

TESATRONIC Length Measuring Instruments – General Overview

Dedicated compact units having either an analogue or a numerical display – Usually applied in association with precision handtools or on stationary devices for shop floor inspection and maintenance, but also in the measuring room.



TESATRONIC	TT 10	TT 20	TT 60	TT 80	TTA 20
NP	04430008	04430009	04430010	04430011	04430003
Number of probe inputs – Automatic recognition	1 —	2 ●	2 ●	2 ●	2 —
Number of measuring ranges – Lowest value – Highest value – Zoom function (5x) – Automatic conversion	3 ± 5 µm ± 500 µm ● ●	7 ± 5 µm ± 5000 µm — ●	7 ± 5 µm ± 5000 µm — ●	9 ± 0,5 µm ± 5000 µm — ●	6 ± 3 µm ± 1000 µm — —
Digital display	●	●	●	●	—
Numerical interval – lowest value – highest value	0,1 µm 10 µm	0,1 µm 0,1 µm	0,1 µm 0,1 µm	0,01 µm 0,01 µm	— —
Analogue display	●	●	●	●	●
Scale value – lowest value – highest value	0,1 µm 10 µm	0,2 µm 200 µm	0,2 µm 200 µm	0,02 µm 200 µm	0,1 µm 50 µm
Metric/Inch unit systems	●	●	●	●	●
Value classification – Number of classes – Signal outputs	—	3 ●	up to 42 ●	up to 42 ●	3 ●
Memory	—	—	●	●	—
Digital output	RS 232	RS 232	RS 232	RS 232	—
Analogue output	—	—	●	●	●
Power supply	Batteries	Adapter	Adapter	Adapter	Mains

TESATRONIC TT 10

Pocket-sized, battery-operated electronic unit for use on the move – Perfect for your measurement tasks on the surface plate, in the inspection room right next to the production floor or directly on the machine – Provides full portability where there's no room for cumbersome power cable.

- Simple-to-use function keys used in conjunction with the combined analogue/digital indication providing easy reading.
- LCD, pointerless display for high repeatability and negligible hysteresis.
- 3 measuring ranges, switchable manually or automatically depending on the size of the measured value.
- Metric and inch conversion.
- Additional signal amplification (5x) for easy display setting.
- Quick zero-setting through to digital technology.
- Signal input for one probe.
- Opto-coupled RS 232 compatible digital output.



DIN 32876 Part 1

66 x 57 mm LC display

9 x 4,5 mm

Response time of display \leq 100 ms. Hold time \geq 100 ms

Zero drift* $\leq \pm 0,005\%$ / °C. Frequency limit of display based on the signal input: 10 Hz

Max. indication error*: 2%

± 1 numerical interval

Opto-coupled RS 232 compatible output

3,5 V to 4,5 V, 3 batteries, type LRC 6, 1,5 V, AA.

Power consumption: ≈ 7 mW/3,5 V

Self-controlled voltage fluctuation.

Drive voltage of the probe: 0,7 V

Drive frequency: $13 \pm 0,65$ kHz

0°C to 60°C

-10°C to 70°C

80%, with no condensation

IP42 (IEC 60529)

EN 50081-1, EN 50081-2, EN 50082-1, EN 50082-2

95 x 170 x 68 mm (W x D x H)

490 g (incl. batteries)

Shipping packaging

Identification number

Declaration of conformity

* With reference to 20°C as well as a relative humidity of $\leq 50\%$.



04430008



TESATRONIC TT 10

Electronic measuring unit with both analogue and numerical display; 3 measuring ranges, switchable from metric to inch; 1 probe input; RS 232 data output.

Provided with following accessories:

04768002 3 batteries, 1,5 V, type LRC 6, AA

04460007 1 Visual template for value classification

Measuring ranges with numerical intervals

	Zoom function	Used for	μm	μm	in	in
1	without 5 x	measuring setting	± 500 ± 100	10 2	± 0.025 ± 0.005	0.0005 0.0001
2	without 5 x	measuring setting	± 50 ± 10	1 0,2	± 0.0025 ± 0.0005	0.00005 0.00001
3	without	measuring	± 5	0,1	± 0.00025	0.000005



TESATRONIC TT 20, TT 60 and TT 80

Feature most advanced technology – Provide functional reliability – Simple to use – Essential for shop floor inspection or in the measurement laboratory.

TESATRONIC TT 20

Includes a combined analogue/numerical display – Two probe inputs for single, sum or difference measurements.

- Large LC display for error-free reading.
- Better repeatability and negligible hysteresis as the analogue display has no mechanical pointer.
- Choice between pointer or bargraph.
- All measuring functions are readable on the LC display.
- 7 measuring ranges, selectable manually or automatically according to the size of the measured value.
- Direct conversion from metric to inch units.
- Zeroing with just one touch button for each measuring channel.
- Setting of tolerances over the keyboard.
- 3 quality classes displayed through LEDs with control signal outputs.
- Lockable display for step by step measurement routines.
- Automatic recognition of the connected TESA's probe with direct adaptation of the measurement signals to the right output (only for TESA probes made in 1997 or later).
- Opto-coupled RS 232 output, bidirectional.
- Power supply through mains adapter.



TESATRONIC TT 60

Same features as TESATRONIC TT 20, but with added functions that include:

- Memory for retaining extreme values «max.», «min.», «max.-min.» along with mean value obtained from «max.» minus «min.».
- Dynamic measurement with acquisition of more than 100 single values/s.
- Value classification with output signals through contact relay for 5, 10, 20 or 40 good classes.
- Remote signal processing using the analogue output.

TESATRONIC TT 20, TT 60, TT 80



DIN 32876 Part 1

126 x 62 mm LC display

110 mm scale length

50 scale divisions

2,2 mm

6-decade display plus minus sign

12,5 x 6,6 mm

Zero drift plus drift of the signal amplification*: $\leq \pm 0,005\%/^{\circ}\text{C}$.

No drift for registered values.

± 1 numerical interval

RS 232 opto-coupled output

6,5 Vdc up to 7,3 Vdc.

Consumption: 2 W

Self-controlled voltage fluctuation.

Drive voltage of the probe: 3 V

0°C to 60°C

-10°C to 70°C

80%, non-condensing

Resistant plastic

IP54 for the front face only (IEC 60529)

EN 50081-1, EN 50081-2, EN 50082-1, EN 50082-2

255 x 235 x 120 mm (W x D x H)

1,1 kg

* With reference to 20°C as well as a relative humidity of $\leq 50\%$.



Shipping packaging



Identification number



Declaration of conformity

Additional data on TESATRONIC TT 20



Response time* of analogue display with pointer and digital display: ≤ 80 ms.

Holding time of digital display: 80 ms



Frequency limit for all displays with reference to the signal input: 12,5 Hz



Limit value* for analogue display: $\leq 2\%$.

Digital display and output: $\leq 0,3\%$



Dive frequency $13 \pm 0,65$ kHz

Additional data on TESATRONIC TT 60



Response time* of analogue display with pointer and digital display: ≤ 80 ms.

Holding time of digital display: 80 ms.

Response time of analogue signal output with reference to the analogue display: ≤ 30 ms.

Response time of the LEDs used for value classification: ≤ 80 ms



Frequency limit for all displays with reference to the signal input: 12,5 Hz

Frequency limit with reference to the signal input: 20 Hz for the analogue output or 100 Hz for the memory



Limit value* for analogue display: $\leq 2\%$.

Digital display, analogue and digital outputs: $\leq 0,3\%$



Voltage range: ± 2 V up to ± 10 V

* With reference to 20°C as well as a relative humidity of $\leq 50\%$.



04430009



TESATRONIC TT 20

Electronic length measuring unit with both analogue and digital display; 7 measuring ranges, switchable from metric to inch; value classification with 1 good class; signal output through contact relay; 2 probe inputs; RS 232 data output.

04430010

TESATRONIC TT 60

Same features as model TT 20, but with added memory; dynamic measuring and signal output through contact relay for 5, 10, 20 or 40 good classes; analogue output.

Delivery includes the following items:

04761054 1 Mains adapter, 110 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA

04761055 1 Adapter cable EU

Optional accessory

Adapter for 5, 10, 20 or 40 classes available on request



Measuring ranges along with scale divisions or numerical intervals (TESATRONIC TT 20 and TT 60)

± 5000	0,1	200	± 0.200	0.000005	0.01
± 2000	0,1	100	± 0.100	0.000005	0.005
± 500	0,1	20	± 0.02	0.000005	0.001
± 200	0,1	10	± 0.01	0.000005	0.0005
± 50	0,1	2	± 0.002	0.000005	0.0001
± 20	0,1	1	± 0.001	0.000005	0.00005
± 5	0,1	0,2	± 0.0002	0.000005	0.00001



TESATRONIC TT 80

Electronic measuring unit with high resolution – Fitted with a combined analogue/digital display – Provided with 2 probe inputs for single, sum as well as difference measurements.

Same features as TESATRONIC TT 20, but with the following added functions:

- 9 measuring ranges with numerical interval to 0,01 μm or 0.000001 in.
- Memory for storing extreme values «max.», «min.» and «max.-min.» plus mean of both values «max.» and «min.».
- Dynamic measurement with acquisition of more than 10 single values/s.
- Value classification with output signals through contact relay for 5, 10, 20 or 40 good classes.
- Remote signal processing using the analogue output.



Output current: $\leq 2 \text{ mA}$
 Permissible adjustment load: $\geq 5 \text{ k}\Omega$
 Residual ripple (with probe at zero point): $\leq 1 \text{ mV}$
 Reference voltage level: analogue earth 0 V

Drive frequency: 13 $\pm 0,65 \text{ kHz}$

Additional data on TESATRONIC TT 80

Response time of the analogue/digital display as well as the classification LEDs: $\leq 100 \text{ ms}$

Holding time of digital display: 100 ms

Response time of the signal of analogue output with reference to analogue display: $\leq 30 \text{ ms}$

Frequency limit for all types of display as well as the memory with reference to the signal input: 10 Hz

Limit values*: 2% for analogue display

0,15% for digital display

0,3% for analogue output

0,15% for digital output

Voltage range: $\pm 2 \text{ V}$ to $\pm 10 \text{ V}$

Output current: $\leq 2 \text{ mA}$
 Permissible adjustment load: $\geq 5 \text{ k}\Omega$

Residual ripple (with probe at zero point): $\leq 1 \text{ mV}$
 Reference voltage level: analogue earth 0 V

Drive frequency: 13 kHz $\pm 0,5\%$

* With reference to 20°C as well as a relative humidity of $\leq 50\%$.



04430011

TESATRONIC TT 80

High-resolution electronic length measuring unit provided with combined analogue/digital display; 9 measuring ranges, switchable from metric to inch; value classification with 1 good class; signals output through contact relay for 5, 10, 20 or 40 good classes; value storage memory; dynamic measuring capability; 2 probe inputs; RS 232 interface with analogue output.

Delivered with the following accessories:

04761054 1 Mains adapter, 110 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA

04761055 1 Adapter cable EU

Optional accessory

Adapter for 5, 10, 20 or 40 classes available on request

Measuring ranges along with scale divisions or numerical intervals (TESATRONIC TT 80)

μm	μm	μm	in	in	in
± 5000	0,01	200	± 0.200	0.000001	0.01
± 2000	0,01	100	± 0.100	0.000001	0.005
± 500	0,01	20	± 0.02	0.000001	0.001
± 200	0,01	10	± 0.01	0.000001	0.0005
± 50	0,01	2	± 0.002	0.000001	0.0001
± 20	0,01	1	± 0.001	0.000001	0.00005
± 5	0,01	2	± 0.0002	0.000001	0.00001
± 2	0,01	0,1	± 0.0001	0.000001	0.000005
$\pm 0,5$	0,01	0,02	± 0.00002	0.000001	0.000001

TESATRONIC TTA 20

Compact design with analogue indication and value classification facility – Aluminium housing for harsh shop floor environment – Easy Handling.

- Easy-to-read analogue display with mirror strip in order to avoid parallax error.
- 6 measuring ranges.
- Metric/Inch conversion.
- Easy display setting through electrical zero.
- 2 probe inputs for single, sum or difference measurements.
- 1 auxiliary signal input, e.g. for all correction values.
- LEDs for signalling the relevant quality class with green for «Good», yellow for «Rework» and red for «Scrap».
- Potentiometer for setting limit deviations.
- Polarity selector switch for the classification signals (internal or external dimensions).
- Switch for locking or unlocking a displayed value.
- Analogue output for the connection of a remote displaying or scribing unit.



DIN 32876
Part 1

≈ 100 mm
scale length

Response
time:
≤ 1 s (display),
20 ms (analogue output),
10 ms (output signal of
classification)

Zero drift*
≤ ± 0,005%/ °C
Frequency limit*:
1 Hz (display)
50 Hz (analogue output)
30 Hz (value classification)

Limit value*:
1,5% (display),
0,3% (analogue
output).

Negligible for
display or 5%
for classification
signals).

Voltage: ± 1V,
output current
≤ 3 mA, perm.
adjustment load ≥ 2 kΩ.

Residual ripple (at zero):
≤ 1 mV.

Reference voltage level:
analogue earth (0 V)

230 or 115 V
-10% to 20%,
50 to 60 Hz

Power consumption:
≤ 20 VA

Drive voltage of
probe:
1,5 V_{eff} -10% to 5%

Drive frequency:
13 ± 0,65 kHz

0°C to 50°C

-10°C to 70°C

IP40
(IEC 60529)

EN 50081-1,
EN 50081-2,
EN 50082-1,
EN 50082-2

258 x 190 x
158 mm
(W x D x H)

3,4 kg

Shipping
packaging

Identification
number

Declaration
of conformity

* With reference to 20°C
as well as a relative
humidity of ≤ 50%.



04430003

TESATRONIC TTA 20

Electronic length measuring unit with analogue display; 6 measuring ranges; switchable from metric to inch; value classification with 1 good class; signal output through contact relay; 2 probe inputs.

Supplied with either of the following cables depending on the country where goods are to be delivered (must be specified on ordering):

03160015 Mains cable fitted with SEV connector, 3-wire cable type, 2 m long

03160016 Mains cable fitted with VDE connector, 3-wire cable type, 2 m long

03160017 Mains cable without connector, 3-wire cable type, 2 m long

Optional accessory

04460004 15-pin connector for the analogue output and classification signal

Measuring ranges along with scale divisions

± 1000	50	± 0.1	0.005
± 300	10	± 0.03	0.001
± 100	5	± 0.01	0.0005
± 30	1	± 0.003	0.0001
± 10	0,5	± 0.001	0.00005
± 3	0,1	± 0.0003	0.00001



TESA TT 300 and MERCER EL 300

The best choice for series inspection – Instantaneous measuring and displaying through colour signals – Value classification with green, amber and red – High-contrast diode chain offering fast and sure reading even at a great distance – Alphanumeric display providing detailed measurement results – Vast range of programmable functions – Digital and analogue interfaces – Signal outputs for the control functions.

- Allow a direct connection of 2 or 4 electronic probes or any plug gauge with built-in probe such as TESADIA.
- Choice of 6 measuring ranges either self set or selected by the user.
- PRESET facility enabling values such as the nominal or actual size of setting standards to be entered.
- Signal combinations in sum or difference measurements, programmable.
- Added features such as selectable digital filters used for the displayed values, also programmable.

Executions with memory for one single inspection characteristic

- Used for both static and dynamic measuring.
- Computing functions «max.», «min.», «max.-min.» as well as mean of both values «max.» and «min.» for value storage.
- Value classification with one good class. Possible entry of tolerances as well as control limits.

Executions for multi-gauging with four inspection characteristics

- Automatic switch-over and recognition or manual switching from one measuring point to another (maximum 4 points).
- Value classification with 1 good class. Possible entry of tolerances as well as control limits for each single characteristic.

Executions with possible classification of up to 30 good classes for one inspection characteristic

- Input of a desired number of good classes along with both LSL and USL specification limits related to the entire tolerance range.



DIN 32876 Part 1

Analogue and digital display as shown in the table



Automatic or selectable display range based on the size of the tolerance field with enabled value classification

254 mm long

100 LEDs (3 colours) 1,75 x 5 mm each (L x I)

Alphanumeric, red colour LED display with 6 signs (7 segments per sign)

7 x 3,2 mm (H x L)

Analogue display with colour LEDs green, red and amber for classification once 4 size limits have been entered.

2 or 4 probe inputs plus 2 DC signal inputs depending on the model. Polarity signs: (+) positive and (-) negative. Besides single measurement, combining the signals in sum or difference measurement is also possible.

Amplification factors for the signal inputs: 0,01 ... 99,99

Response time of the analogue/digital display and outputs with classification included: ≤ 100 ms with a max. perm. error of $< 0,1\%$ for extra measuring deviations.

Max. perm. error of digital display: $\pm 0,5\%$ with reference to 20°C and $\leq 50\%$ relative humidity

Zero drift: $< 0,004\%$ / $^\circ\text{C}$. Drift of the signal amplification: $< 0,008\%$ / $^\circ\text{C}$.

RS 232

Sensitivity of analogue input/output: 1,525 V/mm
Voltage: $\leq \pm 5$ V
Output current: ≤ 3 mA
Adjustment load: ≥ 2 k Ω

100 to 250 Vac,
47 to 60 Hz
Power
consumption: 5,5 VA

0°C to 50°C

-10°C to 70°C

80%,
non-condensing

Painted
aluminium
housing with
acrylic front plate.
Integrated keypad with
touch keys

IP50
(IEC 60529)

EN 50081-2,
EN 50082-2

45 mm wide,
370 mm high,
102,5 mm in
depth, column base and
rear-mounted sockets
not included

0,65 kg

Provided with
base and two
M3 x 6 tightening
screws for safe positioning
of the tool unit

Shipping
packaging

Identification
number

Declaration
of conformity



TESA TT 300 and MERCER EL 300 Length Measuring Instruments

With analogue and digital display, 6 measuring ranges, metric/inch selection, classification with tolerances as well as control limits. Also with both analogue and RS 232 digital outputs.



Number of signal inputs
Probe DC

Executions with memory for one single inspection characteristic

04030002	04036002	2	2
04030004	04036004	4	-

Executions for multi-gauging with four inspection characteristics

04030012	04036012	2	2
04030014	04036014	4	-

Executions with classification of up to 30 good classes for one inspection characteristic

04030022	04036022	2	2
04030024	04036024	4	-

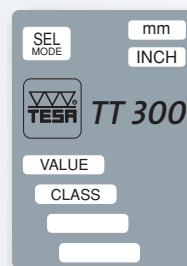
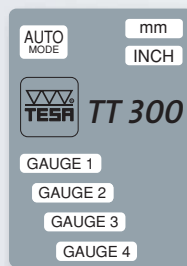
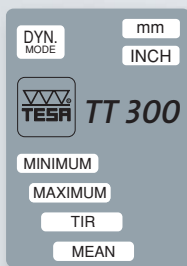
Supplied with either of the following cables depending on the country where goods are to be delivered (must be specified when ordering):



03160015	Mains cable fitted with SEV connector, 3-wire cable, 2 m long.
03160016	Mains cable fitted with VDE connector, 3-wire cable, 2 m long.
03160017	Mains cable without connector, 3-wire cable, 2 m long.

Optional accessories

S40040021	OC3 Open Collector Adapter, low level. Consists of a plug-in module with outputs for open collector and built-in suppression LEDs for inductive load.
S40040022	OE3 Open Emitter-Adapter, high level. Consists of a plug-in module with outputs for open collector as well as positive output voltage.
S40040520	OP3 Opto Coupler Adapter. Consists of a plug-in module with opto-coupled outputs as well as a Trigger input.
S40040521	CA2 Adapter with pins and potentiometer for connecting one column to the other (only for the version fitted with 2 analogue inputs/outputs).
S40040023	Hand switch, protection degree to IP65
S40040024	Hand switch, protection degree to IP32 (IEC 60529)
S40040025	Hand switch, protection degree to IP65 (IEC 60529)
04761052	Connection cable TT 300/PC or TESA PRINTER SPC; 9-pin/m/9-pin/f



Measuring or display ranges along with scale divisions or numerical intervals

± 1500	30	1, 0,1	± 0.1500	± 0.0590	0.0030	0.0001, 0.00001
± 500	10	1, 0,1	± 0.0500	± 0.0500	0.0010	0.0001, 0.00001
± 150	3	1, 0,1	± 0.0150	± 0.0150	0.0003	0.0001, 0.00001
± 50	1	1, 0,1	± 0.0050	± 0.0050	0.0001	0.0001, 0.00001
± 15	0,3	1, 0,1	± 0.0015	± 0.0015	0.00003	0.0001, 0.00001
± 5	0,1	1, 0,1	± 0.0005	± 0.0005	0.00001	0.0001, 0.00001





TESA Data Printer, Portable

Intelligent printer designed for the inspection of finished parts or incoming goods – Provides SPC statistics and prints measurement results with graphical representations.



TESA PRINTER SPC

Can be connected to TESA measuring instruments as well as those provided with a DIGIMATIC output – TESA PRINTER SPC is able to recognise the connected tool and will execute an automatic configuration.

	 «Normal»	 «Tolerance»
Statistical features		
Lower limit of size (LSL)	–	●
Upper limit of size (USL)	–	●
Tolerance	–	●
Number of captured values:		
– sampling extent	●	●
– < lowest size	–	●
– > highest size	–	●
– out of tolerances in per-cent	–	●
Lowest list value	●	●
Highest list value	●	●
Value dispersion R	●	●
Arithmetical mean \bar{x}	●	●
Standard deviation σ_n, σ_{n-1}	●	●
Process capability C_p, C_{pk}	–	●
Graphical Representations		
Position of each single value within the tolerance range (10 classes)	–	●
Histogramme	–	●
Display (luminous LEDs)		
Sorting of each single value with green for <i>Good</i> , yellow for <i>Rework</i> red for <i>Reject</i>	–	●

- Memory capacity: 9999 single values for one feature per sample.
- Two operating modes: «Normal» and «Tolerance».
- Limits of size quickly set on the display of the connected instrument with subsequent transfer to TESA PRINTER SPC.
- Output of statistical values that are further printed with graphical representations.
- Printing of report headings that will be completed by the operator.
- Hardcopies printed in preferred language (English, German, French, Italian or Spanish).
- Self-contained printer unit, battery-powered for use on the fly (optional).



Matrix printer using thermal paper roll

Paper width: 110 mm.
Print mode: 40 signs/line

RS 232 for data inputs (9-pin male, trapezoid connector)

DIGIMATIC (Anslay connector, 10-pin)
Connector with mini-jack for remote triggering of data transfer

Mains adapter 230 Vac, 7,3 Vdc.
Optional accessory: 6 V battery pack, rechargeable

10°C to 40°C

-10°C to 60°C

IP40 (IEC 60529)

EN 50081-1, EN 50081-2, EN 50082-1, EN 50082-2

180x180x84 mm (W x D x H)

0,55 kg

Shipping packaging

Identification number

Declaration of conformity



06430000

TESA PRINTER SPC

Printer with SPC capability, value classification and memory; prints all results with graphical representations using the matrix printer provided with a 110 mm wide thermal paper roll; RS 232 interface.

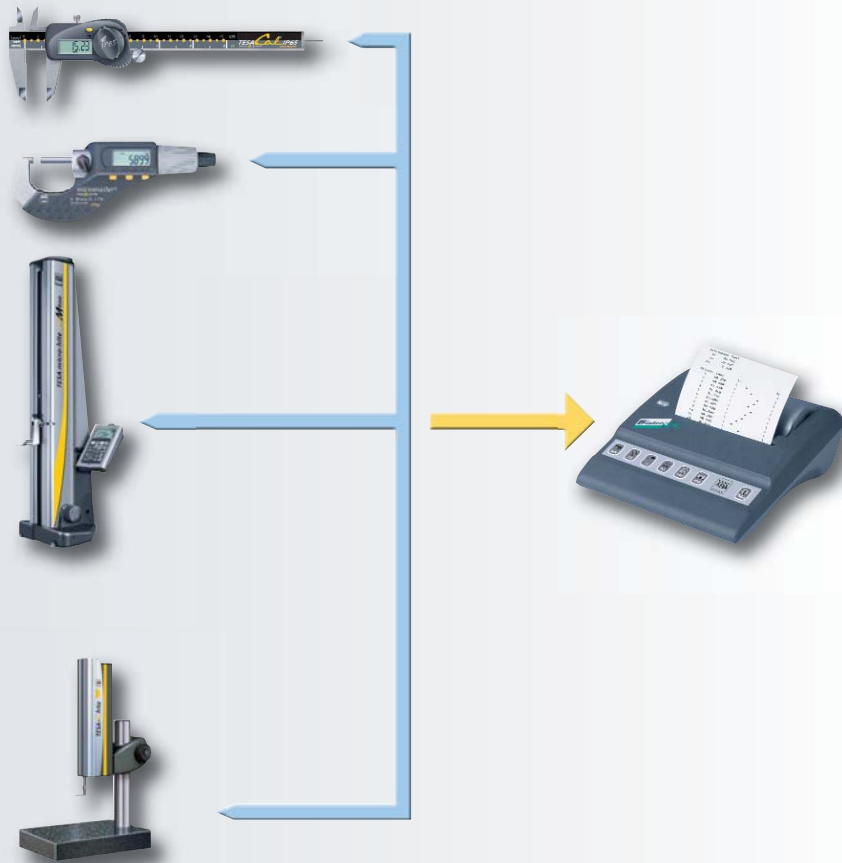
Supplied with the following accessories:

- 04765013 1 Thermal paper roll, 110 mm in width
- 04761054 1 Adapter 100 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA
- 04761055 1 EU adapter cable EU

Optional accessories

- 04768035 Battery pack, 6V
- 04761056 US dapter cable

For ordering information on connection cables etc., see page N-66.



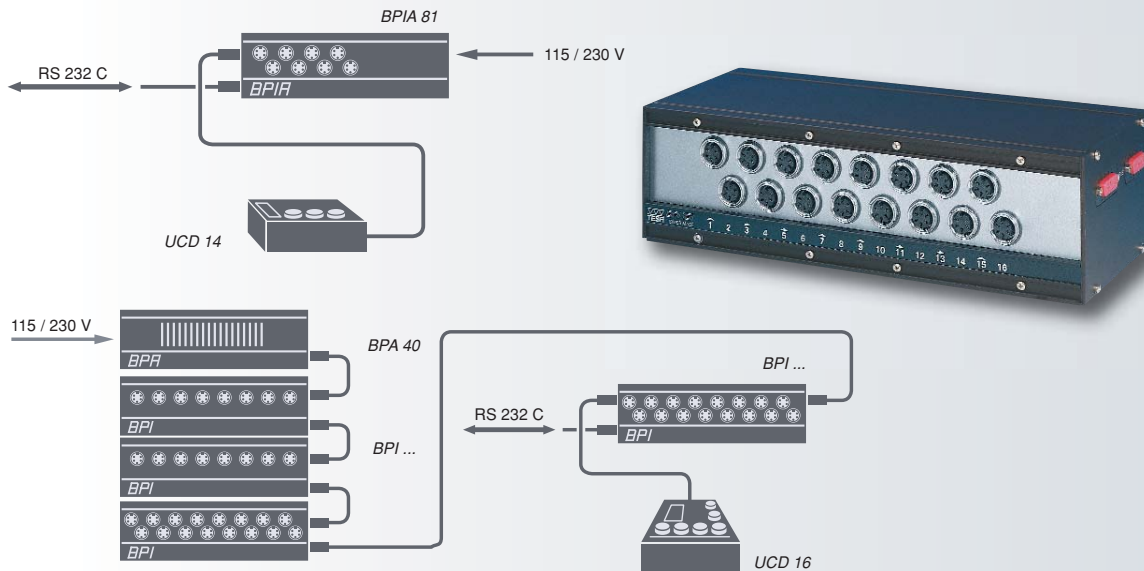
TESA Probe Interface Boxes

Modular system that consists of three basic models acting as probe interfaces for the preparation and further transmission of the measurement signals to a computer, whether in their digital or analogue form – All models are key components for multigauging fixtures applied in centralised process control.

BPI Series

Signal inputs – TESA standard probes (half-bridge)
Signal outputs – RS 232 digital outputs

- Direct connection to the computer's serial port.
- Programmable operating functions over the integrated microprocessor.
- Possible connection of up to 64 probes for optimum adaptation to your metrology applications.
- High functional reliability and precision.
- Total immunity to negative environmental effects, e.g. electrical interferences, liquid and solid contaminants.



RS 232

2 mm, 0,2 mm

1 µm, 0,1 µm

± 0,3% with reference to each measuring span

7 ms per probe or 0,2 ms per probe for BPI 88

Housing cases in anodized aluminium except for stackable BPIA 81

0°C to 40°C

-10°C to 70°C

95%, non-condensing

IP51 (IEC 60529)

EN 50081-1
EN 50082-2

Shipping packaging

Identification number

Declaration of conformity



Number of probe inputs

Number of control inputs/outputs



Integrated power supply

05030004	BPIA 81 Probe interface box	8	6/8	●
05030007	BPIA 81-N Probe interface box	8	1/-	●
05030001	BPI 81 Probe interface box	8	6/8	—
05030002	BPI 161 Probe interface box	16	6/8	—
05030003	BPI 88 Probe interface box with quick signal processing in both static and dynamic measuring	8*	6/8	—
05031000	BPA 40 Power unit for 1 up to 4 interfaces BPI 81, BPI 161 and BPI 88			

* Each measurement signal includes a demodulator.

BPIA 81	6 / 8	220 ÷ 240 Vac, 100 ÷ 120 Vac, 50 ÷ 60 Hz, 25 VA	94 x 322 x 134	2,5
BPIA 81-N	1 / –	230 Vac ^{+10/-15%} , 115 Vac ^{+15/-25%} , 50 ÷ 60 Hz	97 x 320 x 155	3
BPI 81	6 / 8	Durch BPA 40	94 x 322 x 134	2,1
BPI 161	6 / 8	Durch BPA 40	94 x 322 x 134	2,1
BPI 88	6 / 8	Durch BPA 40	94 x 322 x 134	2,1
BPA 40		115 ÷ 230 Vac ± 20%, 50 ÷ 60 Hz, 140 VA	94 x 322 x 134	2,4

Accessories for BPI series

05033000	BAP 10	Extension for digital outputs with positive logic		
04866009	BSF 10	Stacking set for BPI 81, BPI 88 and BPI 161 interface boxes		
05061001	BSF 20	Stacking set for both BPA 40 and BPIA 81 power units		
Connection cable				
05060007	BPI – BPI		0,3	
05060008			2	
05060003	BPI – PC		2	25 / 9
05060002			5	25 / 9
05060004			10	25 / 9
05060005	BPI – PC		2	25 / 25
05060001			5	25 / 25
05060006			10	25 / 25



Highly resistant plastic housing cases

3 m cable length

125 x 160 x 205 mm for UCD 16.
75 x 200 x 120 mm for UCD 14.

1,3 kg (UCD 16)
1,1 kg (UCD 14)

IP65 for UCD 14 (IEC 60529)

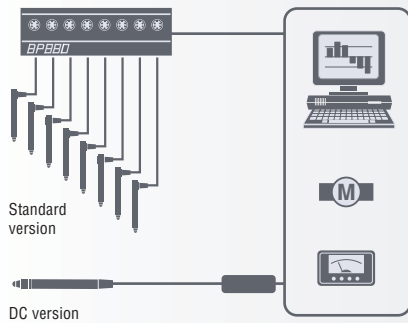


S50078033	UCD 16	Remote control unit for 4 electronic devices; functions: Start 1 to 4 incl. cancellation plus plausibility test; 3 lamps for value classification.
05062000	UCD 14	Remote control unit for 1 electronic device; functions: Start/Stop plus cancellation; 5 lamps for value classification.



BP 880 series

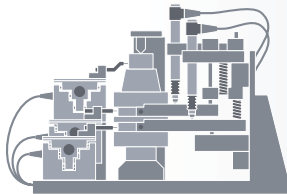
- Signal inputs – TESA standard probes (Half-bridge)
 Signal outputs – analogue outputs
- Allow the connection of up to 8 probes



No		Number of probe inputs
04890001	BP 880 Probe interface with multiplex output.	8
04890002	BP 880-Z Probe interface with multiplex output plus zeroing card.	8
04890000	BP 880-SP Probe interface for enhanced accuracy. Also with zeroing board	8
<i>Accessory</i>		
04866009	BSF 10 Stacking set for interfacing units	

M4P-2 series

- Signal inputs – TESA standard probes (Half-bridge)
 Signal outputs – analogue outputs
- System for connecting 32 TESA standard probes
 - Can be linked to a PC through the A/D transducer



No			mm	kg
S48001721	M4P-2	Probe interface <ul style="list-style-type: none"> • 4 probe inputs with a demodulator included • Sensitivity: 73,75 mV/V/mm • Analogue outputs: ± 1 V/mm, $\pm 2,5$ V/mm, ± 5 V/mm and ± 10 V/mm 	36 x 100 x 120	0,6
S48001722	R2M-1	Rack housing including 2 M4P-2 probe interfaces <ul style="list-style-type: none"> • 2 x 4 = 8 probe inputs 	55 x 212 x 144	0,9
S48001723	R4M-1	Rack housing including 4 M4P-2 probe interfaces <ul style="list-style-type: none"> • 4 x 4 = 16 probe inputs 	160 x 212 x 144	1,2
S48001724	MA4-2	Power unit <ul style="list-style-type: none"> • 230 \pm 10% Vac, 50 Hz • Output voltage: ± 15 V for 32 probes 	85 x 222 x 146	1,1
S48001731	MA4-2	Power unit <ul style="list-style-type: none"> • 110 \pm 10% Vac, 60 Hz • Output voltage: ± 15 V for 32 probes 	85 x 222 x 146	1,1
<i>Accessories</i>				
S48001725	CB37-1	Connection cable to host computer, 2 m long. Provided with two connectors, 37-pin male/female		

- ± 10 V with reference to the measuring range
- $\pm 0,3\%$ or $\pm 0,025\%$ for BP 880-SP (each referring to the measuring span)
- $\leq \pm 250$ ppm/ $^{\circ}$ C
BP 880-SP = $\leq \pm 100$ ppm/ $^{\circ}$ C
- ± 15 Vdc $\pm 5\%$, $\leq \pm 250$ mA
- 15 $^{\circ}$ C to 40 $^{\circ}$ C
- 10 $^{\circ}$ C to 70 $^{\circ}$ C
- 30% to 80% (non-condensing)
- IP50 (IEC 60529)
- EN 50081-1
EN 50082-2
- 322 x 134 x 93,5 mm
- ≈ 2 kg
- Shipping packaging
- Identification number
- Declaration of conformity

- $\pm 0,5\%$ with reference to the measuring span
- $\leq \pm 100$ ppm/ $^{\circ}$ C, stability at zero = $\leq \pm 0,2$ μ m/ $^{\circ}$ C
- ± 10 to ± 15 Vdc, 60 mA
- 15 $^{\circ}$ C to 40 $^{\circ}$ C
- 10 $^{\circ}$ C to 70 $^{\circ}$ C
- 30% to 80% (non-condensing)
- IP50 (IEC 60529)
- Shipping packaging

TESAMODUL precision measuring unit



Technical data and other details available on request

Calibration probes



73,75 mV/mm dummy probes (half-bridge).
Suited for equipment having the following features:
Frequency to 13 ±0,65 kHz.
Voltage 3 ±0,015 Veff (2 symmetrical voltages of 1,5 Veff).
Impedance:
≤ 0,2 Ω (output) or 2000 Ω, (input).



Input impedance
970 ±50 Ω
(13 kHz) or 2150 ±50 Ω (standard 0 μm)
Phase at 13 kHz: 71 ±2°.
Input resistance:
100 ±5 Ω.



Output impedance at 13 kHz: 1000 ± 2 Ω.
Phase at 13 kHz: 0,2 °
±3 ppm/°C.
Ageing:
± 30 ppm/a
20 ±0,5 °C, stabilisation time = 8 h



10°C to 35°C
-10°C to 70°C



Calibration:
40% to 60%.
Operating:
20% to 80%.
Storage: 5% to 95%.
Non-condensing.



18 mm dia.,
118 mm long
≈ 45 g



IP40 (IEC 60529)
Inspection report

Calibration devices

Designed for calibrating and setting TESA length measuring equipment fitted with standard TESA inductive probes (half-bridge).

Calibration of TESA inductive probes

The regular system consists of the following components:

- 1 Precision TESAMODUL No. S41077248.
- 1 Set of calibration probes No. S41077249 with nominal values of ±0 μm, ±100 μm and ±1000 μm.
- 1 Measuring support such as INTERAPID UP 160 (No. 01639041) equipped with the UPZ 40 measuring table (No. 01640405).
- 1 Set of gauge blocks, accurate to calibration grade K (see section I).
- 1 Precision digital voltmeter, min. 5 1/2 digits.



S41077248 TESAMODUL precision unit

Consisting of:

- 1 Measuring unit 429
- 1 Power unit 122, 500 mA



Calibration of measuring instruments

Calibration probes available as single or in sets



	μm	in	Marked with
S41078077	± 0		03270700
S41078078		± 0	03270708
S41078079	± 3		03270704
S41078231	± 5		03270714
S41078080	(± 7,62)	± 0.0003	03270709
S41078081	± 10		03270705
S41078229	± 19		03270720
S41078082	(± 25,4)	± 0.001	03270710
S41078083	± 30		03270706
S41078331	± 50		03270715
S41078084	(± 76,2)	± 0.003	03270711
S41078228	± 100		03270701
S41078230	± 190		03270717
S41078086	(± 254)	± 0.01	03270712
S41078087	± 300		03270707
S41078332	± 500		03270716
S41078088	(± 762)	± 0.03	03270713
S41078751	± 1000		03270702
S41078752	± 1900		03270719

Calibration Probes

Also called «Dummy Probes», these probes serve as resistance dividers producing a given length dimension, electrically simulated with high accuracy.

The whole system provides both positive and negative values. All those given in the table are matching nominal values. These products, which have been adequately calibrated, come with an inspection report that shows the values (actual values) as measured during calibration with related uncertainty of measurement.

Their connection to the instrument replaces that of a regular probe. Calibration and setting operations, if needed, are subject to a number of criteria that must be respected. For a further information with regard to this, refer to the instruction manual or ask for our specialists.



Set of 3 calibrating standards

S41078227	± 3	± 30	± 300
S41077249	± 0	± 100	± 1000
S41000429	± 30	± 300	± 1000

Set for calibrating TESATRONIC

S41078654	± 190	± 1900
S41078612	Cable for analogue output	

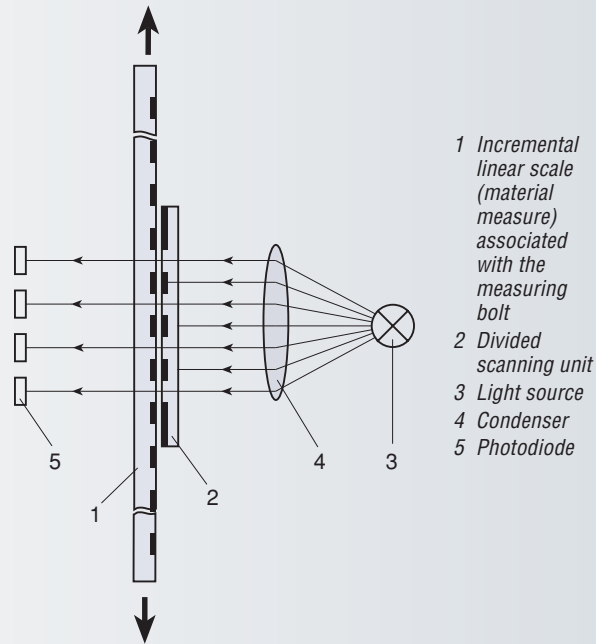


The way they work

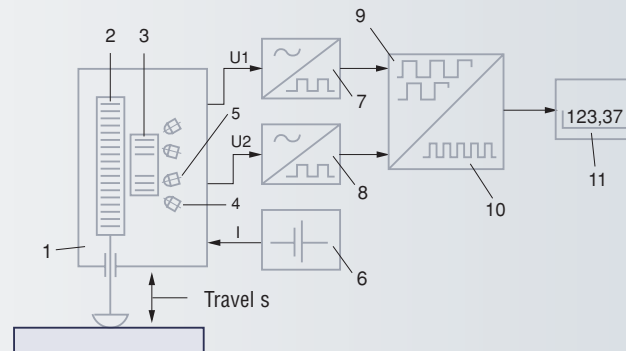
All electronic length measuring systems shown in this part of our catalogue work on the basis of value sensors in the form of digital probes with axial displacement. These probes generate the digital capture of measured physical quantities (i.e. measurands), which are changing as the incremental linear scale lying in front of the scanning unit and fitted with a reticle is moved. Divisions on both features are identical. The opto-electronic detection of these changes uses transmitted light.

Optical material measures are made up of quality glass gratings with a number of divisions distributed over the entire length. These divisions consist alternately of lines and blanks, which represent each individual increment. The distance from line to line or blank to blank is the dividing period, e.g. 20 µm or 40 µm.

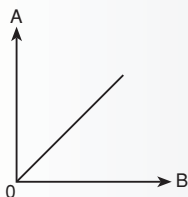
As the gratings of both the scale and reticle are moved in relation to one another, the opaque divisions on the scanning reticle are covered alternately by the lines and blanks on the linear scale, which serves as material measure. This provides a bright/dark information, which is then converted into electrical signals. After their analogue/digital conversion, these signals are shown on the computing counter as the sum of counting impulses equal to the amount of changes of the measured quantity. So as to increase the resolution that results from the dividing periods, the probe signals are split by the electronics (interpolation).



- 1 Incremental linear scale (material measure) associated with the measuring bolt
- 2 Divided scanning unit
- 3 Light source
- 4 Condenser
- 5 Photodiode



- 1 Probe housing
- 2 Linear scale divided into increments
- 3 Divided reticle
- 4 Light source
- 5 Photodiodes
- 6 Power supply
- 7 Conversion of U1 signal
- 8 Conversion of U2 signal
- 9 Signal scanning
- 10 Multiple evaluation of the signal (interpolation) plus direction discriminator
- 11 Numerical display



Typical linearity where digital capture of the measurands is based on incremental linear scales.

A Counting impulses
B Travel



TG Computing Counter



DIN 32876 Part 2

Up/down counter with one probe input

LC display with illuminated colour background for value classification with green, amber and red.

37 x 37 mm display size. 6 decades plus minus sign

0.001 mm and 0.0005 mm or 0.00001 in.

For probes from another maker with dividing periods of 10 µm = 0,0002 instead of 0,0005 mm or of 2 µm = 0,0001 instead of 0,0005 mm

9 x 4,5 mm

According to chosen tolerance range

40 mm scale length

25

20 keys available for entering values and selecting functions. Power supply 5 Vdc (measuring system).

Output: ± 5 ± 1 % Vdc depending on selected tolerance range.

Max. excess voltage: 25% in relation to ± 5 Vdc

Output impedance: < 100 Ω

Resolution: 12 bits

RS 232, bidirectional

Power supply: 7 Vdc. Power consumption: 0,3 A

10 °C to 40 °C

-10 °C to 50 °C

80%

IP40 (IEC 60529)

Continued on next page

TESA TG Digital Measuring System

Ideal for long measuring travels – Incremental probes with a 30 or 60 mm measuring span – Numerical display to 0,001 or 0,0005 mm – Analogue display with illuminated colour background for value classification – Value storage – PRESET function – To name just a few.



TESA TG - C 10 or TG - C 11 Computing Counter



NO

=

04630004 TESA TG - C10 computing counter

Up/down computing counter with numerical display*, resolution to 0,001 and 0,0005 mm or 0.00001 in. Features 1 probe input. Also with value classification and value storage capabilities. RS 232 data output.

04630009 TESA TG - C10 computing counter (HEIDENHAIN)

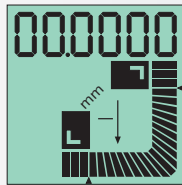
Same execution as above, but compatible with HEIDENHAIN probe MT-1201/2501 only*.

Each unit is supplied with the following accessories:

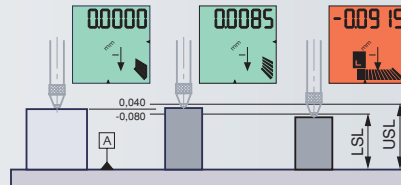
- 04761054** 1 mains adapter 110 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA
- 04761055** 1 EU adapter cable

* Compatible with equivalent HEIDENHAIN probes with same connector shape and signal.

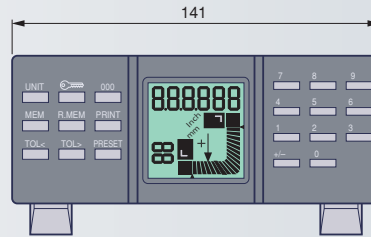
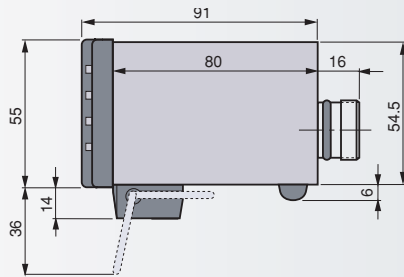
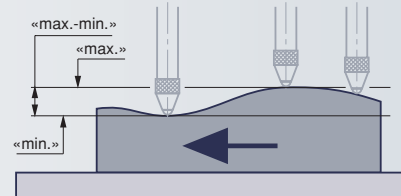




Input of the lower and upper specification limits (LSL and USL)



Digital capture of both extreme values «max.» and «min.» along with the difference between «max.-min.» in dynamic measurement



EN 50081-1,
EN 50081-2,
EN 50082-1,
EN 50082-2

TG - C10
≈ 650 g

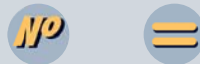
Shipping packaging

Identification number

Declaration of conformity



TESA TG 30 and TG 60 Digital Probes



Digital Probes*

Axial probes with incremental glass scale

04630006 **TESA TG 30**
30 mm measuring span

S46060525 **TESA TG 30**
30 mm measuring span. Also with rubber bellow.

04630007 **TESA TG 60**
60 mm measuring span

Each probe is supplied with the following item:

01960005 1 Retract lever for the measuring bolt

* Compatible with equivalent HEIDENHAIN probes with same connector shape and signal.



TG probe



DIN 32876 Part 2

Axial probe usable in any position. Measuring bolt guided on a plain bearing.

Probe insert with M2,5 mounting thread.

Measuring bolt retraction:

- mechanical retraction, see under standard accessories
- pneumatic retraction, see table

4,3 mm dia. x 3 m cable. Max. cable extension 10 m.

Incremental glass scale

0,002%/ °C

10°C to 40°C

-10°C to 50°C

80%, non-condensing

IP54* (IEC 60529) *probe housing only

5 ± 10% Vdc

Output signal ± 11 µApp, sinusoidal

Shipping packaging

Identification number

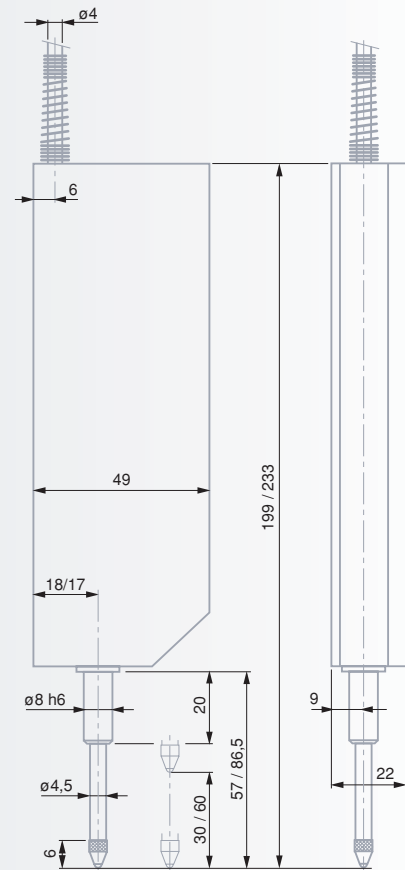
Inspection report

Declaration of conformity

TESA electronic probes		TG 30	TG 60
	mm	30	60
	mm	30,4	60,4
	µm	20	40
	µm	1,0	2,0
	µm	1,0	1,0
	µm	1,0	1,0
	Close to		
	- lower stop of the measuring bolt*	N 0,85	N 0,90
		N ± 0,15	N ± 0,20
	- upper stop of the measuring bolt*	N 1,10	N 1,45
		N ± 0,20	N ± 0,25
	Force hysteresis*	N 0,1	N 0,15
	Max. transverse force	N 2,0	N 2,0
	Pneumatic retraction of the measuring bolt by vacuum or air pressure		
	Position of use		**
	- vertical	bar 0,55 ÷ 0,70	bar 0,60 ÷ 0,75
	- horizontal	bar 0,42 ÷ 0,57	bar 0,52 ÷ 0,67
	- vertical (in suspension)	bar 0,30 ÷ 0,45	bar 0,45 ÷ 0,60
		m/s 1,4	m/s 2,0
	Moved mass	g 350	g 365
		g 28	g 27

* Applicable with the probe used in vertical position with downward oriented measuring bolt, as well as in static measuring.

** TG 60 cannot be used with compressed air.



Optional accessories



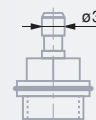
Connectors for lifting the measuring bolt by vacuum

01960009 Suitable for TESA TG 30 (No. 04630006)

01960008 Suitable for TESA TG 60 (No. 04630007)

Connector for lifting the measuring bolt by air pressure

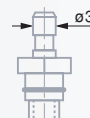
01960010 Suitable for TESA TG 30 (No. 04630006)



01960009



01960008



01960010



TESA- μ HITE Height Gauge

Compact design providing ease of handling and versatility – Made for workpiece inspection close to the production area. Specially suited for measuring those parts which often vary in both their type and their shape.

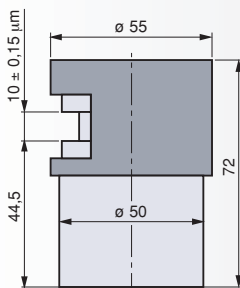
Motor-driven measuring bolt ensuring a constant measuring force at each probing point.

Easy-to-use control panel, which includes all the capabilities to make your measurements easier.

No	=				
		mm		in	
00730049	TESA-μHITE height gauge	0 ÷ 160		0 ÷ 6.3	
<i>Consisting of the following components</i>					
00760203	1 TESA measuring stand, with granite measuring table, 200 x 300 x 50 mm				
00730054	1 TESA-μHITE electronic measuring system				
<i>Including:</i>					
No	=				
		mm		in	
00730050	1 TESA- μ HITE value sensor	100		4	
00760204	1 Control panel. Connected to TESA- μ HITE			0,001 0,0001	0.0001 0.00001
00760191	1 Connecting cable TESA- μ HITE to Control panel				
00760195	1 Probe insert holder, axial for probe inserts with a M2,5 thread				
03510002	1 Probe insert with a 3 mm dia. tungsten carbide ball tip				
00760197	1 Probe insert with a 5 mm dia. tungsten carbide ball tip and offset point				
00760192	1 Master piece for determining probe constant, 10 mm/0.39370 in				
04761054	1 Mains adapter, 110 to 240 Vac/50 to 60 Hz				
04761055	1 Cable EU for mains adapter				
038407	1 Suited plastic case				

Accuracy

No				
	μ m	in	μ m	in
Position of the contact point relative to the axis of the measuring bolt				
– coaxial	1,0	0.00005	0,5	0.00002
– offset	2,0	0.0001	1,0	0.00004
With used the standard accessory.				



For further details, see pages M-19 to M-24.



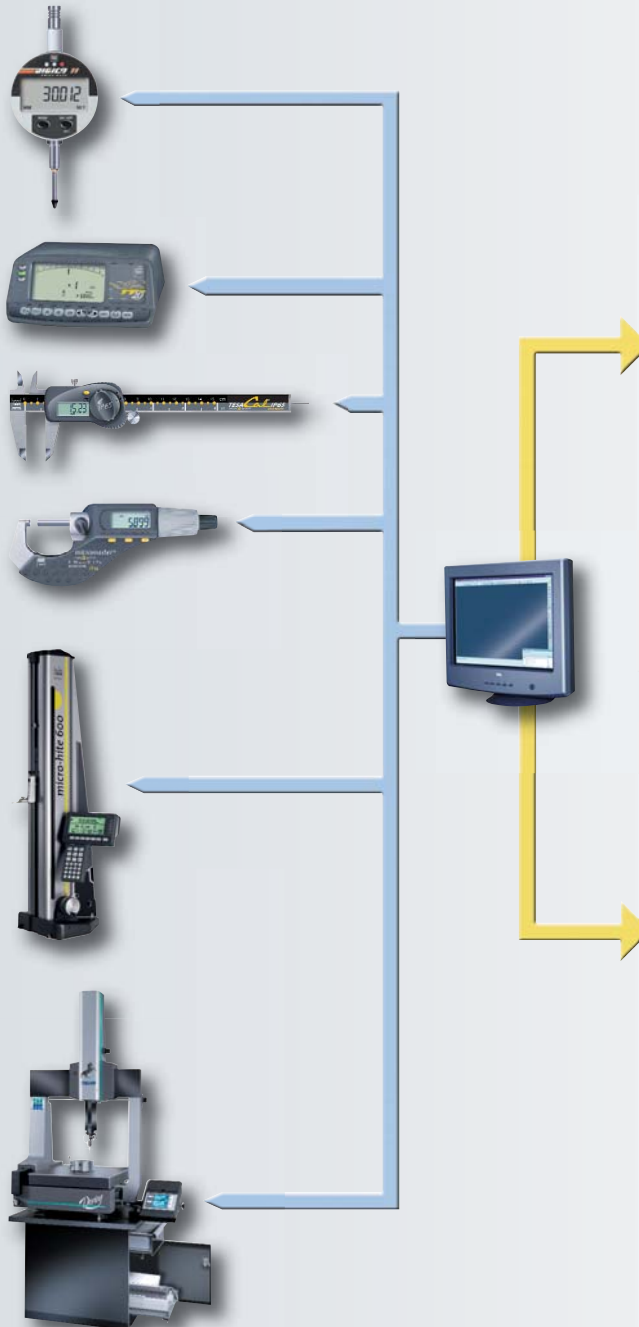
Software for Data Acquisition

DATA-Direct is a software developed by **ArtWare** for real-time reporting of data collected from a TESA's measuring instrument fitted with an RS 232 digital output.

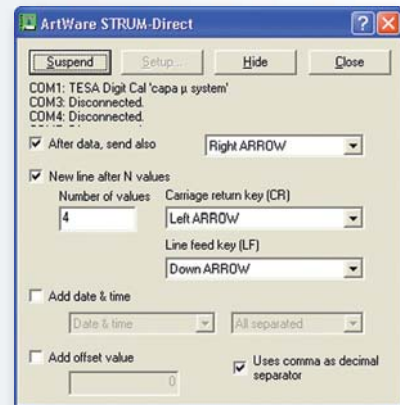
DATA-Direct is provided with serial input/output drives specially configured for those instruments. This software works effectively for transferring data in real time from the measuring instrument to your data sheets, Dbase, statistics module or any other Windows-based applications.

DATA-Direct is a flexible dedicated software that gives users the ability to create custom made inspection reports that fit their specific needs.

Visit the Web site www.artware.it/download/tesa and download the evaluation model for a free try.



DATA-Direct software configuration




Data collection from Excel files

	A	B	C	D
1	Part Number		4694	
2	Controler :		gdp	
3	Control date :		31/10/2002	
4				
5		Value of tolerance		
6		Value of tolerance		
7				
8				
9		Dia 1	Dia 2	Dia 3
10	Nominal	10.000	30.000	5.000
11	Upper tol	10.050	30.100	5.500
12	Lower tol	9.950	29.900	4.500
13	Measure 1	9.993	30.002	4.000
14	Measure 2	9.995	30.000	5.000
15	Measure 3	9.000	29.910	5.100
16	Measure 4	9.993	29.990	5.200
17	Measure 5	9.993	29.000	
18	Measure 6	9.993	30.001	5.300
19	Measure 7	9.993	30.210	
20	Measure 8	10.700	29.910	5.550
21	Measure 9	9.993	30.000	5.580
22	Measure 10	9.993	29.990	5.502



Connection Cables and Accessories for Data Transfer

Plug-in Chart	Personal Computer 9 pin	Personal Computer 25 pin	TESA PRINTER SPC	RS 232 printer	ROCH Interface MULTI - 4V	Cable w/o connector
 Measuring Instruments						
TESA CAL IP65	1		1		1	5
TESA DIGIT-CAL «capa μ system»						
TESA MICROMASTER «capa μ system»						
TESA IMICRO «capa μ system»						
TESA ALESOMETER «capa μ system»	7		7		7	
TESA DIGICO 10/11/ MIN/MAX						
TESATRONIC TT20 / TT60 / TT80						
TESA MICRO-HITE plus M	2		2		2	
TESA-μHITE						
TESA-HITE 400 / 700						
TESA-HITE Magna						
TT 300 / EL 300						
TESA TG						
TESA MICRO-HITE, versions 10/11/12 TT 10	3		3	4	3	
TESA DIGICO 1 / 2	6+11	6	9		6+11*	
TESA RUGOSURF 10G / 90G	8					
TESATAST ELECTRONIC + Digico 12	10		10		10	

* Use of the cable No. 0981680274 is also required (see page N-68).



		Number of pins	Type	Number of pins	Type	m	
<i>Connection cables</i>							
1	04761046	Special, opto		Sub-D	9 f	2	
2	04761052	Sub-D	9 m	Sub-D	9 f	2	
3	04761023	MiniDIN	8 m	Sub-D	9 f	2	
4	04761024	MiniDIN	8 m	Sub-D	25 m	2	
5	04761027	Special, opto		without			
6	04761038	Special		Sub-D	25 f	2	with socket
7	04761049	Special, opto		Sub-D	9 f	2	bidirectional
8	See chapter L						
9	S47078588	Special		Ansley	10 f	2	
10	04761060	special RS 232		Sub-D	9 f	2	with socket
<i>Adapter cables</i>							
11	04761017	Sub-D	25 m	Sub-D	9 f		
	S47001891	Sub-D	9 m	Ansley	10 f		Opto-RS → Digimatic
	04761058	Sub-D	9 m	Sub-D	9 f		For connecting either of both hand and foot switches

Additional accessories

04761054	Mains adapter, 110 to 240 Vac, 50 to 60 Hz, 6,6 Vdc, 750 mA	Universal
04761055	EU cable for mains adapter No. 04761054	
04761056	US cable for mains adapter No. 04761054	
04761037	Mains adapter 230 Vac, 9 V, 22 mA, 1,8 VA	TESA DIGICO 1/2
04761057	Mains adapter 110 Vac	TESA DIGICO 1/2
04768000	Hand switch for triggering data transfer	
04768001	Foot switch for triggering data transfer	

Other connecting cables and accessories available upon request.



Shipping packaging

Connection cables for electronic inclinometers

	Connection cables for:		Number of pins	Type
05360004	TESA ClinoBEVEL 1	RS 485	Special	8 m
	TESA ClinoBEVEL 1	RS 232	Special	8 m
05360004		(RS 485)	Special	8 m
05360005		Adapter	Special	8 f
S53070174	TESA ClinoBEVEL 2	RS 232	Special	8 m
On request	TESA MICROBEVEL 1	RS 485	Special	6 m
	TESA MICROBEVEL 1	RS 232	Special	8 m
On request		(RS 485)	Special	6 m
05360005		Adapter	Special	8 f
On request	TESA BEVELmeter 1	RS 232	Special	8 m



ROCH Interface MULTI - 4V

Enables a direct connection of up to 4 measuring instruments fitted with an RS 232 digital output such as pressure gauges, dynamometers, scale units and the like – Up to 10 MULTI-4V interfaces can be linked to one another, thus enabling the connection of up to 40 measuring instruments to the RS 232 output available on the host computer, e.g. PC for data processing.

- Serial port for both mono and bidirectional data transfer – Standard RS 232 or opto-coupled data output.
- Automatic recognition of the connected instrument.
- Data transfer directly triggered to the connected instrument or through the hand switch or the foot switch.



Robust sheet steel case



Mains adapter
220 Vac, 12 Vdc,
200 mA



Shipping packaging



0983780020 ROCH Interface MULTI - 4V

4 Interfaces, type RS 232, on input side (Sub-D, 9-pin female)
1 Interface, type RS 232, on output side (Sub-D, 9-pin male)
Provided with mains adapter

Accessories

S470785088F Cable for connecting TESA DIGICO 1 et 2 electronic indicators to ROCH interface MULTI - 4V

0981680274 Adapter cable for such instruments as dynamometers or scales units equipped with an RS 232 digital output. Sub-D socket, 9-pin.

0981680279 Adapter cable for MITUTOYO products. Ansley socket, 10-pin.

0981680275 Cable for linking 2 MULTI - 4V interfaces. With socket for the connection of up to 4 hand or foot switches for triggering data transfer.

Connecting cable with Sub-D socket (9-pin female)
ROCH interface MULTI - 4V to host computer.

0981680276 Cable length 2 m

0981680277 Cable length 5 m

0981680278 Cable length 10 m

For ordering information on both hand and foot switches or any other cable-type for data transfer, report to both pages N-66 and N-67.