

ENCODER

Incremental Angle Transducer



Series A36, A58

Key-Features:

- Incremental output Linedriver L (RS422, TTL), or Push-Pull G
- Housing diameter 36 mm or 58 mm
- Solid shaft, hollow shaft and through hollow shaft
- Protection class IP64, solid shaft version also IP67
- Temperature range up to -20...+85 °C
- Output frequency up to 300 kHz
- Rotation speed up to 12.000 r/min
- Aluminium housing
- Customised versions available

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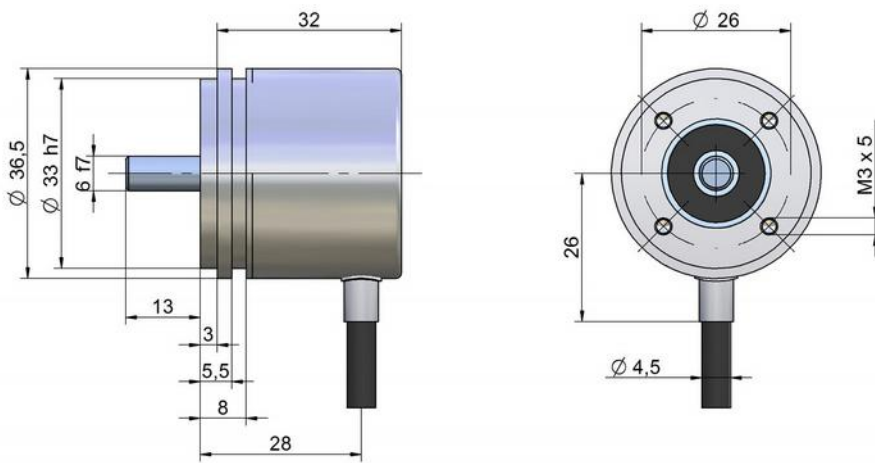
TECHNICAL DATA A36

		Solid shaft	Hollow shaft / Through hollow shaft
Shaft diameter D	[mm]	6	6 / 6.35 / 8 (depth of hollow shaft = 2 x D)
Selectable resolution *	[pulses/turn]	25 / 100 / 125 / 200 / 250 / 300 / 360 / 500 / 1000 / 1024 / 1250 / 1500 / 2000 / 2048 / 2500 / 3600	
Sensor element		Incremental-Encoder (with optical code disk)	
Output signal		A/B-Pulses (90° phase-delayed), Z-Pulse (plus inverted pulses A _{not} , B _{not} , Z _{not})	
Electrical data		see page 6	
Maximum rotation speed	[r/min]	12.000	6000
Maximum shaft load	[N]	radial 40, axial 20	radial 40, axial 20
Moment of inertia	[kgm ²]	0,2x10 ⁻⁶	0,2x10 ⁻⁶
Starting torque at 20°C	[Nm]	<0.05	<0.05
Shaft material		stainless steel	brass
Working temperature	[°C]	-20...+85	-20...+85
Protection class		shaft: IP64, housing IP64 (IP67 optional)	shaft: IP64, housing IP64
Shock resistance		1000 m/s ² ; 6 ms	1000 m/s ² ; 6 ms
Vibration resistance		100 m/s ² ; 55-2000 Hz	100 m/s ² ; 55-2000 Hz
Weight	[g]	approx. 80	approx. 80
Housing material		Aluminium	Aluminium
Electrical connection		cable output or connector output M12	cable output

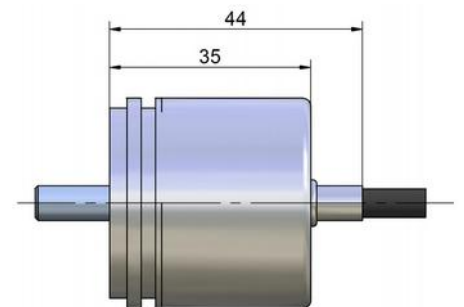
* resolution can be raised by the factor 4 using quadruple edge detection

TECHNICAL DRAWING A36

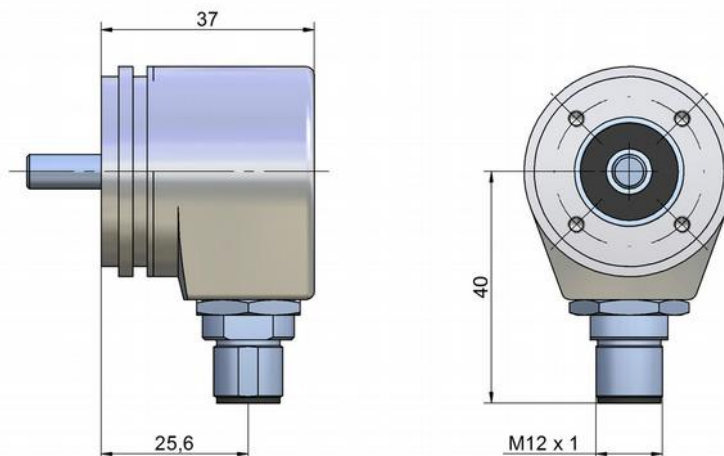
Solid shaft, cable output radial



Solid shaft, cable output axial

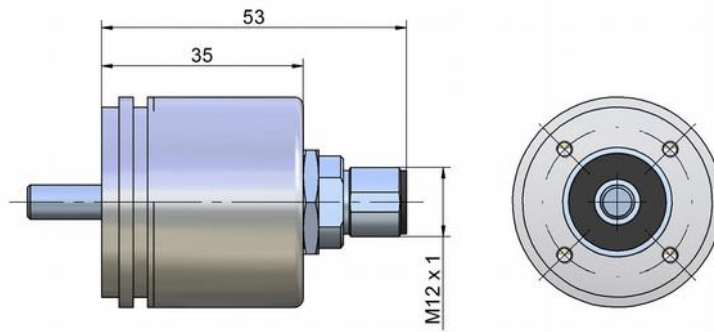


Solid shaft, connector output radial

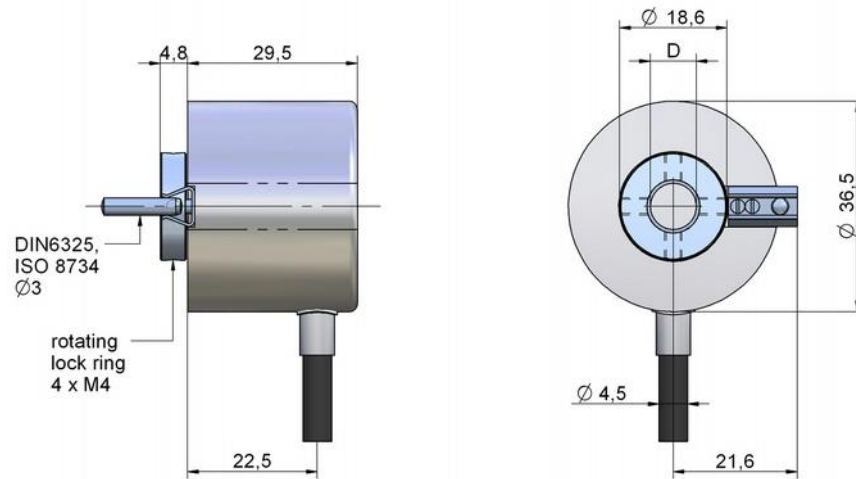


TECHNICAL DRAWING A36

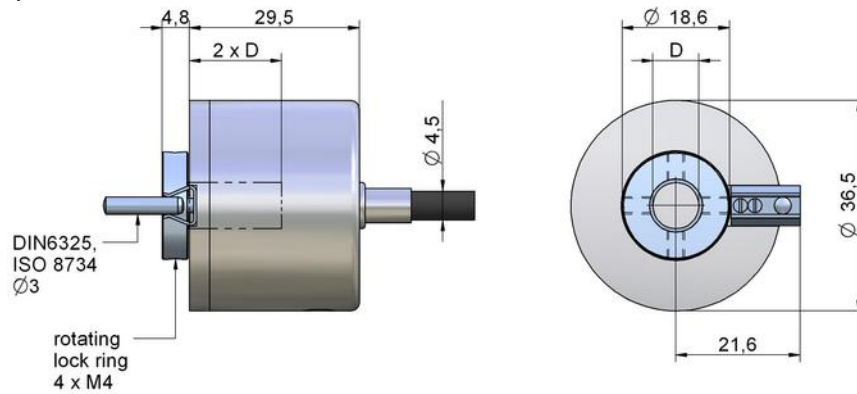
Solid shaft, connector output axial



Hollow shaft / Through hollow shaft, cable output radial



Through hollow shaft, cable output axial



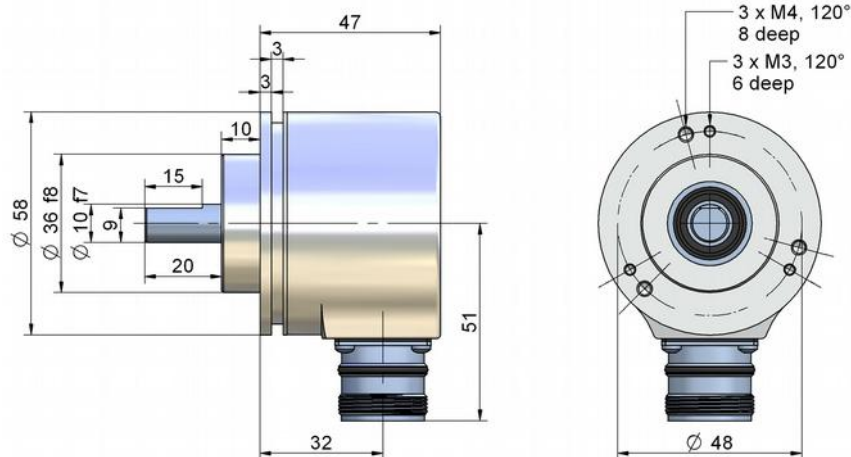
TECHNICAL DATA A58

		Solid shaft	Hollow shaft / Through hollow shaft
Shaft diameter D	[mm]	6 / 10 / 12	12 / 20 / 25 / 28
Selectable resolution *	[pulses/turn]	60 / 100 / 125 / 200 / 250 / 400 / 500 / 960 / 1000 / 1024 / 2000 / 2048 / 5000	
Sensor element		Incremental-Encoder (with optical code disk)	
Output signal		A/B-Pulses (90° phase-delayed), Z-Pulse (plus inverted pulses A _{not} , B _{not} , Z _{not})	
Electrical data		see page 6	
Maximum rotation speed	[r/min]	12.000	2500
Maximum shaft load	[N]	radial 40, axial 60	radial 60, axial 80
Moment of inertia	[kgm ²]	1,4x10 ⁻⁶	3,5x10 ⁻⁶
Starting torque at 20°C	[Nm]	<0.05 Nm	<0.1 Nm
Shaft material		stainless steel	stainless steel
Working temperature	[°C]	-30...+85	-20...+70 (up to max. 2000 r/min), otherwise -20...+60
Protection class		shaft: IP64, housing IP67	shaft: IP64, housing IP64 (through hollow shaft IP67)
Shock resistance		1000 m/s ² ; 6 ms	1000 m/s ² ; 6 ms
Vibration resistance		100 m/s ² ; 55-2000 Hz	100 m/s ² ; 35-2000 Hz
Weight	[g]	approx. 250	approx. 400
Housing material		Aluminium	Aluminium
Electrical connection		cable output, connector output M12 or M23	radial: cable output, connector output M12 or M23

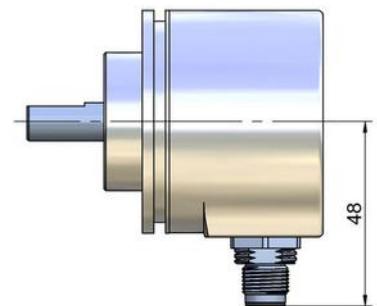
* resolution can be raised by the factor 4 using quadruple edge detection

TECHNICAL DRAWING A58

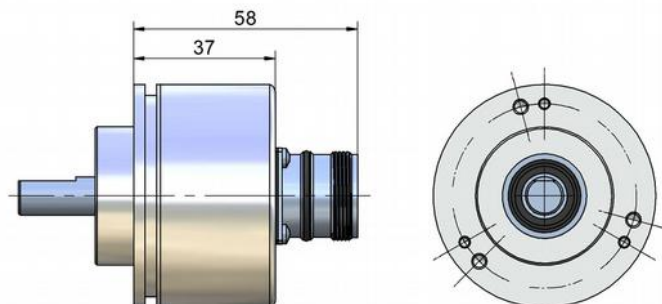
Solid shaft, connector output radial, M23, 12 poles



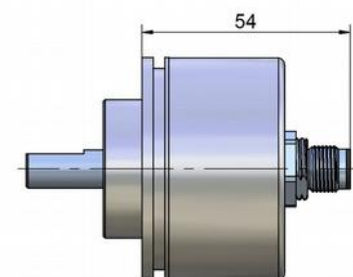
Solid shaft, connector output radial, M12, 8-poles



Solid shaft, connector output axial, M23, 12 poles

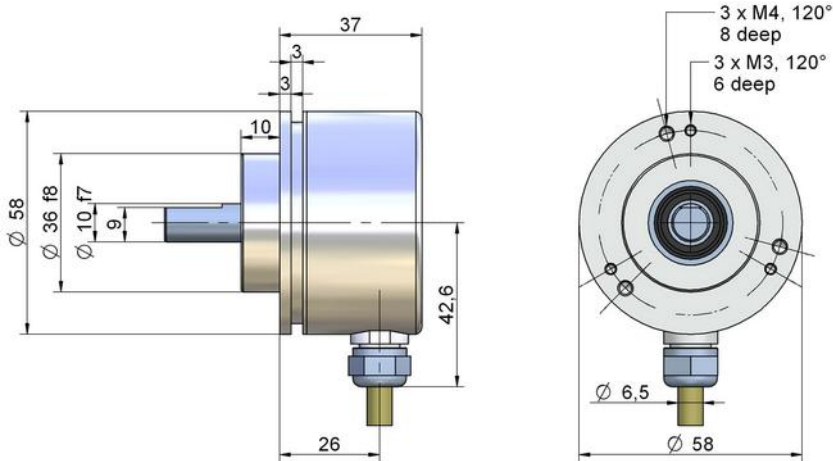


Solid shaft, connector output axial, M12, 8 poles

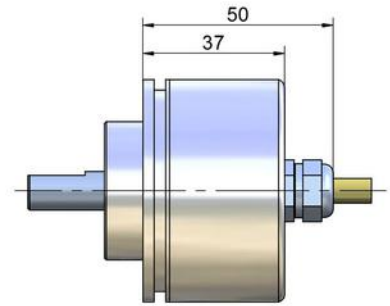


TECHNICAL DRAWING A58

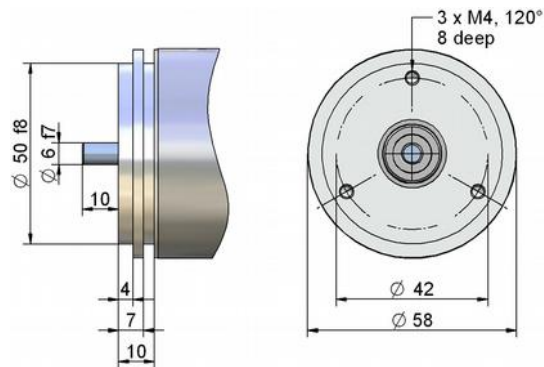
Solid shaft, cable output radial



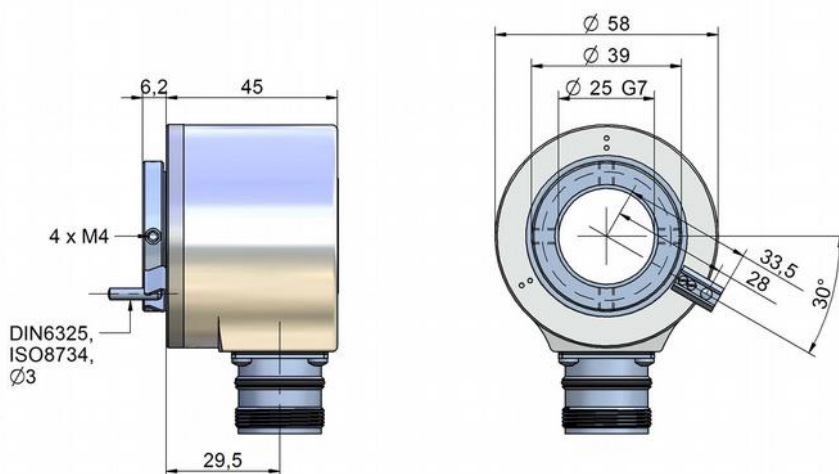
Solid shaft, cable output axial



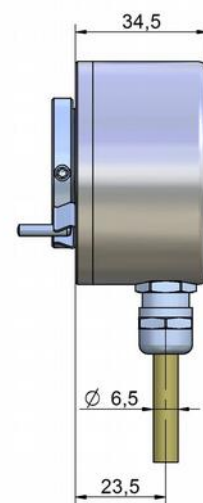
Synchro flange (measurements for connector and cable output please see versions with solid shaft)



Through hollow shaft, connector output radial M23, 12 poles
(measurements for connector output radial M12, 8 poles, see page 4)



Through hollow through shaft, cable output radial


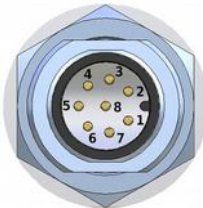


ELECTRICAL CONNECTION A36, A58

Signal	0 V	+V	0 V _{sens} *	+V _{sens} *	A	A _{Not}	B	B _{Not}	Z	Z _{Not}	screen
Connector M23, 12-pole	10	12	11	2	5	6	8	1	3	4	housing
Connector M12, 8-pole	1	2	-	-	3	4	5	6	7	8	housing
Cable output	white	brown	black	violet	green	yellow	grey	pink	blue	red	housing

* For Linedriver L only. For long cable lengths it may occur that the operating voltage at the sensor does not suffice due to the output resistance. With the sensor lines 0 V_{sens} and +V_{sens} the operating voltage can be checked and, if necessary, be readjusted at the input connection.

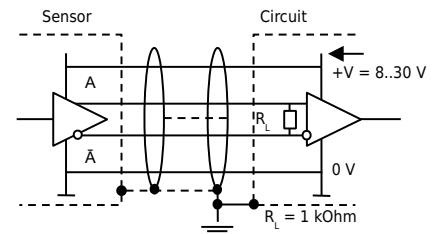
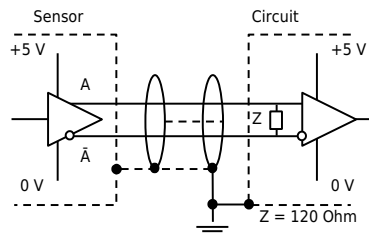
+V:	Encoder power supply +VDC	A, A _{Not} :	Incremental output channel A
0 V:	Encoder power supply ground GND (0 V)	B, B _{Not} :	Incremental output channel B
0 V _{sens} / +V _{sens} :	Using the sensor outputs of the encoder, the voltage present can be measured and if necessary increased accordingly	Z, Z _{Not} :	Reference signal

Connector output M23, 12 poles (only for A58)	Connector output M12, 8 poles	Cable output														
		<table border="1"> <tbody> <tr> <td>Cable type</td> <td>PVC, flexible</td> </tr> <tr> <td>Cable direction</td> <td>radial or axial</td> </tr> <tr> <td>Length</td> <td>2.0 m</td> </tr> <tr> <td>Diameter</td> <td>ø 4.5 mm</td> </tr> <tr> <td>Wires</td> <td>8 (push-pull) and 10 (linedriver) x 0.14 mm²</td> </tr> <tr> <td>Temperature</td> <td>fixed installation -30...+85 °C flexible installation -20...+85 °C</td> </tr> <tr> <td>Assignment</td> <td>see table above</td> </tr> </tbody> </table>	Cable type	PVC, flexible	Cable direction	radial or axial	Length	2.0 m	Diameter	ø 4.5 mm	Wires	8 (push-pull) and 10 (linedriver) x 0.14 mm ²	Temperature	fixed installation -30...+85 °C flexible installation -20...+85 °C	Assignment	see table above
Cable type	PVC, flexible															
Cable direction	radial or axial															
Length	2.0 m															
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Wires	8 (push-pull) and 10 (linedriver) x 0.14 mm ²															
Temperature	fixed installation -30...+85 °C flexible installation -20...+85 °C															
Assignment	see table above															

ELECTRICAL DATA A36, A58

Electrical Data		Linedriver L	Push Pull G
		RS422 (TTL compatible)	
Power supply	[VDC]	5, ±5 %	8...30
Current consumption without load	[mA]	typ. 40, max. 90	typ. 40, max. 100
Load / channel A36	[mA]	max. ±20	max. ±20
Load / channel A58	[mA]	max. ±20	max. ±40
Pulse frequency A36	[kHz]	max. 300	max. 200
Pulse frequency A58	[kHz]	max. 300	max. 200
Signal level high	[V]	min. 2.5	min. +V – 3
Signal level low	[V]	max. 0.5	max. 0.5

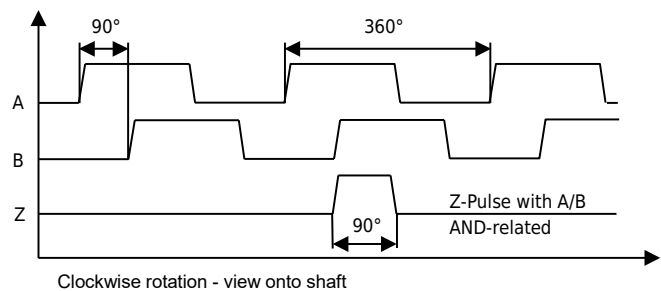
Recommended circuit



Output signal

Pulses A and B are 90° phase-delayed (detection of direction). The Z-Pulse is emitted once per turn. The Z-Pulse can be used as a reference mark.

The diagram shows the signal without inverted pulses



ACCESSORIES

Cable with connector M12, 8 poles, shielded

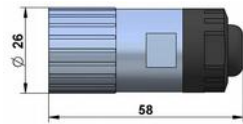
K8P2M-S-M12	2 m, connector straight
K8P5M-S-M12	5 m, connector straight
K8P10M-S-M12	10 m, connector straight
K8P2M-SW-M12	2 m, connector angular
K8P5M-SW-M12	5 m, connector angular
K8P10M-SW-M12	10 m, connector angular



K8P...-M12



D8-W/G-M12-S



CON012-S

Mating connector M12, 8 poles, shielded

D8-G-M12-S	mating connector straight
D8-W-M12-S	mating connector angular
	protection class: IP67
	temperature: -25...+90 °C
	cable passage: \varnothing 4...8 mm
	wire diameter: 0.14...0.34 mm ²
	mode of connection: spring cage

Mating connector M23, 12 poles

CON012-S	straight, metal housing
	wire diameter: AWG 16...26 mm ²
	cable diameter: \varnothing 5.5...10 mm

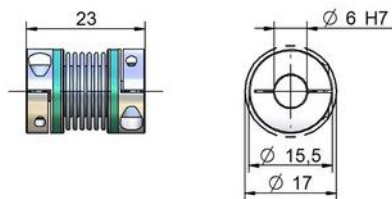
Couplings

Bellows couplings are used for the free of backlash connection between an encoder and a shaft. The couplings are free of wear and compensate lateral, axial and angular shaft misalignment. The mounting on the shaft is done by clamping hubs.

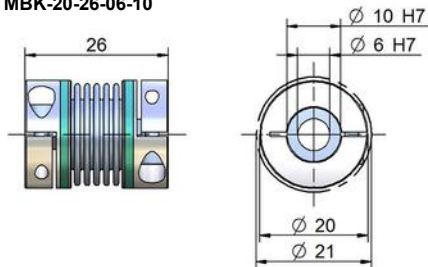


The following bellows couplings are usually on stock:

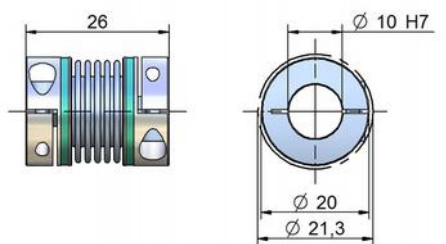
MBK-15.5-23-06-06



MBK-20-26-06-10



MBK-20-26-10-10



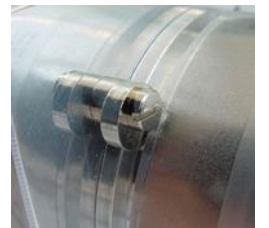
Mounting by clamping excentrics

The A36 and A58 encoder can be mounted with these excentrics. The BX36 and BX58 kits include 3 excentrics and 3 screws.

Required drill holes:

BX36: M2.5-screw thread, depth 5 mm, \varnothing screw-hole circle 42 mm

BX58: M3-screw thread, depth 6 mm, \varnothing screw-hole circle 65 mm



Digital distance and speed display - WAY-D for incremental output signals

Use the WAY-D display to visualise the measured distance or the speed (tachometer) of the position transducer. A transfer of data to a PC or PLC can be done with the RS232 interface of the WAY-DR.

Protection class:	IP65 (front panel)
Display:	6 digits
Supply:	115 / 250 VAC

Output Linedriver L (TTL, RS422):

WAY-DS-5VH:	display only, input level TTL
WAY-DG-5VH:	display with two presets and switching outputs, input level TTL
WAY-DR-5VH:	display with serial interface RS232 / RS485, input level TTL

Output Push-Pull G:

WAY-DS:	display only, input level HTL
WAY-DG:	display with two presets and switching outputs, input level HTL
WAY-DR:	display with serial interface RS232 / RS485, input level HTL



For further information please see the WAY-D data sheet.

MEASURING WHEELS

Measuring wheels for measuring the length of products in movement, e.g. in the paper, metal, textile, wood or plastic industry.

Material of wheel body: aluminium
Temperature range: -30...80°C

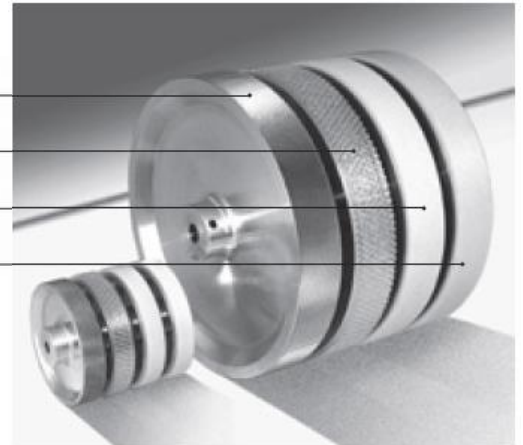
Surface of the measured material	Recommended Profile
Cardboard	1, 2, 3, 4, 5
Wood	1, 2, 3, 4, 5
Textile	1, 2, 3, 4
Plastics (e.g. PVC, PE,...)	2, 3, 4, 5
Paper	2, 3, 4, 5
Wire, greased metals, steel profiles, leather	2
Carpet, cables, nonwoven	3
Greased metals, glass, floor coverings	4
Painted surfaces	2, 4
Rubber, soft plastic	1

Diamond knurl

Tufted rubber

Plastic corrugated

Plastic smooth

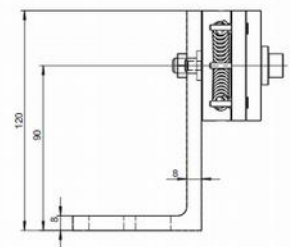
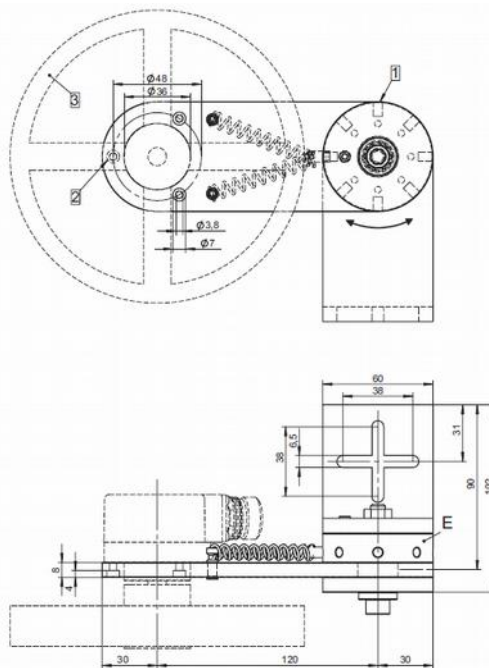


Measuring Wheel Circumference / Ø / Width	Profile Measuring Wheel	Coating	Weight	Bore	Order Code
0.2 m / Ø 63.7 mm / 12 mm	1	diamond knurl (aluminium)	60 g	10 mm	MSR-02-1
	2	plastic (polyurethane) smooth	60 g	(6 mm on request)	MSR-02-2
	3	tufted rubber (polyurethane)	60 g		MSR-02-3
	4	plastic (polyurethane) corrugated	60 g		MSR-02-4
0.5 m / Ø 159.2 mm / 25 mm	1	diamond knurl (aluminium)	775 g	10 mm	MSR-05-1
	2	plastic (polyurethane) smooth	700 g		MSR-05-2
	3	tufted rubber (polyurethane)	700 g		MSR-05-3
	4	plastic (polyurethane) corrugated	700 g		MSR-05-4
12" / Ø 3.82" / 0.38"	5	natural rubber (NR) smooth	100 g	10 mm	MSR-12-5

SPRING ENCODER ARM

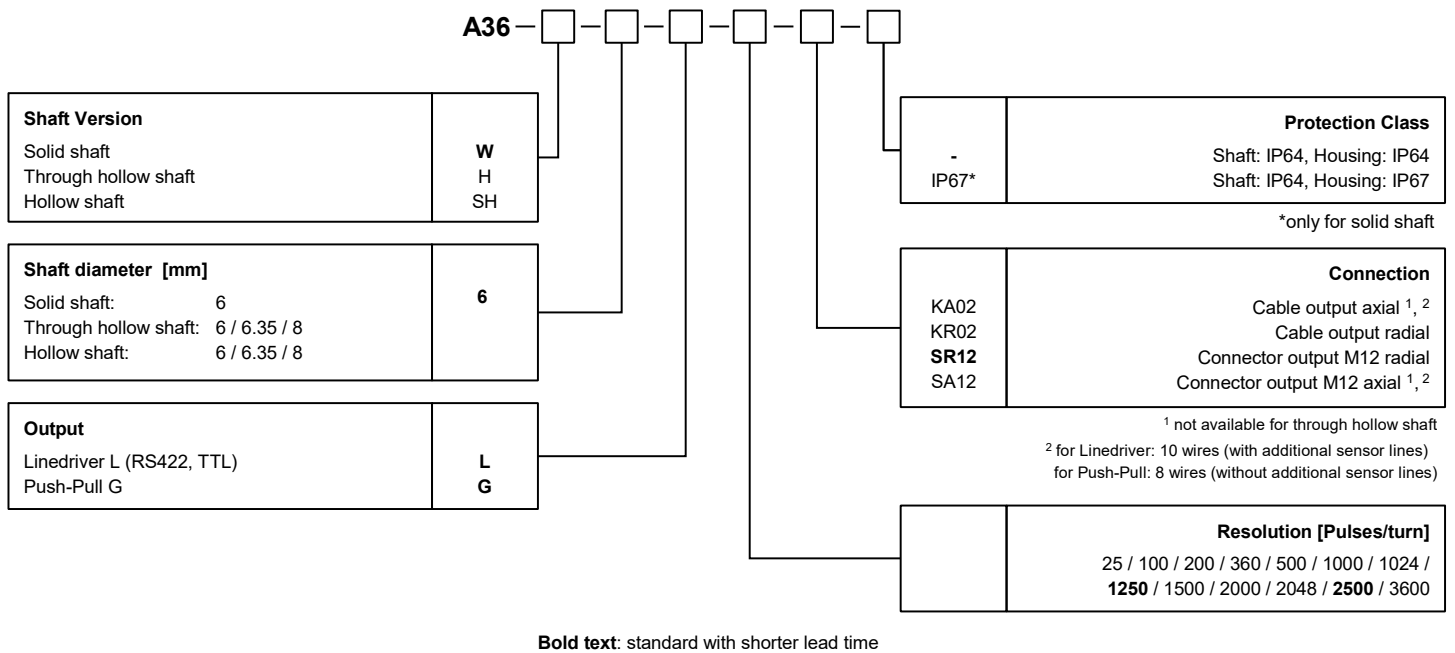
The spring encoder arm DGA-MSR is only available for encoders of the series A58 with a solid shaft Ø 10 mm.

- Spring encoder arm for easy mounting of a measuring wheel with Encoder
- Flexible mounting position: 9 setting positions in 40° steps
- Base plate, variable in 4 directions
- Adjustable spring pressure, max. 40 N
- Pressure for each notch approx. 20 N (first notch between 0 and approx. 20 N)
- Temperature range -40...120°C

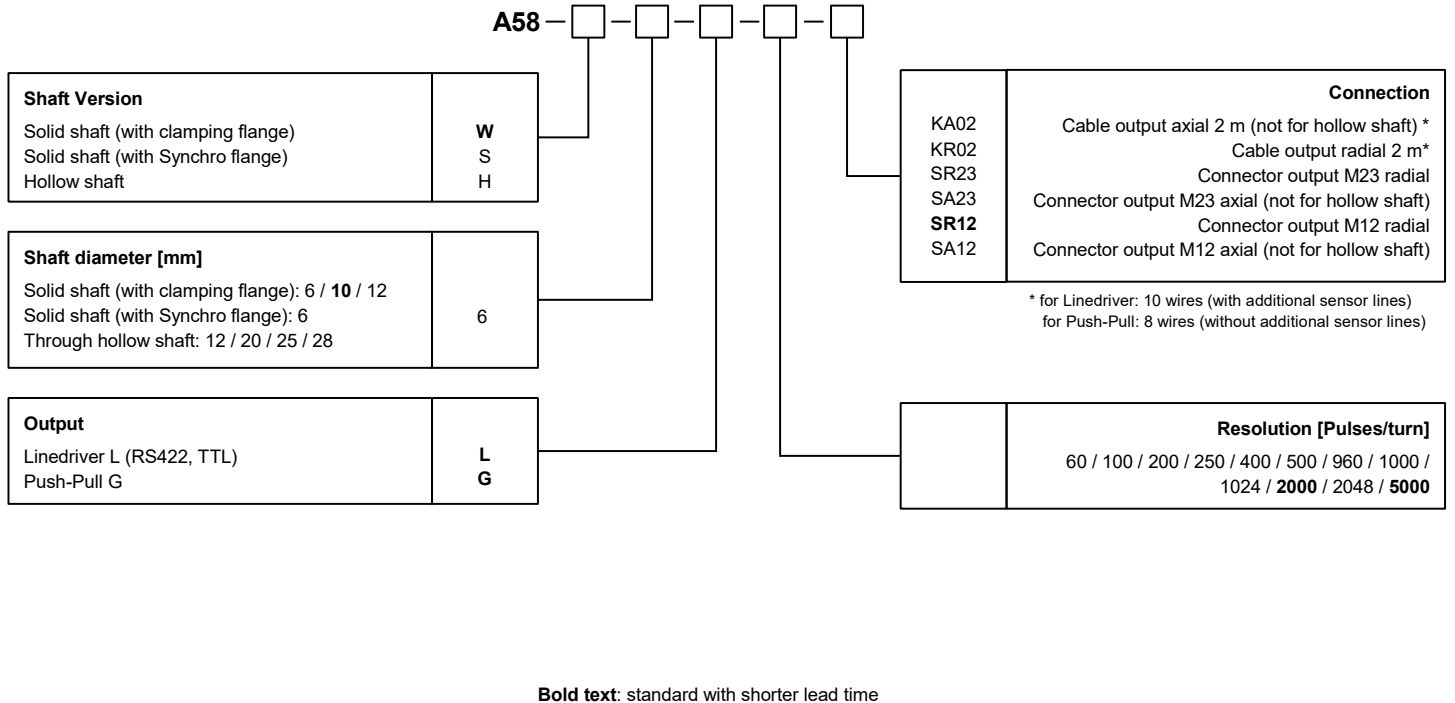


- 1 Setting with a size 0 or 1 screwdriver
- 2 3 pcs. screws M3 x 8 DIN 912 included
- 3 Measuring wheel

ORDER CODE A36



ORDER CODE A58



ACCESSORIES

Cable with connector M12, 8 poles, shielded

K8P2M-S-M12	2 m, straight connector
K8P5M-S-M12	5 m, straight connector
K8P10M-S-M12	10 m, straight connector
K8P2M-SW-M12	2 m, angular connector
K8P5M-SW-M12	5 m, angular connector
K8P10M-SW-M12	10 m, angular connector

Cable with connector M23, 8 poles, shielded

K8P2M-S-M23	2 m, straight connector
K8P5M-S-M23	5 m, straight connector
K8P10M-S-M23	10 m, straight connector

Mating Connector M23, 12 poles, shielded

CON012-S	straight, M23 for self assembly, metal housing
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Mating Connector M12, 8 poles, shielded

D8-G-M12-S	straight, M12 for self assembly
D8-W-M12-S	angular, M12 for self assembly

Extended cable for cable output (2m is standard)

Kabel-PVC-36	1 for each additional meter (for series A36)
Kabel-PVC-58	1 for each additional meter (for series A58)

Measuring wheels

MSR-02-1	diamond knurl (aluminium)
MSR-02-2	plastic (polyurethane) smooth
MSR-02-3	tufted rubber (polyurethane)
MSR-02-4	plastic (polyurethane) corrugated
MSR-05-1	diamond knurl (aluminium)
MSR-05-2	plastic (polyurethane) smooth
MSR-05-3	tufted rubber (polyurethane)
MSR-05-4	plastic (polyurethane) corrugated
MSR-12-5	natural rubber (NR) smooth

Clamping excentric kit

BX36	for A36, the kit includes 3 excentrics and 3 screws
BX58	for A58, the kit includes 3 excentrics and 3 screws

Couplings

MBK-15.5-23-06-06	coupling, bore diameter: 2 x \varnothing 6 mm
MBK-20-26-06-10	coupling, bore diameter: \varnothing 6 mm, \varnothing 10 mm
MBK-20-26-10-10	coupling, bore diameter: 2 x \varnothing 10 mm

Digital display 1 channel, Linedriver L (input level TTL, RS422)

WAY-DS-5VH	display only
WAY-DG-5VH	display with two presets and switching outputs
WAY-DR-5VH	display with serial interface RS232 / RS485

Digital display 1 channel, Push-Pull G

WAY-DS	display only
WAY-DG	display with two presets and switching outputs
WAY-DR	display with serial interface RS232 / RS485

Spring encoder arm (only for encoders A58 with solid shaft \varnothing 10 mm)

DGA-MSR

Subject to change without prior notice.

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