

Data Sheet | Force Transfer Standard Series KTN-P

Nominal Force
2.5 kN – 1.2 MN



Applications | Key Facts

- ▶ Applications: Reference force transducer or master sensor in calibration machines
- ▶ ISO 376 accuracy classes 00 (measuring range 20% -100%) and 0.5 (measuring range 5% - 100%)
- ▶ Suitable for static tensile and compressive forces
- ▶ Hermetically sealed
- ▶ Insensitive to changes in the application of force
- ▶ Easy handling due to low weight
- ▶ Simple mechanical integration thanks to standard connection dimensions

Options | Accessories

- ▶ Optional second axial measuring circuit for redundancy (on request)
- ▶ Optional bending moment measuring circuits M_x , M_y (on request)
- ▶ Extensive electrical connection options
- ▶ Extensive mechanical accessories | also special solutions on request
- ▶ Customized transducer variants on request | even in small numbers

Technical Data | Class 00

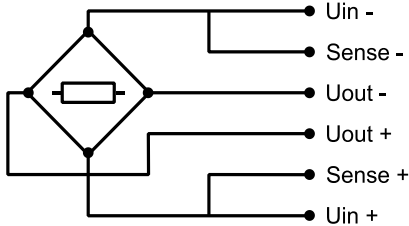
Nominal force		F_{nom}	kN	2.5	5	10	20	50	100	250	600	1200
Metrological Data	Force measurment range		%	20 - 100								
	Interpolation error	f_c	%	0.02								
	Reversibility error	v	%	0.06								
	Repeatability error in unchanged mounting position	b'	%	0.023								
	Reproducibility error in different mounting positions	b	%	0.045								
	Zero error	f_0	%	0.01								
	Creep		%	0.02								
	Temperature effect on characteristic value per 10 K	TK_C	%/10 K	0.01								
	Temperature effect on zero signal per 10 K	TK_0	%/10 K	0.01								
	Electrical Data	Rated characteristic value	C_{nom}	mV/V	2							2.4
Input resistance		R_e	Ω	ca. 1100								
Output resistance		R_a	Ω	ca. 1000								
Insulation resistance		R_{is}	Ω	$> 10^9$								
Operating range of excitation voltage		$B_{U, G}$	V	5 - 12								
Protection (DIN EN 60529)				54								
Mechanical Data	Mass	m	kg	0.3	1.2		2.5	3	8.9	7	43	1)
	Compression force transmission	m	kg	0.15			0.2	0.25	0.4	0.8	2.2	1)
	Tension force transmission	m	kg	0.5	0.55			0.8	1.25	6.7	7.7	1)
	Force limit		%	110								
	Breaking force		%	200								
	Rated temperature range	$B_{T, nom}$	°C	17 - 27								
	Operating temperature range	$B_{T, G}$	°C	10 - 35								

1) Data on request

Technical Data | Class 0.5

Metrological Data	Nominal force	F_{nom}	kN	2.5	5	10	20	50	100	250	600	1200
	Force measurment range		%	5 - 100								
	Interpolation error	f_c	%	0.045								
	Reversibility error	v	%	0.14								
	Repeatability error in unchanged mounting position	b'	%	0.45								
	Reproducibility error in different mounting positions	b	%	0.09								
	Zero error	f_0	%	0.02								
	Creep		%	0.03								
	Temperature effect on characteristic value per 10 K	TK_C	%/10 K	0.02								
	Temperature effect on zero signal per 10 K	TK_0	%/10 K	0.02								
Electrical Data	Rated characteristic value	C_{nom}	mV/V	2								2.4
	Input resistance	R_e	Ω	ca. 1100								
	Output resistance	R_a	Ω	ca. 1000								
	Insulation resistance	R_{is}	Ω	$> 10^9$								
	Operating range of excitation voltage	$B_{U, G}$	V	5 - 12								
	Protection (DIN EN 60529)			54								
Mechanical Data	Mass	m	kg	1.4	1.3	1.4	3	3.3	10	13.5	45	100
	Mass compression force transmission parts	m	kg	0.08				0.13	0.4	0.9	5.5	5.5
	Mass tension force transmission parts	m	kg	0.5	0.4		0.6	0.8	2.2	8	17	31
	Force limit		%	110								
	Breaking force		%	200								
	Rated temperature range	$B_{T, nom}$	°C	17 - 27								
	Operating temperature range	$B_{T, G}$	°C	10 - 35								

Cable connection



Pluggable Connection^{1) 2)}
7-pin LEMO Series 1

female


male


Open cable ends

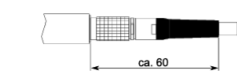
Double shield measuring cable type DMC | yellow cable jacket | Ø 6.5 mm | twisted in pairs | 3 x 2 x 0.25 mm² | temperature range: -40 °C ... +90 °C

Connection		Pin	Wire colour
Supply voltage (+)	U _{in+}	3	blue
Supply voltage (-)	U _{in-}	2	black
Measurement signal (+)	U _{out+}	1	white
Measurement signal (-)	U _{out-}	4	red
Sense (+)	Sense+	5	green
Sense (-)	Sense-	6	grey
Shielding		Housing	yellow

1) View too weldingside
2) Female LEMO S.A. Typ: EGG.1B.307.CLL; Male: FGG.1B.307.CLA.D72

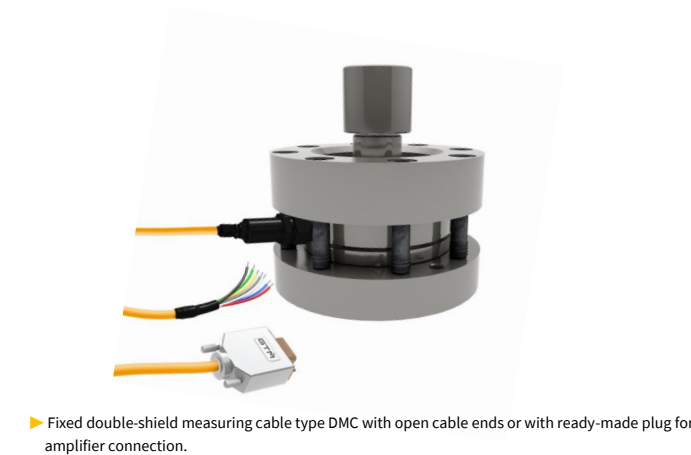
► Pluggable cable connection

All transducers of the KTN-P series can be equipped with a pluggable LEMO socket (on all measuring circuits selected). Suitable measuring cables S-CAB / C- CAB are available as accessories.



► Fixed measuring cable

All transducers of the KTN-P series can be equipped with permanently mounted measuring cables, e.g. with 5 / 10 m double-shielded measuring cable type DMC. The cable ends can be optionally open or equipped with various connectors for strain gauge amplifier connections.



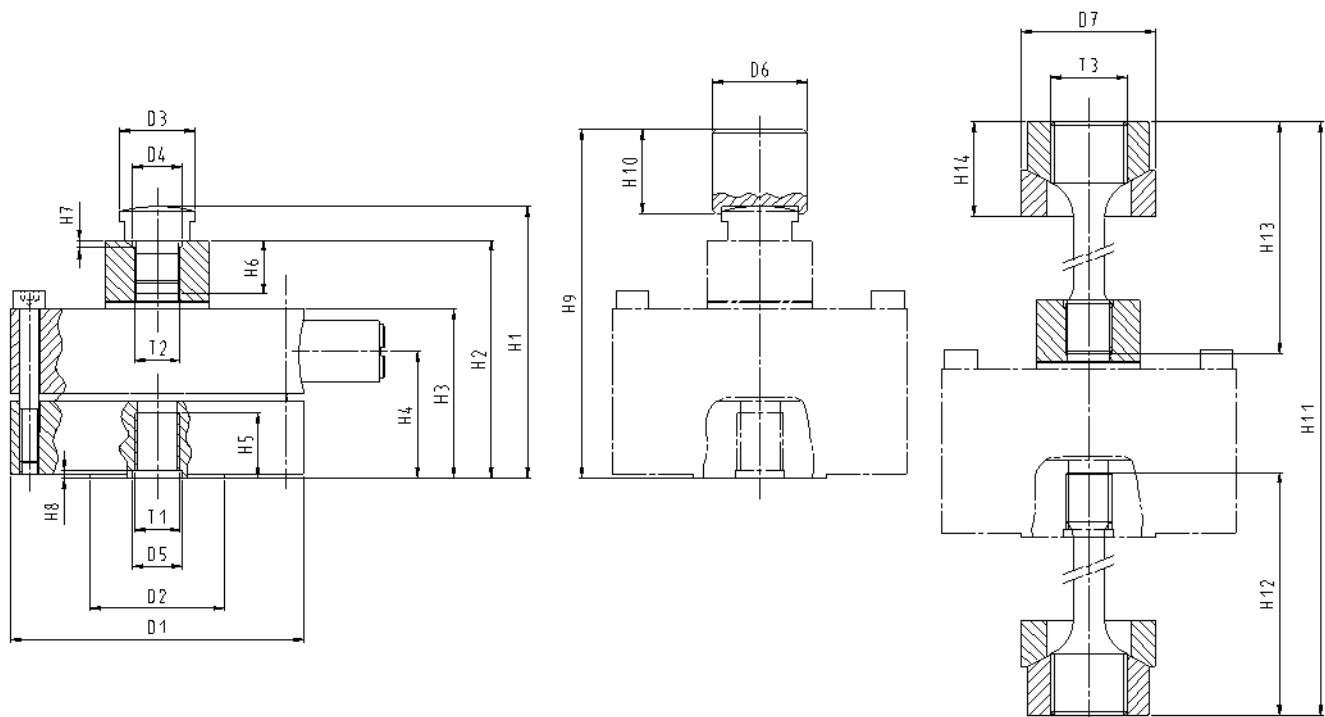
Double Bridge

- ▶ On request | for version with double measuring bridge, the technical data apply equally to both measuring circuits.

Bending Moment Measuring Circuits

- ▶ On request | bending moment measuring circuits M_x and M_y can be used advantageously to control the force application with the use of a multichannel measuring amplifier.

Dimensions | 2.5 - 10 kN

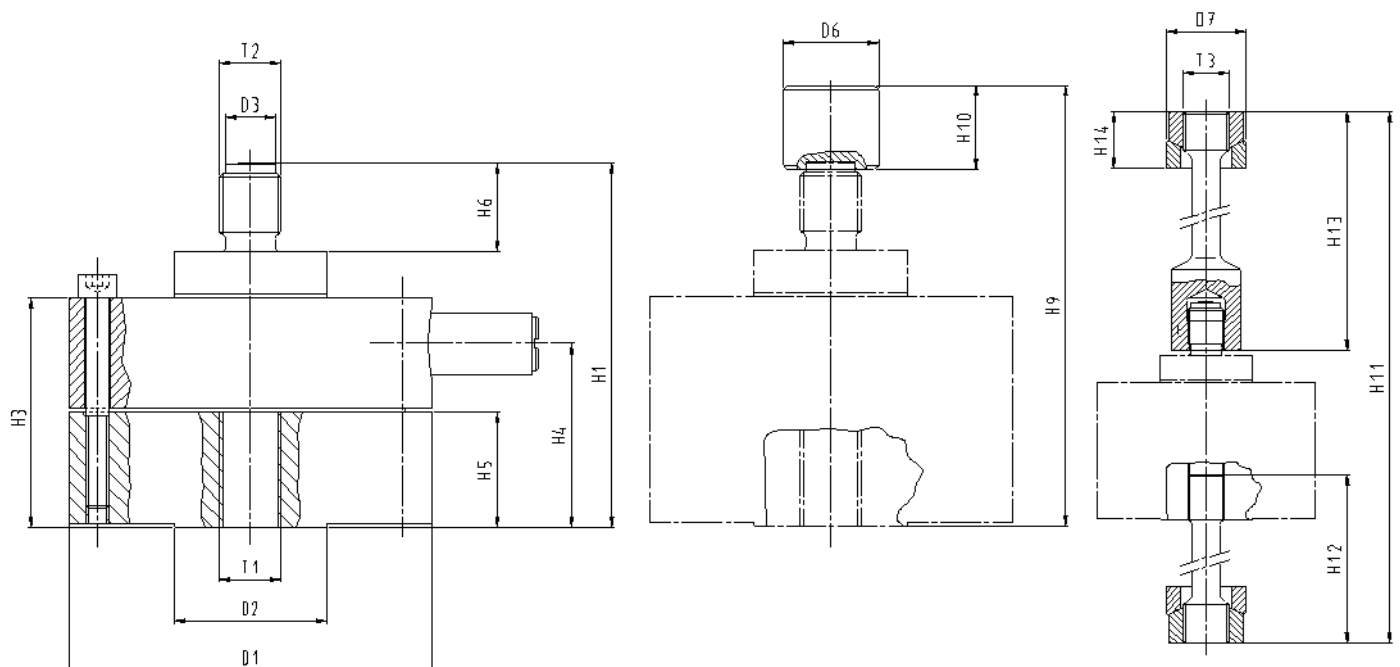


► Standard delivery scope incl. load button

► Zubehör: thrus piece

► Accessories: tension adaption

Dimensions | 20 - 100 kN

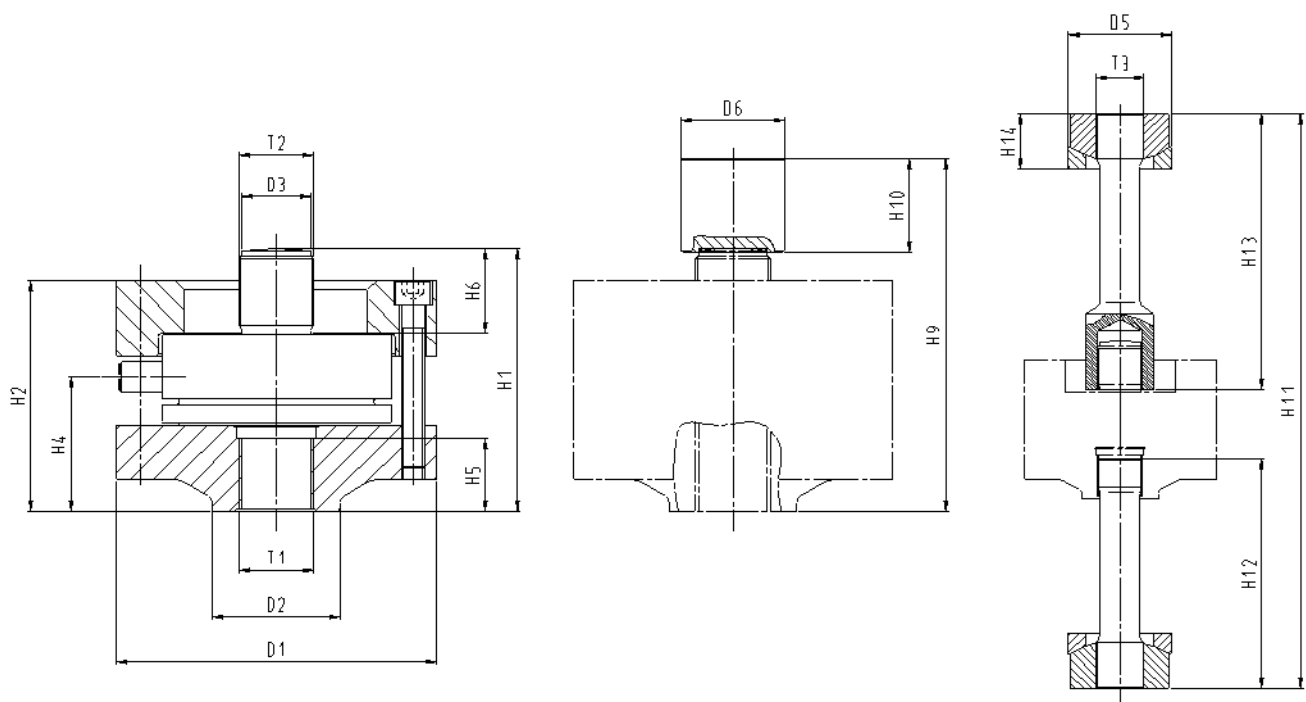


► Standard delivery scope

► Zubehör: Load Button

► Accessories: tension adaption

Dimensions | 250 kN

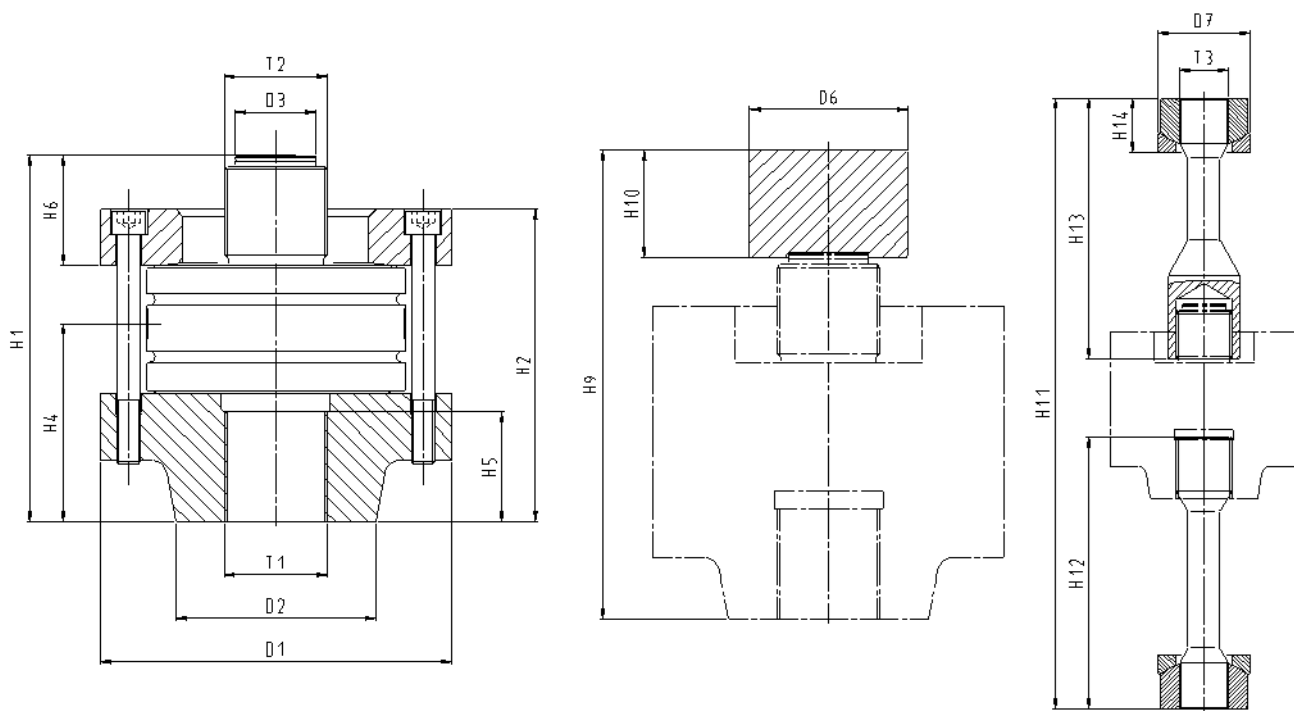


► Standard delivery scope

► Accessories: thrust piece

► Accessories: tension adaption

Dimensions | 600 kN - 1.2 MN



► Standard delivery scope

► Accessories: thrust piece

► Accessories: tension adaption

Dimensions | 2.5 kN - 1.2 MN

Nominal force compression/tension	$\pm F_{nom}$	kN	2.5	5	10	20	50	100	250	600	1200
Diameter	$\varnothing D_1$	mm	77			95	101	148	167	245	335
Diameter	$\varnothing D_2$	mm	35			40	50	60	67	140	120
Diameter	$\varnothing D_3$	mm	20-0.01			12.95-0.05	17.95-0.05	26.95-0.05	35.95-0.05	56-0.05/-0.1	56-0.05
Diameter	$\varnothing D_4$	mm	13 _{H8}	13+0.05		---					
Diameter	$\varnothing D_5$	mm	13+0.05			---					
Diameter	$\varnothing D_6$	mm	25				30	42	54	110	110
Diameter	$\varnothing D_7$	mm	35 _{c11}				45 _{c11}	50 _{c11}	90 _{c11}	90 _{c11}	120 _{c11}
Thread	T_1		M12			M16	M20x1.5	M30x2	M39x2	M72x4	M90x4
Thread	T_2		M12			M16	M20x1.5	M30x2	M39x2	M72x4	M90x4
Thread	T_3		M20x1.5					M24x2	M42x3	M56x4	M64x4
Height	H_1	mm	75	71		95		140	137	256	298
Height	H_2	mm	66	62		---			120	218.5	236.5
Height	H_3	mm	43	44		60	59,5	88.5	---		
Height	H_4	mm	32.5	33		48		65	70	138.5	178
Height	H_5	mm	17			30		40	38	77	76
Height	H_6	mm	13.5	14		23		36	44	77	
Height	H_7	mm	2			---					
Height	H_8	mm	2			---					
Height	H_9	mm	95	91		115	118	177	184	328	370
Height	H_{10}	mm	22				25	39	49	75	
Height	H_{11}	mm	338	331		354	355.5	517	500	800	840
Height	H_{12}	mm	150					230	240	356	340
Height	H_{13}	mm	150					219	200	342	370
Height	H_{14}	mm	24.8				25.8	30.4	47.9	71.4	

1) Data on request

Order Numbers | Configurable Variants

► Force transducer series KTN-P | configurable variants

Item	Code	Description
Force transfer standard Series KTN-P	C-KTN_P	Configurable force transfer standard Series KTN-P
Nominal Force	2K50	2.5 kN
	5K00	5 kN
	10K0	10 kN
	20K0	20 kN
	50K0	50 kN
	100K	100 kN
	250K	250 kN
	600K	600 kN
	1M20	1.2 MN
Accuracy class	05	ISO 376 class 0.5
	00	ISO 376 class 00
Measuring range accuracy class	05	ISO 376 5 - 100 %
	20	ISO 376 20 - 100 %
Single or double measuring bridge	SB	Single bridge
Bending moment measuring circuits Mx, My	NO	No bending moment measuring circuits Mx, My
Temperature range	S	Standard temperature range +17°C ... +27°C
Electrical transducer connection (for all selected measuring circuits)	P	LEMO female plug(s) selected 7-pole push-pull
	A	5 m permanently mounted standard measuring cables type DMC for all measuring circuits
	B	10 m permanently mounted standard measuring cables type DMC for all measuring circuits
Cable connection type (for all selected measuring circuits)	P	LEMO female plug(s) selected no permanently mounted measuring cable(s)
	F	Free cable ends on one permanently mounted measuring cable for all measuring circuits
	A	D-Sub 9 Pol on one permanently mounted measuring cable for all measuring circuits
	B	D-Sub 15 Pol on one permanently mounted measuring cable for all measuring circuits
	C	MS 7 Pol on one permanently mounted measuring cable for all measuring circuits
	D	HD-Sub 15 Pol 3-row on one permanently mounted measuring cable for all measuring circuits

Notes:

► Nominal forces 2.5 kN - 10 incl. load button in standard scope of delivery

Order example

C	-	KTN_P	-	250K	-	00	-	20	-	SB	-	NO	-	S	-	A	-	F
				250 kN		ISO 376 class 00		ISO 376 20 - 100 %		single bridge		no bending moment circuits Mx, My		standard temperature range		5 m permanently mounted cable type DMC		free cable ends

Order Numbers | Configurable Variants

Item	Description
Accuracy class acc. to ISO 376	Force transducers calibrated according to ISO 376 are divided into accuracy classes. The highest accuracy class is class 00, followed by 0.5 and others. A smaller accuracy class represents a more precise sensor. GTM force transfer transducers that meet the requirements of an ISO 376 accuracy class are called reference force transducers or transfer standards. These transducers achieve defined accuracy classes in a specified measuring range, e.g. the force transducer KTN-P achieves accuracy class 00 according to ISO 376 in a measuring range between min. 20 % and 100 % of the nominal force.
Measuring range accuracy class	The measuring range indicates in which measuring range the transducer complies with the selected class. Through internal quality assurance processes, we always ensure that the specified accuracy class is maintained in the selected measuring range. We always recommend a GTM internal calibration of the transducer incl. standard compliant attachments. Every transducer calibrated according to ISO 376 receives a calibration certificate, which provides an evaluation of the characteristic values of the sensor and information about the calibration equipment used, the traceability and measurement uncertainty as well as the environmental conditions during the calibration process. In the calibration certificate, in addition to other technical information, you will find, for example, the measurement uncertainties of the calibrated force transducer for the respective load levels
Single or double measuring bridge	The force transfer transducer series KTN-P can be equipped with a double measuring bridge on request. For redundancy reasons, it is necessary, for example in safety-relevant applications, to check the safety-relevant integrity of the measuring signal by means of a second measuring bridge (functional redundancy in the same force transducer). Two force transducer output signals are processed and evaluated independently of each other via two separate measuring amplifier channels. This makes it possible to connect two measuring amplifiers with different characteristics (DC / TF). The second redundant measuring circuit, is characterised by no crosstalk between the channels at different carrier frequencies.
Bending moment measuring circuits Mx, My	The force transfer transducer series KTN-P can be equipped with bending moment measuring circuits on request. The additional bending moment measuring circuits can be measured to control the horizontal bending moments Mx and My and can be provided as separate channels.
Temperature range	The KTN-P series force transfer transducer can be used in a nominal temperature range of +17°C - +27 °C. Notes: Please observe the corresponding ambient conditions and ensure that there are no significant temperature fluctuations. These can possibly have an effect on the metrological performance.
Electrical transducer connection	The KTN-P series force transfer transducer can be configured with fixed push-pull connectors or fixed double shielded measuring cables leads (type DMC) in different lengths. Notes: The number of connection sockets or measuring cables is determined by the number of measuring bridges selected. Double shielded measuring cable(s) type DMC are always used as fixed measuring cables.
Cable connection type	If the KTN-P series is configured with fixed double shielded measuring cables, different connector types for high precision strain gauge measuring amplifiers can be selected in addition to open cable ends. The assembly of the selected connector plugs is done by GTM. The transducer can be connected directly to a measuring amplifier.

Order Numbers | Accessories

Description	Order number
Measuring cables	
Double-shielded measuring cable yellow 5 m double shielded and twisted in pairs cable sheath Ø 6.5 mm 6-wire technology transducer connection: straight plug (male) type LEMO 7-pole push-pull (male) cable end amplifier: open	S-CAB-DMC-L-5M-F
Double-shielded measuring cable yellow 5 m double shielded and twisted in pairs cable sheath Ø 6.5 mm 6-wire technology transducer connection: straight plug (male) type LEMO 7-pole push-pull (male) cable end amplifier: D-Sub 9 pol assembled	S-CAB-DMC-L-5M-DS09
Configurable measuring cable type DMC and others in different lengths with different connectors for amplifier connection	C-CAB-DMC-...
Series KTN-P thrust piece (1 piece)	
Serie KTN-P 2.5 - 10 kN thrust piece	S-MA-KTN_P-TP-01
Serie KTN-P 20 kN thrust piece	S-MA-KTN_P-TP-02
Serie KTN-P 50 kN thrust piece	S-MA-KTN_P-TP-03
Serie KTN-P 100 kN thrust piece	S-MA-KTN_P-TP-04
Serie KTN-P 250 kN thrust piece	S-MA-KTN_P-TP-05
Serie KTN-P 600 kN thrust piece	S-MA-KTN_P-TP-06
Serie KTN-P 1.2 MN thrust piece	S-MA-KTN_P-TP-07
Series KTN-P tension adaption (1 set)	
Serie KTN-P 2.5 - 5 kN tension adaption	S-MA-KTN_P-TA-01
Serie KTN-P 10 kN tension adaption	S-MA-KTN_P-TA-02
Serie KTN-P 20 kN tension adaption	S-MA-KTN_P-TA-08
Serie KTN-P 50 kN tension adaption	S-MA-KTN_P-TA-03
Serie KTN-P 100 kN tension adaption	S-MA-KTN_P-TA-04
Serie KTN-P 250 kN tension adaption	S-MA-KTN_P-TA-05
Serie KTN-P 600 kN tension adaption	S-MA-KTN_P-TA-06
Serie KTN-P 1.2 MN tension adaption	S-MA-KTN_P-TA-07
Series KTN-P load button (1 piece)	
Serie KTN-P 2.5 - 10 kN load button	S-MA-KTN_P-LB-01
Notes: ► As spare part, as included in KTN-P standard scope of delivery 2.5 - 10 kN.	
Series KTN-P cases (1 piece)	
Case for series KTN-P 2.5 - 10 kN	S-TC-KTN_P-01
Case for series KTN-P 20 kN	S-TC-KTN_P-02
Case for series KTN-P 50 kN	S-TC-KTN_P-03
Case for series KTN-P 100 kN	S-TC-KTN_P-04
Case for series KTN-P 250 kN	S-TC-KTN_P-05
Flight case for series KTN-P 600 kN	S-TC-KTN_P-06

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