OPERATION INSTRUCTION

Outside Micrometers

Metric(ratchet stop type)

Code	Range	Accuracy
3203-25A	0-25mm	±2μm
3203-50A	25-50mm	±2μm
3203-75A	50-75mm	±2μm
3203-100A	75-100mm	±3μm
3203-125A	100-125mm	±3μm
3203-150A	125-150mm	±3μm
3203-175A	150-175mm	±4μm
3203-200A	175-200mm	±4μm
3203-225A	200-225mm	±4μm
3203-250A	225-250mm	±5μm
3203-275A	250-275mm	±5μm
3203-300A	275-300mm	±5μm

Imperial (ratchet stop type)

Code	Range	Accuracy
3203-1A	0-1"	±.0001"
3203-2A	1-2"	±.0001"
3203-3A	2-3"	±.0001"
3203-4A	3-4"	±.00015"
3203-5A	4-5"	±.00015"
3203-6A	5-6"	±.00015"
3203-7A	6-7"	±.0002"
3203-8A	7-8"	±.0002"
3203-9A	8-9"	±.0002"
3203-10A	9-10"	±.00025"
3203-11A	10-11"	±.00025"
3203-12A	11-12"	±.00025"

Imperial (friction thimble type)

Code	Range	Accuracy
3203-1FA	0-1"	±.0001"
3203-2FA	1-2"	±.0001"
3203-3FA	2-3"	±.0001"

1-Anvil
2-Frame
3-Carbide measuring probe
4-locking screw
5-Sleeve
6-Thimble
7-Ratchet stop
8-Spanner
9-Setting anvil
(except 0-25mm and 0-1")
10-Friction thimble

1. Calibration the outside micrometers before measuring:
---Clean the measuring surface of the micrometer with soft cloth.
---Loosen the locking screw, rotate the thimble, when the two measuring surface are closed, but not in contact, rotate the ratchet stop, and reading after hearing squeak. If the zero position has deviation, use the spanner to set zero.
---For the micrometers above 25mm and 1", do calibration with seting standard. Same as the above method.

How to sue spanner:
---Tighten the locking screw,use spanner to rotate sleeve (Fig.1), adjust the reading to be zero.
---Finish calibration.

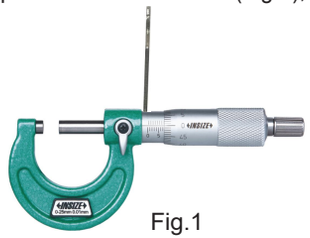
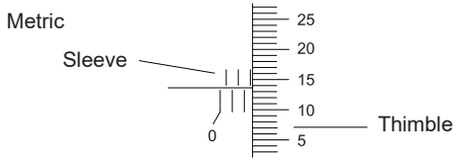
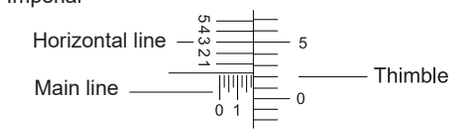


Fig.1

2. Measurement:
---During measurement, make sure there are no cuting chips or other debris on the measuring faces and workpiece surface, or it will lead to inaccurate results.
---Rotate the micrometer to be slightly larger than the measured workpiece, put the workpiece into the micrometer, rotating the thimble. When the measuring surface is in contact with the workpiece to rotate the ratchet stop.Then get the reading after hear squeak.
3. During reading, the line of sight should be perpendicular to the scale surface to avoid parallax-.The reading results are as follows:



Sleeve reading: 2.5mm
Thimble reading: 0.137mm(7 is estimated)
Reading:2.637mm



Main line reading: 0.175"
Thimble reading: 0.002"
Horizontal line:0.0003"
Reading:0.1773"

4. Notes:
---During storage,a gap of 0.1mm to 1mm shall be left between the measuring surfaces,and the outside micrometers shall not be stored in a clamped state.
--- After a long time to store the outside micrometers, the spindle has a protective oil film,use dust-free cloth to wipe the oil film before measuring.

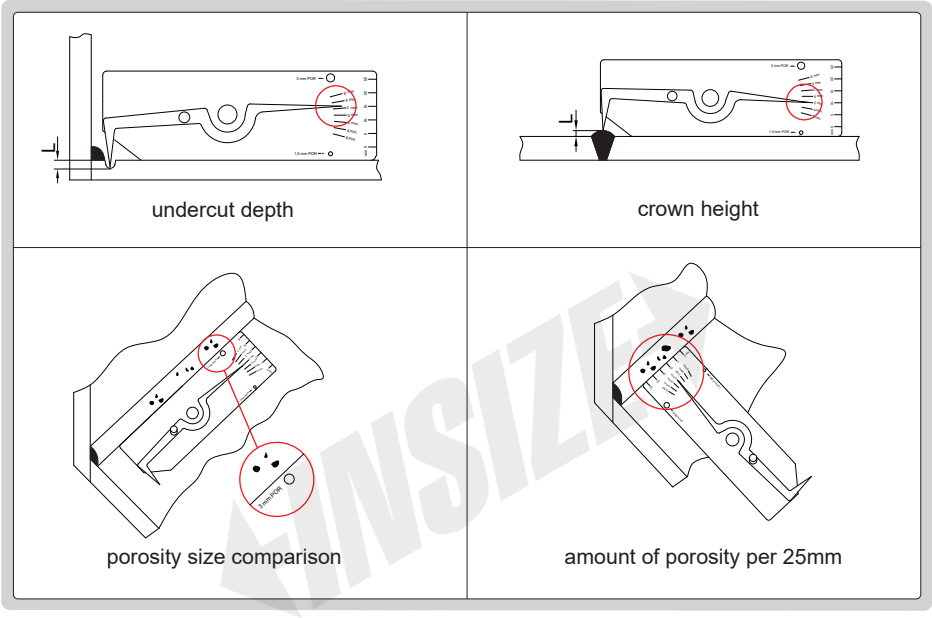
MN-3203-E

V1

OPERATION INSTRUCTION

Welding Gage

Application



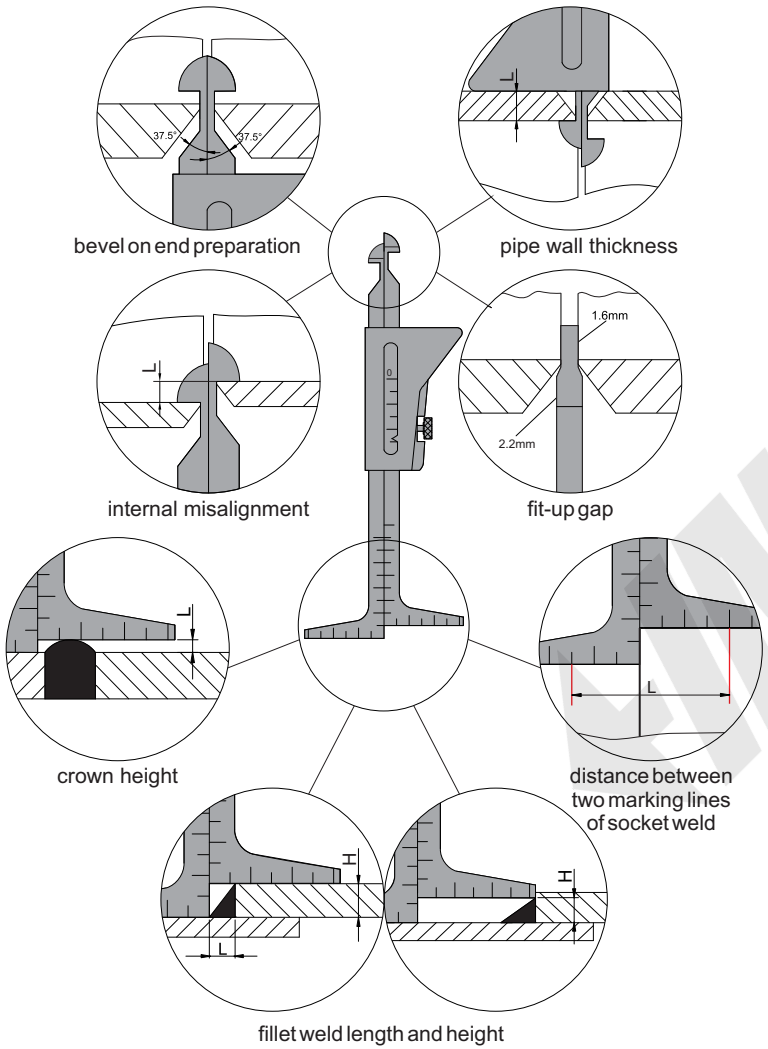
Measurement	Range	Graduation	Accuracy
undercut depth	0 - 6mm	0.5mm	±0.5mm
crown height	0 - 6mm	0.5mm	±0.5mm
porosity size comparison	1.5mm, 3mm	—	±0.2mm
amount of porosity per 25mm	25mm	1mm	—

MN-4834-E

V0

OPERATION INSTRUCTION
Pipe Welding Gauge

Measuring purpose



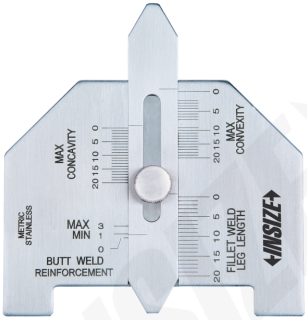
Measurement	Range	Graduation	Accuracy
bevel on end preparation	37.5°	—	±1°
pipe wall thickness	0 - 45mm (0 – 1-3/4")	1mm (1/16")	±0.5mm
internal misalignment	0 - 35mm (0 – 1-3/8")	1mm (1/32")	±0.5mm
fit-up gap	1.6mm, 2.2mm	—	±0.1mm
crown height	0 - 35mm (0 – 1-3/8")	1mm (1/32")	±0.5mm
distance between two marking lines of socket weld	0 - 60mm (0 – 2-3/8")	1mm (1/16")	±0.5mm
fillet weld length	0 - 30mm (0 – 1-1/4")	1mm (1/16")	±0.5mm
fillet weld height	0 - 35mm (0 – 1-3/8")	1mm (1/32")	±0.5mm

MN-4839-1-C/E

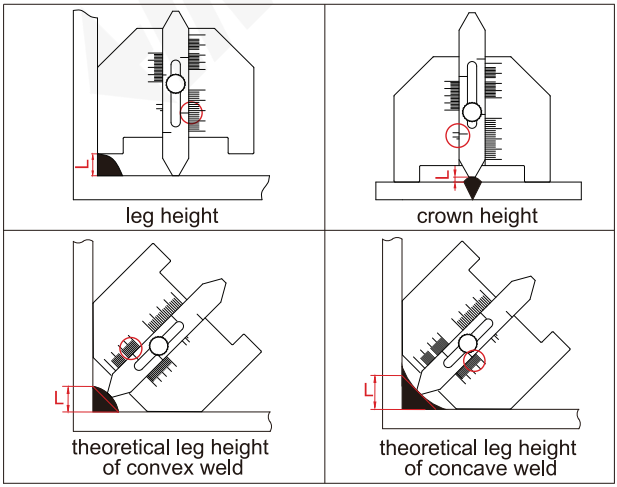
OPERATION INSTRUCTION

Welding Gage

Code	Measurement	Range	Graduation	Accuracy
4851-1	leg height	0-20mm	1mm	±0.5mm
	crown height	0-3mm	—	±0.5mm
	theoretical leg height of convex weld	0-20mm	1mm	±0.5mm
	theoretical leg height of concave weld	0-20mm	1mm	±0.5mm



1. Application



MN-4851-C/E

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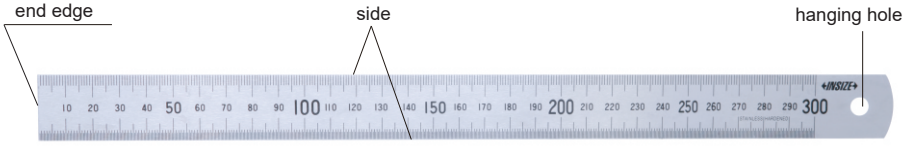
OPERATION INSTRUCTION
STEEL RULER(ECONOMIC TYPE)

Graduation：0.5mm, 1mm, 1/64", 1/32", 1/16"

Code	Range	Accuracy	Remark
7110-150	150mm/6"	±0.18mm	metric graduation on front and inch graduation on back
7110-200	200mm/8"	±0.18mm	
7110-300	300mm/12"	±0.27mm	
7110-3001	300mm/12"	±0.27mm	
7110-500	500mm/20"	±0.40mm	
7110-600	600mm/24"	±0.50mm	
7110-1000	1000mm/40"	±0.50mm	
7110-1200	1200mm/48"	±0.80mm	metric and inch graduation on front
7110-1500	1500mm/60"	±1.00mm	
7110-2000	2000mm/80"	±1.00mm	



1. Measurement:
   ---Before measurement, wipe the steel ruler and the surface of the measured workpiece clean with a clean soft cloth.
   ---When using, the zero mark on the left end should be used as the measurement reference.
   ---When measuring, the ruler should be placed upright and not tilted.

2. Precautions:
   After using the steel ruler, wipe off the dirt on the ruler surface and place it flat on the workbench or hang the ruler with the hanging hole on the right end to prevent deformation of the steel ruler.

MN-7110-E
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