FSG
FERNSTEUERGERÄTE

Rope Length Transmitter

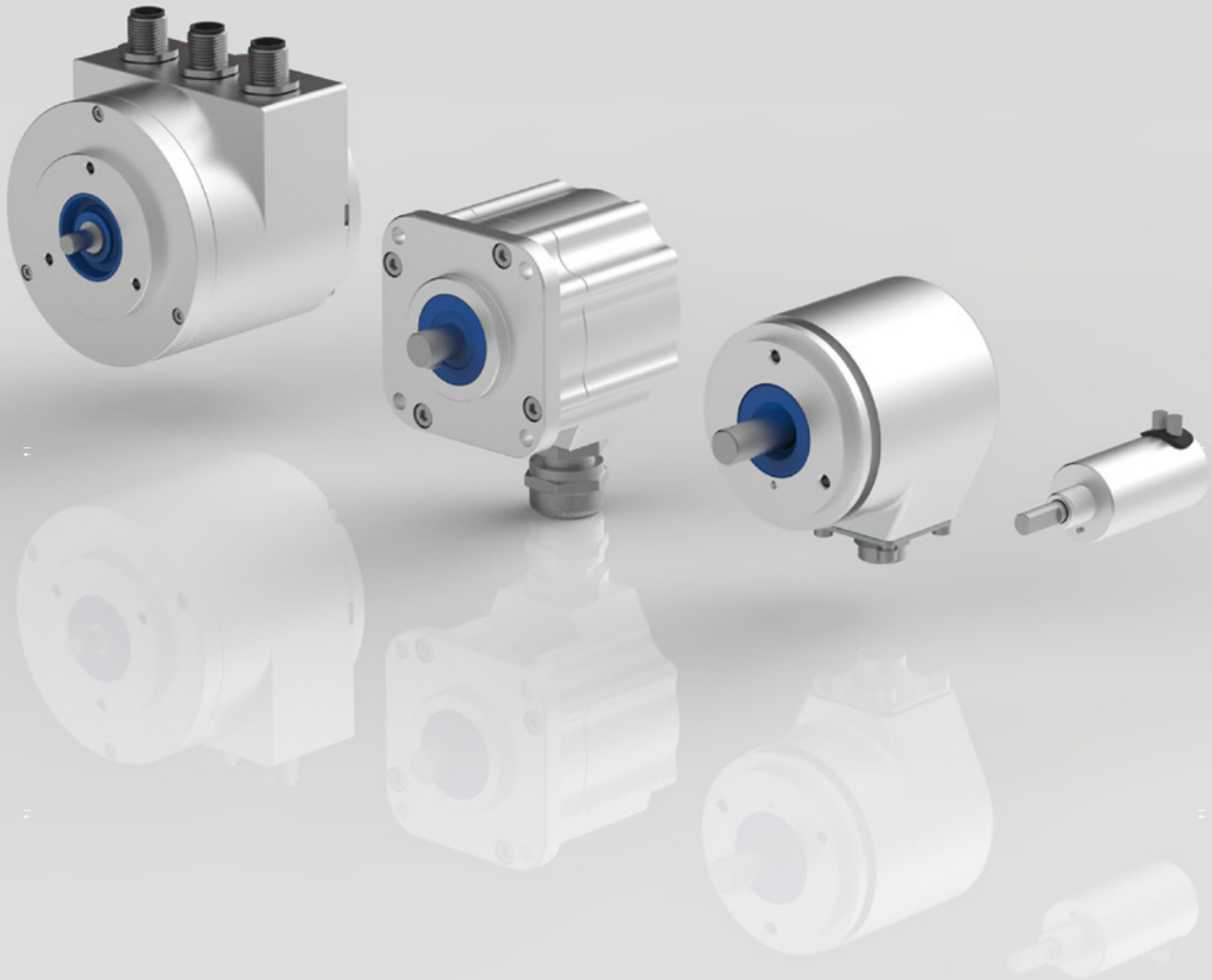
Tilt Angle Sensor

Angular Position Transducer

Joystick

Pedal Actuated Transmitter

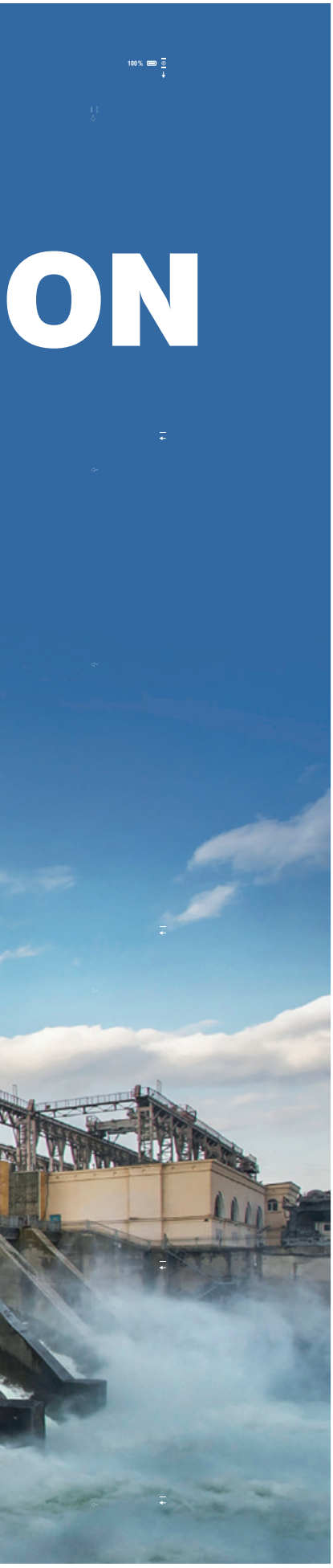
Wind Sensor



MEASUREMENT · CONTROL · REGULATION

THE ANGULAR POSITI TRANSDUCERS

For measuring and converting mechanical angular positions into electrical signals either potentiometric (see data sheet Precision Rotary Potentiometer), magnetic or optoelectronic encoders can be used depending on the application. Angular position detection by means of non-contact measuring systems is performed digital or absolute. According to encoder version measured data are converted in analogue or digital signals and are made available single or two-channel.



HIGH IP PROTECTION

By default all magnetic or optical FSG encoders provide a casing protection between IP65 and IP67, depending on model. Special versions, e. g. magnetic encoders without own driving shaft and bearing position, can easily reach protection IP68 or IP69K. These features are especially required in the construction machinery field or commercial vehicle sector, water management or energy production.

ROBUST CASINGS FOR ALL AREAS

Seawater-resistant aluminium casings of our encoders usually offer sufficient protection against mechanical damages and for outdoor applications. For special applications and requirements, e. g. oil platforms, supply vessels or in the chemical industry, encoder versions with V4A stainless steel casings are available.

FLEXIBLE SIGNAL SETTING

Depending on the model, our encoders may be adjusted by user with analogue output signals, via membrane keypad or via additional control cables and thus be calibrated to angular ranges actually required.

SAFETY

Almost all FSG magnetic encoders are equipped with redundant sensors. Depending on the electrical circuit these sensors thus meet the requirements of functional safety according to EN ISO 1348 and EN61508 guidelines.

SIGNAL OUTPUTS

0.5 – 4.5 V DC / 0 – 10 V DC
4 – 20 mA / HART-interface
CANopen / CANopen-safety
PROFINET / PROFIsafe

CUSTOMIZED SOLUTIONS

All standard encoders can be matched with respect to electrical and mechanical characteristics to applications or specific customer requirements even if low quantities are concerned. This often leads to new casing models or electrical interfaces.

EXPLOSION PROTECTION

For use in potentially explosive environments we offer intrinsically safe single or multiturn encoders of ATEX or IECEX certified design. Together with safety relevant requirements, e. g. in the oil and gas industry, we offer intrinsically safe encoders with additional SIL2 approval.

GL / DNV APPROVAL

Encoders which are used in ships and for offshore applications often require GL / DNV approvals in order to be applied within these fields of application. Having these approvals, series MH1023 and MH620 can be delivered with digital and analogue signal outputs.

System versions	magnetic	magnetic	magnetic
			
Mechanical Data			
Series	**MH609y-II**	**MH613**	**MH620**
Casing - Ø	22,2 mm	36,5 mm	50,8 mm
Casing material	Alu, anodized	Alu, anodized	Alu, anodized
Casing length without shaft	approx. 41 mm	approx. 37 mm	approx. 34 mm
IP code of casing up to	IP65	IP65	IP67
Shaft - Ø	6 mm	6 mm	6 mm
Shaft material	Stainless steel	Stainless steel	Stainless steel
Shaft bearing	Ball bearing	Ball bearing	Ball bearing
Angle of rotation max.	360°	360°	360°
Revolution max.	1	1	1
Temperature range	-40°C up to +85°C	-30°C up to +80°C	-30°C up to +80°C
Shock	25 g, 6 ms	50 g, 6 ms	50 g, 6 ms
Vibration	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz
Connection	cable	plug / cable / solder-type terminals	cable
Weight	80 g	100 g	200 g
Electrical Data			
Electronics	redundant	not redundant	redundant
Voltage output	2 x 0.5 – 4.5 V	0 – 10 V	2 x 0 – 10 V
Current output	2 x 4 – 20 mA [2]	4 – 20 mA	2 x 4 – 20 mA
Maximum load current	600 Ω	600 Ω	600 Ω
Pulse output	–	–	on request
Bus output	2 x CANopen	CAN / CANopen [2]	2 x CAN / CANopen
Signal adjustment via	fixed alignment	keys	cable
Linearity	± 0.2 %	± 0.2 %	± 0.2 %
Resolution	12 bit	14 bit	14 bit
Supply [1]	18 – 36 V DC	18 – 33 V DC	18 – 36 V DC
Current consumption	< 50 mA	< 80 mA	< 80 mA
Temperature coefficient	0.1° / 10K	0.1° / 10K	0.1° / 10K
Test voltage	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min
Immunity standard	EN 61 000-6-2	EN 61 000-6-2	EN 61 000-6-2
Emission standard	EN 61 000-6-4	EN 61 000-6-4	EN 61 000-6-4
Other			
Customized features	smallest redundant Angular Position Transmitter	signal measurement via membrane keypad	galvanic isolation between supply and output
Article number	1143Z01	2740Z05	2845Z01

[1] other on request
[2] on request

System versions	magnetic	magnetic / optic		magnetic
				
Mechanical Data				
Series	**MH-II-.../GS60**	**MH 1023**	**XA 1023**	**MH670**
Casing - Ø	59,5 mm	60 mm		70 mm
Casing material	Alu, anodized	Alu, anodized / Stainless steel		Alu, anodized
Casing length without shaft	approx. 42 mm	approx. 67 mm		approx. 45 mm
IP code of casing up to	IP67	IP67		IP57
Shaft -Ø	6 mm	6 or 10 mm		6 mm
Shaft material	Stainless steel	Stainless steel		Stainless steel
Shaft bearing	Ball bearing	Double ball bearing		Ball bearing
Angle of rotation max.	360°	360°		360°
Revolution max.	1	1		1
Temperature range	-30°C up to +80°C	-30°C up to +80°C		-25°C up to +80°C
Shock	25 g, 11 ms	50 g, 6 ms		50 g, 6 ms
Vibration	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz		10 g Sinus, 5 - 200 Hz
Connection	solder-type terminals / cable	plug / cable		plug
Weight	160 g	300 g		450 g
Electrical Data				
Electronics	redundant	single / redundant		single
Voltage output	–	0 – 10 V		–
Current output	4 – 20 mA	4 – 20 mA		4 – 20 mA, 2-wire system
Maximum load current	250 Ω / 500 Ω *	600 Ω		500 Ω
Pulse output	–	on request		–
Bus output	CANopen / CANopen-safety	CANopen / CANopen-safety		–
Signal adjustment via	fixed alignment - analogue signal	keys		push button
Linearity	± 0.2 %	± 0,1 %		< ± 0,5 %
Resolution	14 bit	14 bit		12 bit
Supply [1)]	6 – 35 V DC	18 – 36 V DC		18 – 33 V DC
Current consumption	< 50 mA	< 80 mA		< 80 mA
Temperature coefficient	0.1° / 10K	0.1° / 10K		0.1° / 10K
Test voltage	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min		500 V, 50 Hz, 1 min
Immunity standard	EN 61 000-6-2	EN 61 000-6-2		EN 61 000-6-2
Emission standard	EN 61 000-6-4	EN 61 000-6-4		EN 61 000-6-4
Other				
Customized features	SIL IEC 61508 PL EN 13849	Ex DNV·GL		current output in 2-wire system
Article number	5758F20	5754Z03	5740Z02	5550S01

* 250 Ω at 6 – 35 V DC supply respectively 500 Ω at 11 – 35 V DC

System versions	magnetic	magnetic	magnetic
			
Mechanical Data			
Series	**MH609-1080**	**MH16-613**	**MH64-II-.../GS60**
Casing - Ø	22,2 mm	36,5 mm	59,5 mm
Casing material	Alu, anodized	Alu, anodized	Alu, anodized
Casing length without shaft	approx. 26 mm	approx. 37 mm	approx. 42 mm
IP code of casing up to	IP65	IP65	IP67
Shaft - Ø	6 mm	6 mm	6 mm
Shaft material	Stainless steel	Stainless steel	Stainless steel
Shaft bearing	Ball bearing	Ball bearing	Ball bearing
Angle of rotation max.	3 x 360°	16 x 360°	64 x 360°
Revolution max.	3	16	64
Temperature range	-30°C up to +80°C	-30°C up to +80°C	-30°C up to +80°C
Shock	50 g, 6 ms	50 g, 6 ms	25 g, 11 ms
Vibration	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz
Connection	cable	plug / cable / solder-type terminals	plug / cable
Weight	100 g	100 g	160 g
Electrical Data			
Electronics	single	single	redundant
Voltage output	0.5 – 4.5 V DC	0 – 10 V	–
Current output	–	4 – 20 mA	4 – 20 mA
Maximum load current	–	–	250 Ω / 500 Ω *
Pulse output	–	–	–
Bus output	–	CAN / CANopen [2]	CANopen / CANopen-safety
Signal adjustment via	fixed alignment	push button	fixed alignment / analogue signal
Linearity	± 0.1 %	± 0.2 %	± 0.2 %
Resolution	12 bit	16 bit	14 bit
Supply [1]	5 V DC	18 – 33 V DC	6 – 35 V DC
Current consumption	< 50 mA	< 80 mA	< 50 mA
Temperature coefficient	0.1° / 10K	0.1° / 10K	0.1° / 10K
Test voltage	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min
Immunity standard	EN 61 000-6-2	EN 61 000-6-2	EN 61 000-6-2
Emission standard	EN 61 000-6-4	EN 61 000-6-4	EN 61 000-6-4
Other			
Customized features	smallest Angular Position Transmitter	signal measurement via membrane keypad	SIL IEC 61508 PL EN 13849
Article number	1140Z01	2750Z05	5758F01

* 250 Ω at 6 – 35 V DC supply respectively 500 Ω at 11 – 35 V DC
[1] other on request
[2] on request

System versions	magnetic / optic		magnetic	magnetic
				
Mechanical Data				
Series	**MH64-1023**	**XA64-1023**	**MH4096-1023**	**MH8-II-MU / GS63**
Casing - Ø	60 mm		60 mm	60 mm
Casing material	Alu, anodized / Stainless steel		Alu, anodized / Stainless steel	Stainless steel
Casing length without shaft	approx. 67 mm		approx. 41 mm	approx. 60 mm
IP code of casing up to	IP67		IP67	IP67
Shaft - Ø	10 mm		10 / 6 mm	10 mm
Shaft material	Stainless steel		Stainless steel	Stainless steel
Shaft bearing	Double ball bearing		Double ball bearing	Ball bearing
Angle of rotation max.	64 x 360°		4096 x 360°	8 x 360°
Revolution max.	64		4096	8
Temperature range	-30°C up to +80°C		-30°C up to +80°C	-20°C up to +60°C
Shock	50 g, 6 ms		50 g, 6 ms	25 g, 6 ms
Vibration	4 g Sinus, 5 - 100 Hz		4 g Sinus, 5 - 100 Hz	2 g Sinus, 5 - 150 Hz
Connection	plug / cable		plug / cable	cable
Weight	400 g		400 g	1200 g
Electrical Data				
Electronics	single / redundant		single	redundant
Voltage output	0 – 10 V		–	–
Current output	4 – 20 mA		–	4 – 20 mA, 2-wire system
Maximum load current	600 Ω		–	500 Ω
Pulse output	on request		–	–
Bus output	CANopen / CANopen-safety		CANopen	–
Signal adjustment via	keys		CAN-Bus	fixed alignment
Linearity	± 0.3 %		± 0.2 %	± 0.1 %
Resolution	4 + 14 bit		16 + 12 bit	14 bit
Supply [1]	18 – 36 V DC		9 – 34 V DC	9 – 33 V DC
Current consumption	< 80 mA		< 80 mA	< 80 mA
Temperature coefficient	0.1° / 10K		0.1° / 10K	> 0.1° / 10K
Test voltage	500 V, 50 Hz, 1 min		500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min
Immunity standard	EN 61 000-6-2		EN 61 000-6-2	EN 61 000-6-2
Emission standard	EN 61 000-6-4		EN 61 000-6-4	EN 61 000-6-4
Other				
Customized features	SIL IEC 61508 PL EN 13849		4096 turns	Ex IEC Ex SIL IEC 61508
Article number	5755Z03	5730Z02	5756S01	5885F01

[1] other on request

System versions	magnetic	magnetic	magnetic
			
Mechanical Data			
Series	**MH605-II-MU**	**MH620-../Z**	**MH680-III-MU**
Casing - Ø	13 mm	50,8 mm	80 mm
Casing material	Alu, anodized	Alu, anodized	Alu, hart-coat
Casing length without shaft	approx. 9 mm	approx. 37 mm	approx. 68 mm
IP code of casing up to	IP67	IP65	IP67
Shaft - Ø	separate magnetic holder	6 mm	6 mm
Shaft material	–	Stainless steel	Stainless steel
Shaft bearing	–	Ball bearing	Ball bearing
Angle of rotation max.	360°	360°	360°
Revolution max.	1	1	1
Temperature range	-40°C up to +105°C	-30°C up to +80°C	-30°C up to +80°C
Shock	50 g, 6 ms	50 g, 6 ms	25 g, 11 ms
Vibration	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz
Connection	cable	cable	3 x plug
Weight	20 g	250 g	800 g
Electrical Data			
Electronics	redundant	redundant	triple
Voltage output	2 x 0.5 – 4.5 V DC	2 x 0 – 10 V	–
Current output	–	2 x 4 – 20 mA	3 x 4 – 20 mA
Maximum load current	–	600 Ω	600 Ω
Pulse output	–	–	–
Bus output	–	2 x CAN / CANopen	on request
Signal adjustment via	fixed alignment	cable	keys
Linearity	± 0.3 %	± 0.2 %	± 0.1 %
Resolution	12 bit	14 bit	14 bit
Supply [1)]	5 V DC	2 x 18 – 33 V DC	3 x 18 – 33 V DC
Current consumption	< 10 mA	< 80 mA	< 50 mA, per channel
Temperature coefficient	0.1° / 10K	0.1° / 10K	0.1° / 10K
Test voltage	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min
Immunity standard	EN 61 000-6-2	EN 61 000-6-2	EN 61 000-6-2
Emission standard	EN 61 000-6-4	EN 61 000-6-4	EN 61 000-6-4
Other			
Customized features	smallest redundant analogue rotary encoder	DNV·GL back hand for representation shaft position	Triple analogue rotary encoder, signal measurement via 3x membrane keypads
Article number	2900Z01	2847Z01	5861Z01

[1)] other on request

System versions	magnetic	magnetic	magnetic
			
Mechanical Data			
Series	**MH64-II-CAN/Mems/GS65**	**MH-II-MU/GS100**	**MH14/12-CAN/GS125**
Casing - Ø	65 mm	100 mm	125 mm
Casing material	Alu, anodized	Steel, zinc-plated, painted	Alu, anodized
Casing length without shaft	approx. 76 mm	approx. 38 mm	approx. 58 mm
IP code of casing up to	IP67	IP69K	IP67
Shaft - Ø	6 mm	–	12 mm
Shaft material	Stainless steel	–	Stainless steel
Shaft bearing	Ball bearing	Ball bearing	Double ball bearing
Angle of rotation max.	64 x 360°	360°	max. 4096 x 360°
Revolution max.	64	1	gearing programmable
Temperature range	-30°C up to +80°C	-40°C up to +80°C	-30°C up to +80°C
Shock	25 g, 11 ms	50 g, 6 ms	50 g, 6 ms
Vibration	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz	4 g Sinus, 5 - 100 Hz
Connection	plug / cable	cable	plug
Weight	400 g	2000 g	500 g
Electrical Data			
Electronics	redundant	redundant	redundant
Voltage output	–	2 x 0 – 10 V	–
Current output	on request	2 x 4 – 20 mA	–
Maximum load current	–	600 Ω	–
Pulse output	–	–	–
Bus output	CANopen / CANopen-safety	2 x CANopen	CANopen / CANopen-safety
Signal adjustment via	CAN-Bus	fixed alignment	CAN-Bus
Linearity	± 0.2 %	± 0.2 %	0.2 %
Resolution	14 bit	14 bit	0,1°
Supply [1)]	9 – 42 V DC	2 x 18 – 36 V DC	9 – 42 V DC
Current consumption	< 100 mA	< 180 mA	< 80 mA
Temperature coefficient	0.1° / 10K	0.1° / 10K	0.1° / 10K
Test voltage	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min	500 V, 50 Hz, 1 min
Immunity standard	EN 61 000-6-2	EN 61 000-6-2	EN 61 000-6-2
Emission standard	EN 61 000-6-4	EN 61 000-6-4	EN 61 000-6-4
Other			
Customized features	Angular Position Transmitter with Tilt Sensor measuring range 360°	Angular Position Transmitter, rugged construction, flat design, without shaft	SIL IEC 61508 PL EN 13849
Article number	5864F01	5810Z01	3933F61

[1)] other on request

BERLIN (HEADQUARTERS)

- founded in 1946
- total production area: 3500 m²
- number of employees: 170
- company management and sales
- design and development
- production and assembly

HEPPENHEIM

- founded in 1961
- total production area: 2700 m²
- number of employees: 40
- production and assembly

4
locations in germany

12
representations worldwide

70
years in the market

90
percent vertical range of manufacture

450
employees

KÖNIGS WUSTERHAUSEN/OT KABLOW

- founded in 1992
- total production area: 5000 m²
- number of employees: 180
- production and assembly

KÖNIGS WUSTERHAUSEN/OT ZERNSDORF

- founded in 2017
- number of employees: 60
- total production area: 4300 m²

Fernsteuergeräte Kurt Oelsch GmbH
Jahnstraße 68 + 70
D-12347 Berlin (Britz)

Phone. +49 (0) 30 62 91-1
Fax. +49 (0) 30 62 91-277

info@fernsteuergeraete.de
www.fernsteuergeraete.de

042019