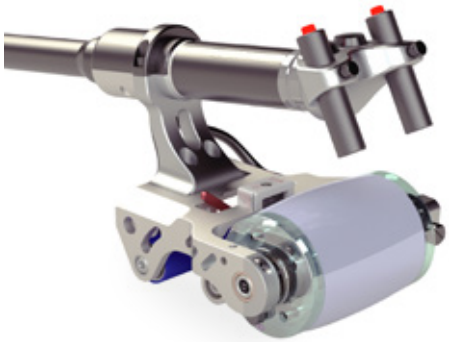
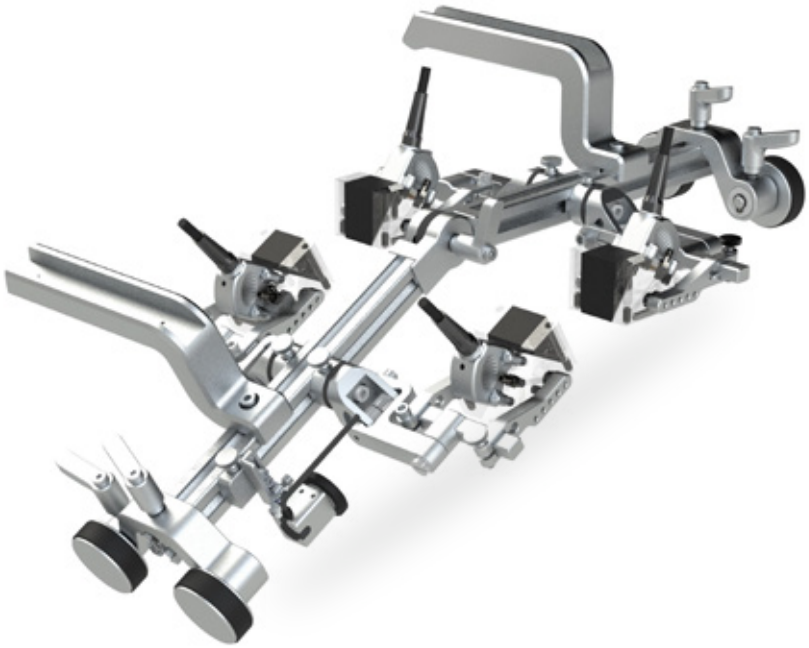
M2PROBE

SCANNER & ACCESSORIES CATALOG





M2 Company Profile

M2 Electronics (Shanghai) Co., Ltd. is a high-tech company specializing in designing and manufacturing ultrasound products. We provide leading-edge ultrasound probes, PAUT (phased-array ultrasound) probes, TOFD probes, medical imaging probes, and custom probes, custom wedges, scanners, encoders, etc.

M2 Electronics encourages innovation and intellectual property protection. We aim to be competitive by possessing proprietary technologies, including core technology in gradient acoustic matching layer, 1-3 piezoelectric monocrystal composite, two-dimensional array probe encapsulation technology, etc. We strictly follow ISO9001:2015 Quality Management System.

We take pride in providing ward-winning products and customer service. Every day, thousands of inspectors around the world are benefiting from M2 probes. Together we hope to build the best products around the globe.

Table of Contents

Scanners

Encoder

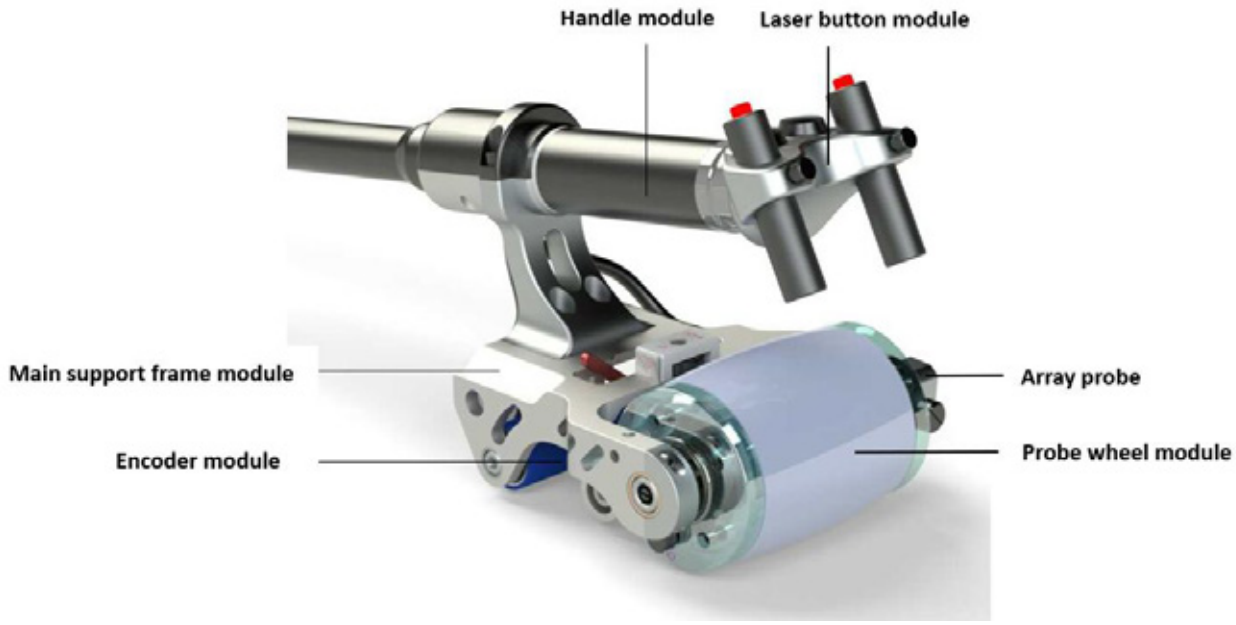
Couplant feed unit

Roller Scanner R1 (wheel scanner)

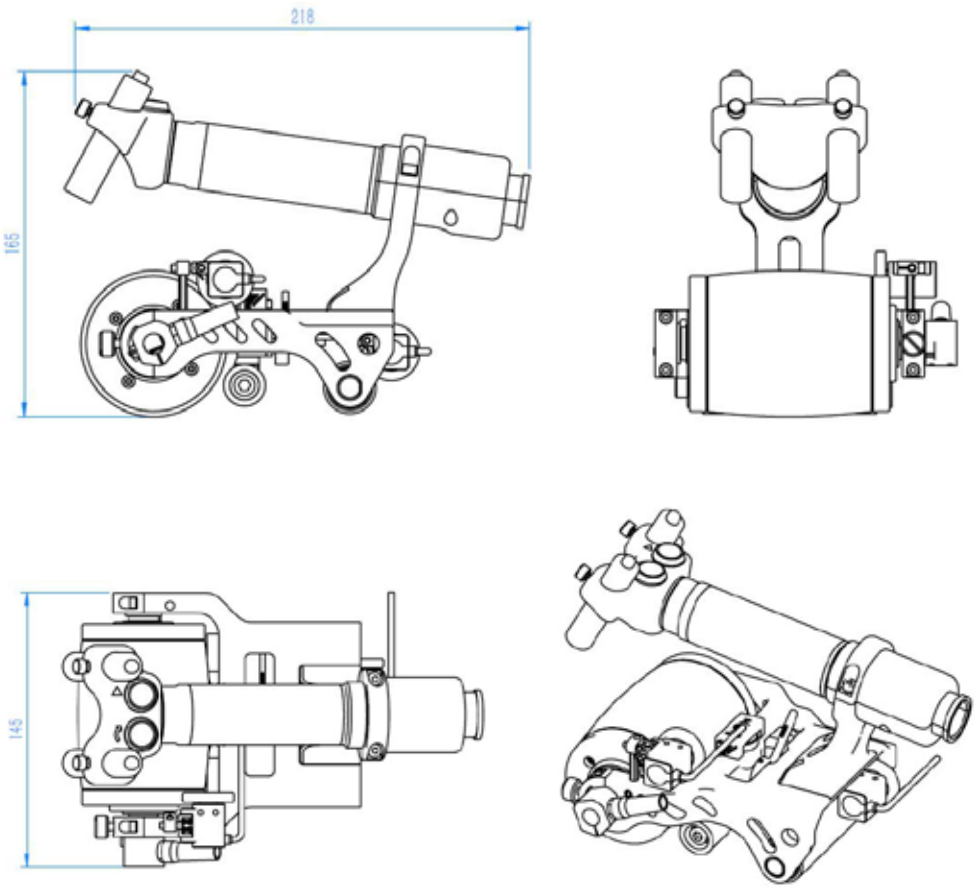
The R1 Scanners are designed to detect composite and other smooth surface materials, Such as carbon fiber and other composite materials commonly used in aerospace industry. The wheel scanner also provides a feasible alternative liquid immersion detection technology.

Unique tire materials to ensure high quality and immersion ultrasonic testing. For wheel scanners, even in difficult scanning positions, minimum coupling and pressure are needed to provide good coupling and strong signal.

Roller scanner R1, its ergonomic design makes it the perfect tool for manual scanning. M2 Encoder with various connector is available on request, support Olympus, M2M, GE, ZETEC, etc.

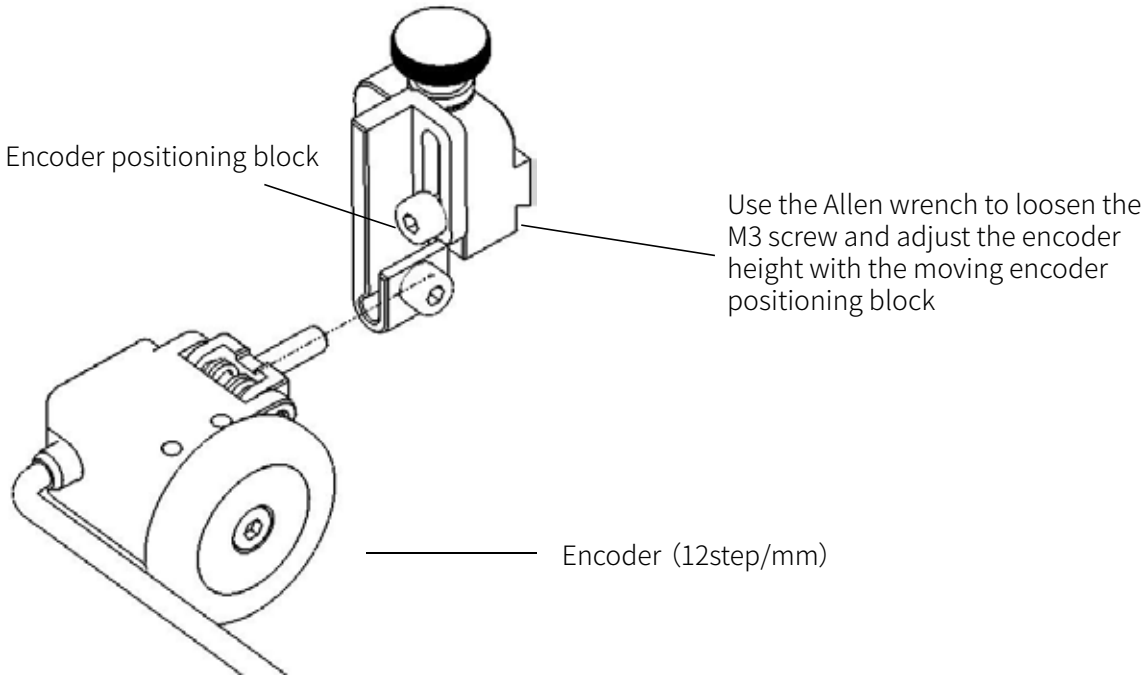


R1 roller scanner adopts the standard modular design, which can be used to replace different frequency probes according to the detection requirements. Its basic modules: array probe, probe wheel module, main support frame module, laser button module, grip module, encoder module.



Model	Features and Applications
R1 Roller Scanner	1, High coupling effect with minimal couplant 2, Easy setup and have efficient C-scan 3, 25mm(0.98 in) water delay block for 50 mm (1.97in) composites inspection. 4, Up to 51.2 mm wide beam coverage 5, Low transparent wheel material 6, Zero-degree detection of composite materials and other materials with smooth surface. 7, Plates corrosion detection, axial corrosion detection in large-diameter pipes.

·Encoder installation instruction



The ergonomic design of the wheeled scanner R1 makes it an ideal tool for manual scanning.Adaptive mangraph encoder can choose a variety of connector types, matching Olympus, M2M, GE, ZETEC, zhongke and other mainstream manufacturers of instruments.

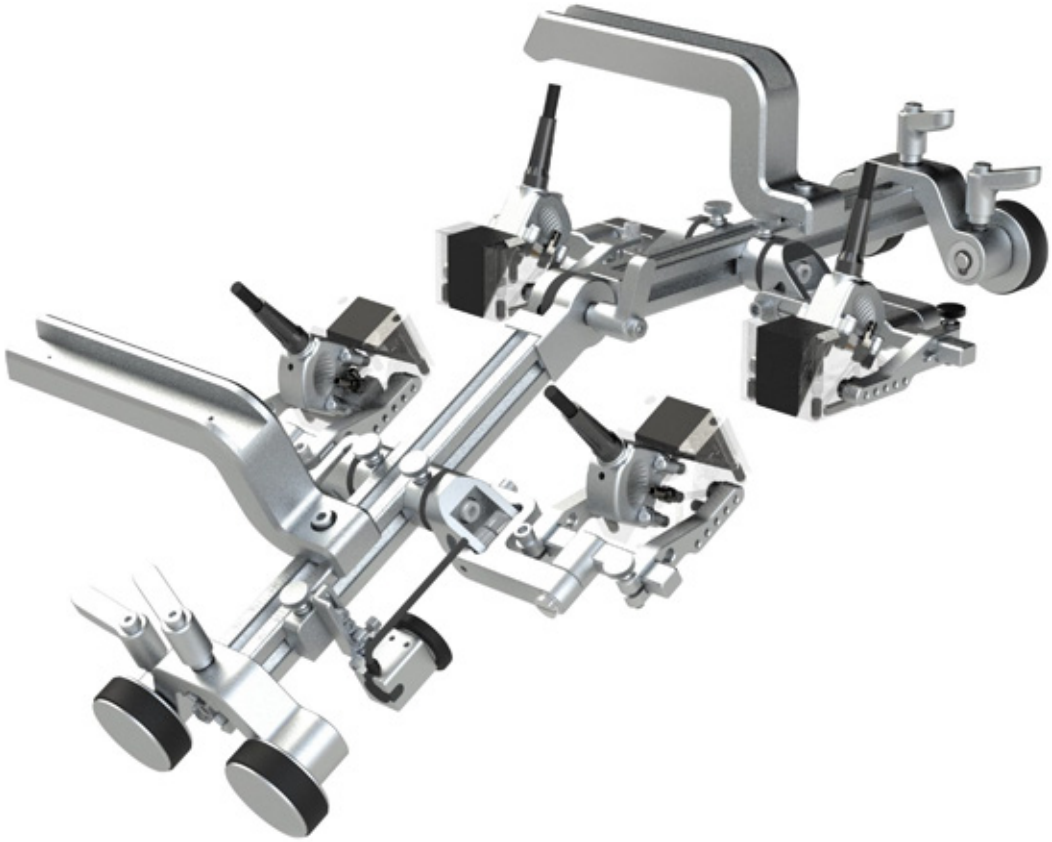
·Specifications of wheel scanner

Describe	Value
Typical near surface resolution a (reflector with a flat diameter of 3 mm)	1 mm, 5 MHz (composite); 1.5mm, 3.5MHz (composite); 3mm 5MHz (steel / aluminum)
Minimum surface curvature (convex radius)	50mm
Location of secondary interface echo (in composites)	50mm
Encoder voltage 5 V	5 V
Weight (w/o liquid)	1.7KG

·Ordering information

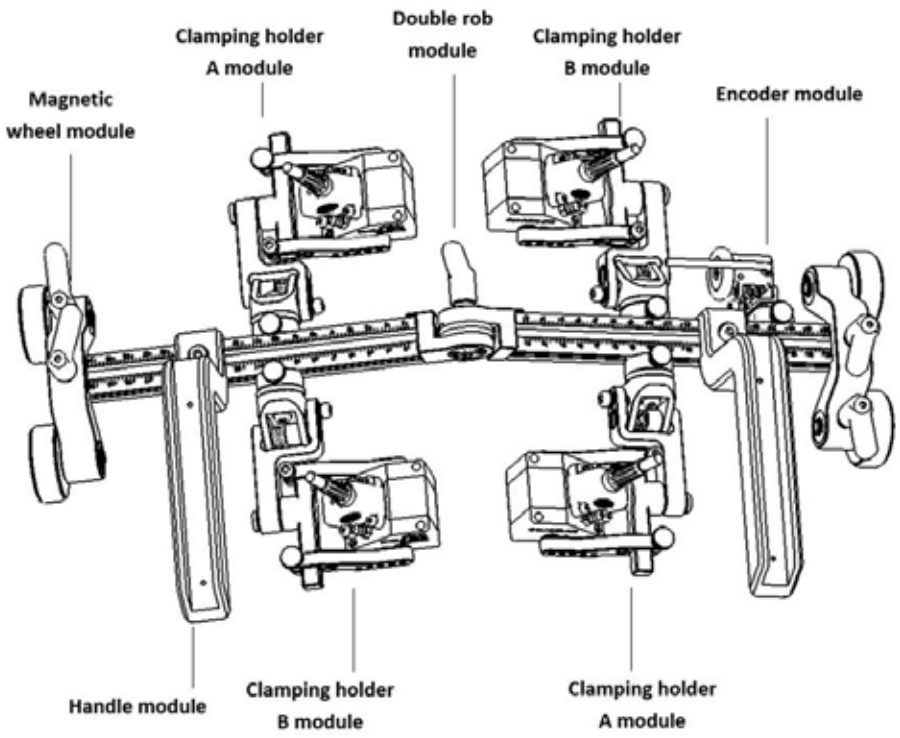
Part number	Frequency (MHz)	Delay Line (mm)	Num. of Elemen-ts	Pitch (mm)	Aperture (mm)	Elevation (mm)
ROLLER-R1-1L64	1	25	64	0.8	51.2	8.0
ROLLER-R1-3.5L64	3.5	25	64	0.8	51.2	6.4
ROLLER-R1-5L64	5	25	64	0.8	51.2	6.4
ROLLER-R1-10L64	10	25	64	0.8	51.2	6.4

Weld scanner R3 series

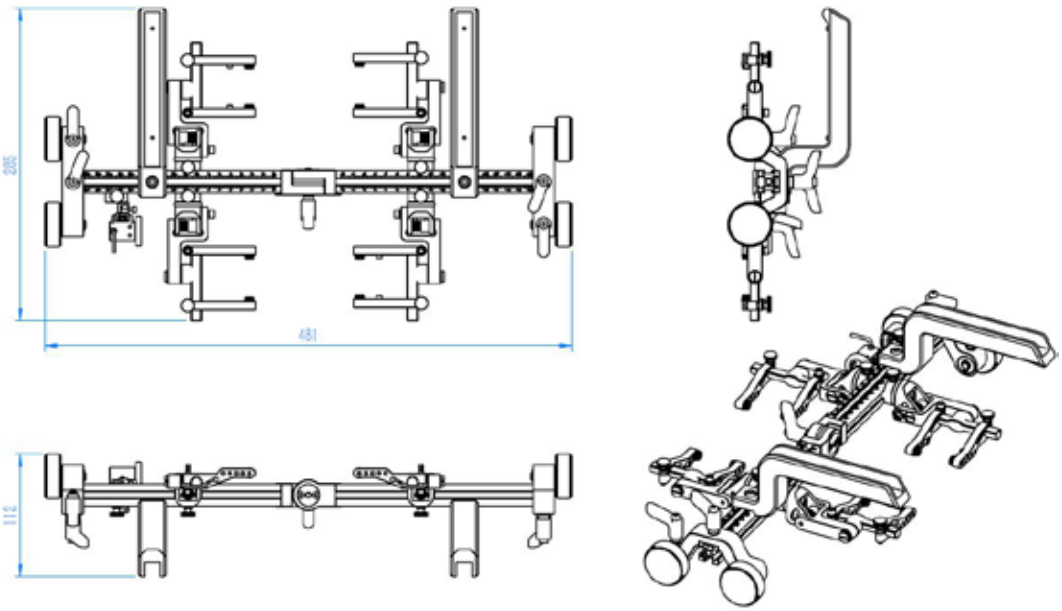


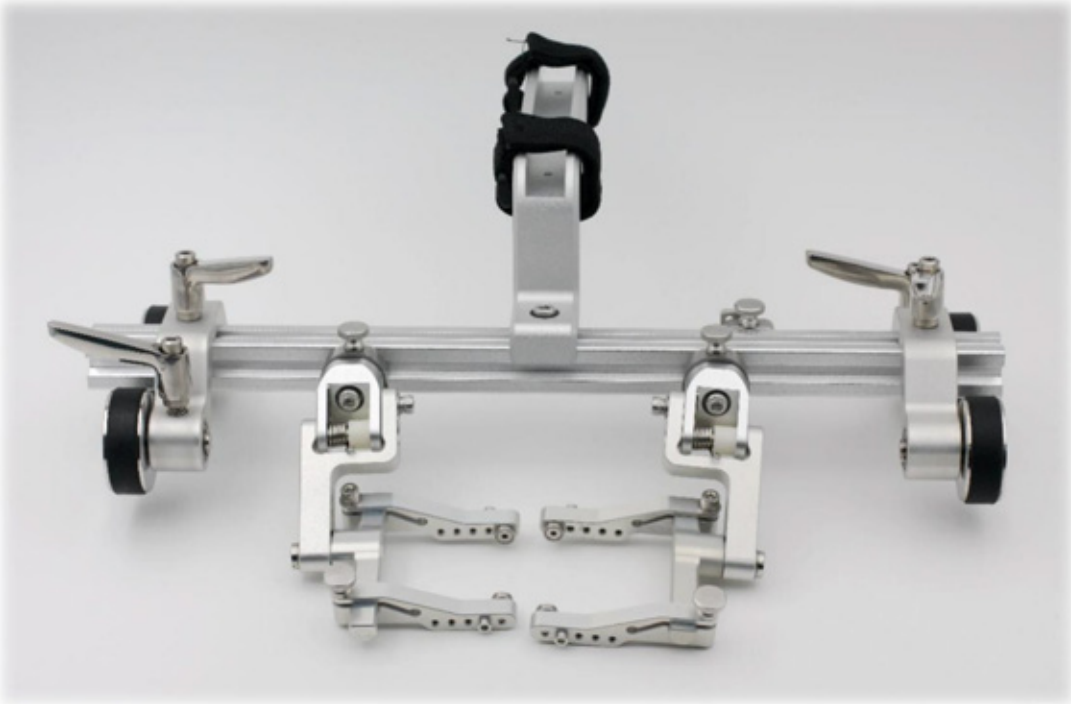
R3 Scanner is a general pipe and plate scanner which can detect longitudinal and annular welds by angle adjustment. The scanner can install one or two pairs of probes, and can detect welds by using TOFD (Time Of Flight Diffraction) probe, PA (Phased Array) probe and pulse echo technology at the same time.

R3 Scanner adopts standard modular design and can be freely combined into double rod or single rod. The basic modules are as follows: Single rob module, Double rob module, Clamping holder A module, Clamping holder B module, Handle module, Magnetic wheel module, Encoder module.



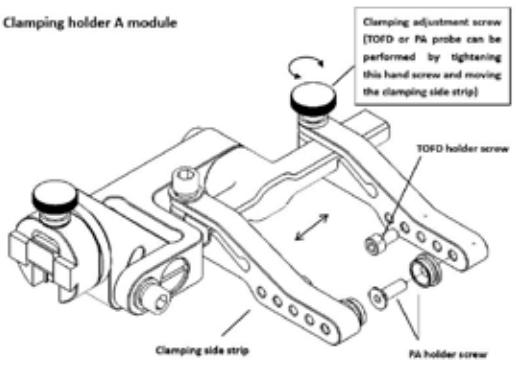
Model	Features and Applications
R3-D Double rob model	1, PA-TOFD weld scanner can be used for phased array and TOFD inspection of flat butt welds and pipe circumferential welds 2, Support up to 4 probes and can remove clamping arm manually 3, Support encoder scanning, quick disassembly and easy installation 4, The spacing of the walking wheels can be adjusted, work freely in small detection space. 5. Excellent adaption, can hold wedges in different sizesetection, axial corrosion detection in large-diameter pipes.



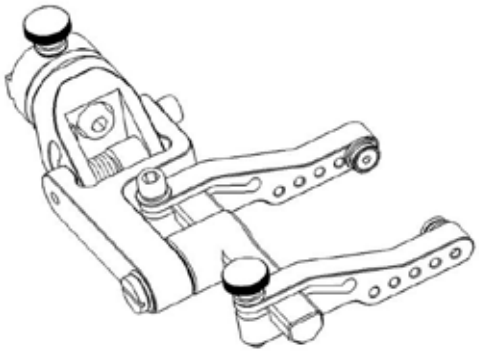


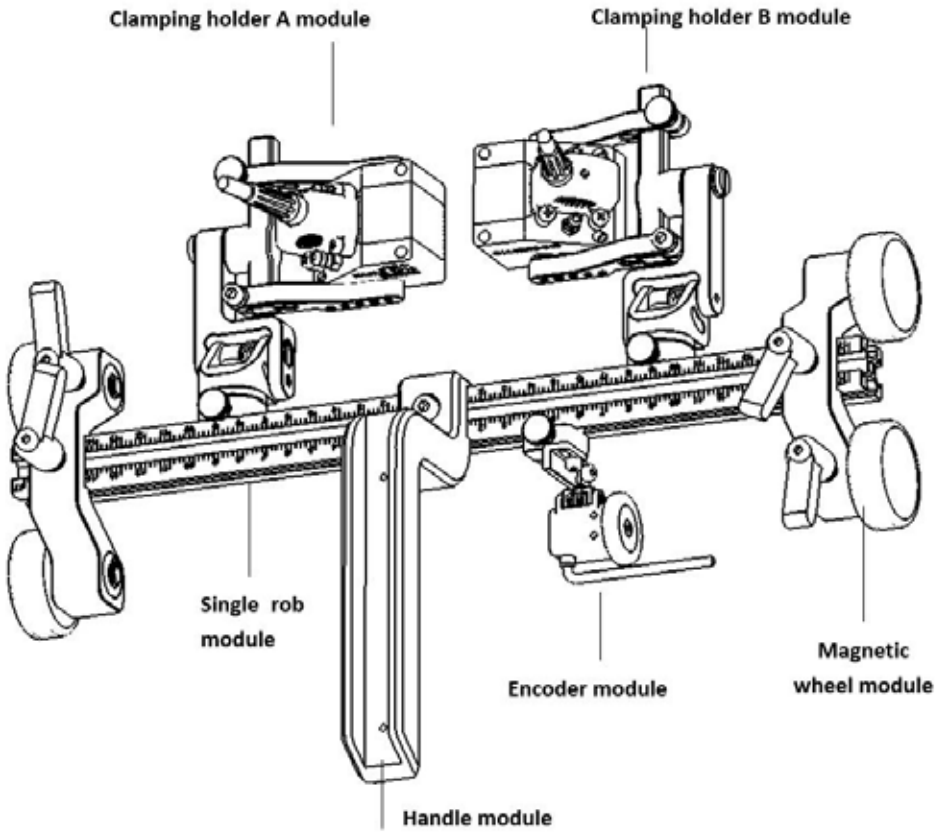
Model	Features and Applications
R3-S Single rob model	1, PA-TOFD weld scanner can be used for phased array and TOFD inspection of flat butt welds and pipe circumferential welds 2, Support up to 2 probes and can remove clamping arm manually in a side 3, Support encoder scanning, quick disassembly and easy installation 4, The spacing of the walking wheels can be adjusted, work freely in small detection space. 5, Excellent adaption, can hold wedges in different sizes

Clamping holder A module



Clamping frame B module





·Technical specification

Double rob assembly dimension

Length (mm)	Width (mm)	Height (mm)
184	450	111

Single rob assembly dimension

Length (mm)	Width (mm)	Height (mm)
184	350	111

Double rob assembly package

Net weight (kg)	Gross weight (kg)	Package box (mm)
2.40	8.90	570*235*465

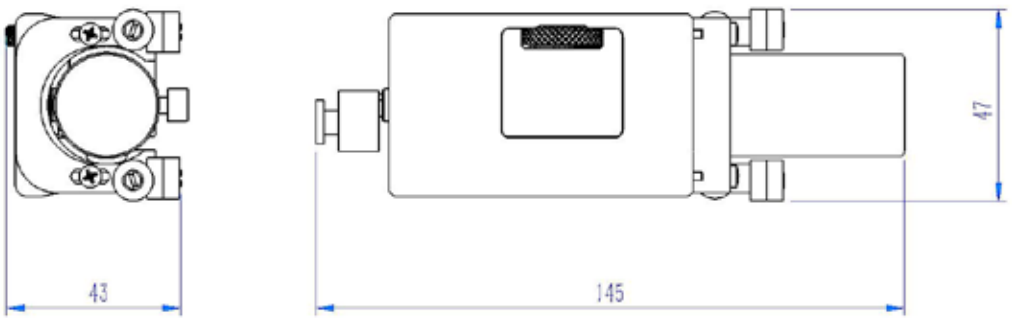
Single rob assembly package

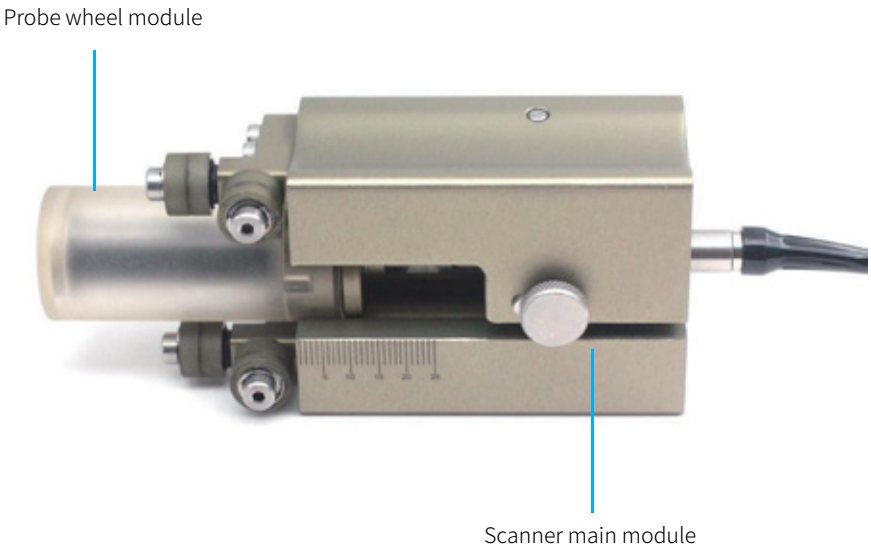
Net weight (kg)	Gross weight (kg)	Package box (mm)
1.65	8.20	570*235*465

Mini roller scanner R4

R4 mini roller scanner is a handheld scanner equipped with phased array probe, mainly used for the detection of composite materials and other smooth surface materials, such as those commonly used in the aerospace industry.The scanner tires are made of unique acoustic rubber,low pressure is required to provide good coupling, thus ensuring high quality ultrasonic testing.

It is mainly composed of scanner main module and probe wheel module, simple and compact structure, suitable for use in limited and narrow Spaces.



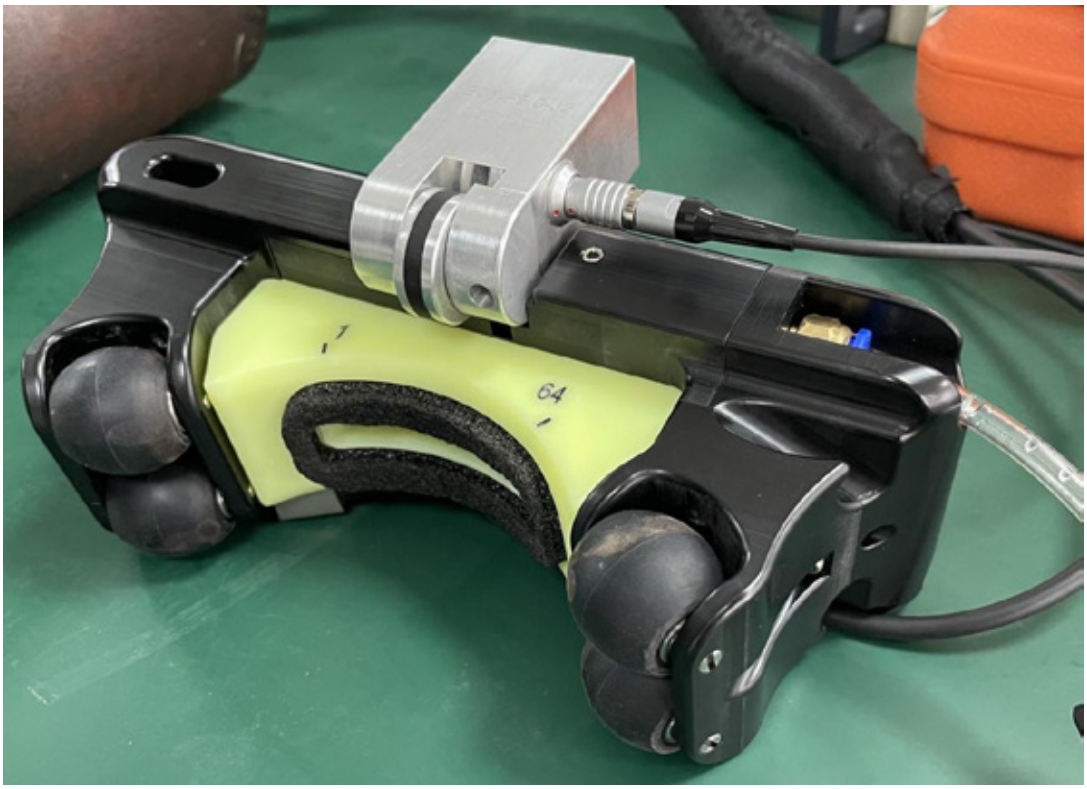


Model	Features and Applications
R4 Mini roller scanner	1, Good coupling effect, only need a small amount of coupling agent 2, Easy installation and high scanning efficiency 3, Compact and light structure, suitable for operation in narrow space 4, Special acoustic rubber wheel with acoustic impedance similar to water 5, Suitable for testing composite materials and other materials with smooth surfaces

·Technical specification

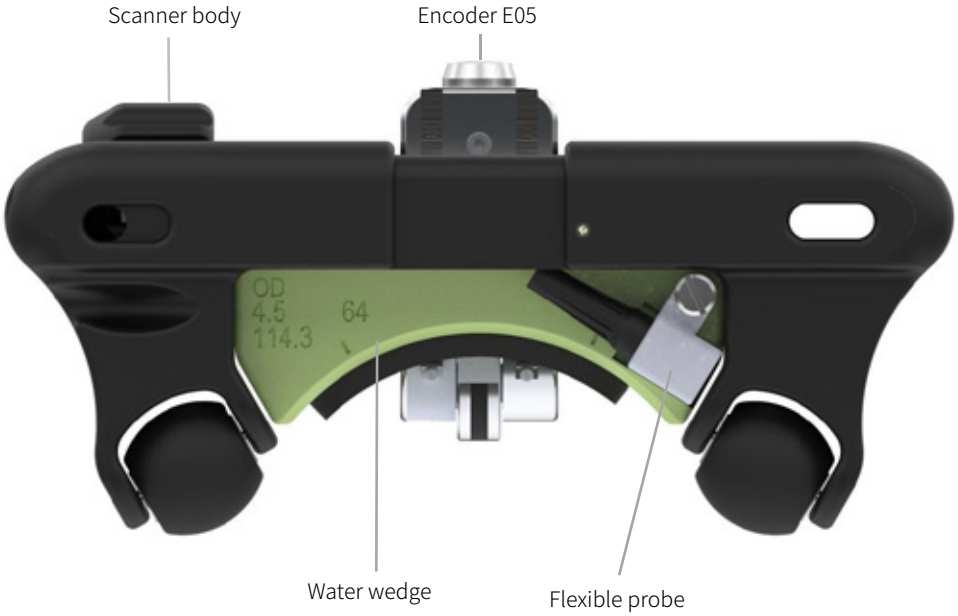
Parameter	Parameter value
Frequency	10MHz、15MHz
Number of array element	64
Elements distance	0.3mm
Secondary axial length	3mm
The thickness of the tire water laye	8mm

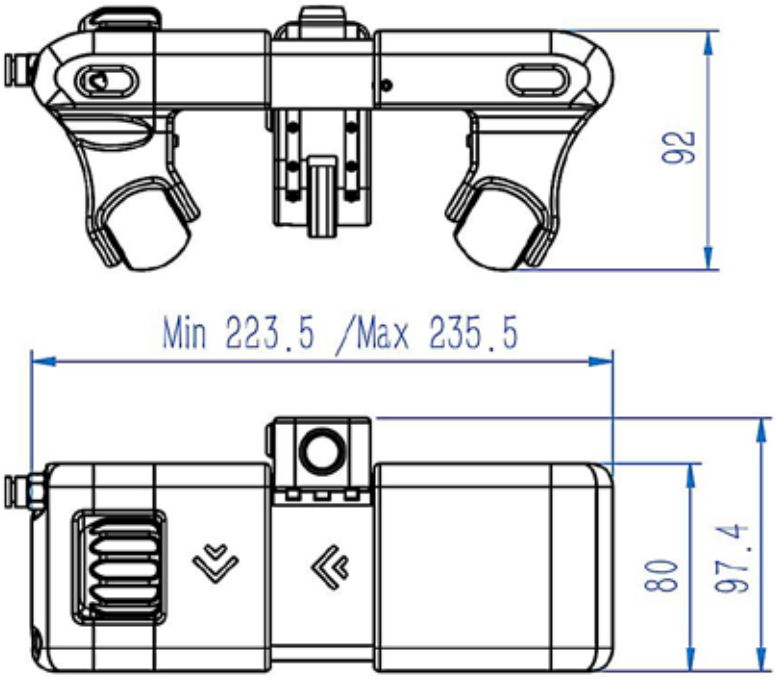
Bend pipe corrosion scanner R5



R5 detects pipe or pipe elbow inner wall corrosion, flexible probe inserted into the water wedge, and fixed on the water wedge block.Its bending shape changes with the radian of the wedge, and the flexible probe passes through the coupling of water inspect pipes. Each water wedge has a different diameter to accommodate a range of pipe diameters. By adjusting the scanner, different water wedges can be clamped.We can supply suitable water wedge.

It is a standard modular design that can be replaced with different frequency flexible probes according to inspection requirements applications.The main modules include: scanner body, E05 encoder, water wedge block, flexible probe.


Scanner body
Encoder E05
OD
4.5
114.3
64
Water wedge
Flexible probe


92
Min 223.5 /Max 235.5
80
97.4

Model	Features and Applications
R5 Bend pipe corrosion scanner	1. Quickly measures the wall thickness of elbows 2.Scanning the entire elbow area to provide high detection rate 3. The scanner is equipped with an intelligent step clicker button 4.The same probe and scanner can be used to scan all pipes and elbows within a certain diameter range 5. Water wedges of different specifications can be replaced to adapt to scanning of different pipe diameters

·Specifications of wheel scanner

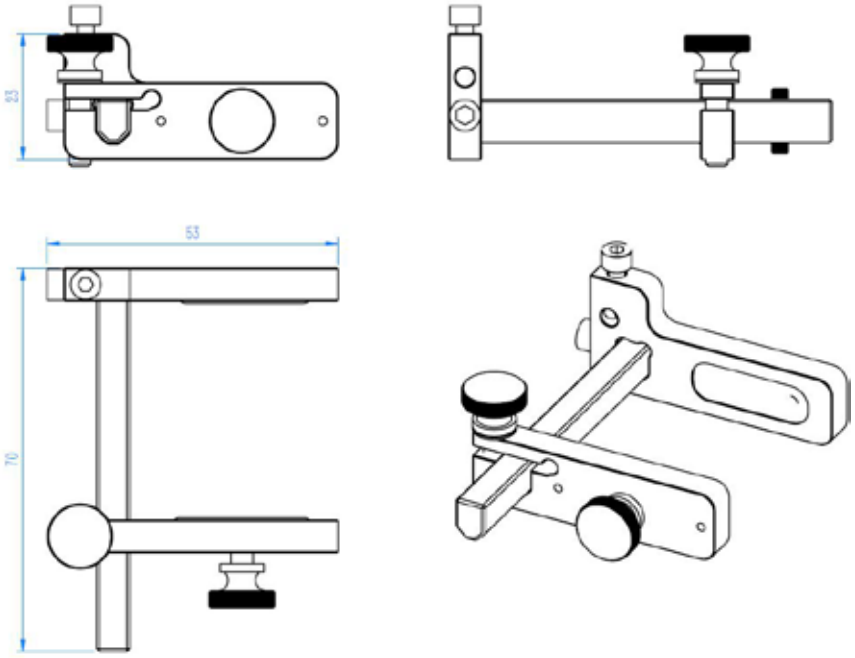
Use range of water wedge

Wedge diameter		Minimum pipe outer diameter		Maximum pipe outer diameter	
inch	mm	inch	mm	inch	mm
4.5	114.3	4.4	111.8	4.5	114.3
5.563	141.3	5.4	137.2	5.6	142.2
6.625	168.3	6.4	162.6	6.8	172.7
8.625	219.1	8.3	210.8	8.8	223.5
10.75	273.1	10.3	261.6	11.1	281.9
11.75	298.5	11.1	281.9	12.1	307.3
12.75	323.9	12.1	307.3	13.3	337.8
14	355.6	13.1	332.7	14.6	370.8
16	406.4	14.9	378.5	16.8	426.7
18	457.2	16.6	421.6	18.9	480.1
20	508	18.4	467.4	21.1	535.9
22	558.8	20.1	510.5	23.4	594.4
24	609.6	21.7	551.2	25.7	652.8
26	660.4	23.3	591.8	28	711.2
28	711.2	24.9	632.5	30.3	769.6
30	762	26.4	670.6	32.7	830.6
32	812.8	28	711.2	35.1	891.5
34	863.6	29.5	749.3	37.4	950
36	914.4	31.3	795	39.6	1005.8
38	965.2	32.5	825.5	42.4	1077
42	1066.8	35.4	899.2	47.4	1204
48	1219.2	39.6	1005.8	55.1	1399.5
平板		200	5080	平板	

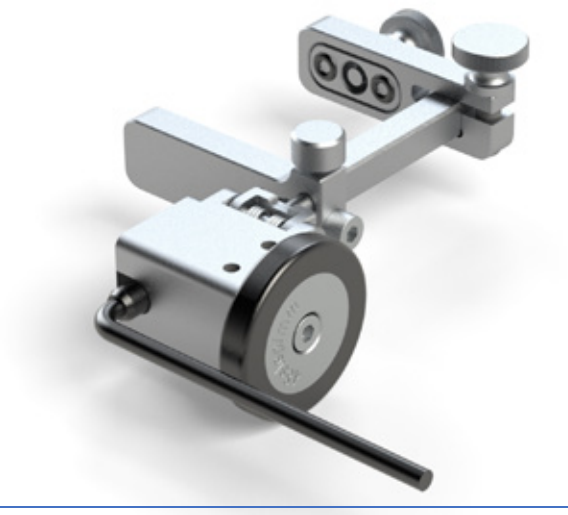
Micro scanner R6

The M2 Mini Scanner R6 is compact, durable and ergonomic in design, making it an excellent tool for scanning in tight Spaces.Enhance the corrosion scanning experience through versatility, functionality and simplicity.

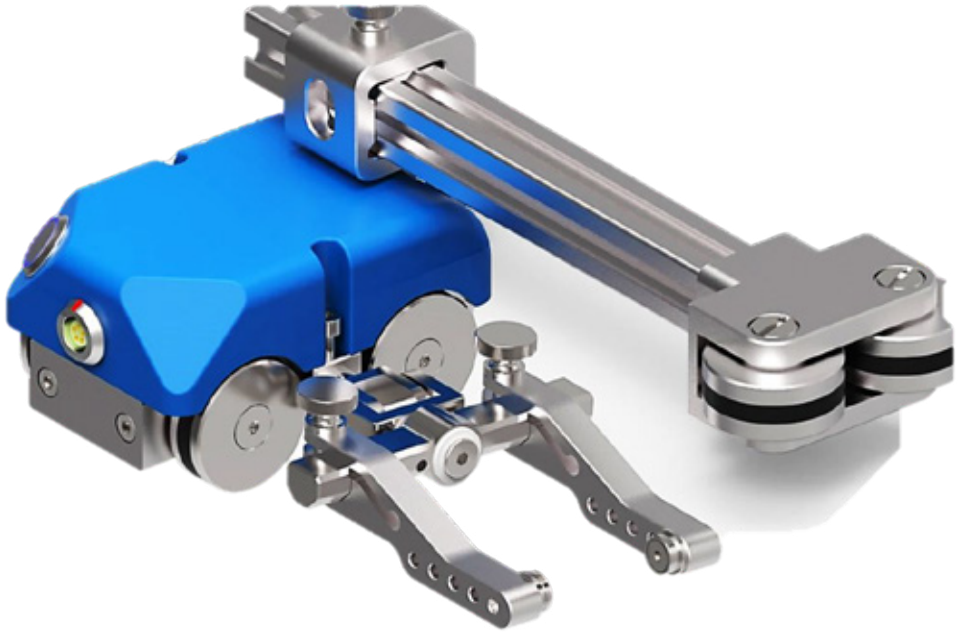
Suitable mangraph encoders can choose from a variety of connector types, matching Olympus,M2M,GE, ZETEC, in section and other mainstream manufacturers of instruments.



Model	Features and Applications
R6 Micro scanner	1, Single probe simple scanning frame is mainly used for detection of array probe of pipeline and flat weld 2, Simple structure, quick disassembly, convenient installation 3, Can assemble the encoder for scanning, and change the clamping direction of the encoder to 90° as required, compatible with ‘axial scanning’ and ‘circumferential scanning’ 4, Clamping width is adjustable, the maximum clamping width is 58 mm.It can also be customized to increase the clamping width to support encoder scanning, suitable for mangraph encoder E01



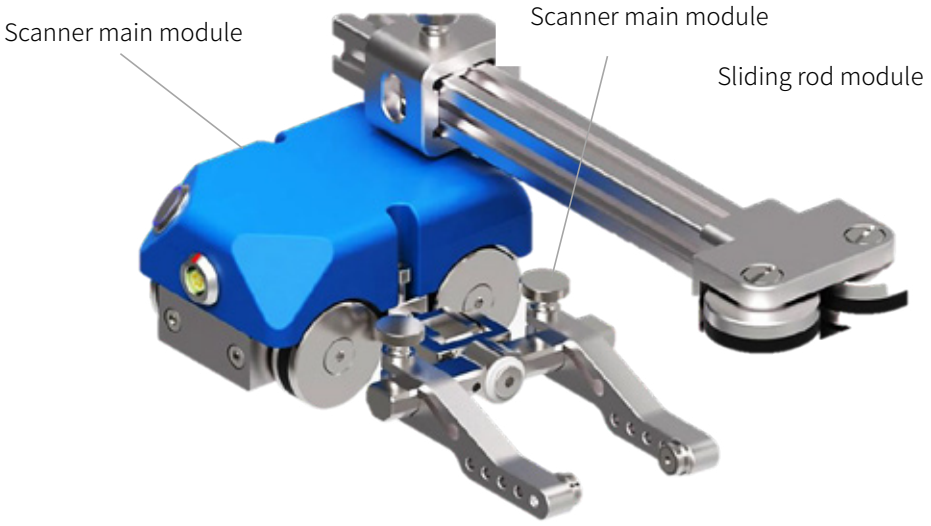
Mirco mouse scanner R13

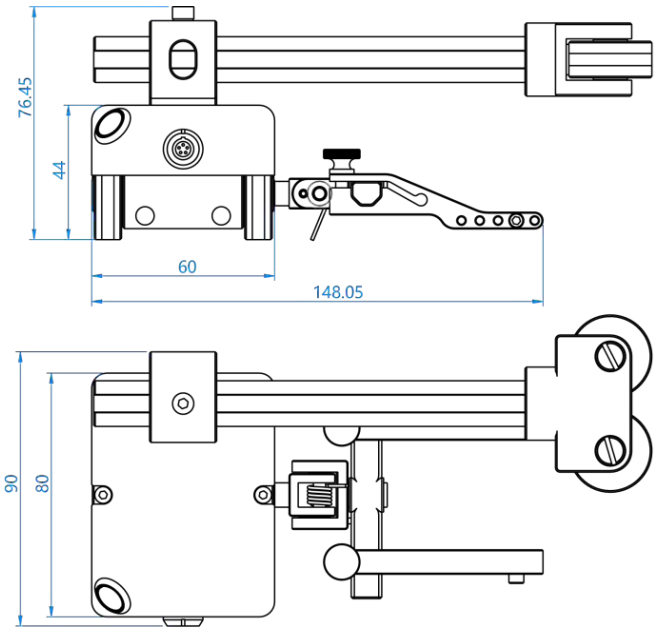


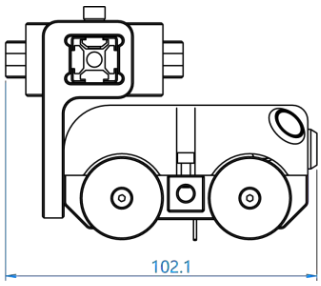
R13 is a scanner with magnetic wheel, detection of pipeline welding seam or plane plate welding seam scanner.

R13 is composed of three parts: scanner main module, clamping head module, sliding rod module.Depending on the operating condition, the slider module may not be installed, or it may be installed.In general, only when the slider module has a positioning surface can the slider module be installed for detection.The clamping head module can be installed on the right or left side according to the working condition.

Model	Features and Applications
Mirco mouse scanner R13	1, Adjustable fork clamp for quick and easy installation of multi -dimensional wedges 2, Four magnetic wheels have strong adhesion performance, which can maintain the contact state with the measured surface 3, Clamping head module can be installed on the right or left side according to the working condition 4, Including intelligent step clicker button 5, The overall structure of the scanner is compact and light



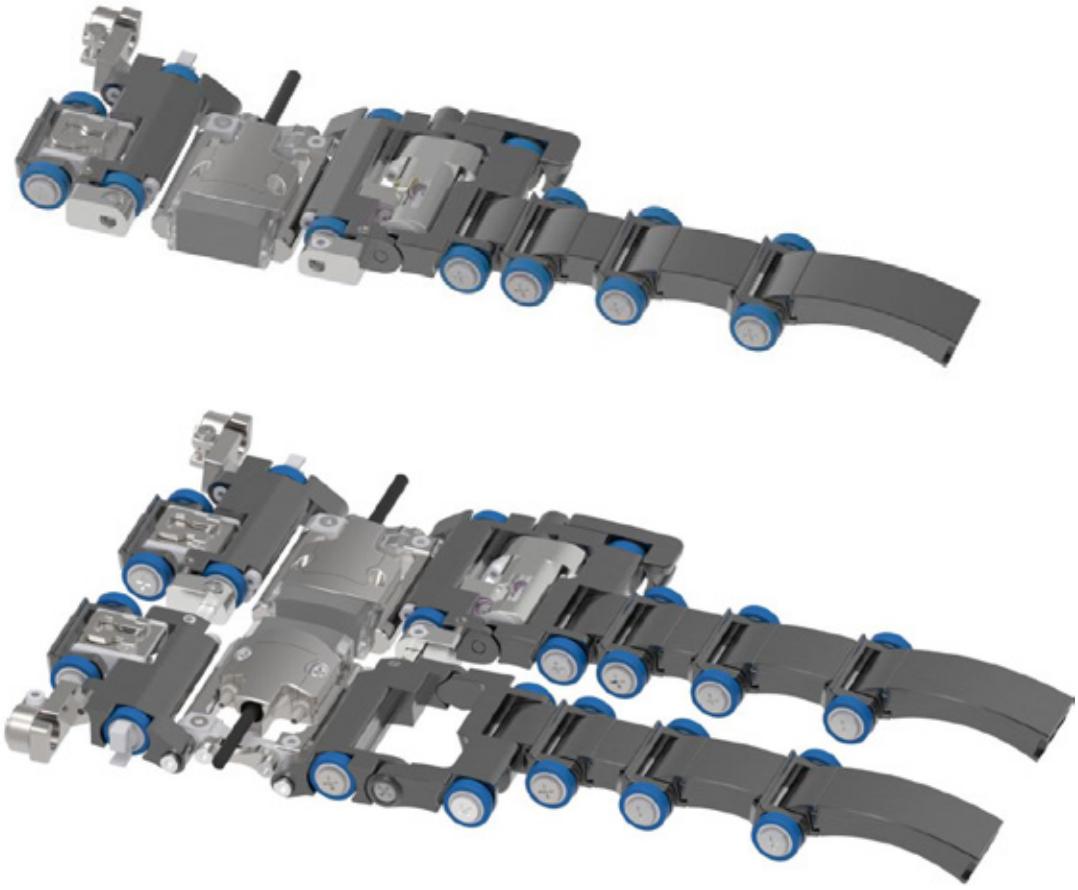




·Specifications of wheel scanner

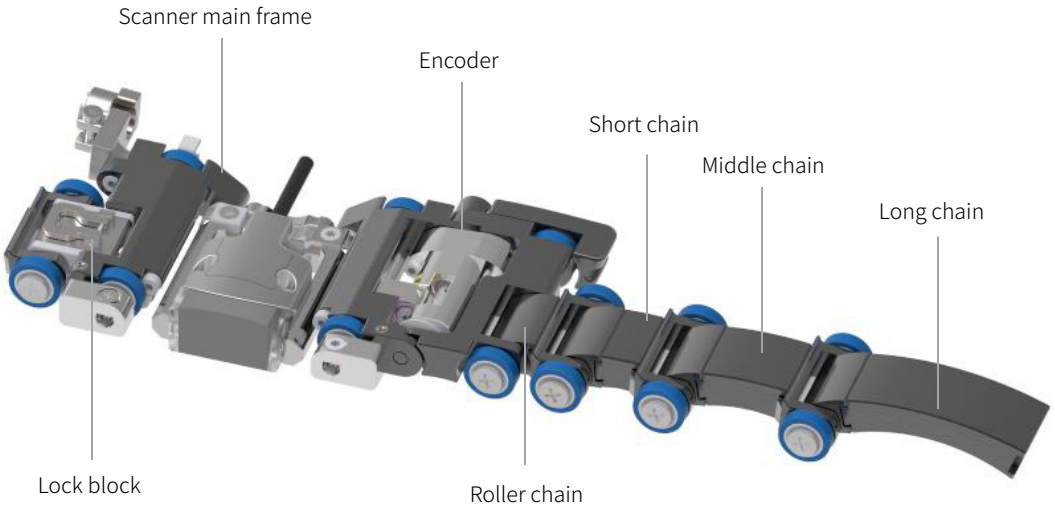
Project	Parameter
Shape dimensions (length × width × height)	80 mm × 54mm × 150 mm
Encoder voltage	5 V
Encoder current	Max 25 mA

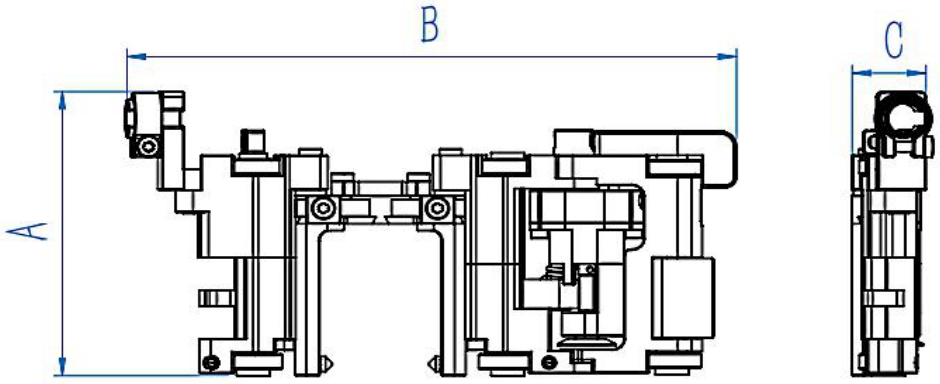
Small diameter pipe weld scanner R20 series



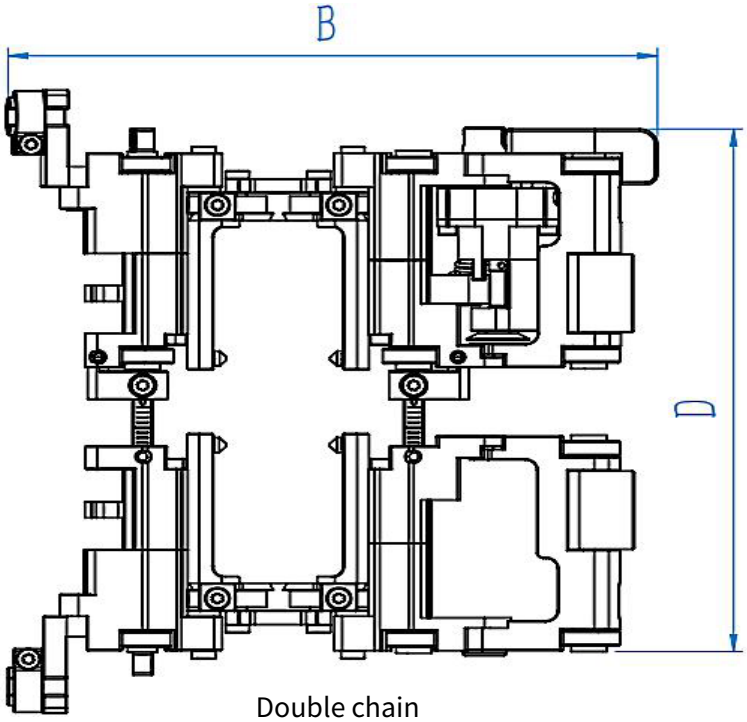
R20 series is divided into single chain and double chain , the scanner structure is slender and flat chain, suitable for small pipe diameter detection space is extremely narrow.

R20 series scanner is mainly composed of scanner main frame module, encoder module, rolling chain module, short chain module, middle chain module, long chain module, lock block and other structures. By configuring different number of chain components, it can be surrounded in different diameters of pipelines.





Single chain



Double chain

Project	Numerical	Note
A	54mm(2.1 inch)	
B	110mm(4.3 inch)	
C	11mm(0.43 inch)	
D	140mm(5.5 inch)	connecting rod 37mm
	172mm(6.8 inch)	connecting rod 69mm
	197mm(7.8 inch)	connecting rod 94mm
	222mm(8.7 inch)	connecting rod 119mm

Model	Features and Applications
R20 series - Small diameter pipe weld scanner	1, R20 scanner is compact and light in structure, suitable for pipe detection with narrow space 2, Through the configuration of different number of chain parts, it can adapt to different diameters of the pipeline 3, Single chain or double chain can be selected according to the actual working condition 4, Double chain can be installed two probes, the space between the two probes is adjustable 5, The replacement operation of probe and wedge is simple and convenient

· Specifications of wheel scanner

(1) Short lock block configuration

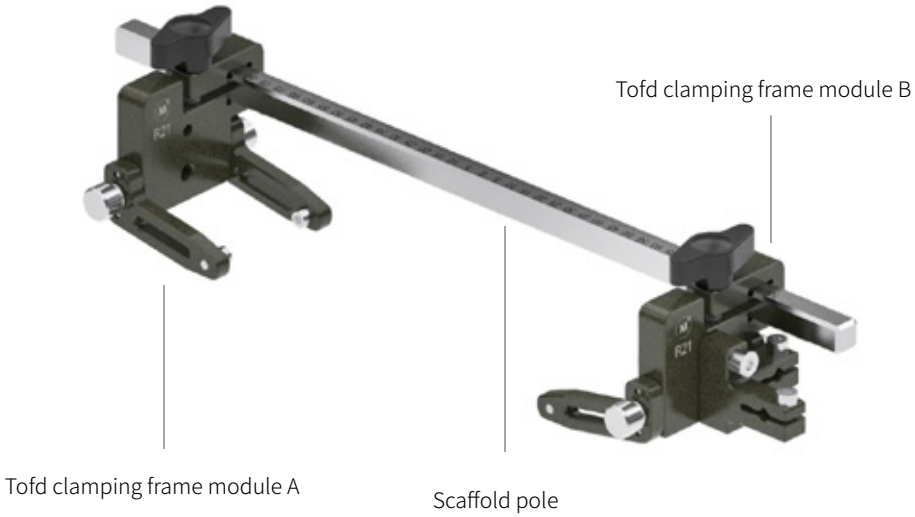
Short lock block							
Pipe diameter				Chain module			
MIN(In)	MAX(In)	MIN(mm)	MAX(mm)	Short	Middle	Long	Roller
0.84	0.94	21	24	0	0	0	0
0.94	1.03	24	26	0	0	0	0
1.02	1.11	26	28	0	0	0	1
1.11	1.20	28	30	1	0	0	1
1.20	1.28	30	33	0	0	0	2
1.28	1.37	33	35	1	0	0	2
1.37	1.45	35	37	0	0	0	3
1.45	1.53	37	39	1	0	0	3
1.53	1.62	39	41	0	0	0	4
1.61	1.70	41	43	1	0	0	4
1.70	1.78	43	45	0	0	0	5
1.78	1.86	45	47	1	0	0	5
1.86	1.95	47	50	0	0	0	6
1.94	2.03	49	52	1	0	0	6

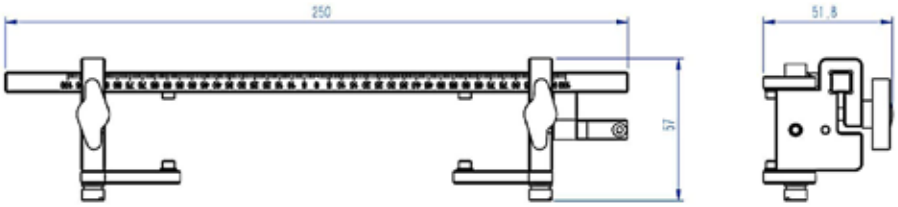
(2) Short lock block configuration

Long lock block							
Pipe diameter				Chain module			
MIN(In)	MAX(In)	MIN(mm)	MAX(mm)	Short	Middle	Long	Roller
2.01	2.15	51	55	0	1	0	5
2.14	2.28	54	58	1	2	0	4
2.27	2.41	58	61	0	3	0	4
2.38	2.52	60	64	0	2	0	6
2.51	2.64	64	67	1	3	0	5
2.64	2.77	67	70	0	4	0	5
2.76	2.89	70	73	0	1	2	4
2.88	3.01	73	76	0	3	1	5
2.99	3.12	76	79	0	0	3	4
3.11	3.24	79	82	0	2	2	5
3.23	3.37	82	86	0	4	1	6
3.34	3.47	85	88	0	1	3	5
3.47	3.60	88	91	0	3	2	6
3.57	3.70	91	94	0	0	4	5
3.69	3.83	94	97	0	2	3	6
3.80	3.93	97	100	1	0	4	6
3.92	4.05	100	103	0	1	4	6
4.00	4.13	102	105	1	1	4	6
4.12	4.25	105	108	0	2	4	6
4.19	4.32	106	110	1	2	4	6
4.31	4.45	109	113	0	3	4	6
4.42	4.55	112	116	1	1	5	6
4.54	4.67	115	119	0	2	5	6

Mirco rod scanner R21

R21 is a light and simple rod scanner, mainly used to detect pipeline welding seam or plane plate welding seam.The micro rod scanner consists of rod bracket, TOFD clamping frame module A, TOFD clamping frame module B and other parts, according to the working conditions, it support rod length can be customized.

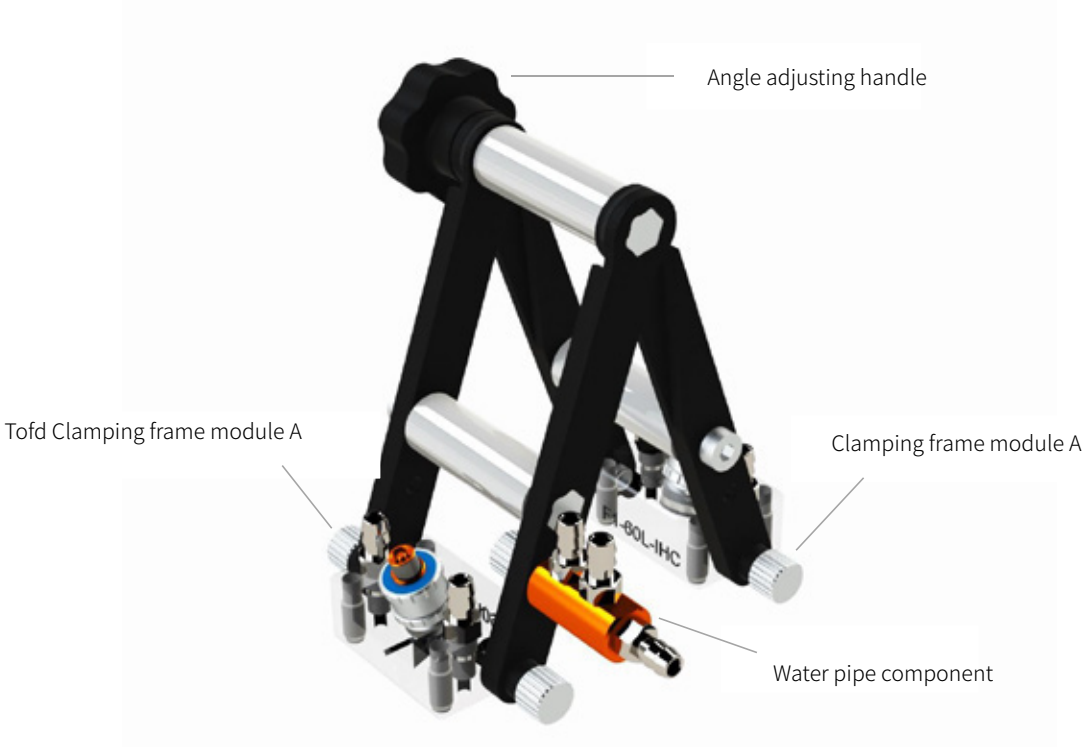


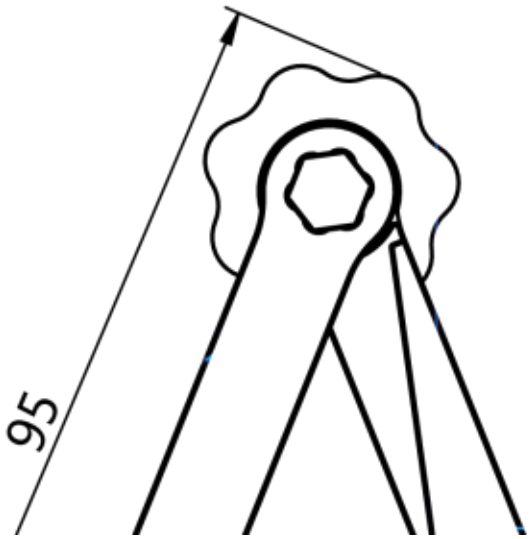


Model	Features and Applications
R21 - Mirco rod scanner R21	1, The scanner is lightweight in structure and supports the detection of pipeline welds or flat plate welds 2, The scanner can be installed with two TOFD probes, and the probe position is adjustable on the support rod 3, The clamping arm is convenient for disassembly and assembly at the side 4, Different sizes of rod supports can be selected according to the working conditions

Tofd Mirco scanner R22

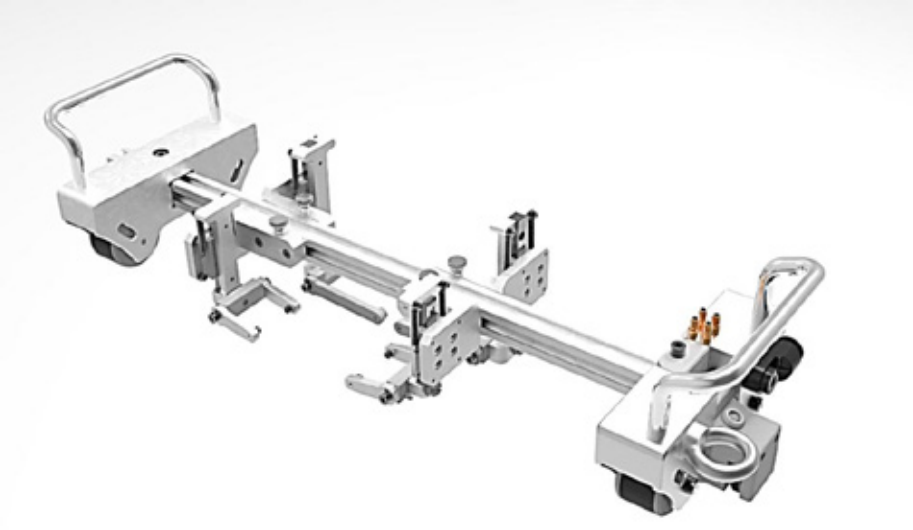
R22 is mainly used to detect pipeline weld or flat plate weld.The scanner is composed of angle adjustment handle, TOFD clamping frame module A, TOFD clamping frame module B, water distribution pipe assembly and other parts.The main bracket of the scanner adopts a step ladder structure, and each side can hold a TOFD probe.The Angle of the main bracket can be adjusted to adjust the distance between the two probes.The overall structure of R20 scanner is simple, convenient disassembly and assembly, elastic clamping, hand-held operation.





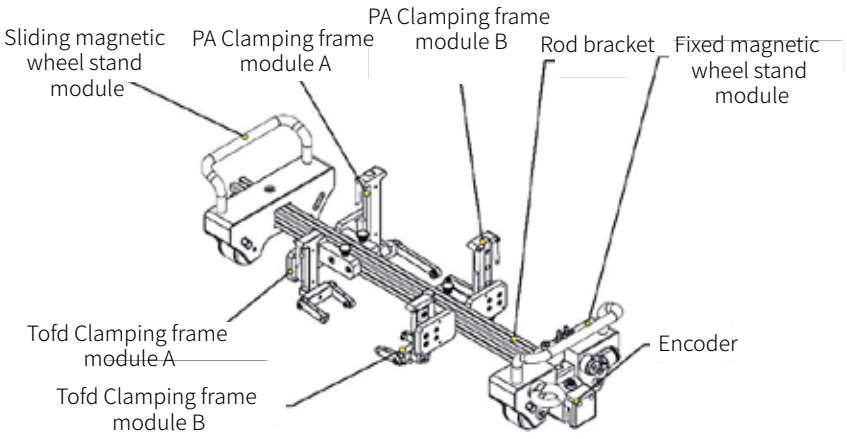
Model	Features and Applications
R22 - Tofd mirco scanner	1. TOFD probe detection for pipe and plate welds 2. Simple structure, convenient disassembly and assembly, elastic clamping and hand-held operation 3. One main pipe is divided into two branch pipes, which are suspended and portable 4. The angle of the main support is adjustable, and the angle range is 14 ° - 290 ° 5. Detection range of probe center distance: 19-156mm 6. The clamping width can be customized and increased as required

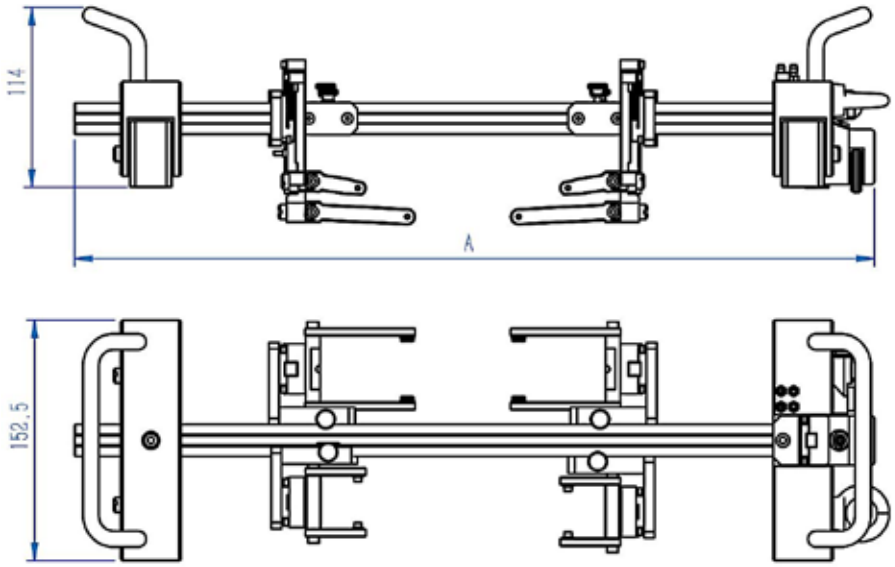
Rod scanner R23



R23 rod scanner is with magnetic wheel, which is used to detect pipeline welds or flat plate welds.

It is composed of 8 parts: sliding magnetic wheel frame module, PA clamping frame module A, PA clamping frame module B, rod support, fixed magnetic wheel frame module, TOFD clamping frame module A, TOFD clamping frame module B, encoder, according to the working condition, it can choose PA clamping frame module;Or TOFD clamping frame module;Or PA gripper module and gripper module.The standard length of rod support is available at 250mm, 450mm and 650mm.





Model	Features and Applications
R23 - Rod scanner	1, R23 with magnetic wheel, support to detect pipeline weld or flat plate weld 2, The scanner can be installed with up to four probes, and the probe position can be on the bracket rod 3, The clamping arm is convenient for disassembly and assembly on the side 4, Support encoder scan, quick disassembly, easy installation 5, It can choose different sizes of rod support according to the working condition

·Specifications of wheel scanner

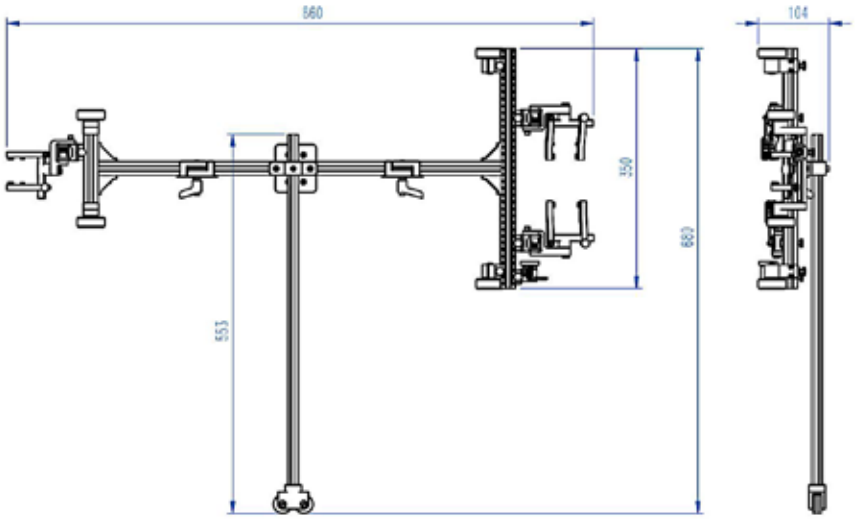
Number	Name	Model	Length of rod bracket(mm)	Length (mm)	Width (mm)	Height (mm)
1	R23-250	2TOFD+2PA+2.5J2	250	307.4	152.5	114
2	R23-450	2TOFD+2PA+2.5J2	450	507.4		
3	R23-650	2TOFD+2PA+2.5J2	650	707.4		

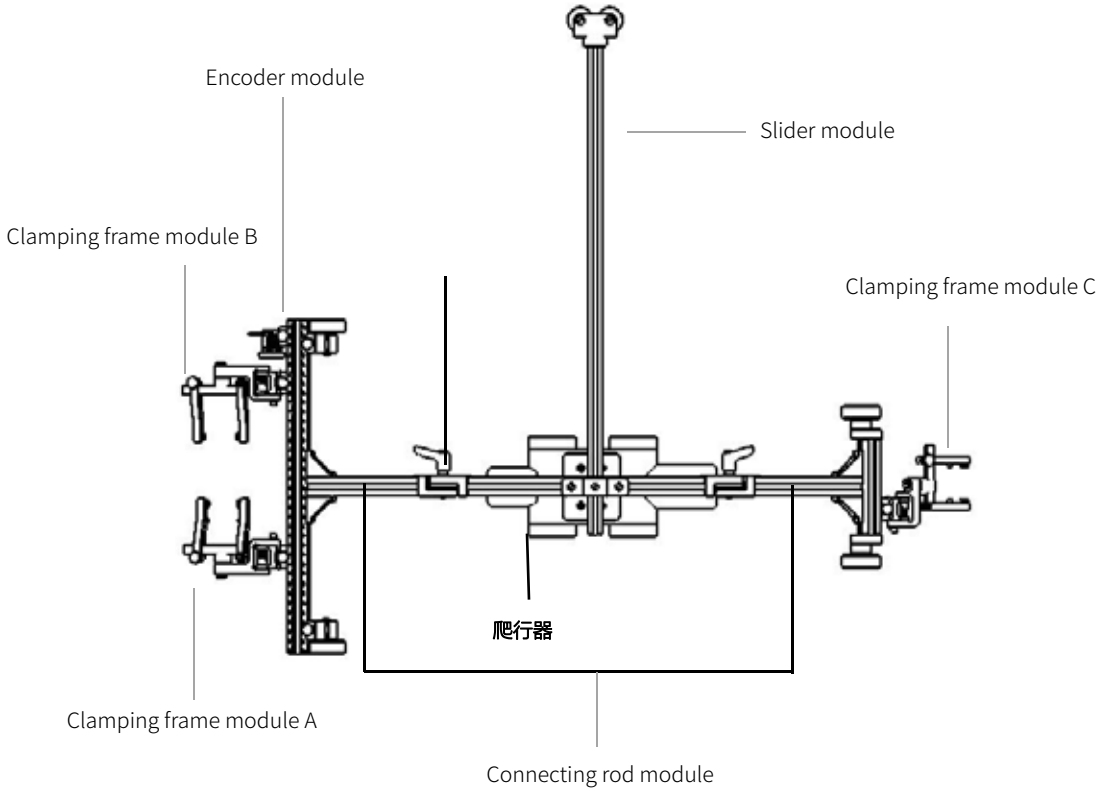
Variable diameter rod scanner R29

R29 rod variable diameter scanner is a kind of suitable flange pipe crack detection scanner, through the curvature adjustment can detect longitudinal cracks and circular cracks.The scanner can be installed with three sets of probes, enabling simultaneous detection of welds using TOFD (diffraction difference method) probe, PA (phased array) probe and pulse-echo technology.

R29 adopts standard modular design, its basic module consists of: connecting rod module, slide rod module, clamping frame A module, clamping frame B module, clamping frame C module, encoder module.

Model	Features and Applications
R29 - Variable diameter rod scanner	1, The scanner is suitable for flange pipeline crack detection, and must be used with crawler 2, The curvature of the scanner is adjustable, by adjusting the curvature can be adapted to 1m-2m flange pipe diameter 3, The scanner can be installed with up to three probes, and the probe position is adjustable on the bracket rod 4, The clamping arm of the installation probe is simple in structure and convenient for disassembly and assembly 5, Support encoder scanning, quick disassembly, easy installation 6, The size of each support rod can be customized according to the detection condition

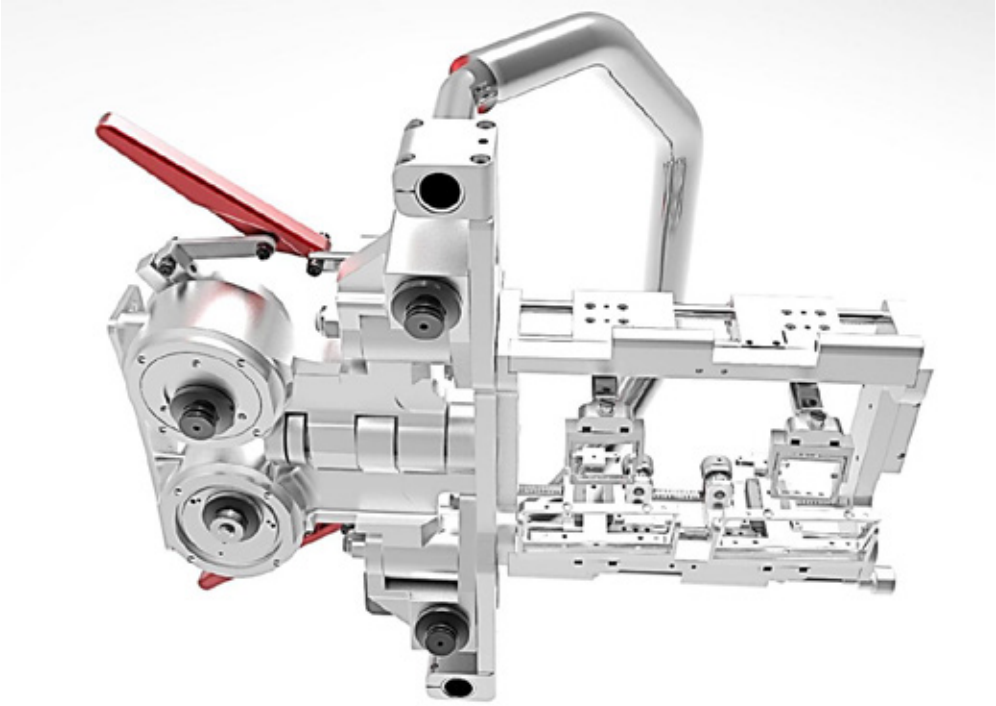




·Specifications of wheel scanner

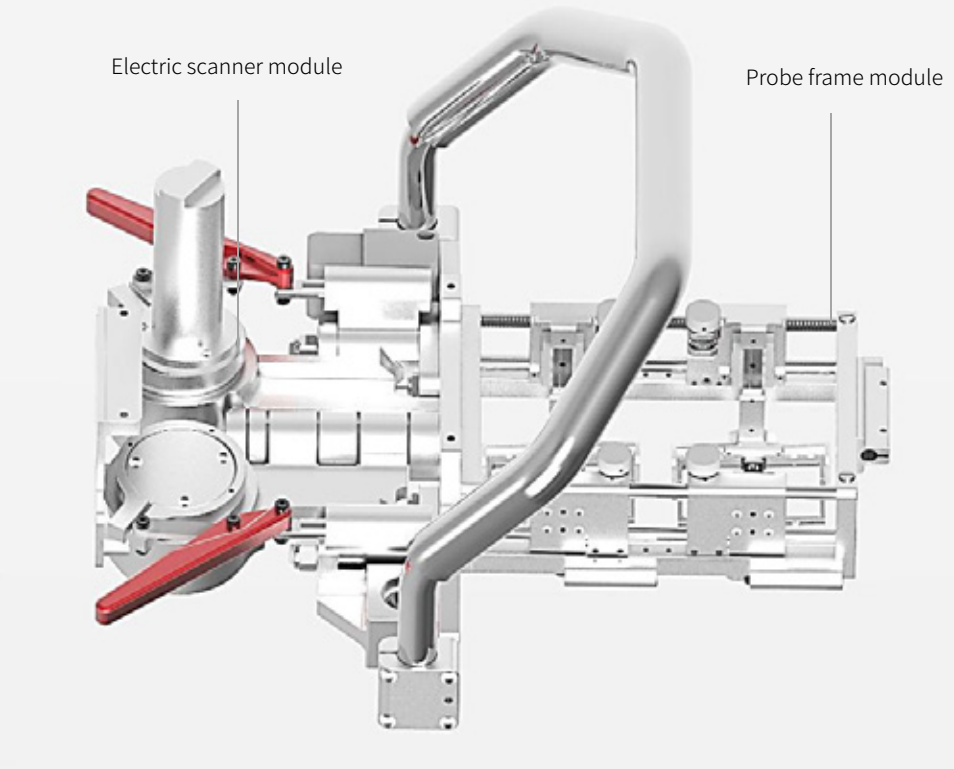
Length (mm)	Width (mm)	Height(mm)	net weight(Kg)	Gross weight (Kg)	Packaging(mm)
860	680	98	2.6	8.5	570x235x465

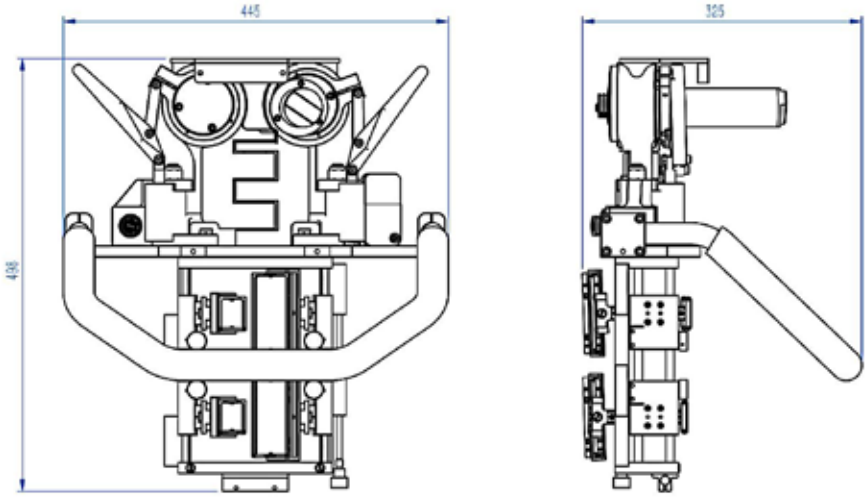
Pipeline scanner R30



R30 pipeline scanner is a kind of applicable pipeline crack detection electric scanner, mainly used to detect the pipeline ring seam.Curvature adjustment can be used for pipe diameter 12 to 48 inches.The scanner can be fitted with four sets of probes, enabling simultaneous detection of welds using TOFD (Diffraction difference method) probe, PA (phased array) probe and pulse-echo technology.

R30 pipeline scanner is mainly divided into two parts: electric scanning frame module and probe frame module. The curvature of the electric scanning frame module is adjustable, and it crawls around the detected pipeline on the track held by four clamping wheels. Different detection speeds can be selected according to working conditions.Probe frame module can be installed four groups of probe, and the probe position can be extended guide rod direction adjustment.

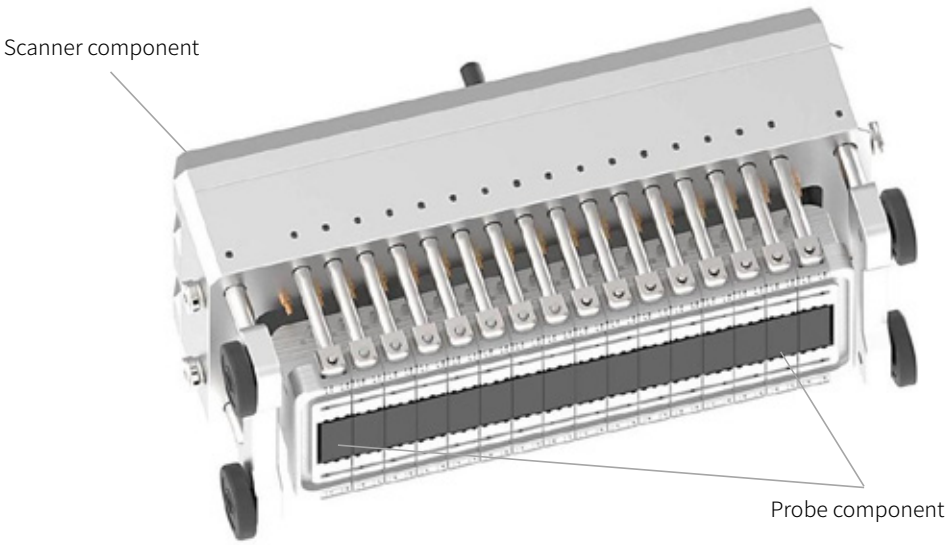


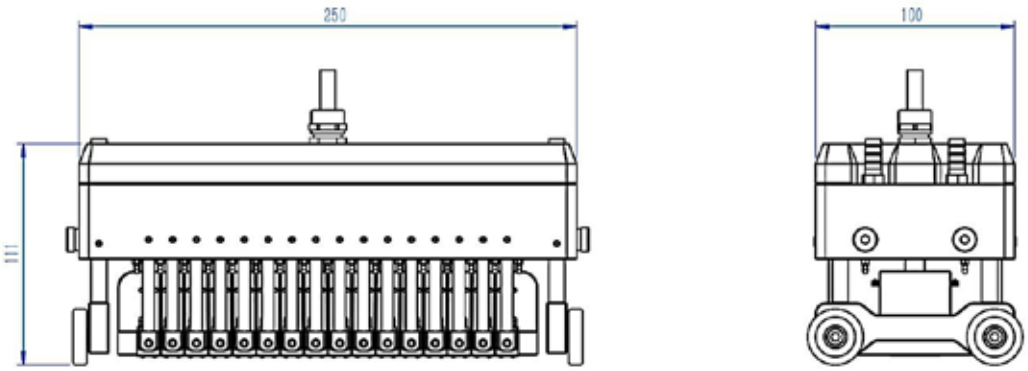


Model	Features and Applications
R30 - Pipeline scanner	1, R30 is an electric scanner, used for automatic pipe ring seam scanning 2, The curvature of scanner is adjustable, by adjusting the curvature can be adapted to 12-45 inch pipe diameter pipe 3, The scanner can be installed with up to four probes, and the probe position is adjustable on the guide rod 4, The clamping frame for installing the probe is simple in structure and convenient for disassembly and assembly 5, Support encoder scanning, quick disassembly, easy installation

Blade flexible scanner R32

R32 is mainly used to detect the defects of wind turbine blades, including the defects between the main body and rubber layer.Defects in rubber layer;Defects of rubber layer and flange surface.The scanner is composed of a main frame and a set of flexible probe (segmented).The probe adapts to the surface fitting with different curvature after pressure is applied, and the thickness of water layer at each position of the probe on the surface is consistent, so as to ensure high quality ultrasonic detection.





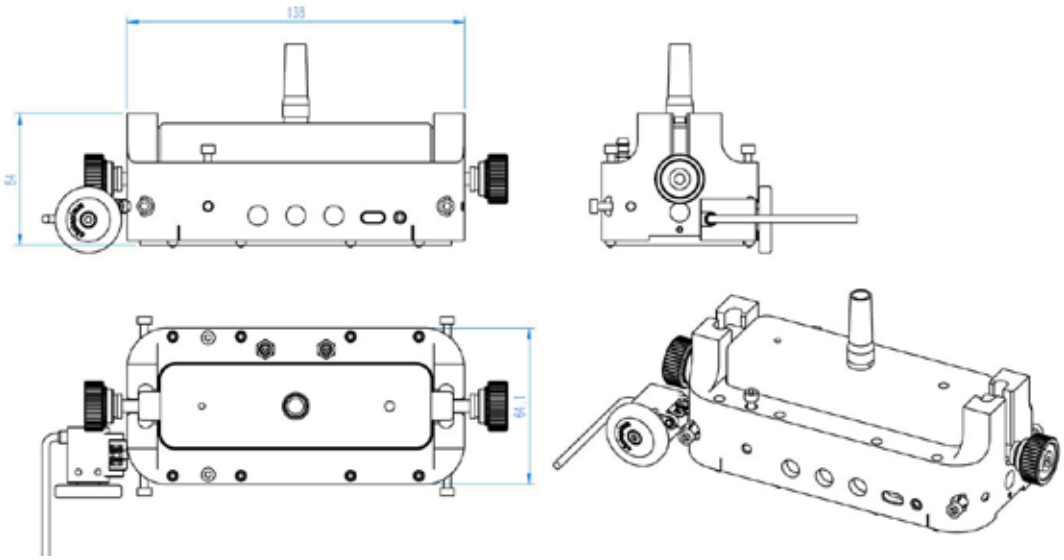
Model	Features and Applications
R32 -Blade flexible scanner	1, It is mainly used to detect the defects of wind turbine blades 2, the probe is segmented flexible probe, each group is independent, can adapt to different curvature surface fitting 3, the lower shell of the probe is inlaid with stainless steel ball, reducing the friction with the workpiece to reduce wear 4, Ensure the consistency and stability of the water layer thickness at each position of the probe on the surface 5, with water recovery device, recycling

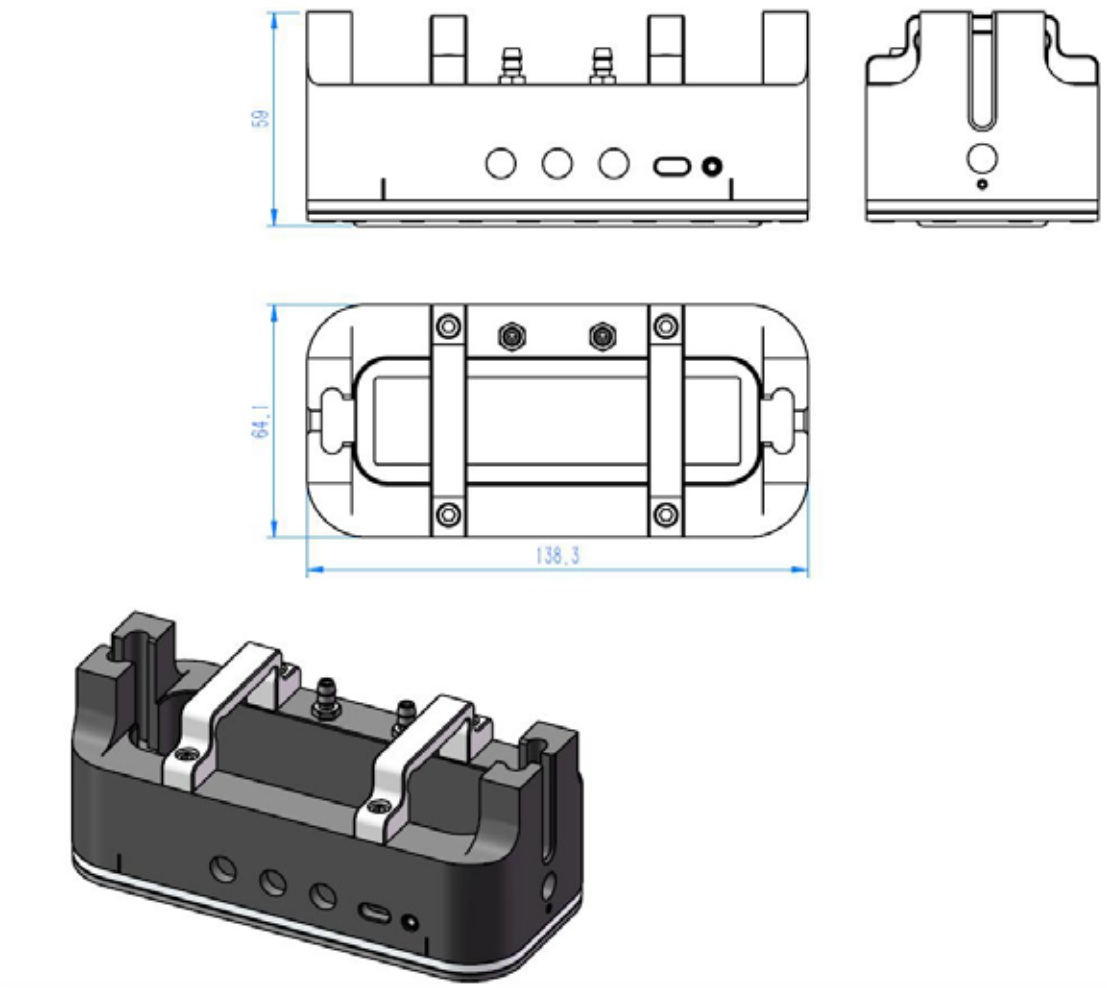
·Specifications of wheel scanner

Parameter	Parameter value
Frequency	1MHz
Number of element	128
Element center spacing	1.5mm
Secondary axial length	22mm
Thickness of the layer	1mm

Blade flexible scanner R32

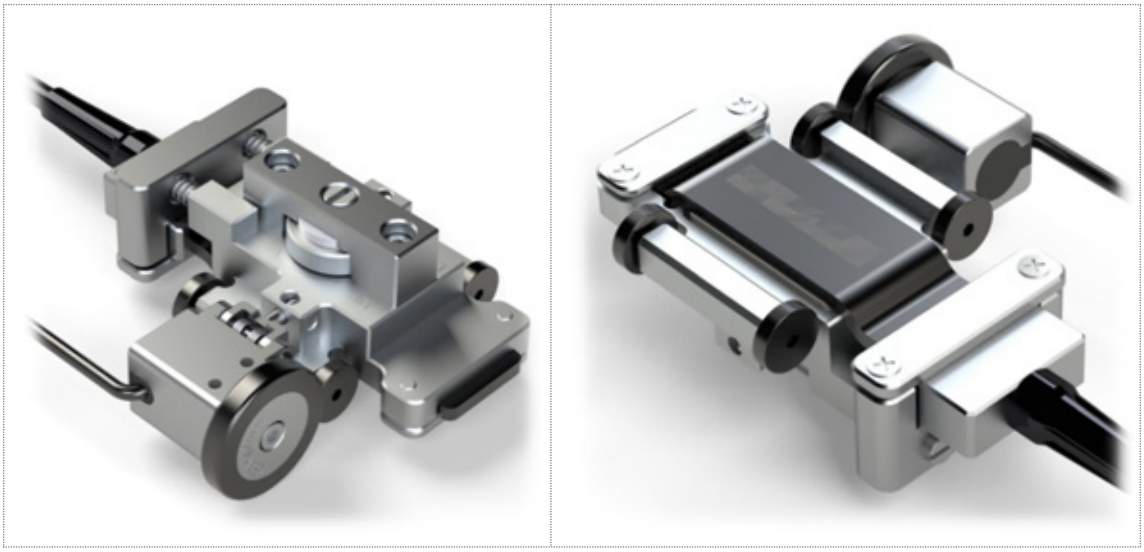
Transducer & Semi - Water scanning rack





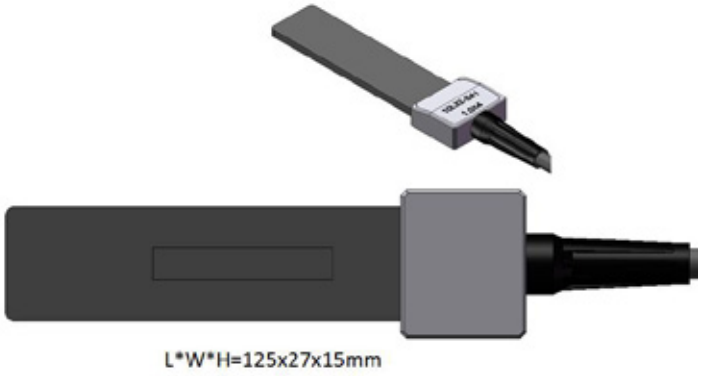
Wind power detection probe and semi-water scanning rack module can be customized, welcome to consult.

Flexible probe scanner R39

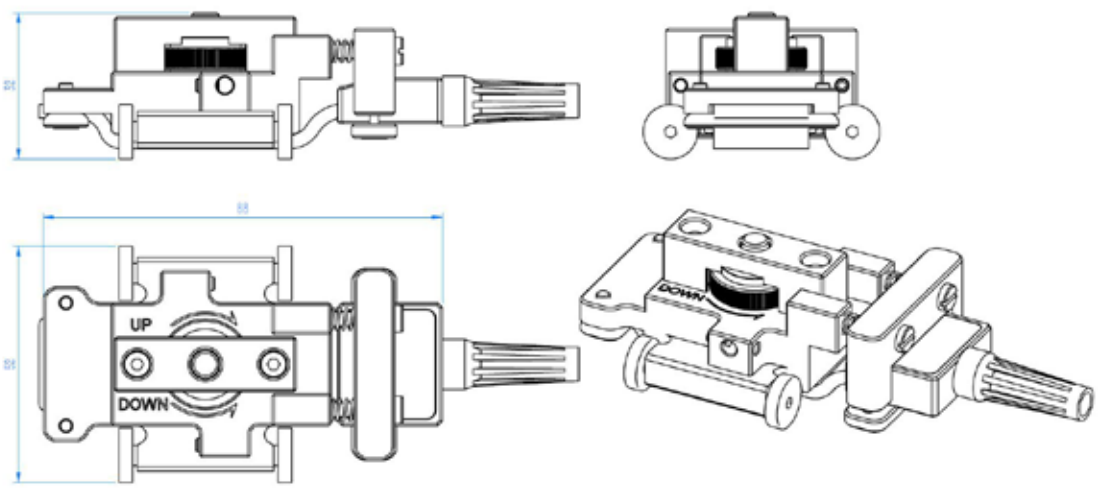


Flexible phased array probe scanner: Flexible probe can be bent at will.It uses water as a coupling medium and can be well coupled to detection pipes, rods and other components.

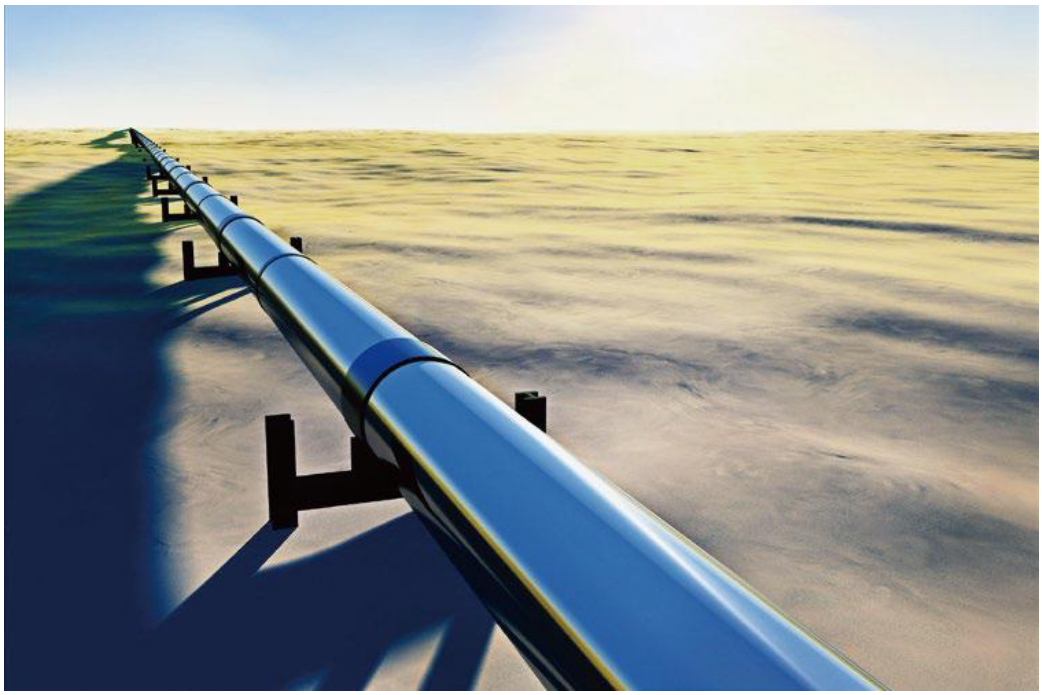
Model	Features and Applications
R39 -Flexible probe scanner	1, Bend to fit the workpiece surface, axial thickness of 3-4mm, can be placed inside the pipeline for internal inspection 2, Pipe and steel corrosion inspection, can be used for different diameters 3, Other complex geometric artifacts 4, It can measure and image the workpiece 5, Simple structure, quick disassembly, convenient installation 6, Support encoder scan, quick disassembly, easy installation



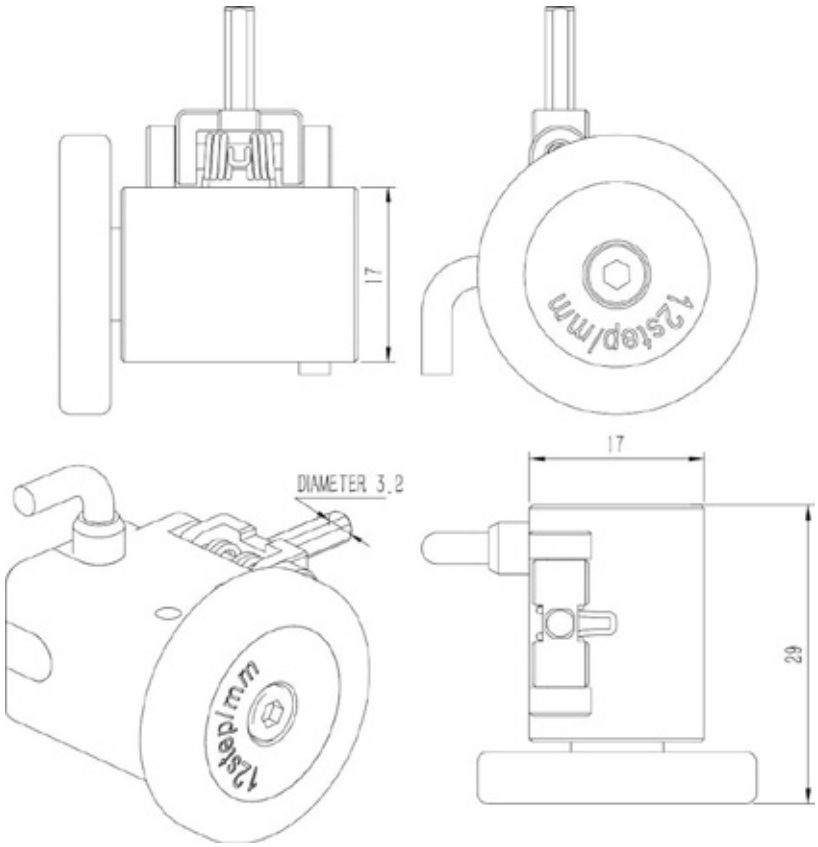
M2 flexible probe, suport customizied order



(Application: corrosion detection)



Encoder E01



Model	Features and Applications
Encoder E01	1, Stainless steel silent bearing structure, durable and stable. 2, Epoxy wear-resistant Pu rubber coated roller, no wear of workpiece. 3, Cable Connection：Top or side. 4, Precision step (12 steps / mm) resolution scale. 5, The encoder pin shaft (3mm) is locked with screws. 6, Easy to realize 90 degree angle scanning with conversion axis. 7, The coding wheel with elastic support of double torsion spring can be pressed reliably, adapt to complex environment and detect accurately. 8, Easily realize 90 degree corner scanning with conversion axis 9, There are M3 threaded holes at the top of encoder housing, which is convenient for reliable and stable screw clamping 10, Bilateral torsion spring elastic support coding wheel reliable pressing, adapt to complex environment, accurate detection

Couplant Feed Unit R9

Couplant Feed Unit R9 is a portable pull rod toolbox integrated filter, mute motor, air pressure diaphragm pump, flow control device, supply to probe by the pipe, coupling agent stored in the supply tank air bag, pressure flow control device can adjust the pressure automatic supply coupling agent matching scan as needed.

Airbag pressure max 1.0 Mpa.

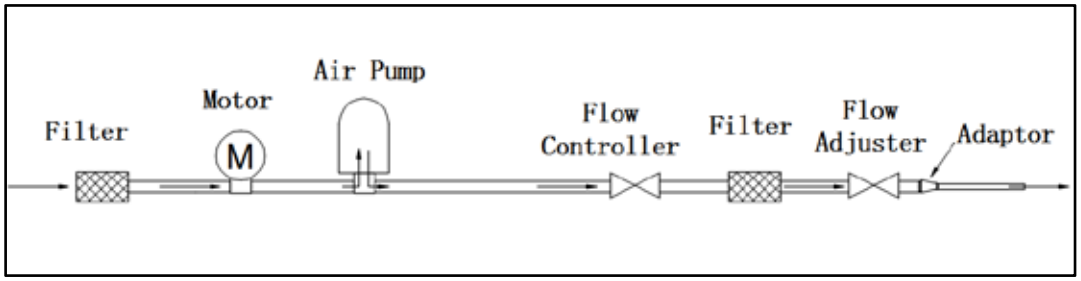
Air pressure diaphragm pump tank capacity 1 liter.

12 lithium batteries built into operating box.

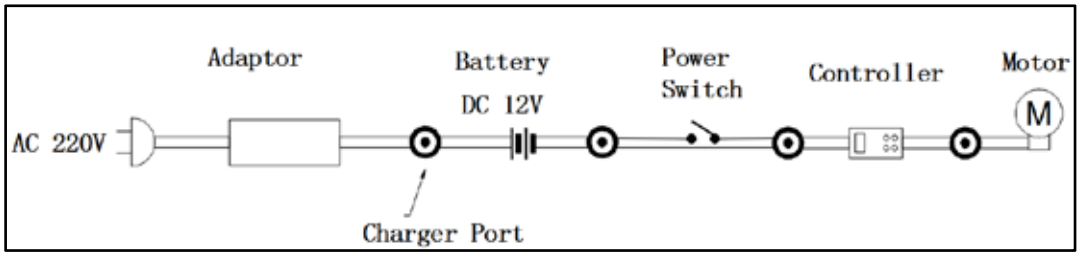
R9 supply device operation box reference diagram is as follows:

Operation diagram of operation box and panel:

R9 Couplant Feed Unit Waterway diagram



R9 Couplant Feed Unit Circuit diagram



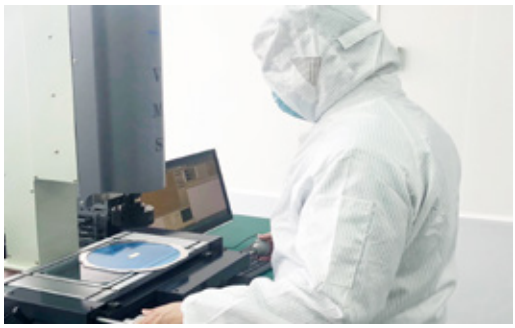
Manual couplant feed unit is also available for order, please contact us.

List of parts and accessories:

Name	Number
Operation box	A set
Inlet pipe fittings (OD12mm)	1.5m
Outlet pipe fittings (OD6mm)	6m
Outlet pipe fittings (OD3mm)	2m
Power adapter	1

Lab级生产工艺
Lab-level Manufacturing

无尘车间
Dust–free workshop



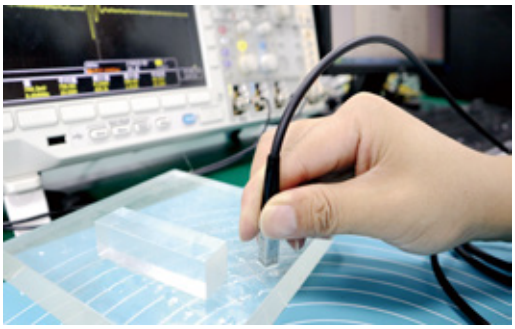
晶片切割
Elements cutting

组装车间
Array production

晶片安装
Elements combination

制程检验
In–process inspection

性能测试
Performance test



计量实验室

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应用开发

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