

Data Sheet | Multicomponent Transducer Series MKA



Key Facts

- ▶ For static and dynamic torques
- ▶ compact design
- ▶ Accuracy class: 0.2
- ▶ Fatigue strength: $\pm 80\%$ of nominal load
- ▶ low weight
- ▶ configurable variants for maximum flexibility of forces and moments

Options | Accessories

- ▶ available as 2-, 3-, 4-, 6- component sensors
- ▶ pluggable version or fixed cable connection available in various lengths
- ▶ Extensive electrical connection options
- ▶ Special versions also in small quantities (on request)

Technical Data

Metrological Data	Accuracy class		%	0.2
	Linearity error	d_{lin}	%	0.2
	Hysteresis	h	%	0.1
	Repeatability (f.s.)		%	0.01
	Creep		%	0.05
	Temperature effect on characteristic value per 10 K	TK_C	%/10 K	0.025
	Temperature effect on zero signal per 10 K	TK_0	%/10 K	0.04
Electrical Data	Input resistance	R_e	Ω	400 - 800
	Output resistance	R_a	Ω	350 - 700
	Insulation resistance	R_{is}	Ω	$> 10^9$
	Operating range of excitation voltage	$B_{U, G}$	V	5 - 12
	Protection (DIN EN 60529)			IP 50 ¹⁾
Mechanical Data	Rated Displacement	s_{nom}	mm	2)
	Spring rigidity	c_{ax}	kN/mm	2)
	Mass	m	kg	2)
	Proportionate moving mass	m_{mess}	kg	2)
	Fundamental resonant frequency	f_G	kHz	2)
Limits	Force limit		%	2)
	Torque limit		%	2)
	Breaking force		%	2)
	Breaking torque		%	2)
	Rated temperature range	$B_{T, nom}$	°C	10 - 60
	Operating temperature range	$B_{T, G}$	°C	5 - 80

1) Permanent connection

2) Data depending on configuration. Data available on request

Load ranges

- ▶ The load ranges shown are examples of possible combinations.
- ▶ The minimum and maximum possible loads for which an MKA can be designed are specified for each component.
- ▶ Not every combination is possible.
- ▶ Additional load ranges and special designs are available on request.
- ▶ For the best possible design for your application, please contact us: contact@gtm-gmbh.com

Size			I	II	III	IV	V	VI	M
Load range ¹⁾	F_{xy}	kN	0.3 - 30	1 - 80	2 - 200	3 - 300	5 - 500	25 - 500	1 - 50
Load range ¹⁾	F_z	kN	1 - 100	2 - 200	5 - 500	10 - 1000	20 - 1000	100 - 4000	5 - 200
Load range ¹⁾	M_{xy}	N·m	5 - 1500	25 - 5000	100 - 20000	250 - 25000	1000 - 100000	5000 - 200000	100 - 8000
Load range ¹⁾	M_z	N·m	5 - 1000	25 - 5000	100 - 10000	250 - 15000	1000 - 25000	5000 - 200000	100 - 8000

Configuration examples

MKA size			I	II	III	IV	V	VI	M
	$\pm F_{nom}^{1)}$	kN	5	40	100	160	200	500	20
	$\pm M_{nom}^{2)}$	N·m	250	3000	10000	15000	20000	50000	4000
Rated characteristic value	C_{Fx}, C_{Fy}	mV/V	2					1.6	2
Rated characteristic value	C_{Fz}	mV/V	0.4					0.4	0.4
Rated characteristic value	C_{Mx}, C_{My}	mV/V	2				1		2
Rated characteristic value	C_{Mz}	mV/V	2				1		2

1) F_x, F_y, F_z

2) M_x, M_y, M_z

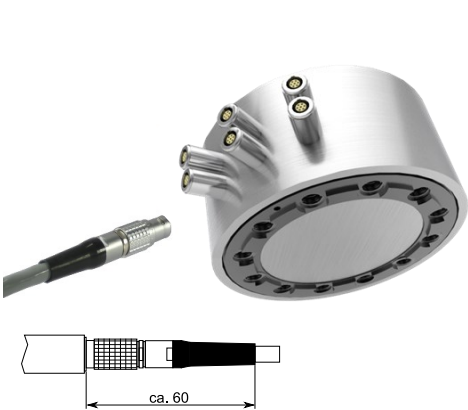
- ▶ Other combinations of forces and moments are possible.
The resulting characteristic values will be provided on request.

Cable connection



		Permanent connection ³⁾⁴⁾ end not connected		Steckbarer Kabelanschluss ¹⁾²⁾
		Grey cable Ø 6,5 mm 6 x 0,25 mm ² Temperature range: -35 °C to +90 °C	Black cable 6-wire Ø 2,9 mm 6 x 0,04 mm ² Temperature range: -50 °C to +105 °C	7-pin LEMO Series 1 Female: - Male:
Connection		Color	Color	Pin
Supply voltage (+)	U _{in+}	blue	blue	3
Supply voltage (-)	U _{in-}	black	black	2
Measurement signal (+)	U _{out+}	white	white	1
Measurement signal (-)	U _{out-}	red	red	4
Sense (+)	Sense+	green	green	5
Sense (-)	Sense-	grey	yellow	6
Shielding		yellow	grey	Housing

1) View too weldingside
 2) Female LEMO S.A. Typ: EGG.1B.307.CLL; Male: FGG.1B.307.CLA.D72
 3) Gray cable with cable fitting PG7
 4) Black cable with cable fitting M 6



► Pluggable cable connection with shielded measuring cable
 Type SMC (S-CAB-SMC-L-5M-F)

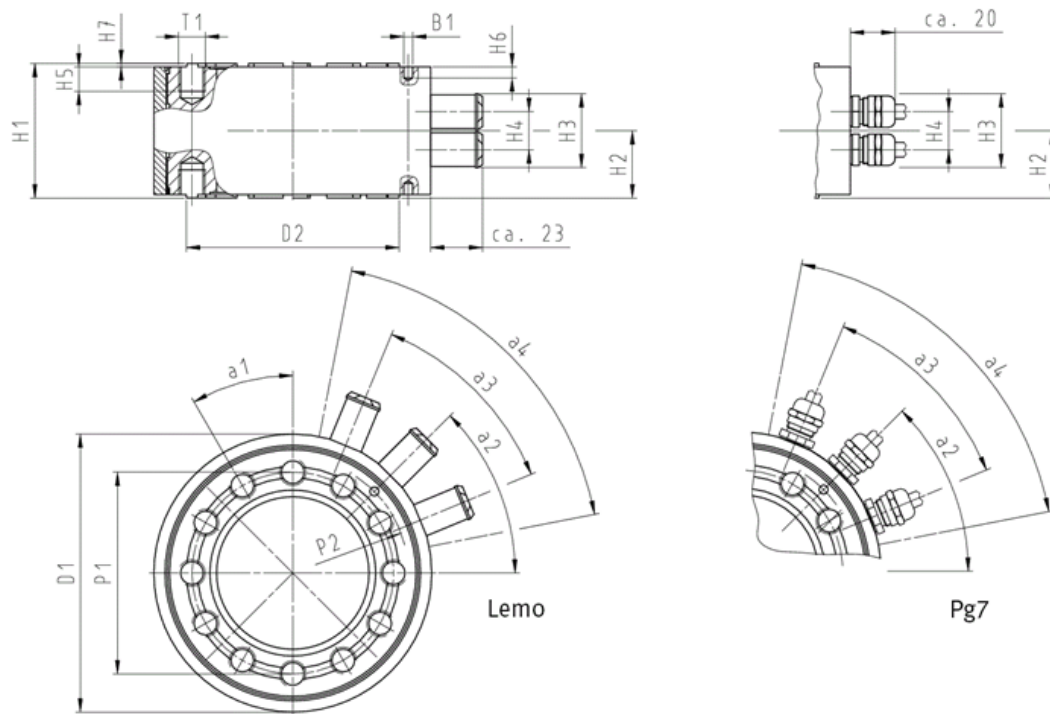


► Fixed cable connection with shielded measuring cable type
 SMC and open cable ends
 (Fig. shows a 3-component MKA)



► Fixed cable connection with shielded measuring cable type
 DMC and open cable ends
 (Fig. shows a 3-component MKA)

Mating dimensions



Typ			I	I	I	II	II	II	III	III	IV	IV	V	V	VI	VI	M	M			
Connection			LEMO	Pg7	M6	LEMO	Pg7	M6	LEMO	Pg7	LEMO	Pg7	LEMO	Pg7	LEMO	Pg7	LEMO	Pg7			
Bore	$\varnothing B_1$	mm	4 H7										6H7		8H7		4 H7				
Diameter	$\varnothing D_1$	mm	88			124			169		180		250		352		220				
Diameter	$\varnothing D_2$	mm	63-0.05			95-0.05			136-0.05		145-0.05		205-0.1		300-0.5		192 _{0,1}				
Pitch circle diameter	$\varnothing P_1$	mm	60±0.1			90±0.1			130±0.1				200±0.2		280±0.2		190 _{±0,1}				
Centering diameter	$\varnothing P_2$	mm	68+0.05			103+0.05			145+0.05		155+0.05		220+0.05		315-0.05		179 _{±0,1}				
Thread	T_1		M8			M12			M16		M20			M30		M10					
Height	H_1	mm	52			60			82		112		180		180		56				
Height	H_2	mm	26			30			41		56		90		90		29				
Height	H_3	mm	33		21	33		21	33						36		33	21			
Height	H_4	mm	17															20		17	
Height	H_5	mm	8			10.5			16		22		30		30		8				
Height	H_6	mm	5									7		8		10		5			
Height	H_7	mm	2										5		5		1				
Angle	a_1		12 x 30°													16 x 22.5° +11.25°		16 x 22,5°			
Angle	a_2		45°													45°		30°			
Angle	a_3		45°		40°	45°		40°	45°					20		45°					
Angle	a_4		68°		54°	68°		54°	68°					30°		68°					

Order numbers | configurable variants

► Multicomponent transducer series MKA | configurable variants

Item	Code	Description
Multicomponent transducer series MKA	C-MKA	Configurable multicomponent transducer Series MKA
Number of components	2K	2 component transducer Fz Mz
	3K	3 component transducer Fx, Fy, Fz
	4K	4 component transducer Fx, Fy, Fz Mz
	6K	6 component transducer Fx, Fy, Fz Mx, My, Mz
Size	BG1	Size 1
	BG2	Size 2
	BG3	Size 3
	BG4	Size 4
	BG5	Size 5
	BG6	Size 6
	BGM	Size M
Version (depending on the specified forces and moments)	000	Version 000
Temperature range	S	Standard temperature range -10°C – +60°C
Electrical transducer connection (for all selected measuring circuits)	P	LEMO female plug(s) selected 7-pole push-pull on all measuring circuits
	A	5 m fixed shielded measuring cable type SMC on all measuring circuits
	B	5 m fixed shielded measuring cable type DMC on all measuring circuits
	C	10 m fixed shielded measuring cable type SMC on all measuring circuits
	D	10 m fixed shielded measuring cable type DMC on all measuring circuits
Integrated amplifier	NOT	Without integrated amplifier
Cable connection type (for all selected measuring circuits)	P	LEMO Anschlussbuchse(n) ausgewählt keine fest montierte(n) Messleitung(en)
	F	Free cable ends on all measuring circuits
	A	D-Sub 9-Pol on all measuring circuits
	B	D-Sub 15-Pol on all measuring circuits
	C	MS 7-Pol on all measuring circuits
	D	HD-Sub 15 Pol 3-row on all measuring circuits
	M	MS12 8 Pol on all measuring circuits
Firmware	NOT	Without firmware

Order-Example

C	MKA	6K	BG3	050	S	A	NOT	F	NOT
		6-component transducer	Size 3	Version	Standard temperature range	6 x 5 m fixed measuring cable SMC	without integrated amplifier	free cable ends	without firmware

Order numbers | Glossar

Item	Description				
Number of components	The multi-component transducers of the MKA series are used to measure forces and moments that occur simultaneously in several spatial directions. Depending on the design, torsional and bending moments (Mx, My, Mz) can be determined in addition to linear forces (Fx, Fy, Fz). In the maximum configuration, up to six measured variables can be recorded. The available versions are available in four different combinations. ☒ ☒				
	Number of components	2K	2 component transducer Fz Mz		
		3K	3 component transducer Fx, Fy, Fz		
		4K	4 component transducer Fx, Fy, Fz Mz		
		6K	6 component transducer Fx, Fy, Fz Mx, My, Mz		
Size	The MKA series comprises seven sizes, which are based on the total load of the sensor. As the load increases, so does the size, whereby within the size, optimization can be carried out for the expected individual loads as part of the “engineered-to-order” process. Each size is therefore designed for a specific load combination and optimized for the best possible signal utilization. The “M” size occupies a special position: it is designed for large bending moments in comparison to relatively small forces (corresponding approximately to BG1 and BG2), such as those that occur with large eccentric loads.				
Version	The version depends on the specified forces and torques. Within a given size, each version is optimized for maximum signal output.				
Temperature range	S = Standard temperature range -10 °C ... +60 °C				
Electrical transducer connection	The MKA multi-component transducer series can be configured either with fixed push-pull connectors or with fixed measuring cables in different lengths. P = LEMO connector 7-pin Push-pull A = 5 m fixed-mounted standard measuring cable type SMC available on all measuring circuits B = 5 m fixed-mounted double-shielded measuring cable type DMC available on all measuring circuits C = 10 m fixed-mounted standard measuring cable type SMC available on all measuring circuits D = 10 m fixed-mounted double-shielded measuring cable type DMC available on all measuring circuits Note: The number of measuring cables corresponds to the number of selected components.				
Integrated amplifier	Currently not available for selection.				
Cable connection type	If the MKA series multicomponent transducer is configured with fixed measuring cables, different connector types for strain gauge measuring amplifiers can be selected in addition to open cable ends. The selected connectors are assembled by GTM. The torque transducer can be connected directly to a measuring amplifier. F = Free cable ends on all configured measuring circuits A = D-Sub 9-pin on all configured measuring circuits B = D-Sub 15-pin on all configured measuring circuits C = MS 7-pin on all configured measuring circuits D = HD-Sub 15-pin connector on all configured measuring circuits M = M12 8-pin on all configured measuring circuits				
Firmware	Currently not available for selection.				