

**TECHNICAL SPECIFICATION**

**COMPLETE PIPE MEASURING AND INSPECTION SYSTEM FOR SMALL DIAMETERS WITH ROTATING LASER SCANNER, FRONT VIDEO AND RANGEFINDER**

**FEATURES**

- Video inspection (frontal and side)
- Non-contact laser measurement
- Laser alignment (option)
- Laser rangefinder

**Measurable parameters**

The system allows for measurement of:

- Inner diameter
- Ovality
- Out-of-roundness
- Non-straightness (option)
- Barrel threading measurement
- Length measurement

The system scans profile of inner surface and performs:

- Surface anomalies detection
- Calculation of the deviation from the shape
- Calculation of the geometric dimensions of the inner surface profile

The system can be equipped with non-straightness module to perform laser-alignment using integrated PSD sensor and external laser emitter

**DESCRIPTION**

The Complete Pipe Measuring and Inspection system for small diameters (Probius™ mini) is the most compact unit available. It measures a few different parameters (inner diameter, ovality, out-of-roundness, non-straightness, barrel threading, rifling/profiling width/height and rifling angle), using five different measurement channels (rotating laser 2D scanner, video inspection channels, rangefinder and PSD sensor) and combines this data to calculate the full 360° cross-sectional profile of the pipe. Based on the exceptional number of precisely measured points, diameters and rifling/profiling parameters (width, height, irregularity) are calculated. Cross-section measurement results are then supplemented by probe positions from the distance gauge and inclinometer data allows the rifling angle to be calculated.

The frontal video inspection channel houses a 5 Mpix camera with panamorph lens and 3 channel LED lighting system especially designed for hi-res video inspection of pipe interiors. The side video inspection channel is located on the rotating laser scanner and provides all-round visibility (panoramic photograph) by hi-resolution camera with adjustable focus. Every visual defect can be detected.

The laser distance gauge measures the distance from the probe to the pipe end to bind measured results to the probe position. The probe can be moved along the barrel manually using a telescopic rod, gooseneck tube or, as an optional extra, by means of the instrument motor. The data can be transferred by wire or Wi-Fi connection.

Non-straightness measurement is performed with a module that is mounted instead of front camera unit. It measures deviation from a determined axis.

Measurement results and video are displayed on a PC in real time. The shots of the defects can be saved in a file. Measurement data can be displayed, protocolled and archived according to user requirements.



**APPLICATION**

Quality and geometric dimensions check during production as well as periodic inspection of components and assemblies.

- Smooth, Profiled and Rifled pipes
- Barrels
- Stators
- Extruders
- Precise Cylinders

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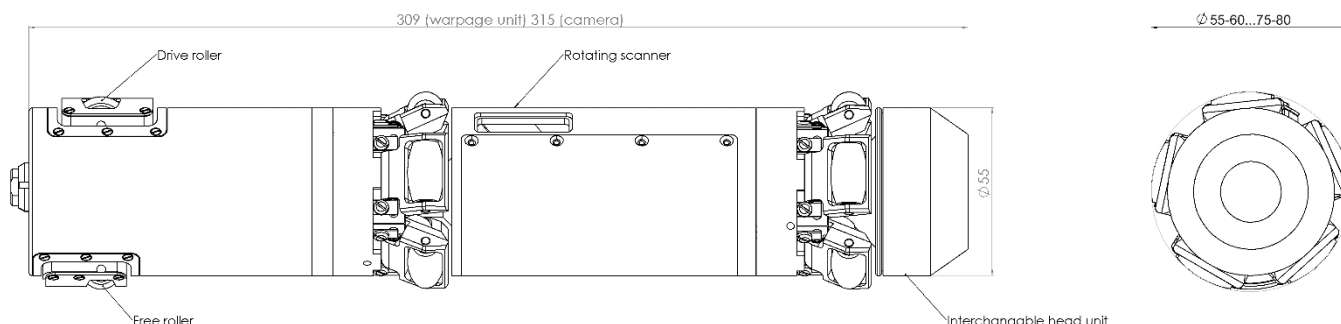
**SPECIFICATION**

Profile measurement accuracy, mm	+/- 0.01
Non-straightness measurement accuracy, mm	+/- 0.01
Diameter Range, mm	30-80
Pipe length, mm	up to 30000
Movement method	Manual by rod or gooseneck tube   Self-crawling (d 60 and up)
Video inspection channel	Front: panamorph lens, 5 Mpix   Side: 5 Mpix, Autofocus
Camera angle (frontal)	180° with distortion elimination
Connection "probe"-computer	Wired   Wireless WiFi
Power	220 V 50 Hz 200 W via power supply

**OPTIONS**

- Laser alignment
- Wireless connection
- Self-moving probe | Gooseneck tube moving probe | Manual moving
- Side video channel
- Coating thickness measurement channel

**OVERALL DIMENSIONS**



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Choose the options

PS-	/pipe type /	D1-D2	/measuring channels/	-	/movement method/	-	/accessories/	-	/data transfer/	-	/calibration unit/
	SP		LRS		MM		PE		W0		CAL1
	RT		FVI		SM		GTK		W1		CAL2
	ST		SVI		PSV						
	DF(x)		NS								
			LD								

The type of checked object (pipe)	
SP	Device for measurement of smooth pipes
RT	Device for measurement of profiled pipes, rifled tubes, siphons. * Profile height does not exceed 5 mm
ST	Device for measurement of stators, screw pumps and pipes. Profile height does not exceed 25 mm
DF(x)	Device for measurement of pipes with a cross-section shape different from circle, where (x): H-hexagonal S-square and rectangular tubes T-triangle tubes C - free-form * customer should provide drawings of the pipe
Diameter Range	
D1-D2	Diameter range of the pipe D1 - Minimum D2 - Maximum
Measuring channels	
LRS	Rotating laser scanner * It is possible to combine with SVI
FVI	Front camera with high-resolution HDR (high dynamic range) and panamorphic wide-angle lens.  * It is possible to combine FVI with NS(x). In this case, fish-eye HiRes lens is integrated instead of panamorphic wide-angle lens. ** Panamorphic wide-angle lens is not available for D1<90 mm
SVI	Side camera installed inside the rotating laser scanner. Available for devices with the diameter of

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	the body more than 60 mm. Equipped with backlighting. Side camera gives you an opportunity to get a panoramic picture of a scanned area and assess the size of defects.
NS(x)	<p>Straightness measurement channel, where (x) the range of measurement of NS(5) +/-5 mm, NS(20) 20 mm.</p> <p>The system with "Straightness measurement channel" is supplied with an external laser module. The probe is equipped with a PSD sensor and rangefinder.</p> <p>* 45 mm PSD sensor is also available for some systems. Contacts us to find out more.</p>
LD xxx	<p>Built-in laser module rangefinder (accuracy ±1 mm). xxx is the pipe length range. Pipe length - up to 30 m.</p> <p>*) For pipe length more than 30 m or higher accuracy, pls, contact us.</p>
Movement method	
MM	Manually: movement by hand using a telescopic rod (similar to tentpole) with 500 mm sections
SM	Self-moving probe for movement along a horizontal line of the object. This is not compatible with NS channel.
PSV	<p>Special modification for measurement of vertically oriented objects.</p> <p>Ordering PSV modification, you should either order HST option (lifting winch/hoist) or inform us about your own lifting mechanism.</p>
Accessories	
PE	The extension tube allows you to measure the pipe from its very edge. Without this option, there are uncheckable areas on both sides of the pipe (up to 200 mm, depends on the probe modification).
GTK(x)	<p>Operator console based on Getac (or similar) laptops, where x:</p> <p>sr, br – semi-rugged, fr - rugged notebooks</p> <p>*according to ruggedness class</p>
Data transfer	
W0	Data transfer and power supply via cable (option)
W1	Wireless data transfer from device to operator console, powered by cable.
Calibration	
CAL1	Calibration module for laser scanner calibrating
CAL2	Calibration module for straightness channel calibrating

**TECHNICAL SPECIFICATION - PAGE 5****Example of product code: PS-SP(40-55) LRS – FVI/SVI/LD(15)-MM- GTK(sr)-W0-CAL2**

The device for smooth pipes from 40 to 55 mm in diameter equipped with laser rotating scanner, frontal video camera, external range finder with the range 15 meters, manual-moving with precise centering by 3 spring-loaded rollers, data transfer and powered by cable. Supplied by calibrating module CAL2. Packed in plastic case. Delivered with semi-rugged notebook as an operator station.

**Send us your solution with pipe(s) parameters and drawings for checking up**

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Examples of solutions

**PS-RT(55-57)-LRS/FVI/LD(15)/NS(2.5)-SM-W0 -CAL2**

The device for profiled pipes from 55 to 57 mm in diameter equipped with laser rotating scanner, removable frontal video camera. Removable straightness measurement face on the probe with the range of +/-2.5 mm and laser module with built-in range finder for measuring distance up to 15 meters. The probe is self-moving with precise centering by 5 spring-loaded rollers. Data transfer and powered by cable. Packed in a rugged plastic case. Supplied with calibration unit for rotation laser head calibration and straightness calibration.

Contents of delivery

Name	Quantity, pcs.
Measuring probe	1
Communication unit	1
Set of connecting cables including probe-communication unit power&data cable communication unit power cable communication unit – PC data cable	1
Laser module for NS with power supply and range finder	1
Calibration unit CAL2	1
Case	1
Software for Windows	1
User manual	1
Quality Certificate	1
Calibration Certificate	1



FOR YOUR NOTES