleturn x 12 bit multiturn).

8015560/2015-09-01

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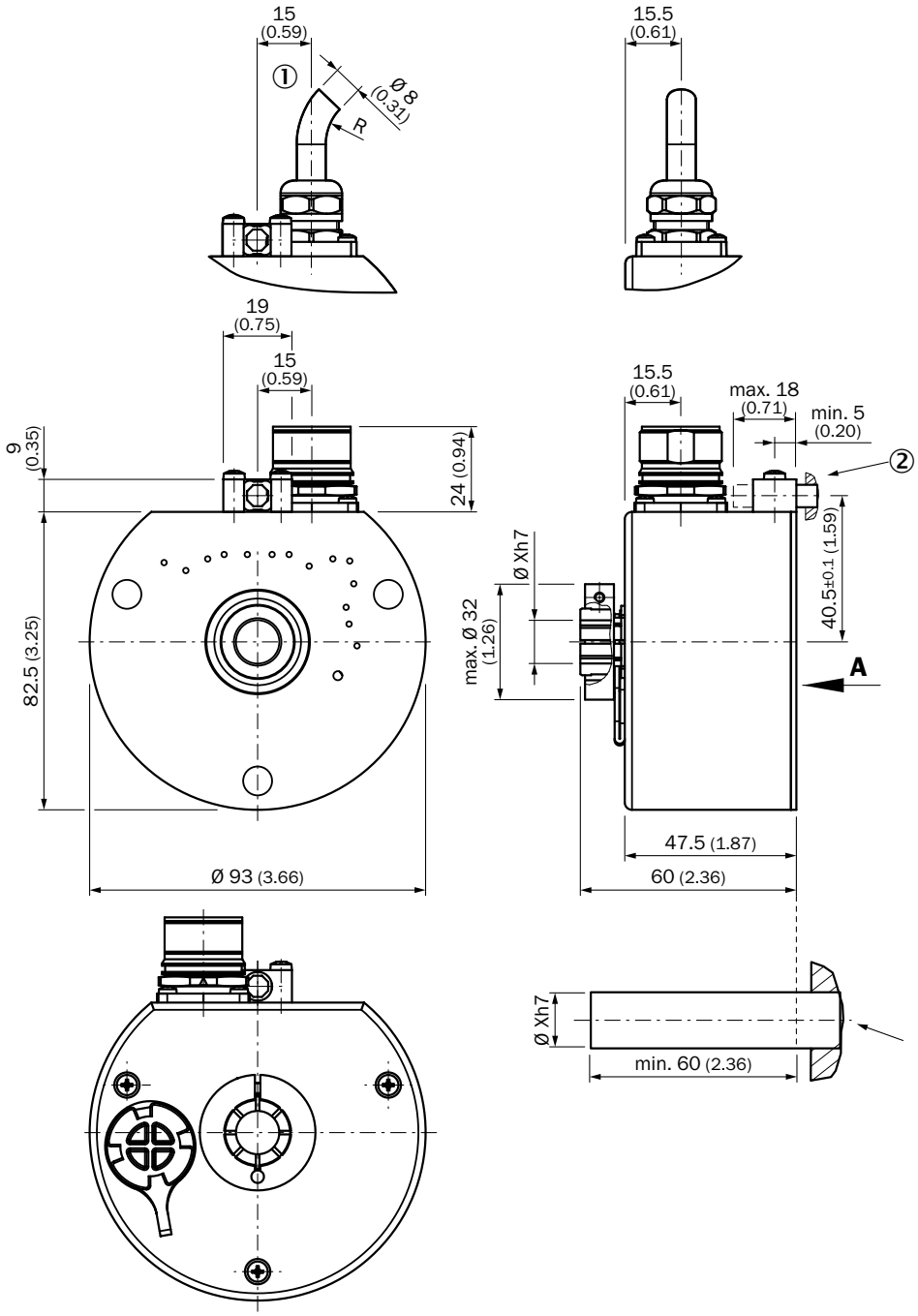
Ordering information

Through hollow shaft

- **Electrical interface:** 10 V ... 32 V, SSI
- **Number of steps:** ≤ 4,096
- **Resolution:** 4,096 x 4,096
- **Programmable:** ✔

Shaft diameter	Connection type	Type	Part no.
1/2"	Cable, 12-wire, radial, 1.5 m	ATM90-AUK12X12	1030035
	Cable, 12-wire, radial, 3 m	ATM90-AUL12X12	1030036
	Cable, 12-wire, radial, 5 m	ATM90-AUM12X12	1030037
	M23 male connector, 12-pin, radial	ATM90-AUA12X12	1030034
12 mm	Cable, 12-wire, radial, 1.5 m	ATM90-ATK12X12	1030031
	Cable, 12-wire, radial, 3 m	ATM90-ATL12X12	1030032
	Cable, 12-wire, radial, 5 m	ATM90-ATM12X12	1030033
	M23 male connector, 12-pin, radial	ATM90-ATA12X12	1030030
16 mm	Cable, 12-wire, radial, 1.5 m	ATM90-AXK12X12	1030039
	Cable, 12-wire, radial, 3 m	ATM90-AXL12X12	1030040
	Cable, 12-wire, radial, 5 m	ATM90-AXM12X12	1030041
	M23 male connector, 12-pin, radial	ATM90-AXA12X12	1030038

Dimensional drawings (dimensions in mm)



General tolerances according to DIN ISO 2768-mk

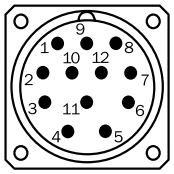
① Min. bend radius 40 mm

② Encoder stator coupling through customer's Ø 6 mm cylindrical pin, DIN EN 28734

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PIN assignment

PIN	Signal	Wire colors (cable outlet)	Explanation
1	GND	Blue	Ground connection
2	Data +	White	Interface signals
3	Clock +	Yellow	Interface signals
4	R x D +	Gray	RS-422 programming cable
5	R x D –	Green	RS-422 programming cable
6	T x D +	Pink	RS-422 programming cable
7	T x D –	Black	RS-422 programming cable
8	U_S	Red	Operating voltage
9	SET	Orange	Electronic adjustment
10	Data –	Brown	Interface signals
11	Clock –	Violet	Interface signals
12	V/$\overline{R}$	Orange/black	Sequence in direction of rotation
	Screen		Housing potential



View of M23 male device connector on encoder

V/$\overline{R}$ This input programs the counting direction for the encoder. When it is not connected, this input is set to HIGH. If the encoder shaft is rotated clockwise (to the right) as viewed when facing the shaft, it counts in ascending order. If it should count in ascending order when the shaft is rotated counterclockwise (to the left), then this connection must be permanently set to LOW level (GND).

SET This input is for electronic zeroing. If the SET cable is set to U_S for more than 100 ms, the mechanical position corresponds to the 0 value, i.e., the predetermined SET value.

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Recommended accessories

Connectivity

Plug connectors and cables

Connecting cables with female connector

Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M23, 12-pin, straight Head B: cable Cable: suitable for drag chain, PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 2 x 0.14 mm², Ø 7.8 mm	1.5 m	DOL-2312-G1M5MA1	2029200
		3 m	DOL-2312-G03MMA1	2029201
		5 m	DOL-2312-G05MMA1	2029202
		10 m	DOL-2312-G10MMA1	2029203
		20 m	DOL-2312-G20MMA1	2029204
		30 m	DOL-2312-G30MMA1	2029205

Dimensional drawings ➜ page K-725

Female connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: –20 °C ... +130 °C	DOS-2312-G	6027538
	Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: –40 °C ... +125 °C	DOS-2312-G02	2077057
	Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm ... 6.6 mm Head B: - Operating temperature: –20 °C ... +130 °C	DOS-2312-W01	2072580
	Head A: female connector, M23, 21-pin, straight, shielded, for cable diameter 5.5 mm ... 12 mm Head B: -	DOS-2321-G	6027539

Dimensional drawings ➜ page K-725

Cables (ready to assemble)

Figure	Brief description	Length of cable	Type	Part no.
	Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm², Ø 5.6 mm	By the meter	LTG-2308-MWENC	6027529
	Head A: cable Head B: cable Cable: PUR, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 1 x 0.14 mm², Ø 7.5 mm	By the meter	LTG-2411-MW	6027530
	Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 2 x 0.14 mm², Ø 7.8 mm	By the meter	LTG-2512-MW	6027531
	Head A: cable Head B: cable Cable: suitable for drag chain, PUR, halogen-free, shielded, UV and saltwater-resistant, 4 x 2 x 0.25 mm² + 2 x 0.5 mm² + 2 x 0.14 mm², Ø 7.8 mm	By the meter	LTG-2612-MW	6028516

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8015560/2015-09-01
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Male connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: male connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: –20 °C ... +130 °C	STE-2312-G	6027537
	Head A: male connector, M23, 12-pin, straight, for cable diameter 5.5 mm ... 10.5 mm Head B: - Operating temperature: –40 °C ... +125 °C	STE-2312-G01	2077273

Dimensional drawings ➜ page K-725

Other accessories

Programming and configuration tools

Figure	Brief description	Type	Part no.
	Programming tool for ATM60, ATM90 and KH53 SSI	PGT-01-S	1030111

➜ For additional accessories, please see page K-668 onwards

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