

- Heavy duty absolute single- and multiturn encoders with SSI, Profibus, CANopen outputs. Parallel output for most versions on request
- Shaft and hollow shaft versions with  $\varnothing$  90 mm
- Applications:
  - Steel industry
  - Paper industry
  - Cranes
- Shaft  $\varnothing$  11 or 12 mm
- Through hollow shaft  $\varnothing$  12, 20, 25, 30 mm (others on request)

- Easy mounting of the hollow shaft version. The encoder is mounted directly on the drive shaft without coupling



**SSI**

**CANopen**

**PROFI**<sup>®</sup>  
PROCESS FIELD BUS  
**BUS**



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Electrical Data:	SSI <sup>1)</sup>	Profibus (MT)	CANopen (MT)
Supply voltage	11–30 VDC (ST) 5–30 VDC (MT)	11–30 VDC	11–30 VDC
Intrinsic current consumption (without load)	100 mA max.	24 VDC: max. 170 mA	24 VDC: max. 120 mA
Interface	Standard SSI	Specification according Profibus DP2.0 Standard (DIN 19245 part 3) RS485 driver galvanically isolated	CAN high speed according ISO 11898, Basic- and full CAN CAN specification 2.0A
Protocol		Profibus encoder profile V1.1 Class 1 and Class 2	CAN open profile DS406 V1.0
Lines/Drivers	RS422		
Output code	SSI: Binary or Gray	Binary	Binary
Singleturn resolution	13 Bit	13 Bit	13 Bit
Multiturn resolution	12 Bit	16 Bit	16 Bit
Incremental signals	optional		
Number of increments	2048		
Clock frequency	ST 100 kHz–1 MHz MT 100 kHz–500 kHz		
Connection	Cable or flange-connector	Cable	
Parameterization		According to Profibus profile	According to CANopen profile
Control input	Direction		

Mechanical Data:	SSI <sup>1)</sup>	Profibus (MT)	CANopen (MT)
Housing diameter	90 mm	90 mm	90 mm
Protection	FAxS90: IP 66 FAxH90: IP 65	FAMS90: IP 67 FAMH90: IP 65	FAMS90: IP 67 FAMH90: IP 65
Flange types	Synchro-flange Spring tether	Synchro-flange Spring tether	Synchro-flange Spring tether
Shaft diameter	Solid shaft: 11, 12 mm Hollow shaft: 12, 20, 25, 30 mm	Solid shaft: 11, 12 mm Hollow shaft: 12, 20, 25, 30 mm	Solid shaft: 11, 12 mm Hollow shaft: 12, 20, 25, 30 mm
Max. speed at 70 °C	FAxS90: continuous 6000 min <sup>-1</sup> short-term 9000 min <sup>-1</sup> (ST) 6000 min <sup>-1</sup> (MT) FAxH90: continuous 3600 min <sup>-1</sup> short-term 6000 min <sup>-1</sup>	FAMS90: continuous 6000 min <sup>-1</sup> short-term 6000 min <sup>-1</sup> FAMH90: continuous 3600 min <sup>-1</sup> short-term 6000 min <sup>-1</sup>	FAMS90: continuous 6000 min <sup>-1</sup> short-term 6000 min <sup>-1</sup> FAMH90: continuous 3600 min <sup>-1</sup> short-term 6000 min <sup>-1</sup>
Starting Torque	< 0,025 Nm	< 0,025 Nm	< 0,025 Nm
Moment of inertia, rotor	15 ... 55 x 10 <sup>-6</sup> kgm <sup>2</sup>	15 ... 55 x 10 <sup>-6</sup> kgm <sup>2</sup>	15 ... 55 x 10 <sup>-6</sup> kgm <sup>2</sup>
Absolute max. shaft load	FAxS90: axial 100 N, radial 200 N FAxH90: axial 50 N, radial 80 N	FAxS90: axial 100 N, radial 200 N FAxH90: axial 50 N, radial 80 N	FAxS90: axial 100 N, radial 200 N FAxH90: axial 50 N, radial 80 N
Shock resistance IEC 68-2-27	500 m/s <sup>2</sup> (6 ms)	300 m/s <sup>2</sup> (6 ms)	300 m/s <sup>2</sup> (6 ms)
Vibration resistance IEC 68-2-6	ST 200 m/s <sup>2</sup> (10 ... 1000 Hz) MT 100 m/s <sup>2</sup> (10 ... 2000 Hz)	100 m/s <sup>2</sup> (10 ... 500 Hz)	100 m/s <sup>2</sup> (10 ... 500 Hz)
Working temperature	ST -20 ... +90 °C MT -20 ... +85 °C	-10 ... +70 °C	-10 ... +70 °C
Weight, approx. (ST/MT)	FAxS90: 1100 g/1600 g FAxH90: 700 g/700 g	FAMS90: 1100 g FAMH90: 900 g	FAMS90: 1100 g FAMH90: 900 g

<sup>1)</sup> Parallel output on request

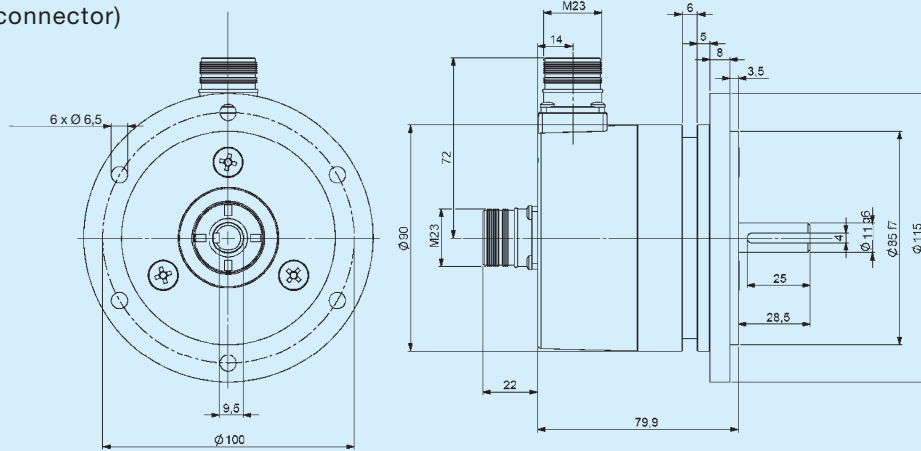
# ABSOLUTE SHAFT ENCODER

# FAxS90

## SINGLETURN, SSI

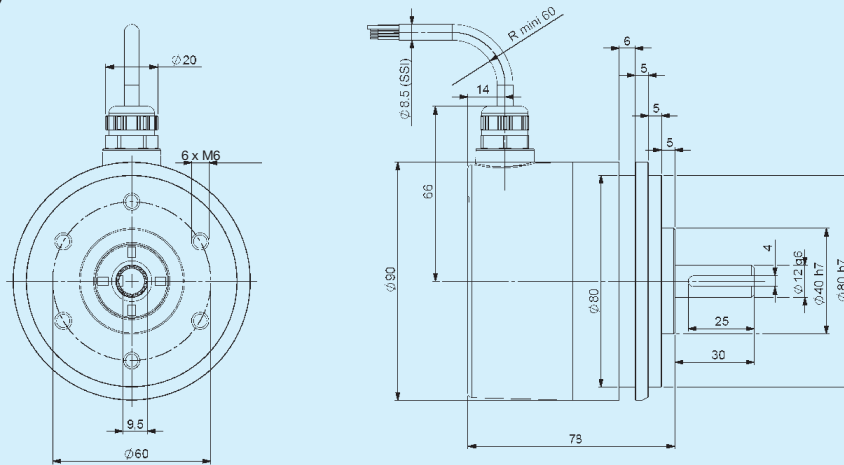
Dimensioned drawing

Flange  $\varnothing 115$  mm, shaft  $\varnothing 11$  mm  
(Drawing with M23 connector)



Synchro flange

(Drawing with cable version)

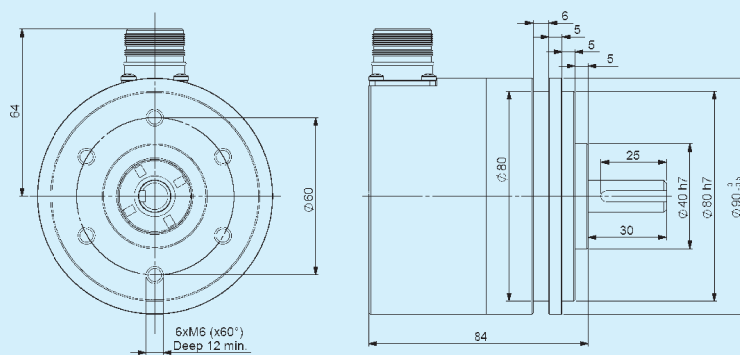


## MULTITURN, SSI

Dimensioned drawing

Synchro flange

(Drawing with M23 connector)



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# ABSOLUTE SHAFT ENCODER

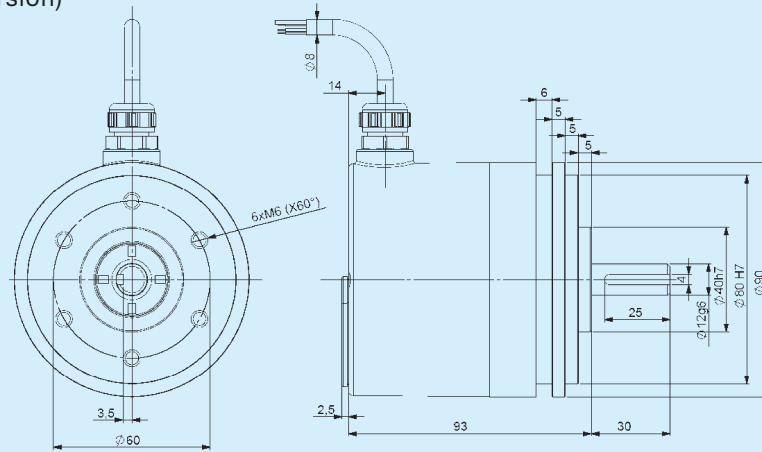
# FAMS90

## MULTITURN, PROFIBUS DP

Dimensioned drawing

### Synchro flange

(Drawing with cable version)

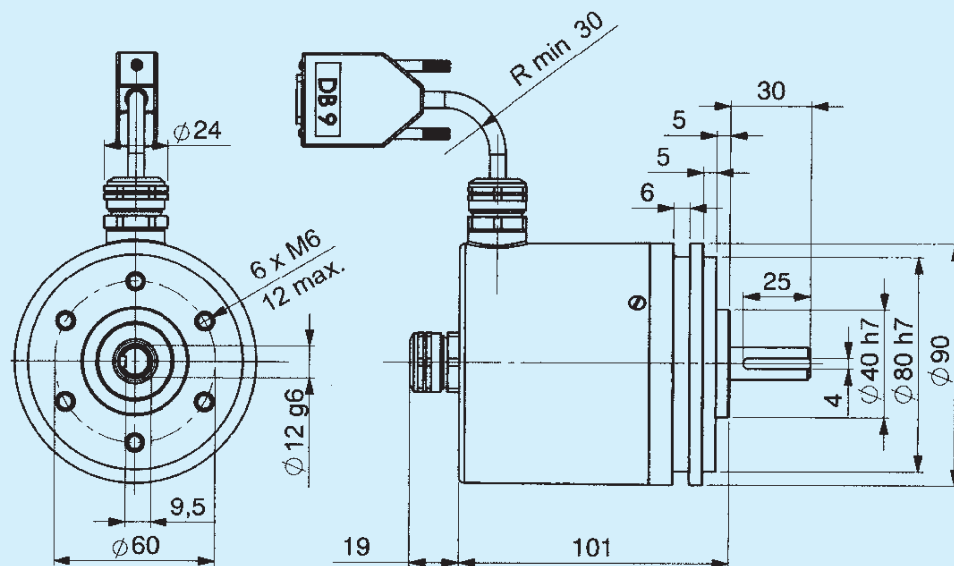


## MULTITURN, CANopen

Dimensioned drawing

### Synchro flange

(Drawing with cable + D-SUB connector)



# ABSOLUTE HOLLOW SHAFT ENCODER

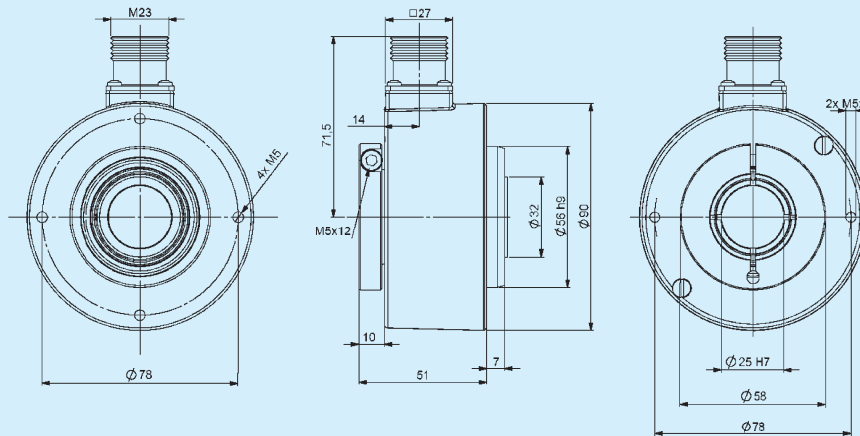
# FAxH90

## SINGLETURN, SSI

Dimensioned drawing

Hollow shaft

(Drawing with M23 connector)

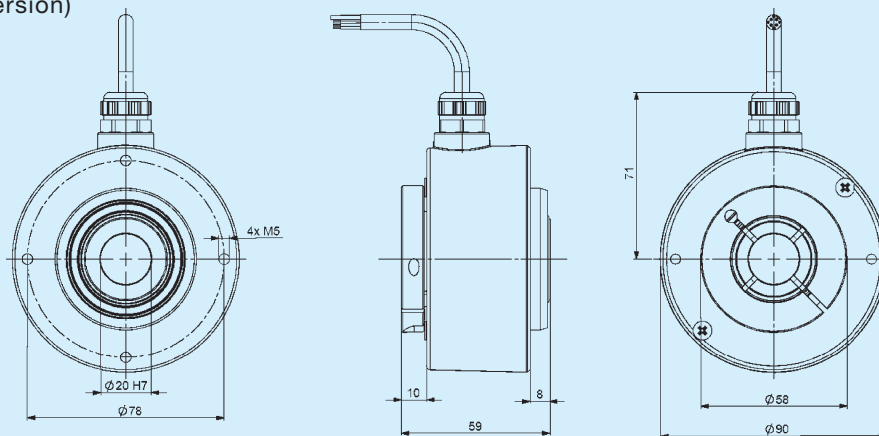


## MULTITURN, SSI

Dimensioned drawing

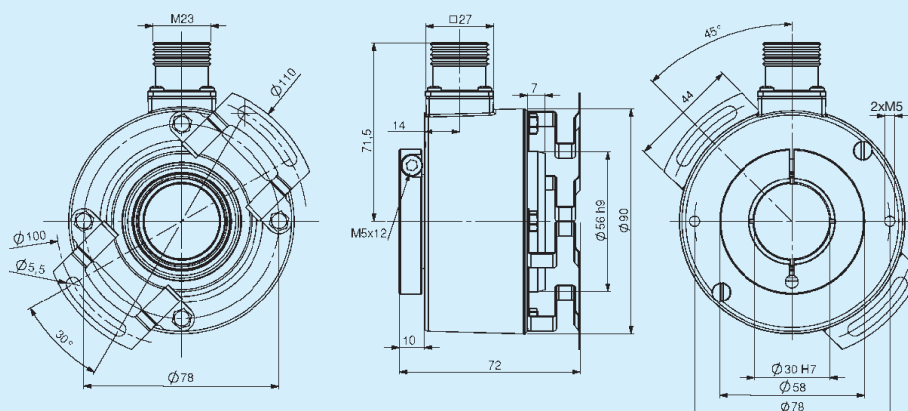
Hollow shaft

(Drawing with cable version)



Hollow shaft

(Drawing with M23 connector and Anti-rotation device 9445/009)



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# ABSOLUTE HOLLOW SHAFT ENCODER

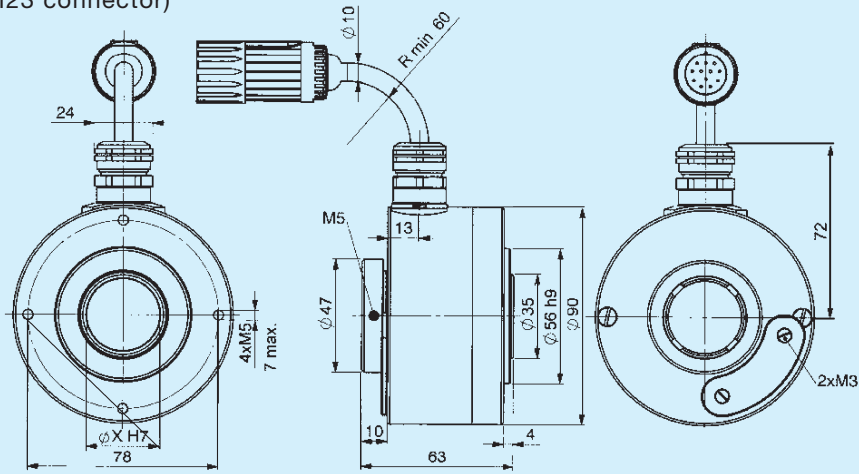
# FAMH90

## MULTITURN, PROFIBUS DP

Dimensioned drawing

### Hollow shaft

(Drawing with cable + M23 connector)

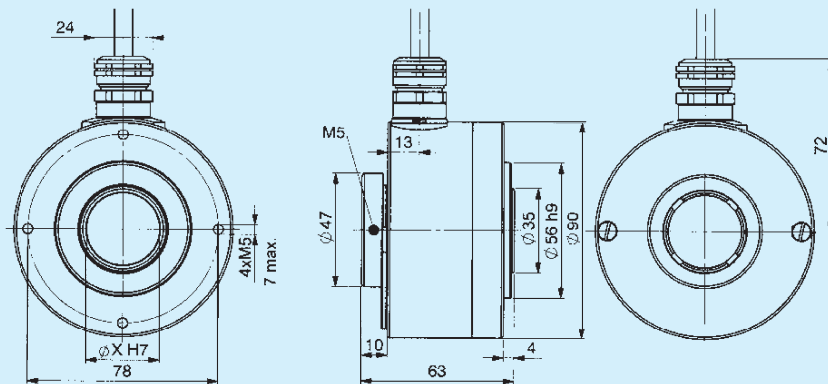


## MULTITURN, CANopen

Dimensioned drawing

### Hollow shaft

(Drawing with cable version)



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## SSI

### Terminal assignment

Signal:	GND	+V	+C	-C	+D	-D	RES <sup>1)</sup>	DIR
Cable colour:	WH	BN	GN	YE	GY	PK	BU	RD
M23 PIN out cw:	2	1	3	7	4	6	5	9
M23 PIN out ccw:	1	8	3	11	2	10	6	5

+V: Encoder Power Supply +VDC

GND: Encoder Power Supply Ground (0V)

+C, -C: Clock signal

+D, -D: Data signal

DIR: Direction input: If this input is active, output values are decreasing when shaft is turned clockwise.

RES: Reset to zero

<sup>1)</sup> MT only

## Profibus DP

### Terminal assignment

Signal:	A	B	+V	0V	N/C
Cable color:	GN	YE	BR	WH	
M23 PIN out cw:	2	4	7	8	1, 3, 5, 6, 9, 10, 11, 12

## CANopen

### Terminal assignment

Signal:	CAN Ground	CAN_Low (-)	CAN_High (+)	GND power supply	+V power supply	DEF	N/C
D-SUB 9pin:	3	2	7	6	9	1	4, 5, 8

DEF: Set to: 20 k Baud, Address = 1, cw, MT 13 Bit

## ORDERING CODE SSI<sup>1)</sup>

	Resolution	Supply voltage	Flange, Protection	Shaft-Ø	Interface	Connection
<b>FASS90</b> Absolute singleturn shaft encoder	0010 = 10 Bit ST 0011 = 11 Bit ST 0012 = 12 Bit ST 0013 = 13 Bit ST	E = 11-30 VDC (ST) E = 5-30 VDC (MT)	S6 = Synchro, IP 66 (shaft) C5 = Hollow shaft, IP 65	11 = 11 mm shaft, flange Ø 115 mm 12 = 12 mm shaft/hollow shaft (with hub) 20 = 20 mm hollow shaft (with hub) 25 = 25 mm hollow shaft (with hub) 30 = 30 mm hollow shaft	SB = SSI Binary SG = SSI Gray	A = cable axial, 1 m PVC B = cable radial, 1 m PVC C = Conin 12pol. axial cw D = Conin 12pol. radial cw G = Conin 12 pol. axial ccw H = Conin 12 pol. radial ccw
<b>FAMS90</b> Absolute multiturn shaft encoder	1210 = 12 Bit MT + 10 Bit ST 1211 = 12 Bit MT + 11 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST					
<b>FASH90</b> Absolute singleturn hollow shaft encoder						
<b>FAMH90</b> Absolute multiturn hollow shaft encoder						

<sup>1)</sup> Parallel output on request

## ORDERING CODE Profibus DP

	Resolution	Supply voltage	Flange, Protection	Shaft-Ø	Interface	Connection
<b>FAMS90</b> Absolute multiturn shaft encoder	1210 = 12 Bit MT + 10 Bit ST 1211 = 12 Bit MT + 11 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST	E = 11-30 V	S7 = Synchro, IP 67 (shaft) C5 = Hollow shaft, IP 65	11 = 11 mm shaft, flange Ø 115 mm 12 = 12 mm shaft/hollow shaft (with hub) 20 = 20 mm hollow shaft (with hub) 25 = 25 mm hollow shaft (with hub) 30 = 30 mm hollow shaft	DP = Profibus DP Class 2	B = Cable radial, 4wire, 1 m, w/o bus cover D = Cable radial, 1 m with conin 12pol. cw
<b>FAMH90</b> Absolute multiturn hollow shaft encoder	1610 = 16 Bit MT + 10 Bit ST 1611 = 16 Bit MT + 11 Bit ST 1612 = 16 Bit MT + 12 Bit ST 1613 = 16 Bit MT + 13 Bit ST					

## ORDERING CODE CANopen

	Resolution	Supply voltage	Flange, Protection	Shaft-Ø	Interface	Connection
<b>FAMS90</b> Absolute multiturn shaft encoder	1210 = 12 Bit MT + 10 Bit ST 1211 = 12 Bit MT + 11 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST	E = 11-30 V	S7 = Synchro, IP 67 (shaft) C5 = Hollow shaft, IP 65	11 = 11 mm shaft, flange Ø 115 mm 12 = 12 mm shaft/hollow shaft (with hub) 20 = 20 mm hollow shaft (with hub) 25 = 25 mm hollow shaft (with hub) 30 = 30 mm hollow shaft	CO = CANopen Profile DS406 V.1.0	L = Cable radial, 1 m with D-SUB, 9pin connector w/o bus cover
<b>FAMH90</b> Absolute multiturn hollow shaft encoder	1610 = 16 Bit MT + 10 Bit ST 1611 = 16 Bit MT + 11 Bit ST 1612 = 16 Bit MT + 12 Bit ST 1613 = 16 Bit MT + 13 Bit ST					