

Data Sheet | Force Transfer Standard Series KTN-LF

Nominal Force
10 MN – 30 MN



Applications | Key Facts

- ▶ Applications: Force transfer standards for high-precision calibration of testing machines up to 30 MN
- ▶ ISO 376 accuracy classe 0.5 from 20% - 100%
- ▶ Suitable for high static compressive forces
- ▶ Particularly tolerant to overload
- ▶ Easy handling and transportation
- ▶ Particularly suitable for calibrating testing machines at changing locations.

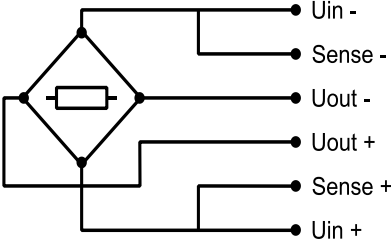
Options | Accessories

- ▶ Optional bending moment measuring circuits Mx, My
- ▶ Optional second axial measuring circuit for redundancy (on request)
- ▶ Extensive electrical connection options
- ▶ Extensive mechanical accessories | also special solutions on request
- ▶ Special transducer variants (e.g. reduced height) on request | also in small quantities

Technical Data | Class 0.5

		Nominal force	F_{nom}	MN	1	2	3	5	7.5	10	12	20	30
Metrological Data	Force measurement range			%	20 - 100								
	Interpolation error		f_c	%	0.045								
	Reversibility error		v	%	0.14								
	Repeatability error in unchanged mounting position		b, b_{rg}	%	0.045								
	Reproducibility error in different mounting positions		b', b_{rv}	%	0.09								
	Zero error		f_0	%	0.02								
	Creep		180 s...20 min	%	0.03								
	Temperature effect on characteristic value per 10 K		TK_C	%/10K	0.02								
	Temperature effect on zero signal per 10 K		TK_0	%/10K	0.02								
Electrical Data	Rated characteristic value		C_{nom}	mV/V	2								
	Input resistance		R_e	Ω	ca. 750								
	Output resistance		R_a	Ω	ca. 700								
	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 transducer		m	kg	6	18	35	65	87	143	151	308	527
	Mass thrust piece		m	kg	3	6	13	30	50	70	75	186	314
	Force limit			%	110								
	Breaking force			%	200								
	Permissible eccentricity		e_G	mm	10								
	Rated temperature range		$B_{T, nom}$	°C	17 - 27								
	Operating temperature range		$B_{T, G}$	°C	10 - 35								

Cable Connection



Connection		Pin
Supply voltage (+)	U_{in+}	3
Supply voltage (-)	U_{in-}	2
Measurement signal (+)	U_{out+}	1
Measurement signal (-)	U_{out-}	4
Sense (+)	Sense+	5
Sense (-)	Sense-	6
Shielding		Housing

Connection
pluggable^{1) 2)}

7-pin LEMO Series 1
Female: - Male:



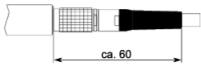
1)View too weldingside
2) Female LEMO S.A. Typ: EGG.1B.307.CLL; Male: FGG.1B.307.CLA.D72

► Pluggable cable connection

All transducers of the KTN-LF 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.



► Plug-in cable connection with double-shielded measuring cable type DMC (S-CAB-DMC-L- 5M-F)



Double Bridge | 1— 30 MN

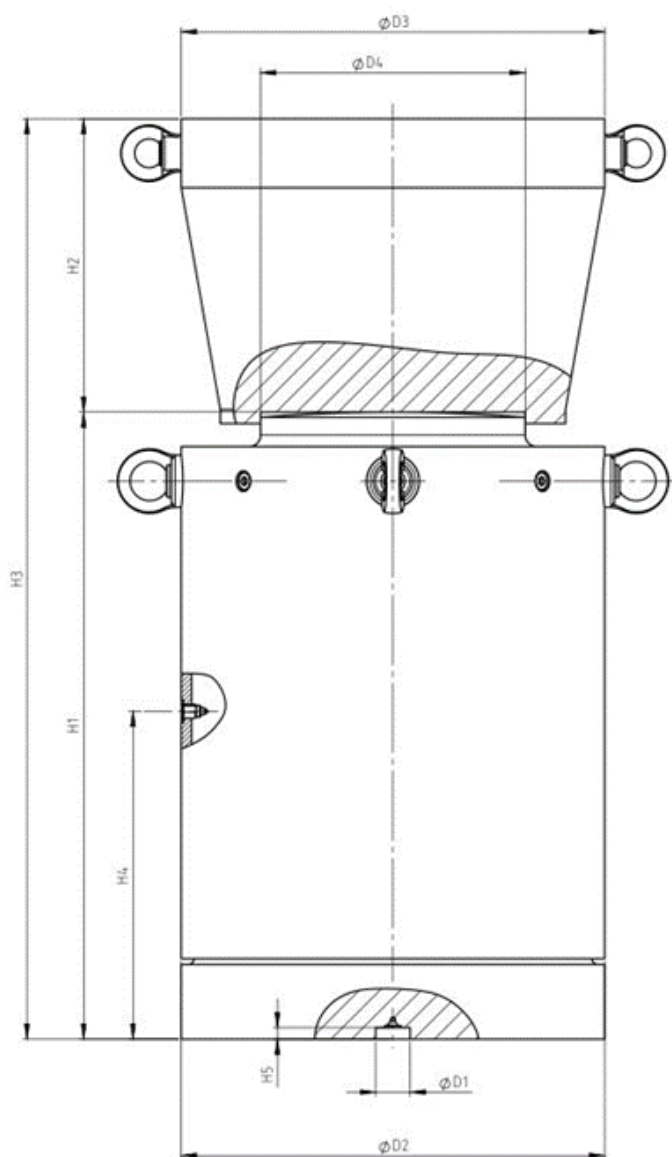
- On request | For version with double measuring bridge, the technical data apply equally to both measuring circuits.

Bending Moment Measuring Circuits | from 10 kN

- Bending moment measuring circuits M_x and M_y can be used advantageously to control the application of force by using a multi-channel measuring amplifier.

Nominal load	F_{nom}	MN	1	2	3	5	7.5	10	12	20	30
Temperature effect on characteristic value per 10 K	TK_C	%/10K	0.2								
Temperature effect on zero signal per 10 K	TK_0	%/10K	0.2								
Input resistance	R_e	Ω	400								
Operating range of excitation voltage	$B_{U,G}$	V	5 - 12								

Dimensions | 1 - 30 MN



Nominal force	F_{norm}	MN	1	2	3	5	7.5	10	12	20	30
Diameter	$\varnothing D_1$	mm	-	30 _{H7}							
Diameter	$\varnothing D_2$	mm	80	120	145	200	240	273		368	440
Diameter	$\varnothing D_3$	mm	80	120	145	200	240	273		368	440
Diameter	$\varnothing D_4$	mm	52	80	100	150	155	158	165	230	275
Height	H_1	mm	170	220	320	345	410	455		545	600
Height	H_2	mm	75	80	110	125	155	180	200	255	300
Height	H_3	mm	245	300	430	470	565	635	655	800	900
Height	H_4	mm	88.5	97.5	120	185	215	232.5		285	290
Height	H_5	mm	-	10							

Order Numbers | Configurable Variants

► Force transfer standard series KTN-LF | configurable variants

Item	Code	Description
Force transfer standard Series KTN-LF	C-KTN_LF	Configurable force transfer standard Series KTN-LF
Nominal Force	1M00	1 MN
	2M00	2 MN
	3M00	3 MN
	5M00	5 MN
	7M50	7.5 MN
	10M0	10 MN
	12M0	12 MN
	20M0	20 MN
	30M0	30 MN
Accuracy class	00	ISO 376 class 00
	05	ISO 376 class 0.5
	10	ISO 376 class 1
Measuring range accuracy class	20	ISO 376 20 - 100 %
	40	ISO 376 40 - 100 %
	10	ISO 376 10 - 100 %
Single or double measuring bridge	SB	Single bridge
Bending moment measuring circuits Mx, My	NO	No bending moment measuring circuits Mx, My
	BM	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
Cable connection type (for all selected measuring circuits)	P	LEMO female plug(s) selected no permanently mounted measuring cable(s)

Notes:

- Thrust piece included in standard scope of delivery
- Transducer with fixed cable connection on request

Order example

C	-	KTN_LF	-	1M00	-	05	-	20	-	SB	-	NO	-	S	-	A	-	P
				1 MN		ISO 376 class 05		ISO 376 20 - 100 %		single bridge		no bending moment circuits Mx, My		standard temperature range		LEMO connection socket		LEMO connection socket No permanently mounted measuring cable

Order Numbers | Glossary

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 series KTN-LF force transfer standard achieves accuracy class 0.5 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 series KTN-LF force transfer standard can be equipped with a double measuring on request. The double bridge option can be used, for example, to separate the reference signal from the input signal or to check the safety-related integrity of the measurement signal using a second measuring bridge (functional redundancy in the same force transducer) for redundancy reasons, for example in safety-relevant applications. Two force transfer standard 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 / CF). The second redundant measuring circuit is characterized by no crosstalk between the channels at different carrier frequencies.
Bending moment measuring circuits Mx, My	The series KTN-LF force transfer standard can optionally be equipped with bending moment measuring circuits. 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 series KTN-LF force transfer standard 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 series KTN-LF force transfer standard can be configured with fixed push-pull connection sockets or, on request, with fixed double-shielded measuring cables (type DMC) in various lengths. Notes: The number of connection sockets or measuring cables depends on the number of measuring bridges selected. On request, DMC type double-shielded test leads are always used as fixed test leads.
Cable connection type	The series KTN-LF force transfer standard can be configured with fixed push-pull connection sockets or, on request, with fixed double-shielded measuring cables (type DMC) in various lengths. Notes: The number of connection sockets or measuring cables depends on the number of measuring bridges selected. On request, DMC type double-shielded test leads are always used as fixed test lead(s)

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)	
Series KTN-LF 1 MN load pad	S-MA-KTN_LF-TP-01
Series KTN-LF 2 MN load pad	S-MA-KTN_LF-TP-02
Series KTN-LF 3 MN load pad	S-MA-KTN_LF-TP-03
Series KTN-LF 5 MN load pad	S-MA-KTN_LF-TP-04
Series KTN-LF 7.5 MN load pad	S-MA-KTN_LF-TP-05
Series KTN-LF 10 MN load pad	S-MA-KTN_LF-TP-06
Series KTN-LF 12 MN load pad	S-MA-KTN_LF-TP-07
Series KTN-LF 20 MN load pad	S-MA-KTN_LF-TP-08
Series KTN-LF 30 MN load pad	S-MA-KTN_LF-TP-09
Notes: ► As a spare part, as included in the KTN-LF standard scope of delivery.	
Series KTN-P cases (1 piece)	
Case for series KTN-LF 1 MN	S-TC-KTN_LF-01
Transport box for series KTN-LF 2 MN	S-TC-KTN_LF-02
Transport box for series KTN-LF 3 MN	S-TC-KTN_LF-03
Transport box for series KTN-LF 5 MN	S-TC-KTN_LF-04
Transport box for series KTN-LF 7.5 MN	S-TC-KTN_LF-05
Transport box for series KTN-LF 10 MN	S-TC-KTN_LF-06
Transport box for series KTN-LF 12 MN	S-TC-KTN_LF-07
Transport box for series KTN-LF 20 MN	S-TC-KTN_LF-08
Transport box for series KTN-LF 30 MN	S-TC-KTN_LF-09