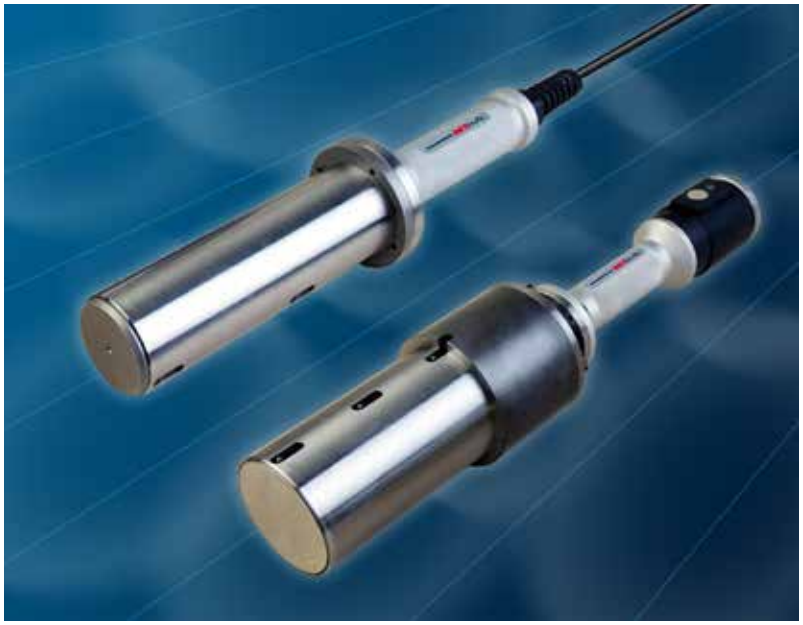
M1 Multi



For the simultaneous measure in multiple sections

The M1 Multi is a manual electronic plug-type gauge for measuring the diameter and geometry (ovality, taper, etc.) of a bore at multiple axial locations using two or four contacts at each location.

ELECTRONIC MULTIPLE BORE GAUGE

The M1 Multi gauge plug consists of a nosepiece that guides the gauge in the bore to eliminate operator-induced variations and one or more measuring armsets. Each nosepiece and complement of armsets is application specific to meet customer requirements. Designed for use in the harshest production environments, the M1 Multi transducer features water, dirt and dust protection meeting the IP67 standard.
.

AVAILABLE VERSIONS

M1 Multi is available in two versions:
- with cable, for connection to electronic interface units
- wireless, utilizing Marposs "Wave" transmission technology with Li-Ion batteries and inductive recharging system.

M1Multi is available on request

TECHNICAL SPECIFICATIONS

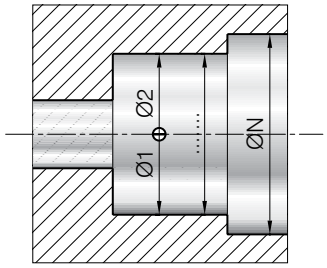
Protection degree	IP67
Repeatability error (range)*	Max. (10% of tolerance; 1,5 micron)

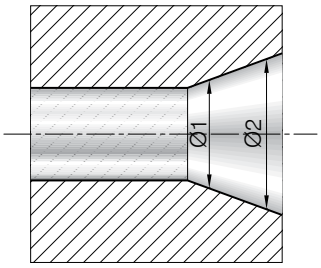
* to be confirmed for the specific application and technical solution.

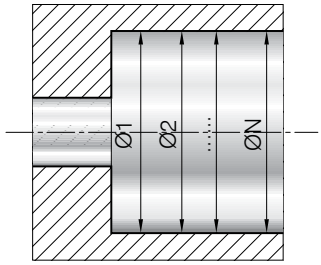
TCHNICAL SPECIFICATIONS OF THE WIRELESS VERSION

Transmission technology	Bluetooth® wireless technology
Transmission distance	10 m
Battery charge duration	up to 36 h in continuous operation
Recharging technology	Contactless recharging system with inductive technology
Recharging time	5-6 hours (80% in 2 hours)
Max. number of manageable signals	7 transducers

APPLICATION EXAMPLES







RECHARGEABLE STAND FOR MULTIWAVE

	DESCRIPTION	ORDER CODE
	Rechargeable Stand for Multiwave handle*	2T0IRBS005

* Compatibility to be verified for extra large dimension gauges.

TESTAR
A MARPOSS DIVISION

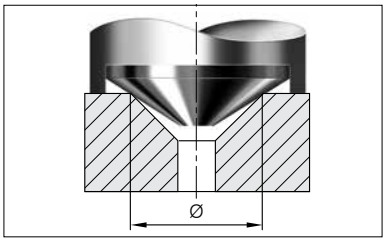
M1 Star
Countersink Gauges

Not only for the Aerospace Industry…

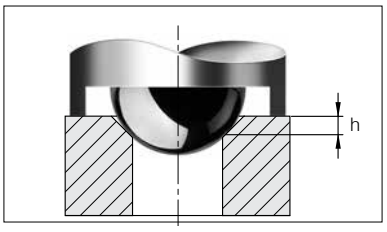
Based on the extensive experience in the Aerospace Industry, TESTAR has developed its line of hand gauges to measure Rivet & Fastener Bore Characteristics. Size, depth and angle can be measured. The line includes both Countersink Diameter Gauge and a Countersink Depth Gauge. These two gauges will measure the countersink maximum diameter and the depth of the countersink and when using Marposs Electronics, display the angle of the countersink.

PRINCIPLE

The countersink gauge with a conical plunger will measure the maximum diameter (the breakout diameter) of the countersink bore by locating on the surface edge.



The countersink depth gauge with spherical plunger will measure the depth of the taper (bottom of the countersink).

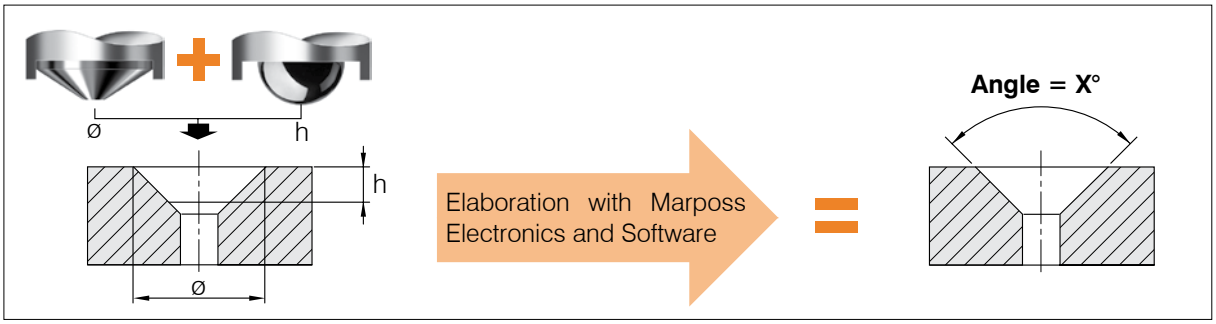


TECHNICAL DATA

A series of plungers and depth stops are available in order to guarantee:
- Measurement of standard rivets designs for Aero Structures.
- Simple, fast retooling

The Countersink Gauges are available in the following versions:
- With programmable standard Quick Digit for cable or Wireless transmission,
- with cable
- wireless

From these two measurements it is possible to obtain the angle of the countersink.



Countersink Diameter Gauge

TECHNICAL CHARACTERISTICS

Description	Value	Note
Application range	0,16"-1" / 4-25,4mm	Maximum Diameter of the tapered bore
Repeatability	≤1 μm	2,77 σ on master
Thermal Drift	≤0.25 μm/°C	

KIT FOR THE MEASURE OF THE BREAKOUT DIAMETER

Measuring kits are available. They're composed of:
- Countersink Diameter Gauge with conical plunger (Please refer to the following table);
- Special depth stop;
- Setting master;
- Quick Digit for cable or Wireless transmission;
- Case.

The Quick Digit for cable or Quick Digit for wireless transmission is zero set at the factory and ready to use. Master's and Quick Digit's certificates are included.

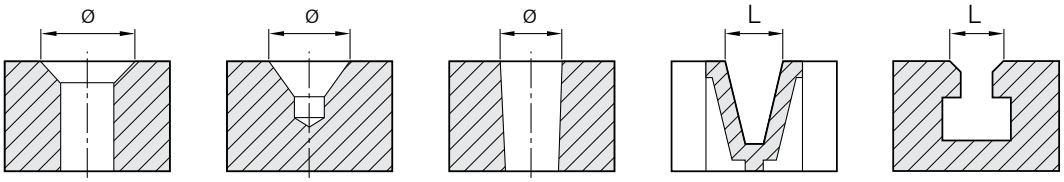
Countersink Taper	Measurable CSK Ø Range	Plunger Taper	Order Code Kit With Quick Digit for cable transmission	Order Code Kit With Quick Digit for wireless transmission	
100°	0,16" ÷ 1"	104°	PSACD00900	PSACD01000	
100°	0,16" ÷ 0,36"	104°	PSACD00901	PSACD01001	
100°	0,36" ÷ 0,56"	104°	PSACD00902	PSACD01002	
100°	0,56" ÷ 0,76"	104°	PSACD00903	PSACD01003	
100°	0,76" ÷ 1"	104°	PSACD00904	PSACD01004	

Dedicated Solutions

Similar kits are available on request:
- Countersink Diameter Gauge with customised taper
- Countersink Depth Gauge, with spherical plunger of a specific diameter
- Countersink Gauge with Mini I-Wave Handle

They are suitable for application in any industrial sector.

Application examples:



For a full list of address locations, please consult the Marposs official website

D6M1ST04G0 - *Edition 09/2014 - Specifications are subject to modifications*

Marposs has an integrated system to manage the Company quality, the environment and safety, attested by ISO 9001, ISO 14001 and OHSAS 18001 certifications. Marposs has further been qualified EAQF 94 and has obtained the Q1-Award.

M1 AIR BORE GAUGES

M1 Air, pneumatic bore gauge, is particularly suitable to test components within very tight tolerances (from IT2 to IT7), and roughness ≤ 0,8 mm Ra.

The measurement principle is based on the variation of pressure, that is proportional to the distance between the bore gauge nozzles and the part under test.

The measurement is obtained by means of the so called “balanced pneumatic bridge” system, with differential pressure transducers and electronic amplification of the signal.

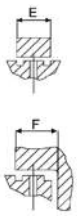
The signal is converted from analogue to digital through electronic converters.

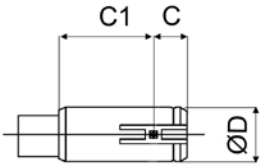
M1 Air bore gauges are entirely manufactured by:

OMG A MARPOSS COMPANY

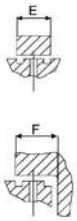
TPS - Pneumatic Plug Gauges

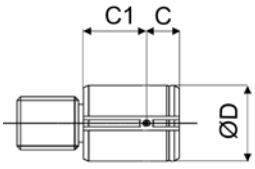
		Through bore				Blind bore			
→ D	range	C	C1	E	Type	C	C1	F	Type
3 - 4,15	0,03	6,5	31,5	1,8	T	3,5	34,5	4,4	B
4,15 - 6,3	0,05	9,5	28,5	2,5		3,5	34,5	4,8	
6,3 - 10	0,1	13	25	3		3,5	34,5	5	



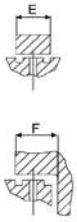


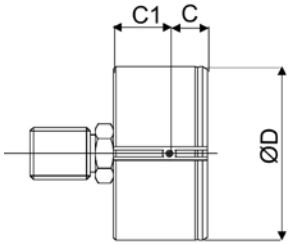
		Through bore				Blind bore			
→ D	range	C	C1	E	Type	C	C1	F	Type
10 - 20	0,1	13	25	3	T	4	34	5,5	B
20 - 30	0,1	13	25	3		4	34	5,5	
30 - 42	0,1	13	25	3		4	34	5,5	
42 - 55	0,1	13	25	3		4	34	5,5	





		Through bore				Blind bore			
→ D	range	C	C1	E	Type	C	C1	F	Type
55 - 70	0,1	13	25	3	T	4	34	5,5	B
70 - 85	0,1	13	25	3		4	34	5,5	
85 - 100	0,1	13	25	3		4	34	5,5	





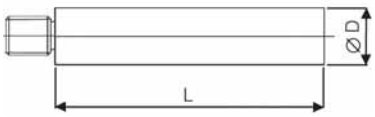
TPS - Technical Specifications

RETOOLING RANGE	**3 - 4,15**	**4,15 - 6,3**	**6,3 - 100**
MEASURING RANGE	max. 0,03 mm	max. 0,05 mm	max. 0,1 mm
REPEATABILITY	≤ 0,5 μm		
AIR SUPPLY	Dry air carefully filtered and purified (filtering degree < 5 μm)		
PIPE FOR AIR SUPPLY	Internal → 4 mm - length 2 meters		
AVERAGE CONSUMPTION	< 1000 l/h		

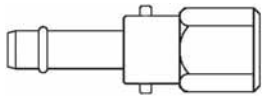
Accessories

EXTENSIONS

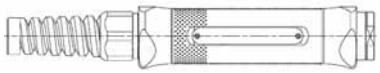
→ D	L	code
20	50	PLPM-50
20	100	PLPM-100
20	200	PLPM-200



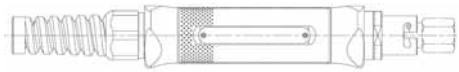
QUICK CONNECTION



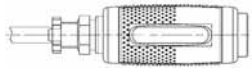
HANDLES



STANDARD

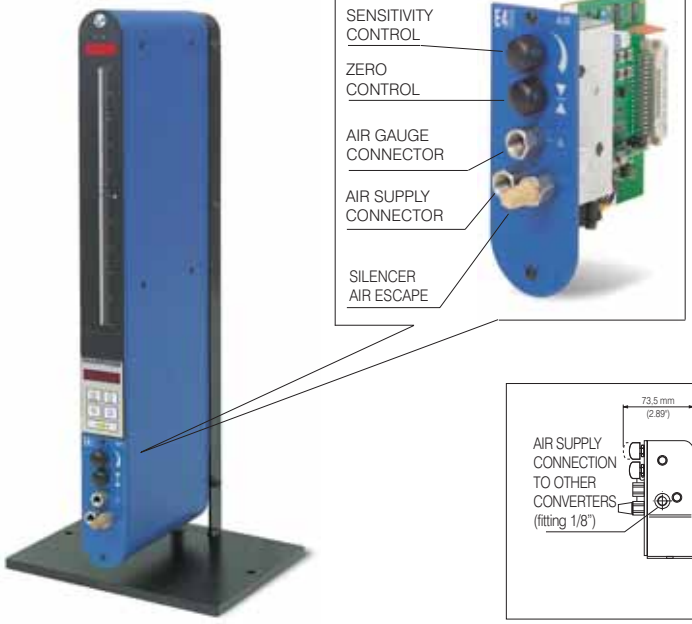


WITH QUICK CONNECTION



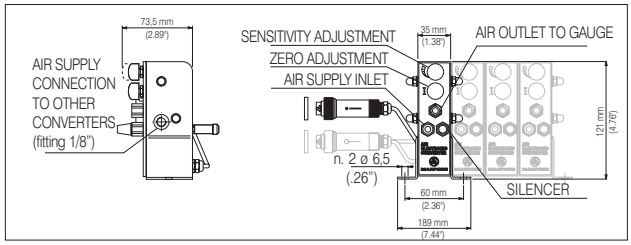
MINI

E4N AIR - External Air / Electronic converters for E4N (type: sensor's pressure)



E4N microprocessor column can display static or dynamic measurements, it features pneumatic-electronic converter with 1 input.

External A/E converter.
The M1 Air bore gauge can be connected to the electronic column E4N by means of an external A/E converter.



TESTAR A MARPOSS DIVISION

M3 Star

To measure shafts between walls

M3 Star™ manual snap guages are designed to measure outside diameters located between walls on shaft-like parts like crankshafts, transmission shafts and camshafts. They are easily re-tooled to measure different workpieces with the same guage and are available in mechanical, wired and wireless configurations to meet a broad range of measurement needs.

M3 STAR

M3Star is an ergonomic, high-precision snap gauge that combines high technology and high quality in a compact body only 10mm wide. Two models are available to handle diameters from 5mm to 30mm and 30mm to 70 mm.
The advanced design is easily re-tooled using only one hex wrench to position both the contacts and V-block.
The standard adjustable M3 Star V-block has a 20mm reference thickness. Optional 10mm and 14mm blocks are available for narrow spaces or to permit measurements within 5mm of shoulders.
The snap head can be combined with various handles and accessories.

MSG - ESG

• **M3Star MSG Mechanical Snap Gauge** is designed to be used with a dial or digital indicator in either a mini or standard holder.
The Snap Head is compatible with both the Marposs I-Wave wireless handle and pencil probe handle (8mm h6).
• The **M3 Star ESG Electrical Snap Gauge** is available in cable or wireless versions equipped with integrated HBT or LVDT transducers. The absence of friction in the measurement chain makes the M3 Star ESG exceptionally accurate.

Technical Specifications

	MSG	ESG
Thickness	10 mm	
Thickness of the “V” part reference	20 mm	
Measurable diameters and retooling range	5 - 15 mm	
	15 - 30 mm	
	30 - 50 mm	
	50 - 70 mm	
Working range	0,6 mm	
Clamping diameter for indicator/probe	Clamping diameter for indicator/probe: 8 mm h6	Cable length 3.5m with SV50/6 connector
Repeatability error (2,77 σ)	≤1,5 µm	≤ 1 µm

M3 STAR - MECHANICAL SNAP GAUGE

1 CONTACT PROTECTIONS: protect the contacts from accidental damage.

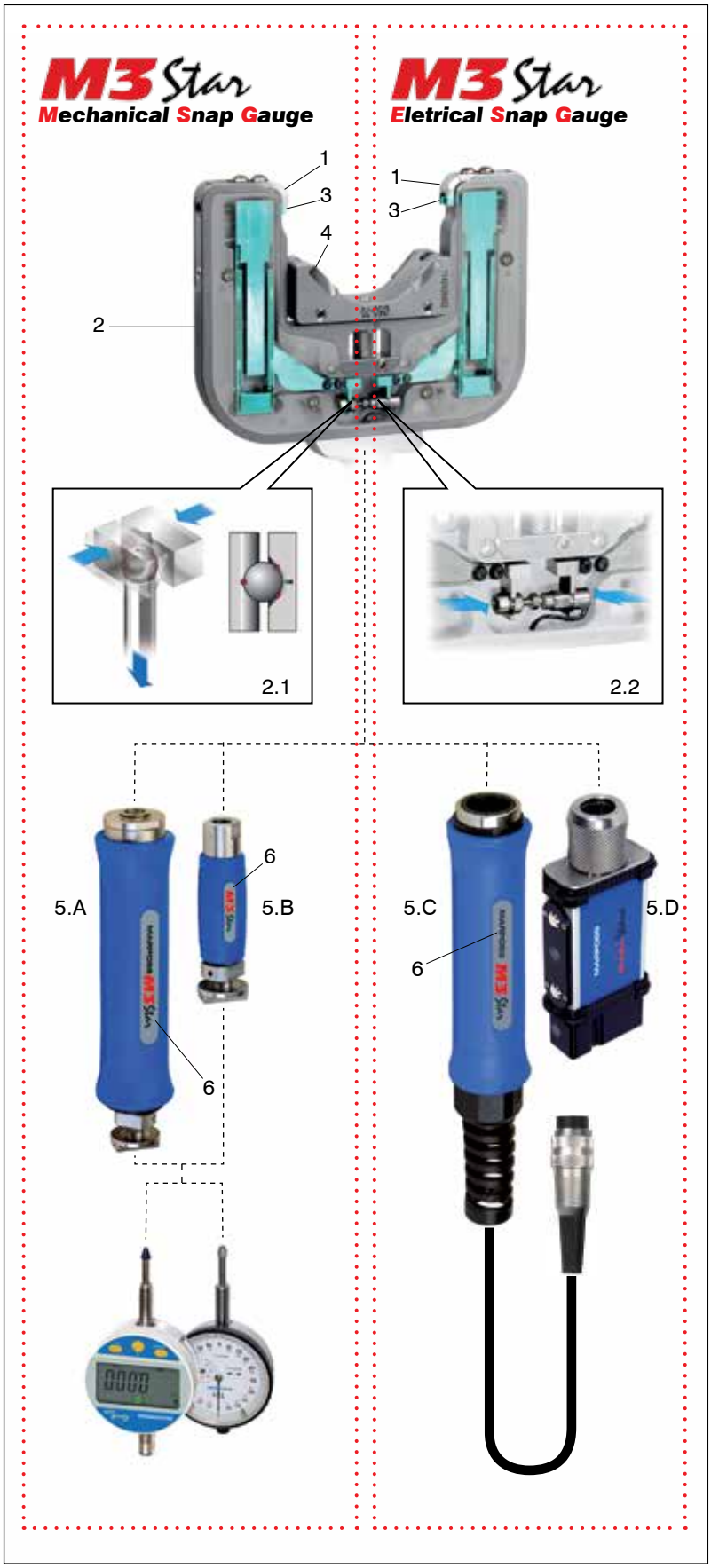
2 BODY: it is 10mm-thick designed to house and protect the measuring mechanism.
- **2.1** Mechanical measuring cells are housed in the M3Star MSG body and transfer the measurement to the dial indicator.
- **2.2** The electrical measuring cell with LVDT or HBT transducer is housed in M3Star ESG body and transfers the measurement to the display device.

3 MEASURING CONTACTS: The easily-replaced threaded tungsten carbide contacts facilitate rapid re-tooling. DLC covered or Diamond contacts are optionally available.

4 "V"-PART REFERENCE: Tungsten carbide planes in the support area reference the snap gauge to the workpiece cylindrical section to be measured. They are available in three versions with thicknesses of 20mm, 14mm or 10mm. A re-adjustment of the "V"-part with respect to the body allows the gauge center line to be changed to re-tool the gauge within the measuring range.

5 HANDLE: The ergonomically-designed handle is used to hold the snap gauge.
- **5.1** M3 Star MSG handle connects the Snap head to the dial indicator and is specifically designed for easy handling. it can be a Standard Indicator Holder (5.A) or a Mini Indicator Holder (5.B).
- **5.2** M3Star ESG is available with a standard handle with a 3,5m cable and SV/50 connector (5.C) or a Mini Wave handle (5.D).

6 **NUMBER PLATE**: Can be marked with any information required by the customer.



M3 Star Mechanical Snap Gauge

The complete snap gauge includes the measuring head, plus handle, chosen to suit the customer's application.

Complete Snap Gauge

Complete M3 Star MSG Order Code

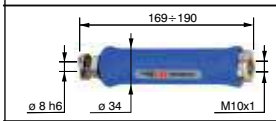
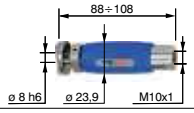
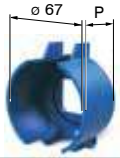
Snap Gauge	Sub-Range (mm)	 Mini Indicator Handle			 Standard Indicator Handle		
		20mm "V"	14mm "V"	10mm "V"	20mm "V"	14mm "V"	10mm "V"
	5 - 15	3TBAMISAWS	3TBAMITAWS	3TBAMIUAWS	3TBAIHSAWS	3TBAIHTAWS	3TBAIHUAWS
	15 - 30	3TBAMISBWS	3TBAMITBWS	3TBAMIUBWS	3TBAIHSBWS	3TBAIHTBWS	3TBAIHUBWS
	30 - 50	3TBAMISCWS	3TBAMITCWS	3TBAMIUCWS	3TBAIHSCWS	3TBAIHTCWS	3TBAIHUCWS
	50 - 70	3TBAMISDWS	3TBAMITDWS	3TBAMIUDWS	3TBAIHSDWS	3TBAIHTDWS	3TBAIHUDWS

The Snap Head

M3 Star Mechanical Snap Head Order Code

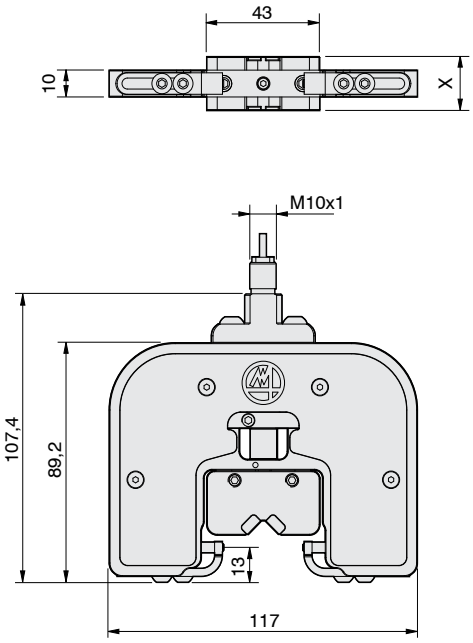
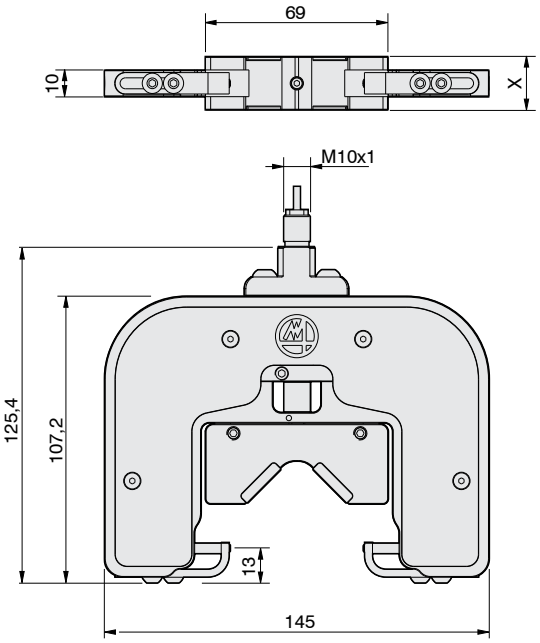
Snap Gauge	Sub-Range (mm)	With 20mm "V " part reference	With 14mm "V " part reference	With 10mm "V " part reference
	5 - 15	3TTASAWXXS	3TTATAWXXS	3TTAUAWXXS
	15 - 30	3TTASBWXXS	3TTATBWXXS	3TTAUBWXXS
	30 - 50	3TTASCWXXS	3TTATCWXXS	3TTAUCWXXS
	50 - 70	3TTASDWXXS	3TTATDWXXS	3TTAUDWXXS

Handles

	Description	Order Code
	Indicator handle	2TCLAS0030
	Mini Indicator handle	2TCSAS0030
	Protective shell for mechanical Indicator (P=38 mm)	2T0DIPS001
	Protective shell for digital Indicator (P=52 mm)	2T0DIPS000
	Protective dome for the upper lifting rod of Quick Digit Digit indicator	2T0DICS000

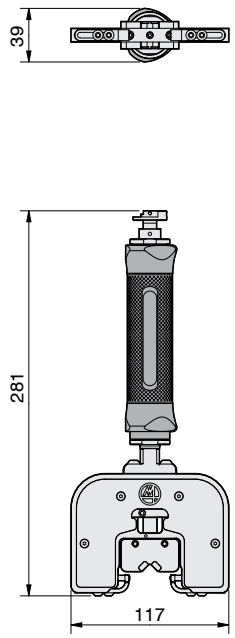
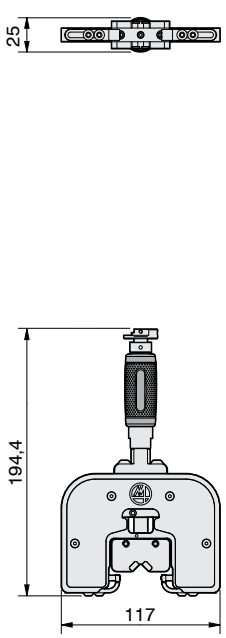
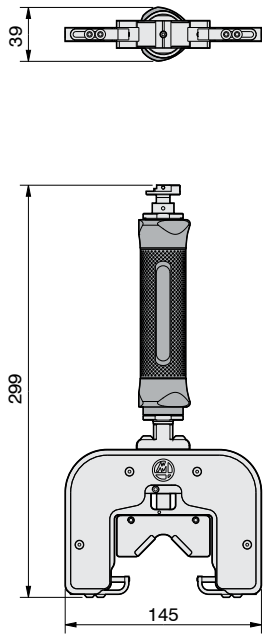
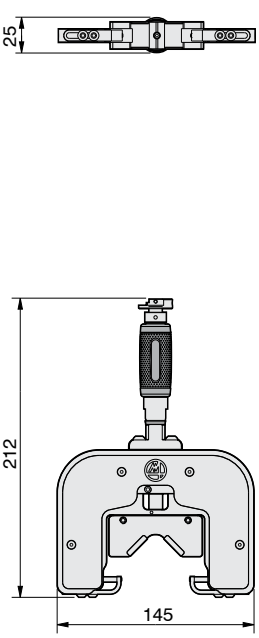
MSG DIMENSIONS

MSG Snap Head

MEASURING RANGE 5÷30	MEASURING RANGE 30÷70
	

X= V REFERENCE PART THICKNESS	20mm	14mm	10mm

Complete snap gage

MEASURING RANGE 5÷30		MEASURING RANGE 30÷70	
			

M3 Star Eletrical Snap Gauge

The complete snap gauge includes the measuring head, plus handle, chosen to suit the customer's application.

Complete Snap Gauge

Complete M3 Star ESG LVDT Order Code

Snap Gauge	Sub-Range (mm)	Standard Handle with 3,5m cable			Mini Wave handle		
		20mm "V"	14mm "V"	10mm "V"	20mm "V"	14mm "V"	10mm "V"
	5 - 15	3TBFE3SAWS	3TBFE3TAWS	3TBFE3UAWS	3TBFEWSAWS	3TBFEWTAWS	3TBFEWUAWS
	15 - 30	3TBFE3SBWS	3TBFE3TBWS	3TBFE3UBWS	3TBFEWSBWS	3TBFEWTBWS	3TBFEWUBWS
	30 - 50	3TBFE3SCWS	3TBFE3TCWS	3TBFE3UCWS	3TBFEWSCWS	3TBFEWTCWS	3TBFEWUCWS
	50 - 70	3TBFE3SDWS	3TBFE3TDWS	3TBFE3UDWS	3TBFEWSDWS	3TBFEWTDWS	3TBFEWUDWS

Complete M3 Star ESG HBT Order Code

Snap Gauge	Sub-Range (mm)	Standard Handle with 3,5m cable			Mini Wave handle		
		20mm "V"	14mm "V"	10mm "V"	20mm "V"	14mm "V"	10mm "V"
	5 - 15	3TBHE3SAWS	3TBHE3TAWS	3TBHE3UAWS	3TBHEWSAWS	3TBHEWTAWS	3TBHEWUAWS
	15 - 30	3TBHE3SBWS	3TBHE3TBWS	3TBHE3UBWS	3TBHEWSBWS	3TBHEWTBWS	3TBHEWUBWS
	30 - 50	3TBHE3SCWS	3TBHE3TCWS	3TBHE3UCWS	3TBHEWSCWS	3TBHEWTCWS	3TBHEWUCWS
	50 - 70	3TBHE3SDWS	3TBHE3TDWS	3TBHE3UDWS	3TBHEWSDWS	3TBHEWTDWS	3TBHEWUDWS

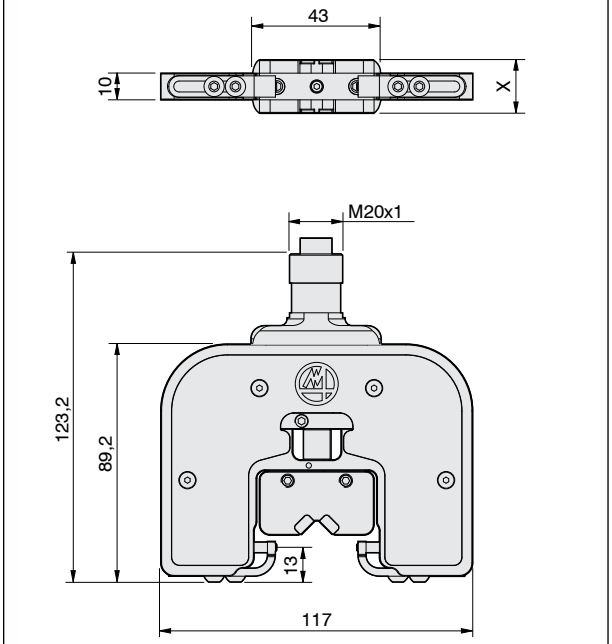
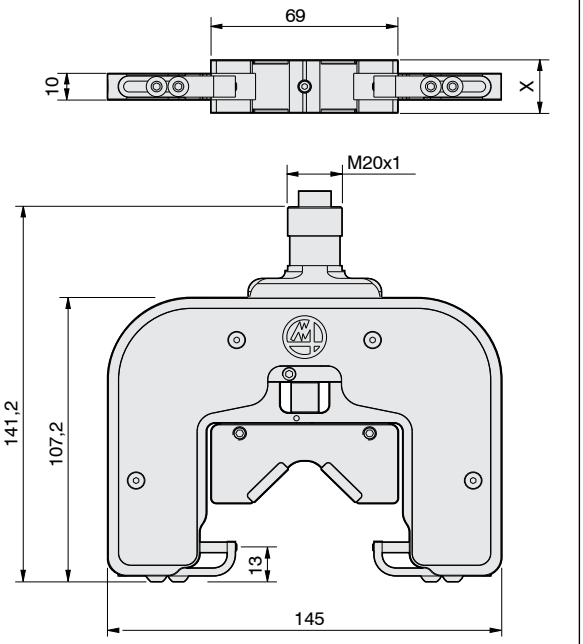
The Snap Head

M3 Star Electrical Snap Head Order Code

Snap Gauge	Sub-Range (mm)	LVDT transducer			HBT transducer		
		With 20mm "V" part reference	With 14mm "V" part reference	With 10mm "V" part reference	With 20mm "V" part reference	With 14mm "V" part reference	With 10mm "V" part reference
	5 - 15	3TTFSAWXXS	3TTFTAWXXS	3TTFUAWXXS	3TTHSAWXXS	3TTHTAWXXS	3TTHUAWXXS
	15 - 30	3TTFSBWXXS	3TTFTBWXXS	3TTFUBWXXS	3TTHSBWXXS	3TTHTBWXXS	3TTHUBWXXS
	30 - 50	3TTFSCWXXS	3TTFTCWXXS	3TTFUCWXXS	3TTHSCWXXS	3TTHTCWXXS	3TTHUCWXXS
	50 - 70	3TTFSDWXXS	3TTFTDWXXS	3TTFUDWXXS	3TTHSDWXXS	3TTHTDWXXS	3TTHUDWXXS

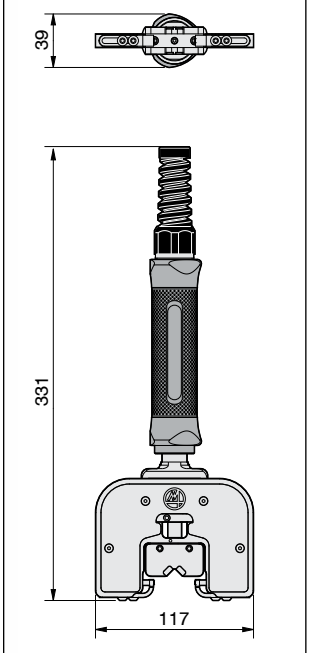
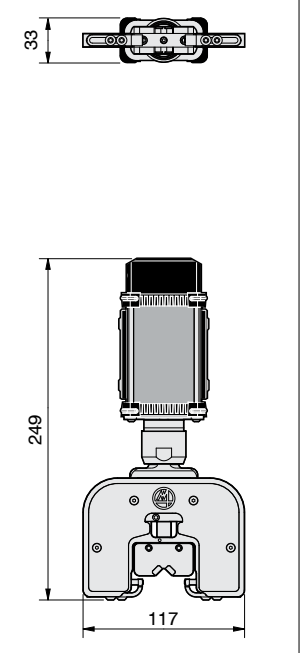
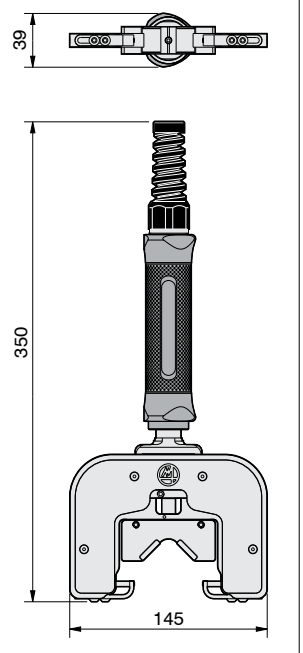
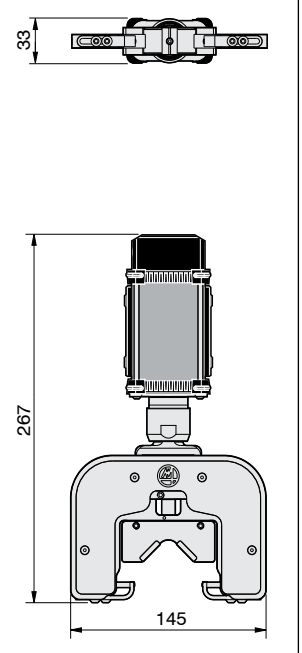
ESG DIMENSIONS

ESG Snap Head

MEASURING RANGE 5÷30	MEASURING RANGE 30÷70
	

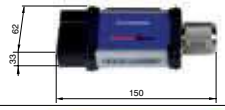
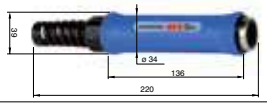
X= V REFERENCE PART THICKNESS	20mm	14mm	10mm

Complete snap gage

MEASURING RANGE 5÷30		MEASURING RANGE 30÷70	
			

HANDLES

HANDLES AND CABLES FOR ESG SNAP GAGE

	Description	Order Code
	Mini Wave Handle for wireless transmission	3TJ1SDJ000
	Handle without cable	2TH3000001
	Cable 2 mt LVDT - connector SV50/6	2TG0000026
	Cable 3,5 mt LVDT - connector SV50/6	2TG0000356
	Cable 5 mt LVDT - connector SV50/6	2TG0000056
	Cable 2 mt LVDT - connector S3	2TG0000023
	Cable 2 mt TESA COMPATIBLE - connector SV50/6	2TG00TS026
	Cable 2 mt HBT - connector SV50/6	2TG0001026
	Cable 3,5 mt HBT - connector SV50/6	2TG0001356
	Cable 5 mt HBT - connector SV50/6	2TG0001056

SPARES AND ACCESSORISES

BODIES (V part contacts and contact protections not included)

	M3 STAR MSG		M3 STAR ESG		
				LVDT	HBT
5-30mm		2942426421		2942426422	2942426423
30-70mm		2942426411		2942426412	2942426413

V-PART REFERENCES

Range	20mm "V"	Order Code	14mm "V"	Order Code	10mm "V"	Order Code
5 - 15 mm		2942426459		2942426463		2942426457
15 - 30 mm		2942426458		2942426462		2942426456
30 - 50 mm		2942426455		2942426465		2942426453
50 - 70 mm		2942426454		2942426464		2942426452

COMPONENTS

Contact (Carbide 1 piece)		Contact Protections (Carbide)		
Description	Order Code	Description		Order Code
	3TXCX00026		M3Star 5÷30 mm	2942426434
			M3Star 30÷50 mm	2942426435
			M3Star 50÷70 mm	2942426436

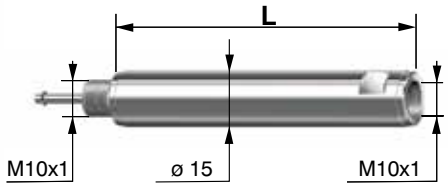
TOOLS

	Description	Order Code
	2,5 mm Hex wrench	4413675313

SPARES

	Description	Order Code
	Protections kit for 5-30mm body	2042426432
	Protections kit for 30-70mm body	2042426406
	Spring – 1 piece	1042426287
	Screw for spring limitation - 1 piece	1042426286
	Transfer Rod	2042433015
	Rod Bushing	1042433204

DEPTH EXTENSIONS available only for M3star MSG



Length L (mm)	Order Code
50	2TXMSF0050
65	2TXMSF0065
80	2TXMSF0080
100	2TXMSF0100
125	2TXMSF0125

STAND available only for M3star ESG Mini Wave

	Description	Order Code
	Stand charger for M3 Star ESG with Mini Wave handle (power supply unit included).	2T0IRBS004

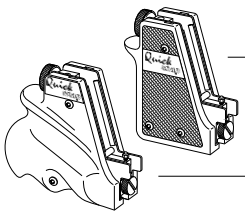
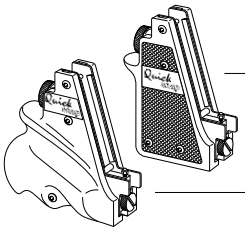
MANUAL SNAP GAUGE

- Rugged manual snap gauge for the mass-control of outside diameters of cylindrical parts in the range 3 to 150 mm (.12" to 5.90").

It can be used both directly on the part in the machine tool and as a simple fixture (an optional bench support is also available).

- Quick and easy to retool without any special tools. The mechanical zero setting is not requiring the assembly of the measuring instrument.
- No maintenance is needed, thanks to its long life carbide reference prisms and contacts.
- Available with two different types of handle, anatomic and slim.
- It can be used with any measuring gauge with clamping diameter 8 mm or 3/8", such as our Red Crown pencil probes, Quick Read compact electronic display unit and, through an optional adapter, Quick Digit electronic digital indicator.
- A wide range of accessories providing flexibility is available, such as off-set measuring contacts to allow checks close to shoulders, bench support, pushing device for part location.

CONFIGURATION LAYOUT AND RETOOLING RANGE

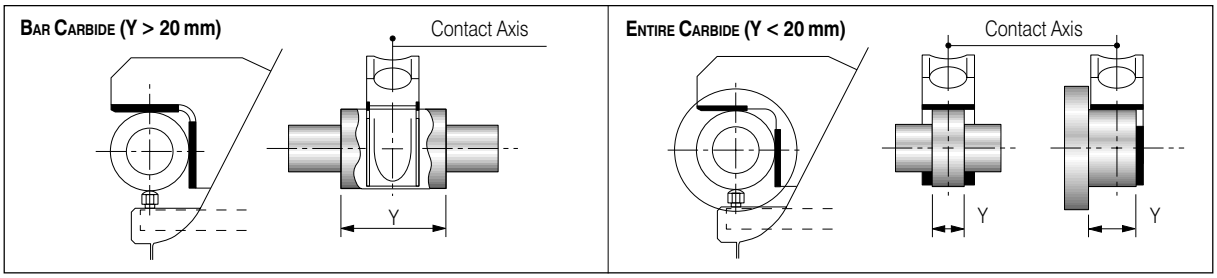
RANGE	SNAP GAUGE BODY	PRETRAVEL ADJUSTER	REFERENCE PRISM UNIT
ø 3 - 25 mm (.12" - .98")		WITHOUT PUSHER WITH PUSHER	3 - 5 mm (.12" - .20") WITH ENTIRE CARBIDE 5 - 10 mm (.20" - .39") WITH ENTIRE CARBIDE 10 - 25 mm (.39" - .98") WITH ENTIRE CARBIDE
ø 25 - 50 mm (.98" - 1.97")		WITHOUT PUSHER WITH PUSHER	WITH ENTIRE CARBIDE WITH BAR CARBIDE
ø 50 - 100 mm (1.97" - 3.94")		WITHOUT PUSHER WITH PUSHER	WITH ENTIRE CARBIDE WITH BAR CARBIDE
ø 100 - 150 mm (3.94" - 5.90")		WITHOUT PUSHER WITH PUSHER	WITH ENTIRE CARBIDE WITH BAR CARBIDE

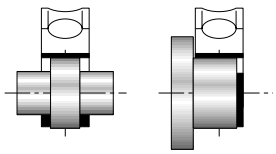
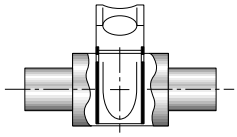
Technical Specifications

Retooling Range (mm)	3 - 25	25 - 50	50 - 150
Measuring Range	± 0.300 mm	± 0.400 mm	± 0.500 mm
Repeatability	≤1µm		
Weight	0.340 - 0.420 kg	0.640 - 0.875 kg	0.850 - 1.085 kg
Measuring Force	Subject to the measuring instrument		

Reference Prism Unit

These units are supplied with wear resistant entire carbide. For parts with external diameter in the range 25 to 150 mm they are available also with wear resistant bar carbide, but can be used only to measure workpieces longer than 20 mm.

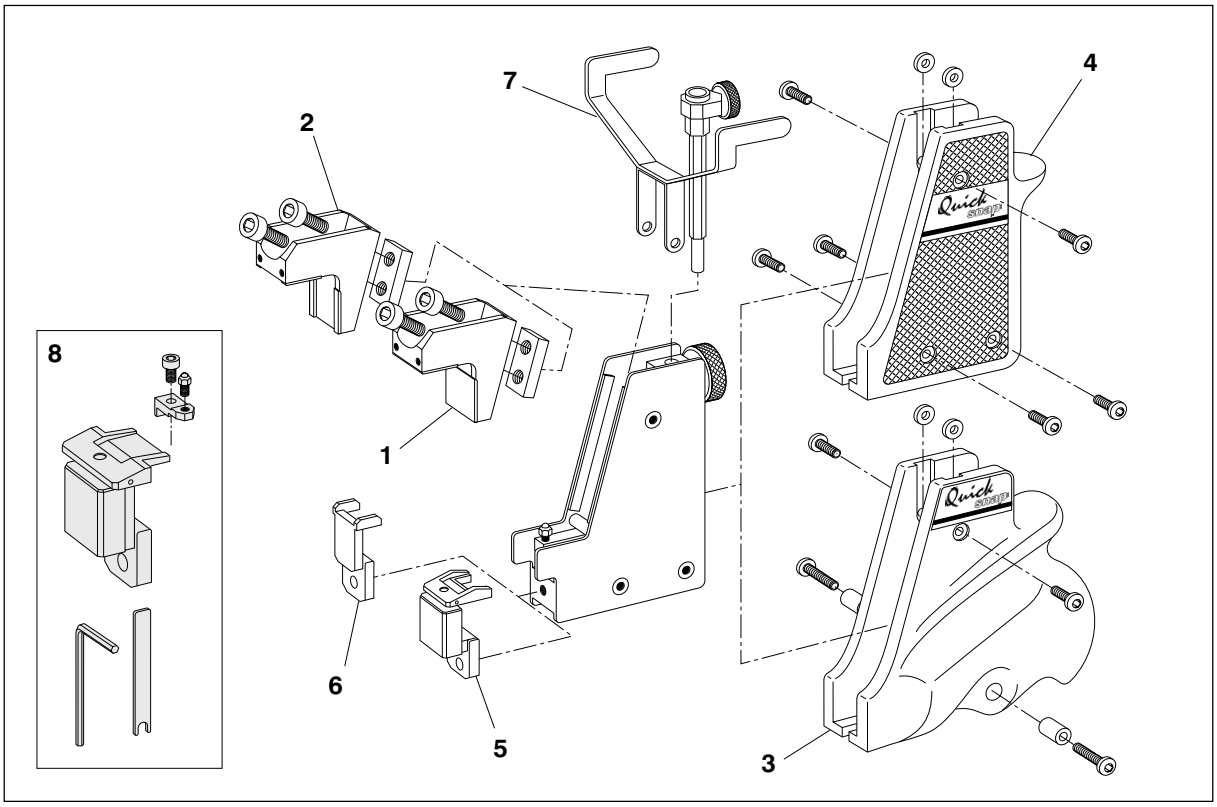


TYPE OF SNAP GAUGE			ANATOMIC HANDLE		SLIM HANDLE	
Reference Prism Unit	Retooling Range	Pretravel Adjuster	Diameter 8 mm Order Code	Diameter 3/8" Order Code	Diameter 8 mm Order Code	Diameter 3/8" Order Code
 With Entire Carbide	3 - 5 mm (.12" - .20")	WITH PUSHER	N/A	N/A	3519750282	3519750287
		W/O PUSHER	N/A	N/A	3519750292	3519750297
	5 - 10 mm (.20" - .39")	WITH PUSHER	N/A	N/A	3519750281	3519750286
		W/O PUSHER	N/A	N/A	3519750291	3519750296
	10 - 25 mm (.39" - .98")	WITH PUSHER	N/A	N/A	3519750280	3519750285
		W/O PUSHER	N/A	N/A	3519750290	3519750295
	25 - 50 mm (.98" - 1.97")	WITH PUSHER	3519750060	3519750065	3519750080	3519750085
		W/O PUSHER	3519750070	3519750075	3519750090	3519750095
	50 - 100 mm (1.97" - 3.94")	WITH PUSHER	3519750160	3519750165	3519750180	3519750185
		W/O PUSHER	3519750170	3519750175	3519750190	3519750195
	100 - 125 mm (3.94" - 4.92")	WITH PUSHER	N/A	N/A	3519750600	3519750605
		W/O PUSHER	N/A	N/A	3519750620	3519750625
	125 - 150 mm (4.92" - 5.90")	WITH PUSHER	N/A	N/A	3519750650	3519750655
		W/O PUSHER	N/A	N/A	3519750670	3519750675
 With Bar Carbide	25 - 50 mm (.98" - 1.97")	WITH PUSHER	3519750061	3519750066	3519750081	3519750086
		W/O PUSHER	3519750071	3519750076	3519750091	3519750096
	50 - 100 mm (1.97" - 3.94")	WITH PUSHER	3519750161	3519750166	3519750181	3519750186
		W/O PUSHER	3519750171	3519750176	3519750191	3519750196
	100 - 125 mm (3.94" - 4.92")	WITH PUSHER	N/A	N/A	3519750610	3519750615
		W/O PUSHER	N/A	N/A	3519750630	3519750635
	125 - 150 mm (4.92" - 5.90")	WITH PUSHER	N/A	N/A	3519750660	3519750665
		W/O PUSHER	N/A	N/A	3519750680	3519750685

Description	Order Code
USER MANUAL	D0080000X1 (*)

(*) **X** = I (Italian); U (English); D (German); E (Spanish); F (French)

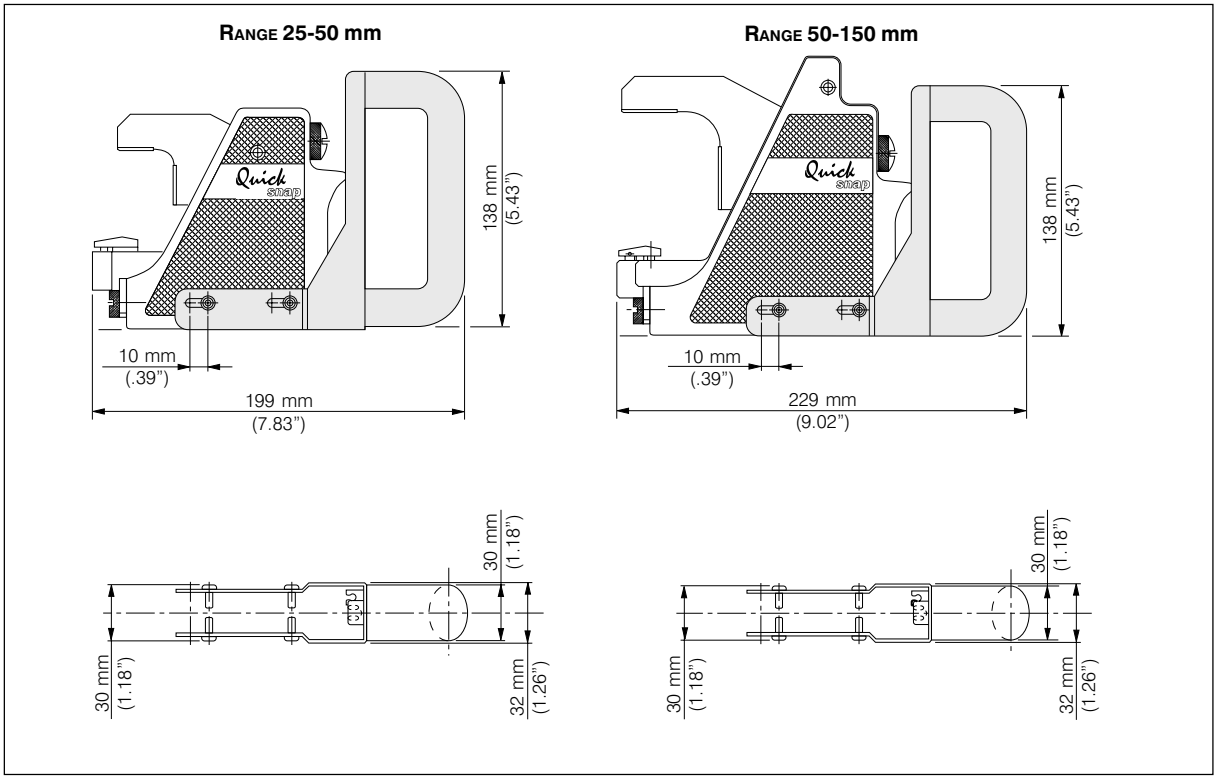
COMPONENTS AND ACCESSORIES



REF.	DESCRIPTION	RANGE ø	ORDER CODE
1	REFERENCE PRISM UNIT WITH ENTIRE CARBIDE	3 - 5 mm (.12" - .20")	2919750072
		5 - 10 mm (.20" - .39")	2919750071
		10 - 25 mm (.39" - .98")	2919750070
		25 - 50 mm (.98" - 1.97")	2919750081
		50 - 100 mm (1.97" - 3.94")	2919750170
		100 - 125 mm (3.94" - 4.92")	2919750600
		125 - 150 mm (4.92" - 5.90")	2919750650
2	REFERENCE PRISM UNIT WITH BAR CARBIDE	25 - 50 mm (.98" - 1.97")	2919750082
		50 - 100 mm (1.97" - 3.94")	2919750171
		100 - 125 mm (3.94" - 4.92")	2919750610
		125 - 150 mm (4.92" - 5.90")	2919750660
3	ANATOMIC HANDLE UNIT	25 - 50 mm (.98" - 1.97")	2919750078
		50 - 100 mm (1.97" - 3.94")	2919750161
4	SLIM HANDLE UNIT	3 - 25 mm (.12" - .98")	2919750061
		25 - 50 mm (.98" - 1.97")	2919750086
		50 - 150 mm (1.97" - 5.90")	2919750181
5	PRETRAVEL ADJUSTER WITH PUSHER	3 - 25 mm (.12" - 98")	2919750220
		25 - 150 mm (.98" - 5.90")	2919750150
6	PRETRAVEL ADJUSTER WITHOUT PUSHER	3 - 25 mm (.12" - .98")	1019750209
		25 - 150 mm (.98" - 5.90")	1019750059
7	DIAL INDICATOR ADAPTER UNIT WITH MOUNTING DIA. 8 mm	3 - 25 mm (.12" - .98")	2919750240
		25 - 50 mm (.98" - 1.97")	2919750090
		50 - 100 mm (1.97" - 3.94")	2919750120
		100 - 150 mm (3.94" - 5.90")	2919750670
7	DIAL INDICATOR ADAPTER UNIT WITH MOUNTING DIA. 3/8"	3 - 25 mm (.12" - .98")	2919750245
		25 - 50 mm (.98" - 1.97")	2919750095
		50 - 100 mm (1.97" - 3.94")	2919750115
		100 - 150 mm (3.94" - 5.90")	2919750675
8	KIT FOR OFF-SET CONTACT (*)	3 - 25 mm (.12" - .98")	2919750310
		25 - 150 mm (.98" - 5.90")	2919750320

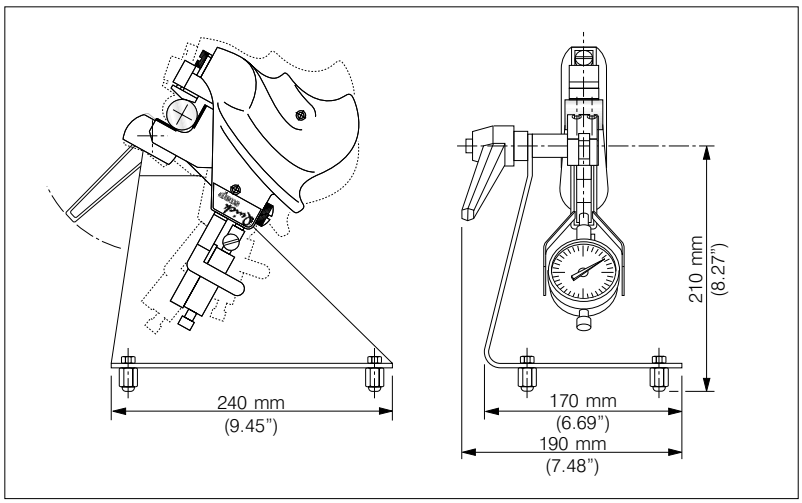
(*) It allows measurements to be performed at a minimum distance of 3 mm from a shoulder by means of a contact extension (with the standard contact the minimum distance is 10 mm).

OPTIONS



DESCRIPTION	ORDER CODE
Handle (*)	2919750880

(*) Available for slim type handle range 25 - 150 mm (0.98" - 5.90") only.



DESCRIPTION	ORDER CODE
Bench Gauge Support	2919750020

… the easy way to measure shafts

M4 Star is a family of high performance gauges for measuring parts such as shafts or pins. The highly customizable M4 Star family includes mechanical dial indicator and electrical LVDT and HBT models with wired and wireless connectivity.
M4 Star is available on request.

M4 Star MRG – The mechanical ring gauge

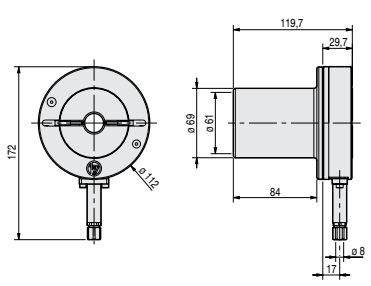
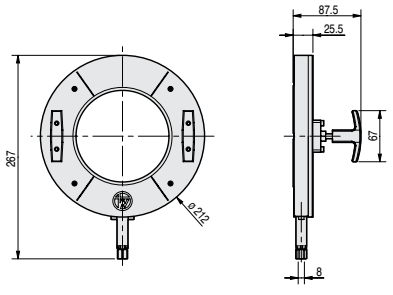
The M4 Star MRG mechanical ring gauge models are for measuring shaft and pin-type parts with diameters from 5 to 125mm with a dial indicator. The C-dimension is customizable from 1 to 6mm which allows measurements to be taken very close to the flange.
M4 Star MRG gauges are easy to use with a single comfortable handle for the smaller sizes and two small handles in the larger models. They also can be stand mounted.

Reliability

The M4 Star MRG's mechanical transmission is housed in a rugged protective body. Its robust construction is rated for more than 10.000.000 measuring cycles.

Technical Specifications

	M4Star MSG
C quote	1÷ 6mm
Thermal Drift	<0,3 μm/°C/mm
Repeatability (2,77σ)	≤1 μm
Working Range	0,1mm

	Measurable diameter 5-60mm	Measurable diameter 60-125mm
Overall dimensions		

M4 STAR ERG - *Electrical Ring Gauge*

The M4 Star ERG Electrical Ring Gauges complete the family with dedicated designs that include the following characteristics:

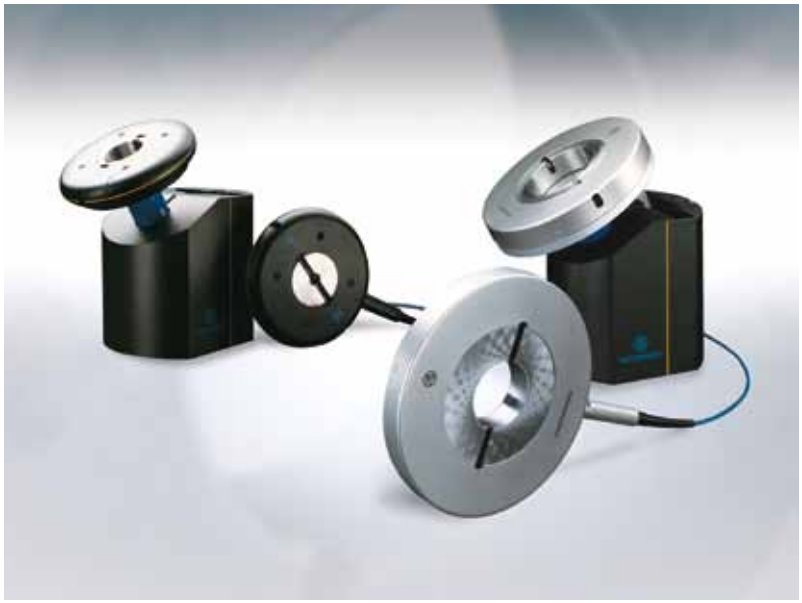
- integrated LVDT or HBT transducer
- Ability to measure diameters from 5mm to larger than 125mm
- Axial or radial exit cables or wireless connectivity
- Optional stand-mounted solutions with or without integrating setting pin slots
- Dedicated design: flexible and customizable

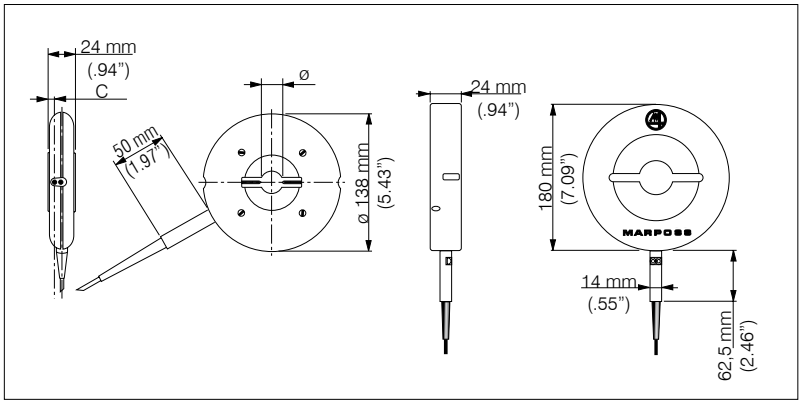
M4Star ERG Cable version

M4Star ERG Wireless solution with remote acquisition button

M4 Star ERG with lightened structure for extra large diameters

M4Star ERG stand mounted





The M4 comes with various C measurement point distance values that allow great flexibility in the measurement position. The C dimension comes in 2,5 mm for close to flange measurements, in 6 mm for normal measurements and in 12 mm for bottom measurements.

MANUAL RING

- Electronic manual ring gauge with full-bridge (LVDT) transducer for checking outside diameters of shaft and pin type parts in the range 4 to 100 mm (.16" to 3.98"). Particularly suitable to perform measurements close to a shoulder.
- It is composed of a ring body and standard interchangeable nosepiece; within its range of use each ring is completely retoolable by changing the nosepiece and the contacts.
- Accurate, rugged and reliable, needs no maintenance and has practically no operating costs.
- Thanks to its outstanding qualities, it can be used in the most difficult working conditions without any affect to its technical characteristics.
- It can be used both directly on the workpiece and as a simple fixture using the optional support.
- The measurement value can be displayed on the TESTAR E18, E4, E4N and, through the Gage Box data acquisition system, on the E9066s Industrial PC.

TECHNICAL CHARACTERISTICS

RETOOLING RANGE (mm)	***4 - 50***	***50 - 100***
REPEATABILITY	*≤1 µm*	
THERMAL DRIFT	*≤0.15 µm/°C*	*≤0.7 µm/°C*
MEASURING FORCE	*1.2 N ±10%*	*0.70 N ±30%*
WEIGHT	*0.7 ÷ 0.8 kg*	*1.8 ÷ 2 kg*
CABLE LENGTH	*1.8 m*	
CONNECTOR TYPE	*Lumberg S3 (DIN 41524) or SV50/6 (DIN 45322)*	

N.B. The above measuring range cannot be covered with only one nosepiece, but a dedicated nosepiece is necessary for each diameter to be measured (SEE HOW TO ORDER A FINISHED RING).

How to Order a Finished Ring

Type of connector:
S3 *= Lumberg S3 - 3 pin - used with E4 and E18*
SV50 *= Lumberg SV50/6 - 5 pin - used with E4N and Gage Box*

Type of contact:
C *= Carbide*
D *= Diamond*

Type of handle:
B *= Basic without handle*
A *= Axial Handle*

Distance (C) *from the edge of the nosepiece to the contacts (mm):*
C *= 2.5 / 6 / 12*

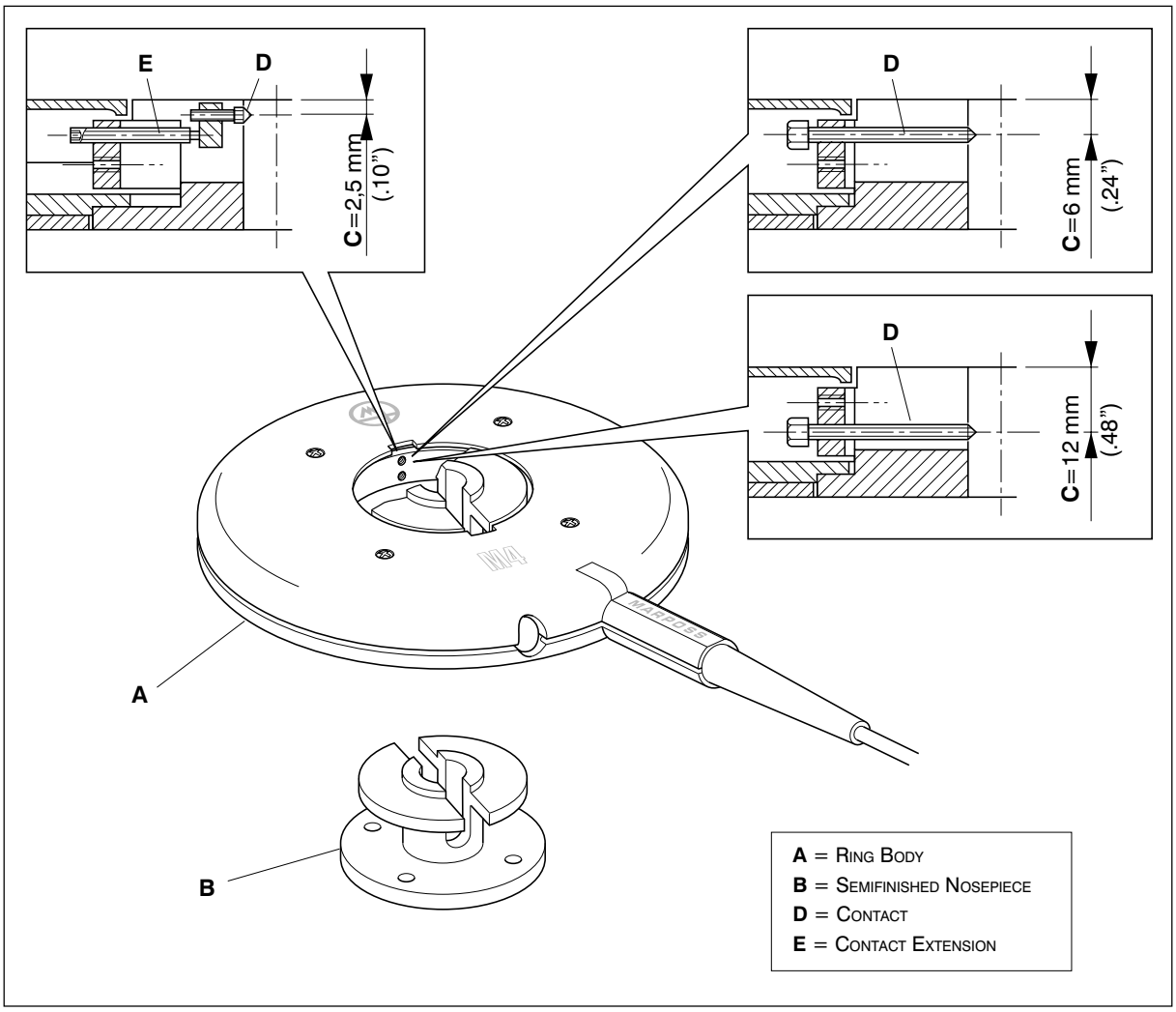
Measurement unit:
M *= Millimeter*
I *= Inch*

M4						Ø max.	Ø min.

Example: Need to order an M4 with C=2.5 mm, carbide contacts, E4N connector, without handle, max. ø 38.735 mm (1.525 inch), min. ø 38.710 mm (1.524 inch).

M4	2.5	C	SV50	B	M	38.735	38.710

Components and Accessories



Retooling Range		C		(A) Ring Body			
				Order Code	Cable Length		Connector Type
(mm)	(inch)	(mm)	(inch)		(m)	(inch)	
4 - 50	.16" - 1.97"	2.5 / 6 / 12	.10" / .24" / .48"	3708602200	1.8	70.86"	LUMBERG S3
				3708602210	1.8	70.86"	LUMBERG SV50/6
50 -100	1.97" - 3.94"	2.5 / 6 / 12	.10" / .24" / .48"	3708602401	1.8	70.86"	LUMBERG S3
				3708602411	1.8	70.86"	LUMBERG SV50/6

Retooling Range		C		(B) Semifinished Nosepieces	(D) Contacts		(E) Contact Extensions
				Order Code	Order Code		Order Code
(mm)	(inch)	(mm)	(inch)		CARBIDE	DIAMOND	
4 - 12	.16" - .47"	6 / 12	.24" / .47"	1408602014	3390860201	3390860205	
		2.5	.10"	1408602013	3390860210	3390860215	1108602201
12 - 25	.47" - .98"	6 / 12	.24" / .47"	1408602015	3390860201	3390860205	
		2.5	.10"	1408602015	3390860210 (*)	3390860215 (*)	1108602201
					3390860212 (**)	3390860217 (**)	1108602201
25 - 30	.98" - 1.18"	6 / 12	.24" / .47"	1408602015	3390860202	3391342601	
		2.5	.10"		3390860212	3390860217	1108602201
30 - 50	1.18" - 1.97"	6 / 12	.24" / .47"	1408602016	3390860202	3391342601	
		2.5	.10"		3390860212	3390860217	1108602201
50 - 90	1.97" - 3.54"	6 / 12	.24" / .47"		3390860201	3390860205	
		2.5	.10"		3390860210 (***)	3390860215 (***)	1108602201
					3390860212 (****)	3390860217 (****)	1108602201
90 - 100	3.54" - 3.94"	6 / 12	.24" / .47"		3390860202	3391342601	
		2.5	.10"		3390860212	3390860217	1108602201

Note: Quantity for order code =1pcs; Not available where not indicated.

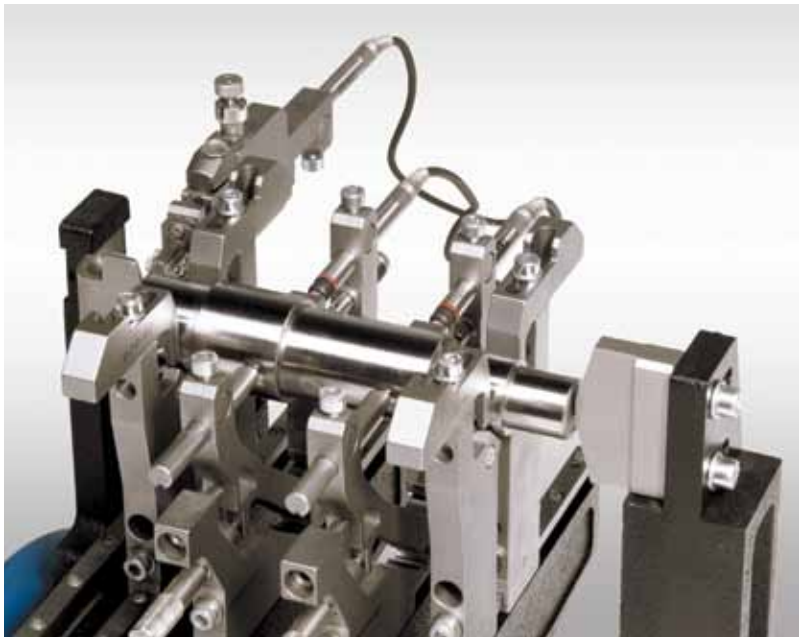
(*) Only for range 12 to 20 mm (.47" to .79")
(**) Only for range 20 to 25 mm (.79" to .98")
(***) Only for range 50 to 85 mm (1.97" to 3.35")
(****) Only for range 85 to 90 mm (3.35" to 3.54")

Description	Order Code
Hex Wrench 1.5 mm	1300725000
Tube Wrench 2.5 mm	1300728000
Tube Wrench 4.0 mm	1300729000
Hex Contact Extension Wrench	1300730000
V for part introduction	1008602207
Axial Handle Transformation Kit (Range 4 to 50 mm)	2908602000
Axial Handle Transformation Kit (Range 50 to 100 mm)	2908602400
Stand	1300610000
Interface Cable Lumberg S3 to SV50/6	6738536000
Interface Cable Lumberg SV50/6 to S3	6735832000
Extension Cable with Lumberg SV50/6 (2 m)	6735932015
Extension Cable with Lumberg SV50/6 (5 m)	6735932016
Extension Cable with Lumberg SV50/6 (10 m)	6735932017
User Manual (Range 4 to 50 mm)	D0040004X1 (*)
User Manual (Range 50 to 100 mm)	D0040008X1 (*)

(*) X= I (Italian), U (English), D (German), E (Spanish), F (French), J (Japanese), P (Portuguese).

Stand

The Stand (same as M1) is designed to enable the use of the M4 electronic ring gauge as a bench gauge. It can accomodate the M4 range 4 to 50 mm in both versions with radial and axial cable output; the M4 range 50 to 100 mm can be accomodated only in axial cable output version. It is particularly helpful when quantities of work pieces with close tolerances are to be gauged.



MODULAR MEASURING SYSTEM

Quick Set™ is a retoolable modular system that can be assembled in three different gauging configurations:

- horizontal and vertical for multidimensional and geometric checking of shaft-like parts;
- chuck for multidimensional and geometric checking on parts that cannot be referenced horizontally with vees or held between centers, such as bushings, bearings, pistons and cylindrical parts that are manufactured with a flange.

Its flexibility guarantees quick retooling without any special tools, using shop-floor components available off the shelf.
The narrow 12 mm (.47") width of all components allows a large number of measuring sections on a short part surface. Several measuring assemblies can be mounted on the base to carry on diameter, distance and geometric measurements.
Part support options allow static as well as dynamic inspection.
It can accomodate any measuring gauge with clamping diameter 8 mm or 3/8", such as TESTAR Red Crown™ and Quick probe™, Quick Read™ compact electronic display unit, Quick Digit™ electronic digital indicator.

PART WEIGHT AND DIMENSIONS REFERENCE TABLE

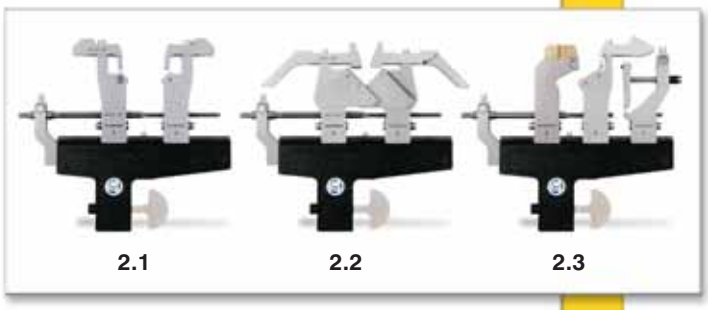
Gauge Configuration	Measurable Diameter	Max. Non-measurable Diameter	Max. Measurable Length	Weight
Quick Set-Horizontal	5 – 160 mm (.02" – 6.30")	260 mm (10.24")	700 mm (27.56")	up to 14 kg
Quick Set-Vertical	5 – 160 mm (.02" – 6.30")	260 mm (10.24")	520 mm (20.47")	up to 8 kg
Quick Set-Chuck	5 – 160 mm (.02" – 6.30")	260 mm (10.24")	250 mm (9.84")	-


Quick Set - Horizontal

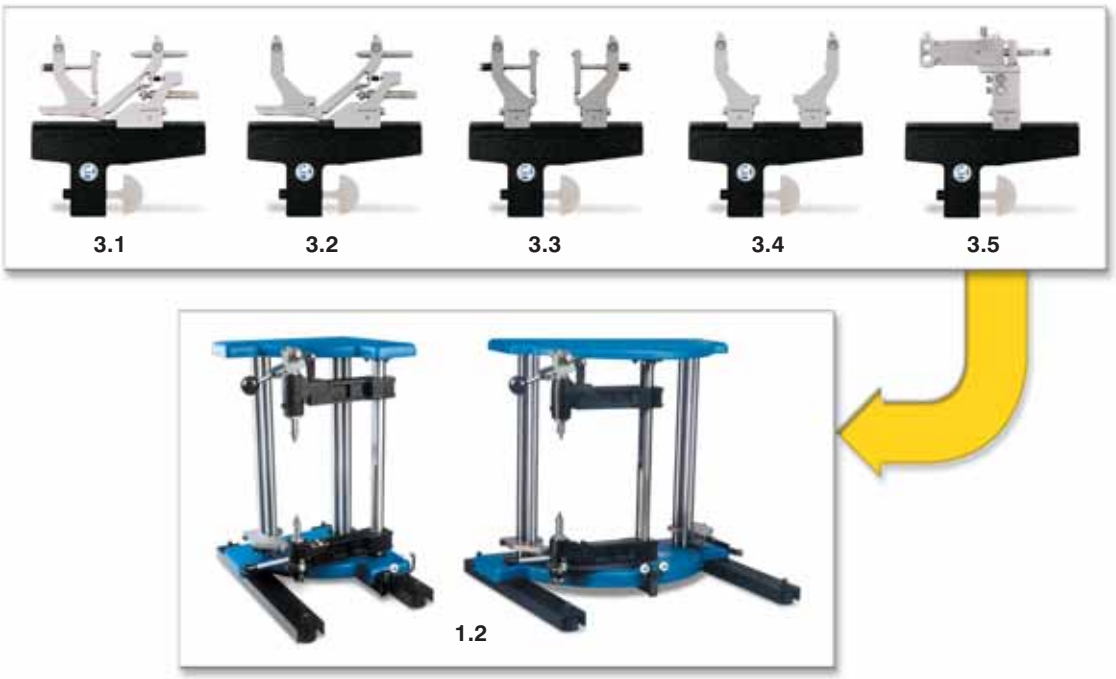

Quick Set - Vertical


Quick Set - Chuck

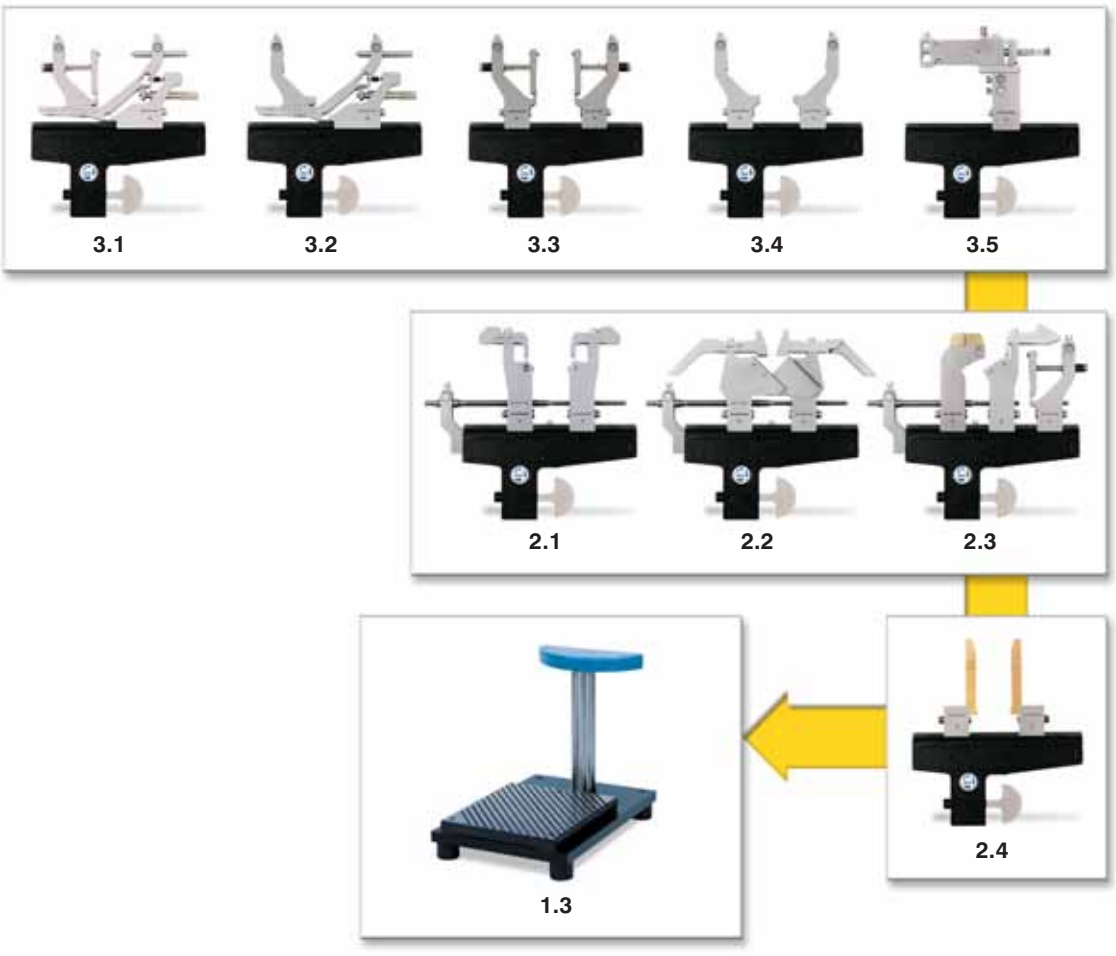
QUICK SET - HORIZONTAL



Quick Set - Vertical



Quick Set - Chuck

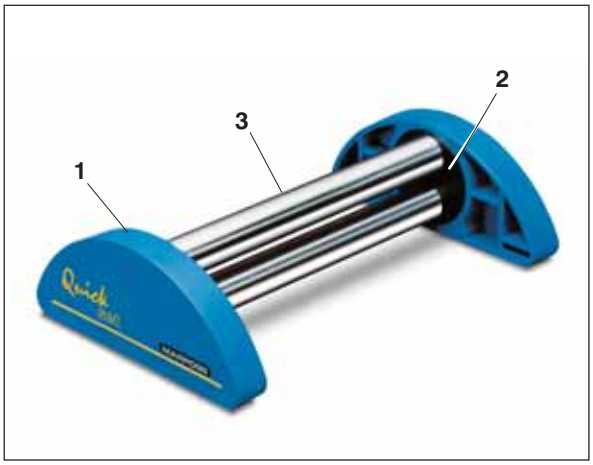


INDEX

1 - Base structure assembly

30 mm diameter stainless steel bars assure rigidity and exact positioning of the bench gauge elements. The bar system allows easy retooling and size expansion of the bench. The bars are fixed to the support by means of a screwed clamp fitted inside the support.

1.1 Base structure assembly for Quick Set-Horizontal

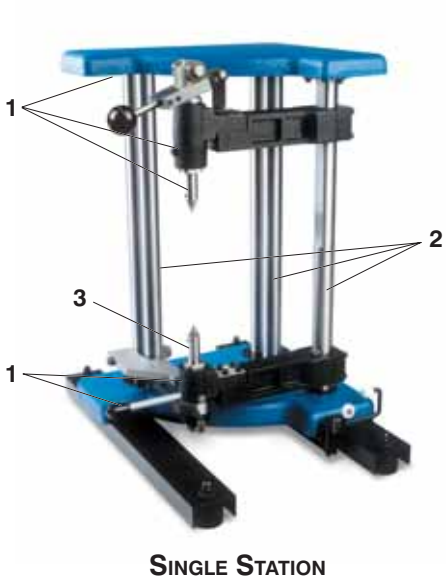


Bars Length		Bench with "V"				Bench with Pivoting centers	
		Max. part length with 2 introducing axial limiters		*Max. part length with 1 introducing axial limiter and 1 measuring axial limiter*		*Max. part length*	
(mm)	(inch)	(mm)	(inch)	(mm)	(inch)	(mm)	(inch)
200	7.87"	100	3.94"	70	2.76"	80	3.15"
300	11.81"	200	7.87"	170	6.69"	180	7.08"
400	15.75"	300	11.81"	270	10.63"	280	11.02"
500	19.69"	400	15.75"	370	14.57"	380	14.96"
600	23.62"	500	19.69"	470	18.50"	480	18.89"
800	31.50"	700	27.56"	670	26.38"	680	26.77"

The base structure assembly includes bars, support feet and clamping devices.

Ref.	Description	Order Code
1	SUPPORT FEET (PAIR)	2924017005
2	CLAMPING DEVICES (PAIR)	2924017115
3	BARS L = 200 mm (PAIR)	2924017010
	BARS L = 300 mm (PAIR)	2924017020
	BARS L = 400 mm (PAIR)	2924017030
	BARS L = 500 mm (PAIR)	2924017040
	BARS L = 600 mm (PAIR)	2924017050
	BARS L = 800 mm (PAIR)	2924017070

1.2 Base structure assembly for Quick Set-Vertical



Single Station

Dual Station

Bars Length		Quick set-Vertical							
		Part length with lower center support L=12 mm				*Part length with lower center support L=37 mm*			
		Min.		Max.		Min.		Max.	
(mm)	(Inch)	(mm)	(Inch)	(mm)	(Inch)	(mm)	(Inch)	(mm)	(Inch)
500	19.69”	24	0.94”	220	8.66”	5	0.20”	200	7.87”
600	23.62”	24	0.94”	320	12.60”	5	0.20”	300	11.81”
700 (*)	27.56”	24	0.94”	420	16.54”	5	0.20”	400	15.75”
800 (*)	31.50”	24	0.94”	520	20.47”	5	0.20”	500	19.69”

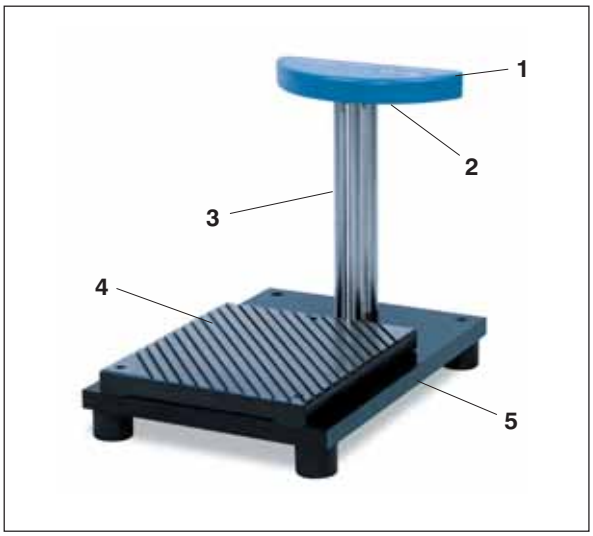
(*) Only for dual station.

Max. part weight: 6 kg for the single station, 8 kg for the dual station.
The base structure assembly is composed of base, bars, lower center support and centers. The upper center support is supplied with the base.

Ref.	Description	Order Code
1	SINGLE STATION BASE	3024025500
	DUAL STATION BASE	3024025000
2	BARS L = 500 mm	3024025025
	BARS L = 600 mm	3024025026
	BARS L = 700 mm (*)	3024025027
	BARS L = 800 mm (*)	3024025028
3	LOWER CENTER SUPPORT L = 12 mm	3024025220
	LOWER CENTER SUPPORT L = 37 mm	3024025210
	UNIVERSAL CENTER	1024017753
	SHORT CENTER	1024017755
	SUPPORT BRACKET WITH BACK HOLES FOR TOOL	2924025255
	RETOOLING TOOL (ONLY FOR BRACKET WITH BACK HOLES)	2924025050

(*) Only for dual station.

1.3 Base structure assembly for Quick Set-Chuck



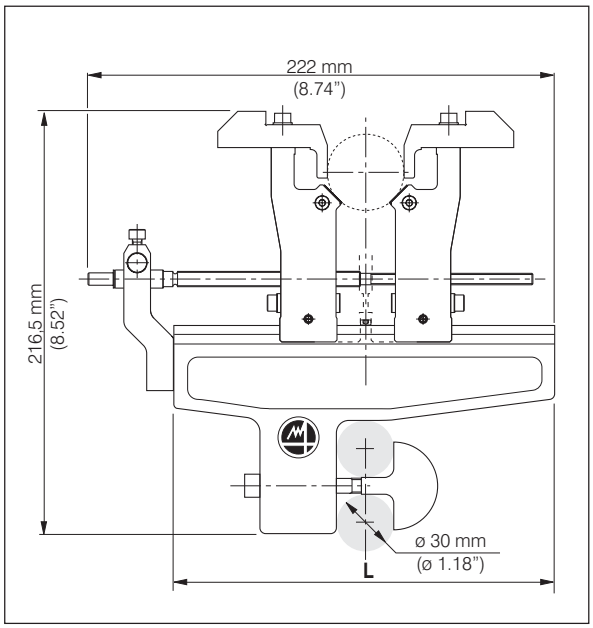
The base structure assembly is composed of bars, support feet, clamping devices, serrated referencing surface and support plate.

Ref.	Description	Order Code
1	SUPPORT FEET (PAIR)	2924017005
2	CLAMPING DEVICES (PAIR)	2924017115
3	BARS L = 300 mm (PAIR)	2924017880
4	SERRATED REFERENCING PLATE (220 x 250 mm)	2924017885
5	SUPPORT PLATE (INCLUSIVE OF RUBBER FEET)	2924017890

2 - Part Support and Reference

2.1 Frontal "V" Assembly

Assembly width: 12 mm (.47")
Version with self-centering screw



The frontal "V" accurately defines the measuring mechanical axis of the part. The assembly is available in two versions:

- with self-centering screw, for fast and frequent retooling;
- without self-centering screw, for economical part positioning.

Two assemblies are normally required to support the part.

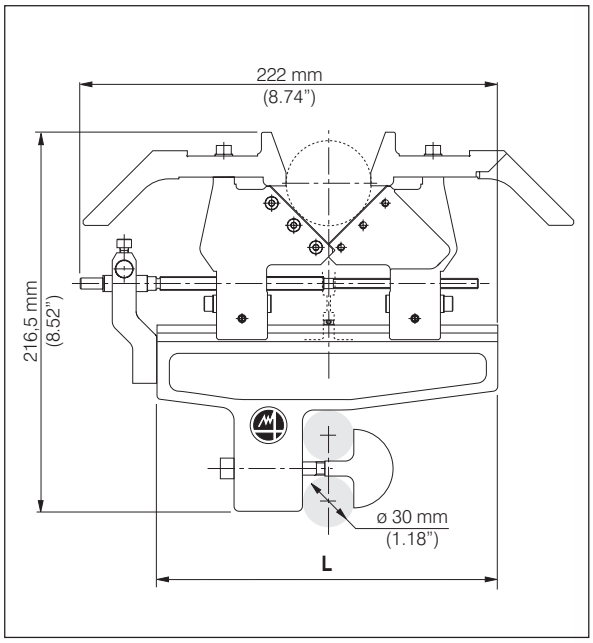
The assembly is composed of one support bracket and one frontal "V".

	Support Bracket			Frontal "V"		
	Length L (mm)	(inch)	Order Code	Range (mm)	(inch)	Order Code
Assembly with self-centering screw	200	7.87"	3024017540	5 - 10	.19" - .39"	3024017633
				10 - 15	.39" - .59"	3024017643
				15 - 24	.59" - .94"	3024017653
				24 - 40	.94" - 1.57"	3024017663
				40 - 70	1.57" - 2.76"	3024017673
				55 - 100	2.16" - 3.94"	3024017693
Assembly without self-centering screw	200	7.87"	3024017000	5 - 10	.19" - .39"	3024017632
				10 - 15	.39" - .59"	3024017642
				15 - 24	.59" - .94"	3024017652
				24 - 40	.94" - 1.57"	3024017662
				40 - 70	1.57" - 2.76"	3024017672
				55 - 100	2.16" - 3.94"	3024017692
	250	9.84"	3024017050	100 - 150	3.94" - 5.91"	3024017695

Description	Order Code
OPTIONAL GUIDE FOR VEE RANGE 55–100 mm (IT HAS TO BE USED WHEN ONTO THE SAME SUPPORT BRACKET OF THE VEE , TWO SINGLE TRANSMISSIONS ARE ASSEMBLED TO CHECK THE DIAMETER (55–100 mm))	2924017695

2.2 Crossed "V" Assembly

Assembly width: 12 mm (.47")
Version with self-centering screw



The crossed "V" is used for very frequent retooling and when a large retooling range is needed. The assembly is available in two versions:

- with self-centering screw, for fast and frequent retooling;
- without self-centering screw, for economical part positioning.

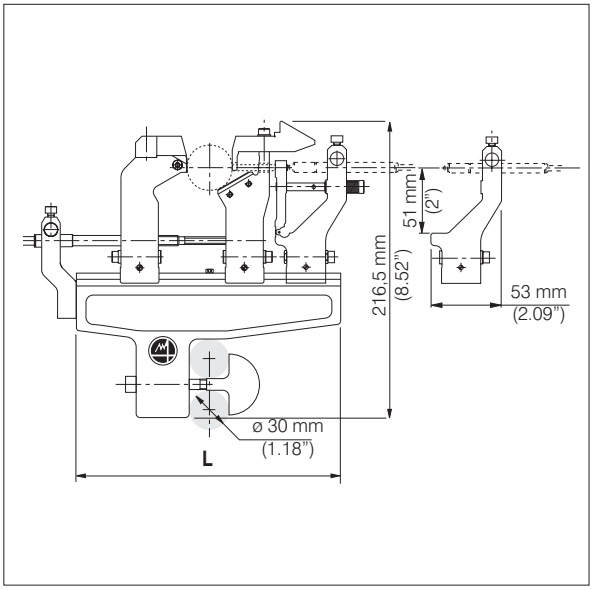
Two assemblies are normally required to support the part.

The assembly is composed of one support bracket and one crossed "V".

	Support Bracket			Crossed "V"		
	Length L (mm)	(inch)	Order Code	Range (mm)	(inch)	Order Code
Assembly with self-centering screw	200	7.87"	3024017540	5 - 100	.19" - 3.94"	3024017553
Assembly without self-centering screw	200	7.87"	3024017000	5 - 100	.19" - 3.94"	3024017552

2.3 Measuring "V" Assembly

Assembly width: 12 mm (.47")
Version with self-centering screw



The measuring "V" is used when both part reference and part diameter measurement have to be carried on in the same section. The measurement is performed by using a special contact for measuring "V" mounted on a single transmission unit or on a direct probe unit (see 4.2 Contacts for Measuring "V").

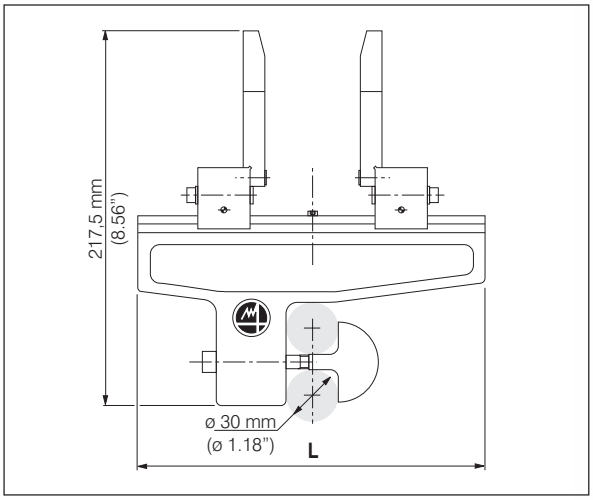
The assembly is composed of one support bracket, one measuring "V", and one single transmission unit or one direct probe unit. The special contact for measuring "V" and the probe to be mounted in the transmission unit or in the direct probe unit must be ordered separately (see section Transducers and Measurement Transmissions).

	Support Bracket			Measuring "V"		
	Length L (mm)	(inch)	Order Code	Range (mm)	(inch)	Order Code
Assembly with self-centering screw and single transmission or direct probe unit	200	7.87"	3024017540	5 - 35	.19" - 1.38"	3024017524
				35 - 65	1.38" - 2.56"	3024017526
Assembly without self-centering screw, with single transmission or direct probe unit	200	7.87"	3024017000	5 - 35	.19" - 1.38"	3024017520
				35 - 65	1.38" - 2.56"	3024017522

Probe Support	Clamping ø for Probe	Order Code
SINGLE TRANSMISSION UNIT	8 mm	3024017155
	3/8"	3024017157
DIRECT PROBE UNIT	8 mm	3024017145
	3/8"	3024017147

2.4 Part Radial Limiters Assembly

Assembly width: 12 mm (.47")



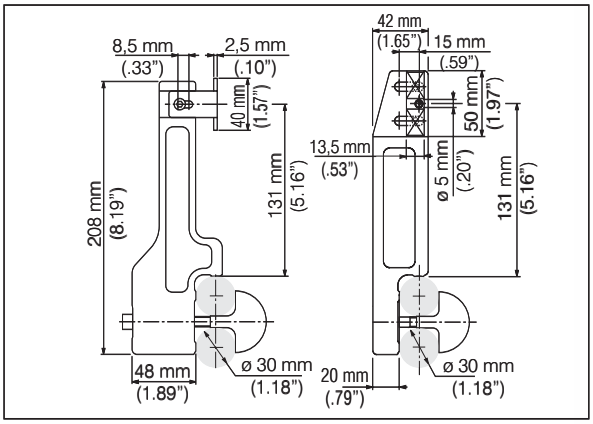
The part radial limiters limit the part radial movement and allows correct part introduction in the bench.
Two versions are available:
- steel limiter;
- brass limiter for parts with low hardness.

The assembly is composed of one support bracket and one pair of radial limiters.

Assembly with radial limiters	Support Bracket		
	Length L (mm)	(inch)	Order Code
	200	7.87"	3024017000
	250	9.84"	3024017050

Description	Order Code
STEEL RADIAL LIMITERS (PAIR)	3024017200
BRASS RADIAL LIMITERS (PAIR)	3024017210

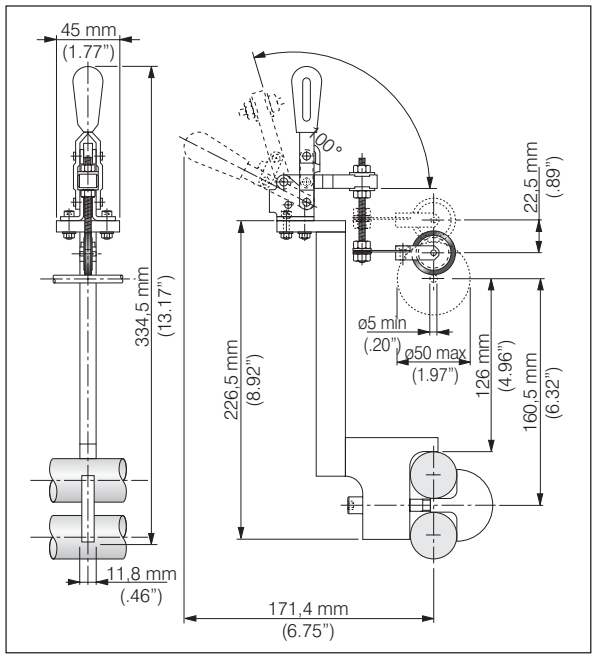
2.5 Part Axial Limiters



The part axial limiter limits the part axial movement and allows correct part positioning in the bench.
Two versions are available:
- Introducing axial limiter to limit part position;
- Measuring axial limiter used both to limit part position and as mechanical reference for a distance measurement carried on by a shoulder transmission unit (see 3. Part measuring assembly).

Description	Order Code
INTRODUCING AXIAL LIMITER	3024017214
MEASURING AXIAL LIMITER	3024017218

2.6 Part Pusher

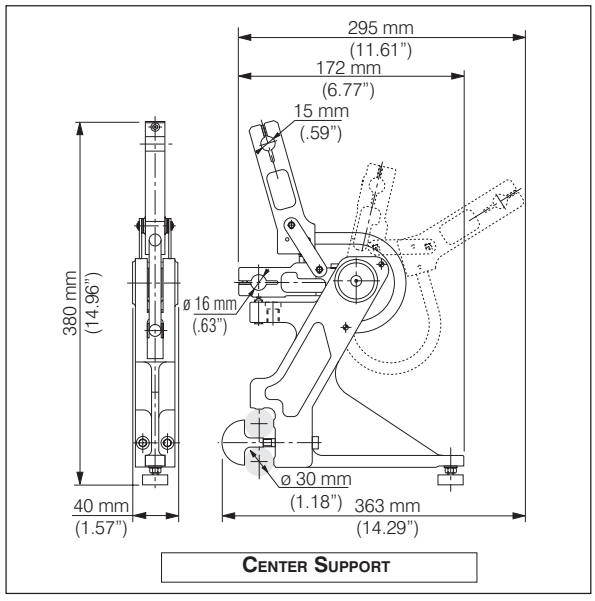


The part pusher guarantees the contact between the part and the "V" supports. It is particularly suitable for parts with weight lower than 200 gr.

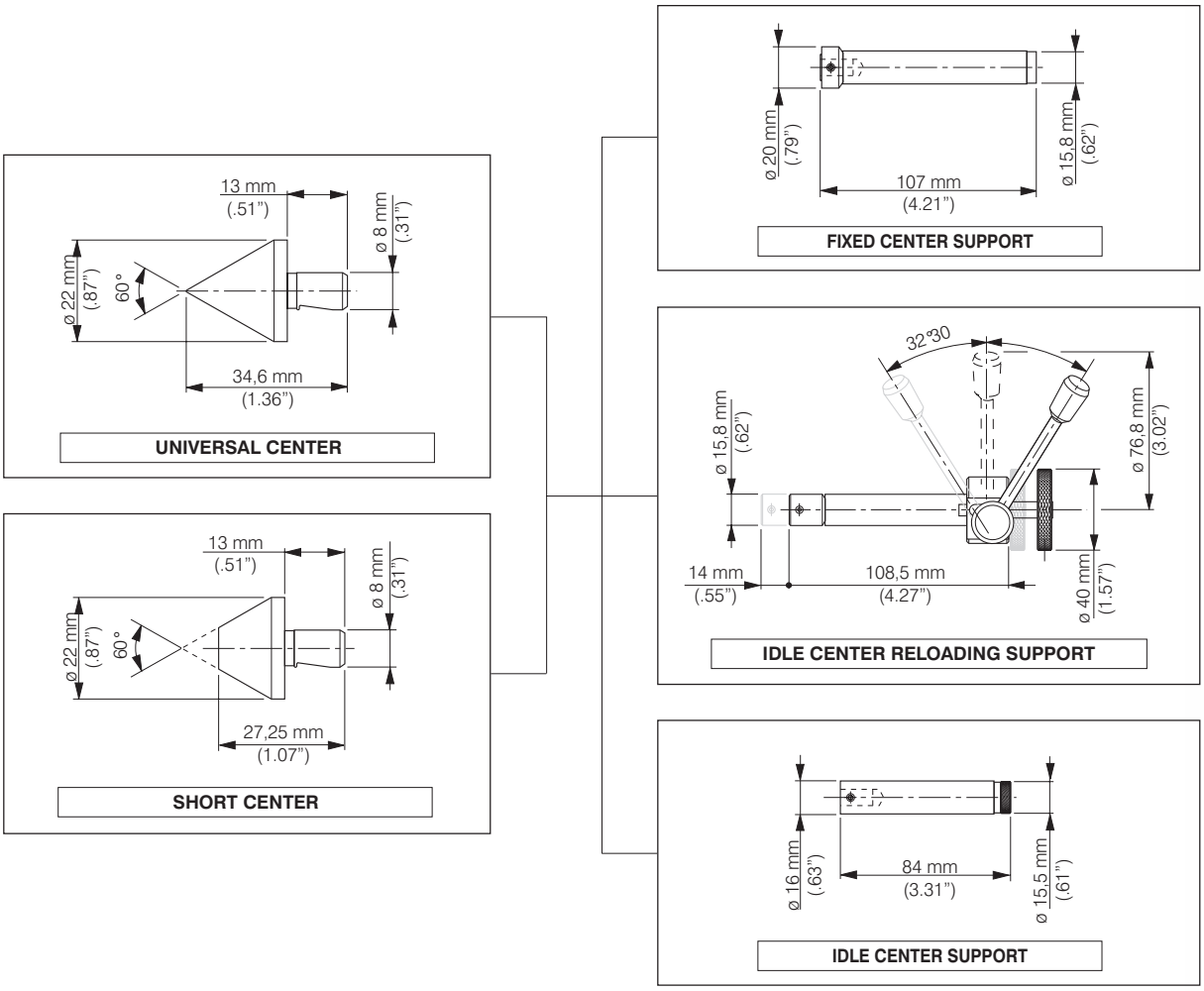
- Suitable for part diameters from 5 to 50 mm (.19" - 1.97")

Description	Order Code
PART PUSHER	3024017980

2.7 Pivoting Centers Unit



This unit is needed when the part to be measured is provided with centers holes. The part is loaded between the centers and then introduced into the measuring station.
It is recommended for small parts [max. part weight 3 kg and max. flywheel overall diameter 170 mm (6.69")]. Dampers are available to avoid impacts during part positioning in the measuring station.



The pivoting centers unit is composed of one pair of center supports and their connecting shaft, whose length depends on the length of the bars of the base structure assembly.
The centers, their supports and the dampers must be ordered separately. To order the base structure assembly see 1. BASE STRUCTURE ASSEMBLY.

CENTER SUPPORTS (PAIR)					CONNECTING SHAFT FOR CENTER SUPPORTS		
BASE BARS LENGTH L (mm)	(inch)	MAX PART LENGTH (mm)	(inch)	ORDER CODE	LENGTH L (mm)	(inch)	ORDER CODE
200	7.87"	80	3.15"	3024017355	360	14.17"	1024017369
300	11.81"	180	7.08"		460	18.11"	1024017371
400	15.75"	280	11.02"		560	22.04"	1024017373
500	19.69"	380	14.96"		660	25.98"	1024017375
600	23.62"	480	18.89"		760	29.92"	1024017377
800	31.50"	680	26.77"		960	37.79"	1024017379

DESCRIPTION	ORDER CODE
FIXED CENTER SUPPORT	1024017567
IDLE CENTER SUPPORT	3024017325
IDLE CENTER RELOADING SUPPORT	3024017315
UNIVERSAL CENTER	1024017753
SHORT CENTER	1024017755
DAMPER (FOR MAX. PART WEIGHT 1,5 kg)	44331AC000
DAMPER (FOR MAX. PART WEIGHT 3 kg)	44331AC001

N.B.

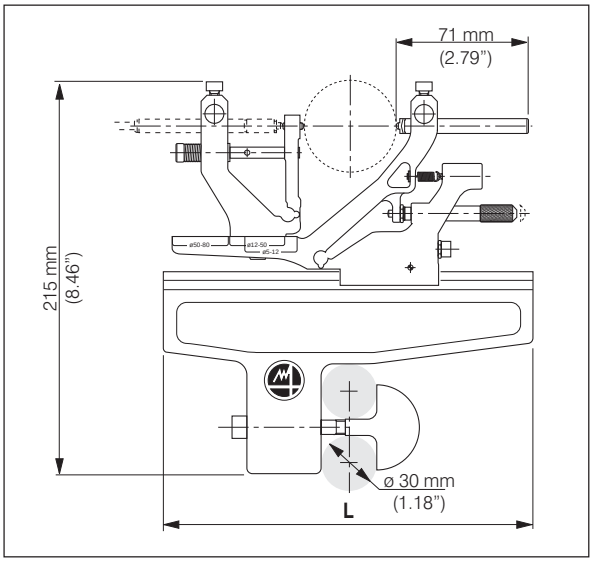
WITH THIS UNIT DIAMETER, OVALITY AND DISTANCE MEASUREMENTS ONLY CAN BE CARRIED ON. FOR MEASUREMENTS SUCH AS PERPENDICULARITY, T.I.R., CONCENTRICITY, ETC.,THAT ARE REFERRED TO THE CENTERS AXIS, PLEASE CONTACT YOUR NEAREST MARPOSS OFFICE.

3 - Part Measuring Assembly

3.1 Assembly with Self-Centering Unit with Transmission

Working range 1,150 mm

Assembly width: 12 mm (.47")



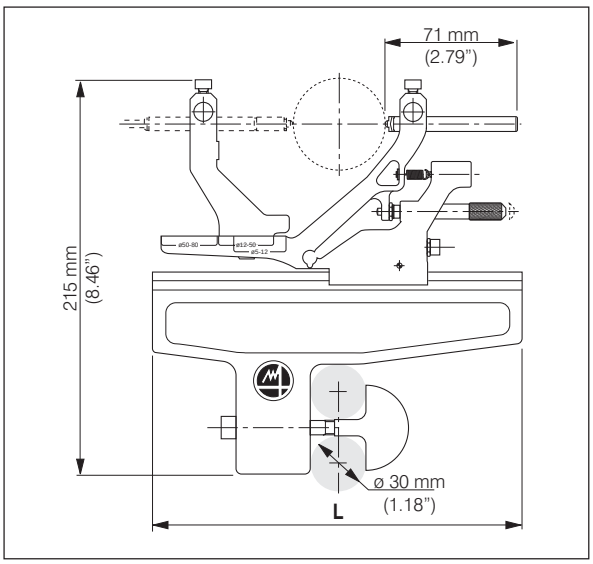
The self-centering unit with transmission is used to carry out diameter measurements only. It can accomodate both pencil probes and dial indicators with diameter 8 mm or 3/8". The probe is not in direct contact with the part and is therefore preserved from radial impact by part loading/unloading.

The assembly is composed of one support bracket and one self-centering unit with transmission. The probe and the two contacts to be mounted on the unit must be ordered separately (see 4. Contacts and Armsets and section Transducers and measurement transmissions).

Support Bracket			Self-Centering Unit with Transmission			
Length L (mm)	(inch)	Order Code	Range (mm)	(inch)	Clamping ø for Probe	Order Code
200	7.87"	3024017000	5 - 80	.20" - 3.15"	8 mm	3024017460
					3/8"	3024017462

3.2 Assembly with Self-Centering Unit with Direct Probe

Assembly width: 12 mm (.47")



The self-centering unit with direct probe is used to carry out diameter measurements only. It can accomodate both pencil probes and dial indicators with diameter 8 mm or 3/8".

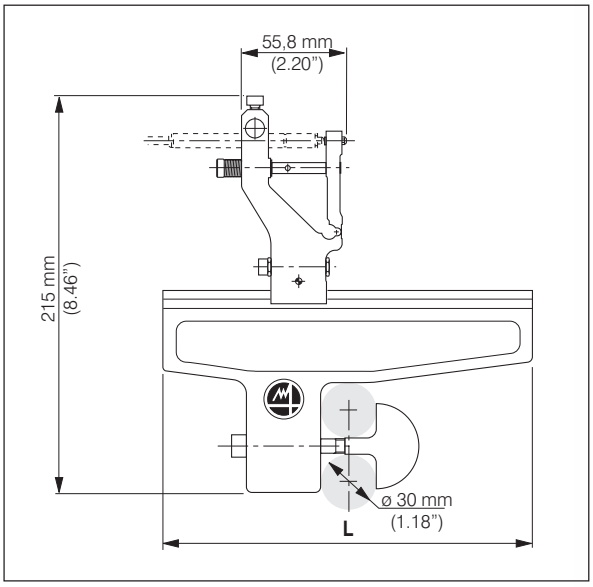
The assembly is composed of one support bracket and one self-centering unit with direct probe. The probe and the contact to be mounted on the unit must be ordered separately (see 4. Contacts and Armsets and section Transducers and measurement transmissions).

Support Bracket			Self-Centering Unit with Direct Probe			
Length L (mm)	Length L (inch)	Order Code	Range (mm)	Range (inch)	Clamping ø for Probe	Order Code
200	7.87"	3024017000	5 - 80	.20" - 3.15"	8 mm	3024017470
					3/8"	3024017472

3.3 Assembly with Single Transmission Unit

Working range of one single transmission unit 1.150 mm/.0452"

Assembly width: 12 mm (.47")



The single transmission unit is used to carry out both diameter and form measurements. It can accomodate both pencil probes and dial indicators with diameter 8 mm or 3/8". The probe is not in direct contact with the part and is therefore preserved during part loading/unloading.
The assembly with only one transmission unit is particularly used for T.I.R. measurements.

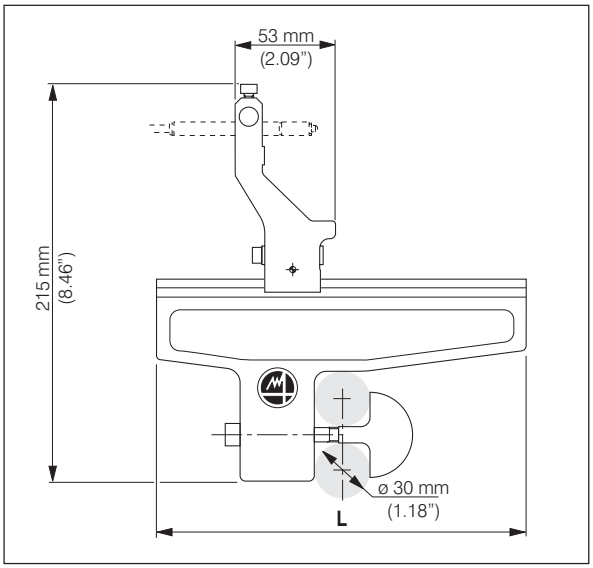
The assembly is composed of one support bracket (L=200 mm or 250 mm) and one or two single transmission units. The probe and the contact to be mounted on the unit must be ordered separately (see 4. Contacts and Armsets and section Transducers and measurement transmissions).

Support Bracket				
Length L (mm)	Length L (inch)	Range (mm)	Range (inch)	Order Code
200	7.87"	3 - 118	.12" - 4.64"	3024017000
250	9.84"	3 - 160	.12" - 6.30"	3024017050

Probe Support	Clamping ø for Probe	Order Code
SINGLE TRANSMISSION UNIT	8 mm	3024017155
	3/8"	3024017157

3.4 Assembly with Direct Probe Unit

Assembly width: 12 mm (.47")



The direct probe unit is used to carry out both diameter and form measurements. It can accomodate both pencil probes and dial indicators with diameter 8 mm or 3/8".

The assembly is composed of one support bracket (L=200 mm or 250 mm) and one or two direct probe units. The probe to be mounted on the unit must be orderd separately (see section Transducers and measurement transmissions).

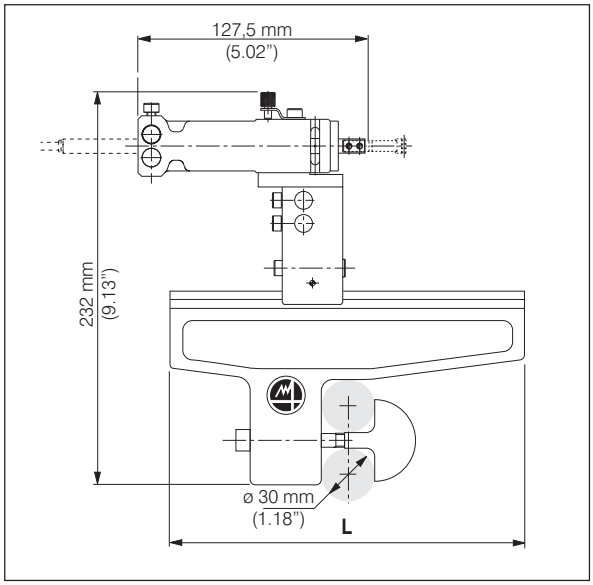
Support Bracket				
Length L (mm)	(inch)	Range (mm)	(inch)	Order Code
200	7.87"	3 - 118	.12" - 4.64"	3024017000
250	9.84"	3 - 160	.12" - 6.30"	3024017050

Probe Support	Clamping ø for Probe	Order Code
DIRECT PROBE UNIT	8 mm	3024017145
	3/8"	3024017147

3.5 Assembly with Shoulder Transmission Unit

Working range 1.50 mm/.059"

Assembly width: 12 mm (.47")



To carry out distance measurements. It can accomodate both pencil probes and dial indicators with diameter 8 mm or 3/8". The probe is not in direct contact with the part and is therefore preserved during part loading/ unloading.
Distance measurements can be carried out by using two assemblies or one assembly and a measuring axial limiter.

The assembly is composed of one support bracket and one shoulder transmission unit. The armset and the contact to be mounted on the unit must be ordered separately (see 4. Contact and Armsets).

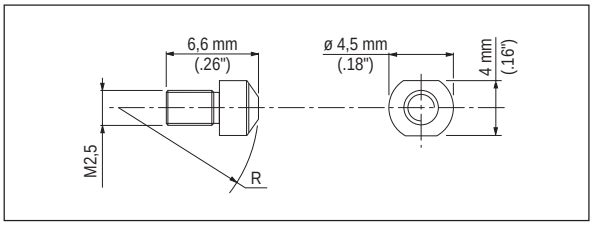
Support Bracket		
Length L (mm)	(inch)	Order Code
200	7.87"	3024017000
250	9.84"	3024017050

	Clamping ø for Probe	Order Code
SHOULDER TRANSMISSION UNIT	8 mm	3024017330
	3/8"	3024017331

4 - Contacts and Armsets

All contacts and extensions to be fitted on Quick Set components must be M 2,5. Contacts 4-48 UNF are listed as accessory to 3/8" pencil probes and dial indicators.

4.1 Standard Contacts

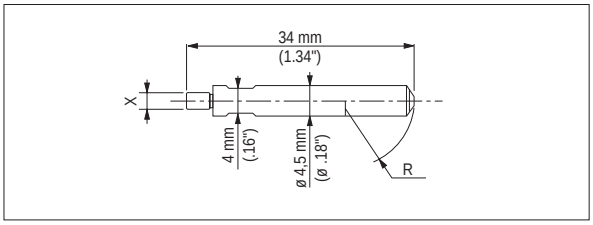


To be used with:

- Self - centering unit with transmission (Q.ty = 2)
- Self - centering unit with direct probe (Q.ty = 1)
- Single transmission unit (Q.ty = 1)

Radius R (mm)	(inch)	Material	Order Code
10	.39"	CARBIDE	3392401702
50	1.97"	CARBIDE	3392401705
100	3.94"	CARBIDE	3392401706
10	.39"	DIAMOND	3392401722
50	1.97"	DIAMOND	3392401725
100	3.94"	DIAMOND	3392401726

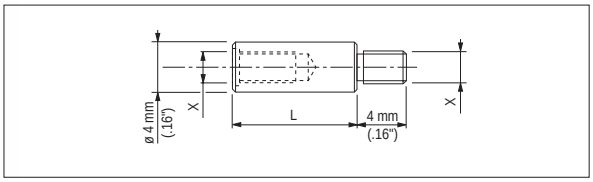
4.2 Contacts for Measuring "V"



Special carbide contact to be mounted on the single transmission unit or directly on the probe.

Radius R (mm)	(inch)	Thread X	Order Code
10	.39"	M 2,5	3392401701
50	1.97"	M 2,5	3392401720
100	3.94"	M 2,5	3392401721

4.3 Contact Extensions



Available with thread M 2.5 or 4-48 UNF. It can be used:

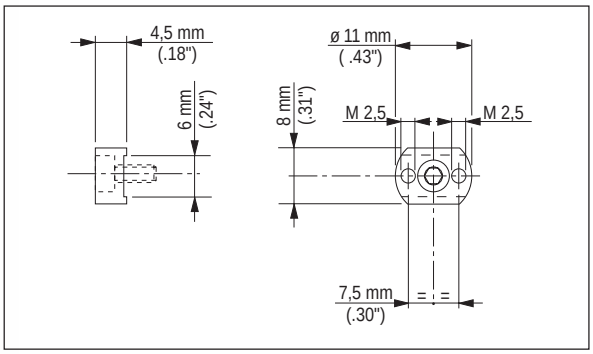
- With self-centering unit
- With single transmission unit
- With direct probe unit
- With dial indicators

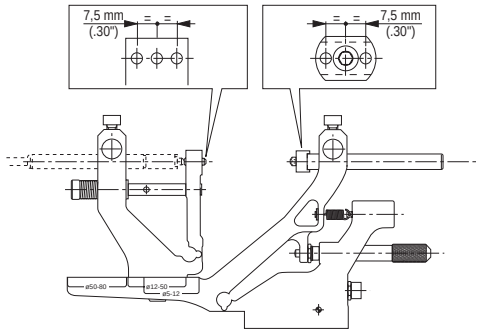
L (mm)	L (inch)	Thread X	Order Code
10	.39"	M 2.5	1024017105
15	.59"	M 2.5	1024017106
20	.79"	M 2.5	1024017107
25	.98"	M 2.5	1024017108
30	1.18"	M 2.5	1024017109
10	.39"	4 - 48 UNF	1024017115
15	.59"	4 - 48 UNF	1024017116
20	.79"	4 - 48 UNF	1024017117
25	.98"	4 - 48 UNF	1024017118
30	1.18"	4 - 48 UNF	1024017119

4.4 Off-Set Arms

4.4.1 Armset for Self-Centering Unit with Transmission

It is needed to carry on measurements very close to each other and close to a shoulder (min. 3 mm) by offsetting the contact.



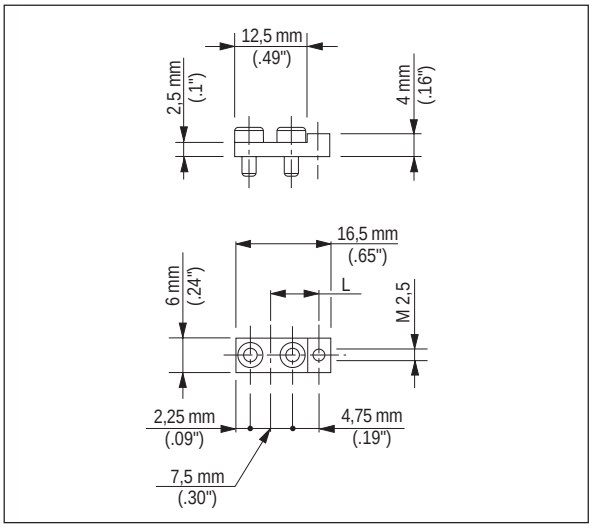


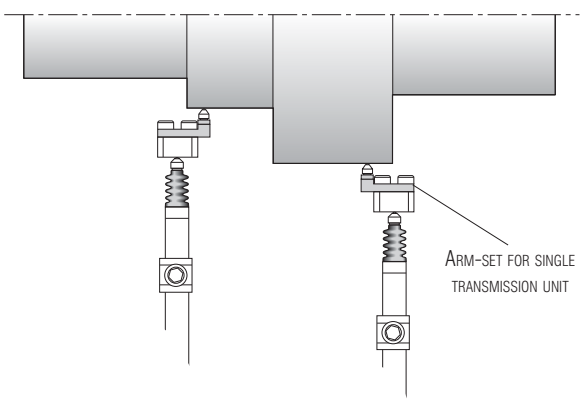
Min. distance between two measuring sections: 5,2 mm

Armset + fixing screw	Order Code
	2924017405

4.4.2 Armset for Single Transmission Unit

For contact off-set when measurements close to each other must be carried on.

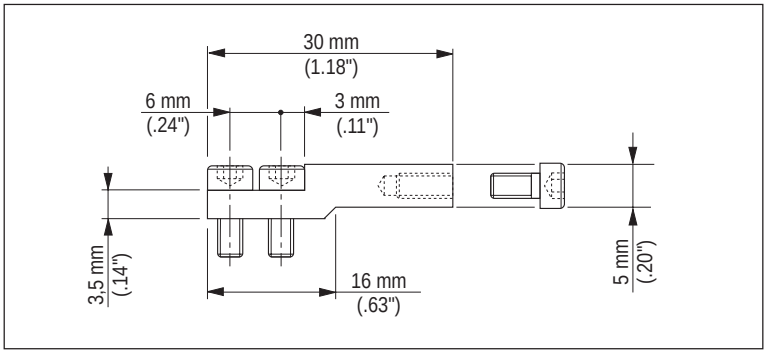




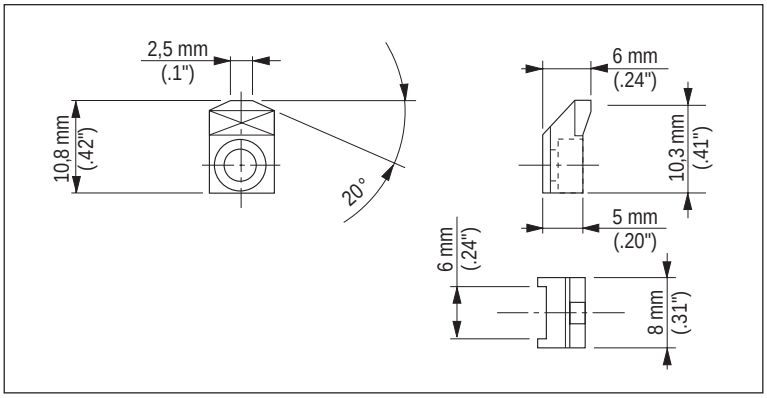
Min. distance between two measuring sections: 5,2 mm

ARMSET + FIXING SCREW	OFF-SET L (mm)	OFF-SET L (inch)	ORDER CODE
	8.5	.33"	2924017150
	10	.39"	2924017151

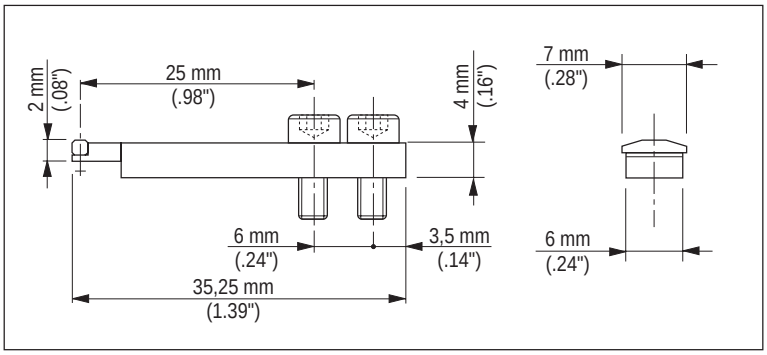
4.5 CONTACTS AND ARMSETS FOR SHOULDER TRANSMISSION UNIT



ARMSET
It is the interface for the mounting of the contact on the unit.



CONTACT
Available with carbide or diamond tip.



ARMSET FOR GROOVES
It is equipped with a carbide contact and must be directly mounted on the unit

DESCRIPTION	ORDER CODE
ARMSET	2924017302
CARBIDE CONTACT	3292401702
DIAMOND CONTACT	3292401712
ARMSET FOR GROOVES	3292401705

5 - Wrench Set

For bench assembly and set-up.

Description	Order Code
WRENCH SET	2924017990

6 - Instruction Manual

Description	Order Code
INSTRUCTION MANUAL	D0QS0002X1

X = I (Italian); U (English); D (German); E (Spanish); F (French)

7 - Quick Set Configurator Program

PC based program to determine the bench gauge composition. It provides the item list for assembly.

Description	Order Code
QUICK SET CONFIGURATOR PROGRAM	ON REQUEST

Quick set universal

GAUGE SYSTEM FOR CYLINDRICAL PARTS

Flexible modular measuring system for multidimensional and geometric checks of cylindrical parts such as bushings, hubs, gear wheels.

Its flexibility guarantees quick retooling without any special tools, and easy reconfiguration through standard components.

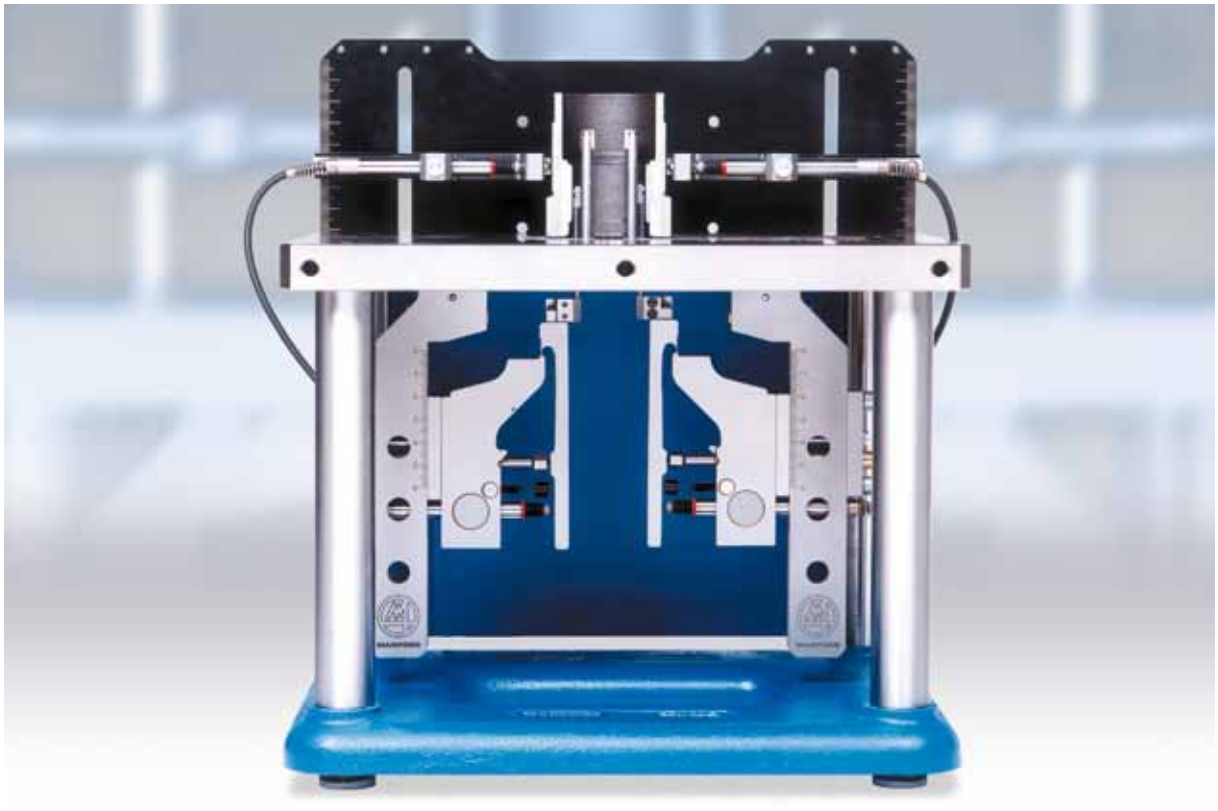
Parts with:

- internal diameter 10 ÷ 100 mm
- external diameter 14 ÷ 160 mm
- max. height 130 mm

can be measured.

It can accomodate any electronic pencil probe with clamping diameter 8 mm or 3/8" such as TESTAR Red Crown™ or Quick Probe™.

Special versions with dedicated nosepieces, automatic part rotation for dynamic measurements, pneumatic slide, pneumatic part lifting device for automatic part loading and unloading can be supplied on request.



COMPONENTS AND ACCESSORIES

1. BASE

BASE		
SIZE	DIMENSIONS (mm)	ORDER CODE
SMALL	280 X 230	3024070025
MEDIUM	350 X 230	3024070020

2. BASE PLATE

It holds all components used for part referencing and measuring.

BASE PLATE		
SIZE	DIMENSIONS (mm)	ORDER CODE
SMALL	280 X 230	3024070051
MEDIUM	350 X 230	3024070050

3. GUARDS

GUARDS		
SIZE	DIMENSIONS (mm)	ORDER CODE
LONG SIDE FOR SMALL BASE	213 X 171	2924070026
LONG SIDE FOR MEDIUM BASE	283 X 171	2924070021
SHORT SIDE FOR BOTH SMALL AND MEDIUM BASE	163 X 171	2924070022

4. RETOOLABLE NOSEPIECE

This unit allows correct part referencing and protects the contacts.

RETOOLABLE NOSEPIECE	
RANGE (mm)	ORDER CODE
10 ÷ 14	3024070100
14 ÷ 18	3024070105
18 ÷ 25	3024070110
25 ÷ 32	3024070115
32 ÷ 45	3024070120
45 ÷ 75 (*)	3024070125
75 ÷ 100 (*)	3024070130

(*) Only with MEDIUM size BASE PLATE.

5. GUIDE FOR TRANSMISSION UNIT FOR INTERNAL DIAMETERS

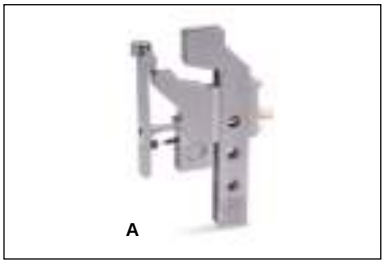
This guide is mounted on the underside of the base plate and holds the transmission units for checking internal diameters.

GUIDE
ORDER CODE
2924070040

6. TRANSMISSION UNIT FOR CHECKING INTERNAL DIAMETERS

Internal diameters in the range 10 to 100 mm can be measured using two of this components. When the size is between 25 and 100 mm, up to 3 inside diameters can be measured. Transmissions with integral fulcrum have ± 1 mm measuring range, transmissions with cross fulcrum have ± 5 mm measuring range.

(A) TRANSMISSION WITH INTEGRAL FULCRUM	
ø PROBE	ORDER CODE
8 mm	3024070000
3/8"	3024070001



(B) TRANSMISSION WITH CROSS FULCRUM	
ø PROBE	ORDER CODE
8 mm 3/8"	3024070011 3024070013

(C) TRANSMISSION WITH CROSS FULCRUM AND PNEUMATIC ACTUATION	
ø PROBE	ORDER CODE
8 mm 3/8"	3024070010 3024070012

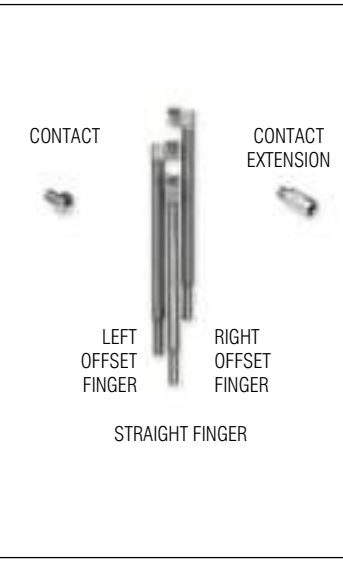
7. FINGERS AND CONTACTS

Using standard fingers and contacts the arm ratio is 1:1.

FINGERS		
DIAMETER (mm)	TYPE	ORDER CODE
3 4 4 4	STRAIGHT STRAIGHT LEFT OFFSET RIGHT OFFSET	3192407004 3192407007 3192407005 3192407006

CONTACTS			
LENGTH (mm)	RADIUS (mm)	TYPE	ORDER CODE
1.8 2.8 3.5	2 2 2	CARBIDE CARBIDE DIAMOND	3392407001 3392407002 3392407010

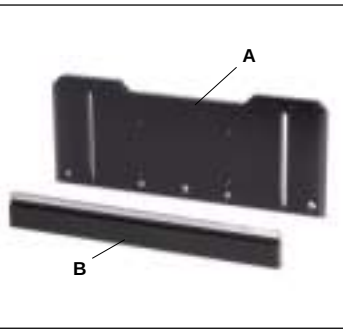
CONTACT EXTENSION	
LENGTH (mm)	ORDER CODE
6.2	1024070014



8. SUPPORT PLATE AND GUIDE FOR EXTERNAL MEASUREMENTS

The support plate can be mounted directly on the base plate or on the manual slide. On this plate (A) up to six guides (B) can be fixed. On the guides the Quick Set measuring elements and transmissions for checking external diameters and thickness are mounted.

SUPPORT PLATE AND GUIDE	
	ORDER CODE
PLATE (A) **GUIDE** (B)	2924070045 2924070046



9. MANUAL SLIDE FOR EXTERNAL MEASUREMENTS

This unit must be used when the measuring components will interfere with part loading (i.e. measuring a groove diameter). It holds the support plate and the guides for the measuring transmissions for checking external diameters and thickness.

MANUAL SLIDE
ORDER CODE
2924070200

10. Transmission unit for checking external diameters

Two units are needed for checking one diameter. The maximum measurable diameter is 160 mm.

TRANSMISSION UNIT FOR EXTERNAL DIAMETERS	
ø Probe (mm)	Order Code
8 mm 3/8"	3024017155 3024017157

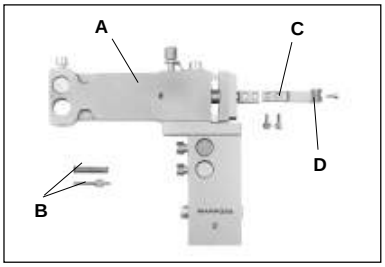
CONTACTS			
Length (mm)	Radius (mm)	Type	Order Code
2.8	10	CARBIDE	3392401702
2.8	10	DIAMOND	3392401722
2.8	50	CARBIDE	3392401705
2.8	50	DIAMOND	3392401725

11. Transmission unit for thickness measurement

It has to be fixed onto the guide for external measurements.

(A+B) TRANSMISSION FOR THICKNESS	
ø Probe (mm)	Order Code
8 mm 3/8"	3024017330 3024017331

Description	Order Code
(C) FINGER (D) CONTACT	2924017302 3292401702

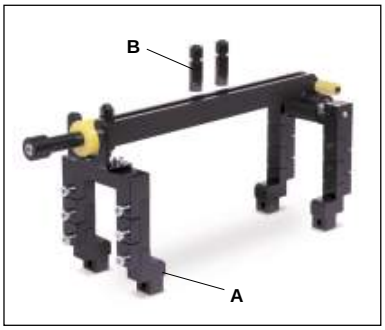


12. Pivoting arm for thickness measurement

This arm holds the probes which carry out the thickness measurements; it is mounted onto the base plate and brings the probes in measuring position after having loaded the part on the referencing nosepiece.

(A) PIVOTING ARM
Order Code
2924070060

(B) PROBE SUPPORT		
Length (mm)	ø Probe	Order Code
60	8 mm 3/8"	2924019070 2924019072
85	8 mm 3/8"	2924019071 2924019073



13. Probe support for plate

This support is fixed under the base plate and allows to measure thickness.

PROBE SUPPORT FOR PLATE	
ø Probe (mm)	Order Code
8 mm 3/8"	2924019075 2924019076

Description	Order Code
WRENCH SET	2924070990
USER MANUAL	D0QS0005X1 (*)

(*) **X** = I (Italian); U (English); D (German); E (Spanish); F (French)

DIAL INDICATORS

High quality dial indicators, whose design, accurate components, precision engineered mechanism and robust construction offer accuracy, reliability, durability and long working life.

Standard features for all models are:

- Adjustable tolerance markers to set tolerance limits
- Hardened, stainless steel mounting shank and measuring spindle are corrosion proof
- Lapped spindle increasing resistance to wear
- Sturdy metal housing

High precision dial indicator TD1/TD1S/TD2R

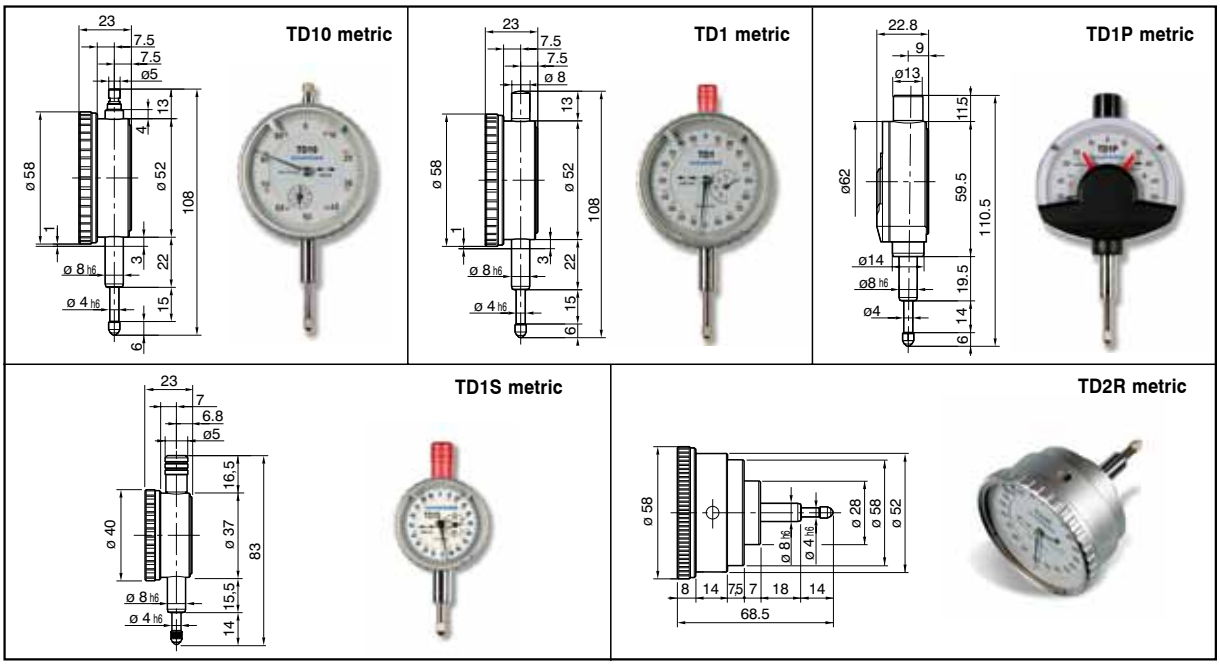
- High magnification gear train and high-resolution dials allow a very precise reading of the measuring value
- Precisely matched measuring spindles and stems minimise lateral play
- All gear pivots run in high class ceramic bearings
- Bezel rotates fully 360° to set zero in any position

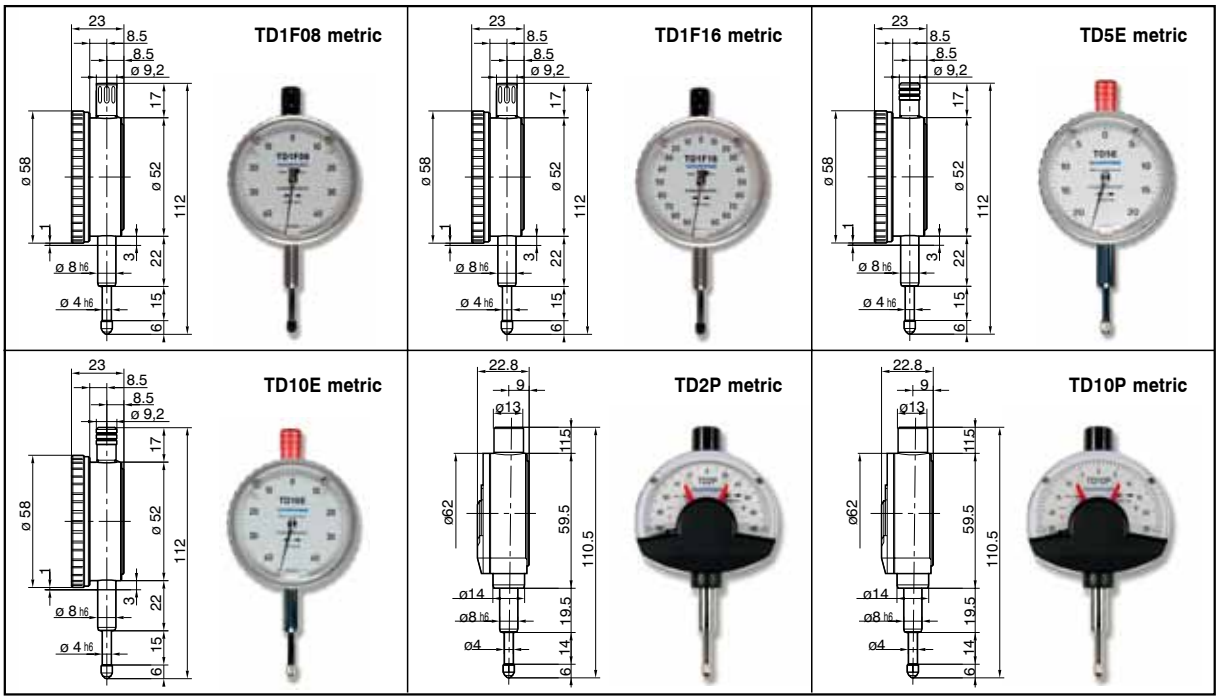
Dial comparator gauge TD1P/TD1PL/TD2P/TD10P

- Jewelled movement and precision pinions and shafts
- Measuring spindle mounted in high-precision guide. This allows high measurement accuracy and minimal hysteresis
- Effective shockproof system
- Quick zero setting with fine adjustment over the total measuring range through the screw on top
- Additional overtravel assists with the insertion of workpieces into the measuring device

Error free dial indicators TD5E/TD10E/TD1F08/TD1F16

- Measurin range is limited to less than one revolution of the pointer
- TD1F08 and TD1F16 feature a combined gear and lever transmission which guarantees high accuracy and low hysteresis
- Effective shockproof system
- Additional overtravel assists with the insertion of workpieces into the measuring device





TECHNICAL SPECIFICATIONS - HOW TO ORDER

MODEL	MEAS. RANGE	RANGE PER REVOLUTION	GRADUATION (RESOLUTION)	SCALE READING	NUMBER OF GRADUATIONS ON THE SCALE	ORDER CODE
TD10 metric	10 mm	1 mm	0,010 mm	0 - 100	100	0E31010100
TD1 metric	1 mm	0,2 mm	0,001 mm	0 - 100 - 0	200	0E31020200
TD1S metric	1 mm	0,2 mm	0,001 mm	0 - 100 - 0	200	0E31020250
TD1P metric	0,100 mm	-	0,001 mm	50 - 0 - 50	100	0E31030200
TD1PL metric	0,100 mm	-	0,001 mm	50 - 0 - 50	100	0E31030250
TD2R metric	0,400 mm	0,2 mm	0,002 mm	0 - 100 - 0	200	0E31040300
TD1F08 metric	0,080 mm	-	0,001 mm	40 - 0 - 40	80	0E31050200
TD1F16 metric	0,160 mm	-	0,001 mm	80 - 0 - 80	160	0E31060200
TD5E metric	0,400 mm	-	0,005 mm	20 - 0 - 20	80	0E31040400
TD10E metric	0,800 mm	-	0,010 mm	40 - 0 - 40	80	0E31070100
TD2P metric	0,200 mm	-	0,002 mm	100 - 0 - 100	100	0E31090300
TD10P metric	0,500 mm	-	0,010 mm	25 - 0 - 25	50	0E31080100

MODEL	BEZEL DIAMETER	STEM DIAMETER	CONTACT THREAD	REPEATABILITY (f_w)	ACCURACY (f_e) (*)	MEASURING FORCE (±10%) (N)
TD10 metric	58 mm	8 h6 mm	M 2,5	0,003 mm	0,015 mm	07 - 1,2
TD1 metric	58 mm	8 h6 mm	M 2,5	0,003 mm	0,005 mm	0,8 - 1,6
TD1S metric	40 mm	8 h6 mm	M 2,5	0,003 mm	0,005 mm	1 - 1,2
TD1P metric	62 mm	8 h6 mm	M 2,5	0,0005 mm	0,001 mm	1,2 - 1,4
TD1PL metric	62 mm	8 h6 mm	M 2,5	0,0005 mm	0,001 mm	0,5 - 0,75
TD2R metric	58 mm	8 h6 mm	M 2,5	0,005 mm	0,005 mm	2 - 2,2
TD1F08 metric	58 mm	8 h6 mm	M 2,5	0,0015 mm	0,002 mm	1,5
TD1F16 metric	58 mm	8 h6 mm	M 2,5	0,0015 mm	0,002 mm	1,5
TD5E metric	58 mm	8 h6 mm	M 2,5	0,003 mm	0,007 mm	1,2
TD10E metric	58 mm	8 h6 mm	M 2,5	0,003 mm	0,007 mm	1,5
TD2P metric	62 mm	8 h6 mm	M 2,5	0,0006 mm	0,002 mm	1,5
TD10P metric	62 mm	8 h6 mm	M 2,5	0,003 mm	0,010 mm	1,5

(*) Span of error being the plunger pressed in

DIGITAL INDICATOR

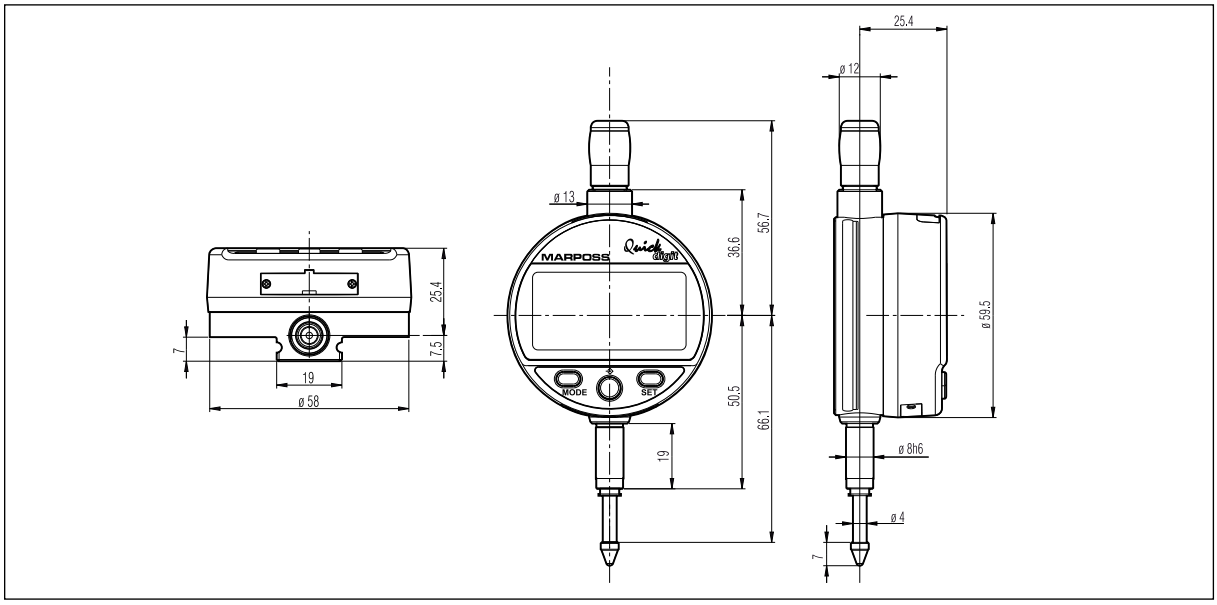
- Aluminium case, polyamide front cover
- Highly accurate capacitive measuring system
- Available measuring range: 12,5 mm/0.5” (25 mm/1.0”, 50 mm/2.0”, 100 mm/4.0” only on request)
- 0,001 mm resolution
- Large 11 mm digits for fast and error-free reading of the measuring value
- LCD display rotates through 270°
- Hardened and ground stainless-steel measuring spindle
- Power supply: replaceable 3V lithium battery, type CR2032, 220 mAh. Average battery life: 8000 h. External power supply using Power type cable for data transmission.
- Working temperature range: 5 °C to 40 °C
- Storage temperature range: - 10 ° C to 60 °C
- Protection degree (CEI/IEC 60529): IP51
- RS232 compatible output
- M 2,5 interchangeable contact

FUNCTIONS

- Direct metric / inch conversion
- Preset
- Zero setting at any point within the measuring range
- Choice of measurement sign (positive or negative)
- Memory HOLD
- Automatic switch-off without loss of the origin value
- Data transmission

ADDITIONAL FUNCTIONS FOR ADVANCED MODEL

- REF I / REF II dual reference point
- Dynamic Min./Max./TIR measuring mode
- Setting and display of tolerance limits
- Measuring value classification through tolerance indicator lights (green, yellow, red)
- Input of a multiplicative coefficient



Technical Specifications - How to Order

Model	Meas. Range		Resolution		Accuracy	Repeatability (± 2σ)	Prot. degree	Meas. Force (± 20%)	Weight	Order Code
	(mm)	(inch)	(mm)	(inch)	(μm)	(μm)		(N)	(gr)	
12,5 S Basic model	12,5	.49”	0,001	.00005”	4	2	IP51	0,65 - 0,90	120	0E21201010
12,5 S Advanced model	12,5	.49”	0,001	.00005”	3	2	IP51	0,65 - 0,90	120	0E21201012
12,5 SL Basic model with low force	12,5	.49”	0,001	.00005”	4	2	IP51	0,40 - 0,55	120	0E21201011
12,5 SL Advanced model with low force	12,5	.49”	0,001	.00005”	3	2	IP51	0,40 - 0,55	120	0E21201013

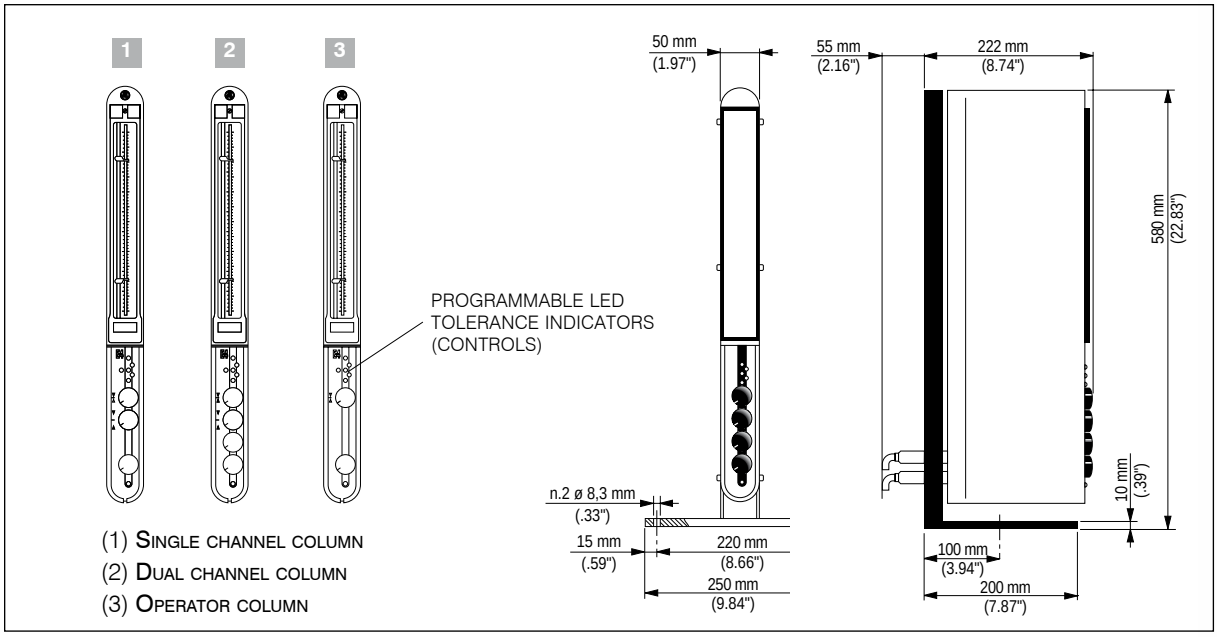
The value of the measuring force is referred to indicator in vertical position and with outgoing spindle.

Accessories

Description		Order Code
	Power – RS232 cable for bidirectional data transmission (L = 3 m)	4420240001
	Proximity – RS232 cable for bidirectional data transmission (L = 3 m)	4420240002

MODULAR ELECTRONIC MEASUREMENT DISPLAY

- Modular electronic measurement display system for the processing and the display of measurements provided by simple or complex gauging equipments.
- As a single unit, it can be used with TESTAR full-bridge (LVDT) Red Crown pencil probes, manual plugs M1, manual rings M4, snap gauges Quick Snap; with Quick Set bench type gauges it can be expanded into a powerful electronic processing system, capable of displaying more complex geometric measurements.
- Available in three basic configurations, each having standard and optional features:
  - single channel module with one input channel, that can be used with single transducer gauges;
  - dual channel module with two input channels, also capable to display sum and differ-ence of the measurements of two transducers;
  - operator module, that can be connected to two dual-channel modules for the arithmetic processing of a maximum of four transducer signals.
- 101 LED bargraph display, equipped with adjustable tolerance indicators. As an option programmable LED tolerance indicators on the front panel, to show part status (oversize, within size, undersize) are available.



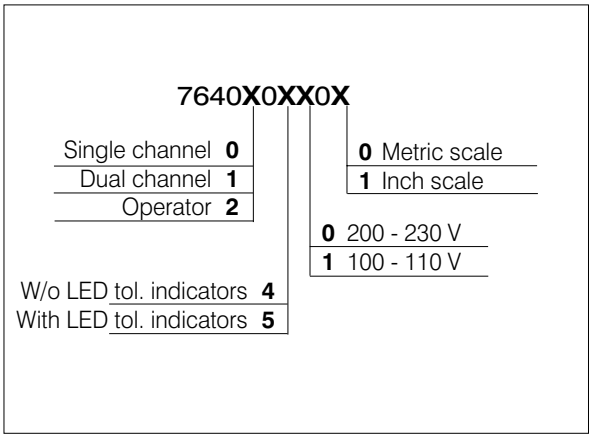
(1) SINGLE CHANNEL COLUMN
(2) DUAL CHANNEL COLUMN
(3) OPERATOR COLUMN

TECHNICAL SPECIFICATIONS

POWER SUPPLY	100-110 V, 120-127 V, 200-230 V, 240-254 V; 50 - 60 Hz
MAXIMUM VOLTAGE VARIATION	± 10%
MAXIMUM ABSORBED POWER	10 VA
SCALE LENGTH	254 mm (10")
DISPLAY RESOLUTION	0,2 µm - .0000080" (full scale ± 10 µm) 0,6 µm - .000024" (full scale ± 30 µm) 2,1 µm - .000080" (full scale ± 100 µm) 6,4 µm - .00024" (full scale ± 300 µm)
ZEROING	*Single channel module:* - Rough zeroing: ± 300 µm - Fine zeroing: ± 10 µm *Dual channel module:* ± 100 µm (1 potentiometer for each channel) *Operator module:* ± 100 µm
OPERATING TEMPERATURE	0/+50 °C
STORING TEMPERARURE	-40/+70 °C
PROTECTION LEVEL	IP50
TIME FOR STABILIZATION AFTER POWER-ON	20 minutes
MEASUREMENT VARIATION IN RELATION TO TEMPERATURE	Lower than the display resolution
TOTAL MEASURING ACCURACY AT 20°C	± 2% of selected full scale
RESPONSE TIME IN DISPLAY MIDDLE SCALE POSITION	150 ms (full scale ± 10 µm) 70 ms (full scale ± 30 µm) 50 ms (full scale ± 100 µm) 40 ms (full scale ± 300 µm)
ANALOG OUTPUT: RANGE - OUTPUT IMPEDANCE - LOADING IMPEDANCE - MEASURING ACCURACY AT 20°C - MEASURING VARIATION IN RELATION TO TEMPERATURE - RESPONSE TIME -	 ± 2,4 V full scale 15 mohm 105 kohm ± 1% of selected full scale ± 0,015 µm/°C 120 ms (full scale ± 10 µm) 40 ms (full scale ± 30 µm) 12 ms (full scale ± 100 µm) 4 ms (full scale ± 300 µm)
CONNECTOR TYPE	7 pin (DIN 45329)

HOW TO ORDER

To order an E4 column it is necessary to complete the following coding plan:



DESCRIPTION		ORDER CODE
SUPPORT STAND FOR UP TO 7 COLUMNS (SAME AS E4N)		6131410040
SUPPORT STAND LINK STUDS (2 REQUIRED FOR EACH ADDITIONAL MODULE)		1529040210
POWER SUPPLY CABLE W/O PLUG		6739998503
POWER SUPPLY CABLE WITH PLUG	USA	6739696120
	CH	6739696121
	F-D	6739696122
	E	6739696123
	I	6739696124
POWER JUMP LEADS		6790020087
ADAPTER CABLE FOR CONNECTING GAUGES WITH LUMBERG SV50/6 CONNECTOR		6735832000

EXAMPLE: The order code for a dual channel column with LED tolerance indicators, metric scale and power supply 200 - 230 V is 7640105000.

COMPACT ELECTRONIC DISPLAY UNIT

Quick Read™ family is made up of three slim, compact versions, each complete with analog and digital displays, and easily programmed via local keypad.

UNIQUE CLEAR DISPLAY

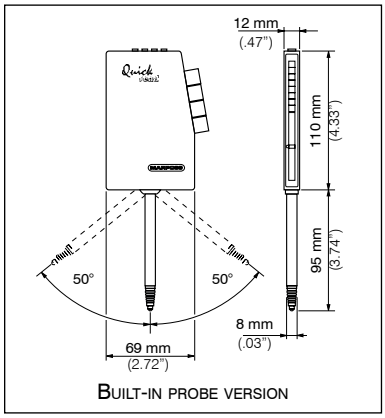
The 3-colour (green, yellow and red) analog display and 8-digit alphanumeric display provide clear definition and easy reading of the measurement results.

PROGRAMMABLE PARAMETERS

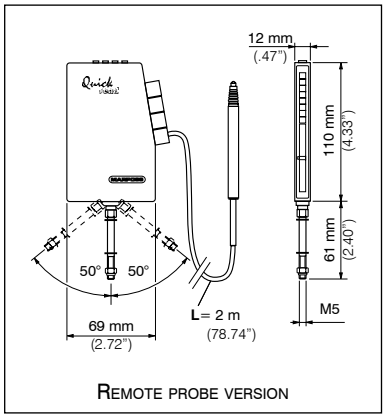
Using the local keypad, the Quick Read™ can be easily programmed to set the digital display resolution, measuring unit, tolerance limits, master deviation, full scale, measurement multiplying coefficient, absolute or comparative reading of the measurement result and the data format for serial transmission.

SERIAL OUTPUT

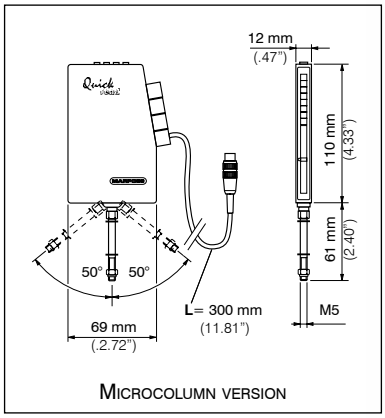
The RS232 output port allows for connection to a PC, statistical printer or data collector for SPC purposes, and to a PLC (data can be sent in ASCII or binary format).



BUILT-IN PROBE VERSION



REMOTE PROBE VERSION



MICROCOLUMN VERSION

BUILT-IN PROBE VERSION

Having the measuring probe directly integrated into the main structure makes it suitable for single, simple implementation and multi-dimensional applications where the measuring locations are close to each other.

REMOTE PROBE VERSION

The pencil probe in this version is attached to the main structure by means of a standard 2 m (78.7") cable. This allows location of the display away from the measur-ing device. In multi-dimensional applications, all the Quick Read displays can be mounted to a standard base structure so that they are located in one common area.

General specifications	
Power supply	7 - 7,5 Vdc ± 5% (300 mA)
Protection level (CEI/IEC 529 - DIN VDE 0470-1)	IP50
Accuracy	± (1% reading value + resolution)
Measurement thermal drift	max 0,25 µm/°C
Output	RS232
Working temperature	0 ÷ 50 °C
Storage temperature	- 40 ÷ 50 °C

Digital display	
Resolution	0,0001/0,001 mm (.00001"/.00005")
Type	8 alphanumeric digits
Measurement multiplying coefficient	-2 to +2 with 0,01 step

Analog display	
Available scales	auto; 0,010 mm (.00050"); 0,020 mm (.00100"); 0,050 mm (.00250"); 0,100 mm (.00500"); 0,250 mm (.01000"); 0,500 mm (.02500"); 1,000 mm (.04000")
Resolution	1/10 of the programmed scale, from 0,001 mm (.00005") to 0,100 mm (.00500")
Type	21 three colour LEDs (green, yellow, red)

Measuring probe	
Prestroke	1,5 mm (adjustable)
Overstroke	1,5 mm
Measuring range	± 1 mm (.04")
Clamping diameter	8h6 mm or 3/8"
Contact	carbide, Ø 3 mm, interchangeable, M 2,5 or 4-48 UNF
Measuring force	0,75 N ± 25%
Repeatability (2,77 σ)	< 0,25 µm

Description	Order Code
Built-In Probe Version (Probe ø 8 mm)	0E01992106
Remote Probe Version (Probe ø 8 mm)	0E01991640
Wrench to adjust the probe pretravel	1320709000

Note : One User manual is supplied with each Quick Read.

MICROCOLUMN VERSION

This version incorporates half-bridge technology (HBT) and allows to connect TESTAR /MARPOSS standard sensors with half-bridge transducer ranging from ± 0,25 mm (.010") to ± 5 mm (.200").
Two versions are available :

- For connection of one sensor to carry out one static measurement .
- For connection of one or two sensors to carry out one static or dynamic measurement [Hold, Max, min, Max-min, (Max- min)/2, (Max+min)/2]. To connect two sensors the specific Y-cable is needed.

FOR CONNECTION OF ONE SENSOR ONE STATIC MEASUREMENT

FOR CONNECTION OF ONE OR TWO SENSORS ONE STATIC OR DYNAMIC MEASUREMENT

General specifications	
Power supply	7 - 7,5 Vdc ± 5% (300 mA)
Protection level (CEI/IEC 529 - DIN VDE 0470-1)	IP50
Accuracy	± (1% reading value + resolution)
Measurement thermal drift	0,1 µm/°C for range up to ± 1 mm (.04000"); 0,2 µm/°C for range ± 2,5 mm (.10000") and ± 5 mm (.20000")
Output	RS232
Working temperature	0 ÷ 50 °C
Storage temperature	- 40 ÷ 50 °C

Digital display	
Resolution	0,0001/0,001 mm (.00001"/.00005") for measuring range up to ± 1 mm (.04000"); 0,001 mm (.00005") for range ± 2,5 (.10000") and ± 5 mm (.20000")
Type	8 alphanumeric digits
Measurement multiplying coefficient	-2 to +2 with 0,01 step

Analog display	
Available scales	auto; 0,010 mm (.00050"); 0,020 mm (.00100"); 0,050 mm (.00250"); 0,100 mm (.00500"); 0,250 mm (.01000"); 0,500 mm (.02500"); 1,000 mm (.05000"); 2,5 mm (.10000"); 5 mm (.25000"); 10 mm (.50000")
Resolution	1/10 of the programmed scale, from 0,001 mm (.00005") to 1,000 mm (.05000")
Type	21 three colour LEDs (green, yellow, red)

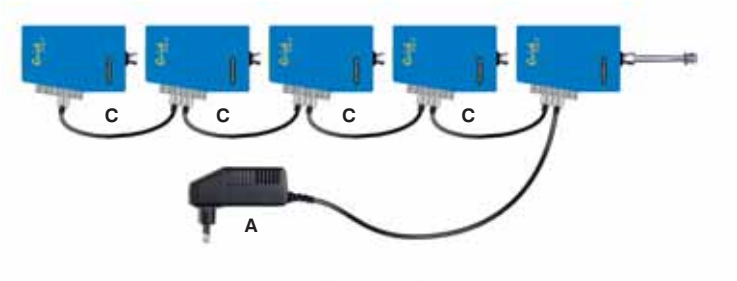
Manageable transducer
1 or 2 half-bridge (*) with Lumberg SV50/6 connector

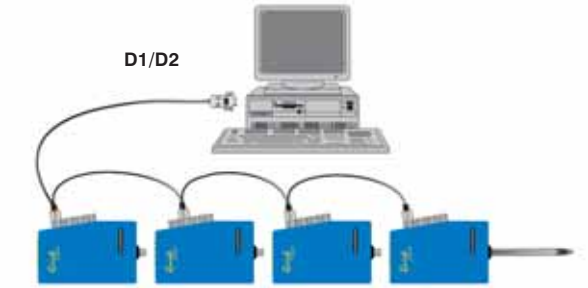
(*) HBT standard TESTAR/MARPOSS. For third parties transducer compatibility please contact the nearest MARPOSS office.

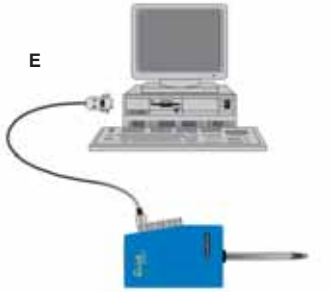
Description	Order Code
Microcolumn Version for one sensor (one static measurement)	0E01991650
Microcolumn Version for one or two sensors (one static or dynamic measurement)	0E01991612
Microcolumn Version for one or two sensors compatible to TESA amplifiers (one static or dynamic measurement)	0E01991670
Y-cable for connection of two sensors	6735532001

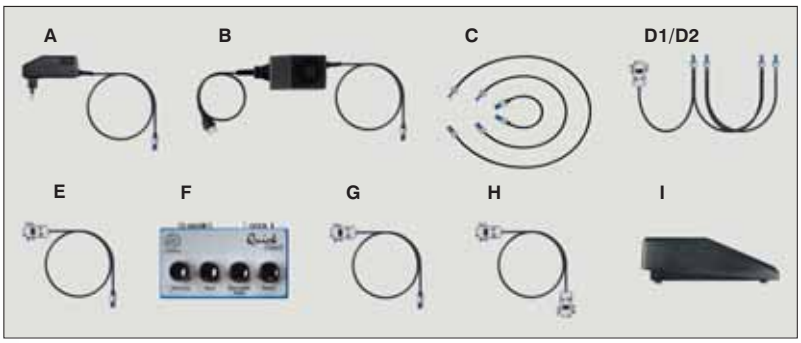
Note : One User manual is supplied with each Quick Read.

ACCESSORIES









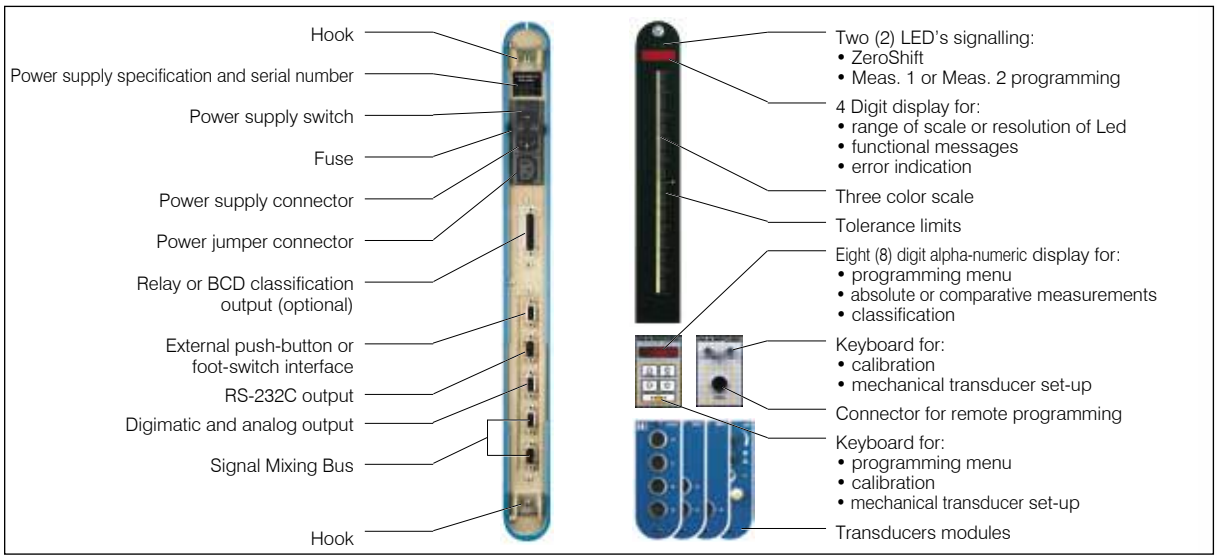
Ref.	Description	Order Code
A	Power supply unit for max. 5 quick read, with EU plug	6871140067
	Power supply unit for max. 5 quick read, with U.S.A. plug	6871140068
	Power supply unit for max. 5 quick read, with U.K. plug	6871140069
B	Power supply unit for max. 5 quick read, with EU mains cable	6871140070
	Power supply unit for max. 5 quick read, with U.S.A. mains cable	6871140071
C	Power jumper cable L = 150 mm	6739696138
	Power jumper cable L = 300 mm	6739696128
	Power jumper cable L = 600 mm	6739696129
D1	Chain serial cable (L = 4 m) for connection of up to 4 Quick Read to pushbutton box, footswitch or PC (9 pins); distance between quick read = 300 mm	6739696299
D2	Chain serial cable (L = 4 m) for connection of up to 4 Quick Read to pushbutton box, footswitch or PC (9 pins); distance between quick read = 600 mm	6739696300
E	Serial cable (L = 2 m) for connection of one Quick Read to pushbutton box, footswitch or PC (9 pins)	6739696157
F	Pushbutton box for remote control of zeroing, dyn. cycle and data transmission to PC	6139013100
G	Power supply cable (L = 2 m) for pushbutton box (power feed is from Quick Read)	6739696301
H	Serial cable (L = 3 m) to connect pushbutton box to PC (9 pins)	6737957002
I	Footswitch with 1,5 m cable for connection to pushbutton box or to Quick Read (in this case cable E is needed)	6738099030
M	Stand for remote probe or microcolumn version (it holds up to 10 units)	2919916500

MICROPROCESSOR COLUMN

- Microprocessor column designed to display dimensional and geometrical measurements, in either static or dynamic elaboration.
- The measurement value is displayed:
  - in an analog way on the three-colour LED bargraph scale, showing the measurement status (green = good; red=scrap; yellow=prescrap).
  - in a digital way on the eight-digit display; in this second case the measurement can be comparative or absolute.
- Measuring unit, tolerance limits, range, resolution can also be displayed.
- It can be configured according to specific application needs, employing different transducer modules provided with 1, 2 or 4 input channels.

These modules can be either:
- Full-bridge (LVDT), half-bridge (HBT) with 1, 2 or 4 inputs.
- MRT (Marposs Resistance Transducer) with 1, 2 or 4 inputs.
- AIR, pneumo-electronic converter with 1 input. When supplied with this module, the E4N can easily and conveniently retrofit and upgrade a wide variety of air gauging applications. The converter card is perfectly interchangeable with the other modules (LVDT, HBT, MRT).

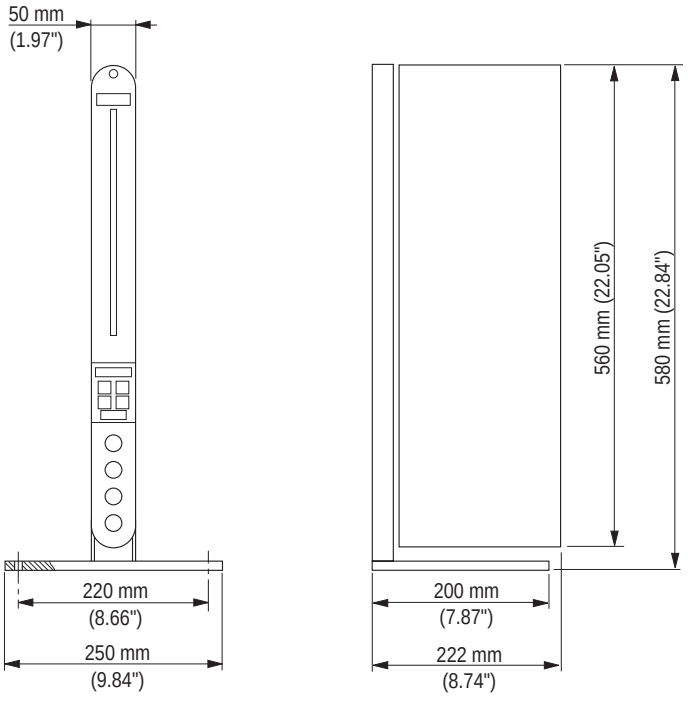
- The E4N features a wide range of interfaces:
  - Digimatic and analog to send data to statistical printers or data collectors.
  - RS232-C to send data to PC or standard printers.
  - Relay/BCD to provide a signal for alarms, resume lamps etc.
  - connector to interface external push-buttons or foot-switches.
- It can be programmed via local keypad or PC (by means of the specific E4N-PC LINK software, which also allows data collection).



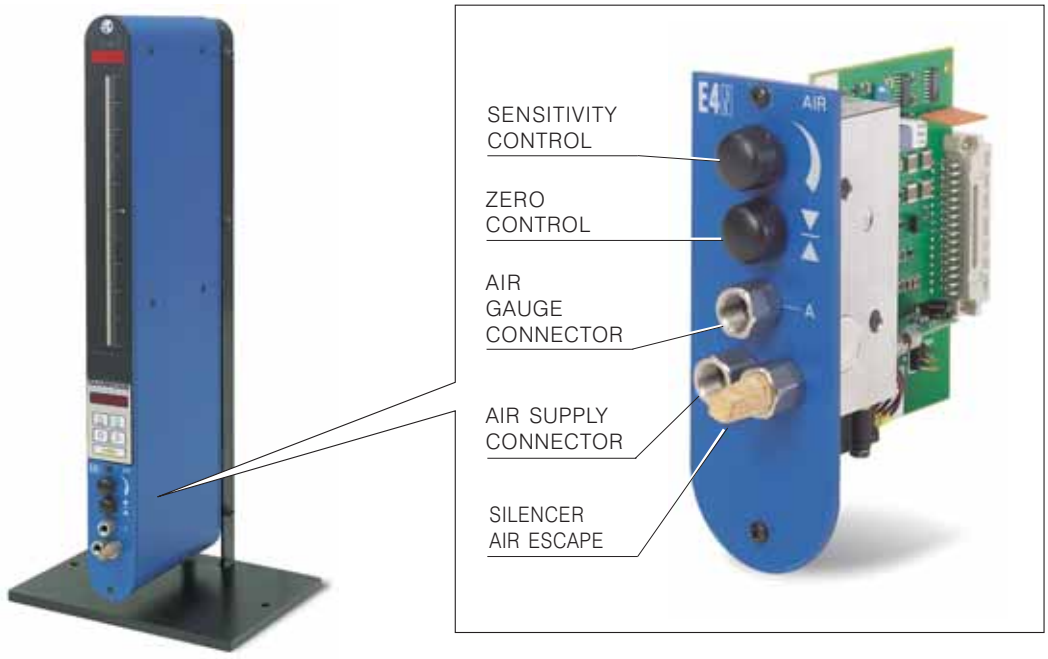
TECHNICAL SPECIFICATIONS

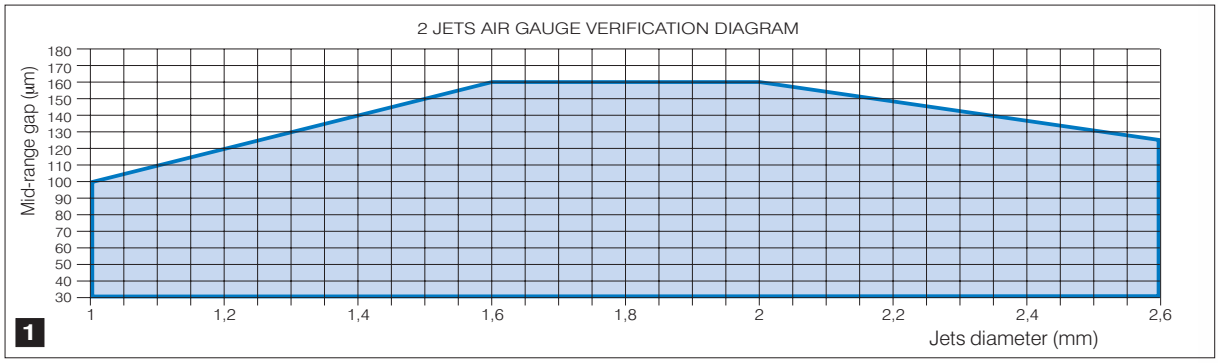
POWER CONTROL UNIT	85/265 VAC 50/60 Hz
VOLTAGE VARIATION	± 10%
MAX. CONSUMPTION	40 VA
FUSE	2A delayed
PROTECTION LEVEL	IP 50
STORAGE TEMPERATURE	-40/+60 °C
WORKING TEMPERATURE	0/+50 °C
WEIGHT	3,7 kg approx
DISPLAY	
BAR LED	101 LED scale
COLOR	3 color LED (auto switch)
HEIGHT	257 mm (bottom to central)
PROGRAMMING POSSIBILITY	Intensity, reponse speed
8 DIGIT DOT MATRIX DISPLAY	Differential, absolute measurements
MEASURING UNITS	Millimeters, inches, grams, degrees
TYPE OF MEASUREMENTS	Static or dynamic (Max + Min) /2 Max - Min (Max - Min) /2
MANAGEABLE TRANSDUCERS	1 - 8
TRANSDUCER PROGRAMMING: STANDARD MEASURING RANGE	Up to ± 1 mm (.04")
TRANSDUCER PROGRAMMING: WIDE MEASURING RANGE	Up to ± 5 mm (.2")
ARM RATIO AND SENSITIVITY ADJUSTMENT	-4 +4 with 0,001 step
ACCURACY AT 20°C	± 0,5 % reading value ± resolution
MEASUREMENT THERMAL DRIFT	150 ppm/°C
MEASUREMENT THERMAL DRIFT/CHANNEL	50 ppm/°C
SCALE	Up to 10 programmable range, from ± 0,005 to ± 5 mm (.000250" to .2")
SCALE RESOLUTION	1/100 of range, from 0,1 to 100 µm (.000005" to .004")
CONNECTOR TYPE	
LVDT INPUT	6 Pin (DIN 45322) for gauges with Lumberg SV50/6 connector
HBT INPUT	6 Pin (DIN 45322) for gauges with Lumberg SV50/6 connector
MRT INPUT	7 Pin (DIN 45329) for gauges with Lumberg SV71 connector

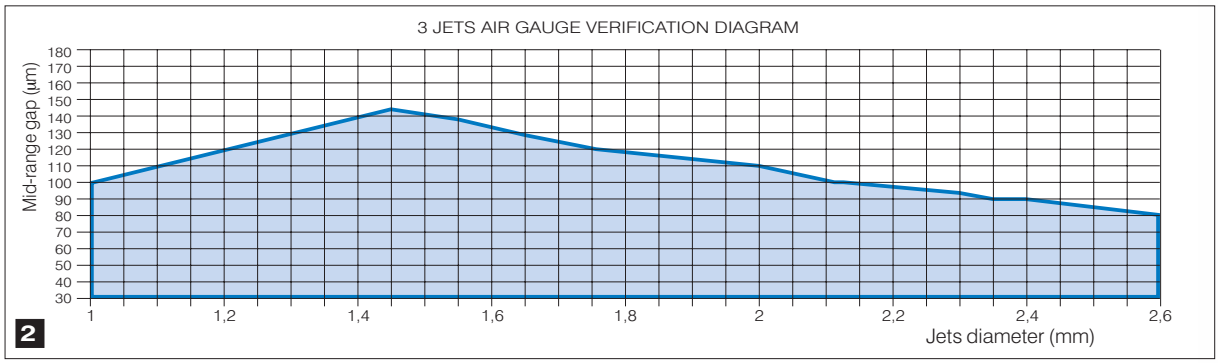
Reference Standards: EN61010-1 (safety); EN61326-1, EN 61326-A1, EN61000-3-2, EN61000-3-3 (EMC)



E4N Air / Electronic Converter





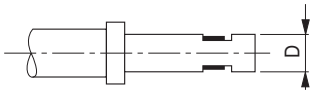


The MARPOSS and/or non-MARPOSS air gauges, with specifications inside the blue area of diagrams no.1 and 2, can be easily and immediately connected to the E4N column and take benefit by its power. The parameters to be considered are the following:

- air supply pressure
- number of air gauge jets
- diameter of air gauge jets
- “mid-range gap”, as to the difference between the mid-tolerance diameter of the part to be measured and the distance between the air gauge jets.

EXAMPLE OF MEASUREMENT WITH AIR-PLUG

- air supply pressure: 3 bar ± 0.1
- number of jets : 2
- diameter of jets: 2mm (.0787")
- diameter of the part to be measured = 10 mm ± 0.030 (.3937" ± .0012")
- mid tolerance diameter = 10 mm (.3937")
- distance between the jets D = 9.90 mm (.3898")



We obtain:

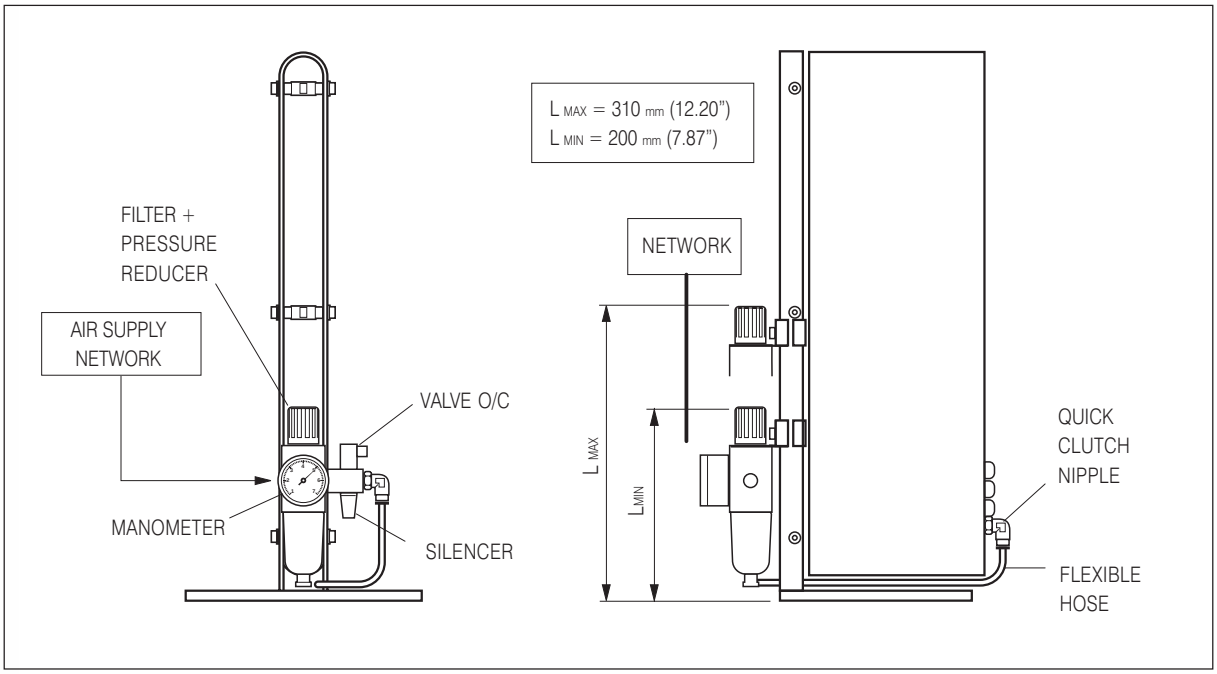
- "mid tolerance gap": (10 - 9.90) = 0.10 mm = 100 μm
  As shown in the diagram no.1 the intersection between the value of the "mid-range gap", 100 μm (.0039"), and the diameter of the jet, 2 mm (.0787"), stays inside the blue area: the application can be therefore realized.

WORKING RANGE	
AIR SUPPLY PRESSURE	1,5 - 4 bar
MEASURING RANGE	± 50 μm (± .0020")

NOMINAL PERFORMANCES	
AIR SUPPLY PRESSURE	3 bar
MEASURING RANGE	± 30 μm (± .0012")
REPEATABILITY	0,7 μm (.0000275")
ACCURACY	1,5 μm (.00006")

AIR TREATMENT SPECIFICATIONS	
FILTERING	5 μm
HOURLY CONSUMPTION	2 m^3/h
AIR MUST BE DRY AND UNOILED	

ACCESSORIES



How to Order

Column with local Programmer	Transd. Type	Transd. Input	Basic Version	BCD Relais	Column with remote programmer (E4N pc-link)	Transd. Type	Transd. Input	Basic Version	BCD Relais
	LVDT	1	76510020X0	76510021X0		LVDT	1	76510040X0	76510041X0
		2	76510120X0	76510121X0			2	76510140X0	76510141X0
		4	76510220X0	76510221X0			4	76510240X0	76510241X0
	HBT	1	76513020X0	76513021X0		HBT	1	76513040X0	76513041X0
		2	76513120X0	76513121X0			2	76513140X0	76513141X0
		4	76513220X0	76513221X0			4	76513240X0	76513241X0
	MRT	1	76516020X0	76516021X0		MRT	1	76516040X0	76516041X0
		2	76516120X0	76516121X0			2	76516140X0	76516141X0
		4	76516220X0	76516221X0			4	76516240X0	76516241X0
	AIR	1	76519020X0	76519021X0		AIR	1	76519040X0	76519041X0

X = 3 Latest SW release 4.0 replacing previous version 3.3
5 SW release 2.72, replacing previous versions 2.71, 2.7, 2.3, 2.1, 2.0
6 SW release 6.3 allowing elaboration and visualization of up to four measurements.

Accessories

Description			Order Code
3 - colour meter module with local programmer (basic version)			76519920X0
3 - colour meter module with local programmer (BCD relais)			76519921X0
3 - colour meter module with remote programmer (basic version)			76519940X0
3 - colour meter module with remote programmer (BCD relais)			76519941X0
Amplifier module 1 LVDT input transducer			6876004013
Amplifier module 2 LVDT input transducer			6876004012
Amplifier module 4 LVDT input transducer			6876004011
Amplifier module 1 HBT input transducer			6876004005
Amplifier module 2 HBT input transducer			6876004004
Amplifier module 4 HBT input transducer			6876004003
Amplifier module 1 MRT input transducer			6876004008
Amplifier module 2 MRT input transducer			6876004007
Amplifier module 4 MRT input transducer			6876004006
Amplifier module 1 AIR input transducer			6876004009
E4N AIR USA with local programmer (basic version)			76519120X0
E4N AIR USA with local programmer (BCD relais)			76519121X0
E4N AIR USA with remote programmer (basic version)			76519140X0
E4N AIR USA with remote programmer (BCD relais)			76519141X0
BCD relais interface card			6344360100
Bus cable for signals exchange among E4N columns			6738057011
Y-cable	Connecting cable from 1 LVDT transducer to 2 E4N inputs (L= 1,2 m)		6735932014
	Connecting cable from 1 MRT transducer to 2 E4N inputs (L= 1,2 m)		6739796001
RS232-cable	From remote programming module to a PC (L= 3 m)	25 pin	6735916001
		9 pin	6735957001
	From rear serial output to a PC (L= 3 m)	25 pin	6737916000
		9 pin	6737957002
	Chain serial cable from 2 E4N to a PC		6739797030
	Chain serial cable from 3 E4N to a PC		6739797029
	Chain serial cable from 4 E4N to a PC		6739797028
	Chain serial cable from 5 E4N to a PC		6739797027
Connecting cable from Digimatic output to Mitutoyo DP1 - DP2 - DP3 (L= 1 m)			6738099016
Connecting cable from Digimatic output to Datamyte 862			92162 (Datamyte-code)
Connecting cable from Digimatic output to Datamyte 529-15			92160 (Datamyte-code)
Cable for analog output			6738098009
External pushbutton panel (4 buttons) with cable (L= 1,5 m)			6139012600
Footswitch with connecting cable to the column or to the pushbutton panel (cable L= 2 m)			6738099015

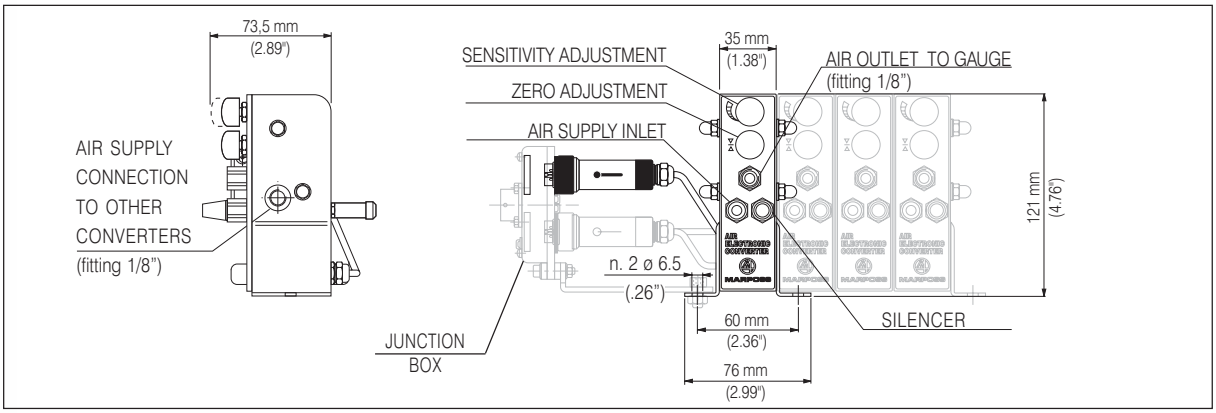
X = 3 SW release 4.0 replacing previous version 3.3
5 SW release 2.72, replacing previous versions 2.71, 2.7, 2.3, 2.1, 2.0

Description		Order Code
Connecting cable of 2 E4N columns to pushbutton or footswitch keyboard		6738097009
Connecting cable of 3 E4N columns to pushbutton or footswitch keyboard		6738097010
Connecting cable of 4 E4N columns to pushbutton or footswitch keyboard		6738097011
Connecting cable of 5 E4N columns to pushbutton or footswitch keyboard		6738097012
Connecting cable of 6 E4N columns to pushbutton or footswitch keyboard		6738097007
Connecting cable of 7 E4N columns to pushbutton or footswitch keyboard		6738097008
Power supply cables (L= 2 m)	USA	6739696030
	CH	6739696031
	WITHOUT PIN	6739696034
	ITALY	6739696036
	F/D	6739696033
	SPAIN	6739696035
Power jumper cable from E4N to E4N		6739696029
Adapter extension from Lumberg S3 to 6 pin connector on E4N for LVDT input (L= 400 mm)		6738536000
Adapter extension from Lumberg S7 to 7 pin connector on E4N for MRT input (L= 400 mm)		6738536001
Support stand (for up to 5 columns)		6131410040
Support stand link studs (2 required for each additional module)		1529040210
Card with adhesive stickers (Graphic symbols)		1529040460
Air filtering and adjusting unit		2915490053
2 x 90° quick clutch nipple		2915490052
2 x straight quick clutch nipple		2915490050
sensitivity adjustment knob cover		1015420614
sensitivity and zero adjustment knob cover		1015420615
User manual for E4N software release 4.0		D2040034X1
User manual for E4N software release 2.72		D2040027X1

X = I (Italian); U (English); D (German); E (Spanish); F (French)

External Air/Electronic Converters for E4N (Pressure sensor type)

Through the external A/E converters pneumatic measuring gauges can be connected to E4N columns with LVDT or MRT inputs.



Type of converter	LVDT	MRT
Measuring range	± 50 µm	
Nominal sensitivity at buffer output	230 µV / µm / V ± 25%	5 mV / µm ± 25%
Linearity error in the range ± 30 µm	≤ 2µm	
Linearity error in the range ± 50 µm	≤ 5µm	
Noise	≤ 0,3 µm	
Measure stability in 3 minutes	≤ 0,2 µm	

Description	Order code			
	W/O Junction box		With junction box	
	LVDT	MRT	LVDT	MRT
Group with 1 air/ electronic converter	2915459915	2915459913	2915459914	2915459910
Group with 2 air/ electronic converters	2915459925	2915459923	2915459924	2915459920
Group with 3 air/ electronic converters	2915459935	2915459933	2915459934	2915459930
Group with 4 air/ electronic converters	2915459945	2915459943	2915459944	2915459940

COLUMN FOR WIRELESS GAUGES

E4N Wave is the latest model of the E4N product family, featuring Bluetooth® wireless technology and developed for use with MARPOSS wireless gauges, such as for example M1 Wave bore gauge. It can connect up to four gauges at one time and manage four measurements carried on in switching mode or simultaneously.

The measurement value is displayed:

- in an analog way on the three-colour LED bargraph scale, showing the measurement status (green = good, red = scrap, yellow = prescrap)
- in a digital way on the eight-digit display; in this case the measurement can be comparative or absolute

The measurement number is displayed on the upper four-digit display.

The Wave input module is characterized by:

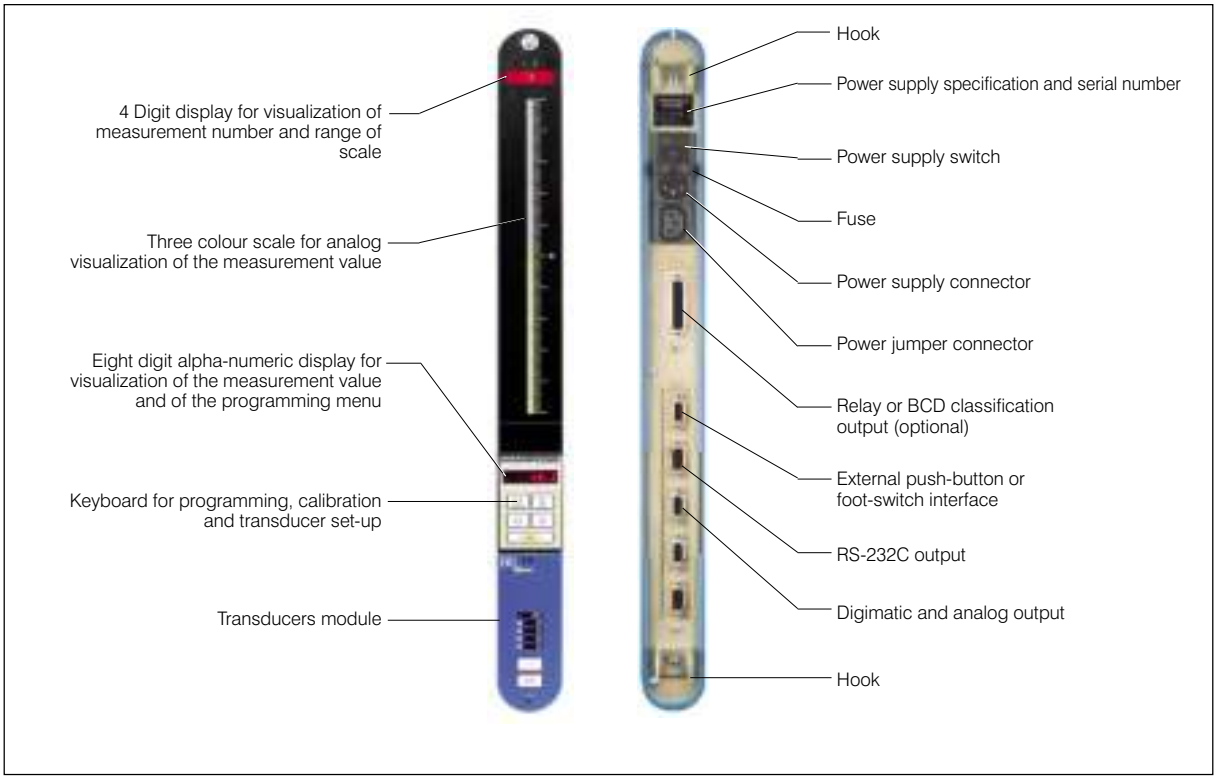
- blue LED's showing status of the channels and diagnostics related to the connected gauges and to the module itself
- two buttons which allow respectively for the selection of the specific channel to which a gauge shall be paired and for enabling of the pairing procedure between channel and measuring gauge.

It is perfectly interchangeable with any other traditional E4N module (for LVDT, HBT, MRT wired sensors) and can therefore conveniently retrofit existing E4N columns and upgrade gauging applications where wired M1 Star EBG bore gauges are used.

Following basic parameters related to the M1 Wave to be connected can be configured in each module through dip-switches:

- type of battery (alkaline, rechargeable NimH)
- sampling rate (10, 20 or 40 samples/second)
- transducer type (HBT, LVDT)
- measuring range (± 500 or ± 1000 microns)
- time to automatic gauge switch-off for battery saving when it is not used (1 min/2 min/10 min/1 hour)

E4N Wave can communicate with MARPOSS wireless gauges within a distance of 10 meters in any kind of conditions. Longer distances can be covered depending on the working environment.



How to Order

Description		Order Code
E4N WAVE for 4 wireless LVDT/HBT gauges		7651592060
E4N WAVE for 4 wireless LVDT/HBT gauges, with BCD relais		7651592160
Wave amplifier module 4 LVDT/HBT input channels		6876004016
Support stand (for up to 5 columns)		6131410040
Support stand link studs (2 required for each additional column)		1529040210
Power supply cable L=2m	USA	6739696030
	CH	6739696031
	WITHOUT PIN	6739696034
	ITALY	6739696036
	F/D	6739696033
	SPAIN	6739696035
Power jumper cable from E4N to E4N		6739696029
User manual		D2040037X1

X = I (Italian); U (English); D (German); E (Spanish); F (French)

Note : For the order codes of the accessories not listed here see E4N catalogue

SUBCOMPACT EMBEDDED GAUGE COMPUTER

Nemo, compact, robust and reliable professional computer has been designed for simple measuring applications up to 8 sensors and 4 measures and offers innovative features that enable to perform simple measurement applications intuitively and rapidly. Nemo is capable of acquiring data from traditional and wireless measurement devices and storing them locally or uploading them to a LAN network. The 5.7" colour display guarantees easy to read measurements, and the touch screen enables the operator to carry out programming operations and acquire data, without the need for external input devices. Thanks to its embedded architecture, the Nemo is smaller than a sheet of A5 paper, while the built in Secure Digital micro card provides powerful memory capacity. Nemo software guarantees a friendly and easy to use operator interface. Its touch-screen designed human interface allows to program and acquire measures without any additional input/command device.

MAIN HARDWARE CHARACTERISTICS

CASE	Robust industrial-grade plastic case
PROTECTION	IP 54 on front panel; IP 40 on rear panel
TOUCH SCREEN	4 wire analog-resistive
STORAGE MEDIA	Internal SD Micro card 4 GB
LCD DISPLAY TYPE	5.7'' color TFT
ETHERNET LAN	2 x 10/100 Mbps RJ45 connector
USB PORTS	2 x type B + 1 x type A
SERIAL PORT	1 x RS232C
BENCH-TOP SUPPORT	Reclinable
DIMENSIONS	160 x 138 x 33 mm (6.3'' x 5.4'' x 1.3'') L x H x D

Main page

Multiple bargraph display

MEASUREMENTS

- Up to 8 sensors connectable via USB, RS232 or Bluetooth® wireless technology
- Data collection from Marposs Easy Box™, Digi Crown™, M1 Wave™, i-Wave™ and third-party serial devices
- Measurement capability up to 4 characteristics
- Multiple measurement display with numeric and graphical layout
- Acquisition command through external signal (footswitch, push buttons) or touch-screen
- Part counters
- Remote data storage through Ethernet LAN (Integrated FTP Server) or removable USB memory device
- Data storage format: .DFQ (Q-DAS® qs-STAT®) and .CSV (Microsoft® Excel Comma Separated Values).

Settings

Characteristics programming

CONFIGURATION AND PROGRAMMING

- Multi-language support for European and Asian languages: English, Italian, German, French, Spanish, Brazilian Portuguese, Swedish, Japanese, Chinese. Other language versions available upon request
- Programming interface designed to be used with touch-screen
- Configuration Backup-Restore-Update by USB memory devices or through Ethernet LAN
- Password protected multi-user management

How to Order

Derscription	Order Code
NEMO for DIGI BOX	830NA00000
NEMO 2 USB	830NA00010
NEMO 8 USB	830NA00030
FOOTSWITCH with 2 m cable for data triggering function	6738099035

EMBEDDED GAUGE COMPUTER

Merlin represents a new concept of gage computer using the same technologies created for portable electronics, for data collection and basic statistical analysis from traditional or wireless measuring devices. It is available as basic version with Microsoft® Windows® CE7 operating system, designed for simple measuring applications up to 16 sensors/measurements, and as Plus version with Microsoft® Windows® XP or 7P Embedded operating system, designed for enterprise applications up to 32 sensors/measurements. Embedded technology allows: small dimensions (the whole system footprint is smaller than an A4 sheet of paper), fanless architecture and no moving parts (flash disk storage media), assuring the highest level of system reliability.
Merlin gage software guarantees a friendly and easy to use operator interface. Its touch-screen designed human interface allows to program and acquire measures without any additional input/command device. The Merlin Plus with Microsoft® Windows® Xp or 7P adds to Merlin enhanced data storage capabilities for the most demanding network environment.

MAIN HARDWARE CHARACTERISTICS

	Merlin	Merlin Plus
CASE	Robust industrial-grade plastic case	
PROTECTION	IP 65 (on front panel)	
TOUCH SCREEN	4 wire analog-resistive	
LCD DISPLAY TYPE	8.4'' color TFT - supporting SVGA resolution (800x600)	8.4'' color TFT - supporting XGA resolution (1024x768)
STORAGE MEDIA	eMMC 4GB + optional internal removable SD card up to 32 GB	Internal removable compact flash up to 32 GB
ETHERNET LAN	10/100 Mbps RJ45 connector	
USB PORTS	4 Host + 1 Device	5 Host
	1 internal to support a *Bluetooth*® adapter	
SERIAL PORT	1 x RS232C	
BENCH-TOP SUPPORT	Reclinable (VESA compliant for pivoting-arm solutions)	
DIMENSIONS	230 x 180 x 45 mm (9'' x 7'' x 1.8'') L x H x D	
OPERATING SYSTEM	Microsoft® Windows® CE7	Microsoft® Windows® XP or 7P Embedded

Multiple bargraph display

MEASUREMENTS

- Up to 16/32 sensors connectable via USB, RS232 or ***Bluetooth***® wireless technology.
- Data collection from Marposs Easy Box™, Digi Crown™, M1 Wave™ , I-Wave™ , M2 Wave™ , M1 Multiwave™ , Quick Digit™ and third-party serial devices.
- Measurement capability up to 16/32 characteristics
- Multiple measurement display with numeric and graphical layout.
- Acquisition command through external signal (foot-switch, push buttons) or touch-screen.

Histogram

Quality Control Chart

STATISTICAL PROCESS CONTROL

- Statistical Analysis with graphic display (Histogram, Control Charts, Value Chart...) and numeric summary (Cp, Cpk, Spread, Average...).
- Data segregation (by machine, product batch, analysis purposes).
- Part counters.
- Local data storage on internal memory and/or removable USB memory devices.
- Remote data storage through Ethernet LAN.
- Data storage format: .DFQ (Q-DAS® qs-STAT®) and .CSV (Microsoft® Excel Comma Separated Values).
- Print of charts

Virtual keyboard

Programming interface

CONFIGURATION AND PROGRAMMING

- Multi-language support for East/West European and Asian languages. Other language versions available upon request.
- Programming interface designed to be used with touch-screen.
- Password protected multi-user management.

How to Order

Description	Order Code
MERLIN with East/Western European operating system	830MEACD00
MERLIN with Japanese operating system	830MECCD00
MERLIN with Korean operating system	830MEECD00
MERLIN with Chinese operating system	830MEFCD00
MERLIN PLUS with Western Windows XP Embedded operating system	830MPAACA0
MERLIN PLUS with Western Windows 7P Embedded operating system (english)	830MPAEEB0
MERLIN PLUS with Western Windows 7P Embedded operating system multi language	830MPMEFB0

SOFTWARE CHARACTERISTICS

- Up to 16 characteristics per part program
- Up to 50 part programs
- Static and dynamic measurement acquisitions
- Up to 4 bar graphs per page with value and status color
- Part counters
- Local data storage on SD card or real time data export to corporate network via WLAN in .csv or .dfq (Q-DAS® ASCII Transfer Format)
- Data transmission secured by WEP, WPA, WPA2 encoding
- Microsoft® Windows CE operating system

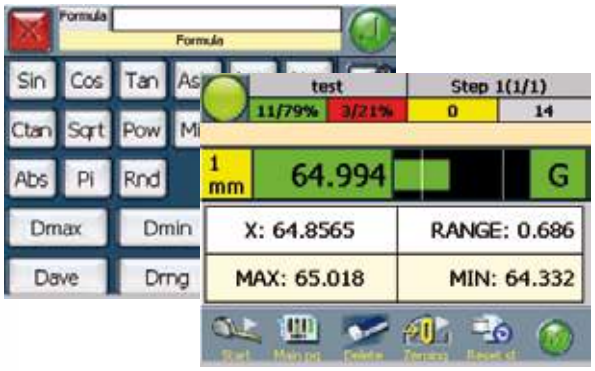
MOBILE GAUGE COMPUTER

Merlin Mobile is a wrist band unit for measurement display and data storage, which expresses the highest level of operating freedom, giving the possibility to the operator to acquire measurements all around the plant. Associated with Marposs Wave and i-Wave measuring devices, it allows to realize totally wireless applications:

- no cables to connect measuring devices to the display unit (using Marposs Wave Bluetooth® interface).
- no cables to connect the display unit to corporate network (using integrated Wireless LAN interface)
- the ergonomic design and the light weight allow the user to wear Merlin Mobile comfortably on a wrist.

MAIN HARDWARE CHARACTERISTICS

DISPLAY	3.5“ LCD colour display (320 x 240 Pixel)
TOUCH SCREEN	4-wire analog-resistive
WIFI	WIFI 802.11 B/G WLAN interface
BLUETOOTH	integrated Bluetooth interface for wireless connection to the device
STORAGE	removable SD memory card
ARMBAND	adjustable strap with Velcro closure



USER INTERFACE

Merlin Mobile can be operated in a easy and intuitive way through the touch screen display. Even the programming of extensive measuring tasks can be simply and quickly done, because the measurement software is optimized through the touch screen display. Easy operation and clear visualization of the measurement values through bar graphs make Merlin Mobile a versatile and practical device for wireless, mobile data acquisition of out of process measurement.

How to Order

	Description	Order Code
	Merlin Mobile (west-european operating system)	830MMAAA00
	Battery charger base for up to four batteries (power supply unit is included)	4703915007
	Single battery holder	4703915008
	Battery	4703915009
	Extended battery pack with EU mains cable Extended battery pack with U.S.A. mains cable Extended battery pack with U.K. mains cable	4703915012 4703915013 4703915014

THIN PANEL INDUSTRIAL COMPUTER

The E9066T™ Thin Panel Industrial Computer is the ideal companion for the Marposs Easy Box™ and Gage Box™ data acquisition systems. When bundled with its' Quick SPC™ for Windows® Measurement & SPC software, and innovative user interface, your applications will be just a few keystrokes or mouse clicks away.

SMALL ON SPACE

With a mere 50mm in depth, the E9066T™ has been designed to satisfy all space-constricted applications, without compromising features and functionalities of a complete, industrial PC at a truely competitive price.
Thanks to its reduced footprint and small weight, it is suitable for bench-top, panel mount, wall-mount and swing-arm solutions alike.

BIG ON FEATURES

Its standard configuration includes a 15" LCD TFT display, 512MB RAM, two built-in Ethernet ports, a built-in Fieldbus socket, six USB ports and all standard computer interface ports.
Options are available for a 17" LCD TFT display, touch screen, expansion slots, various types of mass storage devices and solid state memory disks.

E9066T™ represents a truly innovative family of small, modular and reliable Industrial Computers for Data Collection, Industrial Control and Production/Factory Automation.

The system's flexible, multi-platform mechanical design makes it readly adapted for panel, wall or swing-arm mounting, DIN rail assemblies and bench top mounting as well.

1 - Panel mount assembly
(PC module with front panel)

2 - Bench top assembly
(PC module with front panel and cabinet)

TECHNICAL SPECIFICATIONS

FRONT PANEL SPECIFICATIONS	
LCD DISPLAY TYPE	15" and 17" TFT LCD
RESOLUTION	Color SVGA / XGA / SXGA
CONTRAST RATIO	400:1
BRIGHTNESS	450 cd/m^2 (450 nit)
LAMPS	4 x CCFT
SCREEN	impact resistant / anti-glare
PROTECTION (PANEL MOUNT)	IP65

COMPUTER SPECIFICATIONS	
CPU	All-in-one motherboard
PROCESSORS	INTEL® MOBILE CELERON® and PENTIUM® up to 2.0GHz or INTEL CORE DUO/CORE 2 DUO up to 3.33 GHz
RAM (MIN - MAX)	512 MB - 2GB (2 x SODIMM DDR2); 1 GB - 4 GB (CORE DUO/CORE 2 DUO)
VIDEO CONTROLLER / RESOLUTION	INTEL GMA 900 VGA / SVGA / XGA / SXGA; INTEL GMA X3100
VIDEO RAM	128MB - 256MB
HARD DISK DRIVE	internal 2.5" - 80GB minimum SATA
SERIAL PORTS	2 x RS232C; 1 x RS232C/422/485; 1 x RS232C (touch screen)
KEYBOARD PORT	PS/2
MOUSE PORT	PS/2
USB PORTS	6 (type 2.0)
ETHERNET PORTS	10/100Mbps. 1 x RJ45 connector; 10/100/1000Mbps. 1 x RJ45 connector
POWER SUPPLY	Universal AC input. 100W. 100-240 Vac @ 50 ÷ 60Hz
PC MODULE DIMENSIONS	327 x 238 x 50.5 mm (12.87" x 9.37" x 1.98")
FRONT PANEL DIMENSIONS	430 x 315 x 30 mm (16.92" x 12.40" x 1.18")
WEIGHT (WITHOUT CABINET)	7.9 kg (17,4 lbs)

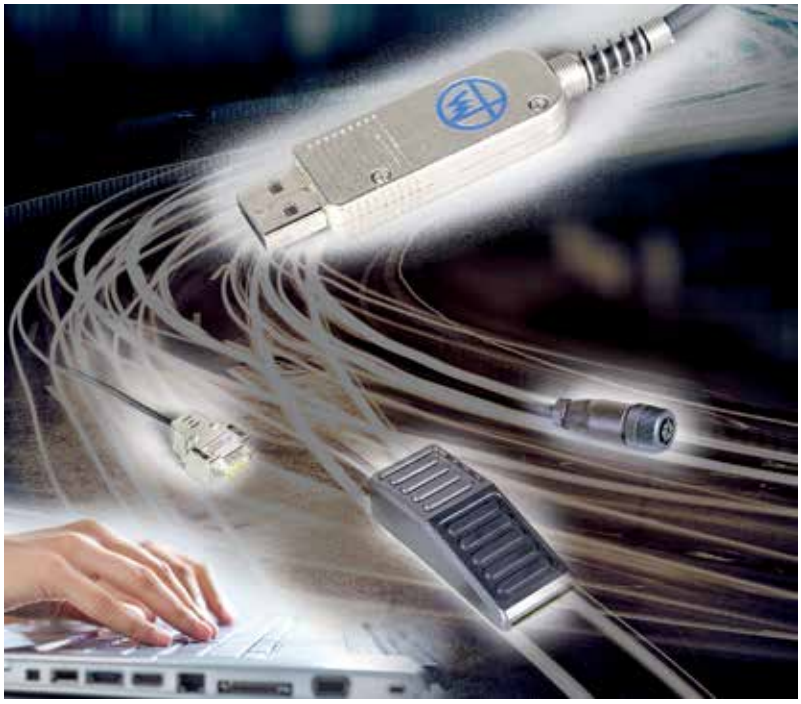
OPTIONS	
TOUCH SCREEN	5 wire analog-resistive
FIELDBUS	Built-in socket supporting COM modules for Profibus, Interbus-S and others
POWER SUPPLY	24 Vdc - 100W
DVD DRIVE (FOR H3 MODEL ONLY)	Intern slim / DVD RW

MOUNTING SOLUTIONS	
PANEL MOUNT	standard
CABINET & FREE-STANDING PEDESTAL	option
SWING-ARM	option
DIN RAIL MOUNT	option

ENVIRONMENTAL	
RELATIVE HUMIDITY	5 ÷ 80 % (non condensing)
TEMPERATURE (OPERATING)	5 ÷ 40 °C (41 ÷ 104 °F) with disk unit
	0 ÷ 40 °C (32 ÷ 104 °F) diskless
TEMPERATURE (NON OPERATING)	- 20 ÷ 60 °C (-4 ÷ 140 °F)

TESTAR
A MARPOSS DIVISION

USB interface



Plug&Play becomes reality for I/O and Encoders

The Marposs USB interface family includes three devices that simplify the integration of Input/Output signals and incremental type sensors, used in measuring applications.

EASY CONFIGURATION

PLUG & PLAY

ACCURATE

The U2-I/O, U1-E and U1-FS are fast, compact interfaces to acquire measurements and drive digital I/O easily. Designed to permit a wide range of applications, they can be directly connected to any USB host device and appear as virtual serial ports via the RS232 standard COM protocol. All the interface electronics are integrated in the standard USB connector. Just plug into to any personal computer or industrial PC, with USB interface, make a few key strokes and you'll be able to use your devices immediately.
The U2-I/O, U1-E and U1-FS are plug and play for Marposs data acquisition systems, such as Nemo, Merlin and Merlin Plus.
Once the device is connected, the user can choose from the following application range:

- UCOM Demo application from the Marposs website (free download available).
- Marposs DLL drivers library for Windows operating systems, allowing you to interface to any compatible application program.
- Marposs Quality Control software, as Quick SPC or Easy Acquisition, to perform any application, from data collection to complex statistical analysis.
- Develop their own software through ASCII protocol commands, to perform simple measurement acquisitions as well as complex gauging applications.

PRODUCT FEATURES

U1-E *Encoder Interface*

The U1-E is a versatile, multi function encoder interface, able to connect linear or rotary encoders. It can be connected directly to a digital or voltage analogue encoder. Otherwise, it needs a Marposs adapter to interface with current analogue encoder.
All parameters are easily programmed from a specific menu. It is easy to obtain static and / or dynamic measurements in your application.
Measurements can be presented as single values or continuous values with 1ms sampling time.
Electrical supply is directly provided by the USB bus.

U2-I/O *Input/Output Interface*

The U2-I/O interface is a device able to drive two industrial digital I/O with galvanic isolation according to CEI EN 61131-2 specification.
The two channels can be set up to work independently as input or output. The PWM output can be implemented too, and they can also work together in a trigger mode.
With the new U2-I/O it is possible to interface to source or sink devices.
Set up is done with dedicated commands directly on the terminal. The selection between source or sink behaviour can be saved.

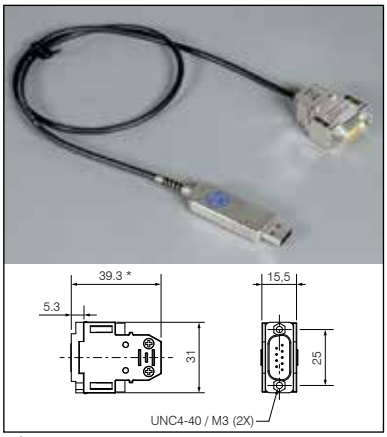
U1-FS *Footswitch Interface*

The U1-FS interface provides a manual input, from a footswitch, making it easy to acquire measurements for the user's application.

TECHNICAL SPECIFICATIONS

U1-E *Encoder Interface*

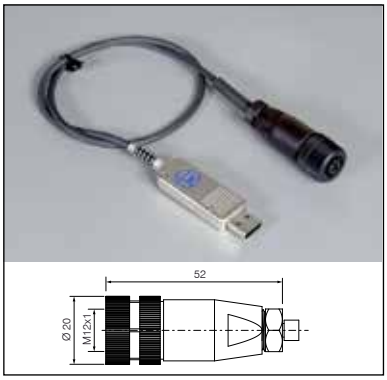
ORDER CODE	687126E000
USB CONNECTOR	TYPE 'A'
ENCODER CONNECTOR	MALE 9 POLES SUB D CONNECTOR
PROTECTION DEGREE	IP40
CURRENT ABSORPTION	< 500 mA < 2.5 mA IN SUSPEND MODE
USB INTERFACE	USB 2.0
POWER SUPPLY USB FACE	4,40 ÷ 5,25 VDC FROM USB BUS
POWER SUPPLY ENCODER	5V FROM USB BUS WITH 400mA MAX AVAILABLE FOR THE ENCODER
RESOLUTION	DEPENDING ON CONNECTED DEVICE
BAND WIDTH	300KHZ ANALOG ENCODER 4MHZ DIGITAL ENCODER
INPUT	DIFFERENTIAL (A+, A-, B+, B-, Z+, Z-)
INPUT TYPE	RS422 (TTL) / INCREMENTAL SIGNAL 1VPP ANALOG SIGNAL / 11μA WITH MARPOSS ADAPTER 6303540800
CABLE LENGTH	50cm / 20 inches*
STORAGE TEMPERATURE	-20°C / +70°C
OPERATIVE TEMPERATURE	0°C / +60°C



U1-E_ Encoder interface
* consider extra 40mm for cable exit and bending

U2-I/O *Input/Output Interface*

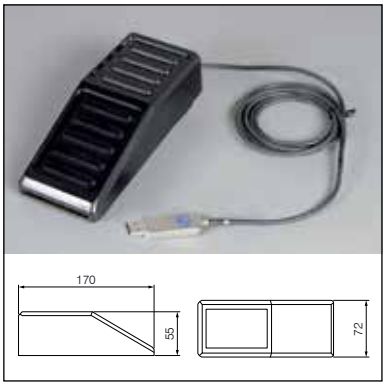
ORDER CODE	687126I000
USB CONNECTOR	TYPE 'A'
I/O CONNECTOR	M12 TYPE, FEMALE STRAIGHT CONNECTOR
PROTECTION DEGREE	IP40
CURRENT ABSORPTION	< 100 mA (MAX) < 500 μA (MAX, IN SUSPEND MODE)
USB INTERFACE	USB 2.0
POWER SUPPLY USB FACE	4,40 ÷ 5,25 VDC FROM USB BUS
POWER SUPPLY I/O FACE (ISOLATED)	24 V NOMINAL VOLTAGE
CABLE LENGTH	50cm / 20 inches*
STORAGE TEMPERATURE	-20°C / +70°C
OPERATIVE TEMPERATURE	-10°C / +40°C



U2-I/O _ I/O interface
* consider extra 40mm for cable exit and bending

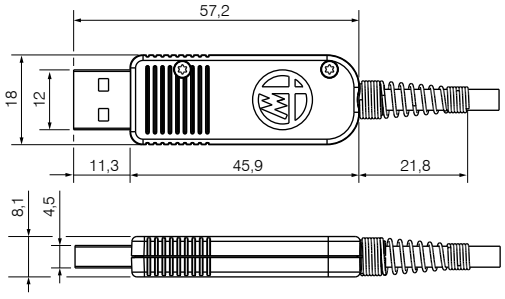
U1-FS *Footswitch Interface*

ORDER CODE	687126F000
USB CONNECTOR	TYPE 'A'
PROTECTION DEGREE	IP40
CURRENT ABSORPTION	< 100 mA (MAX) < 500 μA (MAX, IN SUSPEND MODE)
USB INTERFACE	USB 2.0
POWER SUPPLY USB FACE	4,40 ÷ 5,25 VDC FROM USB BUS
CABLE LENGTH	3 m / 9 feet
STORAGE TEMPERATURE	-20°C / +70°C
OPERATIVE TEMPERATURE	-10°C / +40°C



U1-FS_ Footswitch interface

USB connector



USB INTERFACE BOX

Easy Box™ is a line of interface boxes for easy and economical management via USB port of inductive and incremental transducers, air gauges, Digimatic and serial gauges, I/O signals, thermocouples. It can be used with the MARPOSS compact gauge computers Nemo and Merlin, with the Industrial PC E9066, or with any commercial Personal Computer.

AVAILABLE MODELS

- U4F to connect up to 4 MARPOSS standard full-bridge (LVDT) transducers.
- U4F-HR to connect up to 4 MARPOSS standard full-bridge (LVDT) transducers, for applications requiring a very high measurement resolution
- U4H to connect up to 4 MARPOSS standard half-bridge transducers (HBT).
- U4T to connect up to 4 half-bridge transducers (HBT) compatible with amplifiers of TESA.
- U4E to connect up to three incremental transducers such as linear probes, linear and rotary encoders, etc
- U1AIR, U3AIR, U4AIR with adjustable sensitivity and zeroing nozzles to connect one, three, four air transducers respectively.
- U4D to connect up to 4 Digimatic gauges (such as Mitutoyo calipers, digital dial gauges, etc..).
- U4S to connect up to 4 gauges with RS232 output (cable shall feature Cannon 9-pin female connector).
- U4TP-E, U4TP-J, U4TP-K to connect up to four thermocouples type E, J, K respectively
- U8I/O managing 8 Input/Output powered 24Vdc.

USB OUTPUT

Both Easy Box™ power supply and transmission to a PC of the measuring values of the connected transducers are realized through the USB port. A single cable is therefore required for both functions. The U4E, U4D and U8I/O models may require an external additional power feed according to the type of application.

APPLICATION FIELDS

The Easy Box™ is suitable for static measurement acquisition or for continuous acquisition where the workpiece is rotated manually or automatically.

DATA TRIGGERING

The Easy Box™ continuously provides to the PC (via USB port) the values of the sensors connected to the box.
Whenever a data trigger is necessary, it can be made in the following way:

- With the external signal of a footswitch connected to the Easy Box™
- With a data request from the host PC
- With the data button available on the Digimatic device (gauge data send button)

SOFTWARE PACKAGES

- MARPOSS DLL drivers library for Windows® operating systems, allowing to interface Easy Boxes with any Windows 98® (or higher release) compatible application program with minimum software programming skills.
- Easy Acquisition™ software package for data acquisition and SPC on Excel® worksheets: a complete and easy to operate software package to import data, program measurements, perform data collection and SPC analysis and reporting.
- Quick SPC™ process and quality control software for Windows®, a suite of software products designed to comply with any requirement ranging from simple measurement acquisition to complex gauging applications.

TECHNICAL SPECIFICATIONS

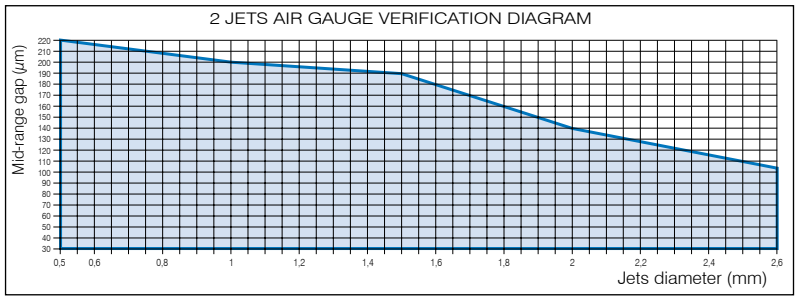
	U4F	U4F-HR	U4H	U4T	U4E	U4D
						
NUMBER OF INPUT CHANNELS	4	4	4	4	3	4
TYPE OF INPUT CHANNELS	MARPOSS standard Full-Bridge (LVDT)	MARPOSS standard Full-Bridge (LVDT)	MARPOSS standard Half-Bridge (HBT)	Half Bridge (HBT) compatible with Tesa amplifiers	Digital and analog incremental transducers (*)	Mitutoyo Digimatic compatible
PROGRAMMABLE MEASURING RANGES NORMAL RANGE LONG RANGE EXTRA LONG RANGE	 up to ±1000 µm (0.04") up to ±5000 µm (0.20") ------	 up to ±1000 µm (0.04") up to ±5000 µm (0.20") ------	 ± 250 µm (0.01")/± 1000 µm (0.04") ± 500 µm (0.02")/± 2000 µm (0.08") ± 625 µm (0.025")/± 2500 µm (0.1")	 up to ±2000 µm (0.08") up to ±5000 µm (0.2") ------	depending on the transducer used	depending on the Digimatic gauge used
OUTPUT TYPE	1 x USB (connector type B)					
OUTPUT TRANSMISSION SPEED	12 MBit / sec.					
SAMPLING RATE	max. 40 samples /s (up to 1000 samples /s if used with Quick SPC)	max. 40 samples /s (up to 1000 samples /s if used with Quick SPC)	max. 40 samples /s	max. 40 samples /s (up to 1000 samples /s if used with Quick SPC)	max. 40 samples /s (up to 1000 samples /s if used with Quick SPC)	max. 40 samples /s (depending on the Digimatic gauge used)
ACCURACY AT 20° C	± 0,5% of the measuring value ± resolution				depending on the transducer used	depending on the Digimatic gauge used
POWER SUPPLY SOURCE	from USB port				from USB port or external power supply	from USB port or external power supply (**)
CURRENT REQUIREMENT	<350 mA (§§)	<350 mA (§§)	<100 mA (§)	<350 mA (§§)	<300 mA (§§)	<100 mA (§)
NUMBER OF EASY BOX CONNECTABLE TO ONE USB PORT	Max. 16					
DATA TRIGGERING MODES	external footswitch / host command				external footswitch / host command / RS422/485 signal / 24V optoInsulated input	external footswitch / host command / Data send button on gauge
FOOTSWITCH OPTION	1 input for each box (female connector ø 3,5 mm stereophonic plug on box rear side)				(***)	
PROTECTION DEGREE	IP40 (on front panel) IP30 (on rear panel)					IP30 (on both front and rear panel)
STORAGE TEMPERATURE	-40 / +70° C					
OPERATING TEMPERATURE	0 / +50° C					
DIMENSIONS W x D x H	157 x 90 x 45 mm (6,2" x 3,5" x 1,8")					
WEIGHT	ca. 0.5 kg					

(*) Any digital encoder or linear scale featuring differential Line Driver output, 6,4 MHz max. frequency, requiring 5 V power supply. Any voltage analog encoder or linear scale featuring 1 Vpp sinusoidal output, 250 kHz max. frequency, requiring 5 V power supply. Any current analog encoder or linear scale featuring 11 µA output, 250 kHz. max. frequency, requiring 5V power supply, by means of a specific adapter (not included in the supply).
(**) For any gauge other than Mitutoyo requiring an external power supply.
(***) Common with data control (9-pin D-Sub connector on the rear side).
(#) Air supply: air must be dry and unoiled, filtered to 5 µm and at a pressure of 3 bar (the working range of the converter is 1,5 to 4 bar).
(§) Max. 4 boxes of this type can be connected to a HUB powered by a USB port. For connection of more than 4 boxes a self-powered HUB is required.
(§§) To connect more than one box to a HUB a self-powered HUB is required

U1AIR / U3AIR / U4AIR APPLICATION RANGE

The MARPOSS and/or non-MARPOSS air gauges, with specifications inside the blue area of the diagram, can be easily and immediately connected to these models.. The parameters to be considered are the following:

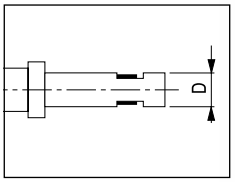
- air supply pressure
- number of air gauge jets
- diameter of air gauge jets
- "mid-range gap", as to the difference between the mid-tolerance diameter of the part to be measured and the distance between the air gauge jets.



	U4S	U1AIR(#)	U3AIR	U4AIR	U4TP-E	U4TP-J	U4TP-K
							
	4	1	3	4	4	4	4
	RS232	Air	Air	Air	Thermocouples Type E	Thermocouples Type J	Thermocouples Type K
	depending on the serial gauge used	±500 µm (0.02") ------ ------	±500 µm (0.02") ------ ------	±500 µm (0.02") ------ ------	0 - 100 °C	0 - 100 °C	0 - 100 °C
	1 x USB (connector type B)						
	12 MBit / sec.						
	max. 40 samples /s (depending on the serial gauge used)	max. 40 samples /s (up to 1000 samples/s if used with Quick SPC)	max. 40 samples /s (up to 1000 samples/s if used with Quick SPC)	max. 40 samples /s (up to 1000 samples/s if used with Quick SPC)	max. 40 samples /s	max. 40 samples /s	max. 40 samples /s
	depending on the serial gauge used	±0,5% of the measuring value ±resolution	±0,5% of the measuring value ±resolution	±0,5% of the measuring value ±resolution	±[0,6° + 0,2% (Tmeas.-T amb.)]	±[0,6° + 0,2% (Tmeas.-T amb.)]	±[0,6° + 0,2% (Tmeas.-T amb.)]
	from USB port						
	<150 mA (§§)	<350 mA (§§)	<350 mA (§§)	<350 mA (§§)	<200 mA (§§)	<200 mA (§§)	<200 mA (§§)
	Max. 16						
	external footswitch / host command						
	1 input for each box (female connector ø 3,5 mm stereophonic plug on box rear side)						
	IP40 (on front panel) IP30 (on rear panel)						
	-40 / +70° C						
	0 / +50° C						
	157 x 90 x 65 mm (6,2" x 3,5" x 2,6")	157 x 103 x 65 mm (6,2" x 4,05" x 2,6")	224 x 159 x 150 mm (8,82" x 6,26" x 5,90")	224 x 159 x 150 mm (8,82" x 6,26" x 5,90")	157 x 90 x 45 mm (6,2" x 3,5" x 1,8")		
	ca. 0.6 kg	ca. 1 kg	ca. 2,8 kg	ca. 3,8 kg	ca. 0.5 kg		

EXAMPLE OF MEASUREMENT WITH AIR-PLUG

- air supply pressure: 3 bar ± 0.1
- number of jets : 2
- diameter of jets: 2mm (.0787")
- diameter of the part to be measured = 10 mm ± 0.030 (.3937" ± .0012")
- mid tolerance diameter = 10 mm (.3937")
- distance between the jets D = 9.90 mm (.3898")



We obtain:

- "mid tolerance gap": (10 - 9.90) = 0.10 mm = 100 µm
  As shown in the diagram the intersection between the value of the "mid-range gap", 100 µm (.0039"), and the diameter of the jet, 2 mm (.0787"), stays inside the blue area: the application can be therefore realized.

I/O MODEL

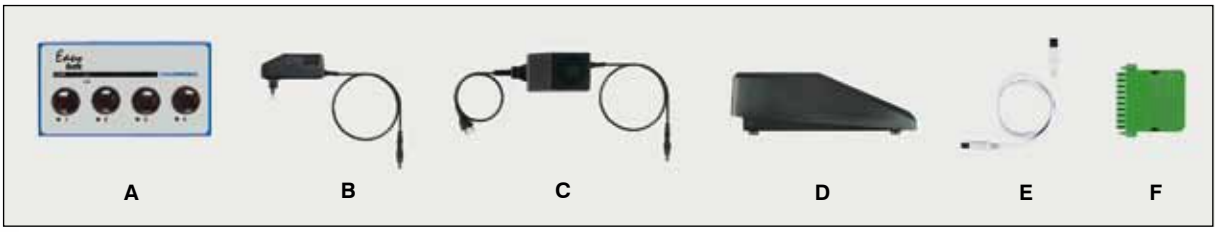
- 8 optoinsulated 24Vdc Input/Output, each free configurable as Input, Output or Input/Output.
- sink or source type I/O's (not in mix); the selection is made by means of a switch located on the rear side of the box
- output current for each Output can be (according to EN61131-2 Standard for Outputs in direct current at 24Vdc):
  max. 100 mA by use of 8 Outputs
  max. 250 mA by use of 4 Outputs
  max. 500 mA by use of 2 Outputs (available only for source type Output)
- The power supply for the Outputs (24Vdc for source outputs, 0V for sink outputs) can be interrupted for safety reasons without compromising the working of the Inputs.

U8 I/O

How to Order

Description	Order Code
Easy Box U4F with 4 MARPOSS standard LVDT inductive inputs	6871250021
Easy Box U4F-HR (HIGH RESOLUTION) with 4 MARPOSS standard LVDT inductive inputs	6871250022
Easy Box U4H with 4 MARPOSS standard HBT inductive inputs	6871250000
Easy Box U4T with 4 HBT inductive inputs compatible with amplifiers of TESA	6871250030
Easy Box U4E with 3 incremental transducer inputs	6871250090
Easy Box U1AIR with 1 air transducer input	6871250101
Easy Box U3AIR with 3 air transducer inputs	6871250111
Easy Box U4AIR with 4 air transducer inputs	6871250122
Easy Box U4D with 4 DIGIMATIC inputs	6871250012
Easy Box U4S with 4 RS232 inputs	6871250060
Easy Box U4TP-E with 4 thermocouple inputs type E	6871250080
Easy Box U4TP-J with 4 thermocouple inputs type J	6871250083
Easy Box U4TP-K with 4 thermocouple inputs type K	6871250086
Easy Box U8I/O with 8 INPUT/OUTPUT	6871250050

Accessories



Ref.	Description	Order Code
A	Easy Box U4P pushbutton box for remote control of data acquisition, zeroing, etc. with Easy Acquisition and Quick SPC Software	6871250070
B	Power supply unit for Easy Box U4E, with EU plug	6871140167
	Power supply unit for Easy Box U4E, with U.S.A. plug	6871140168
	Power supply unit for Easy Box U4E, with U.K. plug	6871140169
C	Power supply unit for Easy Box U4E, with EU mains cable	6871140170
	Power supply unit for Easy Box U4E, with U.S.A. mains cable	6871140171
B	Power supply unit for Easy Box U4D, with EU plug (*)	6871140155
	Power supply unit for Easy Box U4D, with U.S.A. plug (*)	6871140156
	Power supply unit for Easy Box U4D, with U.K. plug (*)	6871140157
C	Power supply unit for Easy Box U4D, with EU mains cable (*)	6871140158
	Power supply unit for Easy Box U4D, with U.S.A. mains cable (*)	6871140159
B	Power supply unit for Easy Box U8I/O, with EU plug (**)	6871140133
	Power supply unit for Easy Box U8I/O, with U.S.A. plug (**)	6871140134
	Power supply unit for Easy Box U8I/O, with U.K. plug (**)	6871140135
C	Power supply unit for Easy Box U8I/O, with EU mains cable (**)	6871140136
	Power supply unit for Easy Box U8I/O, with U.S.A. mains cable (**)	6871140137
D	Footswitch with 2 m cable for data triggering function (not for Easy Box U8I/O)	6131000110
E	USB cable L= 1 m (type A-B) from Easy Box to the PC USB port	4701300229
	USB cable L= 3 m (type A-B) from Easy Box to the PC USB port	4701300230
F	Cable terminal for 10 pin connector of Easy Box U8I/O (one piece is always supplied in the packaging with the Easy Box)	6872010015

(*) For any gauge other than Mitutoyo requiring an external power supply.
(**) This power supply is not required if the Easy Box U8I/O is exclusively configured with inputs or when the box is connected to an alternative 24V power supply.

MODULAR DATA ACQUISITION SYSTEM

The Gage Box™ remote Data Acquisition System is a shop floor proof, expandable gauging system.

The system is composed of dedicated, stackable modules to manage analog sensors and digital Input/Output signals.

All modules are daisy-chained together and exchange measurement data, programming data and I/O signals with the E9066T™ Industrial PC through a USB or a simple RS232 serial link. Any commercial PC can also be used.

The system allows direct interfacing and data collection from TESTAR probes or measuring cells, and from a wide variety of third party sensors. All data acquisition functions (sampling, signal conditioning, A/D conversion) are performed locally (free-ing the computer from any over-head or operating system latency), and then conveniently transferred to the system's companion Industrial PC, the E9066T™, or to any PC-compatible data collector, via a standard RS232 port.

MAIN HARDWARE FEATURES

- Processor module for data synchronization and communication with the PC
- Data Acquisition modules (DAQ):
  - 16 analog sensors per module
  - Up to 8 DAQ modules: 8 x 16 =128 sensors
  - Sensors type full-bridge (LVDT), half-bridge (HBT), Strain Gauge and DC
  - Different sensor type modules can be mixed together (i.e. LVDT+HBT)
- Digital I/O modules
  - 32 I/O per module
  - Up to 8 I/O modules: 8 x 32 =256 I/O
- All modules are daisy chained to the Processor Module
- IP52 rated environmental protection
- Dimensions: 280 x 70 x 225mm (71" x 17.8" x 57.1")
- Power supply: universal AC input (external) or $24V_{dc}$

MAIN SOFTWARE FEATURES

- All modules are configured with a simple download command from Quick SPC™ software
- Static and dynamic measurements (smooth and interrupted surfaces, manual and automatic part rotation)
- Compatible with Quick SPC™ software (versions for MS-DOS® and Windows® operating systems)
- Interfaceable to third party data collection software

VEAM connectors composition

Gage Box™ with E9066s™ Panel PC and Quick SPC™ software

Gage Box™ with notebook computer and Quick SPC™ software

SYSTEM COMPOSITION

- Main Processor Module, including basic Digital I/O for simple application needs (e.g. footswitch, cycle commands, resume lamp column)
- Data Acquisition Modules for full-bridge (LVDT), half-bridge (HBT), Strain Gauge sensors or DC signals
- Digital I/O Modules for cycle commands, BCD output for machine tool compensation or dedicated I/O commands
- Maximum distance between Processor and PC: 10 meters (RS232); 25 meters (USB)

How to Order

Description	Transducer Type	Connector	Order Code
16 Channels	LVDT	LUMBERG	866KAACAX0
		VEAM	866KABCAX0
	HBT	LUMBERG	866KACCAX0
		VEAM	866KADCAX0
16 Channels and 7 IN/5 OUT on Processor Module	LVDT	LUMBERG	866KCACAX0
		VEAM	866KCBCAX0
	HBT	LUMBERG	866KCCCAX0
		VEAM	866KCDCAX0
16 Channels 32 I/O	LVDT	LUMBERG	866KAACBX0
		VEAM	866KABCBX0
	HBT	LUMBERG	866KACCBX0
		VEAM	866KADCBX0
32 Channels 32 I/O	LVDT	LUMBERG	866KAAEBX0
		VEAM	866KABEBX0
	HBT	LUMBERG	866KACEBX0
		VEAM	866KADEBX0

Length of the cable supplied along with the Gage Box:
X = B 3 m for RS232; **X** = F 10 m for RS232; **X** = E 5 m for RS422/USB; **X** = H 15 m for RS422/USB;
X = I 25 m for RS422/USB

Accessories

Description	Order Code
PROCESSOR MODULE	
STANDARD PROCESSOR	7513101400
STANDARD PROCESSOR WITH 7 IN/5 OUT	7513101401
DAQ MODULES	
16 LUMBERG LVDT/HBT	7513101420
16 LUMBERG MRT/DC	7513101430
4 VEAM LVDT/HBT	7513101421
4 VEAM MRT/DC	7513101431
I/O MODULE	
32 I/O OPTOINSULATED	7513101410
POWER SUPPLY MODULE	
POWER SUPPLY 2.3A WITH SUPPORT	6871140028
SERIAL CABLES	
SERIAL CABLE RS232 3m	6737957002
SERIAL CABLE RS232 10 m	679100001L
SERIAL CABLE RS422 5 m	679050001K
SERIAL CABLE RS422 15 m	679150001K
SERIAL CABLE RS422 25 m	679250001K
MANUALS	
HARDWARE MANUAL	D2660005XG

X = I (Italian); U (English); D (German); E (Spanish); F (French)

TRANSDUCER CONDITIONING INTERFACE

TCI is a line of transducer conditioning interfaces composed of three models featuring one, four, eight channels respectively.
It has been developed with technical and functional features particularly suitable to convert a position or dimensional measurement carried out by LVDT or HBT transducers into a signal compatible with most of the analog cards for data acquisition. The output of this unit provides a direct electric signal (voltage or current), proportional to the measurement value of the sensor at the input stage. The output signal can be fetched by PLC analog cards, in order to control and manage process automations and to be further elaborated by systems such as SCADA supervisors.

TCI interfaces are PLUG&PLAY units. They are delivered specifically calibrated for the sensor to be connected to. In this way the machine downtime is dramatically reduced, thanks to quicker installation and maintenance operations.

SENSORS COMPATIBILITY

Both LVDT (full bridge) and HBT(half bridge) sensors can be connected to the TCI. The compatibility is also extended to other brands such as Solartron, Tesa, etc. The specifications of the transducer model/brand to be connected to the TCI are required on the purchase order, in order to perform an ad-hoc calibration.

OUTPUT SIGNAL

Two different output signals are available:
- Voltage (±5Vdc, ±10Vdc, 0-10Vdc)
- Current (4-20mA).

POWER SUPPLY

The electrical supply is provided by the same connector used for the output signal. The TCI can be ordered both in dual voltage mode (±15Vdc/±12Vdc) and single voltage mode (24Vdc)

How to Order

The code to order a TCI 1 is defined by means of the following specifications.
1. Transducer type (LVDT or HBT)
2. Number of channels
3. Measuring range of the sensor
4. Power supply type
5. Compatibility (*)
6. Output type

Example

6 7 4 6	T	N	X	A	C	U
6 7 4 6	0	0	1	1	0	2
LVDT						
1 CHANNEL						
±1 mm						
24 V						
MARPOSS						
CURRENT 4-20 mA						

	6 7 4 6	T	N	X	A	C	U
Transducer type	LVDT	0					
	HBT	1					
Number of channels	1 CH		0				
	4 CH		2				
	8 CH		3				
Measuring range	±0,5			0			
	±1			1			
	±1,5			2			
	±2,5			3			
	±5			4			
Power supply	±15 V / ±12 V				0		
	24 V				1		
Compatibility (*)	Marposs					0	
	Microcontrol					1	
	Solartron					2	
	Mercer					3	
	Tesa					4	
Output signal	±5 V						0
	±10 V						1
	4-20 mA						2
	0 - 10 V						3

Note. (*) If the transducer type is not included in the list, please contact your nearest MARPOSS office to define the specific order code.

TECHNICAL SPECIFICATIONS

MECHANICAL SPECIFICATIONS

	TCI-1	TCI-4/TCI-8
PROTECTION DEGREE (WITH CONNECTORS PLUGGED IN):	IP52	IP54
WEIGHT:	0,14 kg	0,8 kg
DIMENSIONS	see figure below	
OPERATING TEMPERATURE:	0°/+ 50 °C	
STORING TEMPERATURE:	-25°/+ 75 °C	
OPERATING RELATIVE HUMIDITY (NOT CONDENSING):	20% - 80%	
STORING RELATIVE HUMIDITY (NOT CONDENSING):	10% - 95%	

ELECTRICAL SPECIFICATIONS

	TCI-1	TCI-4/TCI-8
LINEARITY ERROR:	max 0.05% of the end scale	max 0.1% of the end scale
GAIN DRIFT:	max 0.02% °C of the end scale	max 0.04% °C of the end scale
OFFSET DRIFT:	max 0.02% °C of the end scale	max 0.01% °C of the end scale
POWER SUPPLY REJECTION RATIO (GAIN+OFFSET):	max 0.04% / V of the end scale (voltage: ±15V)	
OUTPUT RIPPLE (AF SPIKE EXCLUDED):	max 10 mV rms voltge output	
	20 μA rms current output	15 μA rms current output
TRANSDUCER FREQUENCY:	Typical 5.1 KHz	Typical 5.0 KHz
TRANSDUCER VOLTAGE SUPPLY:	Typical 3.3 Vrms	Typical 3.4 Vrms
TRANSDUCER CURRENT SUPPLY:	Max 30 mA	
BANDWIDTH:	Typical 500 Hz	

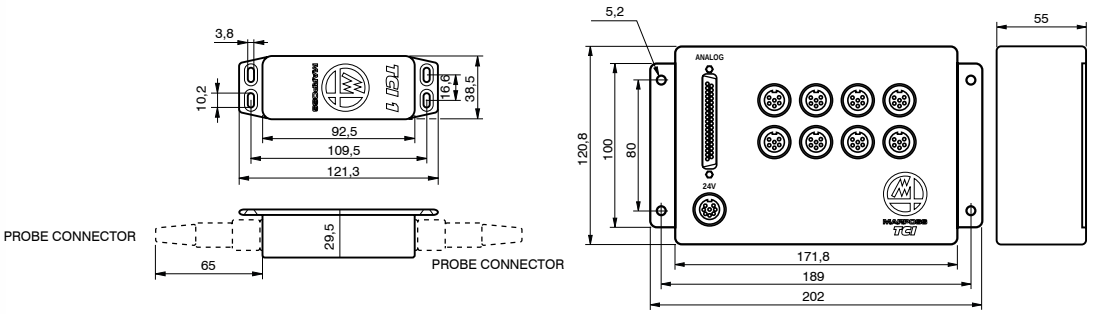
VOLTAGE SUPPLY

	TCI-1	TCI-4/TCI-8
±15 V	Dual filtered and stabilised ±15 Vdc ±5% Max. ripple allowed at 100/120 Hz: 50 mVpp	
Typical consume with transducer connected:	Voltage output: ± 20 mA Current output: ±40 mA	Voltage output: ± 270 mA max. Current output: ±450 mA max.
±12 V (IF CONFIGURED WITH A TENSION OUTPUT SIGNAL)	±12 Vdc ±5% Max. ripple allowed at 100/120 Hz: 50 mVpp	
Typical consume with transducer connected:	Voltage output: ± 20 mA Not available with current output	Voltage output: ± 270 mA max. Current output: ±450 mA max.
+24 V	Single 24 Vdc ±10% Max. ripple allowed at 100/120 Hz: 200 mVpp	
Typical consume with transducer connected:	Voltage output: 45 mA Current output: 65 mA	Voltage output: 300 mA max. Current output: 500 mA max.

OUTPUT SIGNAL

		TCI-1	TCI-4/TCI-8
TENSION MODE	±5V	Maximum output current ±1 mA	
	±10V	Maximum output current ±1 mA	
	0-10V	Maximum output current ±1 mA	
CURRENT MODE	4/20 mA	Load impedance max. 250 ohm, min. 100 ohm	

DIMENSIONS



PROCESS AND QUALITY CONTROL SOFTWARE

Quick SPC™ for Windows® is a suite of software products designed to comply with any requirement ranging from simple measurement acquisition to complex gauging applications. Framed in a simple, wizard driven, common user interface it is possible to complement the base product by means of software Add-ons purposely conceived for specialized industry fields.

READY TO RUN

Templates and wizard driven programming interfaces allow an easy, safe and ready to use software.

Self explanatory with its spreadsheet programming interface, Explorer-like navigation and on-line manuals

Mouse-free Interface

Safe and reliable with checks on programmed data consistency, data back-up and restore utility; multi-level user security access.

REDEFINING THE CONCEPT OF FLEXIBILITY

Fully customizable software environment matching current and future metrological and statistical needs: page layouts, short cuts, hot tabs, application templates, reports, customers' based statistical evaluations and more.

Powerful and versatile capable of connecting to a variety of analog and digital measuring devices and machine tool CNC's.

Native 32-bit Windows® software for shop floor applications: operator prompts with multimedia files (pictorials, drawings, photos, mov-ies).

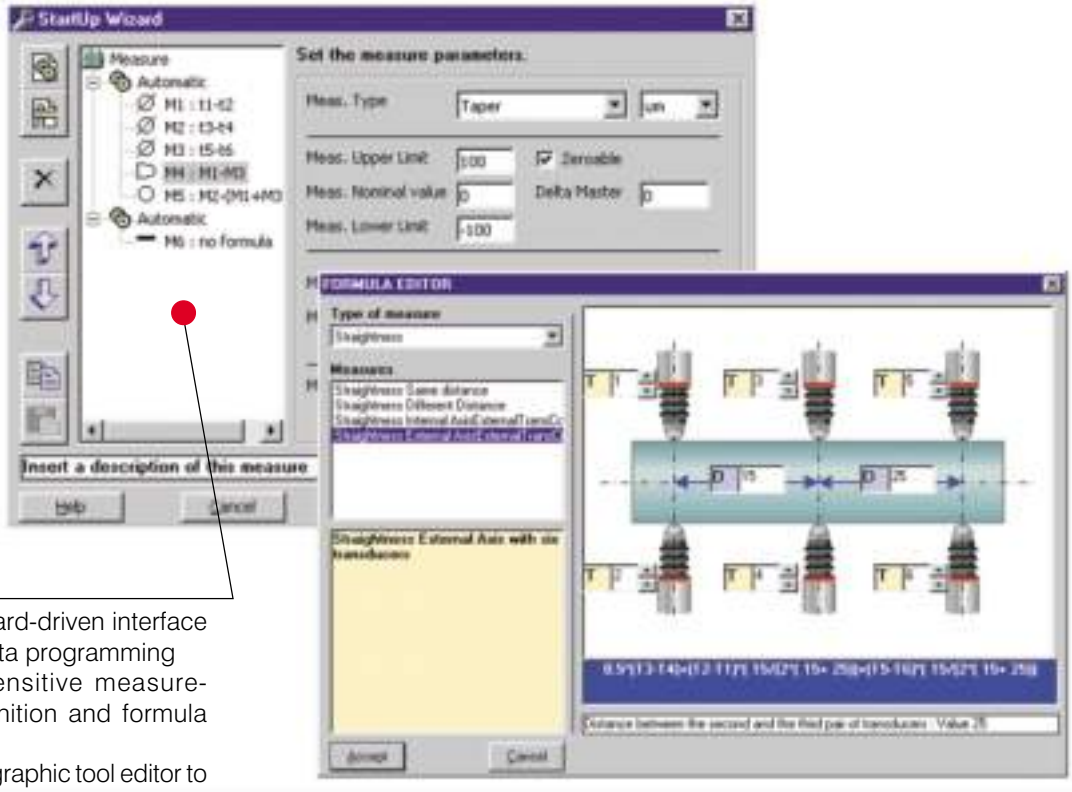
Comprehensive fully integrated software modules for data acquisition, measurement elaboration, statistical analysis, machine tool compensation, network integration and data storage.

Minimum Hardware Requirements

Quick SPC™ requires a Marposs Industrial Computer (E9066s™ family) or any Windows® compatible PC with:

- Pentium® III class processor (or equivalent) with at least 256 MB RAM (512 MB recommended)
- 800x600 SVGA / 65.536 colours (or greater) display resolution
- At least 600 MB free hard disk space

Supported Operating Systems: Windows® NT 4.0 SP6, Windows® 2000 SP4, Windows® XP SP2



WIZARDS

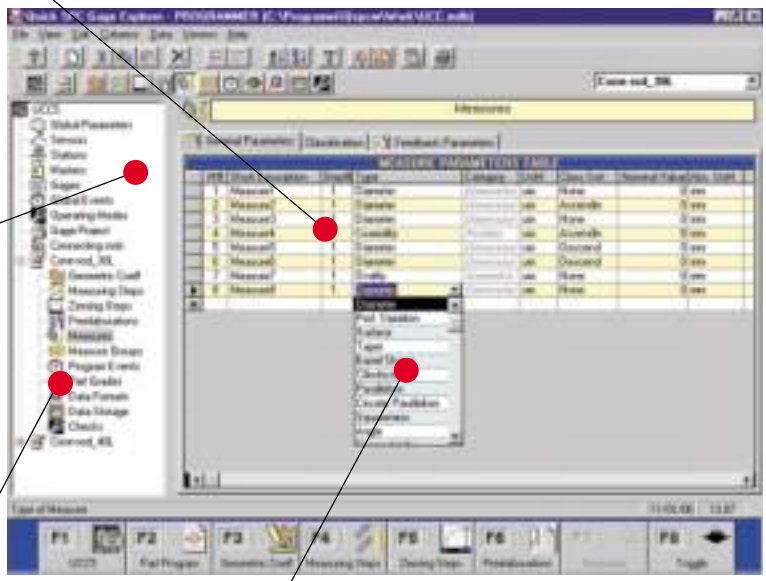
- Simple wizard-driven interface for easy data programming
- Context sensitive measurements definition and formula creation
- Integrated graphic tool editor to create operator prompts and instructions

WORKING GRID

- Spreadsheet programming interface
- Completely customizable visualization
- Quick and safe template-based programming
- MS-ACCESS® database environment

PROGRAMMABLE TOPICS

- MS-Windows® Explorer-style structure
- Intuitive organization of all arguments
- Direct access to all topics



STATISTICAL ANALYSIS

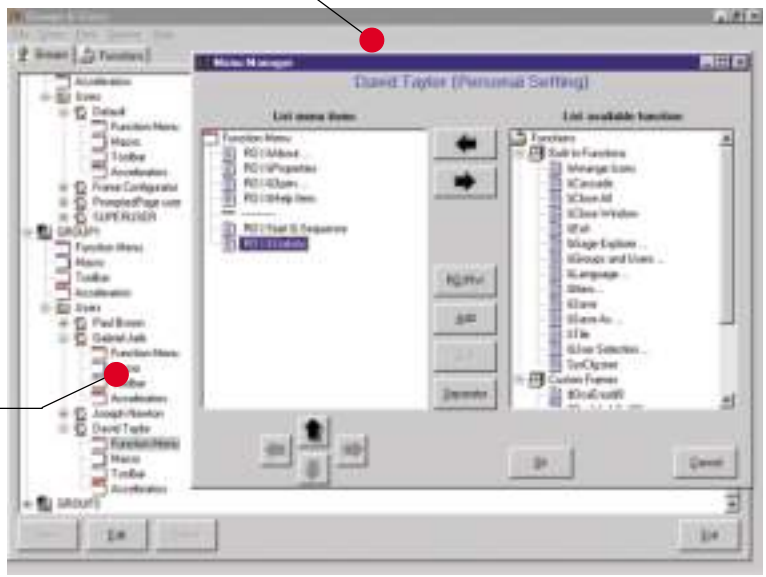
- Embedded Q-DAS® statistical software for on-line control charts, machine and process capability analysis
- Q-DAS® qs-STAT® compliant data storage

GUIDED PROGRAMMING

Guided programming using Online help, tooltips, pick-up lists, Wizards, etc.

GROUPS & USERS

Assignable groups/users rights, functions, hot tabs, function keys and accelerators.

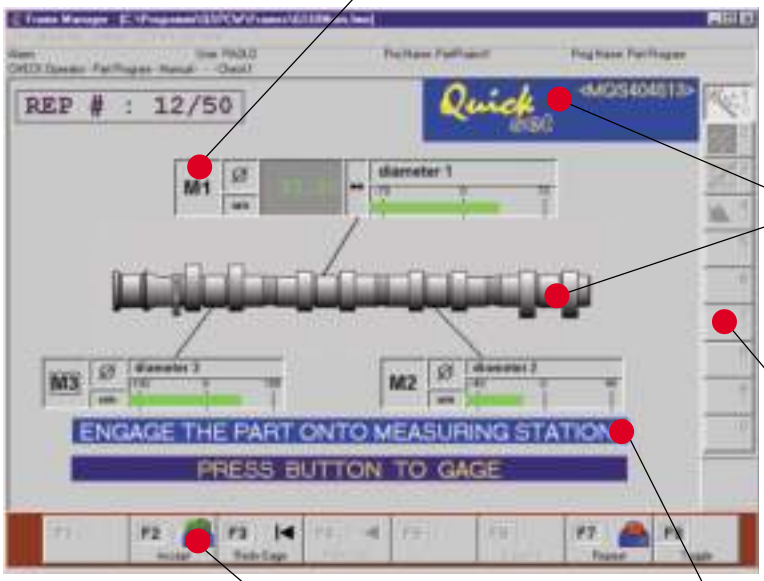


SECURITY

Separate groups/users profile management guaranteed by password validation.

ON LINE

- Customizable display
- Clear and readable information
- Measurement bargraph, numeric and color code displays



MULTIMEDIA

Static and dynamic files (picture, drawings, videos, etc.)

HOT TABS

- Freely programmable
- Direct selection view
- Mouse free

FUNCTION KEYS

- Customizable
- Pictorial helps
- Application dependent
- Mouse free

OPERATOR PROMPTS

- Instructions
- Data acquisition
- Capability studies (gage, machine, process)

TECHNICAL CHARACTERISTICS

QUICK SPC™ FOR MICROSOFT WINDOWS® - STANDARD SOFTWARE CHARACTERISTICS

CONFIGURATION AND PROGRAMMING

Configurable display lay-out for content, color, position, size, text, fonts, menus.
Mouse-free interface for operators unfamiliar with Windows, plus fully compliant Microsoft Windows® display functionalities.

Spreadsheet programming interface, Explorer-style user interface, integrated MS-ACCESS® database. Consistency control routine for all configuration and programming phases.

MEASUREMENTS AND ZERO SETTING

Static and digital dynamic measuring cycles. Unlimited number of measuring steps and part programs. Manages analog sensors (LVDT, Half-Bridge), strain gage, linear and rotary encoders, digital probes, serial input devices and manual data input.
Live measurement display and fully guided operator prompted acquisition sequences using multimedia files (bmp, pcx, jpg, avi, mpg, etc.). Fully automatic machine tool control (Feedback) and multiple stations control for assembly applications.
Zero setting and Min-Max mastering with consecutive, cumulative drift controls and non-zero-band controls.

STATISTICAL PROCESS CONTROL

Configurable and programmable data evaluation complying with International (ISO), National (DIN, AIAG, CNOMO) and customers guidelines.
Embedded Q-DAS® statistical package for on-line, variable data analysis (control chart, machine and process capability). Certified qs-STAT® compliant data storage.

MEASURING SYSTEM ANALYSIS

Accuracy, Repeatability, Reproducibility, Linearity, Stability studies complying with International (ISO), National (DIN, AIAG, CNOMO) and customers guidelines.
Fully programmable prompted acquisition sequences in both blind and full details measure mode.
Measuring System Analysis traceability by storing each study separately together with all necessary references. Data evaluation is run through Marposs Measuring System Analysis (MSA) software module. Analysis can be seamlessly run through Q-DAS® MSA software package (option) as well.

NETWORK

An ODBC-compliant data structure allows seamless integration to virtually any network client and data base architecture, including Industrial Networks (Profibus, Interbus-S, etc.).

UTILITIES

Step Sequencer Designer to create multi-level operator prompts, instruction and data acquisition pages.
Serial Driver Programmer connects to virtually any serial device using ASCII-based protocols. Analog Probes Tuner (APT) to set-up sensors assembly when more than one sensor is used to create a measurement.
Groups and Users to define multi-level password access, operator based software modules, displays, short cuts, hot tabs, icons, soft-keys. Customizable reporting and printing.

LANGUAGE VERSIONS

Change Language module allows to select among the following languages: Chinese, English, French, German, Italian, Japanese, Portuguese and Spanish. Other language versions available upon request.

SUPPLY TERMS AND CONDITIONS

Quick SPC™ is supplied on CDROM either bundled with the E9066s™ Industrial Computer product family or as a stand-alone software package. On-line manuals in Adobe® Acrobat® format are supplied in every available language.

HOW TO ORDER

DESCRIPTION	ORDER CODE
QUICK SPC™ FOR WINDOWS® OPERATING SYSTEMS	CM2A30MA00

For a full list of address locations, please consult the Marposs official website

D6W00204G0 - *Edition,10/2014 - Specifications are subject to modifications*

Marposs has an integrated system to manage the Company quality, the environment and safety, attested by ISO 9001, ISO 14001 and OHSAS 18001 certifications. Marposs has further been qualified EAQF 94 and has obtained the Q1-Award.

TESTAR

Marposs in the world:
www.marposs.com/addresses

Visit the www.marposs.com website
or scan the QR Code® tag
to download the updated version
of this brochure