



## PT. Metro Rekayasa Indonesia

### ABOUT US

We build industrial relation with professional work, trying to get solution for customer problem, Focus on customer satisfy is our responsibility, making efficiency and effective production process with our tools. We Provide with products brand of: Europe, American, Japan and Taiwan.



### CONTACT US

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## Metro Rekayasa Products

### A Abrasive Tools

- 1 Buffing
- 2 Flat Wheel
- 3 Grinder Wheel
- 4 Marking

### B Cutting Tools

- 1 Drill, Tap, Reamer
- 2 Endmill, Drill, Counter
- 3 Saw Blade
- 4 Special Tools
- 5 Turning Tools

### C Machine Tools

- 1 Boring Turning System
- 2 Drill Chuck
- 3 Rotary Table
- 4 Tools Holder Milling
- 5 Tool Holder Tapping
- 6 Tools Accesories

### D Machinery

- 1 Band Saw Machine
- 2 Industrial Machine
- 3 Laser Machine
- 4 Lathe Machine
- 5 Milling Machine
- 6 Precision Drill Grinder

### E Metrology

- 1 Bench Centre
- 2 Block Gauge
- 3 Calibrator
- 4 Caliper
- 5 Dial and Height Gauge
- 6 Dial Indicator
- 7 Digital Microscope
- 8 Gauges
- 9 Inspection Jig
- 10 Magnifier
- 11 Micrometer
- 12 Optical Instruments
- 13 Protector
- 14 Surcafe Plate
- 15 Tester Instruments





### F. Maintenance and Industrial Service:

1. Compressor
2. Dryer
3. Chiller
4. Boiler









GRINDING WHEEL







picture	product name	product information
	<u>Cutting Wheel</u>	<ul style="list-style-type: none"> <li>▪ Double reinforced cut off wheel for metals.</li> <li>▪ 2.3mm thickness for long lasting durability.</li> <li>▪ The depressed center design allows the flange/lock nut to recess within the wheel.</li> </ul>
	<u>Sand Wheel C80</u>	<ul style="list-style-type: none"> <li>▪ Mesh cut off wheel for FRP.</li> <li>▪ Suitable for plastics includes FRP.</li> </ul>
	<u>Jaan Cut</u>	<ul style="list-style-type: none"> <li>▪ Cut off wheel for metals.</li> <li>▪ Reduce heat damage and burr formation by our original technology.</li> </ul>
	<u>Newregi Cut</u>	<ul style="list-style-type: none"> <li>▪ Cut off wheel for metals.</li> </ul>



**Lineup of Grinding and Sanding wheel**

picture	product name	product information
	<u>Mini air grinder Kujin</u>	<ul style="list-style-type: none"> <li>▪ Air mini grinder with spindle lock can be used for both 2'1/4 and 3' wheels.</li> <li>▪ High power, high torque!</li> </ul>
	<u>GreenZ</u> <u>High GreenZ</u>	<ul style="list-style-type: none"> <li>▪ Heavy duty grinding wheel.</li> <li>▪ Excellent durability!</li> <li>▪ High cost efficiency!</li> </ul>
	<u>New Ace</u>	<ul style="list-style-type: none"> <li>▪ Grinding wheel.</li> <li>▪ High performance grinding for the wide range of applications.</li> </ul>
	<u>Super Green Sigma</u>	<ul style="list-style-type: none"> <li>▪ Superior depressed-center grinding wheel to conventional one.</li> <li>▪ General purpose grinding wheel.</li> <li>▪ Moderate flexibility reduces noise and vibration.</li> </ul>
	<u>Super Green</u>	<ul style="list-style-type: none"> <li>▪ Flexible grinding wheel.</li> <li>▪ This is the constant-seller item of green color wheel.</li> <li>▪ General purpose grinding wheel.</li> </ul>
	<u>Super μ</u>	<ul style="list-style-type: none"> <li>▪ Flexible grinding wheel.</li> <li>▪ General purpose grinding wheel.</li> </ul>

	<u>Fine Touch</u>	<ul style="list-style-type: none"> <li>▪ Flexible grinding wheel.</li> <li>▪ Best suited for corner grinding!</li> </ul>
	<u>Sand Wheel</u>	<ul style="list-style-type: none"> <li>▪ Mesh abrasive wheel for polishing.</li> <li>▪ Minimized welding, clogging and heat damage.</li> <li>▪ Various sizes are available.</li> </ul>
	<u>Cloth-in-wheel</u>	<ul style="list-style-type: none"> <li>▪ Flap Disc.</li> <li>▪ Original flexible base absorbs vibration and impact.</li> <li>▪ 15mm and 16mm hole size are available.</li> </ul>
	<u>FC Disc</u>	<ul style="list-style-type: none"> <li>▪ Non-woven disc for grinding.</li> <li>▪ Designed for moderate stock removal and smooth finish on the surface.</li> <li>▪ Its breathability eliminates the heat damage problem.</li> </ul>
	<u>Free Sand</u>	<ul style="list-style-type: none"> <li>▪ Mesh abrasive wheel.</li> <li>▪ Stack 2 to 5 discs as needed.</li> <li>▪ The mesh layout reduces clogging and welding.</li> <li>▪ Ideal for wide range of applications such as polishing steel ,stainless steel, nonferrous metals, plastics and wood products.</li> </ul>
	<u>Tungsten Carbide Burr</u>	<ul style="list-style-type: none"> <li>▪ Tungsten Carbide Rotary Burrs.</li> <li>▪ Various type of head shapes, cutting styles and sizes are available for wide range of applications.</li> </ul>
	<u>Mini Super Green</u>	<ul style="list-style-type: none"> <li>▪ Small diameter wheel is designed to fit in the narrow space or small area.</li> <li>▪ General purpose grinding wheel.</li> <li>▪ Long lasting durability!</li> <li>▪ Minimized clogging and heat damage!</li> <li>▪ Suited to the person who want to reduce the working hours.</li> </ul>
	<u>Mini Sand Wheel</u>	<ul style="list-style-type: none"> <li>▪ Small diameter wheel is designed to fit in the narrow space or small area.</li> <li>▪ Mesh abrasive wheel.</li> <li>▪ Minimized welding, clogging and heat damage.</li> </ul>
	<u>Mini P Wheel</u>	<ul style="list-style-type: none"> <li>▪ Small diameter wheel is designed to fit in the narrow space or small area.</li> <li>▪ High grinding performance wheel is suited for light grinding and polishing.</li> <li>▪ Designed for surface grinding.</li> <li>▪ Long lasting durability!</li> </ul>

	<p><u>Mini R Wheel</u></p>	<ul style="list-style-type: none"> <li>▪ Small diameter wheel is designed to fit in the narrow space or small area.</li> <li>▪ Provides smooth and controlled grinding action for producing smooth surface.</li> <li>▪ Designed for curve grinding.</li> </ul>
	<p><u>Mini FC Disc</u></p>	<ul style="list-style-type: none"> <li>▪ Small diameter wheel is designed to fit in the narrow space or small area.</li> <li>▪ Non-woven disc for grinding.</li> <li>▪ Designed for moderate stock removal and smooth finish on the surface.</li> <li>▪ Its breathability eliminates the heat damage problem.</li> </ul>
	<p><u>Mini Quick Paper</u></p>	<ul style="list-style-type: none"> <li>▪ Small diameter wheel is designed to fit in the narrow space or small area.</li> <li>▪ Screw type disc enables quick change by hand without tools.</li> <li>▪ Designed for surface grinding, curve grinding.</li> </ul>
	<p><u>Mini Quick FC</u></p>	<ul style="list-style-type: none"> <li>▪ Small diameter wheel is designed to fit in the narrow space or small area.</li> <li>▪ Screw type disc enables quick change by hand without tools.</li> <li>▪ Designed for moderate stock removal and smooth finish on the surface.</li> <li>▪ Its breathability eliminates the clogging and heat damage problem.</li> </ul>

**Accessories**

picture	product name	product information
	<p><u>YAKESHIRAZU GOLD (Anti Burning Lubricating Block)</u></p>	<ul style="list-style-type: none"> <li>▪ The product helps grinding and polishing works.</li> <li>▪ Solving a clogging of grinding wheel by a lubricating.</li> <li>▪ Preventing a burn of workpiece by a heat absorption.</li> </ul>
	<p><u>Mini Quick Pad</u></p>	<ul style="list-style-type: none"> <li>▪ Quick wheel removal and mounting without tools.</li> <li>▪ Features smooth and controlled operation for superior curve grinding and finishing.</li> </ul>





## TABLE SCRIBE MARKING SYSTEMS

The machine type MV5 VT0 is designed as a scribe marking system with a marking area of 100 x 100 mm. The system features are very high quality and a very low noise emission at marking.

High value linear guides in connection with ball bearing screws guarantee highest marking repeat accuracy and assure high stability of the marking head. Two brushless stepping motors drive the marking axis. The marking head is maintenance free and offers optimal wear properties.

Due to the robust mechanics, the marking head MV5 VT0 is particularly suitable to mark high-precision Data Matrix Codes – also in small sizes.

The different marking forces are infinitely adjustable by the pressure controller of the filter regulator.

The marking system is equipped with the strongest scribe stylus size F and a low-wear diamond-equipped marking pin with a radius of 0,2 mm.

The marking pin works pneumatically. Depending on the customer's application, other pin sizes and radii are available. The scribe stylus is maintenance free.



### BEST QUALITY



#### Technical data

**Marking area (x/y):**

MV5 VT0 (x/y) 100 x 100 mm

**Available character heights**

1,0 to 99,9 mm,  
continuously adjustable in 1/10-steps

**Marking direction**

Any, from 0° to 360°

**Fonts**

Standard, similar to DIN 1451 in a continuous line or in single dot characters, size 5 x 7 and 9 x 13

**Available characters**

Capital and small letters A to Z,  
figures 0 to 9, various punctuation marks

**Resolution of the stepping motors:**

0,0125 mm for an extremely high marking quality

**Required space of the table marking system:**

342 x 515 mm

## OPTIONS



### Rapid column frame

Due to the easy handling and the exact positioning by a multifunctional hand wheel, the rapid column frame is an efficient way to mark individual parts quickly and with a good solution. It has a z-stroke of 300 mm and will be delivered with a height holding fixture and optional with a laser pointer for an even quicker operation. Because of the quick adjustment tool on the column frame, extremely short setup times and therefore time savings of up to 70%, compared to the standard column with crank handle, can be reached.

[A short movie to this option can be found using following link:](http://www.markator.de/videos.html)  
<http://www.markator.de/videos.html>



### Height adjustment with electrical motor

The height of the marking head can be set automatically with the help of the motorized z-axis. Because of the existing teach in function of the software, the coordinates can be adjusted and saved easily using the arrow-keys. Especially while marking work pieces with interference contours, this option shortens the marking times enormously. A constant distance between marking pin and work piece can be ensured.

[A short movie to this option can be found using following link:](http://www.markator.de/videos.html)  
<http://www.markator.de/videos.html>



### Rotating axis RKM

The optional rotating axis RKM is used for the radial and axial marking of round pieces. Wherever the automatic height tolerance adjustment of the marking pin is not sufficient, this option is perfect. The optional rotating axis RKM includes in the standard scope of delivery a three-jaw chuck out of steel with jaws for clamping and a flange, a mounting plate RKM including identification tag holding fixture and magnets.

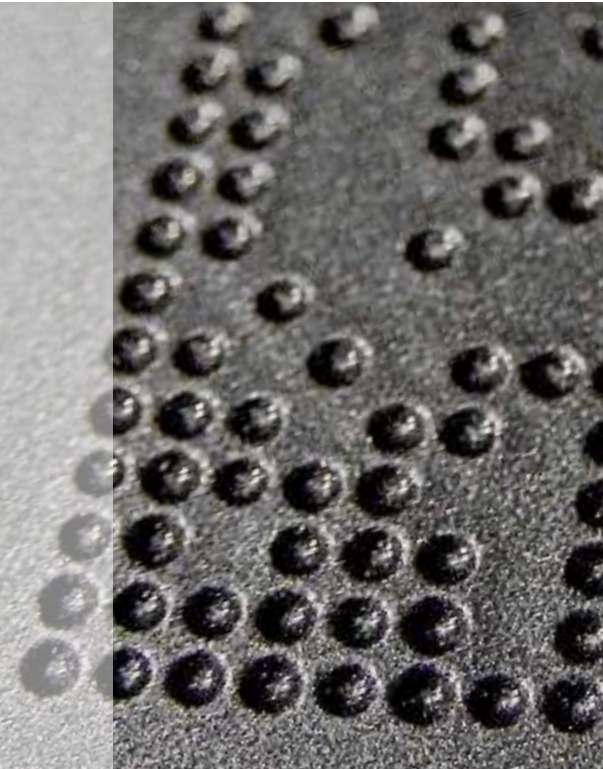
[A short movie to this option can be found using following link:](http://www.markator.de/videos.html)  
<http://www.markator.de/videos.html>



### Electric safety foot switch

Fast and efficient operation! Using the electric safety foot switch offers two major advantages. First your hands are free to do the positioning of the work piece to be marked. This means the work piece is even more surely correctly positioned. Secondly it is possible to reach faster marking times by a quicker positioning and by triggering the marking using the foot switch.

## TYPICAL APPLICATIONS



### Data Matrix Code

For all applications relating to fast production lines, difficult interfaces, a small marking area or safe codes, a 2D-Code is the perfect solution.

The Data Matrix Code is one of the most important representatives in the range of two-dimensional codes. It is already the standard coding of the future. This modern and machine readable marking, provides a high information density and an omnidirectional readability.

The reconstruction of the data content by the Reed-Solomon error correction is even possible in cases where the code is destroyed by up to 25%.

Benefits of the Data Matrix Code:

- High information density on small areas
- Memory capacity from 1 to 2300 characters
- Readable with low contrast
- Reduction and increasing of the data content without changing the physical size of the code
- Readable with every angle of vision
- Registration of fast moving objects



### Identity Tags

To mark products for future identification and to guarantee traceability, identity tags are a good solution. Manufacturing numbers, serial numbers, etc can be marked on the identity tag which can be attached to the particular product.

We offer different solutions depending on style and size of the identity tag. With our central control units it is very easy to prepare and modify marking files. If a high number of identity tags is required, we can offer automatic solutions in form of an automatic type plate machine. Please ask us for further information if this is of interest!



### Logos

Beside alphanumeric characters, it is also possible to mark your company logo, the logo of your customer or a certification mark (for example the CE-mark) on your product. The central control units offer a certain amount of memory space to save these logo-files. The logos itself will be created by MARKATOR® and we will save them on your central control unit before delivery. Optionally it is possible to buy the HPGL-software to administer, convert and transfer the logo and graphic files by yourself. With this you can create as many logos as you want and transfer them onto your central control unit as required.

## MORE PRODUCTS



### Marking head MV5 VU4

The scribe marking head MV5 VU4 (marking area 80 x 50 mm) is featured by a very low noise emission and an extremely high marking quality! With the option SPRINT you will achieve an even shorter marking time.



### Marking head MV5 U50/25

The compact marking head MV5 U50 (50 x 25 mm) is developed to be integrated in any kind of production line. In connection with the central control unit ZE 101 XL, a fast and easy integration in automatic production processes is possible.



### FlyMarker® PRO

Battery operated handy and compact hand-held marking system to mark unmovable and large parts directly on site. In the STATION version also suitable for the marking of small work pieces.



### Central control units MV5 ZE 100/101 XL

Especially developed for the use in integration plants. The central control unit MV5 ZE 100 XL is convincing due to just 6 LED lights as control function to its simplicity. The central control unit MV5 ZE 101 XL is equipped with the option TOUCH and enables with a colour LC-display and a capacitive keyboard an efficient setup.



### Central control unit MV5 ZE 401 XL

The central control unit MV5 ZE 401 XL meets the highest requirements. It is available as front- or rear panel installation as well as 19" rack- or table top option. Special features: type of protection IP54, high-resolution colour LC-display, diagnostic function.



### Conventional Marking

In addition to the CNC controlled marking systems we also offer products in the range of conventional marking – e.g. impact marking systems, numbering heads, interchangeable steel types, marking tools and every kind of special stamps.



Member IMC Group

## Turning Tools & Inserts



Cutting Tools

# Sawblades

**LENOX**



**MADE IN USA**



For fast production cutting of most solids



### Features

M42 HSS tooth  
15° positive curvilinear tooth

### Benefits

Fast cutting, wear-resistant blade



Use these blades to saw these materials  
• Easy-to difficult-machining metals at fast production rates

→  
Cutting  
Edge



## Penetrator Bi-Metal Blades

INCH			MULTI PITCH Teeth per Inch										METRIC		
Width	Gage	Set	0.8-1.2	1-1.5	1.3	1.5-2	2	2-3	3	3-4	4-6	5-8	Width	Gage	Set
3/4	0.035	0.058										301 041	19	0.9	1.47
1	0.035	0.055											27	0.9	1.40
		0.058						301 423	301 598	301 615	301 656	1.47			
		0.060							301 719			1.52			
1-1/4	0.042	0.062											34	1.1	1.57
		0.065						301 689	301 739	301 748	301 789	1.65			
1-1/2	0.050	0.072			301 594		301 842						41	1.3	1.83
		0.078									301 375				1.98
2	0.063	0.080		301 330		301 880		301 879		301 887			54	1.6	2.03
		0.090									301 384				2.29
		0.095									301 085				2.41
		0.100	301 072	301 071	301 073	301 070		301 069							2.54
2-5/8	0.063	0.120								301 088	301 091		67	1.6	3.05
		0.090									301 181	301 180			2.29
3.15	0.063	0.100		301 183	301 185		301 186		301 1814				80	1.6	2.54
		0.100	301 430	301 433						301 990					2.54

Wide set precision teeth provide greater back clearance

Claw Tooth

Precision Tooth



# Cutting Tools



● Ballnose, Roughing, Endmill



● Thread Milling Cutter



● Deburring Tools



● Reamer



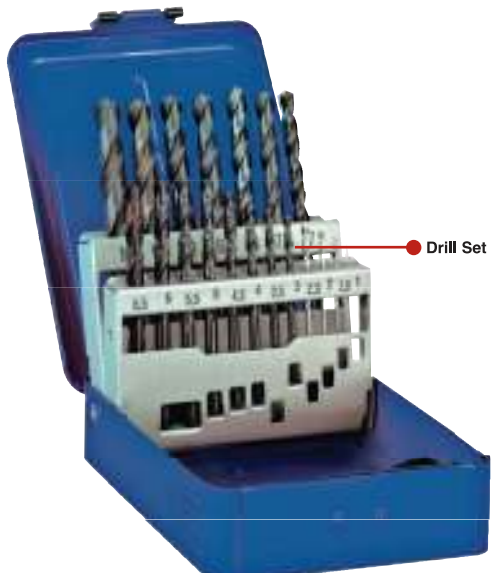
● Face Milling Cutter



● Centre Drill



● HSS Co Tap



● Drill Set



● Special Tools



● HSS Co Drill

# MACHINE TOOL



**MADE IN  
TAIWAN**



**Machine Tools**



MACHINERY



# JK-SERIES

Precision Technology  
**KURODA**



**MADE IN JAPAN**   
**日本製**

Machinery

**DY - 410; 460**  
**2 5/8" SPINDLE BORE**



**Model**

Table  
Table surface  
Table Longitudinal Travel (Manual)  
Table Longitudinal Travel (Power feed)  
Table Cross Travel  
Table Vertical Travel  
Spindle  
Distance from Spindle to table  
Distance from Spindle to Column Surface

**Features:**

- The headstock gear made of Chrom-Molybdenum Alloy steel (SCM21), Carburization Hardened, Precision Ground for smooth and quiet running
- Large hole through spindle. The spindle is 3 point supported by precision bearing assures long lasting cutting stability
- The headstock is a totally enclosed design in oil bath lubrication. A forced lubrication pump delivers oil contacting surface for excellent lubrication effect
- The gear box provides inch/metric threading capacity. Totally enclosed in oil bath lubrication system. It allows accurate cutting of inch and metric threads. A shear pin is fitted for overload protection.
- Extra wide bed is ruggedly constructed of high tensile meehanite casting, annealing treated to relieve stress. Bed ways are high frequency heat treated, precision ground (hardened over 70°)
- Bed-carriage slide way is coated with Turcite-B for less friction and wear, and smooth traverse
- The bed and base is one piece constructed for maximum rigidity, which avoids vibration and tool chattering when in heavy duty cutting
- Carriage is head treated (Hardened over 70°) precision ground to extend its service life
- Hand and automatic lubricator provides lubrication to longitudinal and cross slide ways
- Cross feed screw has back adjustment, which runs in oil bath lubrication for maintaining accuracy and durability
- The apron has interlock device to prevent feeds and thread cutting motions operation simultaneously
- Specially designed rapid traverse for efficient longitudinal and cross traverse
- Extremely rugged tailstocks easy to move. Tailstock quill is hardened and precision ground making it ideal for precision turning and drilling and operations

TRUMPF Laser Marking  
All-in one box solutions.

TruMark 1108  
TruMark 5008



Machine Tools/Power Tools  
Laser Technology/Electronics



Machinery



Machinery

**TruMark Series 3000**

	<b>TruMark 3020</b>	<b>TruMark 3130</b>	<b>TruMark 3230</b>
Wavelength	1064 nm	1064 nm	532 nm
Pulse repetition frequency	cw, 1–100 kHz	cw, 1–100 kHz	1–100 kHz
Max. size of marking field <sup>[1]</sup>	290 x 290 mm <sup>2</sup> ; f = 420 mm	290 x 290 mm <sup>2</sup> ; f = 420 mm	230 x 230 mm <sup>2</sup> ; f = 330 mm
Min. focal diameter <sup>[2]</sup>	30 µm	28 µm	15 µm
Max. internal focal point adjustment <sup>[3]</sup>	± 60 mm	± 60 mm	± 60 mm
Laser medium	Nd:YAG	Nd:YVO <sub>4</sub>	Nd:YVO <sub>4</sub>
Beam quality M <sup>2</sup> /Intensity allocation	1.5/TEM <sub>00</sub>	1.2/TEM <sub>00</sub>	1.2/TEM <sub>00</sub>
Scanner calibration accuracy	± 50 µm	± 50 µm	± 50 µm

**Connection and set-up**

Electrical connection	85 ... 264 V; 47 ... 63 Hz, 10 A	85 ... 264 V; 47 ... 63 Hz, 10 A	85 ... 264 V; 47 ... 63 Hz, 10 A
Max. power consumption	0.6 kW	0.6 kW	0.6 kW
Average power consumption	0.3 kW	0.3 kW	0.3 kW
Protection class	IP 54	IP 54	IP 54
Weight of processing unit	10 kg	10 kg	10 kg
Dimensions of processing unit (L x W x H)	380 x 138 x 138 mm	380 x 138 x 138 mm	380 x 138 x 138 mm
Weight of power-supply unit	34 kg	34 kg	34 kg
Dimensions of power-supply unit (L x W x H)	420 x 445 x 465 mm	420 x 445 x 465 mm	420 x 445 x 465 mm
Permitted ambient temperature of air cooling system	15–40°C	15–40°C	15–40°C

<sup>[1]</sup> Other lens and marking field sizes available. <sup>[2]</sup> Where f = 100 mm. <sup>[3]</sup> Depending on the focal length. Subject to alteration. Only specifications in our offer and order confirmation are binding.

tecmet 2000

MADE IN ITALY



- Solid STRUCTURE made of a 4 mm BEND STEEL SHEET, WELDED and VARNISHED
- Transparent and shock absorbent cover, with rollaway opening system
- Manual descent cutting system by mean of the cutting lever
- Cutting lever 'locked' position when cutting lengthwise with translation table
- Cutting wheel standard  $\varnothing$ : 300mm (optionally 350mm  $\varnothing$ )
- Distance between cutting wheel and T-slot : 110mm with 300mm  $\varnothing$  cutting wheel (distance from the cutting wheel spindle to the T-slot: 260mm)
- Cutting capacity: 108mm with 300mm  $\varnothing$  cutting wheel
- Cutting wheel rotational speed: 3000rpm
- Engine power: 4 Kw
- Left and right side ports for long bars
- Double T-slot fixed system (360x270mm) to fit clamping vices, with chemical Nickel treated grooves
- Low-tension electric commands on the front panel: Start – stop – pump – emergency button
- Safety opening of the cover with time controlled interlock system
- Working area cleaning hose and additional hose for sample cooling
- Machine dimensions: 700w X 810h X 865l mm
- Machines overall dimensions 935w X 810h X 888l (967l mm when the optional hand-wheel of the translation table is opened)
- Coolant re-circulating system with pump and sump assembly
- Tank capacity: 40 litres
- Optional translation table, with 200mm Y axis travel
- Weight of basic machine with fixed T-slot: 215 Kg (w/o the coolant recycling system)
- Weight of the machine (with optional translation table instead of fixed T-slot): 235 Kg (w/o the coolant recycling system)
- (Optional) Standing cabinet with: holes for draining pipe housing, lockable front door; sliding lower base to easily pull in/out cooling liquid tank

Machinery

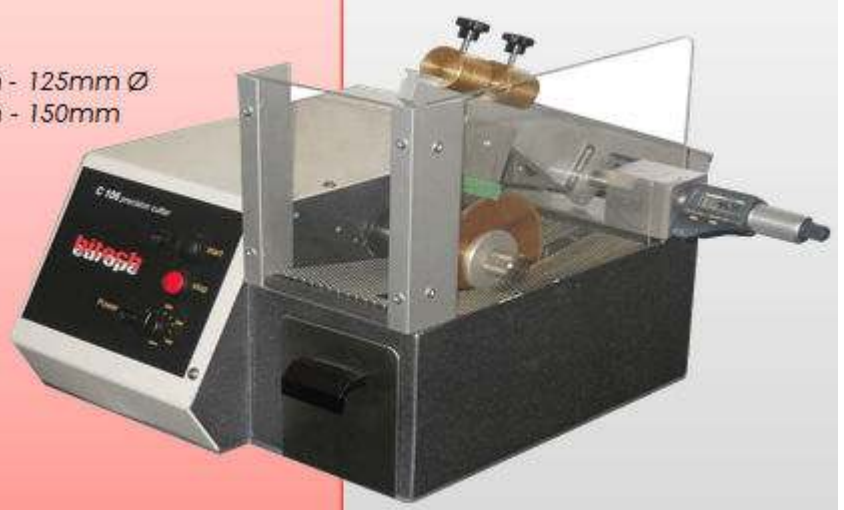
## Precision Sectioning Machine C 100-C106

Low speed precision sectioning machine -

(code 02-16-C106-C) for cutting blades 102mm - 125mm Ø

(code 02-16-C100-C) for cutting blades 102mm - 150mm

- Easy to use
- Solid steel structure
- Small, compact with functional design
- Start/Stop and micro switch limit
- Variable speed up to 400 rpm
- Cutting capacity up to 45mm
- Micrometer feed with 0.01 mm. accuracy
- Easily removable cutting fluid tank
- Variable loading from 0 to 300 grams
- Accommodates diamond, silicon carbide and aluminium oxide wafering blades from 102 to 150mm



### ACCESSORIES

- Chuck double hold down (1)
- Chuck long samples saddle type (2)
- Chuck wafers single crystals, thin sections (3)
- Chuck bars or tubes (4)
- Chuck for special precision (5)
- Chuck bone & other irreg samples (6)
- Chuck irreg samples 7 screws (7)
- Chuck for round mounted samples 25x32mm (8)
- Chuck flanges/blades 100mm
- Chuck flanges/blades 127mm to 150mm
- Dressing stick holder



3



7



2



4



5



8



1



6

N.B. The Cut off Saw is supplied with the Chuck long samples saddle type (code 03-12-0002-A).



## METALLOGRAPHIC CUTTING MACHINE C320



- Solid STRUCTURE made of a 4 mm BEND STEEL SHEET, WELDED and VARNISHED
- Transparent and shock absorbent cover, with rollaway opening system
- Manual descent cutting system by mean of the cutting lever
- Cutting lever 'locked' position when cutting lengthwise with translation table
- Cutting wheel standard Ø: 300mm (optionally 350mm Ø)
- Distance between cutting wheel and T-slot : 110mm with 300mm Ø cutting wheel (distance from the cutting wheel spindle to the T-slot: 260mm)
- Cutting capacity: 108mm with 300mm Ø cutting wheel
- Cutting wheel rotational speed: 3000rpm
- Engine power: 4 Kw
- Left and right side ports for long bars
- Double T-slot fixed system (360x270mm) to fit clamping vices, with chemical Nickel treated grooves
- Low-tension electric commands on the front panel: Start – stop – pump – emergency button
- Safety opening of the cover with time controlled interlock system
- Working area cleaning hose and additional hose for sample cooling
- Machine dimensions: 700wX810h X865l mm
- Machines overall dimensions 935w X810h X 888l (967l mm when the optional hand-wheel of the translation table is opened)
- Coolant re-circulating system with pump and sump assembly
- Tank capacity: 40 litres
- Optional translation table, with 200mm Y axis travel
- Weight of basic machine with fixed T-slot: 215 Kg (w/o the coolant recycling system)
- Weight of the machine (with optional translation table instead of fixed T-slot): 235 Kg (w/o the coolant recycling system)
- (Optional) Standing cabinet with: holes for draining pipe housing, lockable front door; sliding lower base to easily pull in/out cooling liquid tank

# MANUAL POLISHERS MP series



**MP 22V**  
(code 02-30-020V-C)



**MP 22**  
(code 02-30-0201-C)



**MP32V**  
(code 02-30-302V-C)

- Corrosion, heat and impact resistant moulded cover
- Solid steel chassis and stainless steel bolts and screws
- Adjustable tap for water flow
- Removable working wheel 200/230/250/300 mm Ø (not included)
- Cover and splash ring
- Adjustable hydraulic unit
- Motor 220V – AC – 0,75kW - 50 Hz Inverter Controlled Motor, with torque control variable speed
- Motor 220V – AC – 0,37 Kw – 50 Hz for fixed speed versions



**MP32**  
(code 02-30-0302-C)



**MP 22T**  
(code 02-30-022T-A)



**MP32T**  
(code 02-30-032T-A)

## Accessories



Magno Base



Working Wheel



Magno Plate



Paper Clamp



Xlam Fas

**Machinery**

MODEL	MP22 Double Wheel Ø 200 mm	MP22V Double Wheel Ø 200 mm	MP32 Double Wheel Ø 300 mm	MP32V Double Wheel Ø 300 mm	MP22T Double Wheel Ø 200 mm	MP32T Double Wheel Ø 300 mm
code	02-30-0201-C	02-30-020V-C	02-30-0302-C	02-30-302V-C	02-30-022T-A	02-30-032T-A
Working wheel rotational speed	300	0~600	300		0~600	
Working Wheel Rotation	Clockwise				Clockwise/Counterclockwise	
Working Wheel Ø	200/230 mm		250/300 mm		200/230 mm	250/300 mm
Analog Electronics	Yes				No	
Touch-screen	No				Yes	

## AUTOMATIC POLISHERS AP Series

Best quality/price ratio

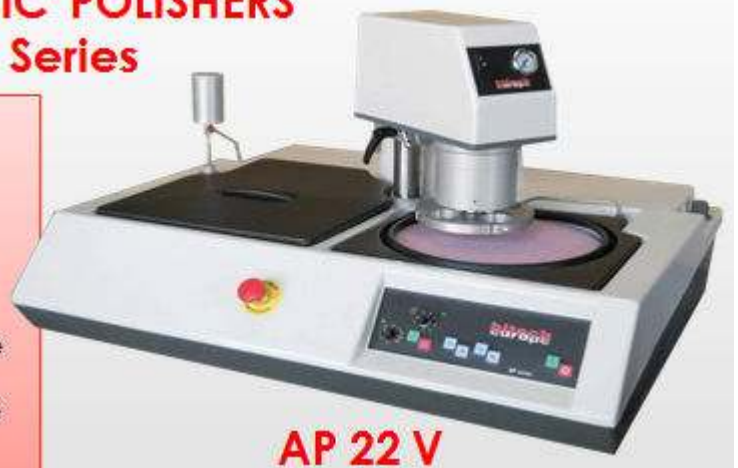
Powerful equipment

Corrosion, impact resistant

Head rotates at 78rpm

Control panel with Start, Timer and Water on/off

A good sample preparation is essential for accurate sample analysis. The Hitech Europe Polishing Machines - AP Series meet all your needs. Their ease of use, quality of construction, technical features and convenience are all fundamental ingredients that make the AP the best choice for your Laboratory.



**AP 22 V**

(code 02-31-2DVA-C)



**AP 32/3**

(code 02-31-1DTA-C)



**AP 32/5**

(code 02-31-4DVA-C)



**AP 32 COMBO/V**

(code 02-31-7DVA-C)

**Machinery**

MODEL	AP 22 Double Wheel Ø 200 mm.	AP 22/3V Double Wheel Ø 200 mm	AP 32/3 Double Wheel Ø 300mm	AP 32/5 Double Wheel Ø 300mm.	AP 32 COMBO/V Wheel Ø 300mm.
Sample Holder	Individual Pressure (3 samples)			Individual Pressure (5 samples)	Individual Pressure (5 samples)+
Motorized head rotational speed	fixed 75 rpm	variable 0~75 rpm	fixed 75 rpm		variable 0~75 rpm
Working wheel rotational speed (clockwise and counterclockwise)	0 ~ 600				
Teradrop Jig Samples (central pressure)	No				4/5/8/10 samples
Sample Holder 3 holes (Ø 25-30-32-38-40 mm.)	Yes			No	
Sample Holder 3 holes (Ø 50 mm.)	Yes			No	
Sample Holder 5 holes (Ø 25-30-32-38-40 mm.)	No			Yes	
Customized Sample Holder or JIG	Yes				

## DIGITAL POLISHERS TSP Series Touch Screen

This Series is based on the efficiency of their electronic parts, which help the operator in his job. It is possible to set up each step of the polishing cycle, in order to guarantee better results with less efforts. The operator can change the settings during the cycle. The PLC, digital electronic is controlled via touch screen, with the possibility to store up to 150 programs with 10 passwords. The electronic control of the parameters is done with extreme precision in order to determine the repeatability of the programs. The operator can store all the cycle parameters: the working wheel rotational speed and the direction, the pressure of the sample, the cycle time and the control of the water and of the fluids used.



MODEL	TSP 32/3	TSP 32 COMBO V	TSP 22	TSP 22/3
Teradrop Jig Samples (central pressure)/levelling base	No		4/5/8/10 campioni	No
Sample Holder 3 holes (Ø 25-30-32-38-40 mm.)	Yes		No	Yes
Sample Holder 3 holes (Ø 50 mm.)	Yes		No	Yes
Sample Holder 5 holes (Ø 25-30-32-38-40 mm.)	No		Yes	No
Working Wheel (Ø 203 – 230 mm.)	Yes	No		Yes
Working Wheel (Ø 250 – 305 mm.)	No	Yes		No
Sample Spacer (Ø 25-30-32-38-40mm) Ø est. 50mm	Yes		No	Yes
Grinding Paper Clamp (Ø 203 – 230 mm.)	Yes	No		Yes
Grinding Paper Clamp (Ø 250 – 305 mm.)	No	Yes		No



**TSP 32/3**  
(Cod. 02-33-3201-C)



**TSP 22**  
(Cod. 02-33-2200-C)

## AUTOMATIC DISPENSER P 4

By using the easy and intuitive touch screen, it is possible to set the number of pulses per minute and also duration of each pulse.

The P4T version can be combined with any polishing machine of all brands and models, as an independently programmable unit working in parallel with the machine.

The P4T dispenser, can be supplied as an optional with the automatic polishing machine Hitech Europe AP311/T, controlled/programmed through the touch screen of the machine.

### TECHNICAL FEATURES:

- Color Touch-screen 3,5"
- 4 programmable peristaltic pumps
- Adjustable telescopic arm
- No. 4 Bottles for fluid
- Cover in resin reinforced shockproof / corrosion
- Power supply 230V - 50 Hz
- Dimensions: 500x200x350
- Weight: 7 Kg



**Machinery**

# METALLOGRAPHIC POLISHER MP311



**MP 311/V**

(code 02-30-311V-A)



**MP 311/F**

(code 02-30-311F-A)



**MP 311/T**

(code 02-30-311T-A)



**Menu**



**Free cycle**



**Grinding cycle**



**Polishing cycle**

MODEL	MP311F Single Wheel	MP311V Single Wheel	MP311T Single Wheel
code	02-30-311F-A	02-30-311V-A	02-30-311T-A
Cover	Resin reinforced shockproof / corrosion		
Working wheel rotational speed	300	0~600	
Working Wheel Rotation	Clockwise		Clockwise/ Counterclockwise
Working Wheel Ø	200/230/250/300 mm		
Cycle time	No	Yes	
Analog Electronics	Yes	No	

**Machinery**

# METALLOGRAPHIC POLISHER AP311



**AP311T/3V**  
(code 02-31-3311-A)



**AP311/3V**  
(code 02-31-6311-A)



**AP311T/3V & P4T**  
(code 02-31-3311-A & 02-37-D0P4T-C)

**Machinery**

MODEL	AP311/3	AP311/3V	AP311/5	AP311/COMBO	AP311T/COMBO
code	02-31-5311-A	02-31-6311-A	02-31-7311-A	02-31-8311-A	02-31-1311-A
Sample Holder	Individual Pressure (3 samples)		Individual Pressure (5 samples)	Individual Central Pressure (5 samples)	Individual Central Pressure (5 samples)
Teradrop Jig Samples (central pressure)/Levelling base	No			Yes	
Sample Holder 3 holes (Ø 25-30-32- 38-40 mm.)	Yes		No	4/5/8/10 samples	
Sample Holder 3 holes (Ø 50 mm.)	Yes			No	
Sample Holder 5 holes (Ø 25-30-32- 38-40 mm.)	No			Yes	
Working Wheel (Ø 203 – 230 mm.)			Yes		
Working Wheel (Ø 250 – 305 mm.)			Yes		
Sample Spacer (Ø 25-30-32-38mm) Ø est. 40mm			Yes		
Sample Spacer (Ø 25-30-32-38-40mm) Ø est. 50mm	Yes			No	
Grinding Paper Clamp (Ø 203 – 230 mm.)			Yes		

# SE-EV Series Advanced All-Electrics

Model sizes: 56, 84, 112, 146 and 202 U.S. tons



New NC-10 control with Z-molding capabilities plus improved ease-of-use, processing speeds and configurability

## The Sumitomo (SHI) Demag Difference

- Sumitomo's advanced motor technology and the company's ability to design and build specialized motors for injection molding machines, ensuring the best combination of motors for the machine type, function and size
- Over 20 years of R&D on all-electric injection molding machines
- A successful track record of breakthrough technologies that improve precision and production efficiency
- Z-molding capabilities which ensure ease of use, optimize machine performance and redefine precision
- A standard-setting warranty program and highly rated training, service, support and parts availability

Innovations and advanced technology can be seen from end-to-end on the new SE-EV Series all-electric injection molding machine. Building on the high-performance and field-proven SE-DUZ/HDZ platform, the SE-EV redefines molding stability and precision, easy operation and energy efficiency.

Throughout this brochure you'll see the many features and capabilities that are new and/or unique to Sumitomo (SHI) Demag. Our unique Z-molding capabilities, for example, provide exceptional molding precision with low-pressure filling and reduced clamp force, and are designed to help molders achieve zero-defect molding and optimum machine performance.

Sumitomo's advanced motor technology is another unique feature of our all-electric machines. For the SE-EV, the new 3rd generation direct-drive motors used for injection and plasticizing are low inertia/low friction servo motors that deliver exceptional control even at low speeds, improved injection speed response and molding stability.

Some added features to the SE-EV that were not found on the SE-DUZ include: a new linear guidance system and greaseless tie bars, high nozzle-contact force, a 4x16 vertical ejector pattern on the 202 U.S. ton model and the availability of the revolutionary SL Screw as a standard option.

As with all Sumitomo (SHI) Demag machines, the SE-EV is backed by a comprehensive Customer Satisfaction Program with our standard-setting warranty program, worry-free parts, responsive field service and financing availability — plus advantages such as expert processing assistance.

Machinery



## SE280HS-CI (English Units)

Multi-Shot All-Electric

[www.sumitomoPM.com](http://www.sumitomoPM.com)

### CLAMP SPECIFICATIONS

Clamping force	U.S. tons	308
Distance between tie-bars	in	36.22 x 22.05
Open daylight (max.)	in	42.13
Mold space (min.-max.)	in	8.27 – 22.05
Opening stroke (max.)	in	20.08 (18.90 when ejector brake is equipped)
Mold open/close speed (max.)	in/sec	51.18
Locating ring diameter	in	4.0
Ejector pattern	in	Center, 7.0 in. (5 points x 2)
Ejector stroke	in	5.91
Ejector force	U.S. tons	4.4
Mold max weight on moving platen	lb	1102 x 2

### INJECTION SPECIFICATIONS

Plasticizing unit		C250M*			C360M			C510M		
Screw diameter	mm	28	32	36	32	36	40	40	45	50
Injection pressure max.	p.s.i.	41248	31576	24891	39683	31291	24322	35558	28020	22757
Holding pressure max.	p.s.i.	32998	25261	19913	31747	25033	19457	28447	22416	18206
Injection capacity	in <sup>3</sup>	5.2	6.9	8.7	7.87	9.95	12.27	12.27	15.50	19.16
Injection weight (GPPS)	g	83	108	137	124	156	193	193	244	302
	oz	2.9	3.8	4.8	4.4	5.5	6.8	6.8	8.7	10.7
Plasticizing capacity (max.)	lb/hr	81.6	116.8	167.6	117	168	223	223	300	425
Injection rate (max.)	in <sup>3</sup> /sec	11.3	14.7	18.6	14.7	18.6	23.0	23.0	29.1	35.9
Screw stroke	in	5.51			6.30					
Injection speed (max.)	in/sec	11.81								
Screw speed (max.)	rpm	400								
Heater capacity (5 zones)	KW	6.6	7.6	8.5	7.6	8.5	10.4	10.4	11.1	11.3
Nozzle contact force	U.S. tons	1.32			1.32			2.76		
Injection unit stroke (penetration)	in	15.35 (1.77)			17.32 (2.56)					
Hopper capacity	in <sup>3</sup>	1830 x 2								

### MACHINE SPECIFICATIONS

Main breaker capacity	amps	225
Machine dimensions (L x W x H)	in	252 x 70 x 79
Machine weight	U.S. tons	18.7

**NOTES:** Specifications subject to change without notice. Machine series photo at top may be different model size.

\* If C250M is selected, it must be selected for both injection units.

# SE280HS-CI

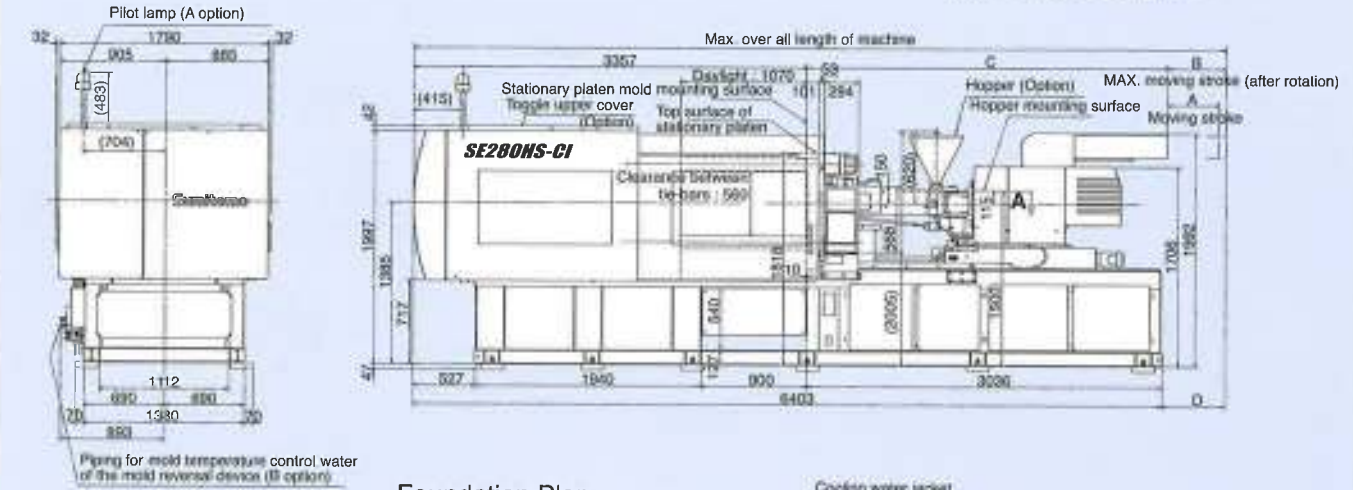
Plasticizing unit	Screw / type	OA	OR	NR	A	B	C	D	Max over all length of machine																								
										OA	OR	NR																					
C250	M	28	28	32	390	450	2527	-69	6403																								
										32	28	32	2617	21	6424																		
																36	32	32	2627	31	6434												
																						36	32	32	2707	111	6514						
																												36	32	32	2717	121	6524

Plasticizing unit	Screw / type	OA	OR	NR	A	B	C	D	Max over all length of machine																				
										OA	OR	NR																	
C360	M	36	36	40	440	655	2772	381	6784																				
										36	36	40	645	2782															
															40	36	40	655	2772										
																				40	36	40	645	2782					
																									40	36	40	565	2862
40	36	40	500	2962	416	6819																							

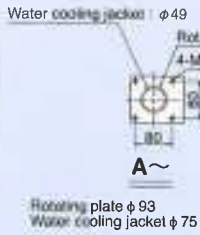
Plasticizing unit	Screw / type	OA	OR	NR	A	B	C	D	Max over all length of machine																								
										OA	OR	NR																					
C510	M	40	40	45	440	500	2927	381	6784																								
										45	40	45	3017	471	6874																		
																50	45	45	3027	481	6884												
																						50	45	45	3107	561	6964						
																												50	45	45	3117	571	6974

OA : Open exclusive type  
 OR : Open type/Open and Needle valve changeable type)  
 NR : Needle valve changeable type  
 (Open and Needle valve changeable type)

**Dimension** The following drawing's dimensions are Japanese specification.



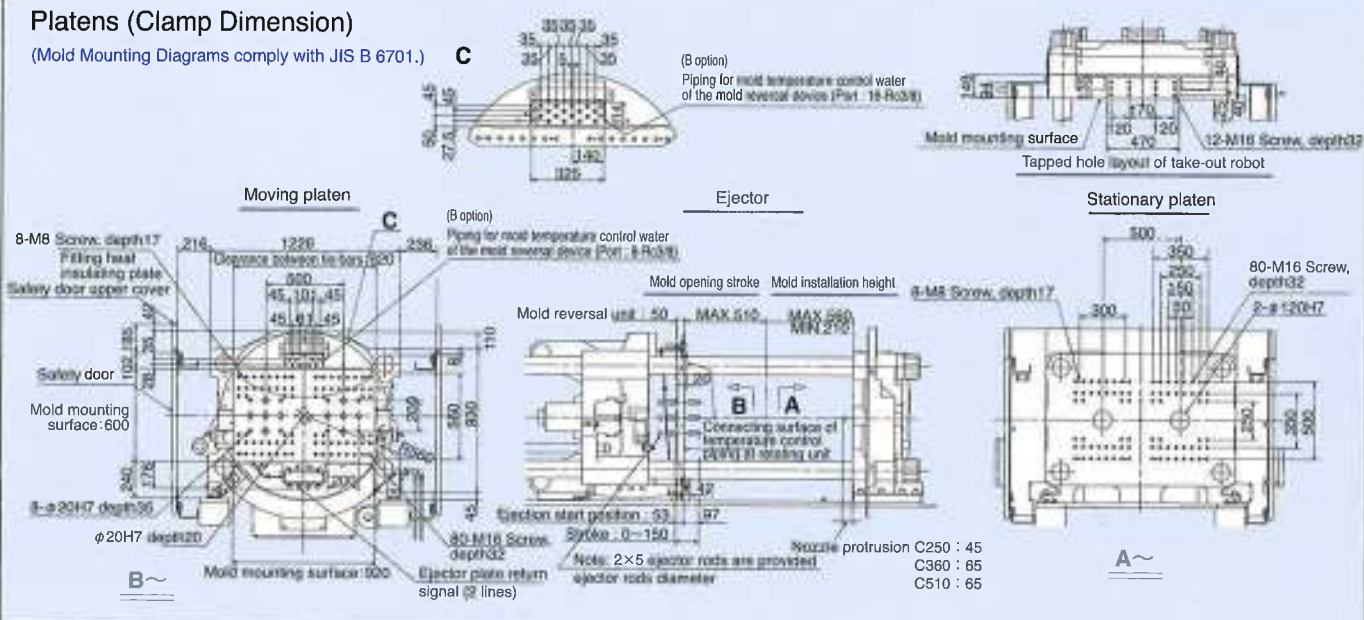
**Foundation Plan**



The figure marked with an asterisk (\*) shows the case of using no leveling pad

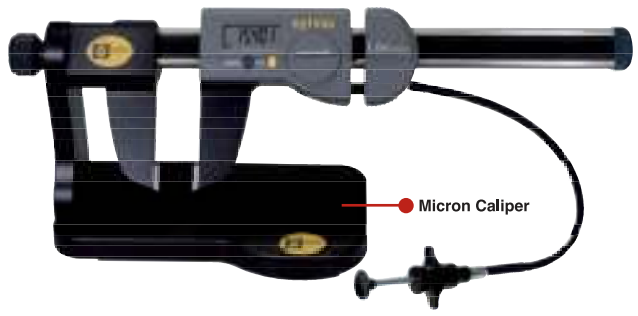
## Platens (Clamp Dimension)

(Mold Mounting Diagrams comply with JIS B 6701.)





● Thickness Gauge



● Micron Caliper



● Dial Gauge



● Inspection Jig



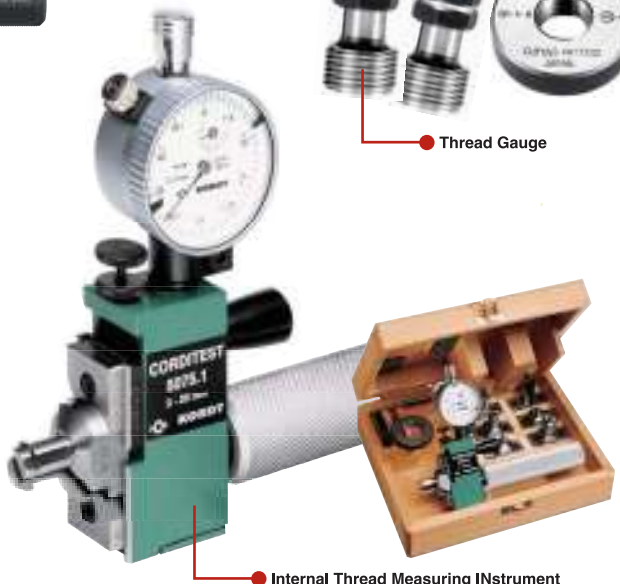
● Air Gauge



● Thread Gauge



● Calipers



● Internal Thread Measuring Instrument

Metrology



Quality and  
efficiency  
in production



**Metrology**



# X-Stream

Best solution for heavy duty pieces.  
Larger opening for easy loading  
Up to 60 kg.



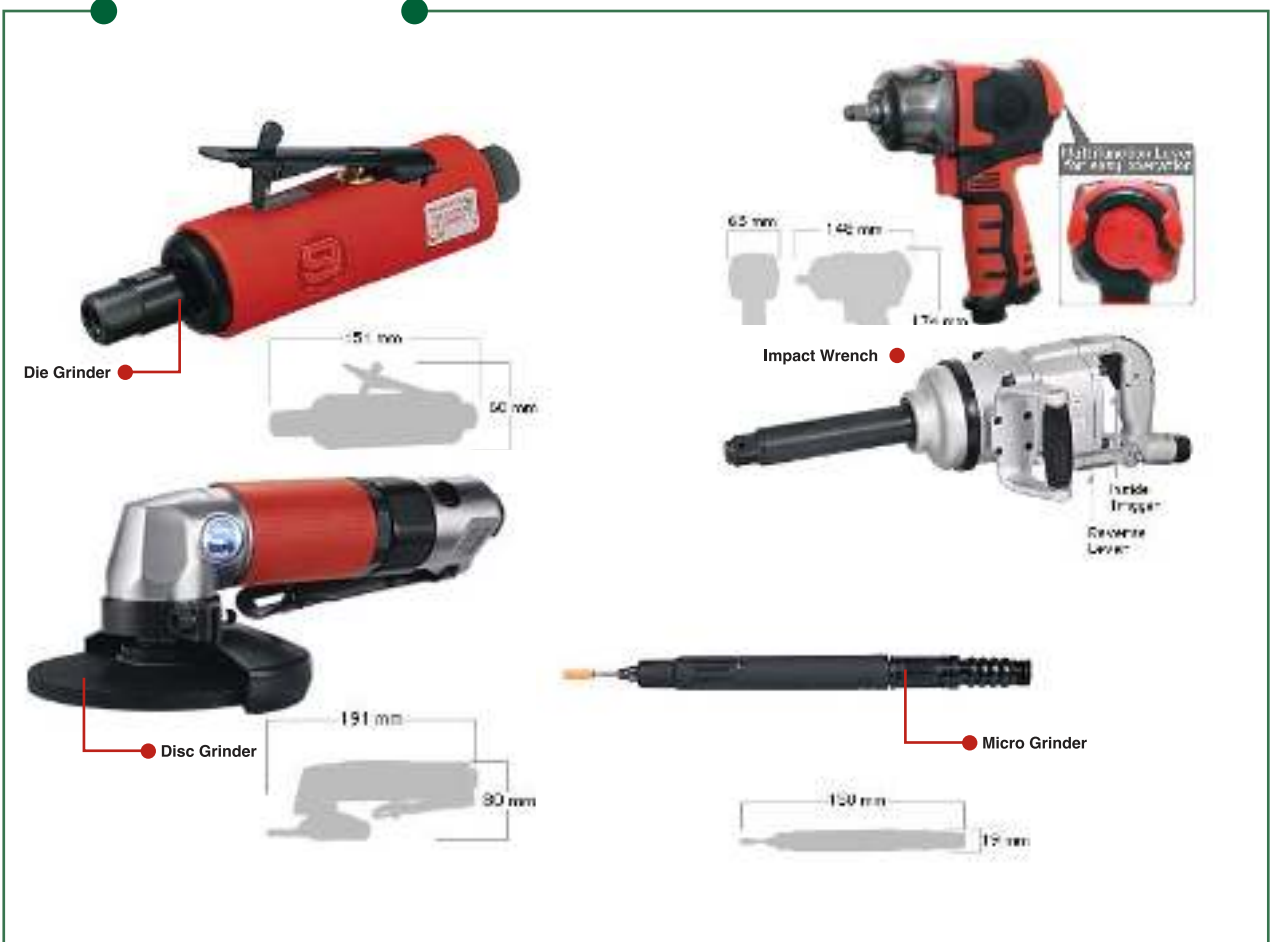
**PT. Metro ReKayasa Indonesia**  
 Marbella Residence C9 No 08 Batam  
 Centre 29464, Indonesia  
 Tlp : (62) 778 198 7719,  
 : Hp (62) 812 7742 5040  
 E-mail : [mail@metrorekayasa.com](mailto:mail@metrorekayasa.com),  
[order@metrorekayasa.com](mailto:order@metrorekayasa.com)  
 Website : [www.metrorekayasa.com](http://www.metrorekayasa.com)



# Our Products



# Our Products



# 簡易比較測長器 PORTABLE RELATIVE MEASURING INSTRUMENT



一般仕様

ハンディサイズで高精度な比較測定が多くのアプリケーションに対応可能な測定器です。

- 手持ちでもベンチ置きでも使用できます。
- 内側、外側の測定方向が簡単な組み替えで変更できます。
- 摺動部のないガイドが理想のスライドを維持します。
- 取付径φ8のインジケータ、プローブ使用できます。
- 簡単なアタッチメント交換で多様な測定に対応します。

適用例: 外径、内径、2面幅、ベアリングの軌道溝径、止め輪溝径、ねじの有効径、ねじの谷径、スプラインのオーバーピン径など。

This instrument is available to various needs of measurement with many applications. Compact size but high precision relative measurement assured.

- Easy operation holding by hand or placing bench.
- Change of the measuring direction of Internal or External measurement can be easily done by rearrangement of attachment.
- Guide without sliding part keeps an ideal movement.
- Enable to use Indicator or Probe having φ8 attaching diameter.
- Available to various measurement by easy exchange of attachment.



測定範囲 Measuring Range	内径φ100mmまで、外径φ80mmまで For internal: φ100 max., For external: 80φ max.
ストローク Stroke	10mm (測定+退避) 10 mm (measure & leave)
測定圧 Measuring Pressure	1 N (変更可) 1 N (changeable)
測定子 Measuring Head/Anvil	内径用、外径用、ねじ用、オーバーピン用など For internal dia., external dia., screw threads, over-pin & etc..
繰返し精度(機械的) Repeatability (Mechanical)	0.5μm

## マルチボールコンタクト式内径測定器 Multiple-Ball Contact type Bore Gauge



22

リファレンスバー(PAT)方式により簡単に高精度な内径測定が可能です。

- 広い測定範囲と測定ポイントに合わせたボール位置で測定可能な対象範囲が広がります。  
例: ツバ付の内径、セレーションの内径、不等配な溝付の内径など
- リトラクタ付でワークに優しく長寿命です。
- 測定ヘッドはアタッチメント交換式でハンドル表示部を兼用して使用できます。
- 取付径φ8のインジケータ・プローブが使用出来ます。

Easy and high accurate internal measurement is available by using Reference-Bar application (PAT. See below) such as internal dia. of workpiece with collar, internal dia. of serration parts or internal dia. with unequal distributive grooves.

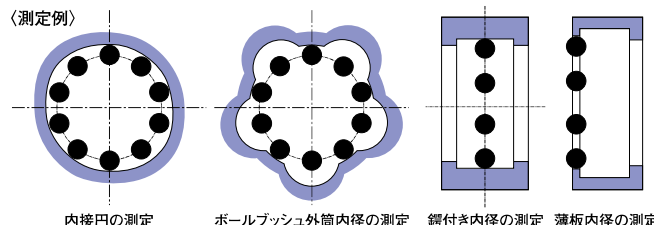
- You can get wide measurable target by using this Bore Gauge which has ideal ball-position matching with wide measuring range and measuring points,
- Retract lever can make each ball touch workpiece softly and this soft-touch gives long life to this gauge.
- Measuring head is easy to change applying attachment exchange method, so that handle and display part can be used commonly.
- Indicator probe with φ8 fitting dia. is available to this gauge.

呼び径 Nominal Dia.	測定範囲(最大) Measuring Range(max.)	コンタクト数(最大) number of contact points (max.)
8-10	0.2 ※	10 ※
10-15	0.2 ※	13 ※
15-20	0.5	14
20-32	1.0	17
32-42	2.0	22
42-50	2.0	24

※測定範囲の設定により最大コンタクト数が変わります。  
Marked \*: Max. number of contact point shall be changed by setting up measuring range.

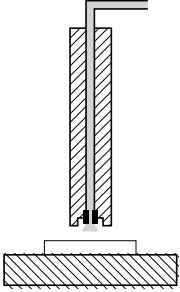
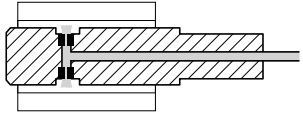
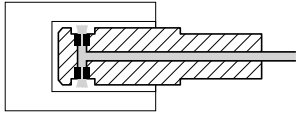
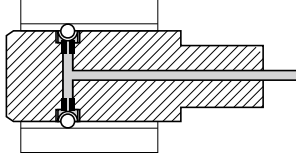
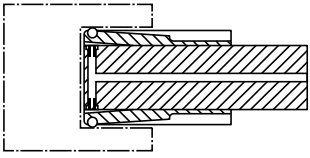
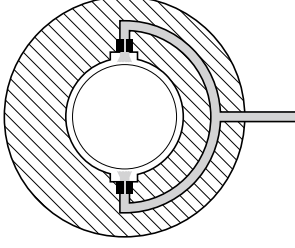
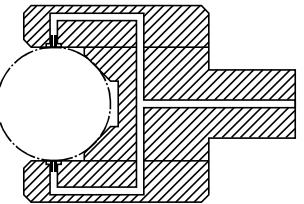
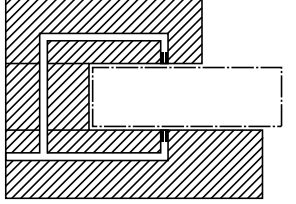
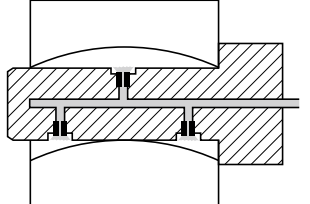
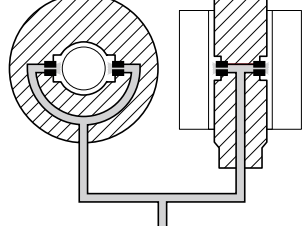
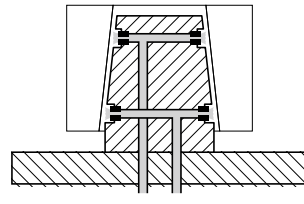
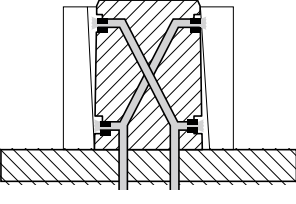
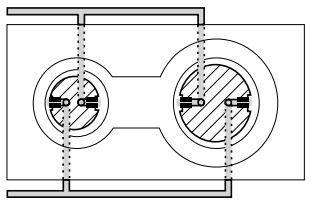
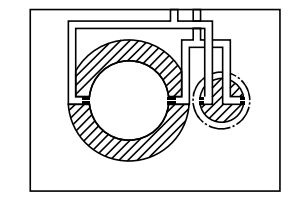
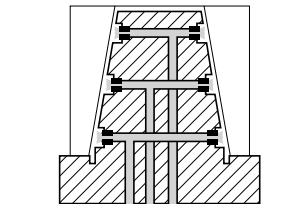
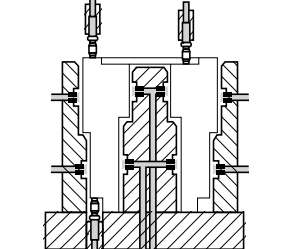
〈測定例〉  
内径円の測定  
ボールブッシュ外筒内径の測定  
鍍付き内径の測定  
薄板内径の測定

〈Examples of measurement〉  
For internal dia. of inscribed circle  
For internal dia. of ball-bush external cylinder  
For internal dia. of workpiece with collar  
For internal dia. of extreme-thin plate



空気マイクロメータ測定例  
Measurement examples of  
Air micrometer

各種の測定ヘッドを用いて下記のような項目の測定ができます。  
Measurement as below can be applied by using various measuring heads.

 <p>1.厚さ測定 For thickness</p>	 <p>2.内径測定 (通し穴) For internal dia.(through hole)</p>	 <p>3.内径測定 (止まり穴) For internal dia.(blind hole)</p>	 <p>4.内径測定 (ボールコンタクト式) For internal dia.(Ball contact type)</p>
 <p>5.内径測定 (リーフ式) For internal dia.(plate spring type)</p>	 <p>6.外径測定 (リング式) For external dia.(Ring type)</p>	 <p>7.外径測定 (ハサミ式) For external dia.(Caliper type)</p>	 <p>8.厚さ測定 For thickness</p>
 <p>9.真直度測定 For straightness</p>	 <p>10.マッチング (穴と軸のはめあいすきま) 測定 For mating between bore and shaft</p>	 <p>11.テーパ測定 For conicity of inner cone</p>	 <p>12.直角度測定 For perpendicularity</p>
 <p>13.心間距離 (ピッチ) 測定 For spacing between separate cylindrical bores</p>	 <p>14.心間距離 (ピッチ) 測定 (特殊) For spacing between separate cylindrical bores (special purpose)</p>	 <p>15.テーパ及び基準径測定 For conicity, form &amp; basic diam.</p>	 <p>16.多点測定 For multi-places</p>

## コラム型(流量式)空気マイクロメータフロメック®(PAT.) COLUMN MODEL(FLOW TYPE)AIR MICROMETER flowmec®(PAT.)



### 概要 [Description]

フロメックは微小なすきまを流れる空気量の変化をテーパ管内のフロートによって拡大指示する精密比較測定器です。測定システムはフロメック本体と測定ヘッド及びマスタから構成されています。

Flowmec is a precision relative measuring instrument that measures changes in airflow running through a slight clearance between workpiece and measuring head as read by the expansion of a float in taper tube. The measuring system consists of flowmec main body, measuring head and masters.

### 多連式にするには…

How to fabricate multiple columns

多寸法同時測定を行う場合、複数の基本ユニット(No.3100)と左右のフートによりブロックビルド方式で多連式フロメックを構成できます。上の写真はフロメック3連式とテーパ測定用測定ヘッドおよびマスタのユニットです。

When performing multiple places measurements, flowmec can be easily fabricated to multiple columns by adding to basic units of No.3100 required and right & left feet. The above picture shows a three columns flowmec with a measuring head and master for taper degree measurement.

### 特長 [Advantages]

- 1 フロートの安定性に優れています。(有効指示範囲の2%以内です)
- 2 2つの基準倍率を共用可能です。(フロート黒の本体は5000倍・2000倍を共用)
- 3 上ダンパが樹脂のためフロートに傷をつけることはありません。
- 4 倍率調整つまみとゼロ点調整つまみが独立しているため操作性に優れています。
- 5 テーパ管の取り外しが容易です。
- 6 テーパ管は各基準倍率とも共通です。(基準倍率変更の場合はフロート、目盛板を取り替えます。)
- 7 フート間に基本ユニットを追加することによりコンパクトに多連式に構成できます。

- 1 Superior stability. (less than 2% active reading range)
- 2 Two standard magnifications can be shared. (The body with the black float shares magnifications of 2,000 and 5,000 times.)
- 3 Since the upper damper is made of resin, it won't scratch the float.
- 4 The magnification setting and zero adjusting knobs and located separately, making operation easy.
- 5 Taper tubes are easy to remove.
- 6 Magnification standards of all taper tubes are the same.(in cases of changing magnification, change the float and scale board)
- 7 Can be fabricated to compact multiple columns by adding basic unit between feet.

緒元 specification	連数 number of columns	巾 width mm	奥行 depth mm	高さ height mm	質量 weight kg
No.3100	—	34	192	475	2.2
No.3101	単式 single column	104			3.8
No.3102	2連式 double columns	138			6.0
No.3103	3連式 three columns	172			8.2
No.3104	4連式 four columns	206			10.4
No.3105	5連式 five columns	240			12.6
No. ∴	∴	∴	∴	∴	∴



ご発注に際しては型式(又は連数)、倍率をご指定下さい。

※例 No.3103(3連式)×5000倍

Indication of number of columns and magnification is required when placing an order.

Ex)No.3103(three columns)×5000

精密加工技術によって製作され、高精度で耐摩耗性に富んでいます。空気マイクロメータ本体と組み合わせて、能率的な測定や省力化、合理化の手段としてご使用をおすすめします。

ISSOKU's measuring heads and masters for air micrometers have high accuracy and superior wear resistance, which are made by our precision machining technologies. We recommend you to use our measuring heads and masters for your efficient and effective measurement, of course together with our high precision air micrometers.

## 内径測定ヘッド MEASURING HEAD FOR INTERNAL DIAM.

円筒の通し穴および止り穴の測定に使用します。測定物の測定位置を変えることにより、直径および円筒度、真円度も測定できます。

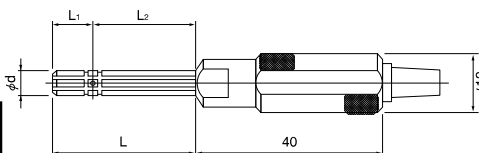
This type of measuring head can be used for internal diam. of through or blind hole. By changing measuring point or position, cylindricity and circularity can be also checked.

### 通し穴用 No.6002

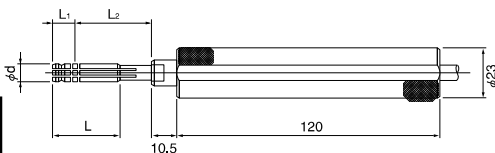
for through hole measurement



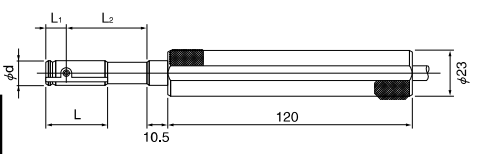
$\phi d$	L	L <sub>1</sub>	L <sub>2</sub>
3-4	27	7	20
4-5	30	8	22



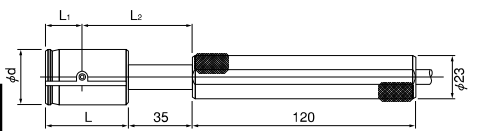
$\phi d$	L	L <sub>1</sub>	L <sub>2</sub>
5-8	30	10	35



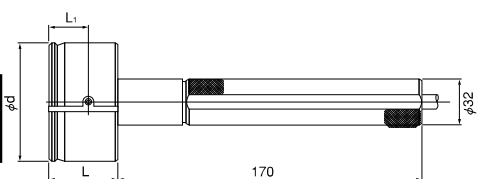
$\phi d$	L	L <sub>1</sub>	L <sub>2</sub>
8-13	30	10	40



$\phi d$	L	L <sub>1</sub>	L <sub>2</sub>
13-50	45	20	60
50-80	35	20	50



$\phi d$	L	L <sub>1</sub>
80-150	50	30

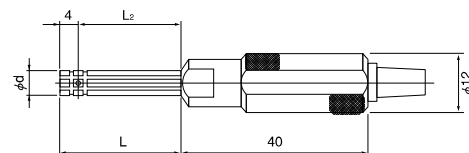


### 止り穴用 No.6012

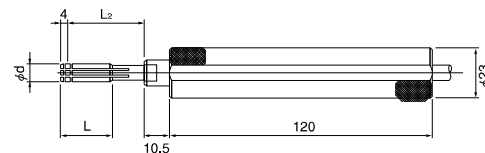
for blind hole measurement



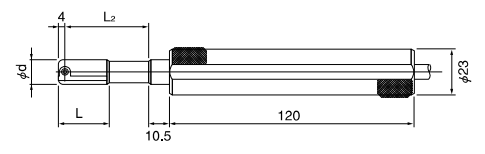
$\phi d$	L	L <sub>2</sub>
3-4	24	20
4-5	26	22



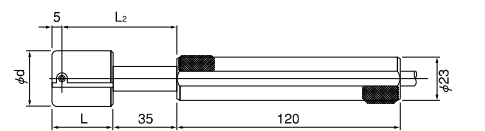
$\phi d$	L	L <sub>2</sub>
5-8	24	35



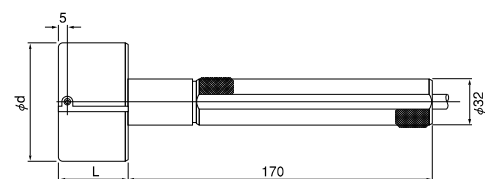
$\phi d$	L	L <sub>2</sub>
8-13	24	40



$\phi d$	L	L <sub>2</sub>
13-50	30	60
50-80	35	65



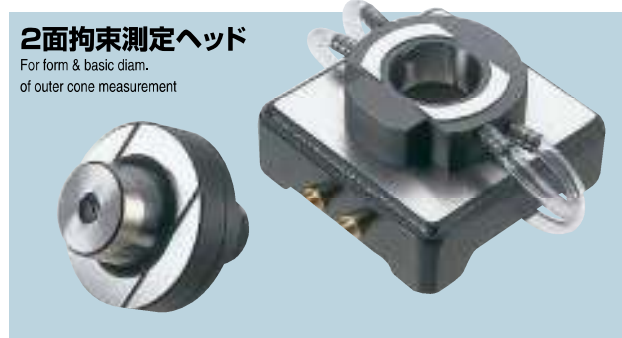
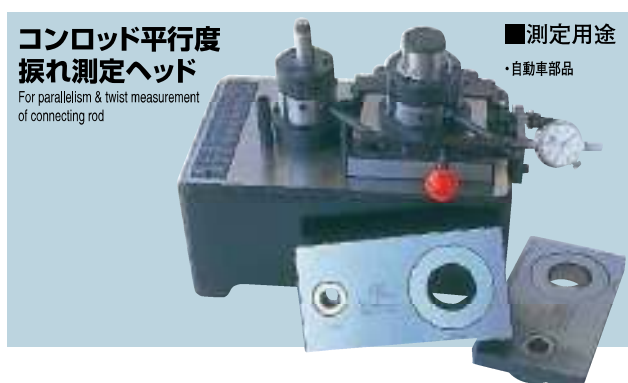
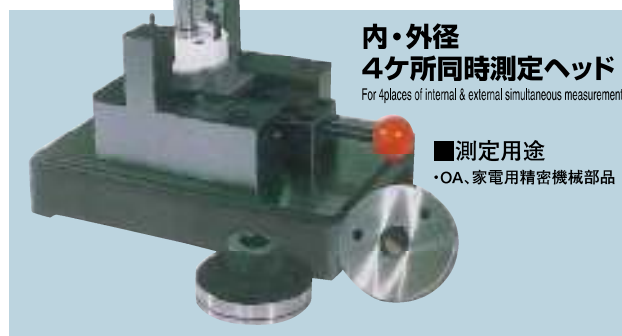
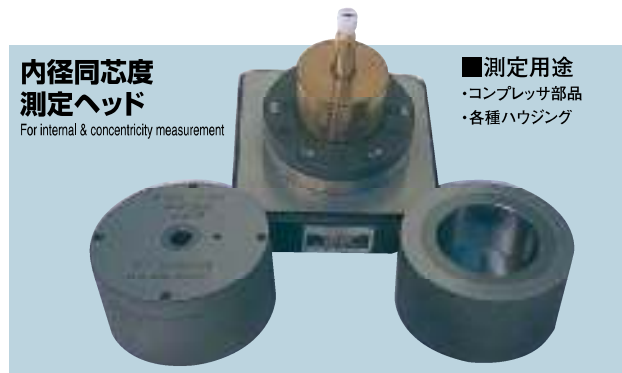
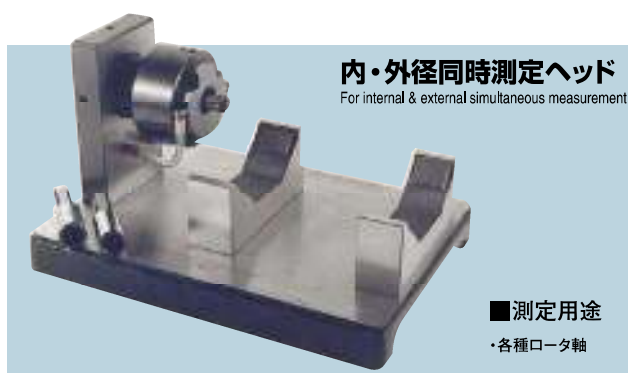
$\phi d$	L
80-150	45



\*上記サイズ以外につきましても製作いたします。

\*Other sizes except above table can be designed and manufactured.

# 各種測定ヘッド MEASURING HEADS FOR MEASUREMENT OF SPECIAL PURPOSES



# ねじゲージングシステム THREAD GAUGING SYSTEM

## 平行ねじ用限界ゲージ [Limit gauges for parallel screw threads]



ISO等級ゲージ方式のねじ用限界ゲージ  
Limit thread gauge of gauging system for ISO class

1,2,3等級ゲージ方式のねじ用限界ゲージ  
Limit thread gauge of gauging system for class 1,2,3

ねじゲージを用いて平行ねじの合否判定を行う一般的な方式が限界式です。

製品ねじの合否を判定するために、通り側ゲージと、止り側ゲージで検査し、精度を保証致します。

メートルねじ用ゲージについては、次のとおり2種類に分けられます。現行JISのISO等級ゲージ方式(6g, 6H等)と旧JISの1,2,3級ゲージ方式がありますので、ご注文の際にご指定ください。

A limit system is generally used for carrying out pass/fail decisions for parallel threads by using a thread gauge. Inspections are conducted using a go/no-go gauge to determine whether a product passes or fails, thereby guaranteeing precision. There are two types of gauges for metric threads: the current JIS gauges classified by the ISO (6g, 6H, etc.), and the old JIS grade 1, 2 and 3 gauges. Please specify the type you want when ordering.

相違点は以下の通りです。  
Differences listed below

1. ISO等級ゲージ方式では、通、止共検査用工作用の区別がなくなりました。
2. 止りゲージの合否判定が、ISO等級ゲージ方式では2回転をこえてねじこまれない事、1,2,3等級ゲージ方式は2回転以上ねじこまれない事になっています。
3. ISO等級ゲージ方式では、ねじリングゲージのはめあい点検ゲージが通止の限界式となりました。
  1. GO and NOT GO of the ISO gauge system is made with same dimensions for both inspection and working.
  2. Pass/Fail assessment of a NOT GO gauge for the ISO class gauge system has been set as not to be screwed in more than two revolutions. For class 1, 2, 3 gauge system it is not to be screwed in more than two revolutions, included two revolutions.
  3. For the ISO class gauge system, the thread gauge for check fitting of the thread ring gauge is the GO and NOT GO limit type.

## 標準ねじゲージ [Standard thread gauges]



標準ねじゲージとは、基準山形にきわめて近く作られたねじプラグゲージとねじリングゲージが互いに精密にはまりあう一組からなっています。

限界ゲージの通り側として使われる場合がありますが、検査対象となるねじ製品同士が精密なはめあいを要する場合には、通り用と止り用のねじゲージで判定する限界式をお勧めいたします。

A standard thread gauge comprises a thread plug gauge and a thread ring gauge, which are manufactured extremely closely to a basic profile, and fit each other precisely.

Although sometimes used as the go-end of a limit gauge, when threaded product pairs that are to be inspected need to precisely fit, we recommend a limit system that makes assessments using go and no-go thread gauges.

### ご使用時の注意

標準ねじゲージの場合、ねじプラグゲージは、はめあい点検ゲージの役目もします。ねじプラグゲージと互換性の無いねじリングゲージをご使用されますと、互いのゲージで合格した場合でも製品どうしの互換性がとれない場合があります。お客様にて標準のねじプラグゲージを保有している場合は、新たに標準ねじリングゲージを製作する際に、ご注意ください。

### Caution when using

For standard thread gauges, the thread plug gauge also acts as the thread gauge for checking fit. If using thread ring gauges, which are not compatible with thread plug gauges, each product cannot be inserted even if passed by both gauges and may not be compatible. If you have your own thread plug gauge, please inform us when ordering a thread ring gauge.

# Our Products



# プレーンゲージ PLAIN GAUGES

## テーパ付テストバー Tapered Test Bars



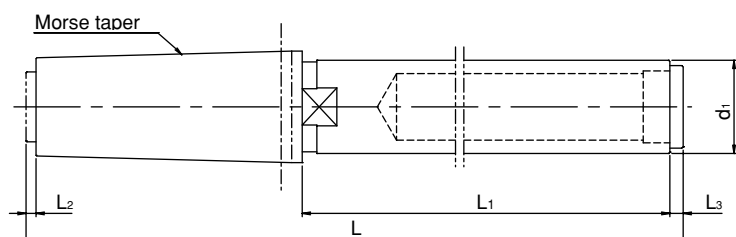
### 精度

円筒部に対するテーパ部の振れは、  
円筒部長さが 150mm以下で0.002以内、  
150mmを超えると0.003以内です。

### Accuracy

Runout of tapered portion to cylindrical portion is  
within 0.002 when cylindrical portion length is below 150 mm,  
and within 0.003 when it is 150mm and over.

## ■モールステーパ Morse taper

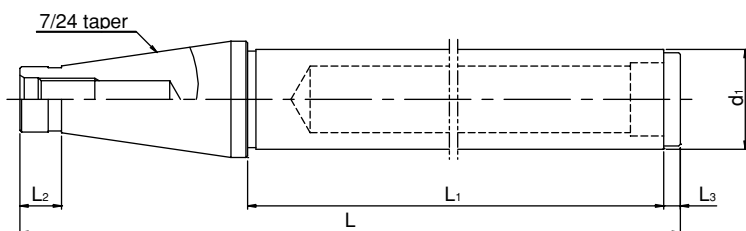


(Unit : mm)

形式番号 Model No.	L	L <sub>2</sub>	L <sub>3</sub>	d <sub>1</sub>	L <sub>1</sub>
MT2-25-310	389	—	10	25	310
MT3-25-310	406	—	10	25	310
MT4-35-310	428	—	10	35	310
MT5-40-310	455	—	10	40	310
MT6-45-310	516	—	10	45	310
MT7-50-310	596	10	10	50	310

## ■7/24テーパ 7/24 taper

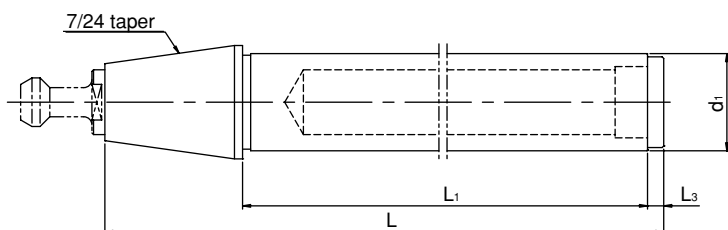
### プレーンタイプ Plain type



(Unit : mm)

形式番号 Model No.	L	L <sub>2</sub>	L <sub>3</sub>	d <sub>1</sub>	L <sub>1</sub>
NT30-35-300	383	20	10	35	300
NT40-40-300	408	28	10	40	300
NT50-50-300	446	25	10	50	300
NT60-60-300	526	45	10	60	300

### マシニングセンタタイプ Machining center type



(Unit : mm)

形式番号 Model No.	L	L <sub>3</sub>	d <sub>1</sub>	L <sub>1</sub>
BT30-30-300	358.4	5	30	300
BT40-40-300	380	10	40	300
BT50-50-300	416.8	10	50	300

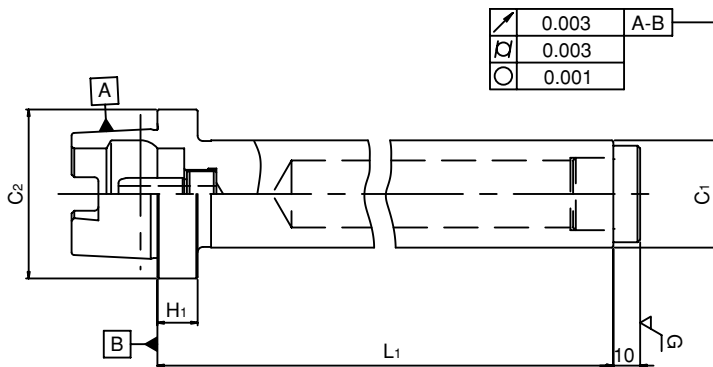
注) マシニングセンタタイプのものには、JIS, MASで規定されたプルスタッドが取付けできます。  
プルスタッドは付属品ではありませんので、別途ご指示ください。

Note) It is possible to equip a test bar of machining center type with a pull stud prescribed by JIS, MAS.  
As the pull stud is not a standard accessory, specify separately when needed.

# 2面拘束テストバー

## Face and Taper Contact Test Bars

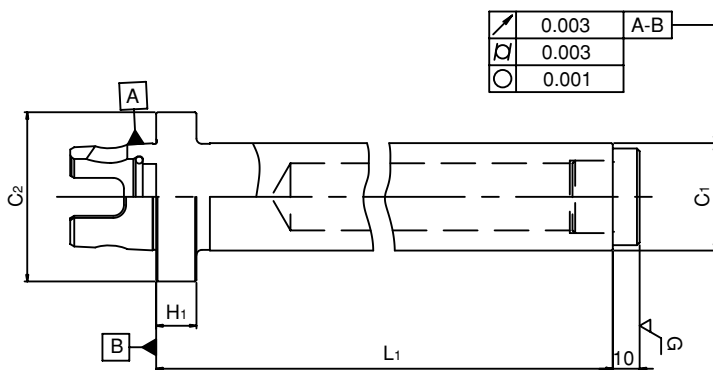
### ■ HSKシャンク HSK shank



(Unit : mm)

形式番号 Model No.	L <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>	H <sub>1</sub>
HSK A 40-30-200	200	30	40	20
HSK A 50-40-300	300	40	50	26
HSK A 63-40-300	300	40	63	15
HSK A100-50-350	350	50	100	20

### ■ KMシャンク KM shank



(Unit : mm)

形式番号 Model No.	L <sub>1</sub>	C <sub>1</sub>	C <sub>2</sub>	H <sub>1</sub>
KM 5040-40-300	300	40	50	15
KM 6350-40-300	300	40	63	15
KM 10080-50-350	350	50	100	20

#### ご注文に際して

ご注文の際は、以下の点をご指示ください。

特殊な場合は、形状とゲージ合せの要・不要をご指示ください。

【例】 NT40-40-300

MT3-25-310

BT50-50-300 プルスタッドMAS1形付

HSK A 63-40-300

KM 6350-40-300

#### Ordering instructions

When ordering, specify the following data :

When requesting special specifications, specify the shape and necessity of gauging.).

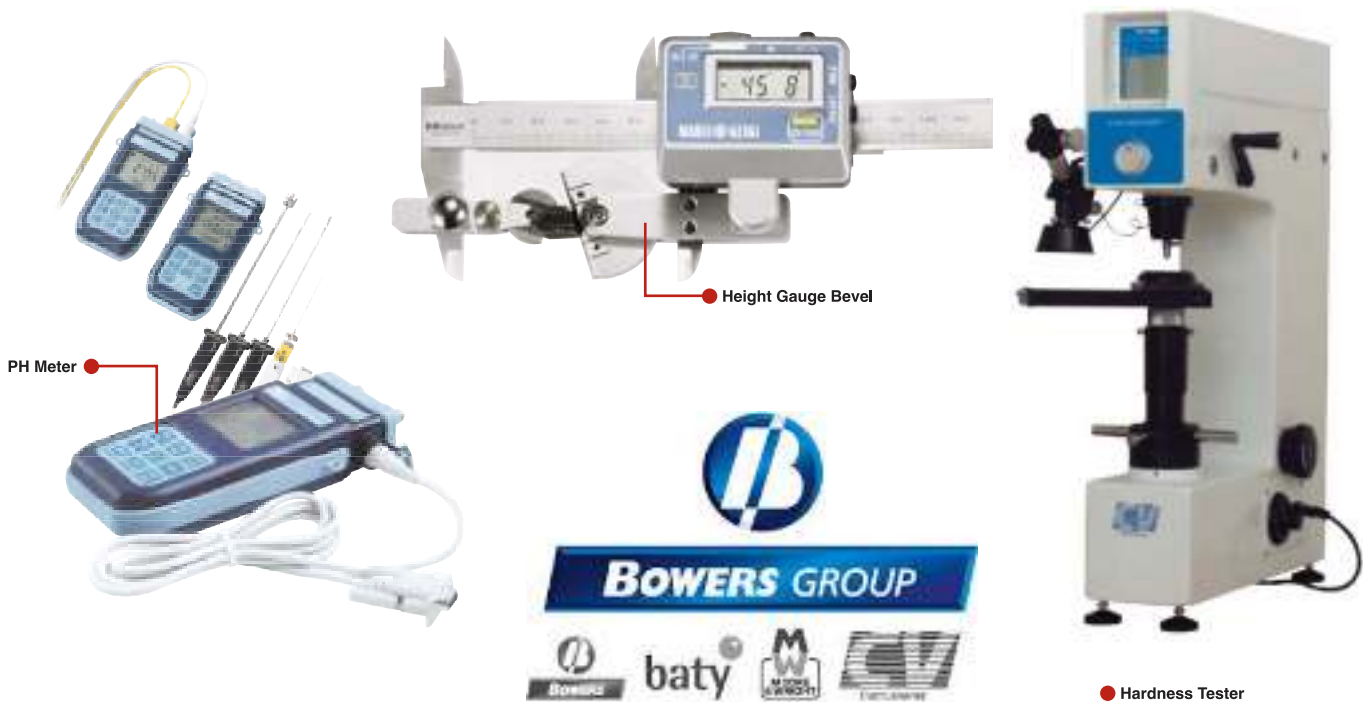
【Example】 NT40-40-300

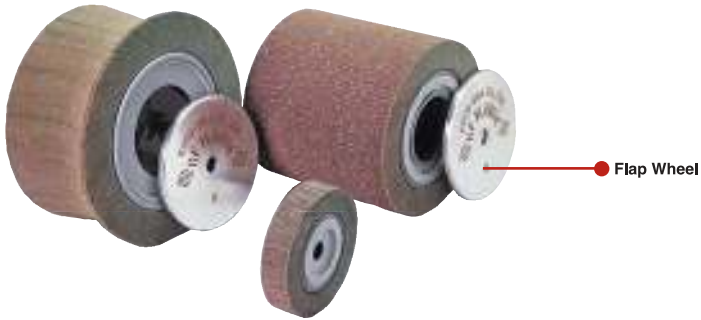
MT3-25-310

BT50-50-300 Pull stud MAS1 type provided

HSK A63-40-300

KM 6350-40-300





Flap Wheel



Precision Square Level



Electric Motor Grinder



Diamond Files Set

# GAUGE

GAUGE CATALOG Vol.008



# HOW TO USE PIN GAUGE

## Measuring Tool Checking



Caliper Checking

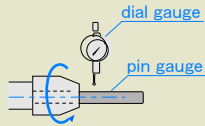


Micrometer Checking



Height Gauge Checking

## Center Runout Measurement



Drilling Machine Runout Measurement



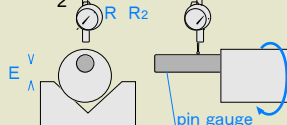
Chuck Runout Measurement

## Hole Eccentricity Measurement



R<sub>1</sub> ... Max. reading of dial gauge  
R<sub>2</sub> ... Min. reading of dial gauge

$$E = \frac{R_1 - R_2}{2}$$



## Dovetail Measurement



## Determination of Channel Width



Determination of channel width



Width measurement of milling slot

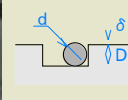
Key way and etc



## Groove Depth Measurement

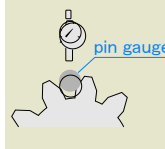


δ ... Dial gauge reading  
D = d - δ



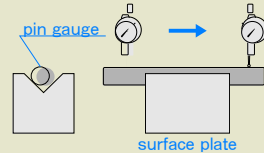
## Gear Tooth Measurement

Dial gauge measurement

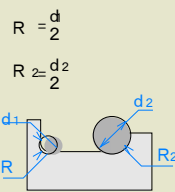


## Measuring Groove Parallelism

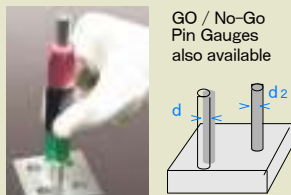
Dial gauge measurement



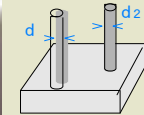
## Radius Measurement



## Hole Diameter Measurement



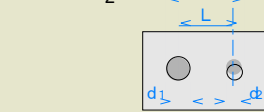
GO / No-Go Pin Gauges also available



## Measurement between holes



d · d<sub>2</sub> ... Pin Gauge diameters  
L<sub>2</sub> ... Micrometer reading



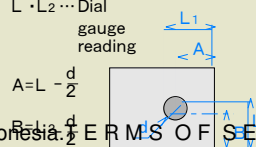
## Mill Tool Positioning



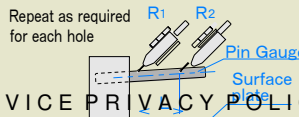
## Measurement of Hole Position, Parallelism



Measuring hole center position  
d ... Pin Gauge diameter  
L · L<sub>2</sub> ... Dial gauge reading



Slope of hole (parallelism measurement)  
R<sub>1</sub> · R<sub>2</sub> ... Dial gauge reading  
Slope =  $\frac{R_2 - R_1}{L}$



# The Measuring Microscope Engineered to Fit Your Needs

Whether samples are small or large, simple or complex, or measurements are being taken by a novice or an expert, the Olympus STM7 range features measuring microscopes tailored to fit your needs.

## OLYMPUS

Your Vision, Our Future



STM7-LFA configuration

### ■ Wide Coverage

Compatible with a range of measurement and observation needs

### ■ Operability

Simpler, more efficient operation

### ■ Height Measurement

Highly accurate measurement of samples with irregular surfaces

### ■ Measurement Support System

Enables simple, highly accurate measurements of complex forms

#### Stage Selection (in mm)

50 x 50, 100 x 100,  
200 x 200, 300 x 300

#### Optics

Measuring Objectives/  
Metallurgical Objectives

#### Frame

Manual Focus/  
Motorized Focus

#### Focusing Equipment

Manual Focus Navigator Unit/  
Autofocus Unit

## STM7 Series

Olympus Measurement  
Software

# Optical Instruments

## Baty R400

Baty has been a leader and innovator in high-accuracy measurement products for over seventy five years. The new horizontal 16"/400mm screen profile projectors offer a large workstage area combined with a multitude of features included as standard.

### Features

- 0.5 micron X, Y measuring resolution
- Fully usable 16"/400mm screen
- Digital Screen Protractor
- Built-in helix adjustment
- Quick change single lens mount
- Sturdy all-steel design
- Cross roller bearings
- Quick release "X" travel
- Erect image
- Easy-view vertical screen
- Large stage travel 6"(150mm) x 12"(300mm)
- Rotating chart clips
- Fibre optic illumination for surface measurement
- Green filter
- Includes 10x lens

### Available Options

- Automated measurement system with joystick control
- Automatic edge sensing
- Motorised focus axis
- Swing-over lamphouse for large parts
- Heavy duty cabinet stand



### Lens Systems

Code No	Description
RH400-087	Lens system - magnification 10x
RH400-088	Lens system - magnification 20x
RH400-089	Lens system - magnification 25x
RH400-090	Lens system - magnification 50x
RH400-091	Lens system - magnification 100x

### Baty R400

Code No	Description	Lens	Includes
R400-GXL	Horizontal projector with QC220 geometric readout	10x lens	Surface illumination
R400-GXL-E	Horizontal projector with QC220 geometric readout & optical edge election	10x lens	Surface illumination
R400-AB2	Horizontal projector with Fusion 2D software including PC	10x lens	Surface illumination
R400-AB2-E	Horizontal projector with Fusion 2D software including PC & optical edge election	10x lens	Surface illumination



# Sound Level Meter

## Sound Level Meter class 1

**NL-62** (With low-frequency sound measurement function)



- Measure frequencies from 1 to 20 000 Hz.
- Measure low-frequency sound and noise with a single unit.

### Specifications

Applicable standards		IEC 61672-1: 2013/2002 class 1, ISO 7196: 1995 ANSI/ASA S1.4-2014/Part 1 class 1 CE marking, WEEE Directives, Chinese RoHS (export model for China only)
Processing		$L_p$ , $L_{eq}$ , $L_E$ , $L_{max}$ , $L_{min}$ , $L_N$ (main ch) $L_p$ (sub ch)
Additional processing		$L_{Ceq}$ , $L_{Beq}$ , $L_{Cpeak}$ , $L_{Zpeak}$ , $L_{A1eq}$ , $L_{A2max}$
Frequency range		1 Hz to 20 kHz
Store	Manual	Data for measurement results are stored manually in single address increments.
	Auto	Instantaneous values ( $L_p$ mode) and processed values ( $L_{eq}$ mode) are stored continuously and automatically at preset intervals.
	Measurement time	Max. 1 000 h (depends on the capacity of the SD Card)*1
Waveform recording*3	File format	Uncompressed waveform WAVE file
	Sampling frequency	Select 48 kHz, 24 kHz or 12 kHz
Dimensions, Weight		Approx. 255 (H) x 76 (W) x 33 mm(D), approx. 400 g (with batteries)

\*1 Use Rion fully guaranteed products. \*2 NX-42WR required (sold separately).

## Sound Level Meter class 2

**NL-27**



### Specifications

Applicable standards		IEC 61672-1: 2013 class 2, CE marking, WEEE Directive
Measurement functions		$L_p$ , $L_{eq}$ , $L_E$ , $L_{max}$ , $L_{Cpeak}$
Measurement level range		A-weighting: 30 dB to 137 dB, C-weighting: 36 dB to 137 dB
Dimensions, Weight		Approx. 120 mm (H) x 63 (W) x 23.5 mm (D), approx. 105 g (including batteries)

# Bourdon Tube Pressure Gauge Model 213.53, with Liquid Filling and Stainless Steel Case Model 212.53, without Liquid Filling and Stainless Steel Case

WIKA Data Sheet PM 02.12



## Applications

- Intended for adverse service conditions where pulsating or vibration exists
- Suitable for all gaseous and liquid media that will not obstruct the pressure system or attack copper alloy parts
- Hydraulics
- Compressors
- Shipbuilding industry

## Special Features

- Vibration and shock resistant
- Especially sturdy design
- NS 63, 100 approved by German Lloyd and Geostandart
- Scale ranges up to 0 ... 1000 bar

## Description

**Design**  
EN 837-1

**Nominal size**  
40, 50, 63 and 100 mm

**Accuracy class**  
NS 40: 2.5  
NS 50, 63: 1.6  
NS 100: 1.0

**Scale range**  
NS 40, 50: 0 ... 1 up to 0 ... 600 bar  
NS 63, 100: 0 ... 0.6 up to 0 ... 1000 bar  
or other equivalent units of pressure or vacuum



Bourdon Tube Pressure Gauge Model 213.53,  
radial connection

### Working pressure

NS 40, 50, 63: Steady: % of scale range  
Fluctuating: % of scale range  
Short time: full scale range

NS 100: Steady: full scale range  
Fluctuating: 0.9 x full scale range  
Short time: 1.3 x full scale range

### Operating Temperature

Ambient:  
NS 40, 50, 63: 0 ... +80 °C  
NS 100: -20 ... +60 °C  
Medium: +60 °C maximum

### Temperature effect

When temperature of the pressure element deviates from reference temperature (+20 °C):  
max.  $\pm 0.4$  %/10 K of the span

### Ingress protection

IP 65 (EN 60 529 / IEC 529)

### Pressure connection

Material: Cu-alloy

Lower mount (LM), centre back mount (CBM) or lower back mount (LBM)

NS 40: G 1/8 B, 14 mm flats

NS 50, 63: G 1/4 B, 14 mm flats

NS 100: G 1/2 B, 22 mm flats

### Pressure element

NS 40, 50, 63:

< 60 bar: Cu-alloy, C-type, soft soldered

≥ 60 bar: Cu-alloy, helical type, soft soldered

NS 100:

< 100 bar: Cu-alloy, C-type, soft soldered

≥ 100 bar: stainless steel 316L, helical type, brazed

### Movement

Cu-alloy

### Dial

NS 40, 50, 63: white plastic, with pointer stop pin

NS 100: white aluminium

with black lettering

### Pointer

NS 40, 50, 63: black plastic

NS 100: black aluminium

### Window

Clear plastic

### Case

Natural finish stainless steel, with pressure relief in case top

O-Ring seal between case and entry stem

Ranges ≤ 0 ... 16 bar with case venting provision

### Bezel ring

Triangular bezel, roll formed, glossy finish stainless steel

### Liquid filling

Glycerine 99,7 %

### Optional extras

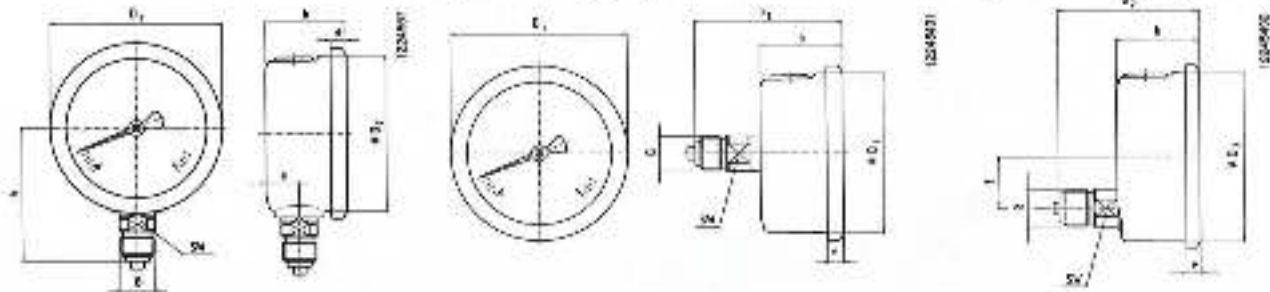
- NS 50, 63: stainless steel pressure system (model 233.53)
- NS 100: zero point adjustment in front
- Medium temperature to 100 °C with special soft solder
- Ambient temperature -40 ... +60 °C: silicon oil filling
- 3-hole panel mounting flange, stainless steel, back entry only (not NS 40)
- 3-hole surface mounting flange, stainless steel (not NS 40)
- With clamp (back entry only)

### Dimensions in mm

Radial bottom pressure entry (LM)

40, 50, 63, centre back pressure entry (CBM)

100 mm, lower back pressure entry (LBM)



NS	a	b <sub>1</sub> ± 0,5	b <sub>2</sub> ± 1	D <sub>1</sub>	D <sub>2</sub>	e	f	G	h ± 1	SW	Weight in kg
40	9.5	30	50	46.5	40	8	-	G 1/8 B	40	14	0.10
50	12	30	55	56	50	5.5	-	G 1/4 B	48	14	0.15
63	13	32	56	68	62	6.5	-	G 1/4 B	54	14	0.21
100	15.5	48	81.5	107	100	B	30	G 1/2 B	87	22	0.80

Standard pressure entry with parallel thread and sealing to EN 357-1 / 7.8

### Ordering information

Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.



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## Waterproof Digital Platform Scale

### DP-6700 Series

- All Stainless Steel Body
- IP65 Waterproof
- Signal (3 color LED) Judgement
- Multi-Functions
- Subtractive Grading
- USB Memory (option)

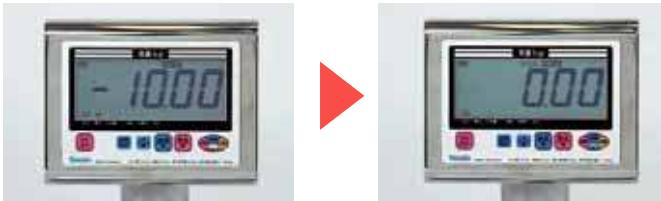


#### Main Specifications of DP-6700

	DP-6700-30	DP-6700-60	DP-6700-150
Capacity x Display Division	30kg x 0.01kg	60kg x 0.02kg	150kg x 0.05kg
Tare Max.	30kg	60kg	150kg
Platform Size	500 x 350mm		
Display	7 segment LCD 45(H) x 23.5(W)mm		
Function	Zero reset, One-touch Tare, Auto power-off, Multi-function (Fixed weighing, Checkweighing, Grading), Counting, Display freezing, etc.		
Power Supply	4 x UM-1 dry battery, 1400 hour continuous operation with alkaline battery		
Dust/Water-proof rating	IP65, Stainless steel construction excluding a load cell of aluminum alloy		
Dimensions	350(W) x 605(D) x 795(H)mm		
Net Weight	Approx. 13kg, including batteries		
Option	Wireless communication (ZBee), USB memory, AC adaptor, Built-in buzzer, Audible rank judgment, Stainless steel levelling legs		

## 01 Fixed weighing function

Normally the worker is trying to reach the target weight when making fixed weight packages. However, Yamato's fixed weighing function makes the worker to try to reach the zero point always regardless of the target weight by indicating the target weight in minus at the initial stage.



Thanks to this feature, it is not necessary to keep the target weight in mind and careless mistake can be much reduced.

## 02 Checkweighing function

The weighing status; short weight, acceptable weight or excess weight can be judged by 3 color LED and a built-in buzzer (option). This helps much to improve the work efficiency.

Ex.) Lower limit : 5.00kg Upper limit 5.30kg



## 03 Grading function



Normal grading

Subtractive grading

In addition to the normal grading function, the subtractive grading function is equipped as a standard. By picking up one item from the basket, the rank of the item picked up is shown on the indicator.

The photo on the left side shows that the rank is No.03.

As an option, audible judgement is possible and it helps much the work efficiency.

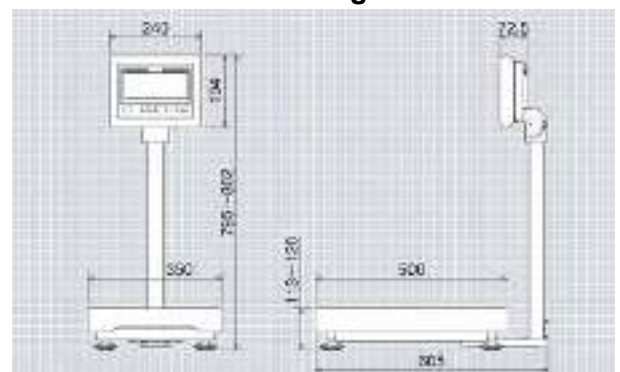


Audible device (factory option)

## 04 USB memory (factory option)

Weighing data can be taken into a USB memory stick.

### Outside view drawing



All illustrations, photos and specifications are subject to change without notice.

## MAINTENANCE AND INDUSTRIAL SERVICES

### A. BOILER SERVICES

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We are and foremost an industrial boiler service company. Call us anytime – we have no hobbies – we eat, sleep & breathe boilers. Our guys really do love boilers and we pride ourselves on knowing everything about industrial boilers and their systems. Our crew is hungry and enthusiastic – you will always get their best effort.

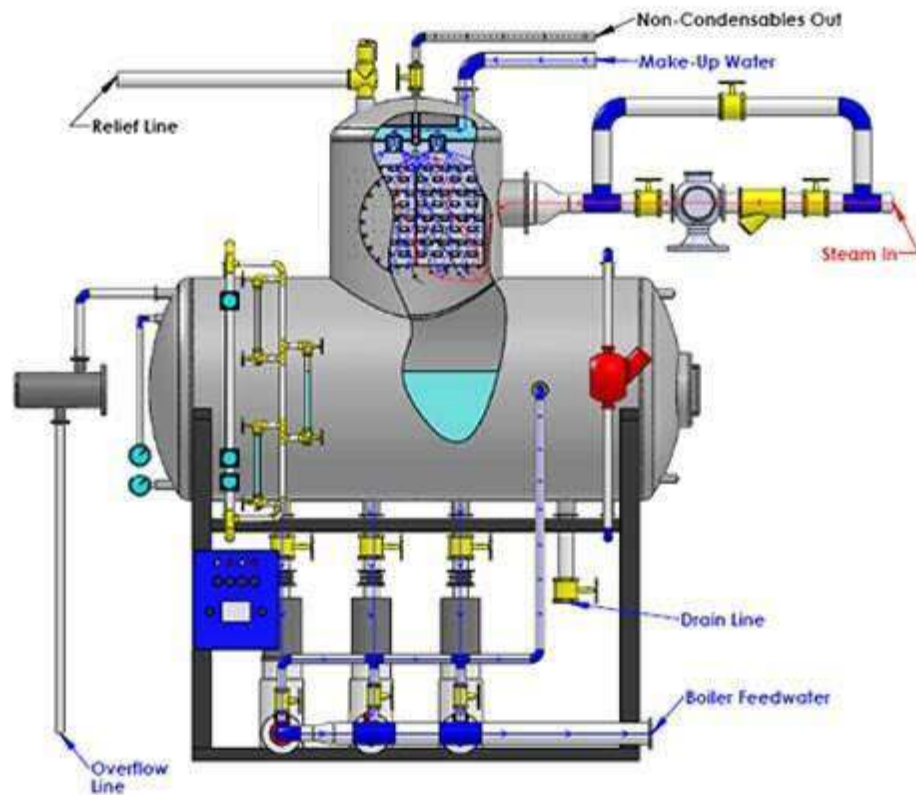
Why deal with more than one company when you don't have to. We can do it all.

- Engineering
- Design
- Auditing
- Boiler Repair
- Boiler tune-up
- Boiler MACT compliance
- Licensed Operators
- Emissions Testing
- ofcourse... more!



## BOILER INSTALLATION

Complete commercial boiler installations from the boiler professionals. From engineering, to new and used boiler room installation, to testing, we are your commercial boiler installation source. No need to subcontract as Powerhouse’s certified boiler professionals have installed boilers and boiler rooms for more than 15 years.



## 24/7 EMERGENCY SERVICE

Emergency Boiler Repairs & Service Boilers are critical to your operations so downtime is not an option. Powerhouse has been providing 24/7 emergency boiler repairs and service to companies worldwide for almost 15 years. Our ability to quickly deploy staff to expertly diagnose and repair your boiler is unmatched.

## BOILER REPAIR

Minor repairs can grow into major issues if they aren't handled by an experienced and professional industrial boiler repair company. With Powerhouse boiler technicians and engineers you can rest assured that the job will be done right the first time, every time.

## BURNER SERVICE

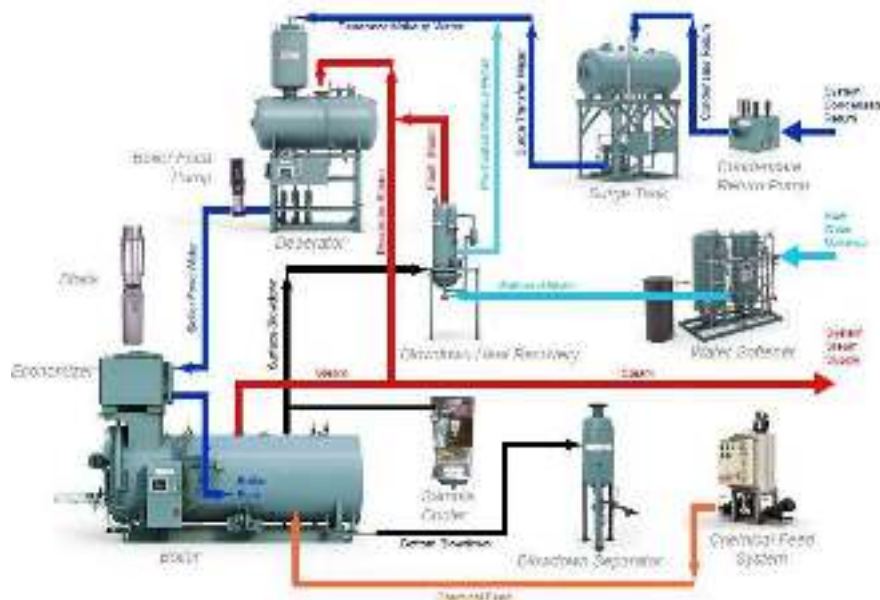
Powerhouse provides industrial burner services for every major manufacturer including Cleaver Brooks, COEN, Todd, Faber, ST Johnson, Power flame and many more. If you are burning #2 Oil, Natural Gas, Solid Fuel or anything else, Powerhouse has experience with it.

## ENGINEERING SERVICE

Our full time Engineering staff is available to plan and implement your project from beginning to end. Powerhouse Equipment & Engineering has a full in-house engineering and drafting department under the supervision of a licensed professional engineer.

## BOILER OPERATORS

Fully certified and licensed boiler operators. High and Low Pressure boilers, complete boiler systems and Powerhouse Portable Boiler Rooms can be run by our highly trained staff. All of our operators are Black Seal certified. Powerhouse Boiler Operators are not your ordinary boiler operators.



## B. AIR COMPRESSOR SERVICES

Air Compressor Service was born as a service company and continues to provide the best in professional service, repair and overhauls for most major makes and models of industrial air compressors. We serve customers ranging from manufacturing and hospitals, to fire departments, government, dairies and food processors. If your compressor needs attention, Air Compressor Service can help. We are licensed, bonded and insured.



### Preventive Maintenance

Performing regularly scheduled preventative maintenance (PM) services on the components of your compressed air system is vital to insuring your system performs at its optimum level, keeping warranties in effect, maintaining equipment reliability, and producing the greatest return on your investment over the long run. Neglecting routine PM services increases your risk of costly breakdowns and shortens the life expectancy of your compressed air equipment.

To help our customers stay on top of their PM requirements, Air Compressor Service developed a proprietary data base system that tracks all maintenance and repair services we perform on your compressed air equipment and projects PM dates based upon periodic hour readings and/or dates of the last service and manufacturers' recommended PM schedules. As the date of your service nears, we will call you to confirm that you are ready to have the PM services

performed. We will then assure that the required parts are on hand and call you again to schedule a date for the service. Our customers never have to worry about remembering to have their systems serviced. We take care of that for you.

Another important aspect of our preventative maintenance services in our free oil analysis program. We periodically test oil using an instant results total acid number (T.A.N.) test or take an oil sample and send it to a laboratory for spectrographic analysis. Spectrographic analysis will confirm whether your oil is suitable for continued use, detect signs of unusual internal wear, and help maintain some warranties.

### **Repairs and Overhauls**

Air Compressor Service repairs and overhauls most major brands of industrial air compressors from 5 through 300-horsepower. One of our experienced service technicians will examine your air compressor to determine the cause of its malfunction, order parts and perform the repairs on-site or in our shop, whatever is most appropriate for the circumstances.

If your industrial air compressor needs overhauling, we will quote you the cost and time required to complete a standard overhaul, with the proviso that disassembly of the compressor may reveal other internal parts that require replacement too. In any case you will be kept apprised of the situation and asked to approve additional recommended repairs.

### **Emergency Repairs**

Even with the best preventative maintenance program compressed air equipment does occasionally break down, usually at the worst possible time, it seems. We understand that breakdowns can be expensive in terms of lost production and idle workers. Therefore, we make every effort to respond rapidly to your emergency breakdown.

If you have an after-hours emergency breakdown, call us, listen to the prompts and select our emergency voice mailbox. Record your name, your company name, a phone number where you can be reached, and a description of your problem as best as you know it.

Our phone system will alert one of our technicians that there is a message in the emergency voice mailbox. He will retrieve it, contact you and arrange to have a service technician respond to your emergency. Of course, overtime rates apply for after-hours and weekend work.

## C. AIR DRYER REFURBISHMENT & REPAIR

### Air Dryer Major Component Repair & Return Program

Our Company offer for Repair & Return Services on Major Components within an Air Dryer. Through this service we can help save you money by repairing components back to new and returning back to you for spare parts. Instead of having a Technician spend Labor Hours on-site repairing or rebuilding components they can just replace the component during an Emergency Call-out or Scheduled Maintenance with a unit already rebuilt and tested. We perform repairs on all Air Compressors and Water Seal Compressors, Heatless Air Dryers Modules, Drying Tower Repacking, Solenoid Valves, Electronic Control/Display Circuit Boards bringing the units back to original factory specs.

### Air Dryer Refurbishment



We offers complete Air Dryer Refurbishment on all makes and models of Air Dryers including many Manufacture discontinued models. This includes all Central Office, Pole mount, Microwave, and Cell Tower Air Dryers.

Due to ever decreasing Air Pressure Budgets replacing your aging Air Dryers at times is not an option. Upon receipt of your Dryer at our facility, we will do a comprehensive assessment by our Technicians to restore your Dryer to a "Like New" condition complete with a warranty.

All Air Dryers are refurbshished using original "OEM" Parts to ensure future maintenance and repair parts remain the same. Once a written estimate is created, we will submit back to you for approval. Contact us for your specific needs and let us provide you with a quotation for your Refurbishment.

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## Air Compressor Repair & Return Service



We can Repair & Return Service benefits Telco's by reducing labor costs and removes the need to stock Air Dryer Parts. We can rebuild your Air Compressors and return back to you for spare. When it becomes time to perform Air Dryer Maintenance or during an Emergency Air Dryer Callout the technician can swap out the Air Compressor with a spare rebuilt unit and be back in service in a matter of minutes as opposed to hours.

### **Overhaul Repairs include:**

- Disassembly
- Cleaning Parts & Castings
- Replace Motor Bearings
- Replace Mechanical Start Switches
- Test Electric Motor
- Replace worn Pistons & Cylinders
- Install New Rings, Valves, Gaskets, Filters
- Reassemble and Test Run

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## Water Seal Compressor Repair & Return Service

We can Repair & Return Service benefits Telco's by reducing labor costs and removes the need to stock Air Dryer Parts. We can rebuild your Water Seal Compressors and return back to you for spare.

When it becomes time to perform Air Dryer Maintenance or during an Emergency Air Dryer Callout the technician can swap out the Air Compressor with a spare rebuilt unit and be back in service in a matter of minutes as opposed to hours.



### Overhaul Repairs include:

- › Disassembly
- › Cleaning Parts & Castings
- › Replace Motor Bearings
- › Test Electric Motor
- › Replace Water Seals & Gaskets
- › Replace worn Cone, Rotor, Lobe
- › Reassemble and Test Run

## Heatless Air Dyer Repair & Return Service



We can Repair & Return Service benefits Telco's by reducing labor costs and removes the need to stock Air Dryer Parts. We can rebuild your Heatless Air Dryer and Towers and return back to you for spare. When it becomes time to perform Air Dryer Maintenance or during an Emergency Air Dryer Callout the technician can swap out the Air Compressor with a spare rebuilt unit and be back in service in a matter of minutes as opposed to hours.

### Overhaul Repairs include:

- › Disassembly
- › Cleaning Parts & Castings
- › Replace Solenoid Valves
- › Replace Ball Checks, Springs, O-Rings
- › Check/Replace Timer, Coils, Orifices
- › Re-Pack Towers with new Filters, Dessicant, O-Rings
- › Reassemble and Test Run

## Air Dryer Component Repair & Return Service



We can Repair & Return Service benefits Telco's by reducing labor costs and removes the need to stock Air Dryer Parts. We can repair components and return back to you for spare. When it becomes time to perform Air Dryer Maintenance or during an Emergency Air Dryer Callout the technician can swap out the component with a repaired spare and be back in service in a matter of minutes as opposed to hours.



### Repair Components include but not limited to:

- › Heatless Air Dryer Modules
- › Re-Pack Dessicant Towers
- › Air Compressor Modules
- › Removable Electrical Modules
- › Printed Circuit Boards
- › Solenoid Valve Rebuild



## D. Chiller Service And Maintenance

We service and install all major brand chillers, cooling towers and associated mechanical equipment. Our association with the Chiller Systems Group, Daikin, SMARTD, Arctic Cool, Turbocor and Kiltech. Our factory trained technicians provide professional results in the least amount of time, minimizing down-time and lost production.



## Here are some of the chiller services that we can provide:

- **Chiller Services**

Our technicians are factory trained on all major brands of centrifugal, screw, scroll, and reciprocating chillers. We perform Turbocor retrofits / energy efficiency upgrades, preventive maintenance programs, annual / preseason services, minor / major repairs, motor replacement / repairs, compressor replacement / repairs, overhauls / conversions / major rebuilds, control panel upgrades / VFD installations, refrigerant containment upgrades, factory and aftermarket parts, and complete unit replacement.

- **Absorption Chiller Services**

Our technicians are factory trained to perform preventive maintenance programs, annual / preseason services, minor / major repairs – pump rebuilds, solution analysis / solution filtering, and complete unit replacement.

- **Other Services**

VFD installations and replacements, water pump overhaul / replacement, air handler / axial fan repair & replacement, vibration analysis / balancing / laser alignment, eddy current testing / re-tubing, chemical-free water treatment installations, boiler maintenance / repair / replacement.





# PT. Metro Rekayasa Indonesia

*Your Quality is our Concern*

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