

General



EN ISO 3650

For gauge blocks ranging from 0,5 mm to 100 mm or 0.02 in to 4 in

Comparative measurement procedure
with transference of the length of a reference gauge block to the gauge block being measured.

Measuring configuration
2 probes connected in sum measurement (function +A+B) with mechanical contact with the measuring face.

Measuring points
On the reference gauge block: at the centre of the measuring face (point R).
On the gauge block to be measured: at the centre (point 1) as well as the 4 corners of the measuring face, each lying 2 mm away from the adjacent faces (points 2 to 5).
Central length l_c is defined by probing both points R and 1.
Establishing lengths at any point requires measurements to be taken at points R plus 1 to 5.

Variation in length v is the result of measurements taken at points 1 to 5.

TESA UPC Gauge Block Comparator for Comparative Measurement

- Measures gauge blocks of same nominal length by comparison.
- Comes with the new template system for positioning the gauge blocks.
 - Single or dual template system for optimum ease of gauge handling.
- Features TESA high-precision inductive probes.
- Allows ultra-precise temperature measurement, integrated.
- Transfers on-line all measured length and temperature values.
- Executes computer-aided data processing with all needed correction values included.
- Performs calibrations that meet the requirements of both ISO standards and EA guidelines (EAL – European cooperation for Accreditation of Laboratories).
- Includes an execution for greater accuracy along with a calibration certificate (optional).

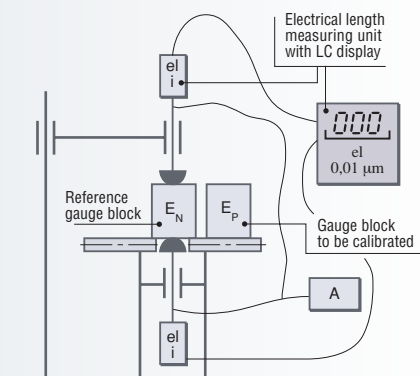


If specified, TESA can also provide the temperature device available as an option. This device has 4 PT100 platinum resistances, each capturing the temperature of the two gauge blocks along with that of both the measuring table and the support.

Computer-aided data processing lets you carry out any calibration most reliably and rationally – for sure.

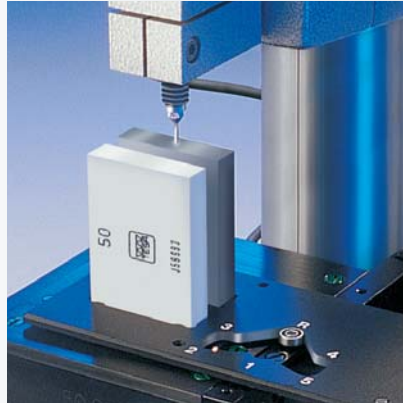
TESA UPC is specially designed for the calibration – or dimensional inspection – of gauge blocks with nominal lengths ranging from 0,5 to 100 mm. The configuration, which consists of two probes aligned opposite one another, associated with both the concept and quality of the measuring system provides full guarantee for an extra low uncertainty of measurement.

Although TESA UPC is mainly intended for manufacturers and end-users of gauge blocks, this comparator is also widely used in nationally accredited laboratories.



Single Template System

- With this system, your reference gauge blocks along with those to be calibrated are moved all together throughout the measurement cycle.



Errors of Measurement

Provided all the metrological conditions are met, the reliability of the two standard executions No. 05930000 and 05930002 is expressed as follows:



Repeatability limit (with no effect due to external temperature): 0,025 µm



Measurement uncertainty*
 $U = \pm (0,10 + 1,0 \cdot L) \mu\text{m}$ (L in m)



Condition involves the use of reference standards (see pages K-14 and K-15) whose uncertainty is as follows:

$U \leq \pm 0,030 \mu\text{m}$
 when calibrating the comparator

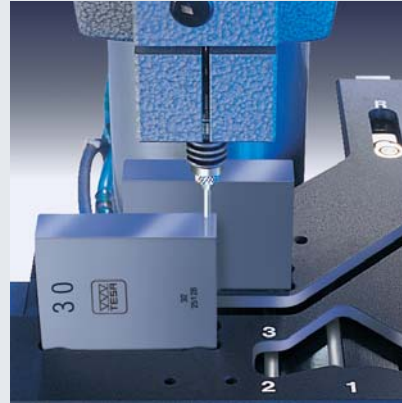
$U \leq \pm (0,05 + 0,5 \cdot L) \mu\text{m}$ (L in m)
 when calibrating the gauge blocks

* Applicable to steel gauge blocks

Dual Template System

(TESA Patent)

- The use of two templates instead of a single one allows you to leave your reference gauge blocks aside until their handling becomes necessary.



Provided all the metrological conditions are met, the reliability of both executions No. 05930001 and 05930003 along with the option for greater accuracy (No. 01690021) is expressed as follows:



Repeatability limit (with no effect due to external temperature): 0,015 µm



Measurement uncertainty*
 $U = \pm (0,05 + 0,5 \cdot L) \mu\text{m}$ (L in m)



Condition involves the use of reference standards (see pages K-14 and K-15) whose uncertainty is as follows:

$U \leq \pm 0,015 \mu\text{m}$
 when calibrating the comparator

$U \leq \pm (0,02 + 0,2 \cdot L) \mu\text{m}$ (L in m)
 when calibrating the gauge blocks

* Applicable to steel gauge blocks

Measuring stand



Heavy construction with toothed rack guide plus handwheel for coarse setting of the measuring arm. Encapsulated attachment plus device for extra-fine setting of upper probe A. 3 mm dia. fixing bore for one temperature sensor No. 05960010.



Main body in cast iron. Column in hardened steel, dull-chrome plated and ground.

Special table



Solid measuring table fitted with 6 cylindrical pins to ensure and protect the gauge blocks as they are being handled. 3 mm dia. clamping bore for one temperature sensor No. 05960010 as well as retaining plate mounted laterally on the table for both sensors No. 05960008 and 05960009 with clip.



Hardened steel. Tungsten carbide cylindrical pins.

Positioning device



Single and dual template systems to shift the blocks to predefined measuring point.

For further details on both template systems, report to pages K-5 as well as to System components on page K-12.

Sensors for length values



2 TESA GT 22-spec. inductive probes with pneumatic retraction of the measuring bolt. Electrical adjustment through resistances fitted on each probe



$\pm 150 \mu\text{m}$ measuring travel



Upper probe A $\approx 1\text{N}$, lower probe B $\approx 0,63\text{N}$

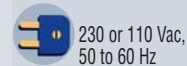


Tungsten carbide insert with spherical measuring face, $R = 20\text{mm}$

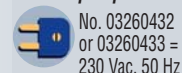


TESA UPC System Components

1	01610401	TESA UPC mechanical part provided with single template system Prepared for mounting the TESA UPT temperature device <i>Consisting of:</i>
	01630004	1 Measuring stand with toothed rack guide Manually operated for coarse setting of the measuring arm. Encapsulated attachment and device allowing extra-fine setting of the upper probe.
	05960031	1 Special solid measuring table Made from hardened steel and fitted with 6 carbide cylindrical pins for a safe positioning. Provides high protection and wear resistance to the gauge blocks over years. Adjustable attachment for lower probe B. Prepared for the integration of the temperature sensors.
	05960032	1 Single template system Used to shift the gauge blocks from a given point to another. Interchangeable templates No. 01660045 (for gauge blocks 9 x 30 mm) and No. 01660046 (for gauge blocks 9 x 35 mm). Also with added support to prevent them from tilting.
	03230045	1 Sensor system for value acquisition consisting of: – Upper probe A, GT 22-spec. No. 03290075. Measuring force to 1 N. Fitted with the measuring insert No. 03510003. – Lower probe B, GT 22-spec. No. 03290076. Measuring force to 0,63 N. Fitted with the measuring insert No. 03510003. – Air pipe system
	01660031	1 Setting piece for probe alignment
	01640420	1 Heat protection shield, 250 x 380 mm in size.
	01660001	1 Pair of grip pliers for safe handling of gauge blocks
	01660030	1 Dust cover
1a	05960030	TESA UPC mechanical part provided with the single and dual template system Prepared for mounting the TESA UPT temperature device <i>Includes the same components as described under the first item above, except for:</i>
	05960029	1 Single and dual template system for positioning the gauge blocks including: 1 Pair of templates for gauge blocks 9 x 30 mm with 1 item No. 05960019 for the reference blocks and 1 item No. 05960020 for the gauge blocks to be calibrated. 1 Pair of templates for gauge blocks 9 x 35 mm with 1 item No. 05960021 for the reference blocks and 1 item No. 05960022 for the gauge blocks to be calibrated. Also with added support to prevent tilting. 1 Template No. 05960023 for the reference blocks and those to be calibrated, 9x30 mm. 1 Template No. 05960024 for the reference blocks and those to be calibrated, 9x35 mm. Also with added support to prevent the gauges tilting.
2	03260401	Pneumatic retraction of the measuring bolt Manually operated
3	03260432	Electric vacuum pump with foot switch For retracting the measuring bolt of each probe. Also used to plug the hand-operated pneumatic suction loader No. 01660011, 230 V.
4	03260433	Electrical vacuum pump with external control Connected to interface unit 708 (No. 04130106). Used for the retraction of the measuring bolt of each probe. Also used to plug the suction loader No. 01660011, 230 V.
5	01660011	Pneumatic suction loader For safe, easy handling of the gauge blocks with nominal lengths up to 10 mm. To be connected to the electric vacuum pump No. 03260432 or No. 03260433.
6	04190190	TESAMODUL electronic length measuring instrument <i>Consisting of:</i> 1 Power and display unit 372 (N° 04130094) 1 Measuring unit S403 (N° S41077235)



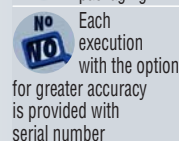
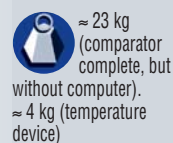
Electric vacuum pump



Temperature device



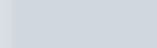
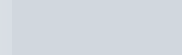
Additional data



Temperature device with SCS certificate.

Electric vacuum pump in special version

With external control as for No. 03260433, except:





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04130105 TESAMODUL electronic length measuring instrument*Consisting of:*

- 1 Power and display unit 372 (No. 04130094)
- 1 Measuring unit S403 (No. S41077235)
- 1 Interface unit 708 (No. 04130106) that serves as control unit for the electric vacuum pump (No. 03260433). To be linked with the computer unit.

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04160079 Plug-in card with RS 232 data output

For serial data transfer, opto-coupled

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04761050 Connecting cable

For RS 232 plug-in card (No. 04160079) to interface unit 708 (No. 04130106).

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04761005 Connecting cable

For interface unit 708 (No. 04130106) to electric vacuum pump (No. 03260433).

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04768000 Hand switch

For triggering the movements of the measuring bolt along with data transfer from TESAMODUL No. 04130105 to computer. To be connected to the interface unit 708 (No. 04130106).

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01690021 Option for greater accuracy and calibration certificate

Consists of TESA UPC (mechanical part No. 01610401 together with TESAMODUL No. 04190190 or 04130105) specially adjusted and calibrated. All key components are marked with serial number.

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05930011 TESA UPT temperature device for TESA gauge block comparatorsFully calibrated for the measuring ranges from 19°C up to 24°C with a numerical interval to 0,001°C. Supplied with a calibration certificate issued by the Swiss Calibration Service (SCS). Uncertainty of measurement achieved during calibration $U = \pm 0,03$ °C. Used in association with TESA UP software programme for value processing.*Consisting of:*

- 05960018 1 Set of 4 temperature sensors
- 05960038 1 Temperature device
- 05960012 1 Adapter
- 05960011 1 Connecting cable

For details, refer to items 9 to 13 on page K-8.

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05960025 TESA UP software programme for value processingRunning under **WINDOWS 98, 2000, NT or XP**

- For details on the programme related features, refer to page K-14.

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Personal Computer

Available upon request. For minimum hardware profile requirements, see on page K-14.

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S16071225 Connecting cable

For serial data transfer from interface unit 708 (No. 04130106) to AT computer, 25-pin female and 9-pin male connector, intersected.

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Matrix Ink Jet Printer

For A4 format (upright)

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S16071229 Connecting cable

For parallel data transfer from computer to printer, 25-pin male connector to 36-pin male one.

Hardware

All hardware components listed opposite (items 15 to 18) can be purchased locally. Should you wish to, we may also provide you with a quotation on request. TESA cannot assure the UP system will operate properly when run on a network. Therefore, we recommend to inquire about a technical information before purchasing your own equipment.

