

ABSOLUTE MULTITURN ENCODER MyAbs

BAMS 90 BAMH 90

- Electronic multiturn gear
- Hollow shaft up to $\varnothing 28$ mm or shaft $\varnothing 12$ mm
- Shock resistant up to 250 g
- Only 50 mm clearance needed
- Easy mounting of the hollow shaft version.
The encoder is mounted directly on the drive shaft without coupling.

- Multiturn up to 8192 (13 bits) resolution, 4096 (12 bits) number of turn
- SSI interface, additional interfaces include RS 485 and OEM specific protocols
- Protection: IP 65
- optional with incremental track 2048 ppr.
-  available as explosion proof zone 2 and 22



Mechanical characteristics:

Speed: ¹⁾	max. 6000 min ⁻¹
Rotor moment of inertia:	appr. 65×10^{-6} kgm ²
Starting torque hollow shaft version:	< 0,2 Nm
Starting torque shaft version:	< 0,05 Nm
Radial load capacity of shaft (hollow shaft): ²⁾	80 N
Axial load capacity of shaft: (shaft): ²⁾	40 N
Weight:	appr. 0,7 kg
Protection acc. to EN 60 529:	IP 65
Working temperature:	-20° C ... +70 °C
Shaft:	stainless steel
Shock resistance acc. to DIN-IEC 68-2-27	2500 m/s ² , 6 ms
Vibration resistance acc. to DIN-IEC 68-2-6:	100 m/s ² , 10 ... 2000 Hz

¹⁾ for continuous operation 3000 min⁻¹

²⁾ at shaft version only (at shaft end)

Electrical characteristics:

Interface type:	Synchronous-Serial (SSI) with outputs
General:	
Supply voltage (U _B):	5,0 ... 30 V DC ³⁾
Current consumption type (no load):	89 mA
max (no load):	138 mA
Short circuit proof outputs: ¹⁾	yes ²⁾
Reverse connection protection at U _B :	yes
SSI-Interface:	
Output driver:	RS 485
Permissible load/channel:	max. +/-20 mA
Update rate for position data:	appr. 1600/s
SSI pulse rate min./max./pulse frequency:	100 kHz/500 kHz
Signal level high:	typ. 3,8 V
Signal level low (I _{Last} = 20 mA):	typ. 1,3 V
Rise time t _r (without cable):	max. 100 ns
Fall time t _f (without cable):	max. 100 ns
Control inputs:	
(V/R, SET)	Voltage: 5 ... 30 V DC = U _B
	Response time: 10 ms
	Signal level: low max. 25 % U _B
	high min. 60 % U _B , max. U _B
	Max. current load ≤0,5 mA
Status outputs:	
	Output driver: Push-Pull
	max. permissible load: ±9,0 mA
	Signal level high: min. U _B -3,0 V
	low: max. 1,5 V
	Rise time: max. 240 μs
	Fall time: max. 300 μs
Incremental outputs (A/B):	
	Output driver: RS422 compatible
	Puls frequency (max.): 200 kHz
	Signal level high: 4,5 V
	Signal level low (I _{Last} = 20 mA): 0,5 V
	Rise time (without cable): max. 200 ns
	Fall time (without cable): max. 200 ns

¹⁾ when U_B supply voltage correctly applied U_B

²⁾ Only one channel at a time:
When U_B = 5 V DC, short-circuit to output, 0 V and + U_B is permitted.
When U_B < 5 V DC short-circuit to output and 0 V is permitted.

³⁾ Please note: the minimum voltage supply must be 5.0 V DC

Conforms to CE requirements acc. to EN 50082-2, EN 50081-2 and EN 55011
Class B
Performance against magnetic influence acc. to EN61000-4, 5



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MultiturnType BAMH 90 SSI or RS 485

Control inputs:

F/R input for change of direction

The encoder can output increasing code values when the shaft is rotated either clockwise or counter-clockwise (when looking from the shaft side).

The appropriate option can be selected via a hardware configuration of the F/R input BEFORE powering up the encoder.

The following table shows the function selection dependent on the hardware and software settings:

Hardware configuration of the F/R input:

Hardware configuration of the F/R input	Function: increasing code value when the shaft is in the following direction:
"low" (0 V) on the F/R input (= cw)	cw
"high" (+U _B) on the F/R input (= ccw)	ccw
"low" (0 V) on the F/R input (= cw)	ccw
"high" (+U _B) on the F/R input (= ccw)	ccw

Notes

- Any hardware configuration of the F/R input must take place BEFORE powering up the encoder!
- If the F/R input is not configured, then a 0 V configuration will apply (default condition)!
- If the direction of rotation is changed due to the F/R configuration, without activating the SET function again, and if the encoder is also then powered up again, a new position value may be outputted, even if the physical shaft position of the encoder has not moved! This is due to internal conversion processes.

The start-up procedure for the encoder should therefore follow this sequence:

1. Determine the count direction of the encoder via the F/R input
 2. Apply power to the encoder
 3. Activate the SET function, if desired (see SET input below)
- If using a cable wire to configure the F/R input, then for EMC reasons the wire should not remain open but should be tied either to 0 V or U_B!
 - The response time of the F/R input with U_B = 5 ... 30 V DC power supply is 10 ms.

SET inputs

This input is used to reset (to zero) the encoder. A high control pulse (+U_B) applied to this input for a minimum of 10 ms will reset the current encoder position to the pre-programmed setpoint value.

Notes

- The SET function should only be implemented when the encoder shaft is at rest.
- For the duration of the SET pulse the SSI interface does not function and therefore does not output any valid position values!
- If using a cable wire to configure the SET input, then for EMC reasons the wire should not remain open but should be tied either to 0 V or U_B!
- The response time of the SET input with U_B = 5 ... 30 V DC power supply is 10 ms.

Encoder outputs¹⁾:

Output	Default-function
A1:	battery control*
A2:	not activated*
A3:	not activated*
A4:	not activated*

The outputs are not activated in the factory setting (default). They can be activated and defined by the factory e. g. limit switch, overspeed and temperature control etc.

¹⁾ not available for versions with incremental track

* can be activated by factory

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BAMS 90 BAMH 90

MultiturnType BAMH 90 SSI or RS 485

Terminal assignment SSI Synchronous Serial interface with 12pin plug

Signal:	0V	+U _B	+T	-T	+D	-D	ST	VR	A1	A2	A3	A4	Shield
Pin:	1	2	3	4	5	6	7	8	9	10	11	12	PH
Col.:	WH	BN	GN	YE	GY	PK	BU	RD	BK	VT	GY PK	RD BL	

T: Clock signal

D: Data signal

ST: SET input. The current position value is stored as new zero position (or the actual value is set to the preset value when using the programmable version).

VR: Up/down input. As long as this input is active, decreasing code values are transmitted when shaft turning clockwise.

PH: Plug housing

Insulate unused outputs before initial start-up.

A1, A2, A3, A4: outputs programmable by factory

Terminal assignment RS 485 and 12pin plug

Signal:	0V	+U _B	T/R-	T/R+	5	6	7*	VR	9	10	11	12	Shield
Pin:	1	2	3	4	5	6	7*	8	9	10	11	12	PH
Col.:	WH	BN	GN	YE	5	6	7*	RD					

R: Receive-channel

T: Transmit-channel

VR: Up/down input. As long as this input (High-Level = +U_B) is active, decreasing code values are transmitted when shaft turning clockwise.

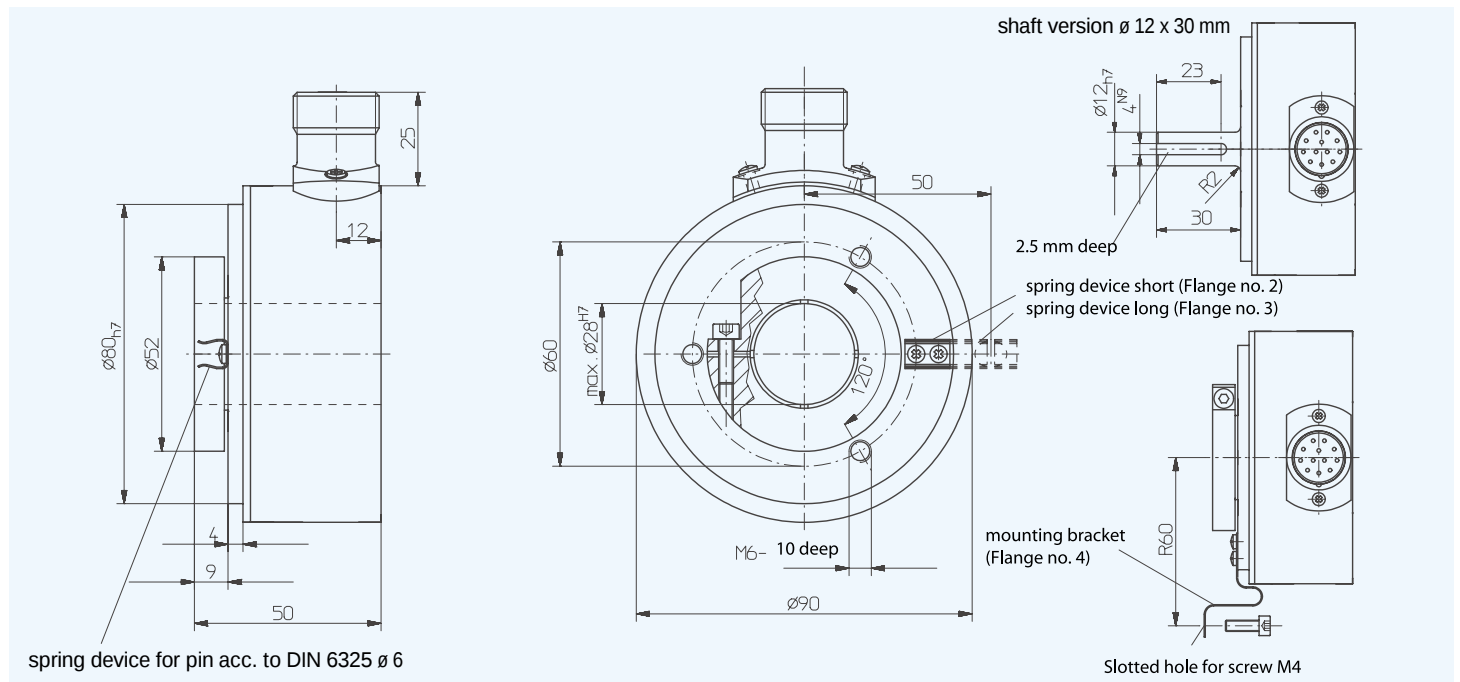
PH: Plug housing

*There is no set input for P3001 version, but it can be realised

SSI interface with incremental track (A, B):

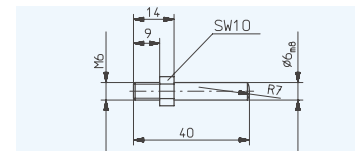
Signal:	0 V	+U _B	Clock+	Clock-	Data+	Data-	Set 0	VR	$\bar{B}$	B	$\bar{A}$	A	Shield
Pin:	1	2	3	4	5	6	7*	8	9	10	11	12	PH

Dimensions:



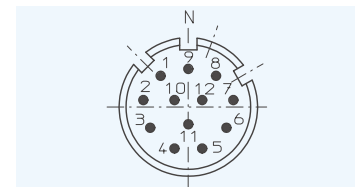
Mounting advice:

- 1) Do not connect encoder and drive rigidly to one another at shafts and flanges!
- 2) Delivery includes a corresponding cylindrical pin (see drawing), when the encoder is ordered with flange type 2 (short spring device) or type 3 (long spring device).



Top view of mating connector, male contact base:

12 pin plug



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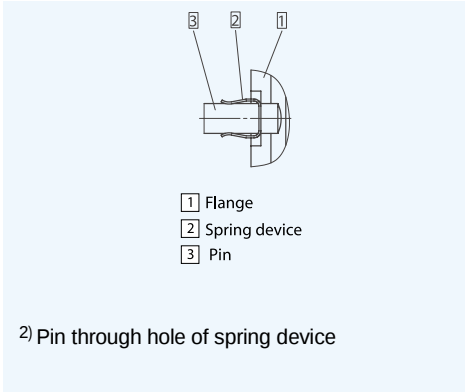
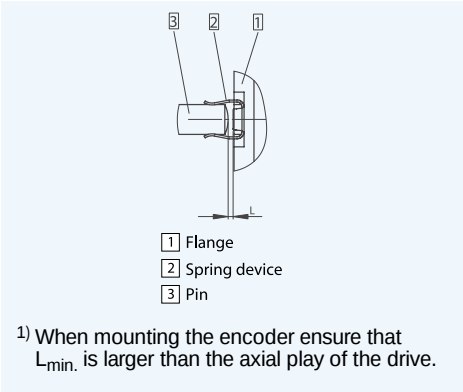
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BAMS 90
BAMH 90

MultiturnType BAMH 90 SSI or RS 485

Max. permissible drive shaft impact:

Type of flange:	Permissible axial impact	Permissible radial play	Permissible angular play
Flange type 2 (short spring device):	max. ±1 mm ¹⁾	max. ±0.3 mm	max. ±2°
Flange type 3 (long spring device):	∞ ²⁾	max. ±0.3 mm	max. ±2°
Flange type 4 (mounting bracket):	max. ±0.5 mm	max. ±0.3 mm	max. ±2°



ORDERING CODE Multiturn BAMH 90

BAMH 90	Flange 1 = without mounting aid 2 = with short spring device 3 = with long spring device 4 = with mounting bracket	Shaft Ø 12 = hollow shaft ø 12 mm 15 = hollow shaft ø 15 mm 20 = hollow shaft ø 20 mm 21 = hollow shaft ø 24 mm 28 = hollow shaft ø 28 mm BAMS 90x12 = shaft ø 12 x 30 mm	Interface and supply voltage 2 = SSI, 5 ... 30 V DC 3 = RS 485, half-duplex 5 ... 30 V DC internal termination 5 = SSI, 5 ... 30 V DC, with incremental track 2048 ppr (A, B) 7 = RS 485 halfduplex 5 ... 30 V DC external termination 8 = RS 485-Interface, halfduplex-mode 9 = ESC-protocol max. 38400 baud	Connection 6R = 12 pin plug without mating connector	Code G = Gray B = Binary	SSI-Interface 1212 = 4096 x 4096 (24-Bit) 1312 = 8192 x 4096 (25-Bit)