

# Preswage Gauge Instructions

These instructions cover the procedure for gauging 1/4 in., 6 mm, and 8 mm Swagelok® tube fittings following the preswaging of the nut and ferrules on a tube using either the Gaugeable Preswaging Tool or the High Volume Swaging Unit (HVSU).

Two features are measured, the tube length (TL) and nut to gauge surface (NTGS), using gauges specific to that purpose.

## Shipping Case Contents:

- TL master gauge
- TL gauge
- TL gauge stand
- NTGS master gauge
- NTGS gauge
- NTGS gauge stand
- Carrying case
- Instructions

## Presetting the Gauges

1. The work area and gauges must be clean and free of debris.
2. Select the set of gauges for the feature to be measured. A gauge and a master gauge are required.

Tube Fitting Size	Measured Feature	Master Gauge Ordering Number	Gauge Ordering Number
1/4 in.	TL	MS-IG-TL-400-MR	MS-IG-TL-400
	NTGS	MS-IG-NG-400-MR	MS-IG-NG-400
6 mm	TL	MS-IG-TL-6M-MR	MS-IG-TL-6M
	NTGS	MS-IG-NG-6M-MR	MS-IG-NG-6M
8 mm	TL	MS-IG-TL-8M-MR	MS-IG-TL-8M
	NTGS	MS-IG-NG-8M-MR	MS-IG-NG-8M

3. Press the ON/OFF button located on the face of the measuring gauge.
4. Preset the gauge to the “zero set” reading using the appropriate master gauge.

**TL gauge:** Insert the master gauge into the gauge body, ensuring that the master gauge seats firmly and evenly. Continue holding the master gauge and press the SET button once. The indicator will read “zero” . Fig. 2.

**NTGS gauge:** Using the pin end of the master gauge, thread the master gauge onto the gauge body clockwise until fingertight. Ensure the master gauge seats firmly and evenly. Press the SET button once. The indicator will read “zero”. Fig. 3 and 4.

### NOTICE

**Do not crossthread. Damage to the gauge and master gauge threads could result.**

5. The gauges should be preset to zero based on a schedule determined by your quality standards.



Fig. 1 Shipping Case

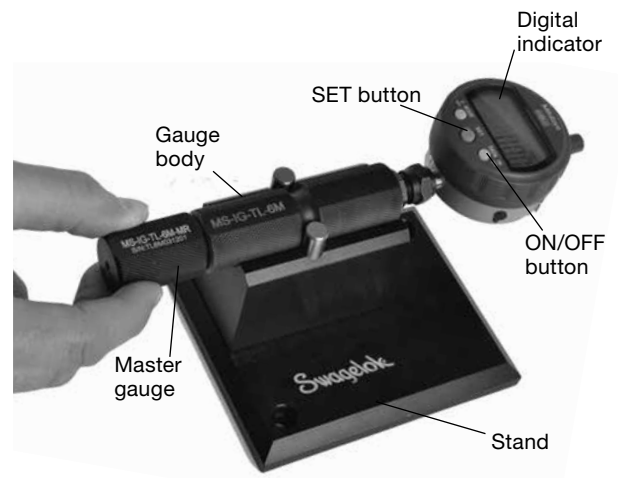


Fig. 2 TL Gauge



Fig. 3 NTGS Gauge Pin End Detail

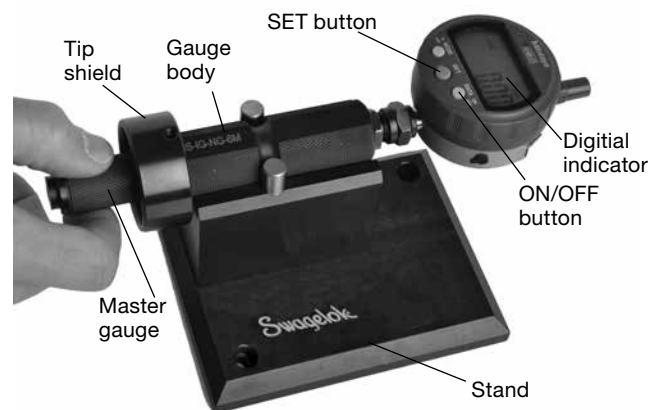


Fig. 4 NTGS Gauge

## Gauging the Preswaged Assembly

1. The work area, gauges, and preswaged assembly must be clean and free of dirt and chips.
2. **TL measurement:** Insert the preswaged assembly into the gauge body, ensuring that the assembly seats firmly and evenly. The gauge can either be held by hand or set in the provided base. Fig. 5.

Note: The TL measurement average is a function of the tube OD and tube end preparation.

3. **NTGS measurement:** Screw the nut of the preswaged assembly into the gauge body until the tube bottoms out, ensuring that the assembly seats firmly and evenly. Also ensure that the back ferrule is in contact with the nut by pulling out on the tube if necessary. The gauge can either be held by hand or set in the provided base. Fig. 6.

### NOTICE

**Do not crossthread. Damage to the preswaged assembly's nut could result.**

4. **Both measurements:** Note the indicator reading and record the data if applicable. Refer to the table below for acceptable measurement values.

- For values outside the Preswage Range that are within the Tool Service Range, inspect the tooling on the preswaging tool used and replace if necessary.
- For values outside the Tool Service range, the preswaged assembly should be discarded.

Gauge	Tool Service Lower Range, in. (mm)	Preswage Range, in. (mm)	Tool Service Upper Range, in. (mm)
TL	Refer to Troubleshooting	-0.031 to +0.031 (-0.80 to +0.80)	+0.032 to +0.033 (+0.81 to +0.83)
NTGS	-0.009 to -0.0075 (-0.23 to -0.19)	-0.007 to +0.007 (-0.18 to +0.18)	+0.0075 to +0.009 (+0.19 to +0.23)

**Note:** Preswage gauge measurements should only be used for verification of the preswage process and do not guarantee the performance of the final assembly. Refer to applicable Swagelok tube fitting installation instructions.

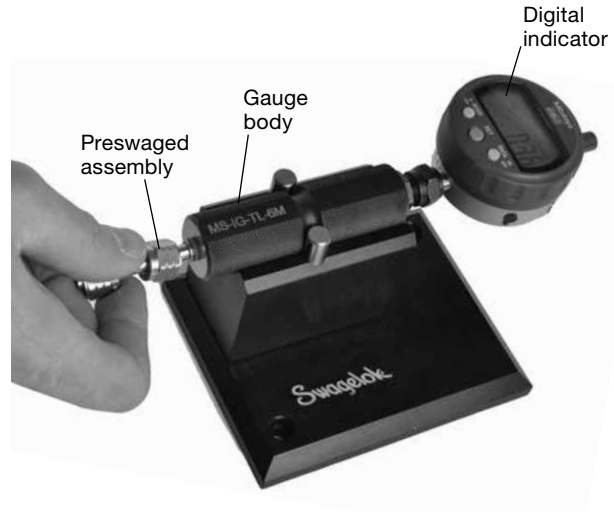


Fig. 5 TL Gauge  
(gauge shown in base)

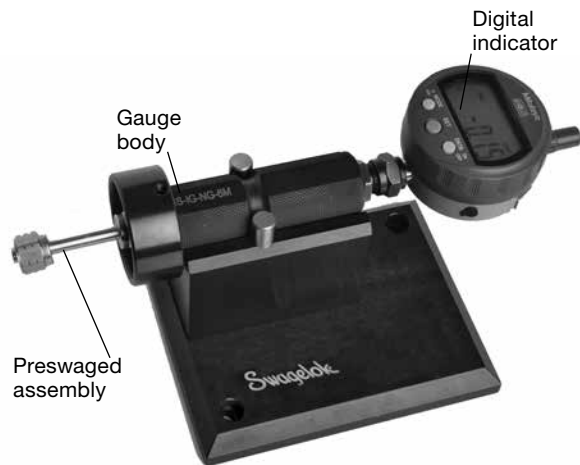


Fig. 6 NTGS Gauge  
(gauge shown in base)

## Verifying Gauge Measurements

The accuracy of each gauge and master gauge can be verified by following the procedure below. This verification should be performed based on a schedule determined by your quality standards.

- The work area and gauges must be clean and free of debris.
- Press the ON/OFF button located on the face of the measuring gauge.

1. Preset the gauge to the “zero set” reading.

**TL gauge:** Hold the gauge face against a clean, flat, hard surface. Ensure the spring loaded tip is pressed flush against the hard surface. Press the SET button once. The indicator will read “zero”. Fig. 7 and 8.

**NOTICE: Press the tip carefully to prevent damage.**

**NTGS gauge:** Using the washer end of the master gauge, press the master gauge against the spring loaded tip of the gauge until the washer is flush against the gauge body face. Press the SET button once. The indicator will read “zero”. Fig. 9 and 10.

**NOTICE: Press the tip carefully to prevent damage.**

2. Verify the gauge measurements using the appropriate master gauge.

**TL gauge:** Insert the master gauge into the gauge body, ensuring that the master gauge seats firmly and evenly. Continue holding the master gauge. Note the indicator reading. Fig. 2.

**NTGS gauge:** Using the pin end of the master gauge, thread the master gauge onto the gauge body until fingertight. Ensure the master gauge seats firmly and evenly. Note the indicator reading. Fig. 3 and 4.

**NOTICE: Do not crossthread. Damage to the gauge and master gauge threads could result.**

3. Refer to the table below for acceptable measurement values.

Master and Gauge Verification Limits				
Gauge	Size	Service Lower Limit, in. (mm)	Master Range, in. (mm)	Service Upper Limit, in. (mm)
TL	1/4 in.	0.300 (7.62)	0.301 to 0.304 (7.65 to 7.72)	0.305 (7.75)
	6 mm	0.280 (7.12)	0.281 to 0.284 (7.13 to 7.23)	0.285 (7.24)
	8 mm	0.311 (7.90)	0.312 to 0.315 (7.92 to 8.00)	0.316 (8.03)
NTGS	1/4 in.	-0.066 (-1.68)	-0.065 to -0.063 (-1.66 to -1.60)	-0.062 (-1.57)
	6 mm	-0.085 (-2.16)	-0.084 to -0.082 (-2.14 to -2.07)	-0.081 (-2.06)
	8 mm	-0.080 (-2.03)	-0.079 to -0.076 (-2.01 to -1.93)	-0.075 (-1.91)

- For values outside the Master Range that are within the Service Limits, replace the master gauge.
- If values remain outside the Master Range after the master gauge has been replaced, contact your authorized Swagelok representative for evaluation and repair.



Fig. 7 TL Gauge Face



Fig. 8 Presetting the TL Gauge to Zero



Fig. 9 NTGS Gauge Washer End Detail



Fig. 10 Presetting the NTGS Gauge to Zero

## **Maintenance**

Spray or liberally wipe all surfaces, with the exception of the digital indicator, with a water dispersal lubricant to help prevent corrosion. Wipe off any excess, especially around the TL and NTGS tips, to prevent transfer of lubricant to preswaged assemblies.

The frequency of the maintenance will depend on environmental conditions. Environments with high humidity may require these steps to be followed more often.

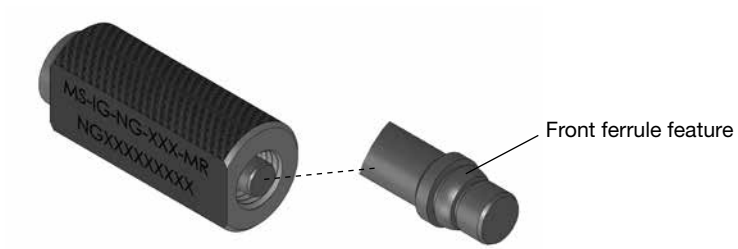
## Troubleshooting

Problem	Cause	Remedy
Measurement readings are inconsistent.	Gauge components are not clean and free of debris.	Wipe the gauge components with a clean, dry cloth, ensuring all surface debris is removed.
	Measurements are switching from fractional to metric readings.	Use left button on the digital gauge to correct the measurement display.
	Side load or excessive force is being applied to the tubing. (NTGS gauge)	Hold the gauge by the knurled body and allow tube to be free-standing.
	Assembly between gauge body and digital indicator is loose.	Contact your authorized Swagelok representative for evaluation and repair.
	Indicator tip may be loose (TL gauge).	Contact your authorized Swagelok representative for evaluation and repair.
No digital illumination on the indicator.	Battery may be low.	Replace the batteries of the digital indicator according to manufacturer's instructions.
Readings on digital indicator are not within the master range. (TL Upper Service Range and NTGS gauge)	The tooling on the swaging device is not functioning properly.	Replace the tooling.
	Master gauge may have damage to the preswage feature. (TL gauge)	Refer to Visual Standard.
		Contact your authorized Swagelok representative for evaluation and repair.
	Master gauge may have damage to the nut face surface. (NTGS gauge)	Refer to Visual Standard. Contact your authorized Swagelok representative for evaluation and repair.
The stem tip and spring assembly are inoperable. (NTGS gauge)	Contact your authorized Swagelok representative for evaluation and repair.	
Unable to thread NTGS master gauge on to gauge body.	Master gauge may have damage to the threads.	Refer to Visual Standard. Contact your authorized Swagelok representative for evaluation and repair.
	Gauge body may have damage to the threads.	Refer to Visual Standard. Contact your authorized Swagelok representative for evaluation and repair.
TL gauge indicator does not read "0.00" when pressed against a surface.	Reference surface is dirty or is not flat.	Verify the surface is free of debris and dirt and is a flat and smooth surface. Use a gauge block to zero the gauge if necessary,
TL measured value is lower than the preswage range.	The tube is not properly bottomed in the swaging tool throughout the preswage process.	Hold the tube against the swaging tool throughout the preswage process.
Preswage assembly does not meet acceptable reading values.	Master gauge was not set to "0.00".	Re-zero the gauge.
	Preswage was done incorrectly.	Assembly cannot be used. Discard.
	There is damage to the preswaged end connection.	Assembly cannot be used. Discard.
Measured values are outside the service range when using a new master gauge.	The gauge is damaged.	Contact your authorized Swagelok representative for evaluation and repair.

## Visual Standard

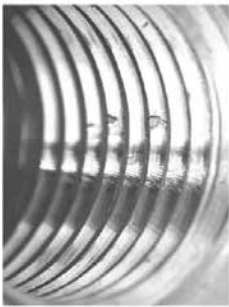
These visual standards are provided as examples of damage. These examples are not intended to be a complete list of possible damage and should be treated as general examples for guidance.

### NTGS Master Gauge

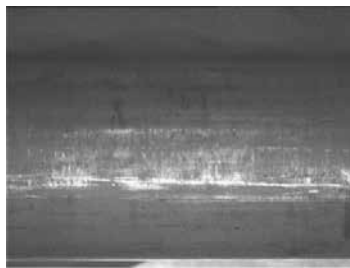


#### Reject Examples

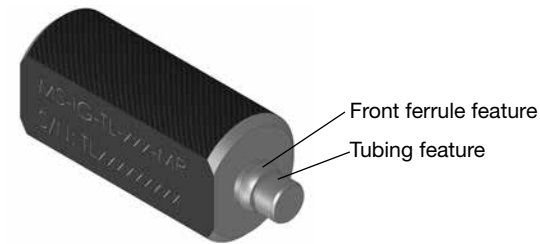
##### Threads



##### Front Ferrule Feature Surface

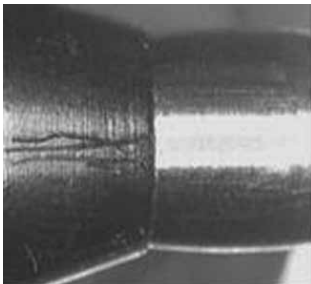


### TL Master Gauge



#### Reject Examples

##### Tubing Feature



##### Front Ferrule Feature Surface

