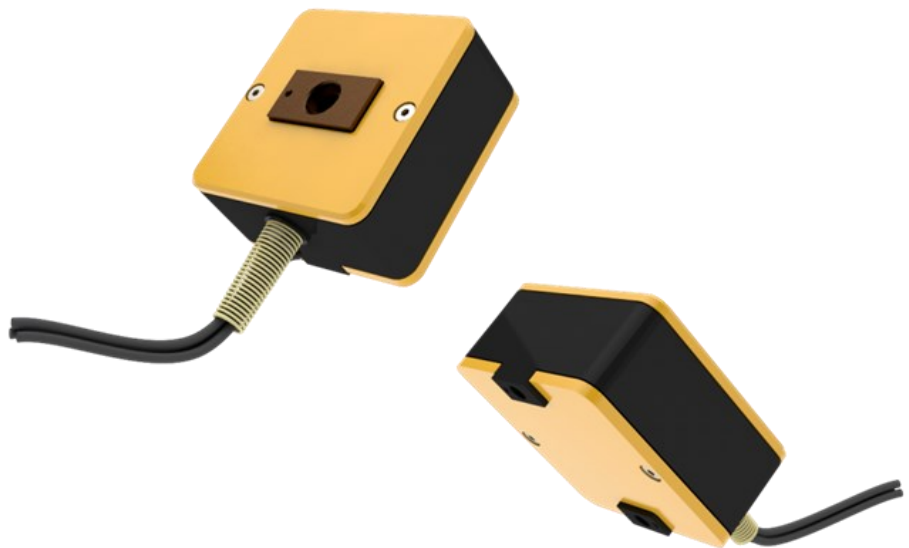


## Operating manual

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# Multicomponent Transducer Series DKA-ZE

Nominal force  
0.5 kN - 10 kN





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The content of these manual is intended solely for information purposes and can be changed at any time without prior notification.

With regard to the warranty and liability, we refer expressly to our 'General commercial terms and conditions' ([www.gtm-gmbh.com](http://www.gtm-gmbh.com)) and the instructions and regulations contained in these installation and operating instructions.

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# 1. Product description

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## 1.1 Designated use

The multicomponent transducer of the DKA series is to be used for measuring static and dynamic forces and torque vectors in test benches and test machines.

Any other use is not intended and is therefore prohibited. No claims may be made for damage resulting from inappropriate use.

The limit values for the total load and all other limits must be complied with.

## 1.2 Exempted use

The multicomponent transducer is not a safety component. You must not use it in a complete system in which its failure may lead to the life and well being of people being endangered.

The transducer is not suitable or approved for use in potentially explosive areas.

## 2. Safety instructions

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### Markings used

The following designations and symbols are used in the operating manual to identify hazards:



**DANGER!**

Denotes a possibly hazardous situation that can lead to physical injuries or death.



**DANGER!**

Denotes a hazardous situation due to electrical voltage that can lead to physical injuries or death.



**NOTE!**

Denotes usage tips, general information and other useful notes.



**DANGER OF BURSTING!**

Denotes a potentially hazardous situation that can cause physical injuries or death if ignored.

▶ Denotes handling instructions

● Denotes lists

## Additional regulations

This operating manual contains the most important notes for safe operation of the transducer. Consideration must also be given to the legal and safety regulations applicable at the operating location, the accident prevention regulations applicable at the operating location and the technical data in connection with the safety regulations listed here.

## Residual hazards

The transducer of series DKA is state-of-the-art technology and safe to operate.

Residual hazards can arise during operation if the devices are used and operated improperly by unqualified personnel.

The scope of delivery for the transducer only covers a partial area of mechatronic metrology. The safety-related criteria for using the transducer within a complete system must be taken into account by the system design engineer, the equipment manufacturer and/or the operator so that residual hazards are minimised. Reference must be made to the remaining residual hazards in the



### **DANGER!**

In the case of a complete system, the safety-related criteria must be taken into account so that any failure of the transducer does not present a hazard to anyone.

## Transducer condition and modifications

You may only operate the transducer in a perfect condition while complying with the instructions given in the operating manual.

The transducer must not be modified either in its design or safety-related features, without our express, written permission.

## Overloading

All transducers of this series have already been subjected to an overload test at the manufacturer's. No additional overloads are permissible; always comply with the nominal loads of the transducer.



### **DANGER OF BURSTING!**

Do not overload the transducer!

The attached parts must also be designed to bear the maximum load. Only use attached parts in an appropriate condition.

In case of new, untested designs, you must provide additional protective measures against bursting parts.

## Personnel qualifications

The transducer and additional components must only be operated and assembled by qualified personnel. Qualified personnel are those persons who are acquainted with the assembly, commissioning and operation of the transducer and who have the appropriate qualifications for their job.



### **NOTE**

GTM offers training courses to qualify personnel.

## Ambient conditions

The transducer is intended for use in enclosed rooms while complying with the ambient conditions detailed in the technical specifications.

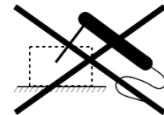
The transducer is not permitted for use in potentially explosive areas.



Protect the transducer against the influences of weather, such as rain and snow. Take appropriate measures on-site against power surges, e.g. from lightning strike.



No welding circuits may be introduced through the body of the transducer. If in doubt, you must dismantle the transducer.



### **DANGER!**

The transducer is not suitable for:

- Potentially explosive areas
- Power surges
- Welding circuits



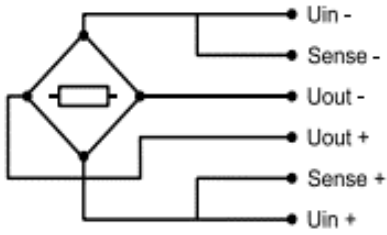
### 3. Storage and transport instructions

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The transducer series DKA is a precision measuring device and must be handled with appropriate caution.

- ▶ If the transducer is dropped or jolted it can become damaged prohibiting any further use.
- ▶ During storage, secure rotationally symmetrical transducers and attachment parts from rolling away.
- ▶ Only use the original transport packaging and other appropriate cut-to-size packaging for storage and transport.

## 4. Cable connection



Permanent connection  
end not connected

Black cable 6-wire  
Ø 2,9 mm  
6 x 0.04 mm<sup>2</sup>  
Temperature range: -50 °C bis +105 °C

Connection		Color
Supply voltage (+)	U <sub>in+</sub>	blue
Supply voltage (-)	U <sub>in-</sub>	black
Measurement signal (+)	U <sub>out+</sub>	white
Measurement signal (-)	U <sub>out-</sub>	red
Sense (+)	Sense+	green
Sense (-)	Sense-	yellow
Shielding		grey



▶ permanent cable connection, end not connected; cable length (3x) 3m

## 5. Application instructions

### 5.1 Assembly instruction

- ▶ Tighten the screws evenly and crosswise. For higher tightening torques, tighten the screws in stages.
- ▶ Avoid mechanical strain on the cable and the connector.
- ▶ Avoid a deformation of the assembly surfaces. This could affect the measurement.
- ▶ Pay attention to the cleanliness of the mounting surfaces and connections. They should be cleaned from dust and dirt before mounting and measuring, otherwise the measuring would be influenced.

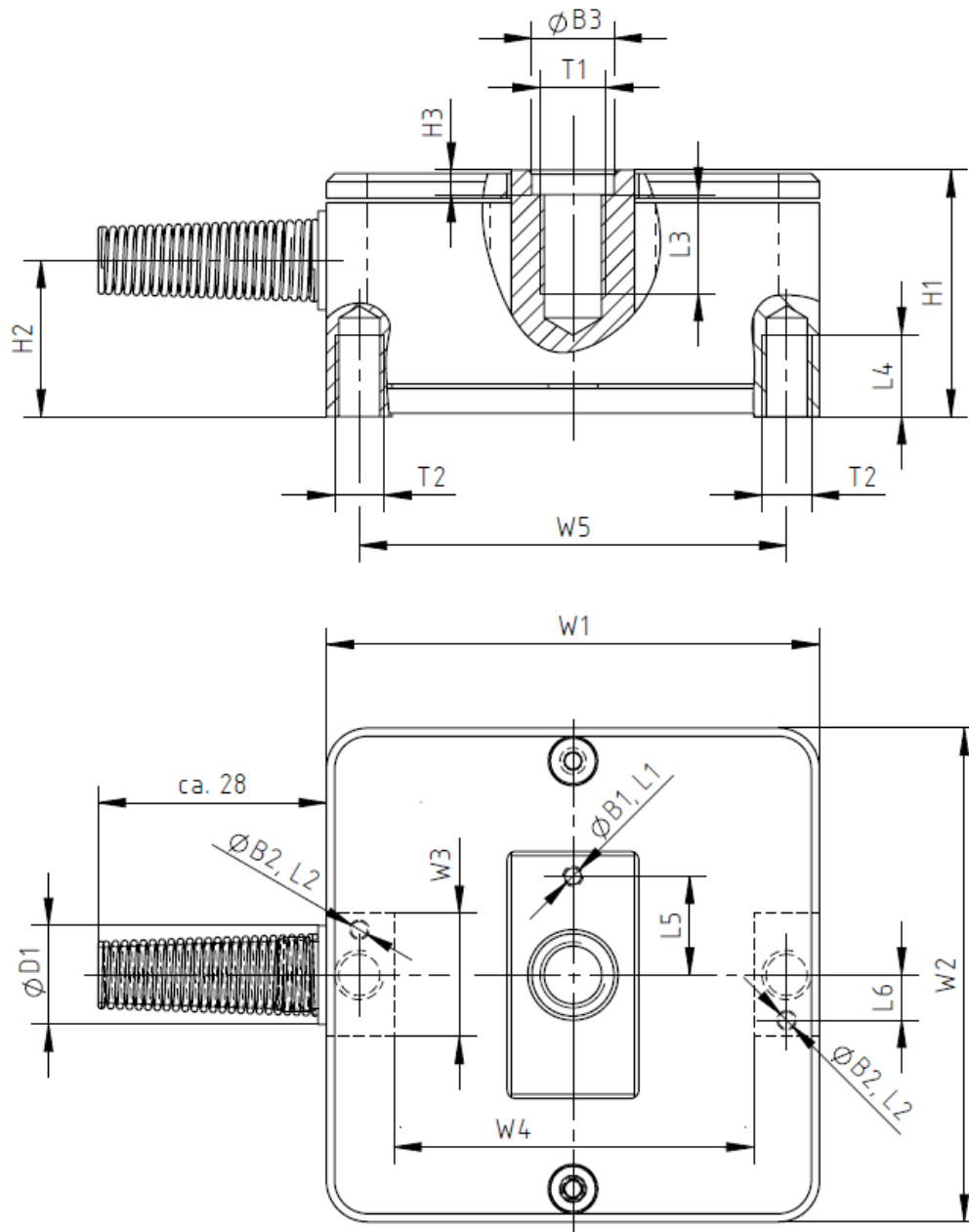
Nominal force	Screw size	Screw quality	Fastening torque
kN	-	-	N·m
0.5	M8	8.8	15
1; 2	M8	8.8	25
5; 10	M8	12.9	43

▶ top assembly

Nominal force	Screw size	Screw quality	Fastening torque
kN	-	-	N·m
0.5; 1	M5	8.8	6
2	M6	8.8	10
5; 10	M6	12.9	18

▶ bottom assembly

## 6. Mating dimensions



# Mating dimensions

Nominal force compression/tension	$\pm F_{nom}$ $F_x$ $F_y$ $F_z$	kN	0.05	0.1	0.2	0.5	1
			0.05	0.1	0.2	0.5	1
			0.5	1	2	5	10
Bore	$\varnothing B_1$	mm	2				
Bore	$\varnothing B_2$	mm	2				
Bore	$\varnothing B_3$	mm	10				
Diameter	$\varnothing D_1$	mm	12				
Thread	$T_1$	mm	M8				
Thread	$T_2$		M5		M6		
Height	$H_1$	mm	23		32		
Height	$H_2$	mm	11		19		
Height	$H_3$	mm	3				
Lenght	$L_1$	mm	5				
Lenght	$L_2$	mm	5				
Lenght	$L_3$	mm	8		12		
Lenght	$L_4$	mm	6		10		
Lenght	$L_5$	mm	12				
Lenght	$L_6$	mm	5.5				
Width	$W_1$	mm	60				
Width	$W_2$	mm	60				
Width	$W_3$	mm	15				
Width	$W_4$	mm	44				
Width	$W_5$	mm	52				

# 7. Technical Data

Metrological data	Nominal forces	$\pm F_x$ $\pm F_y$ $\pm F_z$	kN	0.05 0.05 0.5	0.1 0.1 1	0.2 0.2 2	0.5 0.5 5	1 1 10
	Accuracy class			0.2				0.3
	force measurement range	$d_{lin}$	%	0.2				0.3
	Hysteresis	$h$	%	0.1				0.2
	Reproducibility		%	0.01				0.025
	Creep		%	0.05				
	Temperature effect on characteristic value per 10 K	$TK_C$	%/10K	0.1				
	Temperature effect on zero signal per 10 K	$TK_0$	%/10K	0.1				
	Characteristic value difference, tension/compression force	$d_{zD}$ $x, y$ $z$	%	0.1 1		0.2 2		0.3 3
	Electrical Data	Rated characteristic value	$C_{Fx}, C_{Fy}$ $C_{Fz}$	mV/V	0.7 1	1.4 2	1.8 1.5	1.8 1.5
Input resistance		$R_e$	$\Omega$	350 - 450				
Output resistance		$R_a$	$\Omega$	350				
Insulation resistance		$R_{is}$	$\Omega$	$>10^9$				
Operating range of excitation voltage		$B_{U, G}$	V	5 - 12				
Protection (DIN EN 60529)				IP 40				
Mechanical Data		Rated Displacement	$S_{xnom}$ $S_{ynom}$ $S_{znom}$	mm	0.01 0.01 0.02	0.02 0.02 0.03	0.02 0.02 0.02	0.04 0.04 0.05
	Spring rigidity	$c_{ax}$ $c_{ay}$ $c_{az}$	kN/mm	5 5 25		10 10 100	12.5 12.5 100	25 25 125
	Mass	$m$	kg	0.06		0.15	0.4	
	Proportionate moving mass	$m_{mess}$	kg	0.05		0.09	0.25	0.26
	Resonance frequency	$f_x$ $f_y$ $f_z$	kHz	0.03 0.03 0.1		1.7 1.7 5.3	1.1 1.1 3.2	1.6 1.6 3.5
	Permissible oscillation stress		%	$\pm 80$				

# Technical Data

Limits	Nominal forces	$\pm F_x$ $\pm F_y$ $\pm F_z$	kN	0.05 0.05 0.5	0.1 0.1 1	0.2 0.2 2	0.5 0.5 5	1 1 10
	Force limit <sup>1)</sup>	$F_x$ $F_y$ $F_z$	%			150 150 150		150 150 130
	Breaking force <sup>1)</sup>	$F_x$ $F_y$ $F_z$	%	300				
	Rated temperature range	$B_{T, nom}$	°C	10 - 60				
	Operating temperature range	$B_{T, G}$	°C	5 - 80				
		$e_{Fx}$	mm	150	50	50	150	55
		$e_{Fy}$		150	50	50	150	55
		$e_{Fz}$		25	20	5	20	5

1) For individually occurring components

## 8. Technical support

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If problems arise while working with the product the following GTM services can be used:

### E-mail support

[contact@gtm-gmbh.com](mailto:contact@gtm-gmbh.com)

### Worldwide contact

GTM Testing and Metrology GmbH  
Philipp-Reis-Straße 4-6  
64404 Bickenbach  
Tel. +49 6257 9720-0  
Fax +49 6257 9720-77  
[www.gtm-gmbh.com](http://www.gtm-gmbh.com)

### Local contact in Czech Republic

GTM Praha s.r.o.  
Prosecká 811/76 a  
19000 Praha 9  
Czech Republic  
Tel. +420 286 891 392  
[info@gtm.cz](mailto:info@gtm.cz)  
[www.gtm.cz](http://www.gtm.cz)



## 9. Declaration of incorporation

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In accordance with EC Machinery Directive 2006/42/EC from May 17, 2006,  
Appendix II B

We,

**GTM Testing and Metrology GmbH  
Philipp-Reis-Straße 4-6  
64404 Bickenbach  
Deutschland**

hereby declare that the product

**Multicomponent Transducer Series DKA-ZE**

complies with the following basic requirement:

- ▶ 2006/42/EG, Appendix II B      EC Machinery Directive
- ▶ 2006/95/EG,                      Low Voltage Directive
- ▶ 2004/108/EC                      EMC Directive

The special technical documents were created in accordance with Appendix VII, Part B of the EC Machinery Directive 2006/42/EC. Upon reasoned request we shall undertake to submit them to the market supervision authority in electronic form within an appropriate period.

The product delivered by us may only be put into operation if it has been determined that the machine into which the product is to be incorporated likewise complies with the provisions of the Machinery Directive.

Daniel Schwind, Technical Manager

Bickenbach, 30.06.2022

# 10. Notes

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#precision wins

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