SYL 808 - Indicators & Lever Probes

EN

Sylvac Calibration Method – SYL 808 – Indicators & Lever Probes

This method is based on ISO 9493:2010

1. TERMS OF REFERENCE

1.1. Standards

- A high-precision vertical calibration bench (M3 Sylvac).
- Computer equipment with calibration software (Sycopro).
- A vertical measuring stand with a granite or ceramic table.
- A force sensor (or a precision balance).

1.2. Ambient Calibration Conditions

- The reference temperature is 20°C.
- The maximum temperature variation in the room (Δ max) is 1°C over a period of 6 hours.

2. FUNCTIONAL DIAGRAM

S_DIAL TEST 12.5 & 36.5

DIGITAL LEVER COMPARATOR WITH BLUETOOTH® DATA OUTPUT AND POWER CABLE

- LCD DIGITAL DISPLAY
- ANALOG AND DIGITAL ZEROING
- BEZEL ROTATION

M1.4 MEASURING PROBE (STYLUS) WITH A 2 MM DIAMETER CARBIDE BALL, ROTATABLE THROUGH 220°

12.5 MM PROBE VERSION: 0.8 MM STROKE

36.5 MM PROBE VERSION: 2 MM STROKE

LPD 12.5

DIGITAL LEVER PROBE: SMART VERSIONS WITH BLUETOOTH® OR M8 VERSIONS WITH CABLE HIGH RESOLUTION: 0.000 01 MM

M2 MEASURING PROBE - 12.5 MM (STYLUS) WITH A 3 MM DIAMETER CARBIDE BALL, ROTATABLE THROUGH 190°

OPTIONAL M2 PROBE - 32.3 MM

3. INSTRUMENT CHECKS

3.1. Preparation and Cleaning

- Basic check: Instrument integrity, value display, mobility, and condition and tightness of the measurement button. If out of service, have it repaired or recycled as appropriate.
- Clean the exterior with a soft cloth. Acceptable solvents: Mild detergent, isopropyl alcohol (except on the window), light benzine.
- Verify the suitability and validity of the calibration method.
- Store the instrument under ambient calibration conditions for at least 5 hours prior to measurements (thermal stabilization).

3.2. Visual Inspection

- Check that the instrument has no signs of impact, corrosion, or excessive wear.
- Check the identification number and/or serial number (clearly visible).

3.3. Functional Check

- Verify that the measuring probe returns to the center after the two measurement strokes (strokes A and B). It is normal to observe some variation in the return to zero when the probe is moved through empty space. This is due to the play in the return mechanism, which is necessary to minimize hysteresis error. This is not a measurement error under any circumstances. This variation must be smaller than the pre-travel defined for the measurement (see Table 3.5.1).
- Verify that the orientation friction of the probe is sufficiently firm and consistent.
- S_Dial TEST: verify the rotation of the dial (digital display) over 270° and the operation of the buttons (on/off, zeroing, mode).
- Check the stability of the display. Maximum deviation of 1 µm over 10 seconds (0.02 µm for LPD).
- Check the data output by connecting the instrument to a PC or a Sylvac display.

3.4. Gap ckeck

- Check the effect of axial and transverse movement of the measuring stylus: Instrument mounted on a measuring stand with a table, stylus resting on a calibration block (mid-stroke). The stylus must be horizontal.
- Move the block in all 4 directions (± X, ± Y) by approximately 3 mm. Maximum variation in the display as per Table 3.5.1.

3.5 Measurement Force

Force is a design parameter. If necessary, proceed as follows:

- Mount the instrument on a measuring stand with the stylus (measuring probe) oriented horizontally.
- Allow the probe to make contact with the force sensor (stroke A). Measure the forces at the beginning and end of the stroke. Repeat the procedure from below (stroke B).
- Tolerances according to Table 3.5.1

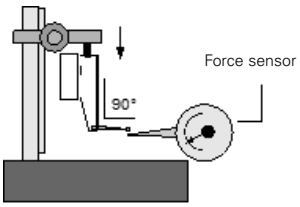


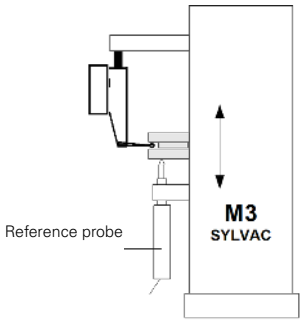
Table 3.5.1 – Measurement force and play

Instrument and key	Pre-race	Race	Measuring force Travel limits	Game control Max. variation
S_Dial TEST 12.5 mm	0.05 mm	0.8 mm	8 – 23 cN	0.001 mm
S_Dial TEST 36.5 mm	0.125 mm	2.0 mm	3 – 9 cN	0.001 mm
LPD 12.5 mm	0.05 mm	0.6 mm	3.2 – 22.8 cN	0.000 05 mm
LPD 32.3 mm	0.12 mm	1.3 mm	1.6 – 10.8 cN	0.000 10 mm

4. CALIBRATION SPECIFICATIONS

4.1 Maximum Permissible Error (MPE E)

- The instrument is mounted on the vertical calibration bench with the stylus in the horizontal position.
- Perform the pre-travel and zero the instrument and standard (pre-travel error = 0).
- Take 10 measurements in the same direction (stroke A) distributed evenly over the entire stroke (at least 5 measurements). Then return precisely to each measurement point from the opposite direction (record measurements in both directions).
- Repeat the procedure for stroke B.



MPE E is the maximum permissible error limit for a single direction of travel. Calibration must be compliant for each stroke separately. Calculate the maximum deviation between measurement errors (Δ max), tolerance according to Table 4.4.2.

A graph of indication errors is useful for both round-trip strokes (4 curves in total).

4.2. Indication Error Hysteresis (MPE H)

- Hysteresis is the difference in measurement of the same height on the forward and return strokes.
- The indication error of the hysteresis is the maximum value of the differences obtained.

4.3. Repeatability (MPE R)

Repeatability is a design parameter; if necessary, proceed as follows:

- Take 5 consecutive measurements at the same height, always in the same direction.
- Record the maximum deviation in the measurement series (delta).

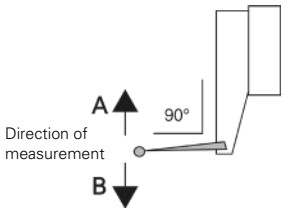


Table 4.4.1 – Measurement range and measurement points

Type	Pre-race	Race	Measurement points
S_Dial TEST 12.5 mm	0.05 mm	0.8 mm	0 to 0.8 mm, in 0.08 mm increments
S_Dial TEST 36.5 mm	0.125 mm	2.0 mm	0 to 2 mm, in 0.2 mm increments
LPD 12.5 mm	0.05 mm	0.6 mm	0 to 0.6 mm, in 0.06 mm increments
LPD 32.3 mm	0.12 mm	1.3 mm	0 to 1.3 mm, in 0.13 mm increments

Table 3.5.1 – Measurement force and play

Type	Max. error MPE E	Hysteresis MPE H	Repeatability MPE R
S_Dial TEST 12.5 mm	3 µm	2 µm	1 µm
S_Dial TEST 36.5 mm	8 µm	3 µm	1 µm
LPD 12.5 mm	0.8 µm	0.5 µm	0.07 µm
LPD 32.3 mm	2.0 µm	1 µm	0.15 µm

5. RESULT AND DECISION

- Issue a calibration certificate (using the calibration software).
- If the measurement conditions are not met, the instrument will either be repaired and recalibrated, or decommissioned or recycled.