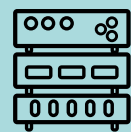# EASYBOX

USB
INTERFACE
BOXES

Interface Boxes for Data Acquisition

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™, Merlin™, Merlin Plus™) and Industrial PC (E9066 Line), or with any commercial Personal Computer.

**Displacement
Sensors**

**Bore Gauges
Line**

**Forks and
Ring Gauges**

**Bench
Gauges**

**Indicators and
Electronic
Display Units**

**Interface
Boxes for Data
Acquisition**

Software

Product **features**

EASYBOX

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.

EASYBOX

U4E to connect up to three incremental transducers such as linear probes, linear and rotary encoders, etc.

EASYBOX

UA4D to connect up to 4 Digimatic gauges (such as Mitutoyo calipers, digital indicators, etc..).

EASYBOX

U4S to connect up to 4 gauges with RS232 output (cable shall feature Cannon 9-pin female connector).

EASYBOX

U3AIR , U1AIR, U4AIR with adjustable sensitivity and zeroing nozzles to connect one, three, four air transducers respectively.

EASYBOX

U4TP-E, U4TP-K to connect up to four thermocouples type E, K respectively.

EASYBOX

U8I/O managing 8 Input/Output powered 24Vdc.

EASYBOX

U4P pushbutton box for remote control of data acquisition, zeroing, etc.

USB **Output**

Both Easy Box power supply and transmission to a PC of the measuring values 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 one of the following ways:
• With the external signal of a footswitch connected to the Easy Box
• With a data request from the host PC
• With the data send button available on the Digimatic device

Software **Packages**

• MARPOSS DLL drivers library for Windows® operating systems, allowing to interface Easy Boxes with any Windows 10® (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.
• MERLIN PLUS process and quality control software for Windows®, combining the ease of use and the abilities of the Merlin Plus™ gauge computer with the capability of running on customer PC with various display formats.
• 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.

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Technical Specifications	U4H	U4F–HR	U4T	U4E	U4D
Number of input channels	4			3	4
Type of input channels	MARPOSS standard Half-Bridge (HBT)	MARPOSS standard Full-Bridge (LVDT)	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	± 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 ±1000 μm (0.04") up to ±5000 μm (0.20") up to ±1000 μm	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	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 (§§)	<100 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 stereo Jack 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 to +70 ℃				
Operating temperature	0 to +50° C				
Dimensions W x D x H	157 x 90 x 45 mm (6.2" x 3.5" x 1.8")				
Weight	ca. 0.6 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).
(§) 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.

THE PRODUCT LINE

Technical Specifications	U4S	U1AIR(#)	U3AIR(#)	U4AIR(#)	U4TP-E	U4TP-K
Number of input channels	4	1	3		4	
Type of input channels	RS232	Air			Thermocouples type E	Thermocouples type K
Programmable measuring ranges Normal Range Long Range Extra Long Range	depending on the serial gauge used	±500 µm (0.02") ------ ------			0 - 100 °C	
Output type	1 x USB (connector type B)					
Output transmission speed	12 MBit / sec.					
Sampling rate	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	
Accuracy at 20° C	depending on the serial gauge used	±0.5% of the measuring value ±resolution			±[0.6° + 0.2% (Tmeas.-T amb.)]	
Power supply source	from USB port					
Current requirement	<150 mA (§§)	<350 mA (§§)			<200 mA (§§)	
Number of Easy Box connectable to one USB port	Max. 16					
Data triggering modes	external footswitch / host command					
Footswitch option	1 input for each box (female connector ø 3.5 mm stereo Jack plug on box rear side)					
Protection degree	IP40 (on front panel) IP30 (on rear panel)					
Storage temperature	-40 to +70° C					
Operating temperature	0 to +50° C					
Dimensions W x D x H	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")	
Weight	ca. 0.6 kg	ca. 1 kg	ca. 2.8 kg	ca. 3.8 kg	ca. 0.5 kg	

(#) 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).
(§§) To connect more than one box to a HUB a self-powered HUB is required.

Displacement Sensors

Bore Gauges Line

Forks and Ring Gauges

Bench Gauges

Indicators and Electronic Display Units
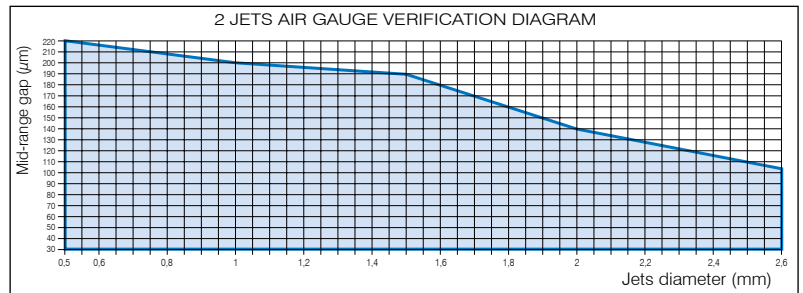
Interface Boxes for Data Acquisition

Software

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.
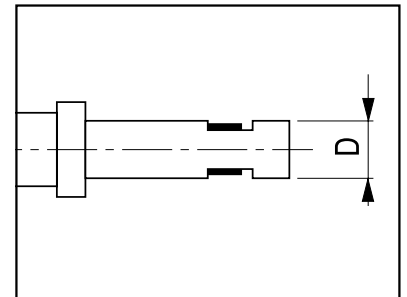

2 JETS AIR GAUGE VERIFICATION DIAGRAM

Mid-range gap (μm) / Jets diameter (mm)

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.
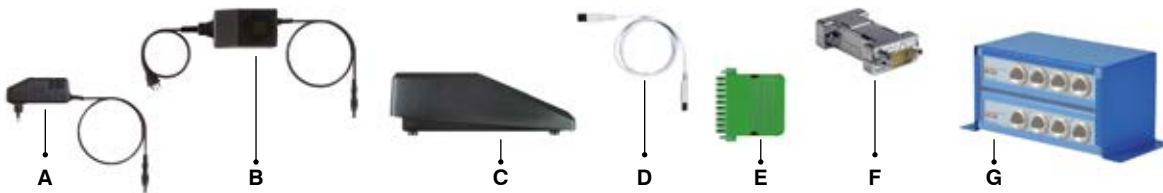

U8 I/O

HOW TO ORDER

Description	Order Code
Easy Box U4F-HR (HIGH RESOLUTION) with 4 MARPOSS standard LVDT inductive inputs	B6871250022
Easy Box U4H with 4 MARPOSS standard HBT inductive inputs	B6871250000
Easy Box U4T with 4 HBT inductive inputs compatible with amplifiers of Tesa	B6871250030
Easy Box U4E with 3 incremental transducer inputs	B6871250090
Easy Box U1AIR with 1 air transducer input	B6871250101
Easy Box U3AIR with 3 air transducer inputs	B6871250111
Easy Box U4AIR with 4 air transducer inputs	B6871250122
Easy Box U4D with 4 DIGIMATIC inputs	B6871250012
Easy Box U4S with 4 RS232 inputs	B6871250060
Easy Box U4TP-E with 4 thermocouple inputs type E	B6871250080
Easy Box U4TP-K with 4 thermocouple inputs type K	B6871250086
Easy Box U8I/O with 8 INPUT/OUTPUT	B6871250050
Easy Box U4P pushbutton box	B6871250070

ACCESSORIES

A   B   C   D   E   F   G

Ref.	Description	Order Code
A	Power supply unit for Easy Box U4D, with EU plug (*)	B6871140155
	Power supply unit for Easy Box U4D, with U.S.A. plug (*)	B6871140156
	Power supply unit for Easy Box U4D, with U.K. plug (*)	B6871140157
A	Power supply unit for Easy Box U8I/O, with EU plug (**)	B6871140238
	Power supply unit for Easy Box U8I/O, with U.S.A. plug (**)	B6871140239
	Power supply unit for Easy Box U8I/O, with U.K. plug (**)	B6871140240
B	Power supply unit for Easy Box U4E, with EU mains cable	B6871140170
	Power supply unit for Easy Box U4E, with U.S.A. mains cable	B6871140171
B	Power supply unit for Easy Box U4D, with EU mains cable (*)	B6871140158
	Power supply unit for Easy Box U4D, with U.S.A. mains cable (*)	B6871140159
B	Power supply unit for Easy Box U8I/O, with EU mains cable (**)	B6871140238
	Power supply unit for Easy Box U8I/O, with U.S.A. mains cable (**)	B6871140239
C	Footswitch with 2 m cable for data triggering function (not for Easy Box U8I/O)	B6131000110
D	USB cable L= 1 m (type A-B) from Easy Box to the PC USB port	B4701300229
	USB cable L= 3 m (type A-B) from Easy Box to the PC USB port	B6871140239
E	Cable terminal for 10 pin connector of Easy Box U8I/O (one piece is always supplied in the packaging with the Easy Box)	B6872010015
F	Interface adapter for connecting analog current transducers feat. 11 µA output to Easy Box U4E	B6303540800
G	Protective and fixing case for 1 Easy Box type U4F-HR, U4H, U4T, U4E, U4D, U4TP-E, U4TP-K, U8I/O	B1502050600
	Protective and fixing case for 1 Easy Box type U1AIR or U4S	B1502050601
	Protective and fixing case for 2 Easy Box type U4F-HR, U4H, U4T, U4E, U4D, U4TP-E, U4TP-K, U8I/O	B1502050610
	Protective and fixing case for 3 Easy Box type U4F-HR, U4H, U4T, U4E, U4D, U4TP-E, U4TP-K, U8I/O or 2 Easy Box type U1AIR or U4S	B1502050620

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

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Acquisition

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Indicators and Electronic Display Units

Interface Boxes for Data Acquisition

Software

Application examples

EASYBOX

M1 AIR

NEMO

MERLIN PLUS

EASYBOX

QUICKSET

Easy Box