

Worm spur Geared limit switches FRLS - Pitch Types



- Worm spur gears
- Comply with Quality management
- Robust housing
- Protection IP 67, EN 60529, NEMA 6
- Free programmable Cams
- Revolutions 1:1 to 8000:1
- Microswitch silver or gold 6A, 250VAC
- Switching with forced separation, EN60947
- Switches with roller
- Terminal rail for easy mounting
- All gears are lifetime lubricated
- Shaft made of stainless steel
- Ambient temperature -40°C to +95°C
- Optional with position sensors available
- From switch to shaft positively driven
- High precise adjustment Cam

Description

Robust worm spur geared limit switch with optional position sensors like incremental encoder or absolute encoder or 4-20mA. Precise adjustable cam and controlled opening micro switches.

For use in Heavy duty industries and safe applications like Wind power, Rail industry, Mining industry, Material handling, Packaging equipment, Processing equipment, Conveyor belt, Cranes, Offshore plants, Commercial solar plants etc. which require a precise feedback signal to operate in very harsh environments.

Technical data

General design

Shaft design	All shaft and switches are ball bearinged
Bearing life	max. 8×10^{11} revs.
Shaft load radial	450 N
Axial	200 N
Max. speed	1500 rpm
Shaft material	Stainless steel
Housing material	Hard anodized Aluminium
Connection	Cable radial
Protection class shaft input	IP 67 EN 60529 or NEMA 6
Protection class housing	IP 67 EN 60229 or NEMA 6
Schock resistant EN 60068-2-27	2500 m/s^2 , 6ms
Vibration EN-60068-2-6	200 m/s^2 , 10....2000Hz
Operating temperature	-40°C +95°C
Storage temperature	-40°C + 100°C
Absolute accuracy	+/- 0.35° cam shaft
Hysteresis	0.8° cam shaft
Repeatability	+/- 0.2° cam shaft
(Remark: For the entry shaft, multiply with the gear ratio)	

Technische Änderungen vorbehalten / Subject to change without prior notice

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Worm spur Geared limit switches FRLS - Pitch Types

Program channels (number of switches)

CAM

Gear ratio worm spur

Fine adjustable single cam

Optional

1 to 20

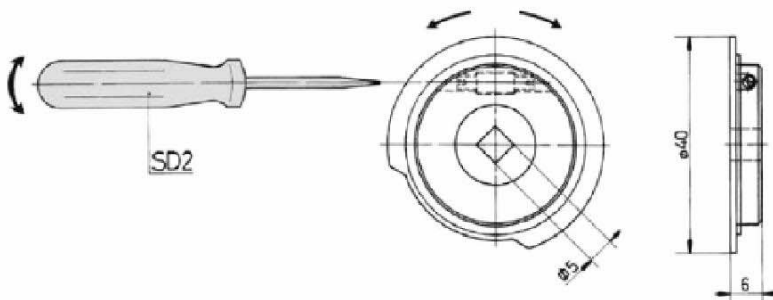
positively driven adjustable Cams

1 : 1 to max 8000:1 (shaft to switch total)

standard -> 40°

all variations of cam degree angles available

Easy adjustable cams with screwdriver over 360°



Micro switches

Design

Electricity switched on

Mechanical lifetime

MTBF

Switch design

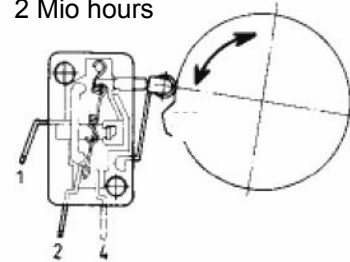
force separation EN 60947

Permanent electricity 6A

10A 250V AC / 6A 24V DC

10 x 10⁶ cycles

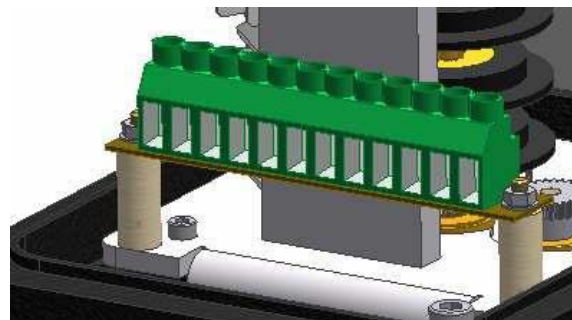
2 Mio hours



CE-conform

EN 61000-6-1, EN 61000-6-4

Terminal rail for easy connection



Worm spur Geared limit switches FRLS - Pitch Types

Specification FRLS-44SGM8Z12E:MY264

Technical data

Cams (*number of switches*) adjustable

4

Gear ratio (multistage)

4,28:1 (shaft to cam)

gear $Z_1 = 29$

gear $Z_2 = 60$

gear $Z_3 = 29$

gear $Z_4 = 60$

Fine adjustable single cam

Micro switches

Permanent electricity

6A

Electricity switched on

10 A 250 V AC / 6 A 24 V DC

Mechanical lifetime

10×10^6 cycles

Encoder MY264 - CASS580012AS41SBB

Gear reduction

4,28:1 (shaft to encoder)

Supply voltage

5 V

Resolution

12 bit singleturn

Output

SSI binary

Pinion

Size

M8 Z12

PG screwing

Size

2 x M20x1,5

Terminal connection:

Terminals

12

Nominal current

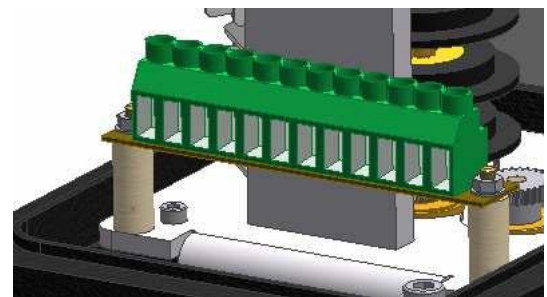
32 A

Nominal cross section

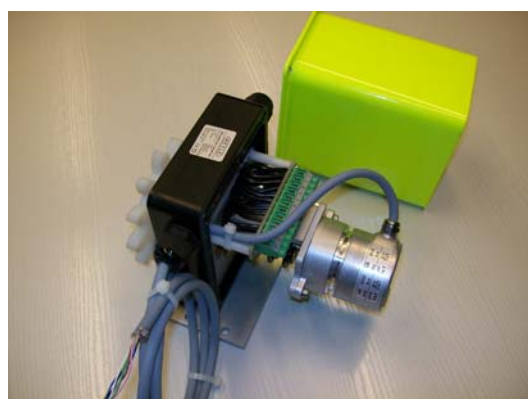
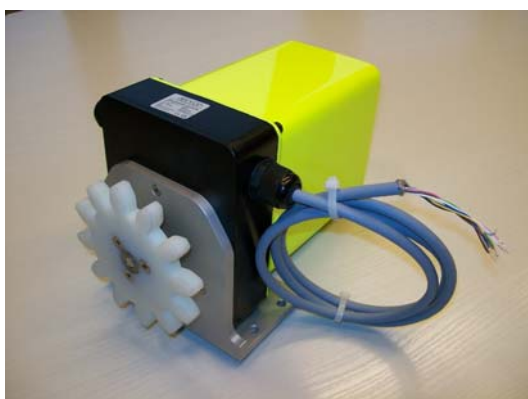
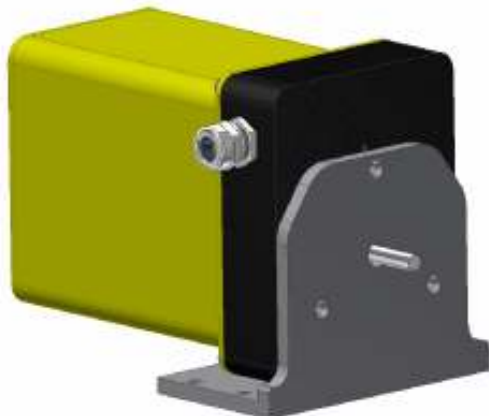
4 mm²

Stripping length

8 mm

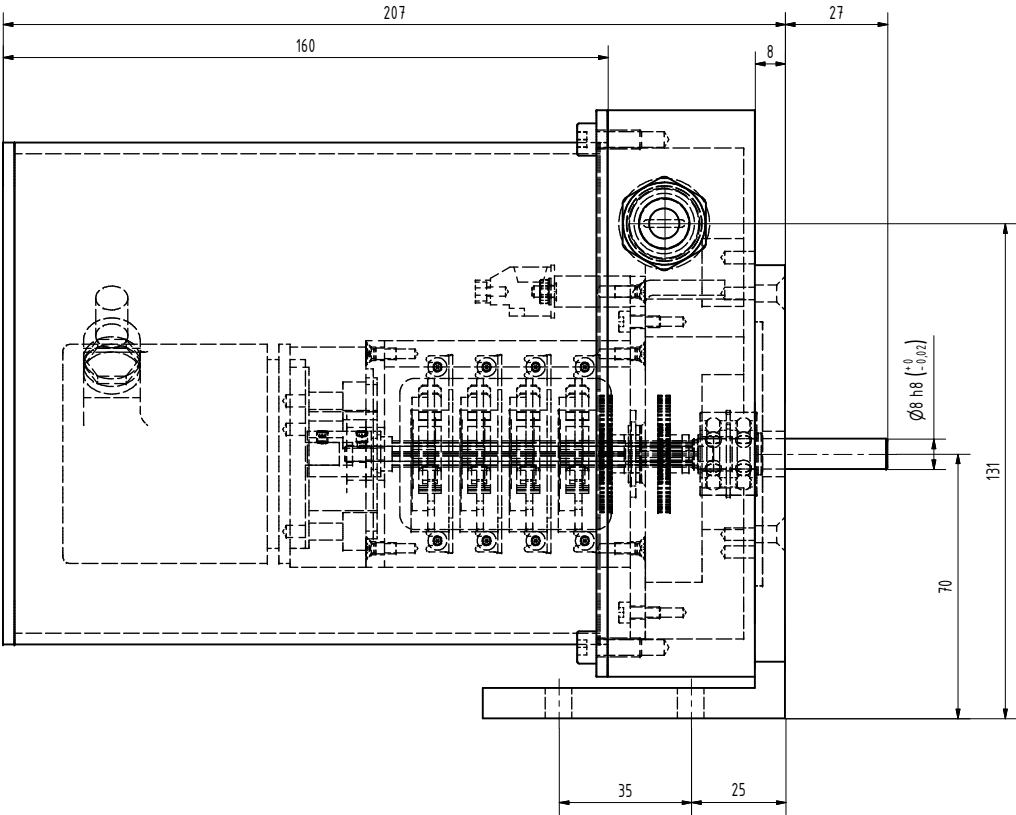
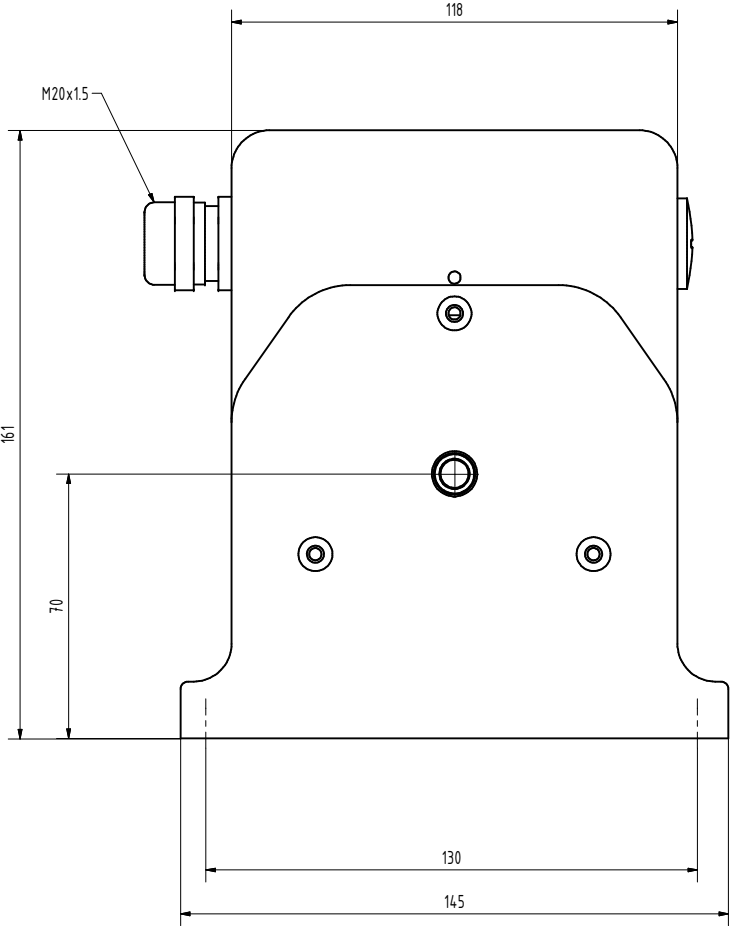


Specification FRLS-44SGM8Z12E:MY264



Specification FRLS-44SGM8Z12E:MY264

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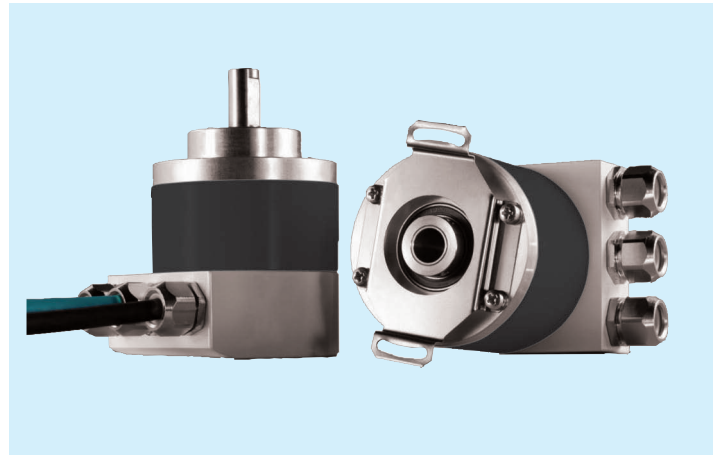
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49525 Lengerich/Germany Fax: +49 54 81-93 85-12 E-Mail: sales@meyle.de

Ersetzt durch				Stücklisten Nr.		Material	
Ersetzt für							
g				Datum	Name	Massstab	Objekt / Bezeichnung
f				Gez.	21.10.2011	1:1	FRLS-44SGM8Z12E:MY264
e				Kont.			
d				Frei.			
c							
b							
a				Meyer Industrie-Electronic GmbH			Zeichnungs Nr.
Modifikation		Datum	Name				830

- Compact design: 50 mm length for singleturn or multiturn versions
- Startup and operating aids:
Diagnostics LED, preset key with optical feedback, status message
- Interfaces: Standard SSI, extended SSI mode, parallel interface or BiSS
- Sine/cosine signals available for dynamic control loops
- Max. 29 Bit

Fieldbus Versions

- Overall length: 63 mm (singleturn), 73 mm (multiturn) including bus cover
- Availability of all common field bus interfaces
- The complete bus-specific electronics is accommodated in the bus cover
- Versions: Profibus DP, DeviceNet, CAN, CANopen and Interbus



Electrical Data:

SSI, BiSS

Parallel

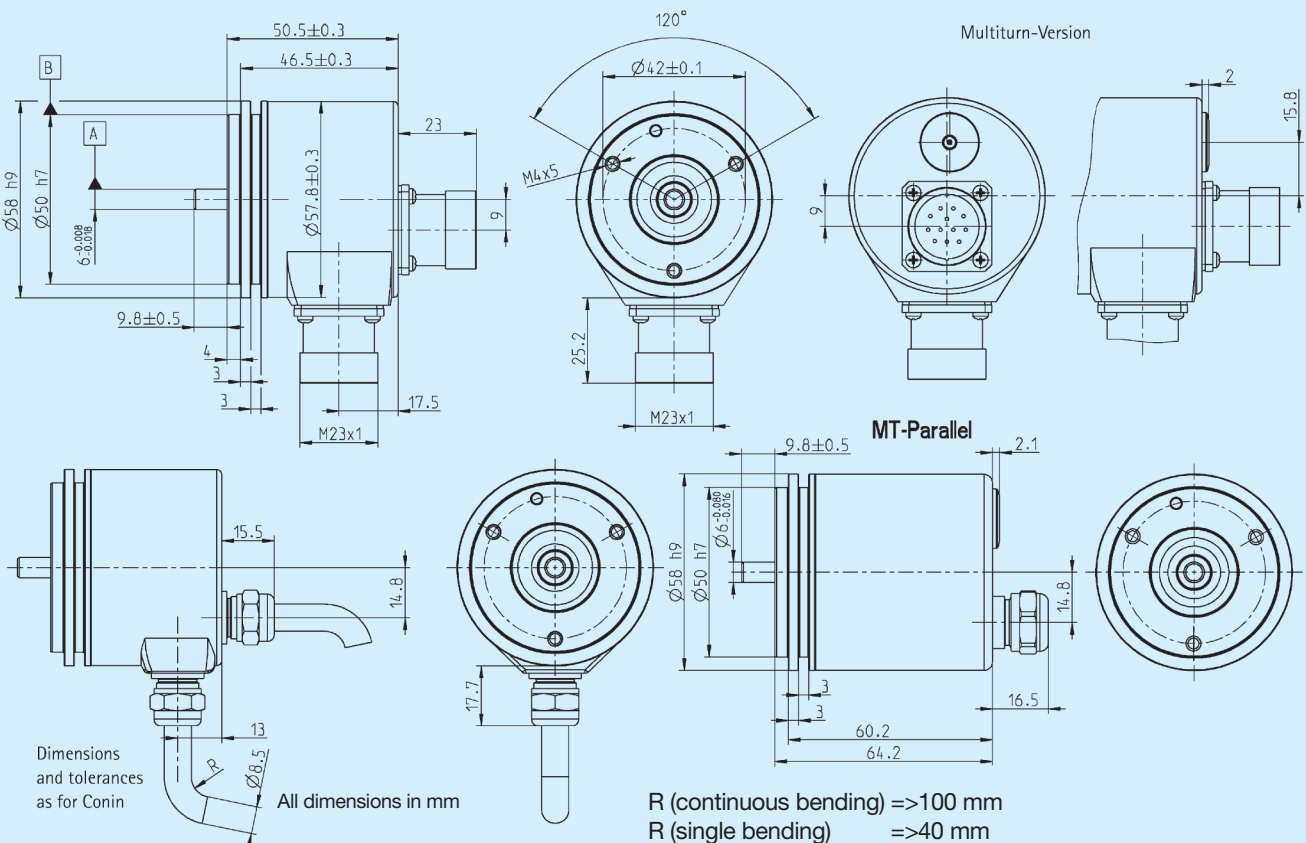
Profibus/DeviceNet other Bus Interfaces on request

Supply voltage	5 V, -5 %/+10 % or 10–30 V	10–30 V	10–30 V
Intrinsic current consumption ST/MT	50 mA/100 mA	200 mA/300 mA	220 mA/250 mA
Interface	Standard SSI or BiSS	Parallel	Profibus-DP, Encoder Profile CAN Highspeed acc. ISO/DIS 11898, CAN Spec. 2.0 B, protocol based on encoder profile draft DeviceNet
Lines/Drivers	Clock and data/RS422		
Output code	Binary Gray;	Binary, Gray, Gray Excess	Binary
Singleturn resolution	10–17 Bits depending on version; max: 13 Bit in SSI-MT Gray Excess: 360, 720 steps	10–14 Bit depending on version 12 Bit in MT version Gray Excess: 360, 720 steps	10–14 Bit depending on version
Multiturn resolution	12 Bit	12 Bit	12 Bit
Incremental signals, optional	Sine – cosine 1 Vpp		
Number of increments	2,048		
3 dB limiting frequency	500 kHz		
Absolute accuracy	± 35"		
Repeatability	± 7"		
Connection	Cable or flange-connector (Conin, axial or radial)	Cable or flange-connector (Conin 17-pole), axial or radial, Sub-D 37-pin	Bus cover with T-manifold
Parameterization	Resolution, code type, sense of rotation, warning, alarm		According to Class 2: Resolution, Preset, Direction 9,6 kBaud–12 MBaud
Linearity		± 1/2 LSB	
Output current		30 mA per Bit, short circuit proof	
Alarm output	Alarm Bit (SSI option), warning Bit and alarm Bit (BiSS)	NPN o.c. max. 5 mA	
Control input	Direction	Latch, Direction, Tristate	
Reset Key	Latch via parameterization		
Status LED	Green = ok.; Red = Alarm		
Integrated Special functions			Speed, Acceleration, Operating Time

Mechanical Data:	SSI, BiSS	Parallel	Profibus
Housing diameter	58 mm	58 mm	58 mm
Protection, shaft input	IP 64 or IP 67	IP 64 or IP 67	IP 64 or IP 67
IP Protection class, housing	IP 67	IP 67	IP 67
Flange types	Synchro-flange, clamping flange, spring tether	Synchro-flange, clamping flange, spring tether	Synchro-flange, clamping flange, spring tether
Shaft diameter	Solid shaft 6 mm, 10 mm; Hub shaft 10 mm, 12 mm	Solid shaft 6 mm, 10 mm; Hub shaft 10 mm, 12 mm	Solid shaft 6 mm, 10 mm; Hub shaft 10 mm, 12 mm
Max. speed	Continuous operation 10,000 min ⁻¹ short-term 12,000 min ⁻¹	Continuous operation 10,000 min ⁻¹ short-term 12,000 min ⁻¹	Continuous operation 10,000 min ⁻¹ short-term 12,000 min ⁻¹
Starting Torque	≤ 0,01 Nm	≤ 0,01 Nm	≤ 0,01 Nm
Moment of inertia, rotor	3.8 x 10 ⁻⁶ kgm ²	3.8 x 10 ⁻⁶ kgm ²	3.8 x 10 ⁻⁶ kgm ²
Tolerance axial (blind shaft)	± 1.5 mm	± 1.5 mm	± 1.5 mm
Tolerance radial (blind shaft)	± 0.2 mm	± 0.2 mm	± 0.2 mm
Absolute max. shaft load	axial 40 N radial 60 N	axial 40 N radial 60 N	axial 40 N radial 60 N
Shock resistance DIN EN 60068-2-27	1,000 m/s ² (6 ms)	1,000 m/s ² (6 ms)	1,000 m/s ² (6 ms)
Vibration resistance DIN EN 60068-2-6	100 m/s ² (10 ... 2,000 Hz)	100 m/s ² (10 ... 2,000 Hz)	100 m/s ² (10 ... 2,000 Hz)
Working temperature	-40...+100 °C	-40...+100 °C	-40 °C... +85 °C
Storage temperature	-40...+85 °C (due to packaging)	-40...+85 °C (due to packaging)	-40...+85 °C (due to packaging)
Weight, approx. (ST/MT)	260 g/310 g	350 g/400 g	350 g/400 g

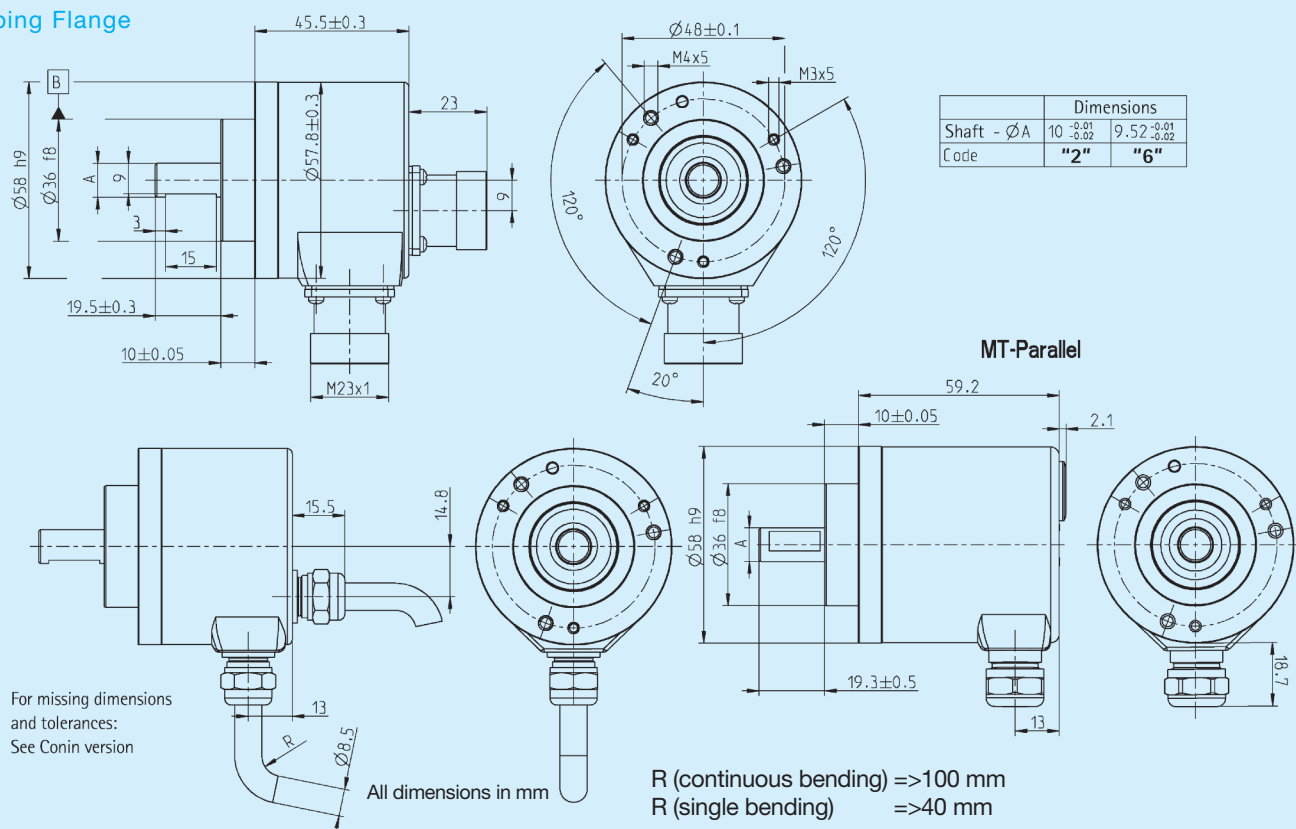
Dimensioned drawing

Synchro Flange

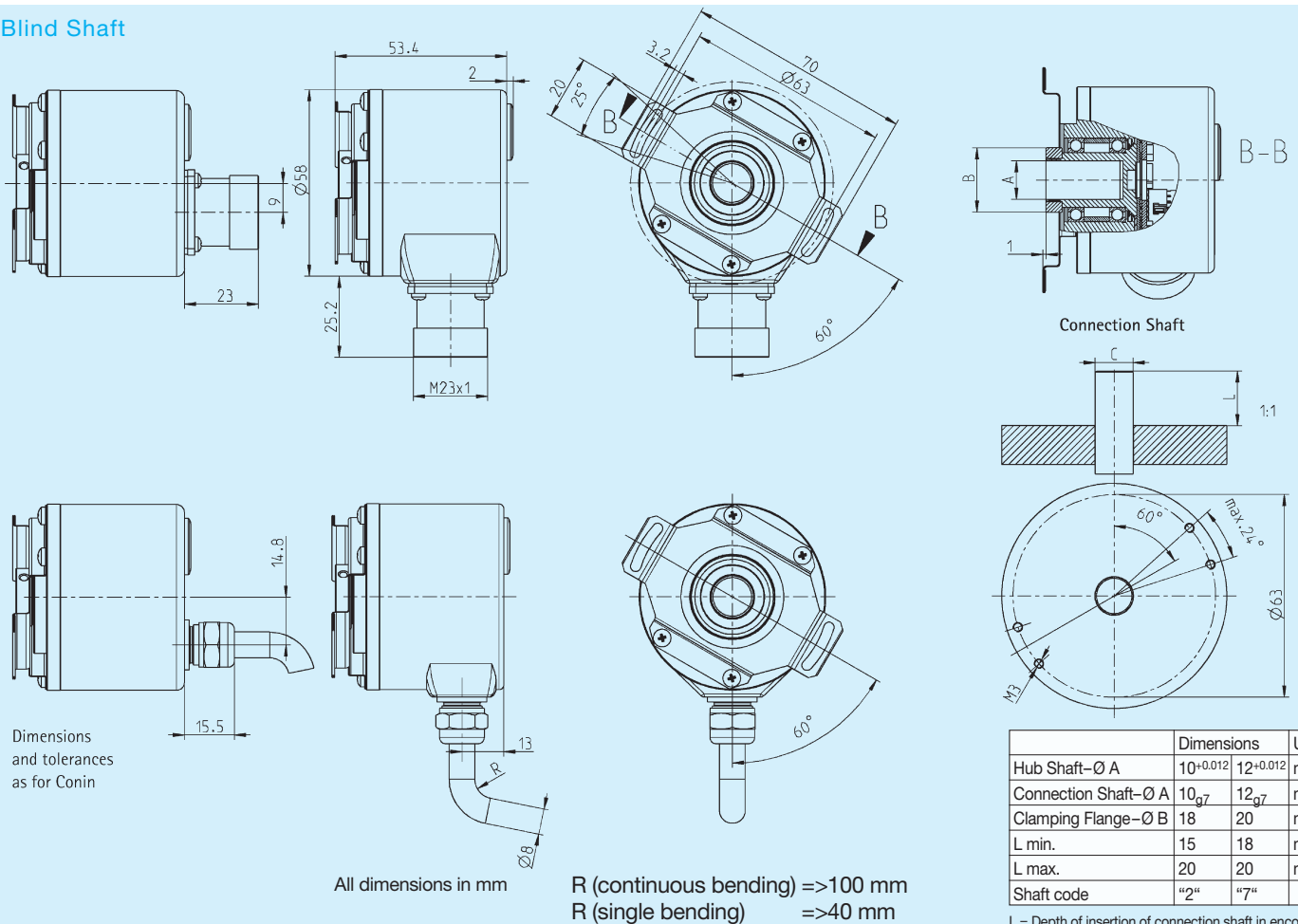


Dimensioned drawing

Clamping Flange



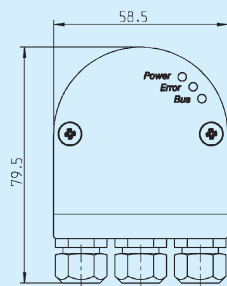
Blind Shaft



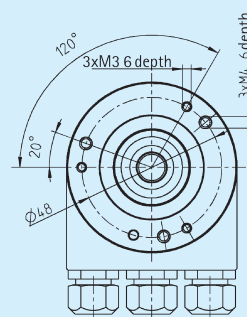
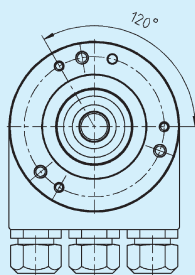
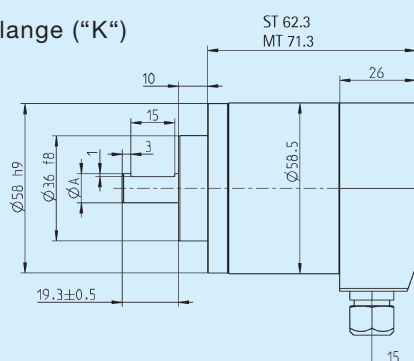
Bus Covers

Bus Covers

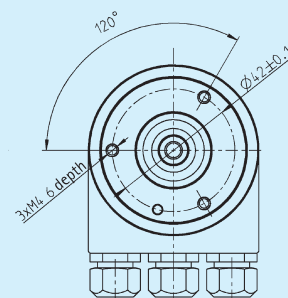
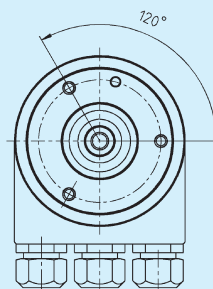
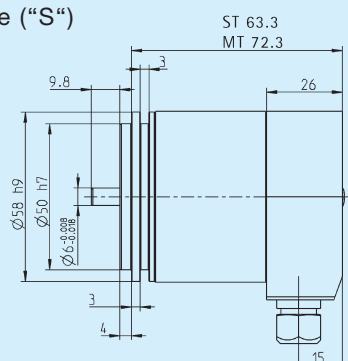
Connection “Z”



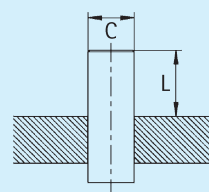
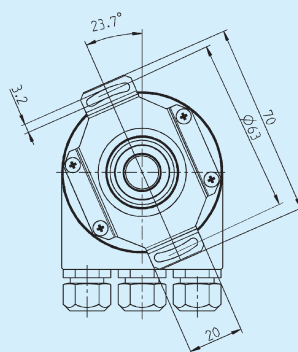
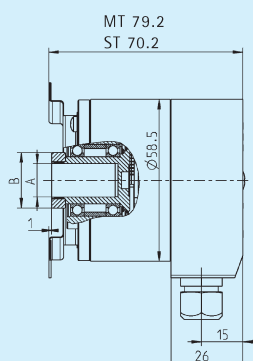
Clamping Flange ("K")



Synchro Flange ("S")



Hub Shaft ("F")

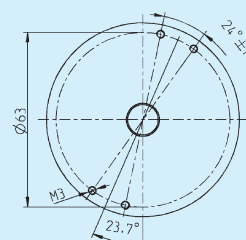


Dimensions

	Dimensions	Unit
Hub Shaft-Ø A	10 ^{+0.012}	12 ^{+0.012} mm
Connection Shaft-Ø A	10 _{g7}	12 _{g7} mm
Clamping Flange-Ø B	18	20 mm
L min.	15	18 mm
L max.	20	20 mm
Shaft code	"2"	"7"

L = Depth of insertion of connection shaft in encoder

Connection Shaft



ST=Singleturn
MT=Multiturn

SSI, BiSS

Terminal assignment

for supply voltage A or E

Signal:	GND	+V	+C	-C	+D	-D	D GND	-DIR	N/C	N/C	N/C	N/C	
Cable colour:	BN	WH	YE	GN	PK	GY	BK	BU	-	-	-	-	
M23 PIN out:	1	8	3	11	2	10	12	5	4	6	7	9	

for supply voltage A or E

Signal:	GND	+V	+C	-C	+D	-D	-DIR	N/C	
M12 PIN out:	2	1	6	4	5	8	7	3	

+V: Encoder Power Supply +VDC

GND: Encoder Power Supply Ground (0V)

+C, -C: Clock signal

+D, -D: Data signal

D GND: Data ground

-DIR: Direction input: If this input is active, output values are increasing when shaft is turned cw.

Parallel

Terminal assignment

for supply voltage E, singleturn 9 Bit/360 ppr

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	-TRI	-LAT ¹⁾	-DIR	GND	+V	-ALM	N/C	N/C
Cable colour:	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN	-	-
Conin 17pol.:	1	2	3	4	5	6	7	8	9	12	13	14	15	16	17	10	11

¹⁾ binary only

for supply voltage E, singleturn 10 Bit/720 ppr

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	-TRI	-LAT ¹⁾	-DIR	GND	+V	-ALM	N/C
Cable colour:	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN	-
Conin 17pol.:	1	2	3	4	5	6	7	8	9	10	12	13	14	15	16	17	11

¹⁾ binary only

for supply voltage E, singleturn 12 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	-TRI	-LAT ¹⁾	-DIR	GND	+V	-ALM
Cable colour:	BN/GY	RD/BU	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN
Conin 17pol.:	1	2	3	4	5	6	7	8	9	10	11	12	-	13	14	15	16	17

¹⁾ binary only

for supply voltage E, singleturn 13 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	-TRI	-LAT ¹⁾	-DIR	GND	+V	-ALM
Cable colour:	BN/YE	BN/GY	RD/BU	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN
Conin 17pol.:	13	12	11	10	9	8	7	6	5	4	3	2	1	-	17 ¹⁾	14	15	16	17 ²⁾

¹⁾ binary only

²⁾ gray only

for supply voltage E, singleturn 14 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	-TRI	-LAT ¹⁾	-DIR	GND	+V	-ALM
Cable colour:	GY/PK	BN/YE	BN/GY	RD/BU	VT	WH/BN	WH/GN	WH/YE	WH/GY	WH/PK	WH/BU	WH/RD	WH/BK	BN/GN	YE	PK	GN	BK	RD	BN
Conin 17pol.:	14	13	12	11	10	9	8	7	6	5	4	3	2	1	-	17 ¹⁾	-	15	16	17 ²⁾

¹⁾ binary only

²⁾ gray only

for supply voltage E, multiturn 12-12 Bit

Signal:	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
Cable colour:	BN	GN	YE	GY	PK	VT	GY/PK	RD/BU	WH/GN	BN/GN	WH/YE	YE/BN
Sub-D 37pol.	2	21	3	22	4	23	5	24	6	25	7	26

Signal:	M0	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11
Cable colour:	WH/GY	GY/BN	WH/PK	PK/BN	WH/BU	BN/BU	WH/RD	BN/RD	WH/BK	BN/BK	GY/GN	YE/GY
Sub-D 37pol.	8	27	9	28	14	33	15	34	16	35	17	36

Signal:	-ALM	-DIR	-LAT	TRI	+V	+V	GND	GND				
Cable colour:	PK/GN	YE/PK	GN/BU	YE/BU	RD	WH	BU	BK				
Sub-D 37pol.	18	10	30	12	13	31	1	20				

+V: Encoder Power Supply +VDC

GND: Encoder Power Supply Ground (0V)

-TRI: Tristate input: if this input is active, outputs are active

TRI: Tristate input: if this input is active, outputs at high impedance (Tristate mode)

-LAT: Latch input: if this input is active, encoder data continuously changing at output

-DIR: Direction input: if this input is active, output values are increasing when shaft is turned cw

S0, S1, ...: Data bits for resolution per turn

M0, M1, ...: Data bits for number of turns

-ALM: Alarm output: NPN open collector

Profibus DP

Terminal assignment

Bus terminal cover with terminal box (type of connection Z)

Signal:	BUS IN				BUS OUT			
	B	A	0 V	+V	0 V	+V	B	A
Terminal:	5	6	2	1	4	3	7	8

Shield must be connected to the cable gland (with the contact surface as large as possible)




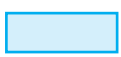



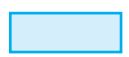
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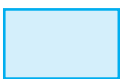
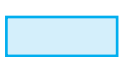



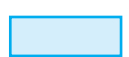
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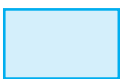
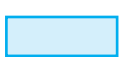



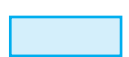
ORDERING CODE SSI

					
CASS58 Absolute singleturn shaft encoder	Resolution 0010 = 10 Bit ST 0012 = 12 Bit ST 0013 = 13 Bit ST 0014 = 14 Bit ST 0017 = 17 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST	Supply voltage A = 5 V E = 10–30 V	Flange, Protection, Shaft-Ø S41 = Synchro, IP 64, 6 mm S71 = Synchro, IP 67, 6 mm K42 = Clamping, IP 64, 10 mm K72 = Clamping, IP 67, 10 mm F42 = Spring tether, IP 64, 10 mm Blind shaft F47 = Spring tether, IP 64, 12 mm Blind shaft	Interface SB = SSI Binary SG = SSI Gray	Connection A = cable axial B = cable radial C = Conin 12 pol. axial cw D = Conin 12 pol. radial cw G = Conin 12 pol. axial ccw H = Conin 12 pol. radial ccw 7 = M12, 8 pol. axial 8 = M12, 8 pol. radial
CAMS58 Absolute multiturn shaft encoder					
CASB58 Absolute singleturn blind shaft encoder					
CAMB58 Absolute multiturn blind shaft encoder					

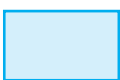
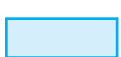



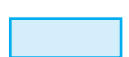
ORDERING CODE BiSS

					
CASS58 Absolute singleturn shaft encoder	Resolution 0010 = 10 Bit ST 0012 = 12 Bit ST 0013 = 13 Bit ST 0014 = 14 Bit ST 0017 = 17 Bit ST 0360 = 360 increments ST 0720 = 720 increments ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST 1214 = 12 Bit MT + 14 Bit ST 1217 = 12 Bit MT + 17 Bit ST	Supply voltage A = 5 V E = 10–30 V	Flange, Protection, Shaft-Ø S41 = Synchro, IP 64, 6 mm S71 = Synchro, IP 67, 6 mm K42 = Clamping, IP 64, 10 mm K72 = Clamping, IP 67, 10 mm F42 = Spring tether, IP 64, 10 mm Blind shaft F47 = Spring tether, IP 64, 12 mm Blind shaft	Interface BI = BiSS (Digital) BC = BiSS (+SinCos 1VPP)	Connection A = cable axial B = cable radial C = Conin 12 pol. axial cw D = Conin 12 pol. radial cw G = Conin 12 pol. axial ccw H = Conin 12 pol. radial ccw 7 = M12, 8 pol. axial 8 = M12, 8 pol. radial
CAMS58 Absolute multiturn shaft encoder					
CASB58 Absolute singleturn blind shaft encoder					
CAMB58 Absolute multiturn blind shaft encoder					

ORDERING CODE PARALLEL INTERFACE

					
CASS58 Absolute singleturn shaft encoder	Resolution 0010 = 10 Bit ST 0012 = 12 Bit ST 0013 = 13 Bit ST 0014 = 14 Bit ST 0360 = 360 increments ST 0720 = 720 increments ST 1212 = 12 Bit MT + 12 Bit ST	Supply voltage E = 10–30 V	Flange, Protection, Shaft-Ø S41 = Synchro, IP 64, 6 mm S71 = Synchro, IP 67, 6 mm K42 = Clamping, IP 64, 10 mm K72 = Clamping, IP 67, 10 mm F42 = Spring tether, IP 64, 10 mm Blind shaft F47 = Spring tether, IP 64, 12 mm Blind shaft	Interface PB = Parallel Binary PG = Parallel Gray	Connection A = cable axial (ST, MT) B = cable radial (ST, MT) U = Conin 17 pol. axial ccw (ST) V = Conin 17 pol. radial ccw (ST) W = Conin 17 pol. axial cw (ST) Y = Conin 17 pol. radial cw (ST) A-A1-F = 0,1 m cable axial + 37 pol. Sub-D (MT) B-A1-F = 0,1 m cable radial + 37 pol. Sub-D (MT)
CAMS58 Absolute multiturn shaft encoder					
CASB58 Absolute singleturn blind shaft encoder					
CAMB58 Absolute multiturn blind shaft encoder					

ORDERING CODE PROFIBUS-DP/DEVICENET

					
CASS58 Absolute singleturn shaft encoder	Resolution 0010 = 10 Bit ST 0012 = 12 Bit ST 0013 = 13 Bit ST 0014 = 14 Bit ST 1212 = 12 Bit MT + 12 Bit ST 1213 = 12 Bit MT + 13 Bit ST 1214 = 12 Bit MT + 14 Bit ST	Supply voltage E = 10–30 V	Flange, Protection, Shaft-Ø S41 = Synchro, IP 64, 6 mm S71 = Synchro, IP 67, 6 mm K42 = Clamping, IP 64, 10 mm K72 = Clamping, IP 67, 10 mm F42 = Spring tether, IP 64, 10 mm Blind shaft F47 = Spring tether, IP 64, 12 mm Blind shaft	Interface DP = Profibus DP VD = DeviceNet	Connection Profibus: Z = Bus cover 3x cable gland DeviceNet: Z = Bus cover 2 x cable gland
CAMS58 Absolute multiturn shaft encoder					
CASB58 Absolute singleturn blind shaft encoder					
CAMB58 Absolute multiturn blind shaft encoder					

Note: Bus Connections radial/axial via connector and cable, optional on request.