ML75P

LASER SYSTEMS FOR TOOL MEASUREMENT AND VERIFICATION ON MACHINE TOOLS

mida

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Description of the system

Mida Laser P is the Marposs system that performs high-speed measurements and checks on rotating tools on CNC machine tools, reducing machine downtime and scrap, increasing productivity and production quality.

Thanks to its flexible interface, Mida Laser P can be programmed to provide the best results, irrespective of the tool type under verification, at the actual rotation speed.

An efficient system of shutters protects the system from dirt: when not performing measurements, the shutter is mechanically closed to prevent dirt from reaching the emitter and receiver lens; whereas, during the measurement cycle, a patented Air Tunnel Effect (ATE) means that it is possible measure and verify tool dimension, wear and breakage, even in the presence of coolant. In addition, the microprocessor is able to elaborate the received signal in order to filter out any noise caused by coolant and chips.

This means that the system features three levels of protection against coolant and chips: mechanical, pneumatic and software.

Machining and turning centres are the environments where Mida Laser P provides the best results, thanks to the multiple software cycles that are able to adapt the behaviour of the laser to the machining requirements.

Benefits

- Unmanned operation
- Preset tools in the machine
- Tool table data updated automatically
- Improved production quality
- Reduced rejects
- Increased production
- Tools checked at normal operating speeds
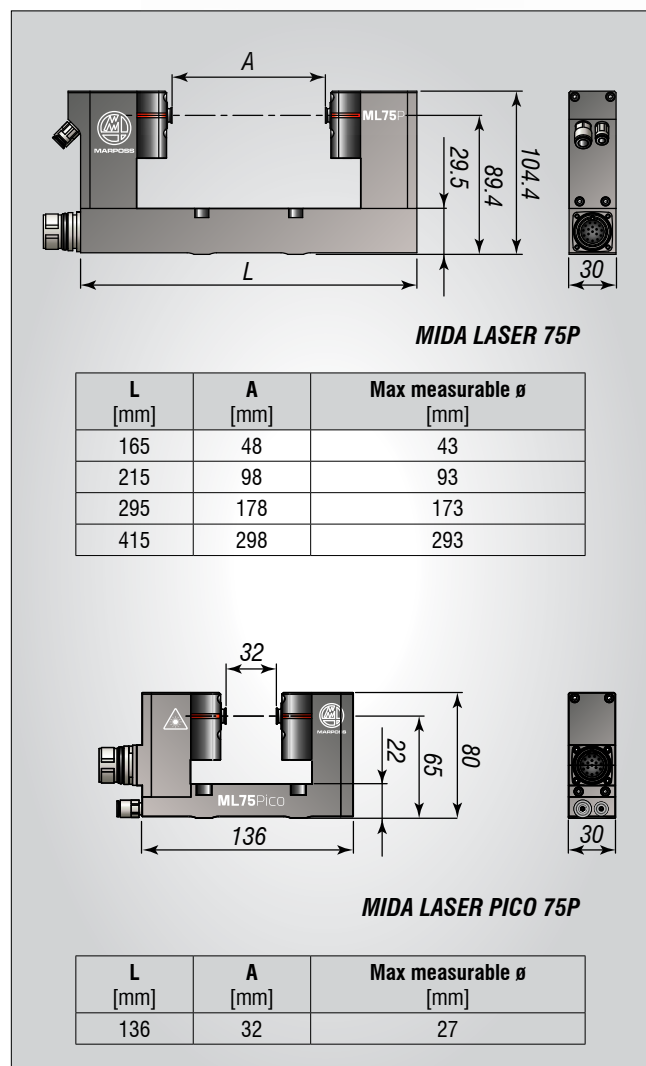- Increased number of measurable tool types

Typical applications

- Tool identification
- Tool breakage detection
- Tool setting
- Dynamic tool diameter and length measurements
- Tool wear compensation
- Tool cutting profile integrity checks
- Machine axis thermal drift compensation
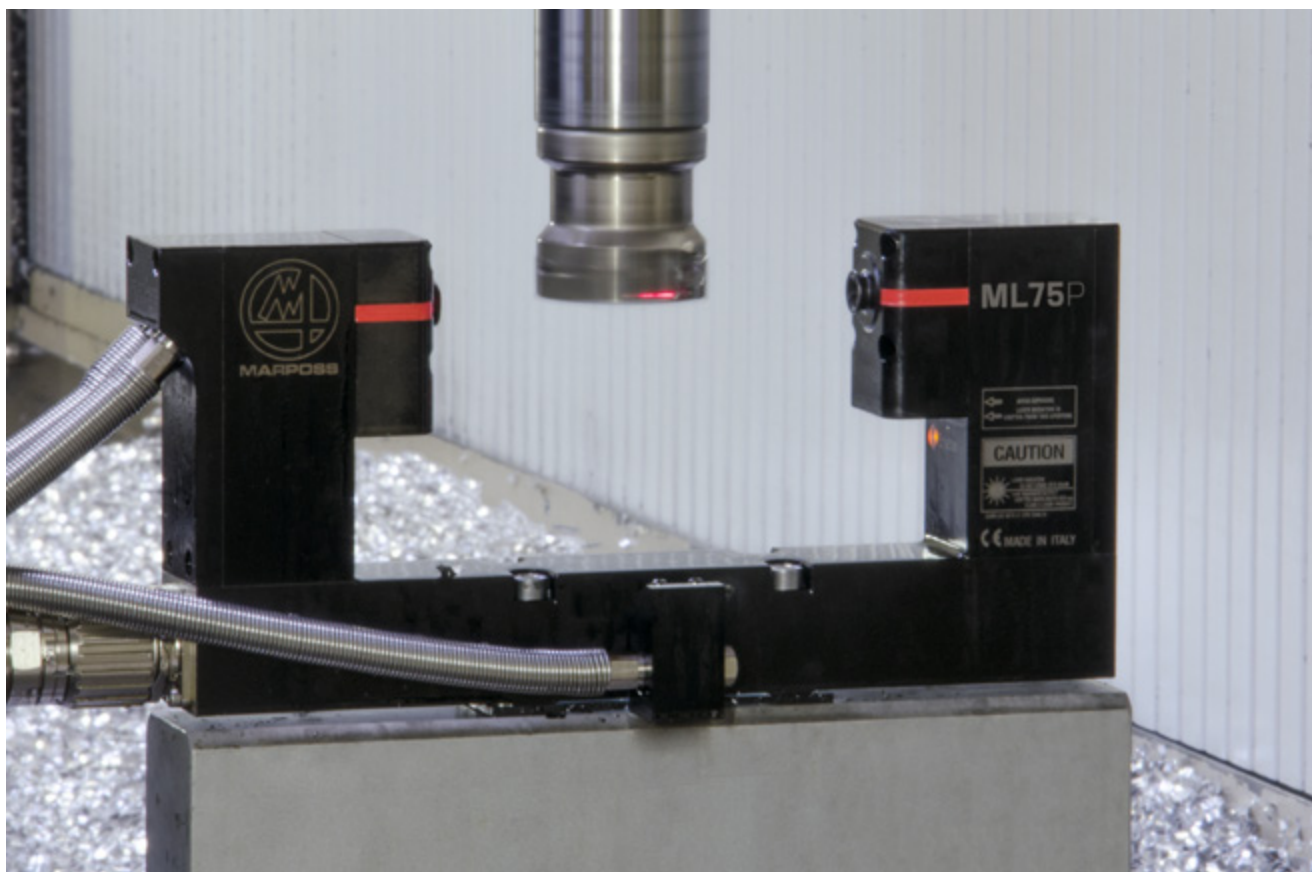
Mida Laser 75P: Stand Alone systems

Stand Alone Mida Laser P provides great measurement accuracy, thanks to its focused laser beam.
Different system lengths are available to guarantee the measurement of tools with different dimensions: 136 mm (Mida Laser Pico), 165 mm, 215 mm, 295 mm and 415 mm.
The special versions are described in the following pages.

MIDA LASER 75P

L [mm]	A [mm]	Max measurable ø [mm]
165	48	43
215	98	93
295	178	173
415	298	293

MIDA LASER PICO 75P

L [mm]	A [mm]	Max measurable ø [mm]
136	32	27

General specifications

REPEATABILITY	2σ ≤ 0.2 µm *with the laser focused*
MINIMUM Ø MEASURABLE	≥0.03 mm
PROTECTION RATING *(Standard IEC 60529)*	IP67
OPTICAL PROTECTION	1. Mechanical shutter 2. Air blower system

Pneumatic specifications

CLEANING AIR	Pressure	0.5 - 3.5 bar *(<1.5 bar with respect to the shutter)*
	Filtering	0.01 µm*
	Consumption at 3 bar	min 9 l/min (closed)
		max 95 l/min (open)
SHUTTER / TOOL CLEANER	Pressure	3-6 bar
	Filtering	5 µm*

(*) = inlet air quality (40 µm) complies with ISO 8573-1 / 7.4.4

Electrical specifications

| POWER SUPPLY		12 ÷ 24 VDC ± 20%
CURRENT		250 mA max
INPUTS*	Power supply	5/24 VDC
	Type	Opto-isolators
	Signals	Enable laser ⚠
		Dynamic polarity
		Enable Dyn. output / Mem. ⚠
		Bit0 dynamic output duration
		Bit1 dynamic output duration
		Trigger selection
OUTPUTS*	Type	SSR 50 V, 100 mA max
	Signals	5-10-20-100 ms pulse dynamic ⚠
		Static
		Laser OK ⚠

* = I/O can be configured via software in order to set-up special functions
⚠ *= These I/O are required for a full installation of the Mida Laser systems*

Mida Laser 75P and 105P: modular systems

They are systems ideal for applications on large machines, where the distance between the transmitter and receiver modules allows larger sized tools to be controlled.

The Mida Laser P system is available with collimated or focused beam. The focused solution is essential when checking the integrity and length of tools with a diameter smaller than 1 mm. The 75P model allows for a focal distance of 500 mm, whilst with the 105P 1.8m. The collimated version is ideal for larger machines, as it allows the measurement at any point of the beam. With the 75P, 3 m can be reached, whilst for longer distances the 105P is required.

Special alignment plates are available to facilitate and speed up the installation process.

ML75P TX   ML75P RX

ML105P TX   ML105P RX
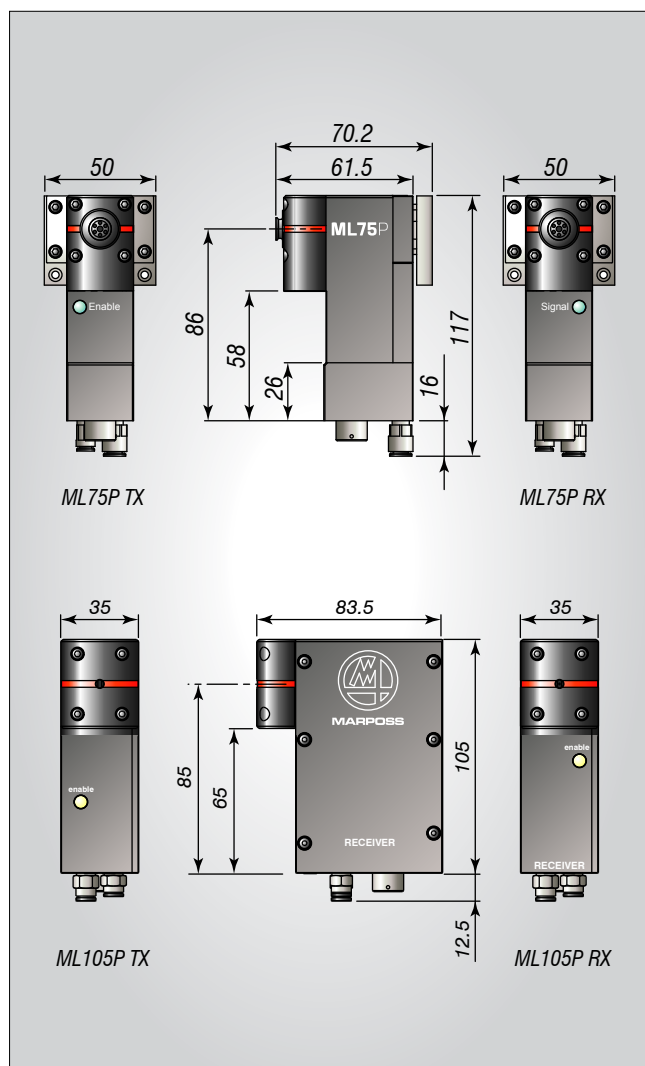
General specifications

REPEATABILITY	2σ ≤ 0.2 μm *with the laser focused*
MINIMUM Ø MEASURABLE	depending on distance between modules and beam type
PROTECTION RATING *(Standard IEC 60529)*	IP67
OPTICAL PROTECTION	1. Mechanical shutter 2. Air blower system

Pneumatic specifications

CLEANING AIR	Pressure	0.5 - 3.5 bar *(<1.5 bar with respect to the shutter)*
	Filtering	0.01 μm*
	Consumption at 3 bar	min 9 l/min (closed)
		max 95 l/min (open)
SHUTTER / TOOL CLEANER	Pressure	3-6 bar
	Filtering	5 μm*

(*) = inlet air quality (40 μm) complies with ISO 8573-1 / 7.4.4

Electrical specifications

POWER SUPPLY		12 ÷ 24 VDC ± 20%
CURRENT		250 mA max
INPUTS*	Power supply	5/24 VDC
	Type	Opto-isolators
	Signals	Enable laser ⚠
		Dynamic polarity
		Enable Dyn. output / Mem. ⚠
		Bit0 dynamic output duration
		Bit1 dynamic output duration
		Trigger selection
OUTPUTS*	Type	SSR 50 V, 100 mA max
	Signals	5-10-20-100 ms pulse dynamic ⚠
		Static
		Laser OK ⚠

* = I/O can be configured via software in order to set-up special functions
⚠ = These I/O are required for a full installation of the Mida Laser systems
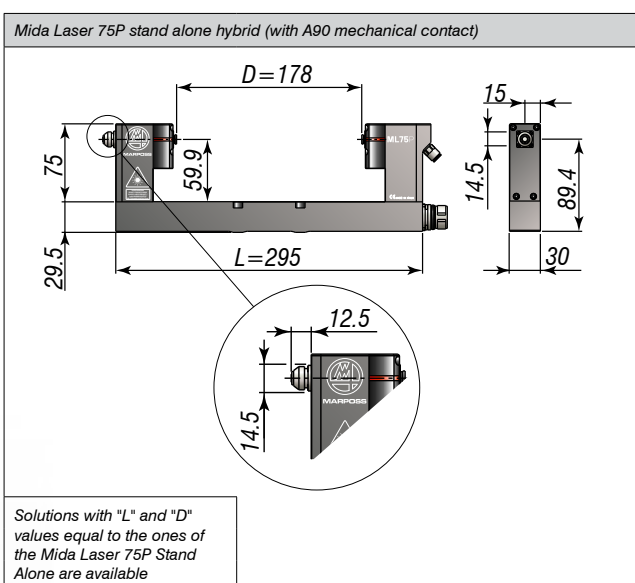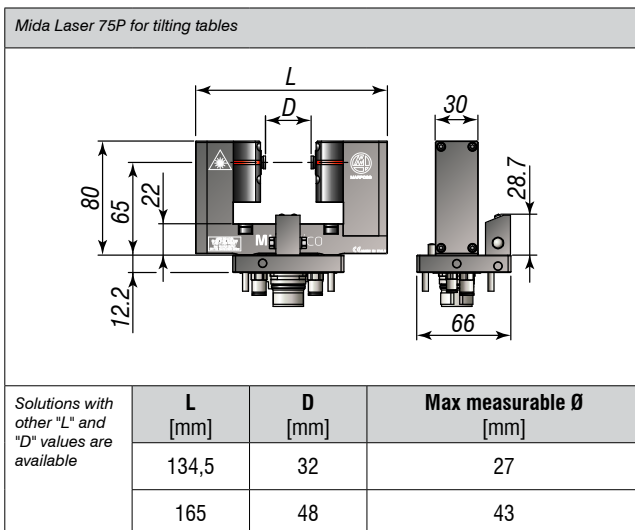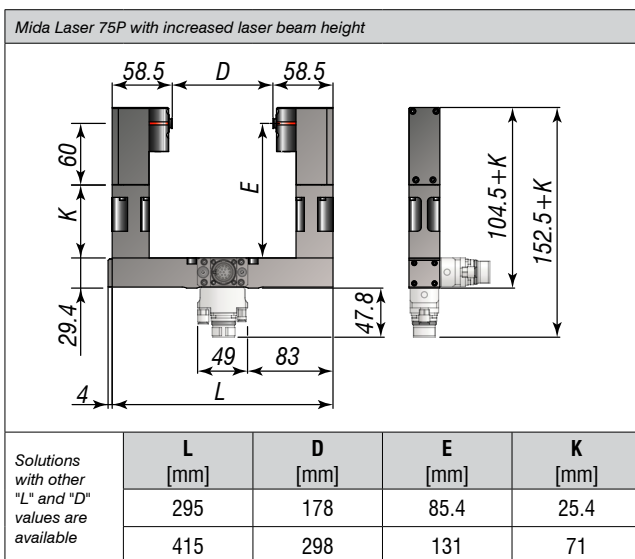
4   MIDA LASER P

Special versions

Special versions are available:
- **Mida Laser 75P with increased laser beam height**, allows the spindle positioning in critical dimensions conditions
- **Mida Laser 75P hybrid**, equipped with lateral touch probe. The probe can also be used for thermal drift compensation measurements, by monitoring the third axis
- **Mida Laser 75P for tilting tables**, this version is supplied with a connector mounted on the bottom so that it can be installed on tilting tables with internal connections. The tool measurement is made possible by rotating the table through 90°
- **Mida Laser 75P Long Distance**, since the stand alone versions are aligned by Marposs when they are delivered and are less sensitive to machine vibrations, the Long Distance probes are suitable for use in situations requiring considerable distances between the modules

Mida Laser 75P with increased laser beam height

Solutions with other "L" and "D" values are available	L [mm]	D [mm]	E [mm]	K [mm]
	295	178	85.4	25.4
	415	298	131	71

Mida Laser 75P Stand Alone Long Distance

L [mm]	D [mm]	B [mm]
600	483	160
800	683	260
1000	883	360

Mida Laser 75P for tilting tables

| Solutions with other "L" and "D" values are available	L [mm]	D [mm]	Max measurable Ø [mm]
	134,5	32	27
	165	48	43
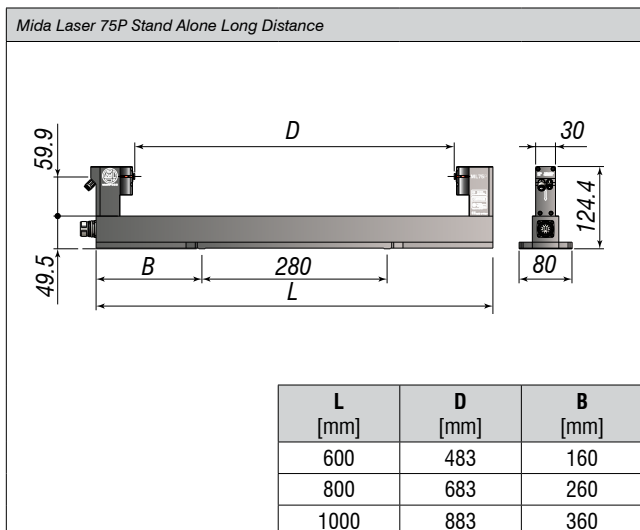
- The new **MIDA 3D Hybrid Laser** is the ideal solution for monitoring tools in turning and milling centres: thanks to the T25 probe, this dual solution allows the measurement of all types of tools and cutting edges, contact and non-contact ones. All the functions of classic MIDA Laser are guaranteed, to which the high performance of the T25 is added.

Mida Laser 75P stand alone hybrid (with A90 mechanical contact)

Solutions with "L" and "D" values equal to the ones of the Mida Laser 75P Stand Alone are available

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Interface

The Mida Laser P is equipped with an external, and easy to install, interface. The user can use it to program the system to communicate with the different types of CNC controls.
It provides a simplified fault-finding function thanks to the LED diagnostic system, thus reducing technical intervention costs.
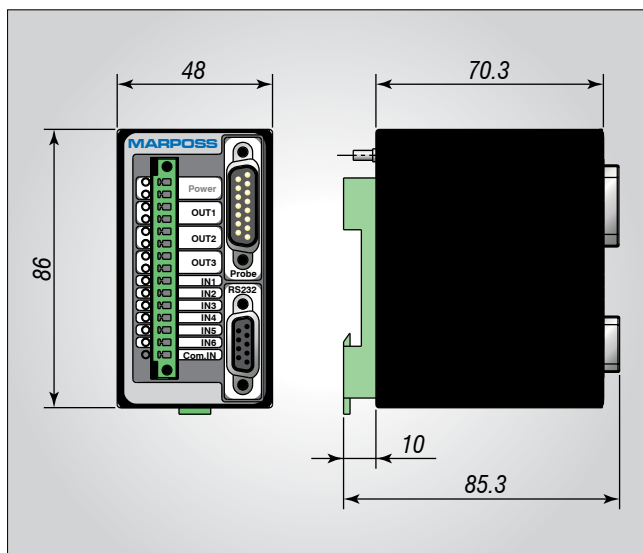

POWER SUPPLY	12 - 24Vdc (+20 / -15%)
CURRENT	300 mA max
PROTECTION RATING *(Standard IEC 60529)*	IP40
OPERATING TEMPERATURE	5-50 °C
CONNECTION CABLES MIDA LASER / INTERFACE	10 m 20 m 30 m

Mida Laser Tool Kit

The Mida Laser P interface can operate with ML Tool Kit, a Windows-based software that provides numerous advantages from various points of view:

• Set-up: the interface is easy to program and set the different parameters with the ML Tool Kit;
• Diagnostics: ML Tool Kit allows the user to analyse the performance of the laser signal during the measuring cycle, with the possibility of saving the last data measured;
• Maintenance: ML Tool Kit allows for an extremely fast control of the firmware version;
• Alignment: with modular Mia Lasers the Tool Kit can be used to display the intensity of the signal in real time and therefore facilitate the installation and alignment of the modules.

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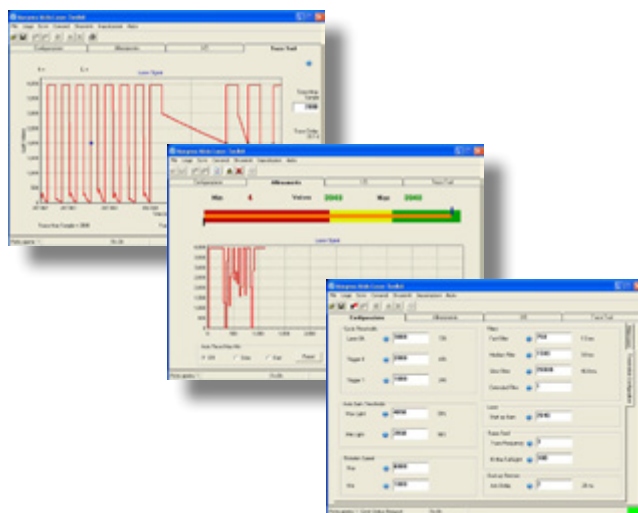
Mida Laser P Accessories

The following accessories are available to complete the Mida Laser P applications:
• An air filtering group, which guarantees the quality of the cleaning air
• An air Tool Cleaner, which increases measurement accuracy by eliminating any coolant drops or chips from the tool tip.
• Calibration tools that ensure the dimensions to be checked are monitored at all times

Air filtering group	Air tool cleaner
Spherical calibration tool	Calibration tool

Software measuring cycles

The synergy between Marposs Mida Laser and software measuring cycles allows for fast and reliable tool measurements. All the tool dimensions are obtained and checked at the real operating speed.
The tool data are automatically transferred to the CNC tool table, thus avoiding all typing errors.
Integrity control cycles of a single cutting edge or of simple and complex profiles are available to check each insert.
With extreme machine conditions the tool parameters and specifications can be sent, with a communication protocol, during the execution of a cycle directly from the CNC to the Mida Laser.

System part numbers

ML75P

Type	Modules / Snap gauge					Extension			
	Connector	D [mm]	L [mm]	H [mm]	Beam type	Length [m]	Connector	Sheath [m]	
Modular	Lower	N/A	N/A	N/A	Collimated	10	Straight	2.5	0T60100001
		N/A	N/A	N/A	Collimated	20	Straight	2.5	0T60100011
Stand Alone 136 mm (Pico)	Side*	32	136	43	Focused	10	Straight	5	0T62000001
		32	136	43	Focused	10	90°	5	0T62000051
Stand Alone 165 mm	Side*	48	165	60	Focused	10	Straight	5	0T63000001
		48	165	60	Focused	10	90°	5	0T63000051
Stand Alone 215 mm	Side*	98	215	60	Focused	10	Straight	5	0T65000001
		98	215	60	Focused	20	Straight	5	0T65000011
		98	215	60	Focused	10	90°	5	0T65000051
Stand Alone 295 mm	Side*	178	295	60	Focused	10	Straight	5	0T67000001
		178	295	60	Focused	30	Straight	5	0T67000021
		178	295	60	Focused	10	90°	5	0T67000051
Stand Alone 415 mm	Side*	298	415	60	Focused	30	Straight	5	0T69000021

ML75P special versions

Type	Modules / Snap gauge					Extension			
	Connector	D [mm]	L [mm]	H [mm]	Beam type	Length [m]	Connector	Sheath [m]	
For tilting tables	Lower	48	136	60	Focused	10	Straight	/	0T62300003
		48	165	60	Focused	10	Straight	/	0T63300003
		98	215	60	Focused	10	Straight	/	0T65300003
		178	295	60	Focused	10	Straight	/	0T67300003
		298	415	60	Focused	10	Straight	/	0T69300003
Increased laser beam height	Side*	98	215	131	Focused	10	Straight	5	0T65000701
		178	295	84.5	Focused	10	Straight	5	0T67000501
		298	415	131	Focused	10	Straight	5	0T69000701
		298	415	131	Focused	30	Straight	5	0T69300721
	Lower	178	295	84.5	Focused	10	Straight	5	0T67300501
Hybrid	Side*	48	165	60	Focused	10	90°	5	0T67000050
		178	295	60	Focused	10	Straight	5	0T67000000
Long Distance	Side*	483	600	60	Focused	10	Straight	5	0T64100001
		683	800	60	Focused	10	Straight	5	0T66100001
		883	1000	60	Focused	10	Straight	5	0T68100001

ML105P

Codes can be ordered on request

Accessories

Single air group filter with 3 solenoid valves (shutter, air barrier and tool cleaner)	29T0443050
Air filter group for air barrier	29T0439080
Air filter group for shutter management	29T0439060
Support plate for ML75P installation on the machine table with standard tool cleaner	29T0439784
Support plate for ML75P installation on the machine table	29T0439786
Standard tool cleaner kit	29T0439782
Protection cover for ML75P	29T0439800
Rounded calibration tool with 12 mm stem	12T0439004
Flat calibration tool with 8 mm stem	12T0439005
Protective metal sheath 1.5 m	10T0439099
Protective metal sheath 3 m	10T0439055
Protective metal sheath 5 m	10T0439056
Adjusting plate for ML105P Emitter	30T0437094
Adjusting plate for ML105P and ML75P Modular Receiver	30T0437097

N.A. = not applicable, it depends on installation
(*) = for each Stand Alone type Bottom and Frontal connector exit are available