

DONG-DO ELECTRONICS



www.dong-do.co.kr/eng

PRECISION MEASURING INSTRUMENTS

STATISTICAL INSPECTION BY HISTOGRAMS

USER-CENTRIC SOFTWARE

HIGH QUALITY & COMPATIBILITY

DP-S2M DP-S1 DP-S1V DP-S2

DP-S2V DP-S4 DP-S4V

- ## Specifications

[illegible]

Technical drawings of eight different types of DP valves, showing dimensions and specifications:

- DP-S2M:** Dimensions include 11.5, 28.5, 60.8, 10.5, and 10.4.
- DP-S1:** Dimensions include 42.71, 67.81, 33.30, 32.60, 8.5, 0.70, 10.0, and 10.0. Stroke: $\pm 0.7\text{mm}$.
- DP-S1V:** Dimensions include 39.41, 43.30, 29.30, 10.0, 0.70, 10.0, 10.0, 40.10, and 10.0.
- DP-S2:** Dimensions include 50, 7.6, 10.0, 10.0, and 10.0.
- DP-S2V:** Dimensions include 58, 53, 10.0, 10.0, and 10.0.
- DP-S4:** Dimensions include R1.50, 21.30, 64.00, 95.30, 111.30, 10.8 h/6, 10.0, 10.0, and 10.0.
- DP-S4V:** Dimensions include R1.50, 21.50, 86.50, 62.00, 13.00, 5.0, 1.0, 10.0, 10.0, 10.0, and 10.0.
- DP-10:** Dimensions include R1.5, 31.9, 123.0, 85.0, 141.0, 10.0, 10.0, 10.0, and 10.0.
- DP-10V:** Dimensions include R1.5, 31.88, 121.38, 84.50, 13.00, 5.0, 1.0, 10.0, 10.0, 10.0, and 10.0.

The diagram illustrates seven types of geometric tolerances, each with a corresponding symbol and a descriptive label:

- Heights:** Shown with a step feature and two vertical dimension lines with arrows indicating the height measurement.
- Flatness:** Shown with a circular feature and three vertical dimension lines with arrows indicating the flatness measurement.
- Surface:** Shown with a curved surface and three vertical dimension lines with arrows indicating the surface measurement.
- Diameters:** Shown with a cylindrical feature and three horizontal dimension lines with arrows indicating the diameter measurement.
- Runout:** Shown with a cylindrical feature and a circular arrow indicating the runout measurement.
- Angle:** Shown with a feature at an angle and a dimension line indicating the angle measurement.

Model	DP –S2M	DP –S1	DP –S1V	DP –SC2	DP –S2	DP –S2V	DP –S4	DP –S4V	DP –10	DP –10V	DP –15	DP –15V	DP –25	DP –S4L	DP –S4VL
TESA	–	430	451	–	410	411	GT21	GT22	GT61	GT62	–	–	–	–	–
Marposs	–	H05	H05	–	H10	HR10	H25	HR25	H50	HR50	–	–	–	–	–
Peter Hirt	1P0			T402	T071F	T072V	T301F	T302V	T501F	T502V					
Solatron	A6G/1/SH AX/0,5/SH			–	AX/1/SH	AXR/1/SH	AX/2,5/SH		ATR/2,5/SH	AX/5/SH	ATR/5/SH		–	–	–



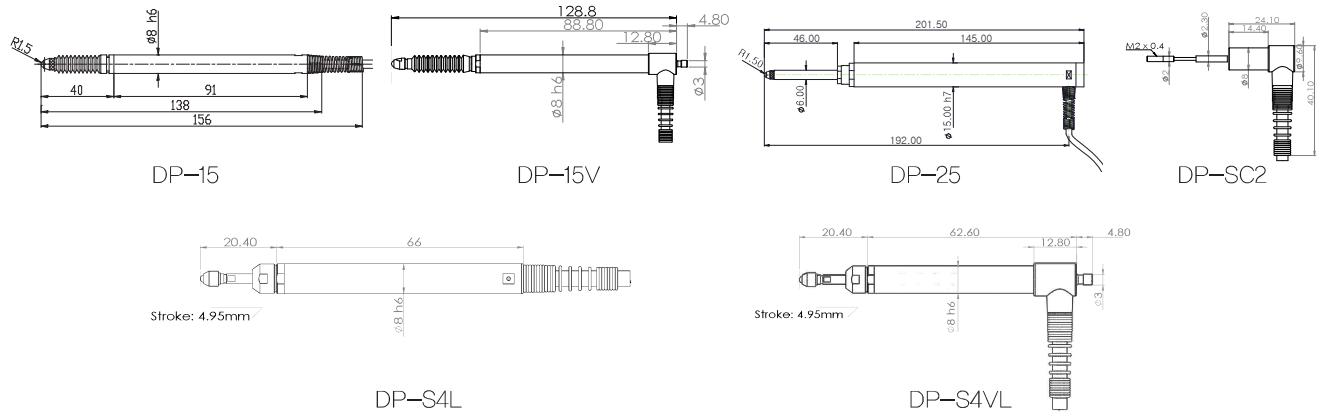
ULTRA SOFT TOUCH SENSORS

DP-S4L/S4VL – HBT type

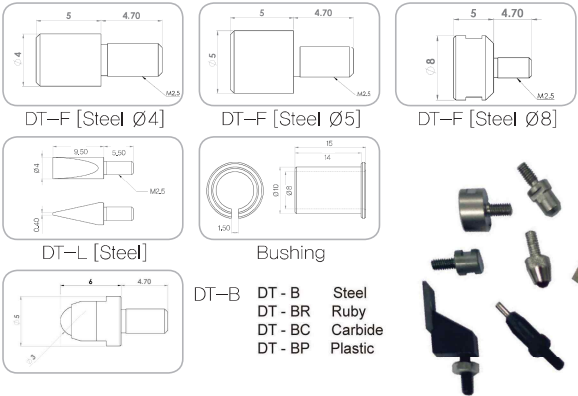
- Ultra soft touch by natural drop, 2g force
- To the part which is easy to damage by force.
- Only can measure the top of the part.

DP-10	DP-10V	DP-15	DP-15V	DP-25	DP-S4L	DP-S4VL	DP-SC2
Standard	Vacuum	Standard	Vacuum	Standard	Natural drop Ultra soft touch	Natural drop Ultra soft touch	None
10.45mm		15.5mm	15.5mm	26mm	4.9mm	4.9mm	—
±4mm		±7mm	±7mm	±12.5mm	±2mm	±2mm	±1mm
0.5μm		1.0μm	1.0μm	1.0μm	0.1μm	0.1μm	0.1μm
0.1%(at the ±3.0mm)		0.3%(at the ±5.0mm)	0.3%(at the ±5.0mm)	0.3%(at the ±8.0mm)	0.1%(at the ±0.1mm)	0.1%(at the ±1.0mm)	0.1%(at the ±0.5mm)
30~80g		30~80g	30~80g	180g	2g	2g	—
3m					2.2m		2.2m
				Ø15mm	Ø8mm		Ø8mm
Approx. 20g	Approx. 26g	Approx. 25g	Approx. 31g	Approx. 145g	Approx. 16g	Approx. 16g	Approx. 10g
0~40 ° C							

*Cable length could be longer by 10M



Probe Tip



Where to use ULTRA SOFT TYPE PROBE

The part sensitive by measuring force

- Glass, plastic, film, Wafer, etc.
- No scratch mark allowed parts.
- 2g force by natural dropping of its weight.
- Only can measure the top of the part.

PNEUMATIC TYPE PROBE

DP-S2A/S4A/10A-HBT type

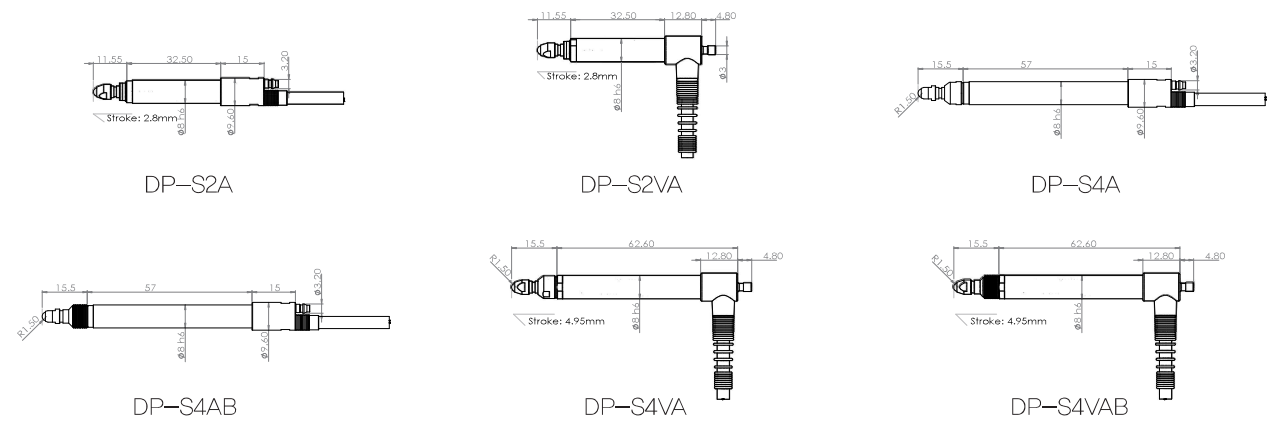
- Simple & low cost system
- Protecting probes from a damage
- Measuring range: ±1.0mm to ±5.0mm



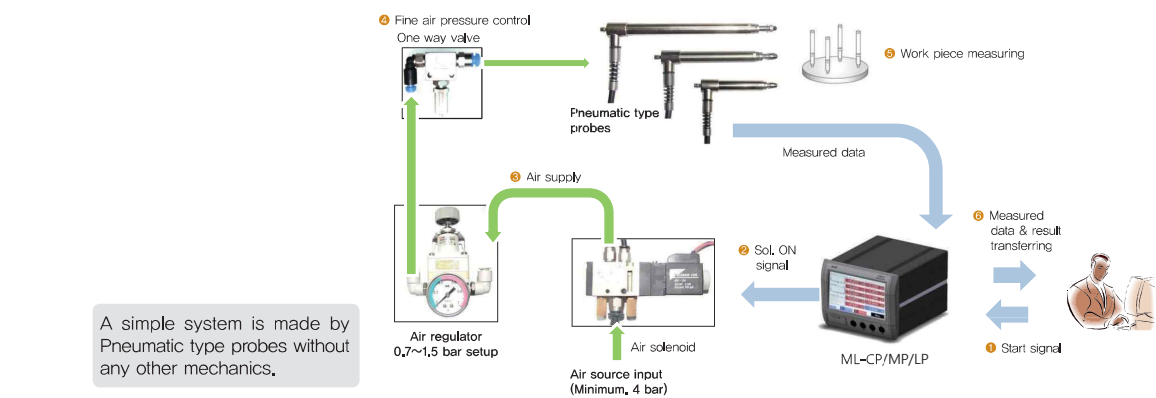
Specifications

Model	DP-S2A	DP-S2VA	DP-S4A	DP-S4AB	DP-S4VA	DP-S4VAB
Plunger retraction	Pneumatic	Pneumatic	Pneumatic	Pneumatic	Pneumatic	Pneumatic
Stroke range	2,8mm	2,8mm	4,9mm		4,9mm	
Measuring range	±1mm	±1mm	±2mm		±2mm	
Repeatability	0,1µm	0,1µm	0,1µm		0,1µm	
Non-linearity	0,1% (at the ±0,5mm)	0,1% (at the ±0,5mm)	0,1% (at the ±1,0mm)		0,1% (at the ±1,0mm)	
Air pressure (Force)	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)
*Cable length	2,2m					
External Diameter	Ø8mm					
Mass (except cable unit)	Approx,11g	Approx,11g	Approx,13g	Approx,13g	Approx,13g	Approx,13g
Operating temp.						

Dimension



A simple system by Pneumatic type probe



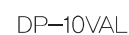
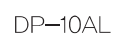
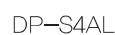
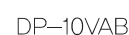
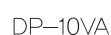


DP-S4AL/10AL-HBT type

- Ultra soft touch
- To the part which is easy to damage by force.
- Measuring range: $\pm 2\text{mm}$ to $\pm 5\text{mm}$.

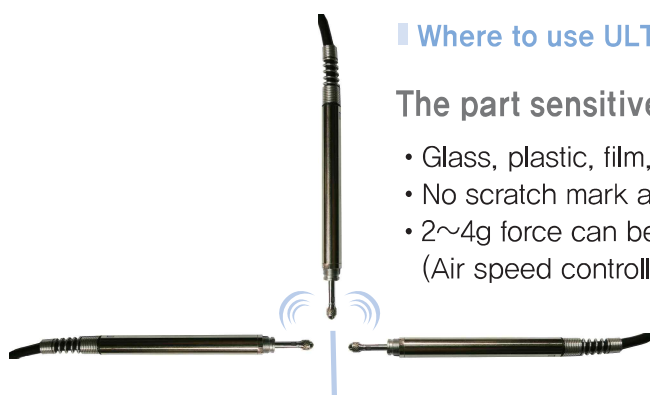
	DP-10A	DP-10AB	DP-10VA	DP-10VAB	DP-S4AL	DP-S4VAL	DP-10AL	DP-10VAL
	Pneumatic	Pneumatic	Pneumatic	Pneumatic	Pneumatic, Ultra soft touch	Pneumatic, Ultra soft touch	Pneumatic, Ultra soft touch	Pneumatic, Ultra soft touch
	10,45mm		10,45mm	10,45mm	4,9mm	4,9mm	10,45mm	10,45mm
	±5mm		±5mm	±5mm	±2mm	±2mm	±5mm	±5mm
	0,1µm		0,1µm	0,1µm	0,1µm	0,1µm	0,1µm	0,1µm
	0,1% (at the ±3,0mm)		0,1% (at the ±3,0mm)	0,1% (at the ±3,0mm)	0,1% (at the ±1,0mm)	0,1% (at the ±1,0mm)	0,1% (at the ±3,0mm)	0,1% (at the ±3,0mm)
	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)	0,5-1,0 bar(0,5~1,0 N)	0,1-0,5 bar(0,03~0,06 N)	0,1-0,5 bar(0,03~0,06 N)	0,1-0,5 bar(0,03~0,06 N)	0,1-0,5 bar(0,03~0,06 N)
	3m				2,2m		3m	
	Ø8mm							
	Approx. 18g	Approx. 18g	Approx. 18g	Approx. 18g	Approx.13g	Approx.13g	Approx. 18g	Approx. 18g
	0~40 °C							

*Cable length could be longer by 10M



The part sensitive by measuring force

- Glass, plastic, film, Wafer, etc.
- No scratch mark allowed parts.
- 2~4g force can be controlled
(Air speed controller should be added.)



DIGITAL LINEAR GAUGE

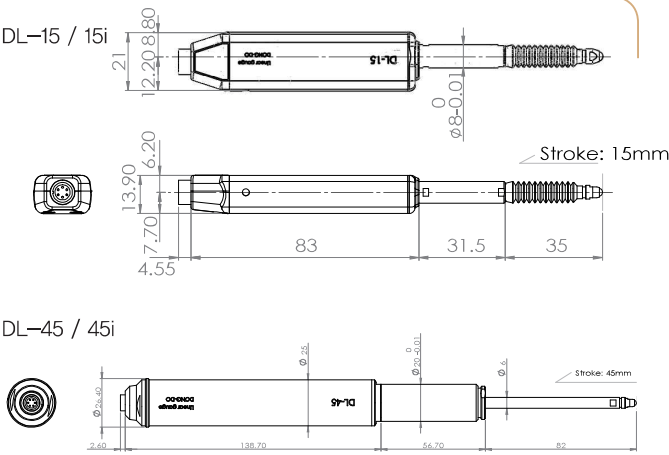
DL-15 / 45 / 15i / 45i

- Absolute / Incremental digital linear gauges
- Measuring range: 15mm / 45mm
- Excellent resistance to workshop conditions
- Resistant to oil and dust
- Resolution: 0.1μm
- Accuracy: +/-1μm
- Compact size
- Various & multi channel applications

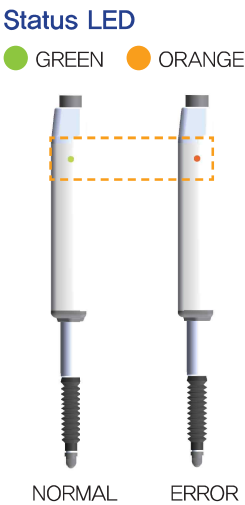
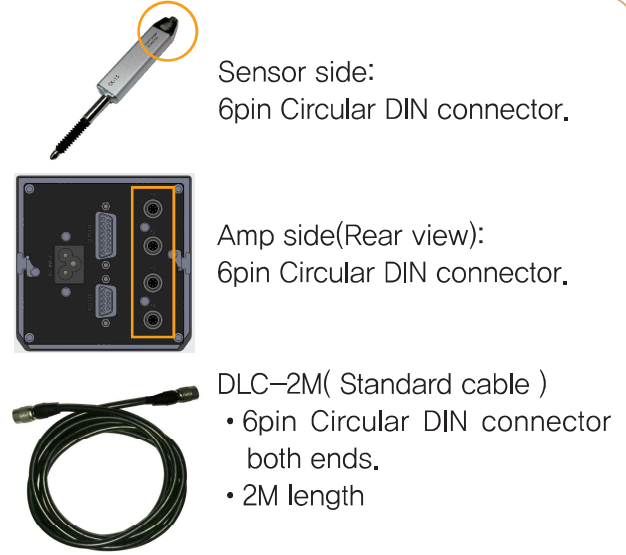
Specifications

Model	DL-15	DL-45	DL-15i	DL-45i
Method	Optical absolute linear encoder		Optical linear encoder	
Measuring range	15mm	45mm	15mm	45mm
Resolution	1μm	1μm	1μm	1μm
Accuracy	±1μm	±2μm	±1μm	±2μm
Measuring Force	80+/- 30g	200g ± 60g	80+/- 30g	200g ± 60g
Mounting stem diameter	ø 8mm	Ø20mm	ø 8mm	Ø20mm
Output	BiSS		A/B Voltage—differential line driver output (EIA-422)	
Operating temperature	10°C to 40°C, ref. temperature 20°C			
Cable length	2m			
Mass (except cable unit)	Approx. 70g	Approx. 500g	Approx. 70g	Approx. 500g

Dimensions



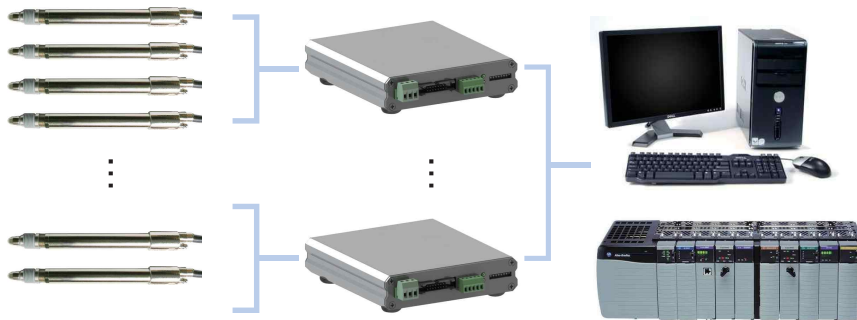
Connection



MEASURING MODULE

M2M(Main module) / M2S(Sub module)

- Easy serial connection module.
- 4ch/8ch module.
- RS232C/RS485(Modbus) support.
- 1 main module + 3 sub module (Max 28ch)



DC power input, RS232/485 port, ID setting



PC SOFTWARE FOR WINDOWS

- PC software for DONG-DO units.
- RS232C/RS485 connections.
- Countless units can be added on.
- Master setting, Display edit, Model saving are possible.
- Various calculation modes (+, -, x, /, avg, Max, min, M-m, user's functions.)



Main menu



ELECTRONIC MICROMETERS

- 1~32ch various electronic micrometers
- To use for height, thickness, inside/outside diameter, flatness, runout.
- Various calculation modes(+, -, x, /, avg, Max, min, M-m, trigonometrical function)
- Statistical process control by histogram, flow chart, CP/CPK.
- High resolution & reliability
- Easy operation
- PLC I/O interface
- RS232c / RS485(option) communication



ML-LP


PC editor

ML-LP

- Channel: 1 ~ 16ch
- 7" Color TFT LCD
- Easy operation with touch pad
- Data saving on Micro SD card,
- Support user's measuring screen editor,
- Panel purpose(option)
- Panel size: 219×119mm



ML-SP

- Channel: 1ch
- 2.8" Color TFT LCD
- Easy operation with touch pad
- Histogram display
- Panel size: 92x46mm



ML-4P2

- Channel: 1 ~ 4ch
- 128×64 pixel Black& white LCD
- RS232C communication
- I/O interface



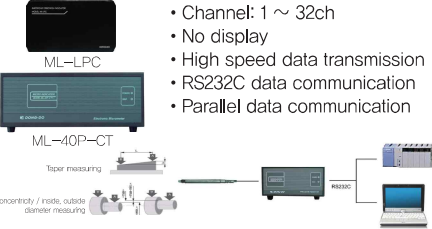
ML-MP

- Channel: 1 ~ 8ch
- 4.2" Color TFT LCD
- Easy operation with touch pad
- Histogram display
- Data saving on SD card,
- Panel size: 93x123mm



ML-16PT/32PT

- Channel: 1 ~ 32ch
- 7" Color TFT LCD
- RS232C communication
- I/O interface
- PLC interface(option)


ML-LPC
ML-40P-CT
Taper measuring
Concentricity / inside outside diameter measuring

ML-4P/16P/32P-CT

- Channel: 1 ~ 32ch
- No display
- High speed data transmission
- RS232C data communication
- Parallel data communication



ML-CP

- Channel: 1 ~ 4ch
- 3.5" Color TFT LCD
- Easy operation with touch pad
- Histogram display
- Panel size: 93×93mm



ML-4PT

- Channel: 1 ~ 4ch
- 3.5" Color TFT LCD
- RS232C communication
- I/O interface


ML-1CT/2CT/4CT

ML-1CT / 2CT / 4CT-Probe type

- Channel: 1 ~ 4ch
- 3color LED bar, Color TFT LCD
- RS232C communication
- I/O interface

Specifications

Model	ML-SP	ML-CP	ML-MP	ML-LP	ML-4P2	ML-4PT	
Display	2,8" Color TFT LCD	3,5" Color TFT LCD	4,2" Color TFT LCD	7" Color TFT LCD	Black & white LCD	3,5" Color TFT LCD	
Resolution	1/1000mm or 1/100 (Option: 1/10000mm)						
Input channel	1ch	1ch ~ 4ch	1ch ~ 8ch	1ch ~ 16ch	1ch ~ 4ch	1ch ~ 4ch	
Size(mm) W x H x D	106x64x147	100x100x160	128x154x160	220x163x120	215x272x105	215x272x105	
Power Input	AC100 ~ 220V 50Hz/60Hz						
Data communication	RS232C (Option: RS485)						
I/O port	11pins I/O interface	6 inputs(Start 1, Zero 1, Model 3) / 6 outputs(Ready 1, OK/NG 2) / Option: 25points					
Compatible Probes	DP-S4 series, DP-10 series, DP-25, other companies HBT probes / Option: LVDT or other analog sensors, Digital gauges						

Application



Grading purposed electronic micrometer

- Max, 15 grade



Run-out electronic micrometer

- High speed run-out measurement(Max, 5kHz)
- Max, min, avg, mid, P-P



General purposed electronic micrometer

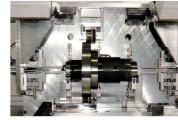


Out-Dia & height inspection

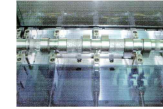


Digiforce

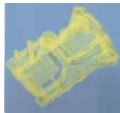
- Automatic pressure inspection along the pressed depth / sections
- Whole processing monitoring of the displacement & pressure,
- Peak pressure checking at the each section,
- Maximum pressure inspection,
- High speed(2kHz)



Car part Runout Measuring Machine



Cam shaft runout Measuring machine



Die-cast part hole Measuring machine



Armature RO/OD Measuring machine



Bush pressing Inspection machine



Wafer thickness measurement machine



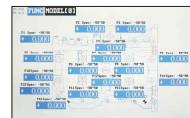
Flatness & Distance Gauging Unit



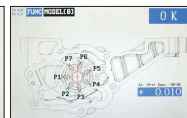
Laser Scan OD gauging Unit



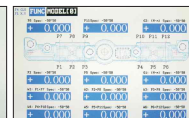
Scratch gauging Unit



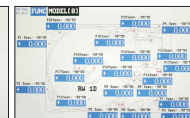
Hole check



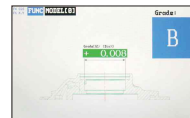
Max-min



Thickness



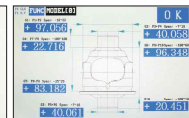
Multi heights



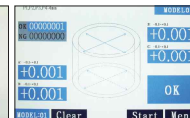
In-dia grading



Multi grading



OD, RO check

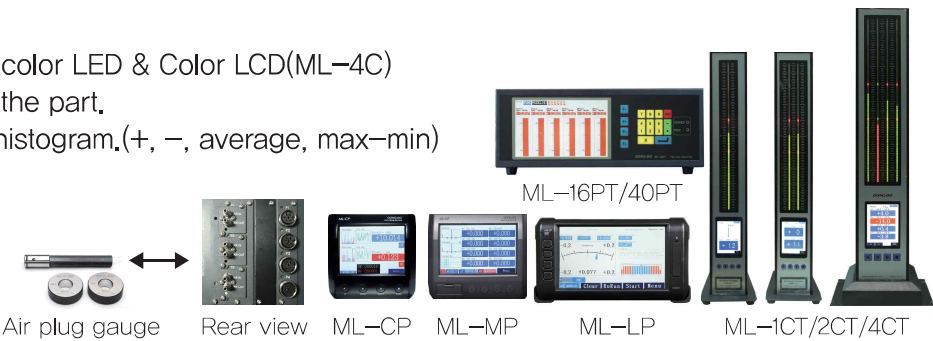


ID in 2 depth

ML-16PT	ML-32PT	ML-LPC	ML-4P-CT	ML-16P-CT	ML-32P-CT	ML-1CT / 2CT	ML-4CT
7" Color TFT LCD	7" Color TFT LCD	None				1 or 2 row 3color bar, 2.8"Color TFT LCD	4 row 3color bar, 3.5"Color TFT LCD
1/1000mm or 1/100 (Option: 1/10000mm)							
1ch ~ 16ch	1ch ~ 32ch	1ch ~ 16ch	1ch ~ 4ch	1ch ~ 16ch	1ch ~ 32ch	1 ~ 2ch	1 ~ 4ch
280x290x140	360x290x151	220x163x120	215x272x105	280x290x140	360x290x151	153x107.5x440	170x110x487
AC100 ~ 220V 50Hz/60Hz							
RS232C (Option: RS485)						RS232C	
6 inputs(Start 1, Zero 1, Model 3) / 6 outputs(Ready 1, OK/NG 2) / Option: 25points						Input: 2 / Output: 4 points	
DP-S4 series, DP-10 series, DP-25, other companies HBT probes / Option: LVDT or other analog sensors, Digital gauges							

AIR TYPE ELECTRONIC MICROMETERS

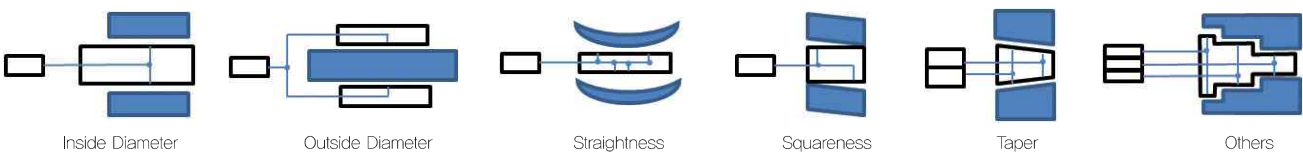
- Air type
- Easy view of the result with 3 color LED & Color LCD(ML-4C)
- Intuitively confirm the state of the part.
- Various measuring modes & histogram.(+, −, average, max-min)
- High resolution & reliability
- Easy operation
- RS232c communication
- I/O interface



Specifications

Model	ML-1CT-A	ML-2CT-A	ML-4CT-A	ML-CP-A	ML-MP-A	ML-LP-A	ML-16PT-A	ML-32PT-A
Display	1 row 3color bar, Color TFT LCD	2 rows 3color bar, Color TFT LCD	4 rows 3 color bar, Color TFT LCD	3.5" TFT Color LCD	4.2" TFT Color LCD	7" TFT Color LCD	7" TFT Color LCD	7" TFT Color LCD
Resolution	0.1μm							
Input Channel	1ch	1ch ~ 2ch	1ch ~ 4ch	1ch~2ch	1ch~4ch	1~6ch	1ch ~ 3ch	1ch ~ 12ch
Dimension (W x D x Hmm)	153 x 107.5 x 440	153 x 107.5 x 440	170 x 110 x 487	100 x 160 x 100	128 x 154 x 100	220 x 163 x 120	280 x 290 x 140	360 x 290 x 151
Mass	Approx. 1.7kg	Approx. 1.7kg	Approx. 1.9kg	Approx. 1.2kg	Approx. 1.7kg	Approx. 2.2kg	Approx. 4.5kg	Approx. 6.0kg
Data communication	RS232C (Option: RS485)							
Working voltage	AC100~220V 50Hz/60Hz							
Input / Output	Input : 2 points / Output: 4 points			6 inputs, 6 outputs / Option: 25points				

Application



Wireless Mechanical Bore Gauge

- Wireless(Bluetooth) portable bore gauge.
- Realtime value checking by 2" color TFT LCD.
- Various measuring modes(Max, min, Avg, Max-min)
- 1μm resolution • ±0.3μm repeatability.
- Built-in Li-ion rechargeable battery.
- Wireless recharging. • Robustness. Strong at contamination

Bore measuring range	Variable diameter heads can be used that has M11x0.75mm, M10x1mm, M6x0.75mm thread
Internal gauge measuring range	±1.5mm(±2.0 stroke)
Internal gauge resolution	0.1μm (1μm for display)
Internal gauge repeatability	±0.3μm
Internal gauge non-linearity	0.1% at ±1.0mm
Bluetooth range	10m
Display	2" color TFT LCD
Operating temperature	0 ~ 40 ° C
Sealing	IP65



B-100



Wireless charging pad

Order code

Electronic micrometer

ML-CP-	S	2	-	R	A	-	A	1	E	-		
1	2	3		4	5		6	7	8	9	10	11
1	ML-SP-						5			standard		
	ML-CP-							A		16bit or special		
	ML-MP-							A		4mm		
	ML-LP-							B		10mm		
	ML-1C-							C		25mm		
	ML-1CT-							D		RDP, ACT1000A		
	ML-2CT-							E		RDP, ACT2000A		
	ML-4CT-							F		special		
	ML-4P2-							G		Magnescale		
	ML-4PT-							H		Heidenhain		
	ML-16PT-							I		Current Output Sensor		
	ML-32PT-							M		Marposs		
	ML-LPC-							S		Solartron		
	ML-4P-CT1-							V		Voltage Output Sensor		
2	ML-16P-CT1-							X		15mm		
	ML-32P-CT1-							LC		Loadcell (Num, 7 Skip)		
	M2M-							DL		DL series		
	M2S-											
	S							1		Resolution : 1um		
	R							2		2um		
3	RH							3		0.1um		
	RH							4		0.5um		
	DF							5		by Probe and ADC		
	F							6		special		
	A									standard		
	GR							S		special		
4	1~32											
	R									Extended I/O		
	RH											
	RS									standard		
	CC											
	DP									Panel type		
5	RU											
	PCI											

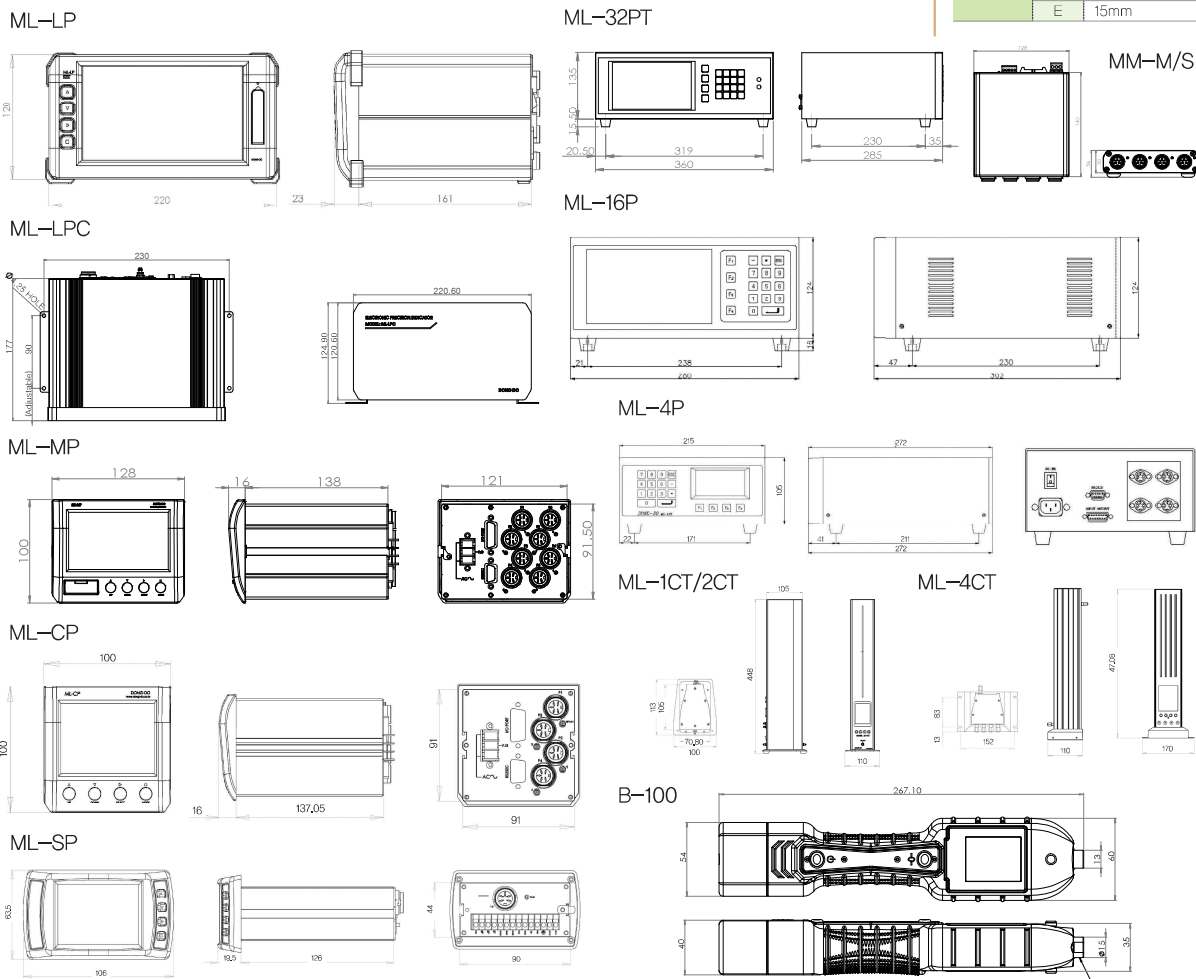
HBT Probe

DP	-	S4	/	48g	/	3M	/	N	-	BC
		1		2		3		4		5
1	S1									
	S1V									
	S2M									
	S2									
	S2V									
	S4									
	S4V									
	10									
	10V									
	15									
	15V									
	25									
	S4L									
	S4VL									
2	SC2									
	S2A									
	S2VA									
	S4A									
	S4AB									
	S4VA									
	S4VAB									
	10A									
	10AB									
	10VA									
	10VAB									
	S4AL									
	S4VAL									
	10AL									
	10VAL									
3	0g									
	4g									
	16g									
	48g									
	80g									
	Null									

DC amp module

AMP100-	A	1	
	1	2	3
Power 1	A		+/-15V
	B		24V DC
Output 2	1		0~5V
	2		-2.5V ~ +2.5V
	3		4~20mA
Sensor 3	Null		4mm / 10mm
	A		25mm
	B		LVDT
	C		Other Company
	D		Special type
	E		15mm

Dimension

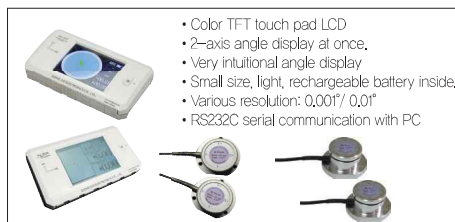


DONG-DO has Reliability and unique solution of Precision Measurement.

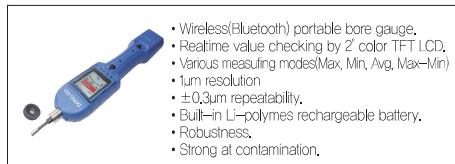
HI-PRECISION SENSOR

DIVISION	MODEL	FIGURE	MEASURING Stroke	DIMENSION		RE-MARKS
				Out Dia	Length	
HBT SENSOR	DP-S1		1mm	8	43	
	DP-S1V				39	
	DP-S2M		2mm	5	60,8	
	DP-S2		2mm	8	65	
	DP-S2V		2mm	8	57	Vacuum
	DP-S2C2		2mm	8	27	Separated type
	DP-S4		4mm	8	94,5	
	DP-S4V				85	Vacuum
	DP-10		10mm	8	124,5	
	DP-10V				117,5	Vacuum
	DP-15		15mm	8	139,3	
	DP-15V				130,6	Vacuum
HBT Pneumatic Type	DP-25		25mm	15	201,5	
	DP-S4A		4mm	8	87,5	
	DP-S4VA		4mm	8	83	
	DP-10A		10mm	8	111	
	DP-10VA		10mm	8	108	
	DP-S4AL		4mm	8	87,5	Ultra soft
	DP-10AL		10mm	8	111	Ultra soft

2-AXIS DIGITAL INCLINOMETER



WIRELESS BORE GAUGE



ELECTRONIC MICROMETER

Column Type Electronic Micrometer



DC AMP(AMP100)



1~4Ch. Panel Type (Model:ML-CP)



1~8Ch. Panel Type (Model: ML-MP)



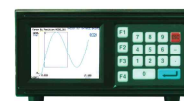
1~16Ch. Panel Type (Model:ML-LP)



1~4Ch. Statistical Electronic Micrometer



DIGIFORCE(ML-4PT-DF)



Out-Dia & Height Inspection Electronic Micrometer



Run Out Micrometer



Custom Function Electronic Micrometer



1~13Ch. Air type Electronic Micrometer



Programmable GROUPING Electronic Micrometer



Computer Interface Electronic Micrometer



Measuring Module - M2M/S

