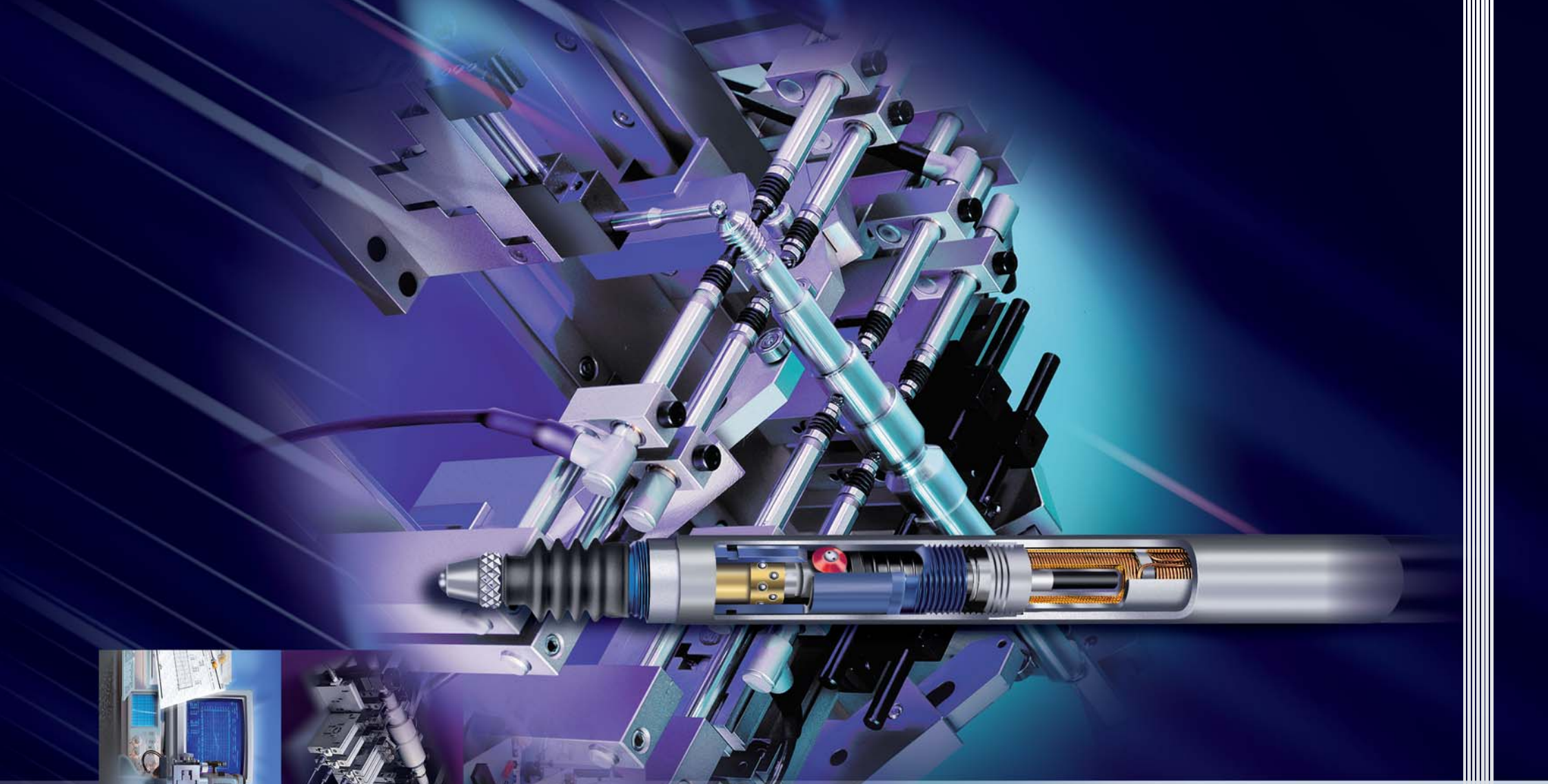


Electronic Length Measuring Equipment

TESA LENGTH MEASURING EQUIPMENT WITH INDUCTIVE PROBES

*TESA offers a complete family of value sensors (electronic probes) as well as dedicated measuring instruments for the most demanding applications. Our **standard probes** – also known as **half-bridge probes** – operate according to the electrical principle. They do not require any special setting.*

Electronic probes that are used in conjunction with measuring instruments from other manufacturers work partly on the basis of a differential transformer. These probes are known as LVDT (Linear Variable Differential Transformer) probes. TESA also offer a full range of this kind of probes which, however, need to be fitted with a convenient socket and further adapted, accordingly.

For more details about TESA half-bridge or LVDT inductive probes, read the information that follows.

Countless Measuring Capabilities

All TESA electronic probes can either be used with hand-held tools, whether internal or external, or in conjunction with other typical measuring devices and supports.

TESA can supply such executions as axial probes with linear displacement of the measuring bolt, angled probes with inclinable lever or probes with parallel guiding that are specially designed for multigauging devices as well as any other equipment for in-process inspection – thus allowing to spare many assembly components.

With a very few exceptions, these probes perform comparative measurement, essentially. Based on a master standard, which can either be a gauge block, a setting ring or any other workpiece accepted as such, a number of sizes are compared on the test piece.

- *All measurements are taken with high accuracy. The bias errors usually count for very little in the uncertainty budget since the comparison is made between two values nearly equal to the measurand.*
- *Random errors are also significantly reduced as display setting and all subsequent measurements are usually made under the same conditions.*
- *TESA provide measuring instruments equipped with an analogue and/or digital display, depending on their type.*

Internal Data Processing

The measurement signals are processed differently according to the measuring application.

Mathematical Data Processing

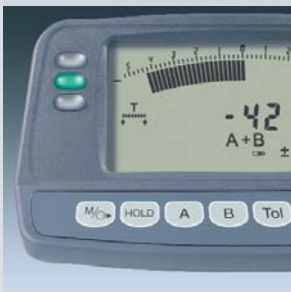
Signal processing can equally be made with positive or negative polarity signs. The use of one single probe enables single measurement of internal or external dimensions while the combination of the signals of two probes produces either a «sum measurement» or a «difference measurement».

Value Storage

Provides the needed safety for your dynamic measurement cycles. The smallest or highest value as well as the difference between both values are some of the part features that are questioned when capturing form and position errors.

Value Classification

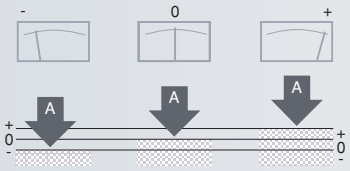
Uses limit deviations to classify the measured values while producing additional control signals usable through a remote unit.



MEASURING FUNCTIONS – OVERVIEW

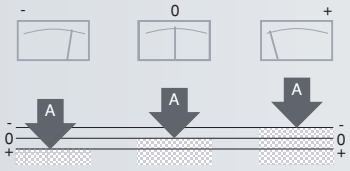
Single measurements with positive polarity sign (+A)

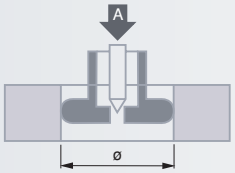
Measuring external dimensions with use of a measuring stand, snap gauge etc.



Single measurements with negative polarity sign (-A)

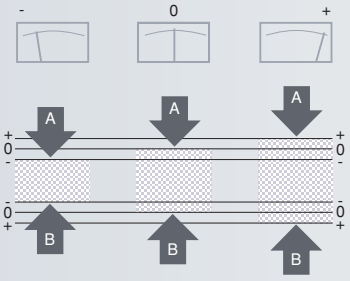
Inspecting sizes with change of the polarity sign. Display shows a low value for a small bore or a high value for a large diameter.

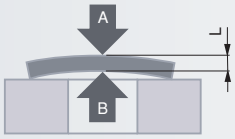




Sum measurements with positive polarity signs (+A +B)

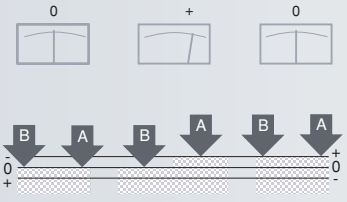
Measuring external dimensions regardless of form and position errors.

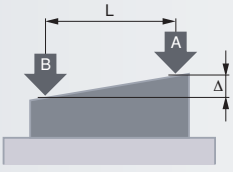




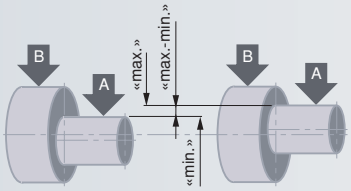
Difference measurements with opposite polarity signs (+A -B)

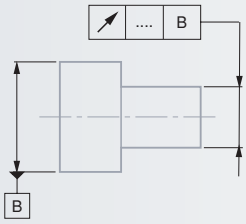
Performing step, cone and inclination measurements.

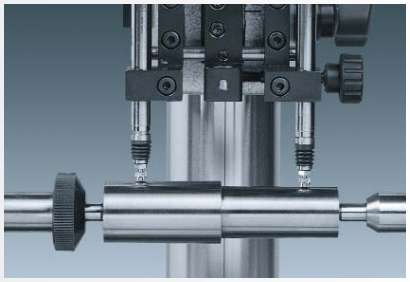




Establishing form and position errors such as runout errors with use of the memory function «max.-min.» as shown in this example.



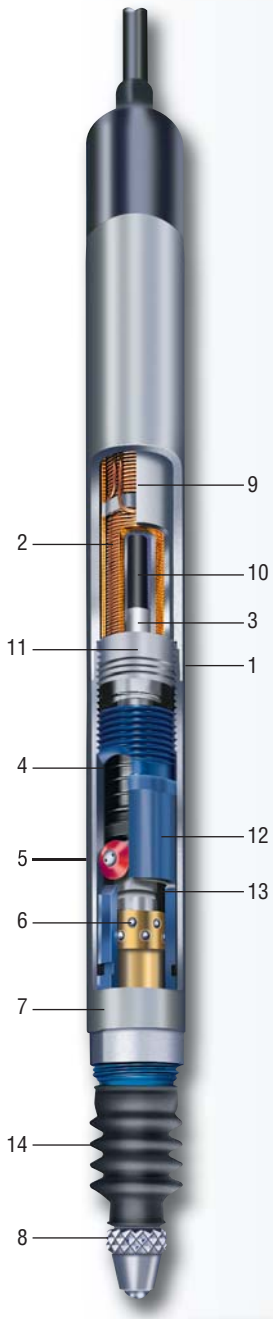




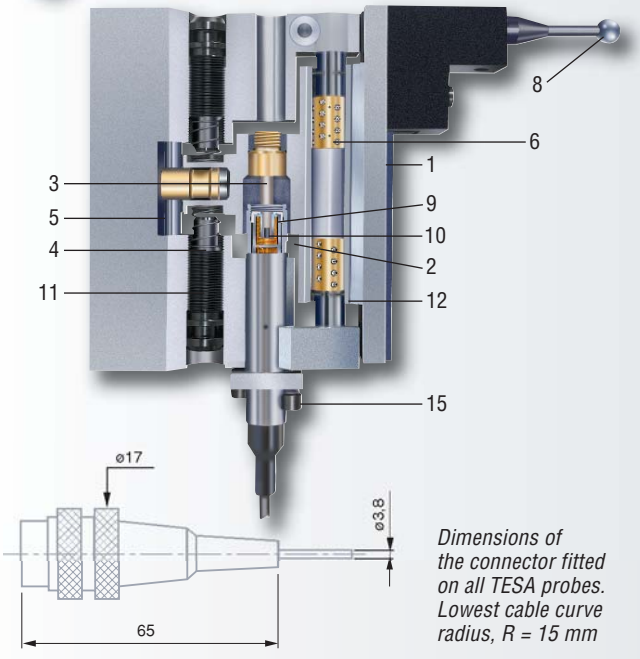
TESA Electronic Probes at the Forefront in Precision Measurement

TESA is a leading designer, manufacturer and user of inductive probes for more than 40 years. Its high-precision electronic probes are made to withstand the stresses sustained in the production environment where they can be constantly used for series inspection. But, these probes are also designed for high accuracy measurements such as those performed in gauge block calibration, for instance.

- *All electronic probes are mounted on ball-bearings, except for miniature axial probes.*
- *Ball-bearings are virtually insensitive to radial forces.*
- *Probe guide system is efficiently protected against the penetration of solid and liquid contaminants by sealing rubber bellows. In normal conditions of use, nitrile elastomer rubber bellows are sufficient. For applications where the probes remain permanently in contact with cooling and lubricating agents, we would recommend the use of Viton rubber bellows.*
- *Sealing bellows ensure full airtightness so that the measuring bolt is retracted by throwing off the air contained in the probe. This provides optimum protection of the guiding system as no mechanical device is used.*
- *Electronic signal amplification produces excellent repeatability and low hysteresis.*
- *Resolution is as high as 0,01 µm.*



1 Mounting stem or probe housing
2 Coil system
3 Element mounted between the ferro-magnetic core and the measuring bolt for the correction of varying coefficients of thermal expansion
4 Force compression spring
5 Anti-rotation guiding system
6 Ball cage
7 Setting element for limiting the measuring bolt travel
8 Probe insert
9 In-between tube being part of the coil system
10 Ferro-magnetic core
11 Force spring stop
12 Ball-bearing guiding tube
13 Measuring bolt
14 Sealing rubber bellow
15 Mechanical device for zero-setting



Dimensions of the connector fitted on all TESA probes. Lowest cable curve radius, R = 15 mm

Sensitivity of standard half-bridge probes used in conjunction with TESA and MERCER electronic probes

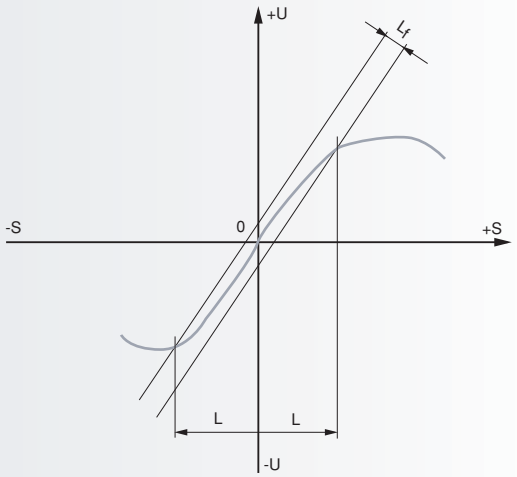
All given values are valid for the following reference conditions:

• Drive voltage	3 V	< 5 V
• Drive frequency	13 kHz	5 kHz
• Adjustment load	2 kΩ	10 kΩ
	mV/V/mm	mV/V/mm
For any probe type	73,75	50
except probe series:		
• GT 61/62	29,5	5,0
• GT 61S/62S	7,375	–
• FMS 130/132	49,17	–

For LVDT probes, see both pages N-12 and N-13

Operating Principle

All TESA electronic probes (value sensors) work based on the inductive principle with mechanical contact of the workpiece.
They are fitted with a coil system inducing an alternating output voltage that depends on the the position of the ferromagnetic core. When symmetrically positioned - i.e. at electrical zero - no voltage is impressed.
A move of the core, which may be attached to the measuring bolt while the measurand is being taken, causes the inductance to change. This change generates a signal that is amplified and rectified before being displayed and further output. Depending on the instrument type, the analogue signal will be shown on a voltmetre or a numerical display after a digital transformation.
Unambiguous assessment of the measurand (at bolt position) to the signal (displayed value) is the main characteristic of analogue value acquisition. One of its distinct advantages lies in the value primarily displayed, which will be reproduced in the event of a power cut (switch-off or power failure).

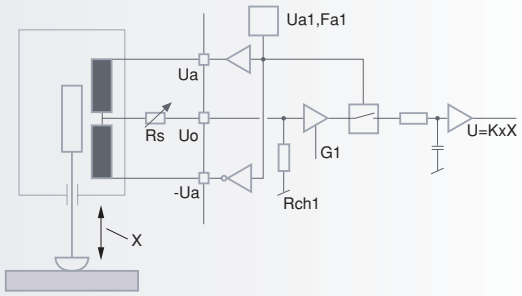


Inductive measuring
s Travel
U Output current
0 Electrical zero
L Linearity range
Lf Linearity error

The linearity range L, which is the range within which the max. perm. errors are contained, is equal to the measuring range. The max. perm. errors are limiting values given for the linearity errors.

TESA Standard Half-Bridge Probes For TESA Measuring Equipment

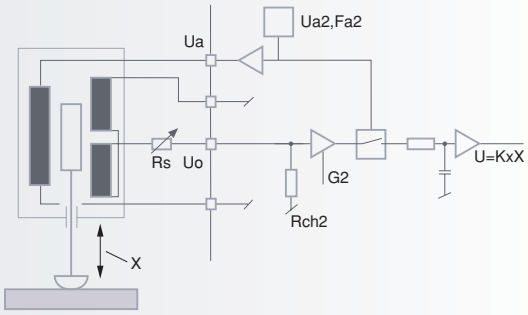
These probes have two serial coils with middle output mounted side by side, which are energized by a sinusoidal alternation at 3 kHz. Both are linked together to a Wheatstone bridge over an additional half-bridge.



Wiring plan of half-bridge probes

TESA LVDT Probes

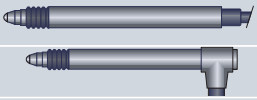
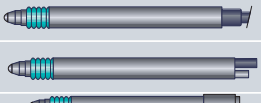
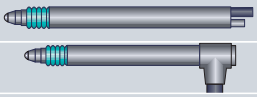
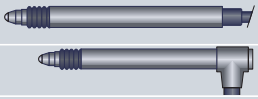
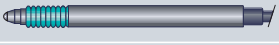
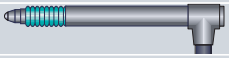
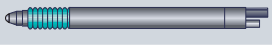
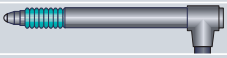
These probes are based on a Linear Variable Differential Transformer (LVDT). They have three coils, i.e. one primary coil being energized by a sinusoidal alternation at 5 kHz, and two secondary coils connected in opposite phase, which generate the output current proportional to the measuring travel.



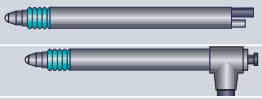
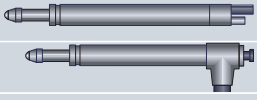
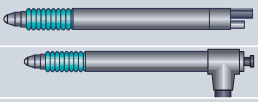
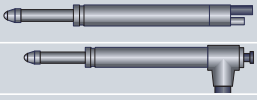
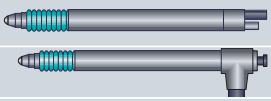
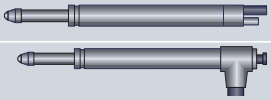
Wiring plan of LVDT probes

TESA Standard Probes – Overview

8 mm diameter axial probes with ball-bearing measuring bolt

			Measuring range (mm)	mm	Cable exit	Measuring bolt retraction	Sealing bellows
Standard probes							
	03210904	GT 21	± 2	4,3	axial	mechanical	Nitrile
	03210924	GT 22	± 2	4,3	radial	by vacuum	Nitrile
	03230057	GTL 21	± 2	4,3	axial	mechanical	Viton
	03230072	GTL 211	± 2	4,3	axial	by vacuum	Viton
	03230056	GTL 22	± 2	4,3	radial	by vacuum	Viton
Standard high-precision probes							
	03230036	GT 21HP	± 0,2	4,3	axial	mechanical	Nitrile
	03230021	GT 22HP	± 0,2	4,3	radial	by vacuum	Nitrile
Standard long-travel probes							
	03230027	GT 27	± 2	10,3	axial	mechanical	Viton
	03230073	GT 271	± 2	10,3	axial	by vacuum	Viton
	03230026	GT 28	± 2	10,3	radial	by vacuum	Viton
Probes with extended measuring range							
	03230041	GT 61	± 5	10,3	axial	mechanical	Viton
	03230074	GT 611	± 5	10,3	axial	by vacuum	Viton
	03230042	GT 62	± 5	10,3	radial	by vacuum	Viton

...with activation of the measuring bolt by pneumatic pressure

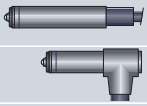
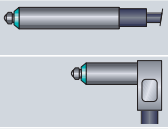
			Measuring range (mm)	mm	Cable exit	Pressure (bar) nominal	maximum	Sealing bellows
Standard probes								
	03230060	GTL 212	± 1,5	3,2	axial	0,7	1,0	Viton
	03230054	GTL 222	± 1,5	3,2	radial	0,7	1,0	Viton
	03230067	GTL 212-A	± 1,5	3,2	axial	0,25	6,0	none
	03230063	GTL 222-A	± 1,5	3,2	radial	0,25	6,0	none
Long-travel probes								
	03230061	GT 272	± 2	10,3	axial	1,1	1,5	Viton
	03230053	GT 282	± 2	10,3	radial	1,1	1,5	Viton
	03230068	GT 272-A	± 2	10,3	axial	1,0	6,0	none
	03230069	GT 282-A	± 2	10,3	radial	1,0	6,0	none
Probes with extended measuring range								
	03230062	GT 612	± 5	10,3	axial	1,1	1,5	Viton
	03230055	GT 622	± 5	10,3	radial	1,1	1,5	Viton
	03230070	GT 612-A	± 5	10,3	axial	1,0	6,0	none
	03230071	GT 622-A	± 5	10,3	radial	1,0	6,0	none

** Nominal value of the measuring force at electrical zero, max. deviation ±25%.
*** Highest mechanical frequency valid for the final value of the measuring range, amplified by 10%.
**** Linearity related max. permissible errors.

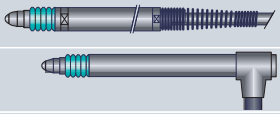
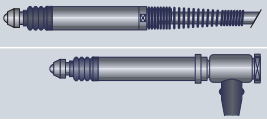
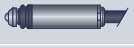
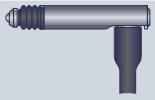
N**	Moving mass (g)	Frequency limit Hz***	Dismount-able	µm	(L in mm) µm****	°C	IEC 60529	
0,63	6	60	●	0,01	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP65	N-17
0,63	6	60	●	0,01	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP65	N-18
0,63	6	60	●	0,01	$0,2 + 2,4 \cdot L^2$	–10 ÷ 65	IP65	N-17
0,63	6	60	●	0,01	$0,2 + 2,4 \cdot L^2$	–10 ÷ 65	IP65	N-17
0,63	6	60	●	0,01	$0,2 + 2,4 \cdot L^2$	–10 ÷ 65	IP65	N-18
0,63	6	60	–	0,01	$0,07 + 0,4 \cdot L$	10 ÷ 40	IP64	N-17
0,63	6	60	–	0,01	$0,07 + 0,4 \cdot L$	10 ÷ 40	IP64	N-18
0,63	8	60	●	0,05	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP65	N-19
0,63	8	60	●	0,05	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP65	N-19
0,63	8	60	●	0,05	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP65	N-19
0,9	8	60	●	0,05	$1 + 4 \cdot L$	–10 ÷ 65	IP65	N-20
0,9	8	60	●	0,05	$1 + 4 \cdot L$	–10 ÷ 65	IP65	N-20
0,9	8	60	●	0,05	$1 + 4 \cdot L$	–10 ÷ 65	IP65	N-20

N**	Moving mass (g)	Frequency limit Hz***	Dismount-able	µm	(L in mm) µm****	°C	IEC 60529	
1,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	–10 ÷ 65	IP65	N-21
1,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	–10 ÷ 65	IP65	N-21
0,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	–10 ÷ 65	IP50	N-21
0,2	6	60	●	0,015	$0,2 + 2,4 \cdot L^2$	–10 ÷ 65	IP50	N-21
1,0	8	60	●	0,05	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP65	N-22
1,0	8	60	●	0,05	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP65	N-22
0,85	8	60	●	0,05	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP50	N-22
0,85	8	60	●	0,05	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP50	N-22
2,0	8	60	●	0,05	$1 + 4 \cdot L$	–10 ÷ 65	IP65	N-23
2,0	8	60	●	0,05	$1 + 4 \cdot L$	–10 ÷ 65	IP65	N-23
1,0	8	60	●	0,05	$1 + 4 \cdot L$	–10 ÷ 65	IP50	N-23
1,0	8	60	●	0,05	$1 + 4 \cdot L$	–10 ÷ 65	IP50	N-23

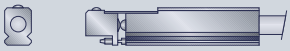
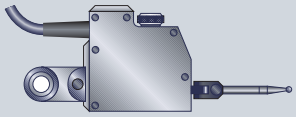
Miniature axial probes, 8 mm dia. probe housing

			Measuring range mm	mm	Cable exit	Measuring bolt retraction	Sealing bellows
Measuring bolt hanging from diaphragm springs							
	**03230001**	**GT 41**	± 0,3	0,7	axial	without	Nitrile
	03230002	**GT 42**	± 0,3	0,7	radial	vacuum	Nitrile
Measuring bolt mounted on a plain bearing							
	**03230035**	**GT 43**	± 1	2,1	axial	mechanical	Viton
	03230017	**GT 44**	± 1	2,1	radial	vacuum	Viton

Axial probes with measuring bolt mounted on a ball-bearing, with no brand name

			Measuring range mm	mm	Cable exit	Measuring bolt retraction	Sealing bellows
Standard probes							
	**03230490**	**490**	± 1,5	4,3	axial/radial	mechanical	Viton
	03230491	**491**	± 1,5	4,3	radial	vacuum	Viton
Standard probes with short body							
	**96410012**	**410**	± 1	2,5	axial/radial	mechanical	Nitrile
	96411014	**411**	± 1	2,5	radial	vacuum	Viton
Standard probes with short body, 6 mm dia. fixing shank							
	**96160013**	**160**	± 1	3,3	axial	mechanical	Viton
Miniature probes, 8 mm dia. fixing shank							
	**96430029**	**430**	± 0,5	1,25	axial	mechanical	Nitrile
	**96441041**	**451**	± 0,5	2,1	radial	vacuum	Nitrile

Lever probes

			Measuring range mm	mm	Cable exit	Measuring bolt retraction	Sealing bellows
	**96420004**	**420**	± 0,2	0,525	parallel	without	none
	**96499007**	**499**	± 0,5	1,2	parallel	without	none

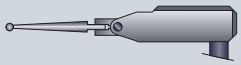
N**	Moving mass g	Frequency limit Hz***	Dismount-able	µm	(L in mm) µm****	°C	IEC 60529	
0,63	2	60	–	0,01	$0,2 + 5 \cdot L^2$	–10 ÷ 65	IP65	N-24
0,63	2	60	–	0,01	$0,2 + 5 \cdot L^2$	–10 ÷ 65	IP65	N-24
0,4	2	60	–	0,1	$0,2 + 5 \cdot L^2$	5 ÷ 65	IP65	N-24
0,4	2	60	–	0,1	$0,2 + 5 \cdot L^2$	5 ÷ 65	IP65	N-24

N**	Moving mass g	Frequency limit Hz***	Dismount-able	µm	%****	°C	IEC 60529	
0,63	6	60	●	0,02	0,2	–10 ÷ 65	IP65	N-25
0,63	6	60	●	0,02	0,2	–10 ÷ 65	IP65	N-25
0,6	3,1	58	–	0,1	0,2	0 ÷ 60	IP62	N-26
0,6	3,1	58	–	0,1	0,2	0 ÷ 60	IP62	N-26
0,6	2,5	60	–	0,1	0,2	0 ÷ 60	IP62	N-27
0,75	1,9	60	–	0,1	0,2	0 ÷ 60	IP62	N-27
0,6	3	60	–	0,1	0,2	0 ÷ 60	IP62	N-27

N**	Moving mass g	Frequency limit Hz***	Dismount-able	µm	%****	°C	IEC 60529	
1,8	2,5	10	–	0,5	0,3	0 ÷ 60	IP40	N-28
0,02 ÷ 0,2	10,6	10	–	0,25	0,6	0 ÷ 60	IP40	N-28

** Nominal value of the measuring force at electrical zero, max. deviation ± 25%.
*** Highest m mechanical frequency valid for the final value of the measuring range, amplified by 10%.
**** Linearity related max. permissible errors.

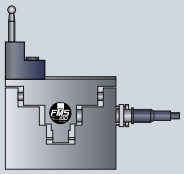
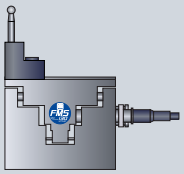
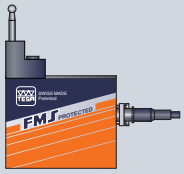
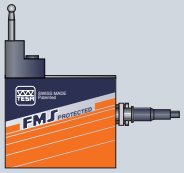
TESA probe with inclinable lever

			Measuring range (mm)	mm	Cable exit	Measuring bolt retraction
	03210802	GT 31	± 0,3	0,7	angled	without

TESA universal probes

			Measuring range (mm)	mm	Cable exit	Measuring bolt retraction (accessory)
	03230078	I-DIM	± 0,5	2	parallel	air pressure

Probes with parallel guiding

			Measuring range (mm)	mm	Cable exit*	Measuring bolt retraction (accessory)
Standard probes						
	03230019	FMS 100	± 2	5,8	parallel	air pressure
	03230028	FMS 102	± 2	5,8	angled	air pressure
	03230049	FMS 130	± 2,9	5,8	parallel	air pressure
	03230050	FMS 132	± 2,9	5,8	angled	air pressure
Probes «FMS Protected»						
	03230037	FMS 100-P	± 2	5,8	parallel	air pressure
	03230038	FMS 102-P	± 2	5,8	angled	air pressure
	03230051	FMS 130-P	± 2,9	5,8	parallel	air pressure
	03230052	FMS 132-P	± 2,9	5,8	angled	air pressure

* Position in relation to the measuring direction

N**	Moving mass (g)	Frequency limit Hz***	Dismount-able	µm	(L in mm) µm****	°C	IEC 60529	
0,1	12	25	–	0,1	$0,2 + 50 \cdot L^2$	–10 ÷ 50	IP40	N-29

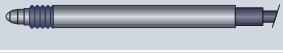
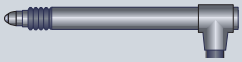
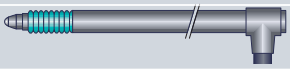
N/mm	Moving mass (g)	Frequency limit Hz***	Dismount-able	µm	(L in mm) µm****	°C	IEC 60529	
0,442	33	10	–	0,01	$0,2 + 14 \cdot L^3$	5 ÷ 60	IP40	N-31

N**	Moving mass (g)	Frequency limit Hz***	Dismount-able	µm	(L in mm) µm****	°C	IEC 60529	
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP50	N-33
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP50	N-34
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP50	N-33
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP50	N-34
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP54	N-33
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP54	N-34
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP54	N-33
2	110	25	●	0,5	$0,2 + 3 \cdot L^3$	–10 ÷ 65	IP54	N-34

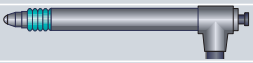
** Nominal value of the measuring force at electrical zero, max. deviation ±25%.
*** Highest mechanical frequency valid for the final value of the measuring range, amplified by 10%.
**** Linearity related max. permissible errors.

TESA LVDT Probes – Overview

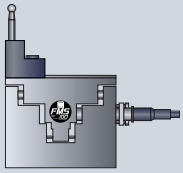
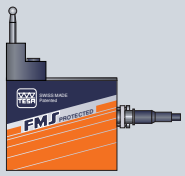
LVDT axial probes, 8 mm diameter, ball-bearing measuring bolt

			Measuring range mm	mm	Cable exit	Measuring bolt retraction	Sealing bellows
Standard probes							
	03230029	GT 21 LVDT	± 1,5	4,3	axial	mechanical	nitrile
	03230030	GT 22 LVDT	± 1,5	4,3	radial	vacuum	nitrile
Standard long-travel probes							
	03230031	GT 27 LVDT	± 1,5	10,3	axial	mechanical	Viton
	03230032	GT 28 LVDT	± 1,5	10,3	radial	vacuum	Viton
Probes with extended measuring range							
	03230046	GT 61 LVDT	± 5	10,3	axial	mechanical	Viton
	03230048	GT 62 LVDT	± 5	10,3	radial	vacuum	Viton

… with activation of the measuring bolt by pneumatic pressure

			Measuring range mm	mm	Cable exit	Pressure (bar) nominal value	Pressure (bar) highest value	Sealing bellow
	S32020269	GT 222 LVDT	± 1,5	3,2	radial	0,7	1,0	Viton

LVDT probes with parallel guiding

			Measuring range mm	mm	Cable exit*	Measuring bolt retraction (accessory)
Standard probes						
	03230033	FMS 100 LVDT	± 1,5	5,8	parallel	air pressure
	03230034	FMS 102 LVDT	± 1,5	5,8	angled	air pressure
Probes «FMS Protected»						
	03230039	FMS 100-P LVDT	± 1,5	5,8	parallel	air pressure
	03230040	FMS 102-P LVDT	± 1,5	5,8	angled	air pressure

* Position in relation to the measuring direction

N**	Drive voltage Drive frequency Adjustment load	Sensitivity mV/V/mm	µm	%***	°C	IEC 60529	
0,63	3 V / 5 kHz / 100 kΩ	150	0,15	0,2	–10 ÷ 65	IP65	N-17
0,63	3 V / 5 kHz / 100 kΩ	150	0,15	0,2	–10 ÷ 65	IP65	N-18
0,63	3 V / 5 kHz / 100 kΩ	150	0,15	0,2	–10 ÷ 65	IP65	N-19
0,63	3 V / 5 kHz / 100 kΩ	150	0,15	0,2	–10 ÷ 65	IP65	N-19
0,9	3 V / 5 kHz / 100 kΩ	98	0,2	0,3	–10 ÷ 65	IP65	N-20
0,9	3 V / 5 kHz / 100 kΩ	98	0,2	0,3	–10 ÷ 65	IP65	N-20

N**	Drive voltage Drive frequency Adjustment load	Sensitivity mV/V/mm	µm	%***	°C	IEC 60529	
1,2	3 V / 5 kHz / 100 kΩ	150	0,15	0,2	–10 ÷ 65	IP65	N-21

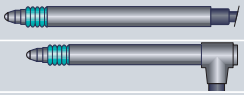
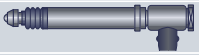
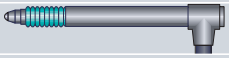
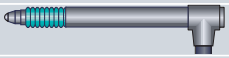
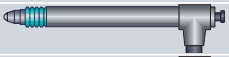
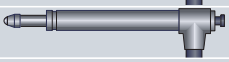
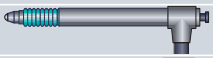
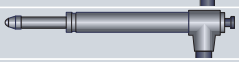
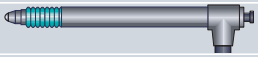
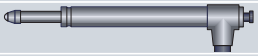
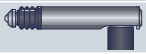
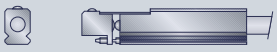
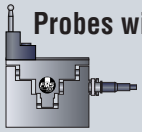
N**	Drive voltage Drive frequency Adjustment load	Sensitivity mV/V/mm	µm	%***	°C	IEC 60529	
2	3 V / 5 kHz / 100 kΩ	150	0,5	0,25	–10 ÷ 65	IP50	N-33
2	3 V / 5 kHz / 100 kΩ	150	0,5	0,25	–10 ÷ 65	IP50	N-34
2	3 V / 5 kHz / 100 kΩ	150	0,5	0,25	–10 ÷ 65	IP54	N-33
2	3 V / 5 kHz / 100 kΩ	150	0,5	0,25	–10 ÷ 65	IP54	N-34

** Nominal value of the measuring force at electrical zero, max. deviation ±25%.

*** All linearity related max. permissible errors expressed as % refer to each relevant measuring span (= difference between both first and last values of the measuring range). For max. perm. errors expressed in µm, see the information provided on each LVDT probe.

Note: LVDT probes are delivered without connector. For additional technical data, report to TESA standard probes.

TESA Probes Compatible with Electronic Equipment

		Measuring range (mm)	TESA Half-bridge	MERCER Half-bridge	DATAMYTE Half-bridge	ETAMIC (ZCB) LVDT
8 mm diameter axial probes with measuring bolt mounted on a ball-bearing						
Standard probes						
	**GTL21**	± 2	**03230057**			**03290119**
	GTL22 (491)	± 2	**03230056**	**03236491**		**03290120**
	**490**	± 1,5	**03230490**	**03236490**	**03258490**	
Standard probes with short body						
	**410**	± 1	**96410012**	**96410010**		
	**411**	± 1	**96411014**	**96411011**		
Standard long-travel probes						
	**GT27**	± 2	**03230027**			**03290121**
	**GT28**	± 2	**03230026**			**03290122**
Probes with extended measuring range						
	**GT61**	± 5	**03230041**	**03236061**	**03258061**	
	**GT62**	± 5	**03230042**	**03236062**		
8 mm diameter axial probes with activation of the measuring bolt by pneumatic pressure						
Standard probes						
	**GTL212**	± 1,5	**03230060**		**03258212**	
	**GTL222**	± 1,5	**03230054**		**03258222**	
	**GTL222-A**	± 1,5	**03230063**	**03236492**	**03258223**	
Long-travel probes						
	**GT282**	± 2	**03230053**		**03258282**	
	**GT282-A**	± 2	**03230069**		**03258283**	
Probes with extended measuring range						
	**GT612**	± 5	**03230062**		**03258612**	
	**GT622**	± 5	**03230055**			
	**GT612-A**	± 5	**03230070**		**03258613**	
	**GT622-A**	± 5	**03230071**			
Probes with short body, ball-bearing measuring bolt						
Standard probes with a 6 mm fixing shank diameter						
	**160**	± 1	**96160013**	**96160011**		
Miniature probes with a 8 mm fixing shank diameter						
	**430**	± 0 ,5	**96430029**	**96430028**		
	**451**	± 0,5	**96441041**	**96441015**		
Lever probes						
	**420**	± 0,2	**96420004**	**96420001**		
	499	± 0,5	**96499007**	**96499004**		
Probes with parallel guiding						
	**FMS100**	± 2	**03230019**			**03290123**
	FMS102	± 2	**03230028**			**03290124**

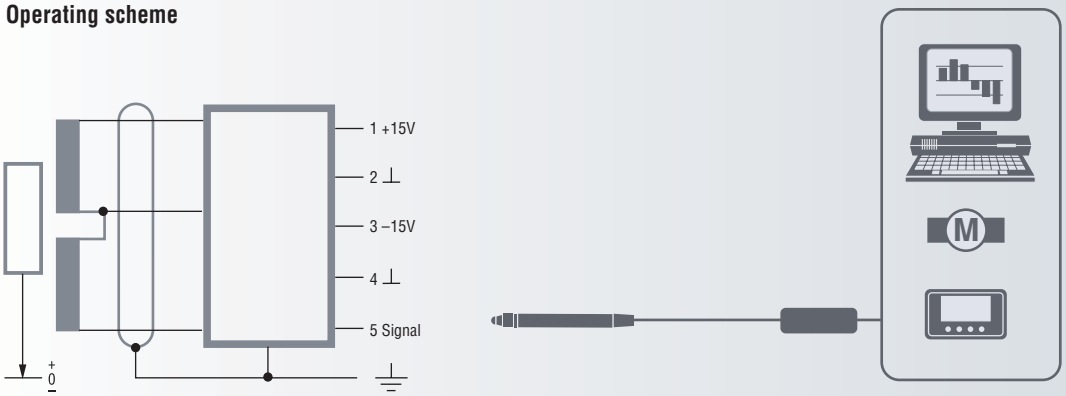
from Other Makers

ETAMIC (ZDB) LVDT	MAHR Half-bridge	MARPOSS LVDT	MARPOSS Half-bridge	METEM Half-bridge	PRETEC Half-bridge	SIGMA Half-bridge	SOLARTRON Half-bridge	SOLARTRON LVDT
03251021	03290143	03253021	03253001	03254021	03259021	03255021	03257001	03257021
03251022	03290144	03253022	03253002	03254022	03259022	03255022	03257002	03257022
							03257490	
96410101	96410111	96410033	96410136	96410031	96410171	96410093	96410044	96410211
96411101	96411111	96411131	96411136	96411141	96411171	96411181	96411201	96411211
03251027	03252027	03253027	03253005	03254027		03255027	03257005	03257027
03251028	03252028	03253028	03253006	03254028		03255028	03257006	03257028
03251061	03252061	03253061	03253011	03254061		03255061	03257011	03257061
03251062	03252062	03253062	03253012	03254062		03255062	03257012	03257062
	03290145			03254212				
03251222	03290146	03253222	03253003	03254222		03255222	03257003	03257222
03251223	03252223	03253223	03253004	03254223		03255223	03257004	03257223
03251282	03252282	03253282	03253007	03254282		03255282	03257007	03257282
03251283	03252283	03253283	03253008	03254283		03255283	03257008	03257283
				03254612				
03251622	03252622	03253622	03253013	03254622		03255622	03257013	03257622
				03254613				
03251623	03252623	03253623	03253014	03254623		03255623	03257014	03257623
96160101	96160111	96160169	96160136	96160141	96160171	96160015	96160021	96160211
96430101	96430111	96430131	96430136	96430030	96430171	96430181	96430033	96430211
96441101	96441054	96441131	96441136	96441032	96441058	96441093	96441077	96441211
96420101	96420003	96420131	96420136	96420006	96420007	96420011	96420012	96420211
96499101	96499111	96499020	96499136	96499141	96499018	96499010	96499201	96499211
				03254100				
				03254102				

TESA DC Probes

Provided with a DC output for direct connection to a host computer or a peripheral fitted with an analogue input.

Operating scheme



✓

DIN 32876 Part 1

See table

Usable in any position

Drive voltage: ±15 V
Consumption: 15 mA
Adjustment load: > 1 kΩ
Sensitivity: see table

See table

See table

Additional data: see standard probes

No		Measuring range (mm)	Output voltage V	Sensitivity V/mm	µm	(L in mm) µm*	Technical data sheets
Standard probes							
03230059	**GTL 21 DC**	± 2	± 2	1	0,1	0,2 + 3,5 · L^2	03200396
S32080457	**GTL 21 DC ±10 V**	± 1	± 10	10	0,1	0,2 + 3,5 · L^2	
03230058	**GTL 22 DC**	± 2	± 2	1	0,1	0,2 + 3,5 · L^2	03200397
S32080722	**GTL 22 DC ±10 V**	± 1	± 10	10	0,1	0,2 + 3,5 · L^2	
S32080723	**GTL 22 DC ±10 V**	± 2	± 10	5	0,1	0,2 + 3,5 · L^2	
Standard long-travel probes							
03230079	**GT 27 DC**	± 2	± 2	1	0,1	0,2 + 3 · L^3	03200514
S32180358	**GT 27 DC 5 V/mm**	± 2	± 10	5	0,1	0,2 + 3 · L^3	
03230080	**GT 28 DC**	± 2	± 2	1	0,1	0,2 + 3 · L^3	03200515
Probes with extended measuring range							
03230086	**GT 61 DC**	± 5	± 5	1	0,1	1 + 4 · L	03200519
03230087	**GT 62 DC**	± 5	± 5	1	0,1	1 + 4 · L	03200520
Probes with activation of the measuring bolt by pneumatic pressure							
03230088	**GTL 222 DC**	± 1,5	± 1,5	1	0,1	0,2 + 3,5 · L^2	03200525
S32080728	**GTL 222 DC 5 V/mm**	± 1,5	± 7,5	5	0,1	0,2 + 3,5 · L^2	
S32080729	**GTL 222 DC ±10 V**	± 1	± 10	10	0,1	0,2 + 3,5 · L^2	
03230089	**GT 282 DC**	± 2	± 2	1	0,1	0,2 + 3 · L^3	03200526
03230090	**GT 622 DC**	± 5	± 5	1	0,1	1 + 4 · L	03200483
Miniature probes with measuring bolt hanging from a diaphragm spring							
03230082	**GT 41 DC**	± 0,3	± 0,3	1	0,1	0,2 + 5 · L^3	03200516
03230083	**GT 42 DC**	± 0,3	± 0,3	1	0,1	0,2 + 5 · L^3	03200517
Miniature probes with measuring bolt mounted on a plain bearing							
03230084	**GT 43 DC**	± 1	± 1	1	0,1	0,2 + 5 · L^3	03200479
03230085	**GT 44 DC**	± 1	± 1	1	0,1	0,2 + 5 · L^3	03200518
Probes with inclinable lever							
03230081	**GT 31 DC**	± 0,3	± 0,3	1	0,1	0,2 + 50 · L^2	03200484
Probes with parallel guiding							
03230091	**FMS 100 DC**	± 2	± 2	1	0,5	0,2 + 3 · L^3	03200521
03230092	**FMS 102 DC**	± 2	± 2	1	0,5	0,2 + 3 · L^3	03200522
S32080007	**FMS 102 DC ±10 V**	± 1	± 10	10	0,5	0,2 + 3 · L^3	
03230093	**FMS 130 DC**	± 2,9	± 2,9	1	0,5	0,2 + 3 · L^3	03200523
03230094	**FMS 132 DC**	± 2,9	± 2,9	1	0,5	0,2 + 3 · L^3	03200524

* Linearity related max. permissible errors.

Note: Other existing probe types and versions are available on request (2 V/mm, 5 V/mm, 10 V/mm or 0 to + 10 V; max. output voltage 10 V).

TESA Axial Probes

Standard and LVDT Probes

Universal probes for common but constraining applications.

- 8 mm diameter probe housing. Can be clamped over its entire length.
- Measuring bolt mounted on a ball bearing.
- Both the probe housing and ball-bearing guide are separate from one another, so that the measuring bolt moves easily even if the probe is not clamped appropriately.
- Degree of protection IP65 according to IEC 60529.
- Wide range of accessories including measuring inserts, spring sets, etc.
- Compatible with measuring equipment from other makers (see page N-14).

✓

DIN 32876 Part 1

See in the table

Axial probes usable in any position

8 mm dia. fixing shank. Ball-bearing measuring bolt.

Distance from electrical zero of both stops is either adjustable (downward) or depending on the position of the lower stop (upward).

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip plus M2,5 thread.

2 m long cable. DIN 45322 5-pin connector, LVDT probes not included.

Nickel-plated housing. Stainless steel measuring bolt, hardened.

Sealing bellows made from resistant Nitrile or high-resistance Viton (elastomer)

Moved mass 6 g

13 kHz (± 5%) drive frequency. For LVDT probes, see on pages N-12 and N-13. Highest mechanical frequency to 60 Hz.

0,15 µm/ °C or 0,2 µm / °C for GTL 21 and GTL 211

20 ± 0,5°C

-10°C to 65°C 10°C to 40°C for GT 21 HP

80%

IP65(IEC 60529), IP64 for GT 21 HP

Shipping packaging

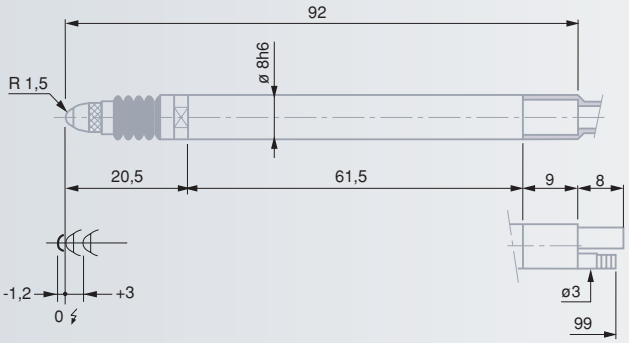
Identification number

Inspection report with a declaration of conformity

GT 21 and GTL 21 probes with axial cable exit

		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Standard probes					
03210904	**GT 21**	± 2	0,63	mechanical	Nitrile
03210905	**GT 21**	± 2	1,0	mechanical	Nitrile
03210906	**GT 21**	± 2	1,6	mechanical	Nitrile
03210907	**GT 21**	± 2	2,5	mechanical	Nitrile
03210908	**GT 21**	± 2	4,0	mechanical	Nitrile
03230057	**GTL 21**	± 2	0,63	mechanical	Nitrile
03230072	**GTL 211**	± 2	0,63	vacuum	Viton
High-precision standard probes					
03230036	**GT 21 HP**	± 0,2	0,63	mechanical	nitrile
LVDT-probes					
03230029	**GT 21 LVDT**	± 1,5	0,63	mechanical	nitrile

* Nominal value at electrical zero, max. ± 25%.Valid for upright assembly position, with downward oriented measuring bolt, as well as in static measuring.



GT 21/GTL 21

GTL 211

GT 21 **GTL 21**

	Lower stop of the measuring bolt**, adjustable from... mm	to mm	ex-factory mm	mm	µm	µm	µm***	Technical data sheets
GT 21	–2,2	0,1	–1,2	4,3	0,01	0,02	$0,2 + 3 \cdot L^3$	03200249
GTL 21	–2,2	0,1	–1,2	4,3	0,01	0,02	$0,2 + 2,4 \cdot L^2$	03200391
GTL 211	–2,2	0,1	–1,2	4,3	0,01	0,02	$0,2 + 2,4 \cdot L^2$	03200435
GT 21 HP	–2,2	0,1	–1,2	4,3	0,01	0,01	$0,07 + 0,4 \cdot L$	03200264
GT 21 LVDT	–2,2	0,1	–1,7	4,3	0,15	0,15	4,5****	03200228

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).
**** With reference to the 3 mm measuring span (measuring range ±1,5 mm)

GT 22 and GTL 22 probes with radial cable exit

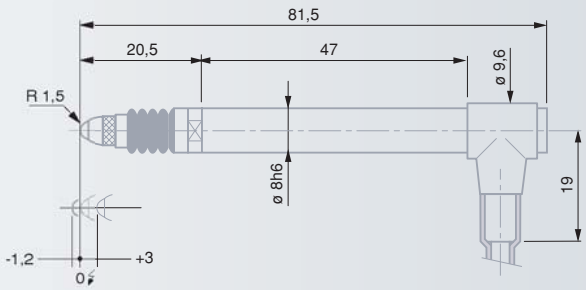
№		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Standard probes					
03210924	**GT 22**	± 2	0,63	vacuum	Nitrile
03210921	**GT 22**	± 2	0,16	vacuum	Nitrile
03210922	**GT 22**	± 2	0,25	vacuum	Nitrile
03210923	**GT 22**	± 2	0,4	vacuum	Nitrile
03210925	**GT 22**	± 2	1,0	mechanical	Nitrile
03210926	**GT 22**	± 2	1,6	mechanical	Nitrile
03210927	**GT 22**	± 2	2,5	mechanical	Nitrile
03210928	**GT 22**	± 2	4,0	mechanical	Nitrile
03230056	**GTL 22**	± 2	0,63	vacuum	Viton
03230076	**GTL 22**	± 2	1	vacuum	Viton
High-precision standard probes					
03230021	**GT 22 HP**	± 0,2	0,63	vacuum	Nitrile
LVDT probes					
03230030	**GT 22 LVDT**	± 1,5	0,63	mechanical	Nitrile

* Nominal value at electrical zero, max. ± 25%. Valid for upright assembly position, with downward oriented measuring bolt, as well as in static measuring.

GT 22

GTL 22

GT 22/GTL 22



	Lower stop of the measuring bolt**, adjustable from... mm	to mm	ex-factory mm	mm	µm	µm	µm***	Technical data sheets
GT 22	–2,2	0,1	–1,2	4,3	0,01	0,02	$0,2 + 3 \cdot L^3$	03200250
GTL 22	–2,2	0,1	–1,2	4,3	0,01	0,02	$0,2 + 2,4 \cdot L^2$	03200392
GT 22 HP	–2,2	0,1	–1,2	4,3	0,01	0,01	$0,07 + 0,4 \cdot L$	03200265
GT 22 LVDT	–2,2	0,1	–1,7	4,3	0,15	0,15	4,5****	03200229

** Distance from electrical zero. *** Linearity related max. perm. errors. (L in mm).
**** With reference to the 3 mm measuring span (measuring range ±1,5 mm).

✓

DIN 32876 Part 1

See in the table

Axial probes usable in any position

8 mm dia. fixing shank. Ball-bearing measuring bolt.

Distance from electrical zero of both stops is either adjustable (downward) or depending on the position of the lower stop (upward).

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip plus M2,5 thread.

2 m long cable. DIN 45322 5-pin connector, LVDT probes not included.

Nickel-plated housing. Stainless steel measuring bolt, hardened.

Sealing bellows made from resistant Nitrile or high-resistance Viton (elastomer)

Moved mass 6 g

13 kHz (± 5%) drive frequency. For LVDT probes, see on pages N-12 and N-13.

Highest mechanical frequency to 60 Hz.

0,15 µm/ °C or 0,2 µm / °C for GTL 22

20 ± 0,5°C

–10°C to 65°C 10°C to 40°C for GT 22 HP

80%

IP65 (IEC 60529) or IP64 for GT 22 HP

Shipping packaging

Identification number

Inspection report with a declaration of conformity

✓

DIN 32876 Part 1

See in the tables

Axial probes usable in any position

8 mm dia. fixing shank. Ball-bearing measuring bolt.

Distance from electrical zero of both stops is either adjustable (downward) or depending on the position of the lower stop (upward).

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip plus M2,5 thread.

2 m long cable. Standard probes with a 5-pin DIN 45322 connector. LVDT probes have no connector.

Nickel-plated housing. Stainless steel measuring bolt, hardened.

Viton rubber bellow in high-resistance elastomer

Moved mass 6 g

13 kHz (± 5%) drive frequency. For LVDT probes, see on pages N-12 and N-13.

Highest mechanical frequency to 60 Hz.

0,15 µm/ °C

20 ± 0,5 °C

-10°C to 65°C

80%

IP65 (IEC 60529)

Shipping packaging

Identification number

Inspection report with a declaration of conformity

TESA Axial Probes with Long Retraction Travel

Standard and LVDT Probes

Universal inductive probes for common applications, especially those using multigauging devices.

- Long retraction travel to prevent the probe from being damaged.

Compatible with measuring equipment from other makers (see page N-14).

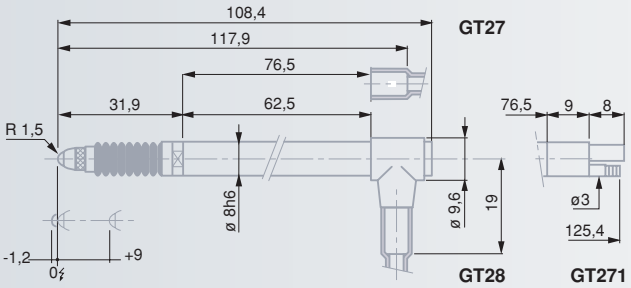
GT 27 probes with axial cable exit

		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Standard probes					
03230027	**GT 27**	± 2	0,63	mechanical	Viton
03230073	**GT 271**	± 2	0,63	vacuum	Viton
LVDT probe					
03230031	**GT 27 LVDT**	± 1,5	0,63	mechanical	Viton

GT 28 probes with radial cable exit

		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Standard probes					
03230026	**GT 28**	± 2	0,63	vacuum	Viton
LVDT probe					
03230032	**GT 28 LVDT**	± 1,5	0,63	by vacuum	Viton

* Nominal value at electrical zero, max. ±25%. Valid for upright assembly position, with downward oriented measuring bolt, as well as in static measuring.



	Lower stop of the measuring bolt**, adjustable from... mm	to mm	ex-factory mm	mm	µm	µm	µm***	Technical data sheets
GT 27	–2,2	0,1	–1,2	10,3	0,05	0,05	$0,2 + 3 \cdot L^3$	03200251
GT 271	–2,2	0,1	–1,2	10,3	0,05	0,05	$0,2 + 3 \cdot L^3$	03200436
GT 28	–2,2	0,1	–1,2	10,3	0,05	0,05	$0,2 + 3 \cdot L^3$	03200252
GT 27 LVDT	–2,2	0,1	–1,7	10,3	0,15	0,15	4,5****	03200245
GT 28 LVDT	–2,2	0,1	–1,7	10,3	0,15	0,15	4,5****	03200246

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).
**** With reference to the 3 mm measuring span (measuring range ±1,5 mm).

TESA Axial Probes with Extended Measuring Range

Standard and LVDT Probes

Designed for long travels and low resolutions – Specially suited for use with multigauging systems.

- Correction factor used to get the true value is 2,5x (10x for the S probe version).

Compatible with measuring equipment from other makers (see page N-14).

GT 62

GT 61

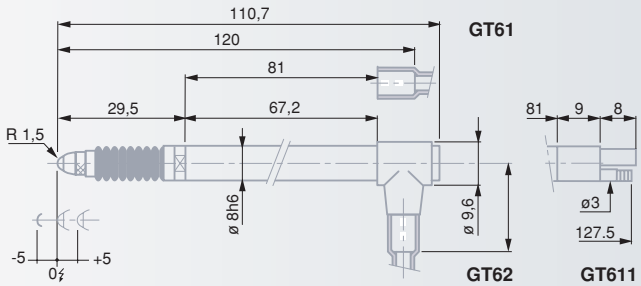
GT 61 probes with axial cable exit

No		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Standard probes					
03230041	**GT 61**	± 5	0,9	mechanical	Viton
S32070041	**GT 61S**	± 5	0,9	mechanical	Viton
03230074	**GT 611**	± 5	0,9	vacuum	Viton
LVDT probes					
03230046	**GT 61 LVDT**	± 5	0,9	mechanical	Viton

GT 62 probes with radial cable exit

No		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Standard probes					
03230042	**GT 62**	± 5	0,9	vacuum	Viton
S32070042	**GT 62S**	± 5	0,9	vacuum	Viton
S32080861	**GT62**	± 5	0,16	mechanical	none
LVDT probes					
03230048	**GT 62 LVDT**	± 5	0,9	vacuum	Viton

* Nominal value at electrical zero, max. ± 25%. Valid for upright assembly position, with downward oriented measuring bolt, as well as in static measuring.



	Measuring bolt stops** lower stop (mm)	upper stop (mm)	mm	µm	µm	µm***	Technical data sheets
GT 61	–5,1	5,2	10,3	0,05	0,05	1 + 4 · L	03200294
GT 611	–5,1	5,2	10,3	0,05	0,05	1 + 4 · L	03200437
GT 62	–5,1	5,2	10,3	0,05	0,05	1 + 4 · L	03200295
GT 61 LVDT	–5,1	5,2	10,3	0,2	0,2	20****	03200337
GT 62 LVDT	–5,1	5,2	10,3	0,2	0,2	20****	03200339

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).
**** With reference to the 10 mm measuring span (measuring range ±5 mm).

✓
DIN 32876 Part 1
See in the tables
Axial probes usable in any position
Signal combination with probes having a standard resolution may require your special attention to needed correction
8 mm dia. fixing shank. Ball-bearing measuring bolt
Both lower and upper stops are fixed.
Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip. M2,5 thread.
2 m long cable.
5-pin DIN 45322 connector, LVDT probes not included.
Nickel-plated housing. Stainless steel measuring bolt, hardened.
Viton rubber bellows in high-resistance elastomer
Moved mass 8 g
13 kHz (± 5%) drive frequency. For LVDT probes, see on pages N-12 and N-13.
Highest mechanical frequency to 60 Hz.
0,09 µm/ °C or 0,16 µm/ °C for GT 61 and GT 62 LVDT probes
20 ± 0,5°C
–10°C to 65°C
80%
IP65 (IEC 60529)
Shipping packaging
Identification number
Inspection report with a declaration of conformity

TESA Axial Probes with Measuring Bolt Activation by Pneumatic Pressure

Standard and LVDT Probes

These probes are intended for use with measuring devices providing fully or half-assisted inspection routines.

Compatible with measuring equipment from other makers (see page N-14).

✓

DIN 32876 Part 1

See in the tables

Axial probes usable in any position

8 mm dia. fixing shank. Ball-bearing measuring bolt.

Both lower and upper stops are fixed.

Interchangeable measuring insert with a 3 mm dia. tungsten carbide ball tip. M2,5 thread.

2 m long cable.

Standard probes with a 5-pin DIN 45322 connector, LVDT probes not included.

Nickel-plated housing. Stainless steel measuring bolt, hardened.

Viton rubber bellows in high-resistance elastomer

Moved mass 6 g

13 kHz (± 5%) drive frequency. For LVDT probes, see on pages N-12 and N-13.

Highest mechanical frequency to 60 Hz.

0,2 µm/ °C

20 ± 0,5 °C

–10°C to 65°C

80%

IP65(IEC 60529) or IP50 for GTL 212-A and GTL 222-A

Shipping packaging

Identification number

Inspection report with a declaration of conformity

GT 212 probes with axial cable exit

No		Measuring range (mm)	N*	Measuring bolt activation	Sealing bellows	
Standard probes						
03230060	**GTL 212**	± 1,5	1,2	▼	▲	Viton
03230067	**GTL 212-A**	± 1,5	0,2	▼	▲	none

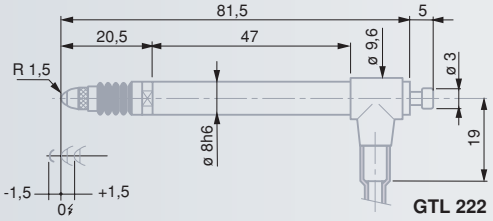
GT 222 probes with radial cable exit

No		Measuring range (mm)	N*	Measuring bolt activation	Sealing bellows	
Standard probes						
03230054	**GTL 222**	± 1,5	1,2	▼	▲	Viton
03230063	**GTL 222-A**	± 1,5	0,2	▼	▲	none
LVDT probes						
S32020269	**GT 222 LVDT**	± 1,5	1,2	▼	▲	Viton

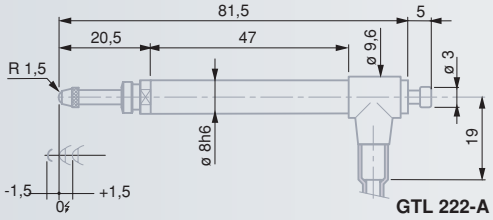
* Nominal value at electrical zero, max. ± 25%. Valid for upright assembly position, with downward oriented measuring bolt, as well as in static measuring

▼ Downward movement of the measuring bolt activated by pneumatic pressure.

▲ Upward movement of the measuring bolt activated under the spring force only.



GTL 222 GTL 212



GTL 222-A GTL 212-A

GTL 222

GTL 212-A

	Air pressure (bar) nominal	maximum	mm	µm	µm	µm***	Technical data sheets
GTL 212	0,7	1,0	3,2	0,015	0,02	0,2 + 2,4 · L^2	03200413
GTL 212-A	0,25	6,0	3,2	0,015	0,02	0,2 + 2,4 · L^2	03200430
GTL 222	0,7	1,0	3,2	0,015	0,02	0,2 + 2,4 · L^2	03200393
GTL 222-A	0,25	6,0	3,2	0,015	0,02	0,2 + 2,4 · L^2	03200422
GT 222 LVDT	0,7	1,0	3,2	0,15	0,15	4,5****	

*** Linearity related max. perm. errors (L in mm).

**** With reference to the 3 mm measuring span (measuring range ±1,5 mm).

TESA Long-Travel Probes with Measuring Bolt Activation by Pneumatic Pressure

Standard Probes

Probes intended for use with measuring devices providing fully or half-assisted inspection routines.

Compatible with measuring equipment from other makers (see page N-14).

GT 282

GT 272-A

GT 272 probes with axial cable exit

		Measuring range (mm)	Upper travel (mm)*	N**	Measuring bolt activation	Sealing below
Standard probes						
03230061	**GT 272**	± 2	8,1	1,0	▼ ▲	Viton
03230068	**GT 272-A**	± 2	8,1	0,85	▼ ▲	none

GT 282 probes with radial cable exit

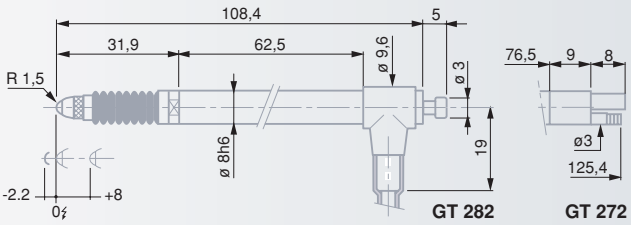
		Measuring range (mm)	Upper travel (mm)*	N**	Measuring bolt activation	Sealing below
Standard probes						
03230053	**GT 282**	± 2	8,1	1,0	▼ ▲	Viton
03230069	**GT 282-A**	± 2	8,1	0,85	▼ ▲	none

* Travel from the electrical zero up to the upper stop.

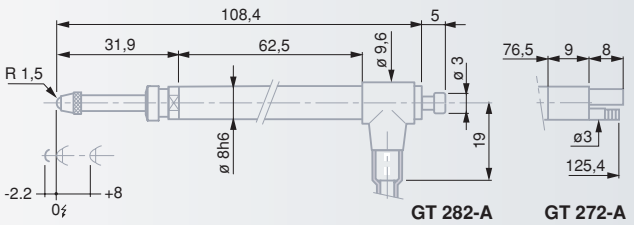
** Nominal value at electrical zero; max. deviation ±25%. Valid in upright assembly position with downward oriented measuring bolt, as well as in static measuring.

▼ Downward movement of the measuring bolt activated by pneumatic pressure.

▲ Upward movement of the measuring bolt activated under the spring force only.



GT 282 GT 272



GT 282-A GT 272-A

	Air pressure (bar) nominal	Air pressure (bar) maximum	mm	µm	µm	µm***	Technical data sheets
GT 272	1,1	1,5	10,3	0,05	0,05	0,2 + 3 · L^3	03200414
GT 272-A	1,0	6,0	10,3	0,05	0,05	0,2 + 3 · L^3	03200431
GT 282	1,1	1,5	10,3	0,05	0,05	0,2 + 3 · L^3	03200390
GT 282-A	1,0	6,0	10,3	0,05	0,05	0,2 + 3 · L^3	03200432

*** Linearity related max. permissible errors (L in mm).

✓

DIN 32876 Part 1

See in tables

Axial probes usable in any position

8 mm dia. fixing shank. Ball-bearing measuring bolt.
Both lower and upper stops are fixed.

Interchangeable insert with a 3 mm dia. carbide ball tip. M2,5 thread.

2 m long cable.

5-pin DIN 45322 connector.

Nickel-plated housing.
Stainless steel measuring bolt, hardened.

Viton rubber bellows in high-resistance elastomer

Moved mass 8 g

13 kHz (±5%) drive frequency. ,Highest mechanical frequency 60 Hz.

0,15 µm/ °C

20 ± 0,5°C

–10°C to 65°C

80%

IP65 (IEC 60529) or IP50 for GTL 272-A plus GT 282-A

Shipping packaging

Identification number

Inspection report with a declaration of conformity

✓

DIN 32876 Part 1

See in tables

Axial probes usable in any position

8 mm dia. fixing shank. Ball-bearing measuring bolt.
Both lower and upper stops are fixed.

Interchangeable insert with a 3 mm dia. carbide ball tip. M2,5 thread.

Cable length: 2 m.

5-pin DIN 45322 connector.

Nickel-plated housing.
Stainless steel measuring bolt, hardened.

Viton rubber bellows in high-resistance elastomer

Moved mass 8 g

13 kHz (± 5%) drive frequency. Highest mechanical frequency 60 Hz.

0,09 µm/ °C

20 ± 0,5°C

–10°C to 65°C

80%

IP65 (IEC 60529) or IP50 for GTL 612-AA plus GT 622-A

Shipping packaging

Identification number

Inspection report with a declaration of conformity

TESA Probes with Extended Measuring Range and Bolt Activation by Pneumatic Pressure

Standard Probes

Probes intended for use with measuring devices providing fully or half-assisted inspection routines.

Compatible with measuring equipment from other makers (see page N-14).

GT 612 probes with axial cable exit

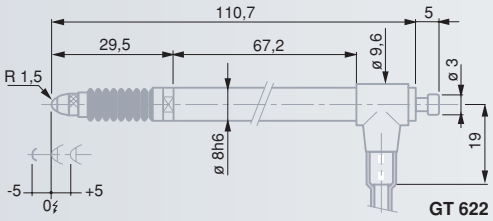
		Measuring range (mm)	N*	Measuring bolt activation		Sealing bellows
Standard probes						
03230062	**GT 612**	± 5	2,0	▼	▲	Viton
03230070	**GT 612-A**	± 5	1,0	▼	▲	none
03230097	**GT 612-AA**	± 5	0,3	▼	▲	none

GT 622 probes with radial cable exit

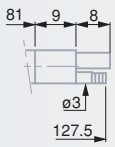
		Measuring range (mm)	N*	Measuring bolt activation		Sealing bellows
Standard probes						
03230055	**GT 622**	± 5	2,0	▼	▲	Viton
03230071	**GT 622-A**	± 5	1,0	▼	▲	none

* Nominal value at electrical zero, max. ± 25%. Valid for upright assembly position with downward oriented measuring bolt, as well as in static measuring.

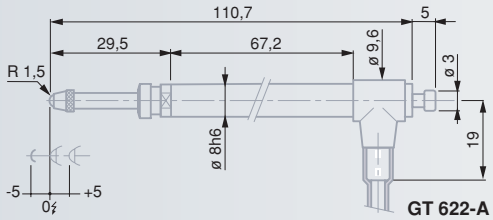
▼ Downward movement of the measuring bolt activated by pneumatic pressure.
▲ Upward movement of the measuring bolt activated under the spring force only.



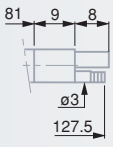
GT 622



GT 612



GT 622-A



GT 612-A

GT 622

GT 612-A

	Air pressure (bar) nominal	maximum	mm	µm	µm	µm**	Technical data sheets
GT 612	1,1	1,5	10,3	0,05	0,05	1 + 4 · L	03200415
GT 612-A	1,0	6,0	10,3	0,05	0,05	1 + 4 · L	03200433
GT 612-AA	0,3	2,0	10,3	0,05	0,05	1 + 4 · L	03200537
GT 622	1,1	1,5	10,3	0,05	0,05	1 + 4 · L	03200394
GT 622-A	1,0	6,0	10,3	0,05	0,05	1 + 4 · L	03200434

** Linearity related max. permissible errors (L in mm).

TESA Axial Miniature Probes

GT 41 GT 43

Standard probes

Compact probes specially designed for use where there's no room for longer probes – Possible assembly on measuring heads for bore measurement and the like.

GT 41 and GT 43 probes with axial cable exit

		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Measuring bolt hanging from a diaphragm spring					
03230001	**GT 41**	± 0,3	0,63	without	Nitrile
Measuring bolt mounted on a plain bearing					
03230035	**GT 43**	± 1	0,4	mechanical	Viton

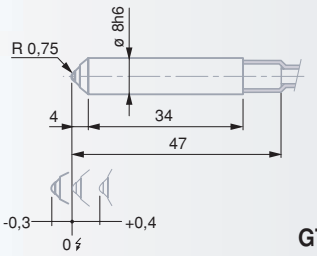
GT 42 and GT 44 probes with radial cable exit

GT 42

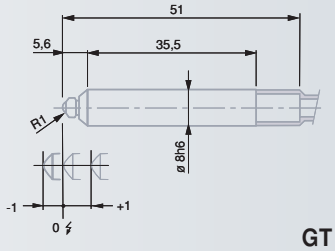
GT 44

		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
Measuring bolt hanging from a diaphragm spring					
03230002	**GT 42**	± 0,3	0,63	vacuum	Nitrile
Measuring bolt mounted on a plain bearing					
03230017	**GT 44**	± 1	0,4	vacuum	Viton

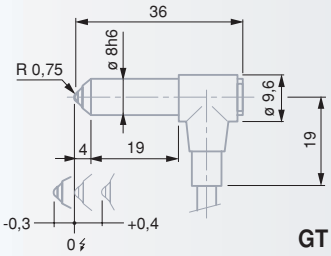
* Nominal value at electrical zero, max. ±25%. Valid for upright assembly position with downward oriented measuring bolt, as well as in static measuring.



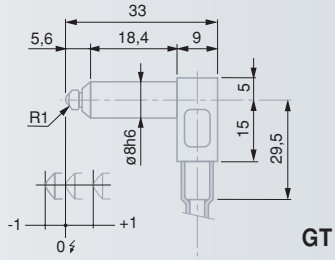
GT 41



GT 43



GT 42



GT 44

	Measuring bolt stops** lower (mm)	upper (mm)	mm	µm	µm	µm***	Technical data sheets
GT 41	–0,3	0,4	0,7	0,01	0,01	$0,2 + 5 \cdot L^2$	03200258
GT 43	–1,05	1,05	2,1	0,1	0,15	$0,2 + 5 \cdot L^2$	03200260
GT 42	–0,3	0,4	0,7	0,01	0,01	$0,2 + 5 \cdot L^2$	03200259
GT 44	–1,05	1,05	2,1	0,1	0,15	$0,2 + 5 \cdot L^2$	03200261

** Distance from electrical zero. *** Linearity related max perm. errors (L in mm).

✓

DIN 32876 Part 1

See in tables

Axial probes usable in any position

8 mm dia. fixing shaft. Measuring bolt guided on a plain bearing or hanging from diaphragms.

Both lower and upper stops are fixed.

GT 41 or GT 42 with a fixed measuring insert; spherical carbide measuring face, R = 0,75 mm.
GT 43 or GT 44 with a selectable measuring insert; spherical carbide face, R = 1 mm.
M2 coupling thread.

Cable length: 2 m.

5-pin DIN 45322 connector.

Nickel-plated fixing shank. Resistant Nitrile rubber bellow or Viton rubber bellow with high-resistance elastomer

Moved mass 2 g

13 kHz (± 5%) drive frequency. Highest mechanical frequency 60 Hz.

0,1 µm/ °C

20 ± 0,5°C

-10°C to 65° for GT 41 and GT 42; 5°C to 65°C for GT 43 and GT 44.

80%

IP65 (IEC 60529)

Shipping packaging

Identification number

Inspection report with a declaration of conformity

TESA Axial Probes – Series 490 and 491

Probes with no brand name for use with both TESA and MERCER electronic equipment

Universal probes to suit common but constraining applications.

- 8 mm diameter probe body that can be clamped over its entire length.
- Measuring bolt mounted on a ball-bearing.
- Probe body made in steel, nickel-plated.
- Degree of protection to IP65 as per IC 60529.
- Probe series 490 provided with a flexible axial cable exit with steel spring to prevent the cable from breaking.

Compatible with measuring equipment from other makers (see page N-14).

✓

DIN 32876 Part 1

See in tables

Axial probes usable in any position

8 mm body diameter. Measuring bolt mounted on a ball-bearing.

Adjustable distance between both lower stop and electrical zero.

Interchangeable measuring insert with M2,5 thread. 3 mm dia. carbide ball tip.

Cable length: 2 m.

DIN 45322 connector.

Nickel-plated body. Steel measuring bolt, hardened.

Viton rubber bellow with high-resistance elastomer

Moved mass 6 g

Force increase 0,2 N/mm

Highest mechanical frequency 60 Hz

0,2 µm/ °C

-10°C to 65°C

-20°C to 65°C

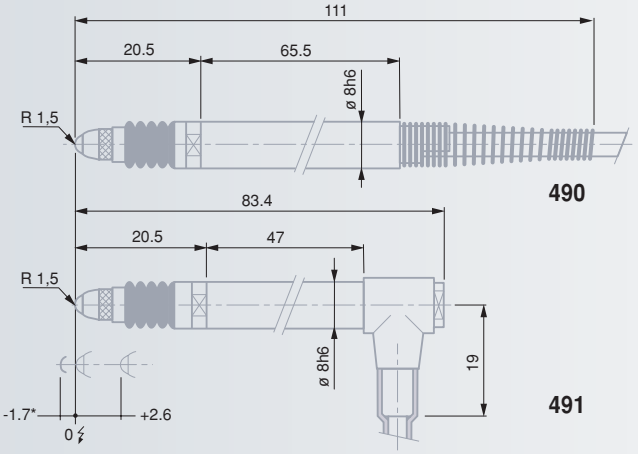
IP65 (IEC 60529)

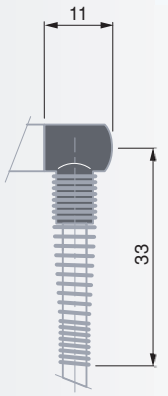
Shipping packaging

Identification number

		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
*Probe series 490 with axial/radial cable exit***					
03230490	**03236490**	± 1,5	0,63	mechanical	Viton
Probe series 491 with radial cable exit					
03230491	**03236491**	± 1,5	0,63	vacuum	Viton

* Nominal value at electrical zero; max. deviation ± 0,15 N. Valid for upright assembly position with downward oriented measuring bolt, as well as in static measuring.
Probes with measuring force of 0,4, 1,0, 1,6, 2,5 or 4 N also available upon request.
** Using the right angle adaptor that came with the probe.





		Lower stop of the measuring bolt***, adjustable from... mm	to mm	ex-factory mm	mm	µm	%****	Technical data sheets
490	**TESA**	–2	0	–1,7	4,3	0,02	0,2	03200456
490	**MERCER**	–2	0	–1,7	4,3	0,02	0,15	03200450
491	**TESA**	–2	0	–1,7	4,3	0,02	0,2	03200457
491	**MERCER**	–2	0	–1,7	4,3	0,02	0,15	03200454

*** Distance from electrical zero.
**** Linearity related max. perm. errors within the measuring span of 3 mm (measuring range ±1,5 mm).

Axial Probes with Short Body – Series 410 and 411

Probes for use with electronic equipment from both TESA and MERCER

Universal probes for common but constraining applications.

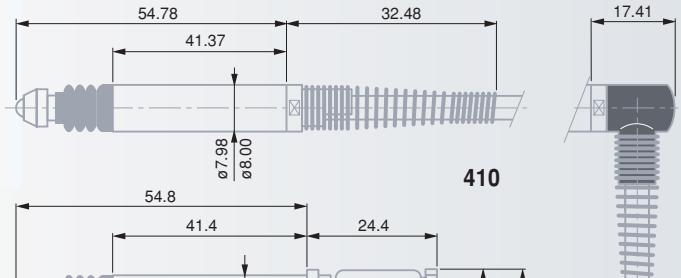
- 8 mm diameter probe body that can be clamped over its entire length.
- Measuring bolt mounted in a ball-bearing.
- Hardened steel body, hard-chrome plated.
- Degree of protection to IP62 (series 410) or IP65 (series 411) as per IEC 60529.
- Probe series 490 provided with a flexible axial cable exit, also steel spring to prevent the cable from breaking.

Compatible with measuring equipment from other makers (see page N-14).

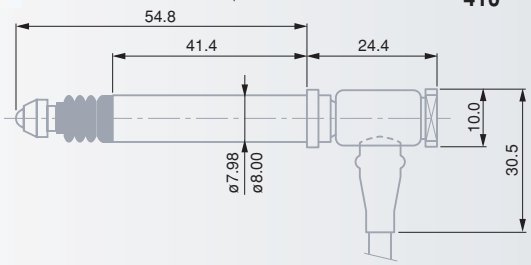
411 410

		Measuring range (mm)	N*	Measuring bolt retraction	Sealing bellows
*Probe series 410 with axial/radial cable exit***					
96410012	**96410010**	± 1	0,6	mechanical	Nitrile
Probe series 411 with radial cable exit					
96411014	**96411011**	± 1	0,6	vacuum	Viton

* Nominal value at electrical zero; max. deviation ± 0,15 N. Valid for upright assembly position with downward oriented measuring bolt, as well as in static measuring. Also Probe series 410 with measuring force of 0,1 or 1,6 N also available upon request.
** Using the right angle adaptor that came with the probe.



410



411

		Lower stop of the measuring bolt***, adjustable from... mm	to mm	ex-factory mm	mm	µm	%****	Technical data sheets
410	**TESA**	–1,2	0	–1,08	2,5	0,1	0,2	F96410012
410	**MERCER**	–1,2	0	–1,08	2,5	0,1	0,2	F96410010
411	**TESA**	–1,2	0	–1,08	2,5	0,1	0,2	F96411014
411	**MERCER**	–1,2	0	–1,08	2,5	0,1	0,2	F96411011

*** Distance from electrical zero.
**** Linearity related max. perm. errors; within the measuring span of 2 mm (measuring range ±1 mm).

✓
DIN 32876 Part 1
See in tables
Axial probes usable in any position
8 mm body diameter. Measuring bolt mounted on a ball-bearing.
Adjustable distance between both lower stop and electrical zero.
Interchangeable probe insert with a M2,5 mounting thread. 3 mm dia. tungsten carbide ball tip.
Cable length: 2 m.
DIN 45322 connector.
Hardened steel probe body, hard-chrome plated. Stainless steel measuring bolt, hardened.
Rubber bellows in resistant Nitrile or Viton with high-resistance elastomer
Moved mass 3,1 g (probe series 410) or 3,2 g (probe series 411)
Force increase 0,15 N/mm
Highest mechanical frequency 60 Hz
0,025 µm/ °C
0°C to 65 °C
-40°C to 65°C
IP62 (series 410) IP65 (series 411) as per IEC 60529
Shipping packaging
Identification number

Axial Probes with Short Body – Series 160, 430 and 451

Probes for use with electronic equipment from both TESA and MERCER

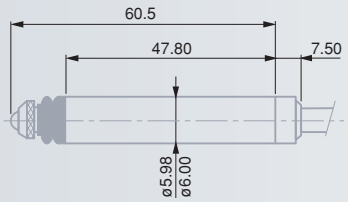
Their compact size and robust construction make them perfect for a frequent use.

- 8 mm diameter probe body that can be clamped over its entire length.
- Nickel-plated, hardened steel body. Ball-bearing probe insert.

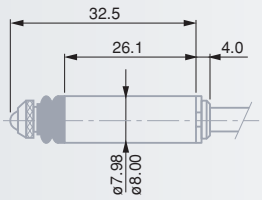
Compatible with measuring equipment from other makers (see page N-14).

		Measuring range mm	N*	Measuring bolt retraction	Sealing bellows
Series 160 – Probes with short body, axial cable exit					
96160013	**96160011**	± 1	0,6 ± 0,15	mechanical	Viton
Series 430 – Miniature probes with axial cable exit					
96430029	**96430028**	± 0,5	0,75 ± 0,2	mechanical	Nitrile
Series 451 – Miniature probes with radial cable exit					
96441041	**96441015**	± 0,5	0,6 ± 0,15	mechanical	Nitrile

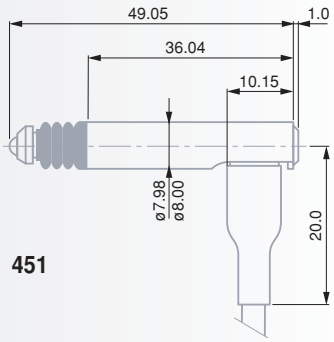
* Nominal value at electrical zero; max. deviation ± 0,15 N. Valid for upright assembly position with downward oriented measuring bolt, as well as in static measuring.



160



430



451

		Lower stop of the measuring bolt**, adjustable from... mm	to mm	ex-factory mm	mm	µm	%***	Technical data sheets
160	**TESA**	–1,2	0	–1,08	3,3	0,1	0,2	F96160013
160	**MERCER**	–1,2	0	–1,08	3,3	0,1	0,2	F96160011
430	**TESA**	–0,7	0	–0,58	1,25	0,2	0,2	F96430029
430	**MERCER**	–0,7	0	–0,58	1,25	0,2	0,2	F96430028
451	**TESA**	—	—	–0,58	2,1	0,1	0,2	F96441041
451	**MERCER**	—	—	–0,58	2,1	0,1	0,2	F96441015

** Distance from electrical zero.
*** Linearity related max. perm. errors; within either of both measuring spans of 2 mm (measuring range ±1 mm) and 1 mm (measuring range ±0,5 mm).

✓

DIN 32876 Part 1

See in tables

Axial probes usable in any position

6 and 8 mm probe housing diameters for both series 160 and 430/45, resp.

Ball-bearing measuring bolt.

Distance between both stops and electrical zero is either adjustable (series 160, lower stop only) or fixed (series 451).

Interchangeable probe insert.

M2 thread for series 160 or M2,5 for both series 430 and 451)

3 mm dia. tungsten carbide ball tip.

2 m long cable.

DIN 45322 connector.

Hardened steel probe body, chrome plated. Measuring bolt in stainless steel, hardened.

Rubber bellows in resistant Nitrile or Viton with high-resistance elastomer

Moved mass 2,5 g (series 160) 1,9 g (series 430) 3,0 g (series 451)

Force increase to 0,3 N/mm (series 160), 0,25 N/mm (series 430) or 0,15 N/mm (series 451)

Highest mechanical frequency 60 Hz

0,025 µm/ °C

0°C to 60°C

–40°C to 60°C

IP62 (IEC 60529)

Shipping packaging

Identification number

Lever Probes – Series 420 and 499

Probes for use with TESA or MERCER electronic equipment

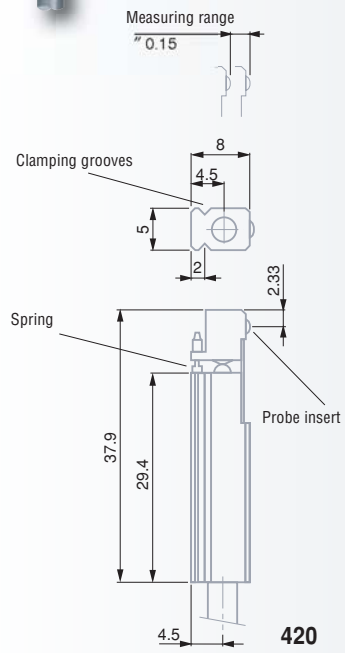
Probe series 420

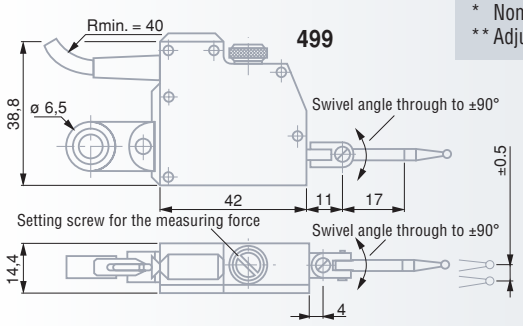
- Very short body that can be recessed into a fixture or a plug gauge.
- Probe insert mounted on leaf springs.

Probe series 499

- Parallel guiding of the measuring bolt moving in both probing directions.
- Interchangeable probe insert. Any of those having a varying length can equally be used with no influence on the leverage.
- Used where probes with measuring bolt moving lengthwise cannot easily be handled.
- Without switch-over feature for the probing direction.

Compatible with measuring equipment from other makers (page N-14).





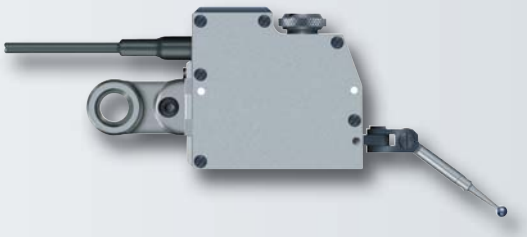
		Measuring range (mm)	N*
Series 420 – Miniature lever probes			
96420004	**96420001**	± 0,15	1,8 ± 0,4
Series 499 – Lever probes with parallel guiding			
96499007	**96499004**	± 0,5	0,02 ÷ 0,2**

Accessories for probe series 499

		mm		mm
03238401	Measuring insert	0,8	carbide	12,3
03238402	Measuring insert	1,6	carbide	12,3
03238403	Measuring insert	3,2	carbide	12,3
03238411	Measuring insert	0,8	carbide	37,7
03238412	Measuring insert	1,6	carbide	37,7
03238413	Measuring insert	3,2	carbide	37,7
01840105	Cylindrical clamp	8		

For other clamping items, report to page F-6.

* Nominal values at electrical zero. Valid in static measuring.
** Adjustable with both the probe housing and lever lying horizontally.



		Lower stop of the measuring insert***, adjustable from... mm	to mm	ex-factory mm	mm	µm	%****	Technical data sheets
420	**TESA**	—	—	–0,225	0,525	0,5	0,3	F96420004
420	**MERCER**	—	—	–0,225	0,525	0,5	0,3	F96420001
499	**TESA**	0,6	0	0,6	1,2	0,25	0,6	F96499007
499	**MERCER**	0,6	0	0,6	1,2	0,25	0,6	F96499004

*** Distance from electrical zero.
**** Linearity related max. perm. errors; within either of both measuring spans of 0,3 mm (measuring range ±0,15 mm) and 1 mm (measuring range ±0,5 mm).

✓
DIN 32876 Part 1
See in tables
Lever probes usable in any position
Series 420 with a clamping groove.
Leaf-spring mounted articulation.
Series 499: 2 dovetails with mounting lug or clamping rod. Probe insert on a leaf-spring bearing. 2 x 90° friction clutches for smooth displacement of the probe insert.
Triple protection against damages in both probing directions.
Series 499 with Interchangeable insert fitted with a 10 BA coupling thread.
2 m long cable.
DIN 45322 connector.
Stainless steel probe body, hardened (series 420). Dull-chrome plated housing (series 499).
Tungsten carbide ball tip
Moved mass 2,5 g (series 420) or 10,6 g (series 499)
Force increase 0,2 N/mm (420) 0,25 N/mm (499)
Highest mechanical frequency 10 Hz
0,025 µm/ °C for series 420 or 0,25 µm/ °C for series 49
0°C to 60°C
-40°C to 60°C
IP40 (IEC 60529)
Series 499 along with a 3,2 mm dia. probe insert (No. 03238403) plus lug (No. 03238013)
Shipping packaging
Identification number

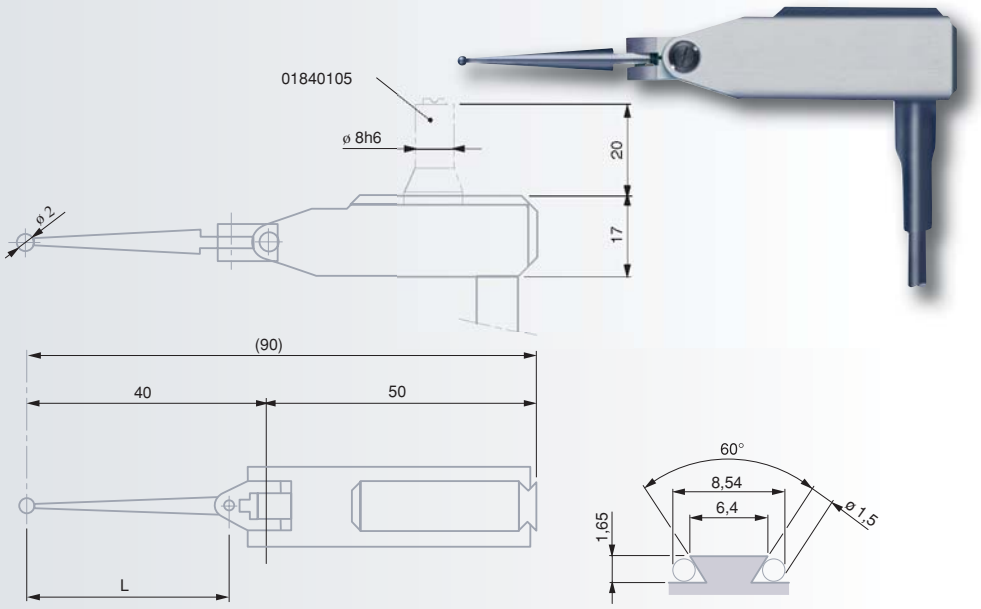
TESA GT 31 Lever Probes

Models with inclinable probe insert for measuring in two directions – Well suited for use where probes with measuring bolt moving lengthwise can not be conveniently operated.

- Ball-bearing balanced lever.
- Interchangeable probe insert fitted with a tungsten carbide ball tip, inclinable through to 180°.
- Automatic reversal of the probing direction while that of the indication remains unchanged.
- Protected against shocks by 2 safety clutches.
- One-piece housing provided with 2 dovetails.

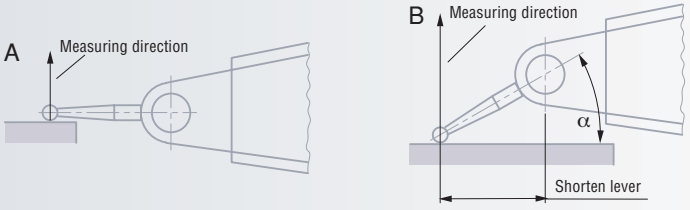
№		Measuring range (mm)	N*
03210802	**GT 31**	± 0,3	**0,1** (standard)
03210801	**GT 31**	± 0,3	**0,02**
03210803	**GT 31**	± 0,3	**0,2**

* Nominal value at electrical zero; max. deviation ± 25%. Valid with both probe housing and lever lying horizontally, as well as in static measuring.



	mm	µm	µm	µm*	Technical data sheets
GT 31	0,7	0,1	0,25	$0,2 + 50 \cdot L^2$	03200266

* Linearity related max permissible errors (L in mm).



Note:
With the insert lying parallel to the workpiece surface (Fig. A), the leverage is 1:1. Therefore, no correction of the measured values is needed.
Any other position (angle α, Fig. B) will change the effective length of the lever, so that read values must be corrected. With regard to this, also report to the instructions for use that came with your electronic probes.

✓

DIN 32876 Part 1

± 0,3 mm

Lever probe usable in any position

2 dovetail attachments. Both lower and upper stops are fixed.

Probe inserts with removable stainless steel shaft. Also with a 2 mm carbide ball tip.

For all other inserts, see under optional accessories on next pages.

2 m long cable.

5-pin DIN 45322 connector.

All-metal housing, matt-chromium finish

Moved mass 12 g

13 kHz (± 5%) feeding frequency. Highest mechanical frequency to 25 Hz

20 ± 0,5°C

5°C to 60°C

80%

IP40 (IEC 60529)

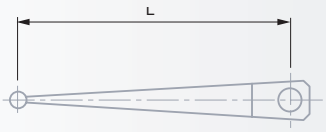
Equipped with a 2 mm dia. probe insert (No. 03260410) plus a 8 mm dia. fixing shaft No. 01840105.

Shipping packaging

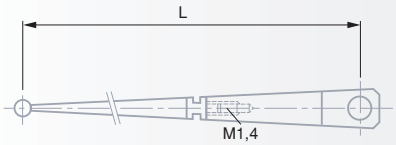
Identification number

Inspection report with a declaration of conformity

Accessories for TESA Probes GT 31

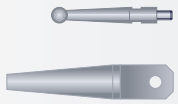


03260410



03590003


03260410


03590003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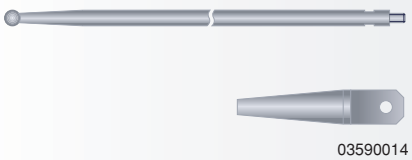
03590001


03590014

Probe inserts

	Ball tip mm	Lever – amplification	Length L in mm
Standard probes with a one-piece shaft			
03260402	1	1 : 1	32
03260410	2	1 : 1	32
03260403	3	1 : 1	32
Special probes with a two-piece shaft			
03590002	1	1 : 1	32
03590003	2	1 : 1	32
03590004	3	1 : 1	32
03590005	4	1 : 1	32
03590006	1	1 : 2	72
03590007	2	1 : 2	72
03590008	3	1 : 2	72
03590009	4	1 : 2	72
03590010	1	1 : 3	112
03590001	2	1 : 3	112
03590011	3	1 : 3	112
03590012	4	1 : 3	112
03590013	1	1 : $\sqrt{10}$	118,49
03590014	2	1 : $\sqrt{10}$	118,49
03590015	3	1 : $\sqrt{10}$	118,49
03590016	4	1 : $\sqrt{10}$	118,49

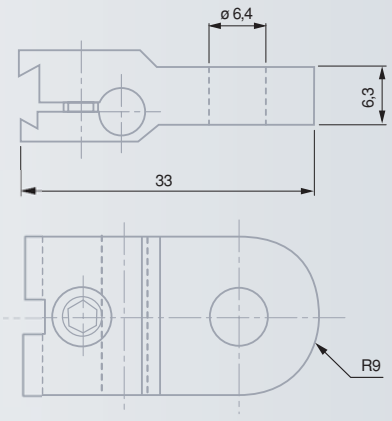
✓ Stainless steel insert holder, tungsten carbide ball tip

Shipping packaging

03240100 **Fixing brackets**
Features both a dovetail and cylindrical bore.

03260414 **Cable for probe constant alteration**
Allows the probe constant to be modified at zero using the probe insert with a 1 mm dia. ball tip.

✓ Shipping packaging



03240100

TESA Universal Probes I-DIM

These probes provide all End-users with the needed versatility for many measuring applications due to their metrological properties.

- Short probe body.
- Adjustable measuring force by moving the electrical zero. Enables parts made from materials of any type to be securely measured, with no distortion.
- Several mounting possibilities.
- Wide choice of probe inserts.
- Possible retraction of the measuring bolt over the pneumatic jack (available as an option).

✓

DIN 32876, Part 1

See in table

Usable in any position

3 tightening alternatives

Leaf spring guiding.

Various clamping possibilities for probe inserts.

2 m long cable.

DIN 45322 connector, 5-pin.

Steel probe insert, light alloy probe body

Moved mass 33 g

13 kHz (± 5%) drive frequency. Highest mechanical frequency 10 Hz.

0,15 µm/ °C

20 ±0,5°C

5 to 60°C

80%

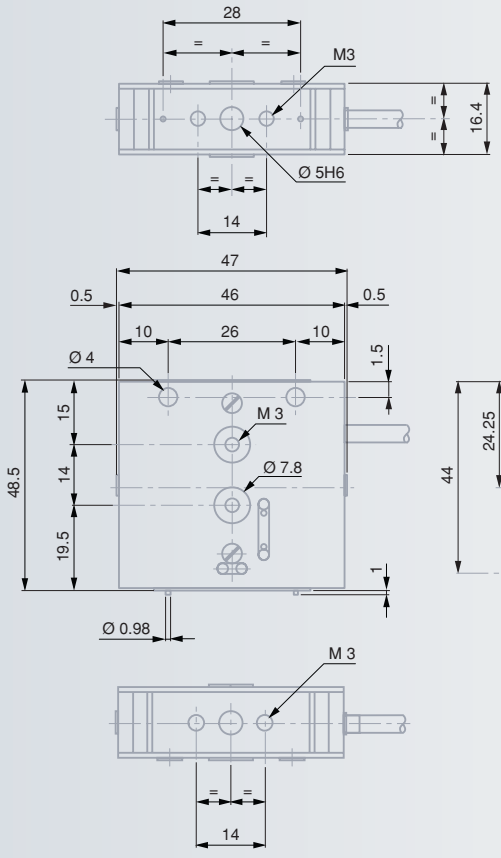
IP40 (IEC 60529)

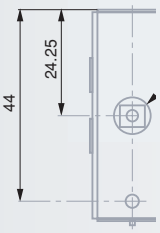
Shipping packaging

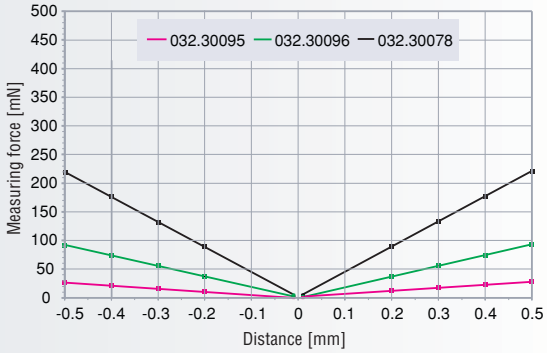
Identification number

Declaration of conformity

№		Measuring range (mm)	N/mm	Measuring bolt retraction (accessory)
03230078	**I-DIM**	± 0,5	0,442	air pressure
03230095	**I-DIM**	± 0,5	0,055	air pressure
03230096	**I-DIM**	± 0,5	0,186	air pressure







	Electrical zero*, adjustable from... mm	to mm	ex-factory mm	mm	µm	µm	µm**	Technical data sheet
I-DIM	–0,5	0,5	0	2	0,01	0,02	0,2 +14 · L^3	03200485

* Distance from the balanced point (F = 0).
** Linearity related max. permissible errors (L in mm).

Accessories for TESA I-DIM Probes

Steel probe insert

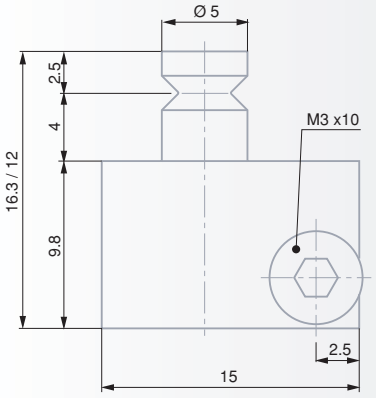
Shipping packaging

I-DIM probe with a pivot probe insert fitted with a ruby ball tip

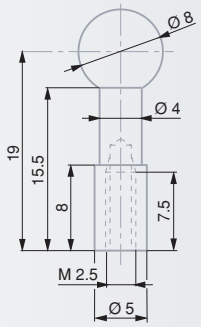
I-DIM probe with clamping shaft and probe insert in tungsten carbide

I-DIM probe with a M2,5 probe insert

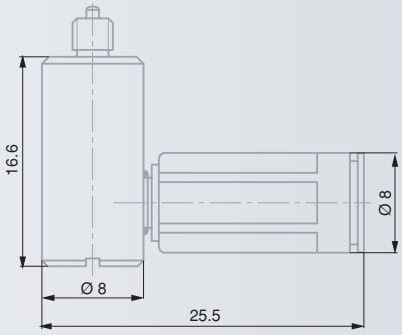
I-DIM probe with pneumatic jack



03260478

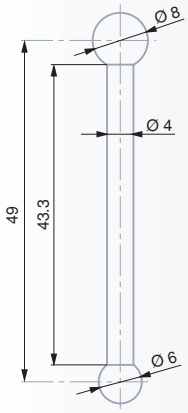


03260482



03260492

03260473	Clamping bracket
01840107	Clamping shaft, 8 mm diameter
03260478	Holder for pivot probe inserts
03260482	Pivot holder for probe inserts with a M2,5 coupling thread
03260492	Pneumatic jack for activating the moving part of the probe



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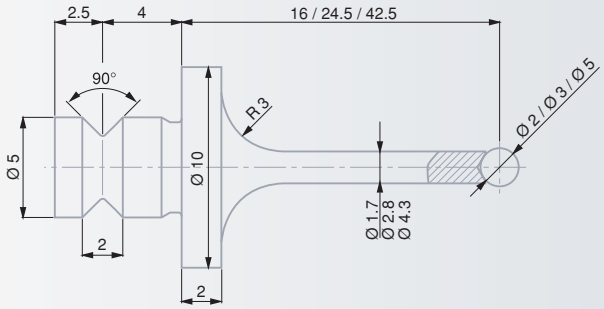
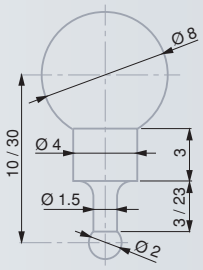


03260475/76/77



03260479/80

Probe inserts

		mm		mm
03260475	Probe insert	2	carbide	
03260476	Probe insert	3	carbide	
03260477	Probe insert	5	carbide	
03260479	Pivot probe insert	2	ruby	10
03260480	Pivot probe insert	2	ruby	30
03260481	Pivot probe insert	6	ruby	49

TESA Probes with Parallel Guiding

Standard, FMS protected and LVDT probes

Universal probes for multigauging devices. Let you capture the values measured on machines or other fixtures for in-process inspection.

- Long-life probes featuring a small-size, rugged design.
- Modular construction to eliminate the need for many assembly components.
- Ball-bearing probe displacement.
- Direction of the probing force and probe retraction mathcing used accessory.
- Wide choice of measuring inserts and supports for optimum adaptation to your measuring job.

Compatible with measuring equipment from other makers (see page N-14).

✓

DIN 32876 Part 1

See in tables

Probes with linear action usable in any position

4 coupling threads M6. Linear ball-bearing guiding with fixed stops.

Insert holder attachment with dovetail.

Cable length: 2 m.

Standard and FMS protected probes including aligning elements for the signals are fitted with a 5-pin DIN 45322 connector.

LVDT probes have no connector and no aligning elements.

Hardened steel probe body, nickel-plated

Moved mass 110 g

13 kHz (± 5%) drive frequency. LVDT probes only: 3 V drive voltage 5 kHz drive frequency 100 kΩ adjustment load

Sensitivity to 150 mV/V/mm

Highest mechanical frequency to 25 Hz

-0,14 µm/ °C or 0,15 µm/ °C for LVDT probes

20 ± 0,5°C

–10°C to 65°C

80%

IP50 or IP54 for protected probes as per IEC 60529

Shipping packaging

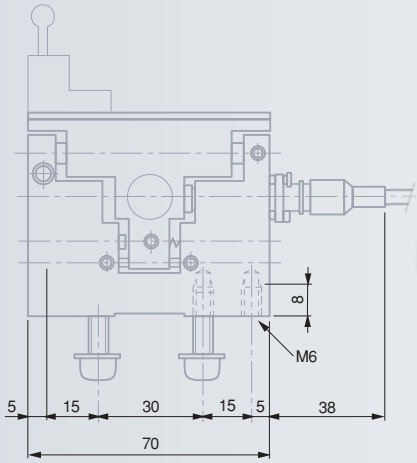
Identification number

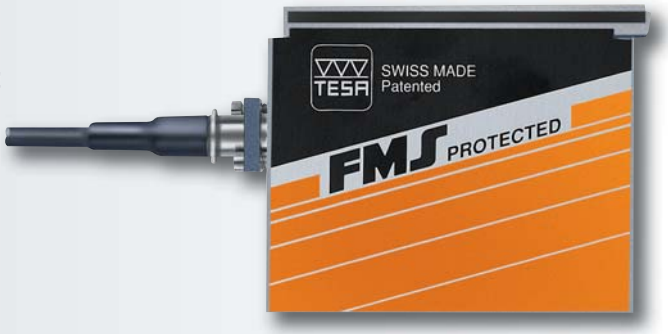
Inspection report with a declaration of conformity

FMS probes with parallel cable exit

		Measuring range (mm)	N*	Measuring bolt retraction (accessory)
Standard probes				
03230019	**FMS 100**	± 2	2	air pressure
03230049	**FMS 130**	± 2,9	2	air pressure
Probes «FMS protected»				
03230037	**FMS 100-P**	± 2	2	air pressure
03230051	**FMS 130-P**	± 2,9	2	air pressure
LVDT probes				
03230033	**FMS 100 LVDT**	± 1,5	2	air pressure
03230039	**FMS 100-P LVDT**	± 1,5	2	air pressure

* Nominal value at electrical zero; max. deviation ± 25%. Valid for probing movement exerted horizontally or in static measuring.





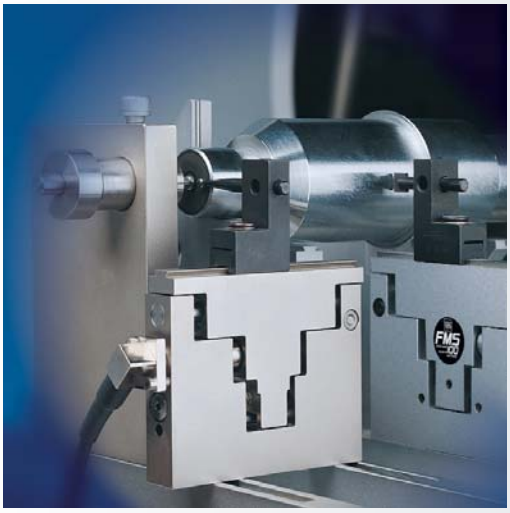
	Mechanical stop** lower mm	upper mm	mm	µm	µm	µm***	Technical data sheets
FMS 100	–2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200253
FMS 100-P	–2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200283
FMS 130	–2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200342
FMS 130-P	–2,9	2,9	5,8	0,5	0,5	$0,2 + 3 \cdot L^3$	03200344
FMS 100 LVDT	–2,9	2,9	5,8	0,5	0,5	4,5****	03200247
FMS 100-P LVDT	–2,9	2,9	5,8	0,5	0,5	4,5****	03200290

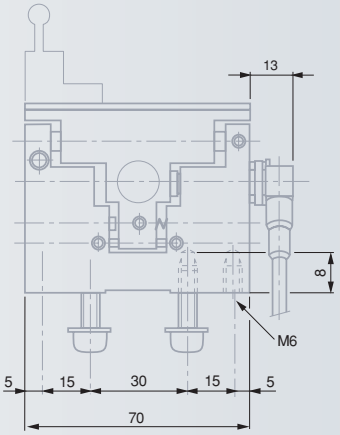
** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).
**** With reference to the measuring span of 3 mm (measuring range ±1,5 mm).

FMS probes with angled cable exit

		Measuring range (mm)	N*	Measuring bolt retraction (accessory)
Standard probes				
03230028	**FMS 102**	± 2	2	air pressure
03230050	**FMS 132**	± 2,9	2	air pressure
Probes «FMS protected»				
03230038	**FMS 102-P**	± 2	2	air pressure
03230052	**FMS 132-P**	± 2,9	2	air pressure
LVDT probes				
03230034	**FMS 102 LVDT**	± 1,5	2	air pressure
03230040	**FMS 102-P LVDT**	± 1,5	2	air pressure

* Nominal value at electrical zero; max. deviation ± 25%. Valid for probing movement exerted horizontally or in static measuring.





	Mechanical stop** lower mm	upper mm	mm	µm	µm	µm***	Technical data sheets
FMS 102	–2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L³	03200254
FMS 102-P	–2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L³	03200289
FMS 132	–2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L³	03200343
FMS 132-P	–2,9	2,9	5,8	0,5	0,5	0,2 + 3 · L³	03200345
FMS 102 LVDT	–2,9	2,9	5,8	0,5	0,5	4,5****	03200248
FMS 102-P LVDT	–2,9	2,9	5,8	0,5	0,5	4,5****	03200291

** Distance from electrical zero. *** Linearity related max. perm. errors (L in mm).
**** With reference to the measuring span of 3 mm (measuring range ±1,5 mm).

✓

DIN 32876 Part 1

See in the tables

Probes with linear action usable in any position

4 coupling threads M6. Linear ball-bearing guiding with fixed stops.

Insert holder attachment with dovetail.

Cable length: 2 m.

Standard and FMS protected probes including aligning elements for the signals are fitted with a 5-pin DIN 45322 connector.

LVDT probes have no connector and no aligning elements.

Hardened steel probe body, nickel-plated

Moved mass 110 g

13 kHz (± 5%) drive frequency.

LVDT probes only:
3 V drive voltage
5 kHz drive frequency
100 kΩ adjustment load

Sensitivity to 150 mV/V/mm

Highest mechanical frequency to 25 Hz

0,15 µm/ °C

20 ± 0,5°C

-10°C to 65°C

80%

IP50 or IP54 for FMS protected probes as per IEC 60529

Shipping packaging

Identification number

Inspection report with a declaration of conformity

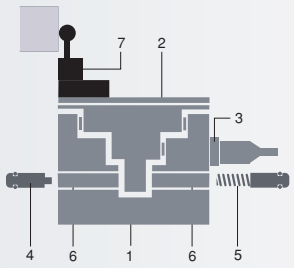
Configuration and Use of TESA FMS Probes

The following examples provide you with a number of possibilities to activate and retract the measuring insert during your measurement cycles.

Example A

- Moving the probe insert toward the part to be inspected using the measuring force produced through the compression spring.
- No insert's retraction.

Effect
The insert remains into position. Exchanging parts is made with mechanical contact of the probe under the measuring force.

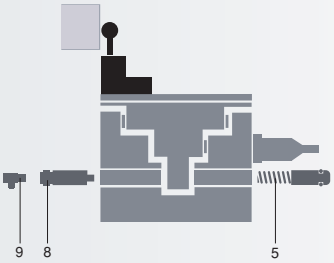


1 *Fixed probe body*
2 *Moving probe body*
3 *Measuring element with fine adjust*
4 *Adjustable stop*
5 *Spring set for the measuring force*
6 *Mounting bores*
7 *Holder for the probe insert*

Example B

- Moving the probe insert toward the part to be inspected using the measuring force produced through the compression spring.
- Insert's retraction by pneumatic pressure.

Effect
Exchanging parts is made with no mechanical contact of the probe.



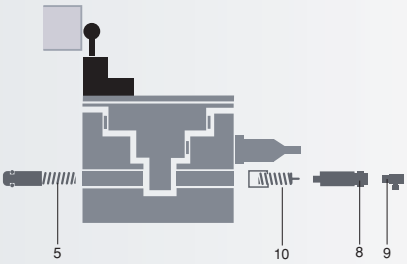
5 *Spring set for the measuring force*
8 *Pneumatic jack, No. 03260440*
9 *Connector (No. 024388, page N-45)*

Example C

- Activating the measuring insert towards the part to be inspected by air pressure using the measuring force produced by the compression spring.
- Insert's retraction by disabling the pneumatic pressure.

Effect
Exchanging parts is made with no mechanical contact of the probe, thus providing absolute security since the probe insert retract itself due to a lack of air pressure.

This configuration is also applied where there is no room on the left side for the pneumatic jack (as shown in the example B).

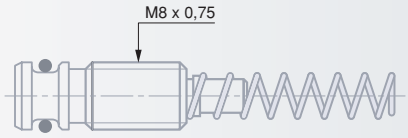


5 *Spring set for the measuring force*
8 *Pneumatic jack, No. 03260440*
9 *Connector (No. 024388, page N-45)*
10 *Auxiliary spring-loaded element, No. 03260445*

The force of the spring set (5) must be equivalent to the force of the auxiliary spring-loaded element (10).

Accessories for TESA FMS Probes

Spring set for the measuring force



Spring set for the measuring force

Examples A to C
Item 5

	N	
*	2,0	nickel-plated
03260448	0,4	red
03260449	0,63	yellow
03260450	1,0	green
03260451	1,6	blue
03260452	2,5	brown
03260453	4,0	black

* Provided with FMS probes

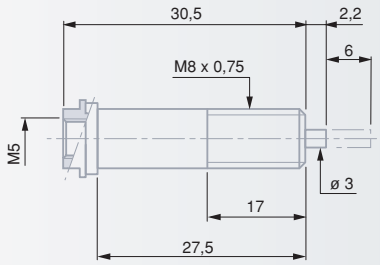
✓
All values given in the table for the measuring force equal nominal values at electrical zero; max. deviation ± 25%. Valid for probing movements exerted horizontally as well as in static measuring.

Shipping packaging

Accessories for Pneumatic Activation of the Moving Probe Body

03260440	**Pneumatic jack** Operates the moving probe body. Force under a pressure of 4 bars = 11 N

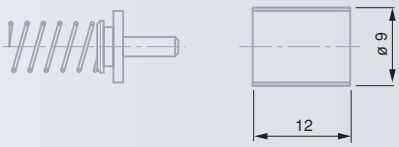
Examples B and C
Item 8



Auxiliary spring-loaded element

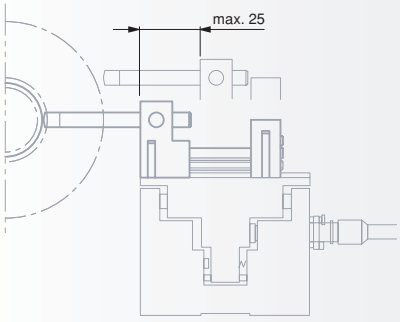
Example C
Item 10

	N	
03260441	0,4	red
03260442	0,63	yellow
03260443	1,0	green
03260444	1,6	blue
03260445	2,0	nickel-plated
03260446	2,5	brown
03260447	4,0	black



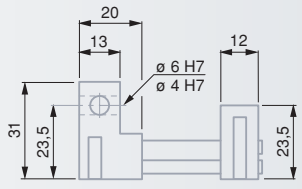
Probe Insert Holder with Fine Adjustment

Helps you to set the probe – Setting and locking screws remain accessible even when several probes are mounted side by side.

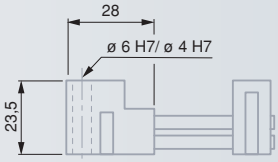


Mounting bores for probe inserts

	mm	Number	Position	mm
02630053	4	2	horizontal	25
02630055	4	1	vertical	25
02630052	6	2	horizontal	25
02630054	6	1	vertical	25



02630052/53



02630054/55

✓
Width of the insert holder. 12 mm

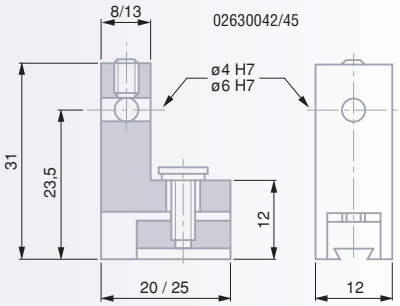
Shipping packaging

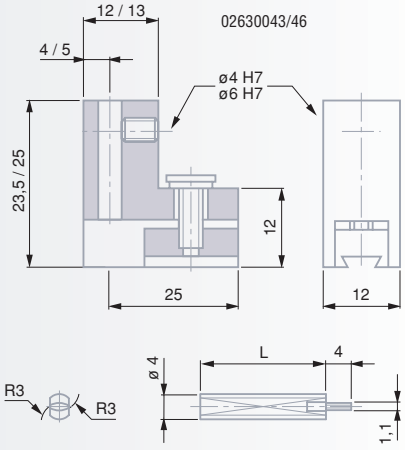
Shipping packaging

Fixed probe insert holder

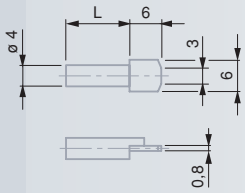
Mounting bores for probe inserts

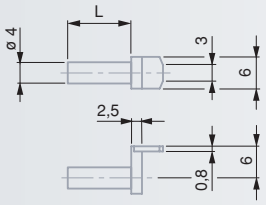
	mm	Number	Position
02630042	4	2	horizontal
02630043	4	1	vertical
02630045	6	2	horizontal
02630046	6	1	vertical





Probe inserts with a 4 mm diameter mounting shaft





Centred probe inserts with a flat, right-angle measuring face

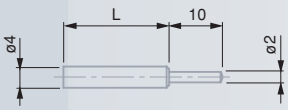
		L mm
02660066	Carbide	12
02660068	Carbide	25

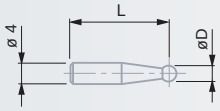
Off-centre probe inserts with a flat, right-angle measuring face

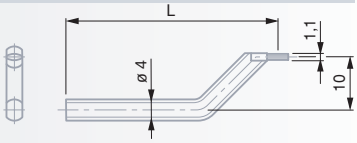
		L mm
02660067	Carbide	12
02660069	Carbide	25

Centred probe inserts with 2 cylindrical measuring faces

		L mm
02660070	Carbide	20
02660071	Carbide	40
02660072	Carbide	60







Probe inserts with a 2 mm dia. contact pin with spherical measuring face

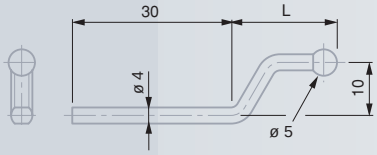
		L mm
02660073	Carbide	20
02660074	Carbide	40
02660075	Carbide	60

Inserts with a tungsten carbide ball tip

	mm	L mm
02660076	3	20
02660077	3	40
02660078	3	60
02660079	5	20
02660080	5	40
02660081	5	60

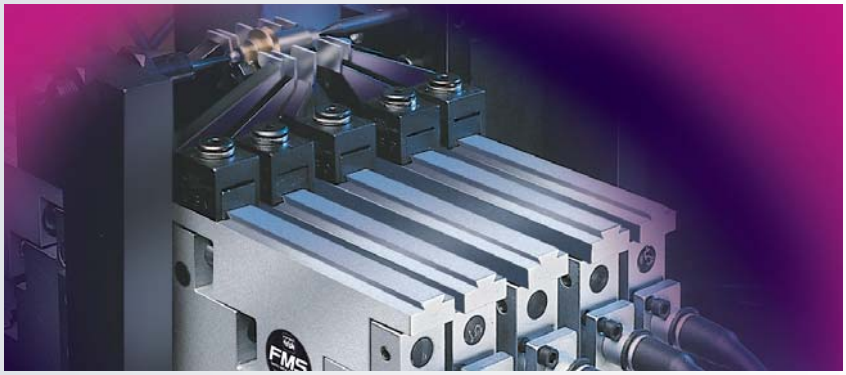
Off-centre probe inserts with 2 cylindrical measuring faces

		L mm
02660082	Carbide	40
02660083	Carbide	60



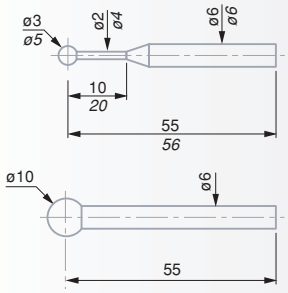
Off-centre probe inserts with a tungsten carbide ball tip

	mm	L mm
02660084	5	20
02660085	5	33
02660086	5	48



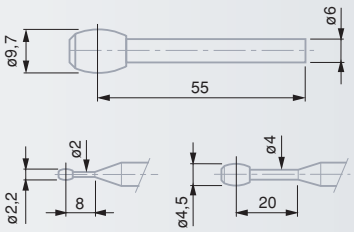
Probe inserts with a 6 mm diameter mounting shaft

Shipping packaging



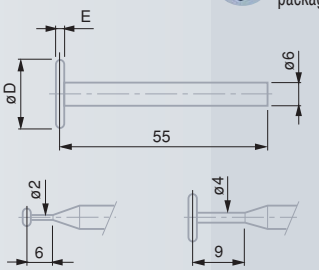
Probe inserts with a carbide ball tip

№	⌀ mm
00760058	3
00760059	5
00760060	10



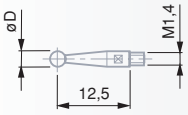
Probe inserts with a barrel-shaped measuring face for cylindrical bores. Also serve for determining the position of internal threads.

№	⌀ mm	For threads
00760066	2,2	M3 ÷ M16
00760067	4,5	M6 ÷ M48
00760068	9,7	M12 ÷ M150



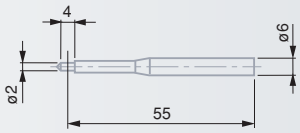
Probe inserts with a tungsten carbide disc for grooves, nuts, centering shoulders etc.

№	⌀ mm	E mm
00760074	4,5	1
00760075	14	2
00760076	19	3



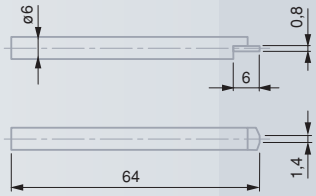
TESATAST probe inserts with a tungsten carbide ball tip. M1,4 mounting thread.

№	⌀ D mm	L mm
01860201	1	12,53
01860202	2	12,53
01860203	3	12,53
01860307	Wrench	



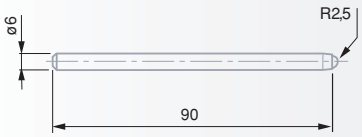
Probe insert with small cylindrical measuring face

№		⌀ mm
00760082	Carbide	2



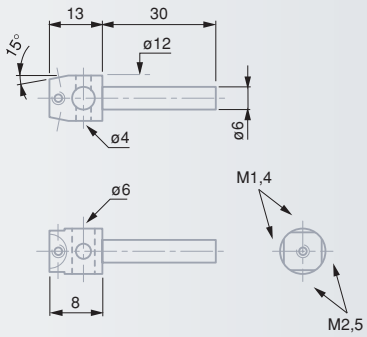
Centred probe insert with a small flat, right- angle measuring face

№		mm
S26074380	Carbide	64



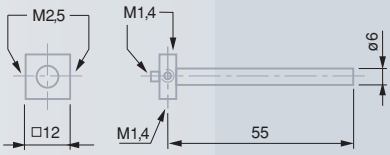
Probe inserts with one flat and one spherical measuring faces

№		mm
025589	Carbide	64



Universal probe insert holder specially designed for various types of clamps

№	
S26074372	1 x Ø 4 mm 1 x Ø 6 mm 2 M1,4 threads 2 M2,5 threads

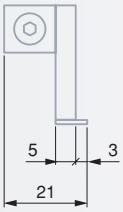


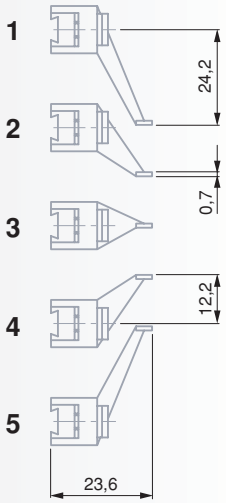
Universal probe insert holder with 2 mounting threads

№	
00760096	M1,4; M2,5

✓ Shipping packaging

Probe inserts with offset measuring face





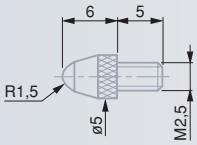
Probe inserts with a flat, right-angle measuring face in tungsten carbide, whether centred or offset

	As shown opposite
02630047	1
02630048	2
02630049	3
02630050	4
02630051	5

✓ Shipping packaging

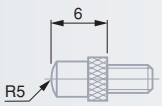
Measuring Inserts for Axial Probes, Dial Gauges and the Like

Models with M2,5 mounting threads



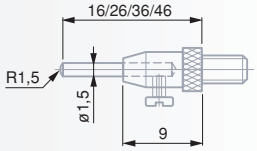
Standard probe inserts with a ball tip

		L mm
03510001	Steel	6
03510002	Carbide	6



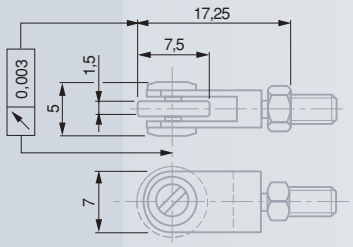
Probe inserts with a spherical measuring face

		R mm
03510101	Steel	5
03510102	Carbide	5



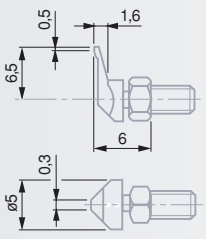
Probe insert with 4 interchangeable steel pins. Spherical face, R = 1,5 mm

		L mm
03510201	Steel	16, 26, 36, 46



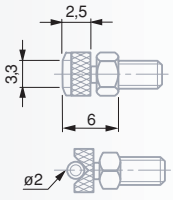
Probe inserts with a ball-bearing steel roller.
Counternut for radial alignment.

		Shape
03560010	Steel	cylindrical
03560011	Steel	domed



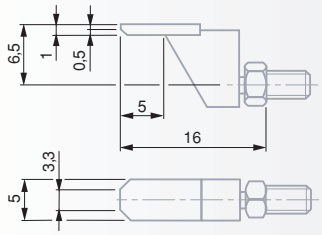
Off-centre probe insert (A) with pointed measuring face.
Counternut for radial alignment.

		A mm
03510401	Steel	6,5



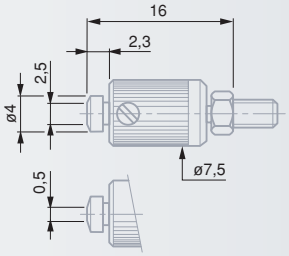
Probe insert with cylindrical measuring face. Counternut for radial alignment.

03510502	Carbide



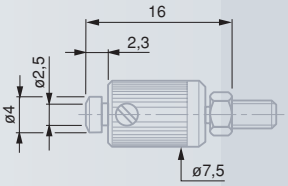
Offset probe insert with a narrow measuring face. Counternut for radial alignment.

		B mm
03510602	Carbide	0,5



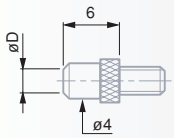
Probe insert with a narrow measuring face, parallel adjustable. Counternut for radial alignment.

		B mm
03510702	Carbide	0,5



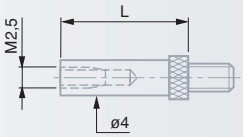
Probe insert with a flat measuring face, parallel adjustable. Counternut for radial alignment.

		mm
03510902	Carbide	2,5



Probe inserts with a flat measuring face

		D mm
03510801	Steel	2,5
03510802	Carbide	2,5
03560022	Steel	3,4
03560023	Carbide	3,4

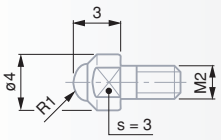


Extensions for probe inserts

	L mm
03540501	10
03540502	15
03540503	20
03540504	40

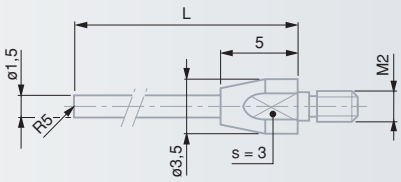
Additional probe inserts as well as extensions with M2,5 coupling thread as listed on the pages E-51 to E-53.

Probe Inserts with a M2 Coupling Thread for GT 43 and GT 44 Miniature Probes as well as Probes with Short Body, Series 160



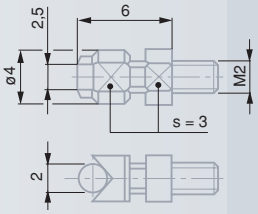
Probe inserts with spherical measuring face. Also with a M2 thread.

		mm
03510204	Carbide	R 1
03510103	Carbide	R 5



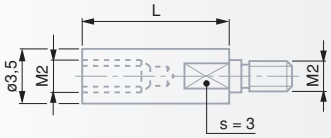
Probe inserts with a spherical measuring face (R5). Also with a M2 thread.

		mm
03510202	Carbide	16
03510203	Carbide	26



Probe insert with cylindrical measuring face. Counternut for radial alignment. M2 thread.

03510503	Carbide



Extensions for inserts with a M2 thread

	L mm
03540505	10
03540506	15

Accessories for TESA Probes

Spring Sets for Axial Probes

No	N
Probes GT 22 and GTL 22	
03260419	0,16
03260420	0,25
03260421	0,40
Probes GT 21, GT 22, GTL 21, GTL 211, GTL 22 plus probe series 490 and 491	
03260457	0,63
03260422	1,0
03260423	1,6
03260424	2,5
03260425	4,0

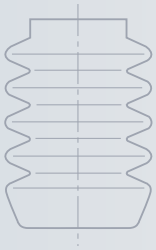
No	N
Probes GT 27, GT 271 and GT 28	
03260458	0,63
03260459	1,0
03260460	1,6
03260461	2,5
Probes GT 61, GT 611 and GT 62	
03260483	0,8
03260463	1,0
03260464	1,6
03260465	2,5

All values given in the table for the measuring force equal nominal values at electrical zero; max. deviation ± 25%. Valid for upright assembly position with downward oriented measuring bolt, as well as in static measuring.

Plastic sleeve marked with force related data

Shipping packaging

Spare Bellows for Axial Probes



Complete set with safety ring and washer

No	
Probes GT 21, GT 22, GTL 21, GTL 211, GTL 22 plus probe series 490 and 491	
03260468	Nitrile
03260470	Viton
Probes GTL 212 and GTL 222	
03260489	Viton

No	
Probes GT 27, GT 271, GT 28, GT 61, GT 611 plus probe series GT 62	
03260491	Viton
Probes GT 272, GT 282, GT 612, GT 622	
03260490	Viton

Bellows supplied individually

Probe series 410 and 451	
19901024	Nitrile
19901026	Viton
Probe series 430	
19901027	Nitrile
19901028	Viton

Probes GT 43 and GT 44	
028845	Nitrile
037608	Viton

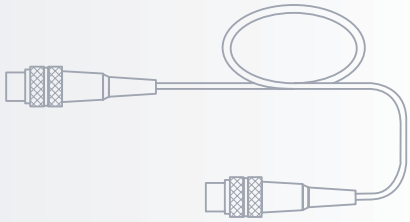
Nitrile: resistant synthetic rubber for normal use.

Viton: high-resistance synthetic rubber used where probes are permanently exposed to cooling and lubricating agents.

Safety rings plus washer.

Shipping packaging

Extension cable



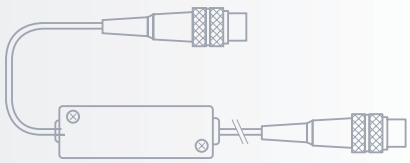
No	m
03240201	1
03240202	2
03240203	3

Other cable lengths available on request

For high accuracy requirements, we recommend to adjust each part of your measuring equipment all together

Shipping packaging

Attenuator Cable



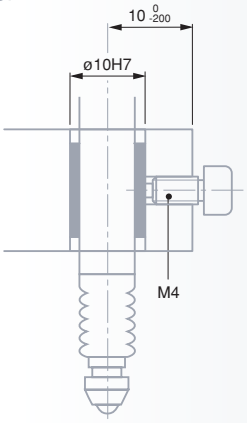
No	Factor	m
03260415	1:2	0,3
03260416	1:3	0,3
03260417	$1:\sqrt{10}$	0,3
03260418	1:10	0,3

Mounted between the probe and the electronic device

Shipping packaging

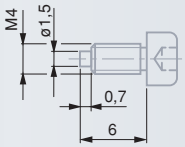
Eléments de serrage pour palpeurs axiaux

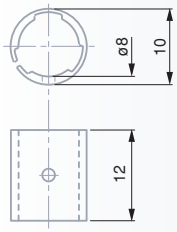
Eléments à 3 faces de serrage – Evitent toute déformation du guide de la tige de mesure qui conserve ainsi toutes ses propriétés métrologiques.



Vis de serrage VKD

N°	
02611013	M4



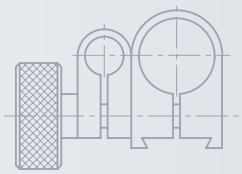


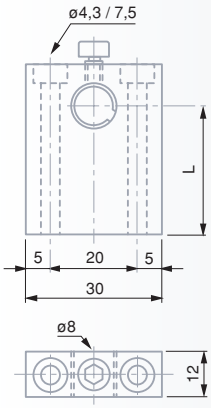
Douille de serrage VKE

N°	Ø mm
02611014	8

Bride de serrage

N°	Points de serrage mm
01860401	Ø 5,6, Ø 9,5 et queue-d'aronde





Elément de serrage VDE avec douille et vis incluses

N°	Ø mm	L mm
02660048	8	28
02660049	8	37

Les dimensions à observer figurent sur le dessin ci-contre

Conditionnement de transport

Systèmes à commande manuelle pour le relevage de la tige de mesure

N°	=	
03540104		**Relevage mécanique**
Composé de:		
03540101		1 levier
03540102		1 rondelle

N°	=	
03260401		**Relevage pneumatique** Convient pour les palpeurs GT 22, 271, 28, 42, 44, 611, 62 – GTL 211, 22 – 491
Composé de:		
		1 pompe à vacuum manuelle
03540405		1 tuyau de 1 m, Ø 4,7 mm

Conditionnement de transport

Hardened and ground steel

Shipping packaging

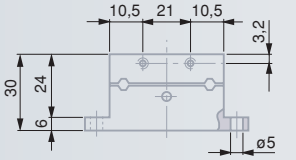
TESANORM Assembly Components

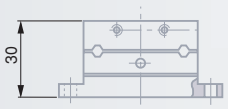
Small coordinate tables with accessories used for measuring centre-to-centre distances of bores or for similar applications – Mounted on roller-bearings for free move in one or two axes – Available in two sizes – Provided with probe holders among others.

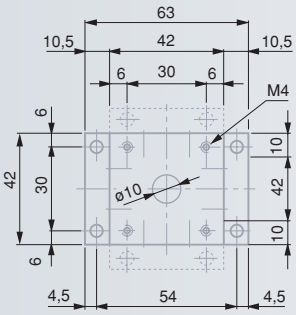
- Model 42 x 42 mm with a 3 mm long travel, for bore diameters from 0,2 to 26 mm.
- Model 62 x 62 mm with a 6 mm long travel, for bore diameters from 26 to 100 mm.

Coordinate tables, 42 x 42 mm

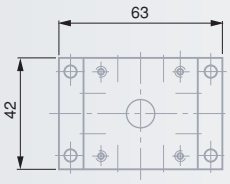
02630001	**VMA**	Coordinate table for 1 axis, 3 mm long travel
02630005	**VOA**	Coordinate table for 2 axes, 3 mm long travel
02630003	**VLA**	Holder for centring heads
02660004	**VQA**	Centring head
02660005	**VQB**	Centring head
02660041	**VUA**	Holder for measuring heads



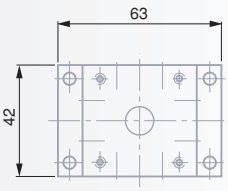




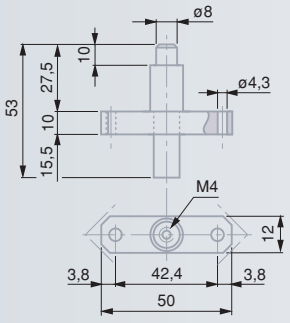
02630001



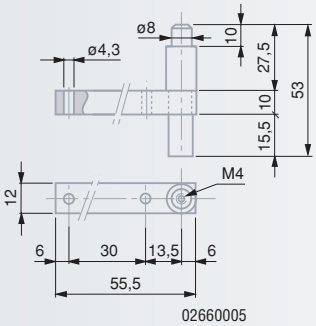
02630005



02630003



02660004



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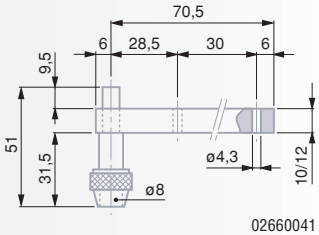


02660041

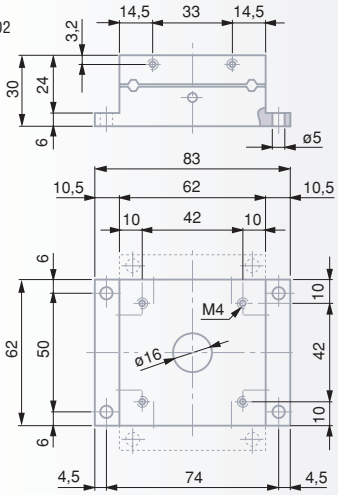
Coordinate table, 62 x 62 mm

02630002	**VNA**	Coordinate table for 1 axis, 6 mm long travel
02630006	**VPA**	Coordinate table for 2 axes, 6 mm long travel
02630004	**VLB**	Holder for centring heads
02660006	**VRA**	Centring head
02660007	**VRB**	Centring head
02660042	**VUB**	Holder for probing heads

Hardened and ground steel

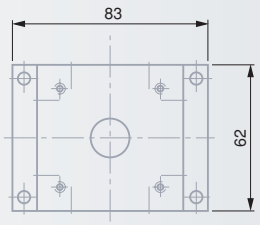
Shipping packaging

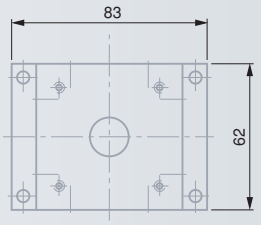
02630002



02630006

02630004





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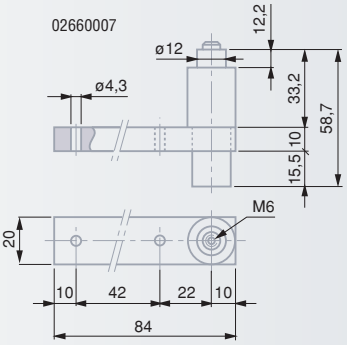
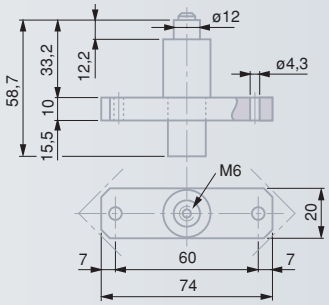


02660006



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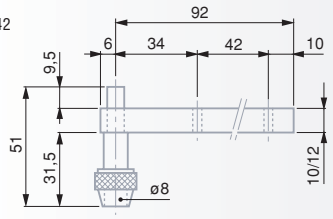
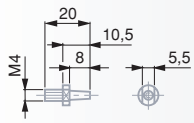


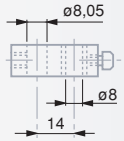
Nº	A	ø mm
02660008	VSA	0,2 ÷ 0,7
02660009	VSB	0,7 ÷ 1,2
02660010	VSC	1,2 ÷ 1,7
02660011	VSD	1,7 ÷ 2,2
02660012	VSE	2,2 ÷ 2,7
02660013	VSF	2,7 ÷ 3,2
02660014	VSG	3,2 ÷ 3,7
02660015	VSH	3,7 ÷ 4,2
02660016	VSJ	4,2 ÷ 4,7
02660017	VSK	4,7 ÷ 5,2
02660018	VSL	5,2 ÷ 5,7
02660019	VSM	5,7 ÷ 6,2
02660020	VSN	6,2 ÷ 6,7
02660021	VSO	6,7 ÷ 7,2
02660022	VSP	7,2 ÷ 7,7
02660023	VSQ	7,7 ÷ 8,2
02660024	VSR	8,2 ÷ 8,7
02660025	VSS	8,7 ÷ 9,2
02660026	VST	9,2 ÷ 9,7
02660027	VSU	9,7 ÷ 10,2

Nº	A	ø mm
02660028	VTA	10,2 ÷ 11,8
02660029	VTB	11,8 ÷ 14,2
02660030	VTC	14,2 ÷ 16,2
02660031	VTD	16,2 ÷ 18,2
02660032	VTE	18,2 ÷ 20,2
02660033	VTF	20,2 ÷ 22,2
02660034	VTG	22,2 ÷ 24,2
02660035	VTH	24,2 ÷ 26,2
02660036	VTJ	26,2 ÷ 28,2
02660037	VTK	28,2 ÷ 30,2
02660038	VTL	30,2 ÷ 32,2
02660039	VTM	32,2 ÷ 34,2
02660040	VTN	34,2 ÷ 36,2
02660050	VTO	36,2 ÷ 38,2
02660051	VTP	38,2 ÷ 40,2
02660052	VTQ	40,2 ÷ 42,2
02660053	VTR	42,2 ÷ 44,2
02660054	VTS	44,2 ÷ 46,2
02660055	VTT	46,2 ÷ 48,2
02660056	VTU	48,2 ÷ 50,2

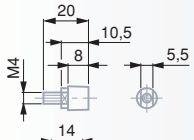
Nº	A	=	= L mm
02630016	VDA	Probe holder	
02630017	VDB	Probe holder	
02630018	VDC	Probe holder	
02660047	VDD	Probe holder	
02660048	VDE	Probe holder	28
02660049			37
02660044	VFB	Spring clamp	
02611010	VKF	Spring	29
02611011			45
02611001	VKA	Rods	50
02611002			75
02611003			100
02611004			125
02611005			150
02611006			175
02611007			200
02630020	VEB	Stops	35
02630021			60
02630022			110
02630023			160

02660008/17





02660018/27



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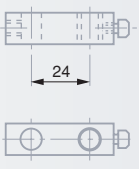
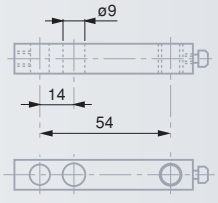


02630017



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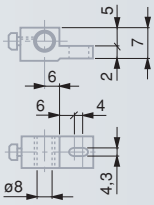

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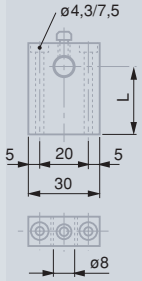
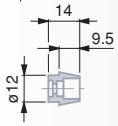
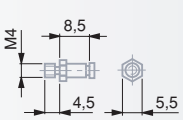




02660028/56



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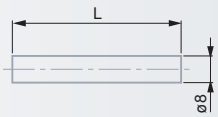
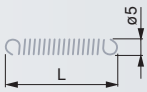
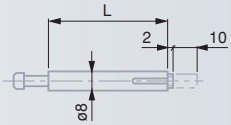


02611001/7



02611010/11



02630020/23

02660048/49

Electropneumatic Systems for Activating the Measuring Bolt

✓

Suited for 20 probes GT 22, 42 and 44 series or max. 10 probes GT 28 and 62.

230 V, 50 Hz

✓

Shipping packaging

✓

230 ± 10% V, switchable to 115 ± 10% V

Needed pressure: 1 to 7 bars

190 x 170 x 310 mm

3,5 kg

✓

Shipping packaging

Electropneumatic vacuum pump

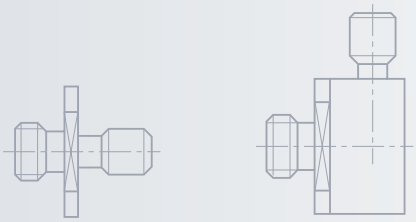
For lifting up to 20 measuring bolts simultaneously with a measuring force up to 0,63 N

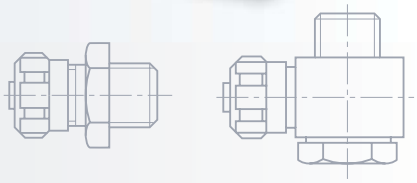
Nº	
03260431	Operated via the built-in push-button or 24 V relay
03260432	Operated via the mains powered foot switch

FMS-C electropneumatic vacuum pump

Uses vacuum or air pressure; allows simultaneous connection of up to 30 TESA probes.
Ideal for use with FMS probes with parallel guiding.

Nº	
03260486	Controlled electrically through a TESA's electronic unit or manually





Air tube connectors for TESA probes GT 22, 271, 28, 42, 44, 611, 62 – GTL 211, 22 – 491

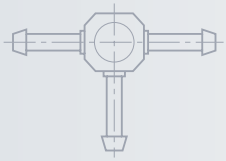
M4 coupling threads; suited for a 4,7 / 2 mm dia. air pipe (No. 03540405)

Nº	Connector type
03560000	straight
03560002	angled

Air tube connectors for TESA FMS probes

M5 coupling threads; suited for a 4,7 / 2 mm dia. air pipe (No. 03540405)

Nº	Connector type
026522	straight
024388	angled



Connecting T-piece

Nº	For air pipe diameter
03540403	Ø 4,7 / Ø 2 mm (Nº 03540405)

Vacuum release delay valve

For controlling the lowering speed of axial probes

Nº	For air pipe diameter
03540404	Ø 4,7 / Ø 2 mm (Nº 03540405)