

# Gauging force – plunger actuation

## Gauging force

Gauging force is the force that the plunger exercises on the measured object. An excessively large gauging force can cause deformation of the measuring contact and the measured object. If the gauging force is too small, an existing dust film or other obstacle may prevent the plunger from fully contacting the measured object. The gauging force depends on the type of plunger actuation.

## Plunger actuation by spring

For the AT 1218, AT 3018, MT 12x1, MT 25x1, ST 12x8 and ST 30x8, the integral spring extends the plunger to the measuring position and applies the **gauging force**. In its resting position, the plunger is extended. The gauging force depends on the following criteria:

- The operating orientation
- The plunger position, i.e. the force changes over the measuring range
- The measuring direction, i.e., whether the gauge measures with extending or retracting plunger

In the diagrams, the measuring force is shown over the measuring range for a retracting and extending plunger in a horizontal operating orientation.

The MT 1281 and ST 1288 length gauges are available with various gauging forces. Particularly for fragile materials this makes it possible to measure without deformation.

The gauging forces can be divided into the following classes:

- Reduced MR: Approx. half the gauging force of the standard variant.
- Low MW: Gauging force at the beginning of the measuring range, approx 0.01 N
- Springless MG: Constant gauging force over the entire measuring range

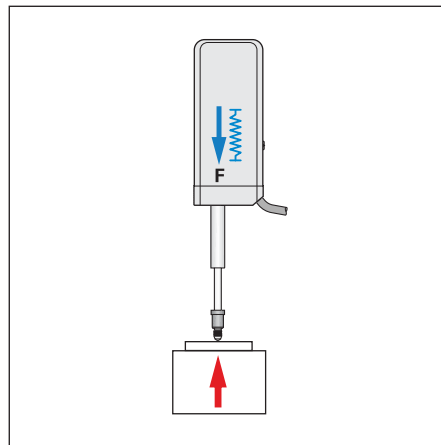
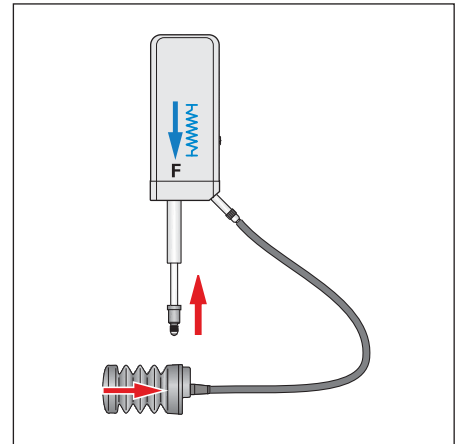
In order not to influence the gauging force, the variants ST 1288 MR and ST 1288 MG are provided without a rubber bellows. Due to their low gauging force, the variants MT 1281 MW, MT 1281 MG and ST 1288MG can be used only for measuring vertically downward. For this reason, the diagram shows only gauging forces for a vertical orientation.

## Plunger actuation by measured object

The complete gauge is moved relative to the measured object. The measurement is made with retracting plunger.

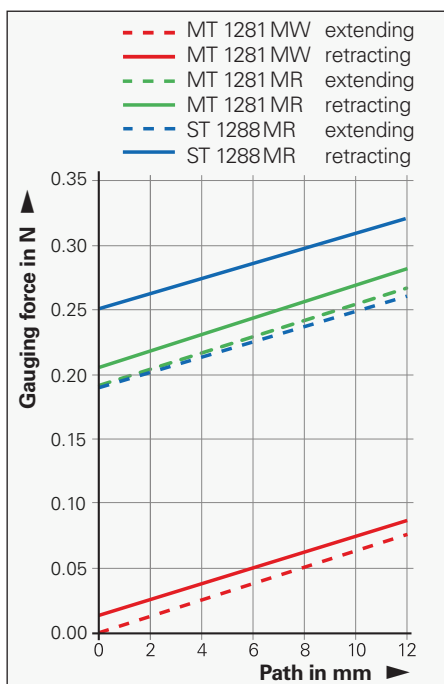
## Plunger actuation via cable-type lifter (MT 12x1, MT 25x1)

Through a cable mechanism, the plunger is retracted by hand and then extended onto the measured object. The measurement is made with extending plunger.

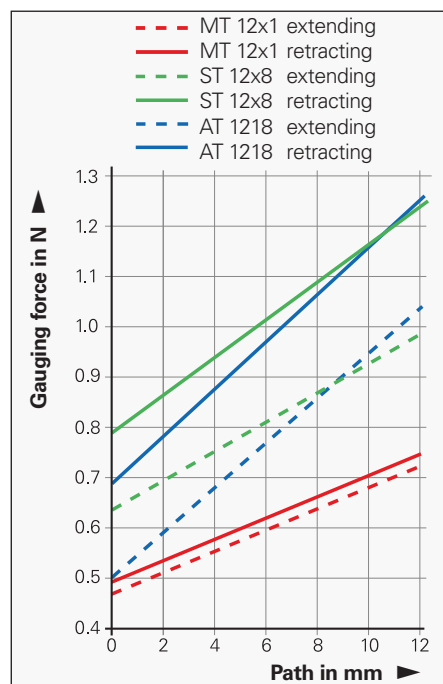


The adjustable integral pneumatic damping reduces the plunger extension speed to prevent rebounding, for example on very hard materials. This prevents measuring error through bouncing.

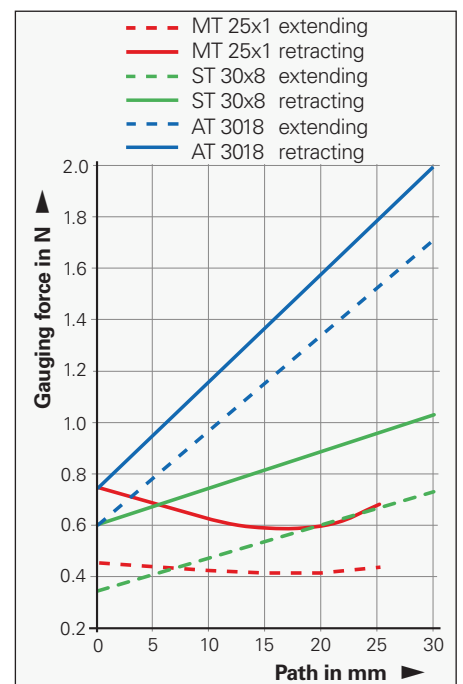
## Special variants



## 12 mm measuring range



## 25 mm/30 mm measuring range

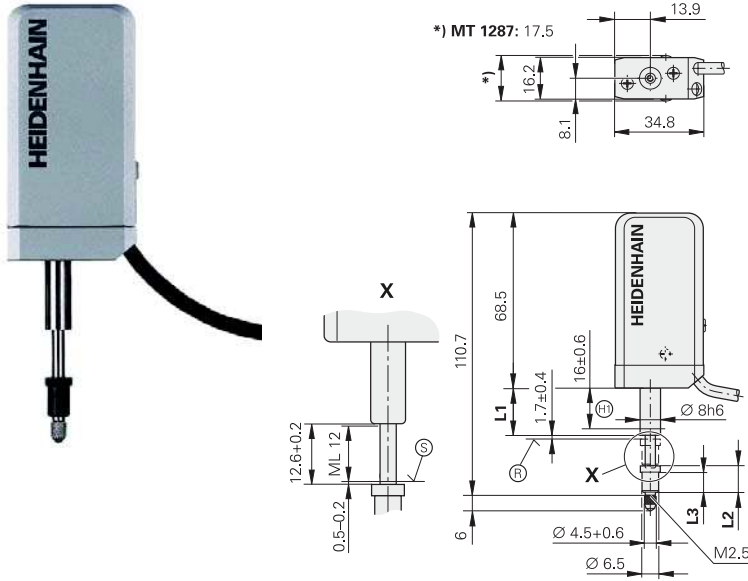


# HEIDENHAIN length gauges with low measuring forces

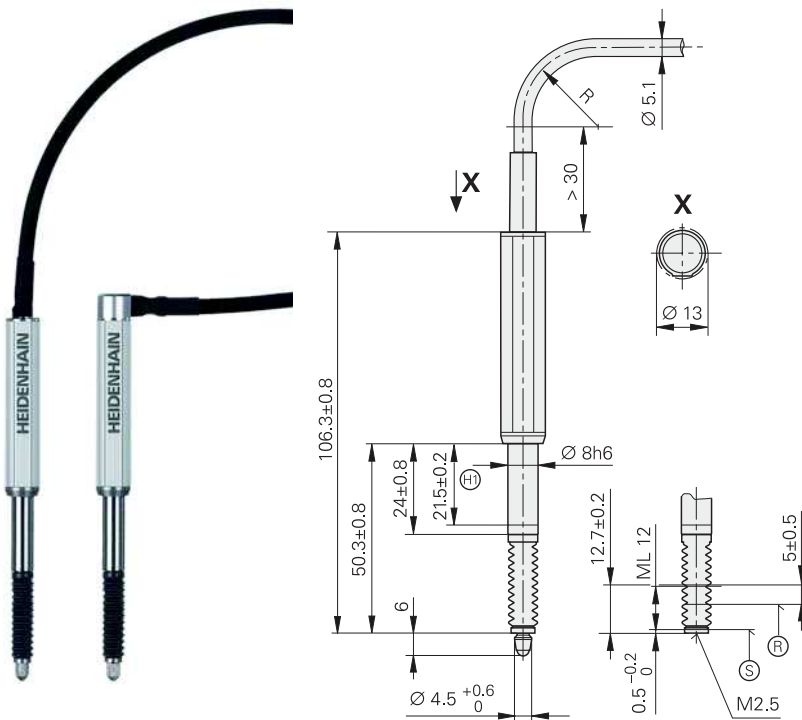
## Incremental length gauges

- Ball-bush guided plunger
- Same specifications as for standard products

### MT 1200



### ST 12



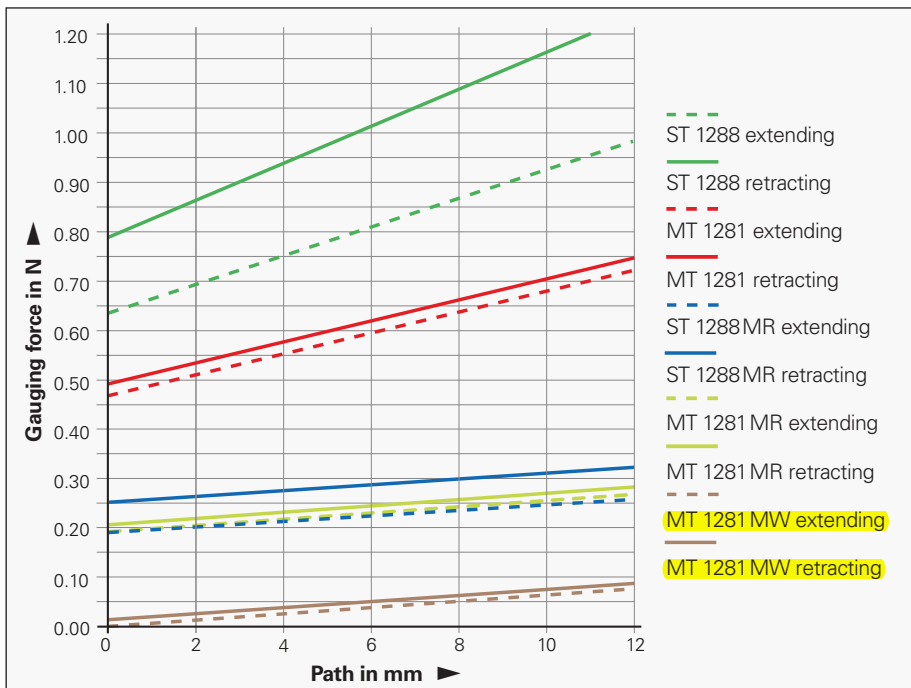
mm



Tolerancing ISO 8015  
ISO 2768 - m H  
< 6 mm: ±0.2 mm

- ⊕ = Reference mark position
- Ⓢ = Beginning of measuring length
- ⊕ = Clamping area
- ⊕ = Air connection for 2 mm tube

Mechanical data	MT 1281	ST 1288
Plunger actuation	By cable or measured object	By measured object
Measuring standard	DIADUR phase grating on Zerodur glass ceramic; grating period 4 $\mu\text{m}$	DIADUR grating on glass; grating period 20 $\mu\text{m}$
System accuracy	$\pm 0.2 \mu\text{m}$	$\pm 1 \mu\text{m}$
Short-range accuracy typically	0.03 $\mu\text{m}$	0.3 $\mu\text{m}$
Measuring range	12 mm	
Fastening	Clamping shank $\varnothing 8\text{h}6$	
Protection EN 60529	IP50	IP50
Interface	$\sim 1 V_{PP}$	
Signal period	2 $\mu\text{m}$	20 $\mu\text{m}$



	Version	Gauging force	Operating orientation
<b>MT 1281</b>	Default	0.75 N <sup>1)</sup>	Any desired operating orientation
	MR	0.25 N <sup>1)</sup>	Vertically downward and horizontal
	<b>MW</b>	<b>0 N<sup>1)</sup></b>	<b>Vertically downward</b>
	MG	0.13 N <sup>2)</sup>	Vertically downward
<b>ST 1288</b>	Default	0.65 N <sup>1)</sup>	Any desired operating orientation
	MR	0.4 N <sup>1)</sup>	Any desired operating orientation
	MG	0.2 N <sup>2)</sup>	Vertically downward

<sup>1)</sup> With nearly completed plunger extension

<sup>2)</sup> Over the entire measuring range