

Applications
Brochure

CORROSION MAPPING SOLUTIONS

Keep critical assets in safe operating condition

The complete turnkey phased array ultrasonic testing (PAUT) solution comprising instruments, scanners, and probes to cover a wide range of applications - Up to 150°C Semi-Automated & 350°C Automated.

THE BEYOND CURRENT SOLUTION

It is well known and documented that corrosion and erosion are universal integrity threats across many industry sectors. Inspecting for the reduction in wall thickness of industrial components can help asset managers calculate corrosion rates, plan remedial maintenance, and most importantly, prevent potential loss of containment incidents that have significant cost and environmental impact.

Eddyfi Technologies provides a comprehensive range of highly innovative ultrasonic corrosion inspection solutions. The non-intrusive technique is typically utilized on the external surface of a test component, providing a 2D map representing the condition and visually highlighting variations in material thickness due to material loss, graphically portrayed as an easy to interpret picture. The data sets are fully recordable which carries a wealth of benefits including offline analysis and repeatability. This improves accuracy for repeat surveys and auditable data, suiting compliance within industry regulations. Each of these benefits help control the exclusion of human error, and as a result, increased probability of detection (POD) and accuracy of results.

Eddyfi Technologies offers a complete solution with advanced phased array instruments, a range of automated and manual scanners, and a full range of probes and wedges.

Our team of technical experts have invested time in creating ready made kits ensuring we deliver highly optimized turnkey solutions.

Pairing Cypher® with the automated solution unlocks a new level of autonomy through seamlessly integrated piloting control.

The technical expert driven solutions are available in both conventional and phased array ultrasonic testing method types. Due to the larger footprint of PAUT probes, productivity is significantly increased and the data benefits from enhanced resolution, resulting in a high POD and sizing accuracy. Recognition from various inspection bodies and asset integrity engineers has resulted in PAUT becoming the preferred technique and is widely used for the in-service detection and characterization of corrosion in pipes, tanks, vessels, and other critical assets.

Our solutions consist of advanced phased array instruments, semi-automated and manually encoded scanners, and a full range of probes and accessories. The software driving the instruments benefit from many corrosion specific features; these tools simplify and streamline setup through to analysis and reporting, which help demonstrate the inspection campaign results to asset owners. In addition to this, users gain inspection efficiency and an enhanced user experience.

- Simple workflow for setup creation and adaptation
- Dynamic floating gates maximizing detection capabilities and thickness accuracy
- Auto-sizing feature to automatically size and group areas of corrosion
- Time-based synchronization optimizing clean data sets
- 3D C-scan mapping
- Streamlined reporting
- Remote login options – setup/data capture/analysis
- Maximize productivity with Cypher embedded piloting capabilities

Discover a new era of precision with Eddyfi Technologies' high-quality NDT probes and transducers: View Probe Catalog

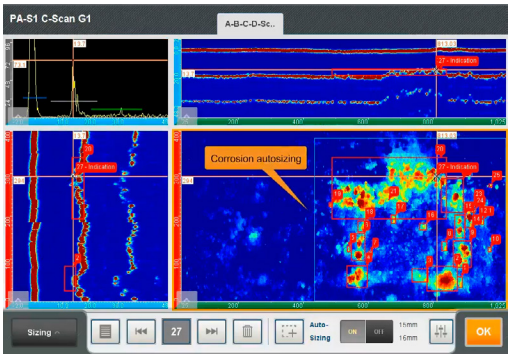


Figure 1: Assisted analysis for corrosion detection and sizing.

APPLICATIONS

- Pressure vessels
- Storage tanks
- Pipelines
- Spheres
- Restricted access areas
- Ship hulls and other marine vessels
- Other critical assets

ADVANCED CORROSION MAPPING TECHNIQUES

Choosing the appropriate corrosion mapping technique is essential for accurate inspection results.

SELECTING THE BEST METHOD FOR YOUR INSPECTION NEEDS

The pulse echo phased array technique electronically generates multiple beam angles, similar to conventional ultrasonic testing (UT), which provides digital imaging for easier detection, positioning, and sizing. There are several options to consider when selecting the corrosion mapping technique, each with its advantages depending on the inspection requirements and conditions:

- **Local Immersion PAUT:** Utilizing the Aqualock waterbox and generally a 7.5MHz 64EL I4A casing probe, the ultrasound propagates through a column of water. This eliminates the need for a wedge, thus providing the benefits of improved signal consistency, accuracy, and a limited dead zone.
- **Dual Linear Array:** This contact method is often chosen for its near-surface resolution capabilities due to having no interface echo, with minimum remaining wall thickness sizing capabilities of approximately 1.5mm (0.06in). These probes are a great choice for general corrosion, pitting, and even high temperature hydrogen attack (HTHA)/hydrogen induced cracking (HIC)/stress corrosion cracking (SCC). Suitable for total focusing method (TFM)/phase coherence imaging (PCI), the preferred option for these techniques is utilizing the 10MHz version. An additional advantage is that the probe can be removed from the scanner for live scanning of restricted areas.



Figure 2: Local immersion PAUT probe.



Figure 3: Dual linear array probe.

- **Linear Array:** Also a contact method, standard PAUT probes can be utilized with a 0L wedge to take advantage of TFM/PCI techniques.



Figure 4: Linear array probe.

- **Conventional UT:** Our recommended conventional UT option when paired with an automated system is utilizing a single crystal probe with a local immersion water column, housed in a gimbaled holder. Advanced surveys can be deployed without the requirement for phased array qualified personnel, while still taking full advantage of corrosion mapping benefits, including application-specific software features, also available with twin crystal UT.
- **Dry coupled UT:** Specific to the Scorpion 2 system, this patented twin crystal wheel probe eliminates the need for couplant or a constant water supply, unlike typical ultrasonic probes.



Figure 5: Single crystal probe with a local immersion water column.



Figure 6: Twin crystal wheel probe.

INSPECTION SOLUTIONS

Our instruments offer inspection techniques through semi-automated or motorized scanners, for accurate data acquisition, ensuring 100% coverage, high POD, and precise positioning. Eddyfi Technologies' corrosion scanners provide efficient coverage for diverse geometries, ensuring thorough corrosion mapping.

AUTOMATED SOLUTION

The automated, robust, field-proven NAV2 robotic scanner has multiple configuration options. The system is capable of high-speed phased array (PAUT and conventional UT) corrosion mapping, elevated-temperature corrosion mapping, and weld inspection utilizing both PAUT and TOFD probes.

- From 75mm (3in) OD to flat
- Ultra low profile
- Battery operated and remote controlled
- Max speed 250mm (9.8in)/sec
- Elevated temperatures up to 150°C (302°F)
- Versatile and ultra low profile
- Piloting capability with Cypher

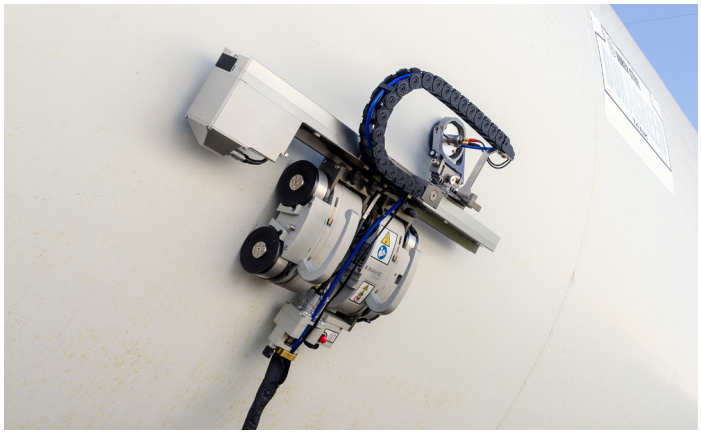


Figure 7: NAV2 automated crawler for corrosion and weld Inspection.

The Swift™ and Scorpion® 2 dry-coupled remote-access and battery-operated ultrasonic crawler brings major efficiency and data improvements to tank shell inspections and other structures such as vessels and offshore installations.

API 650/653 compliant, this powerful system is the perfect solution for in-service inspection of large assets.



Figure 8: Swift and Scorpion 2 remote-access tank shell ultrasonic inspection solution.

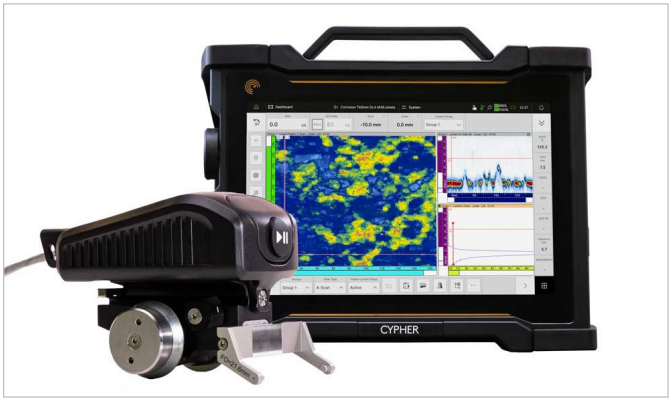


Figure 9: Scorpion 2 inspecting tank roof.

SEMI-AUTOMATED SOLUTION

The PaintBrush 2 is an advanced semi-automated corrosion mapping scanner designed for optimal versatility. Its double encoded wheels allow tracking of probe position and orientation, while also allowing accurate mapping even around obstacles.

- Easy setup and onboard controls
- Easy to deploy and able to encode in raster scan over long distances
- High Temperature Kit available
- Minimal water supply
- Excellent Near surface resolution
- Expansive application range
- Compact, lightweight, and portable
- Extensive temperature range -35°C to 150°C / -31°F to 302°F
- Live location and probe orientation on screen
- Freedom to move. Accuracy to trust. Paints the perfect picture.



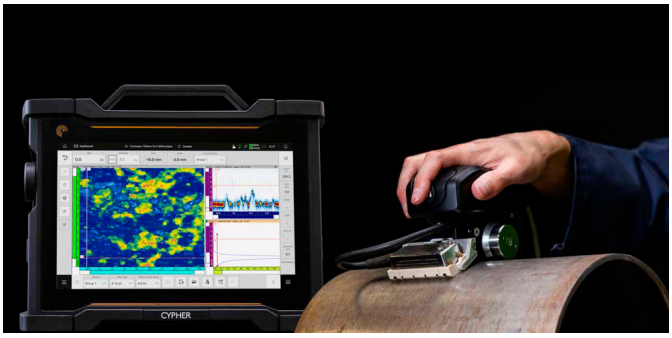


Figure 10 & 11: PaintBrush 2 coupled with the industry-leading Cypher ultrasonic instrument.

When there is need to cover larger areas, the use of a lightweight fixed frame XY scanner may be the preferred choice. Boasting an array of application deployment options including the aquablock waterbox for localized immersion corrosion mapping, linear array probes with 0L wedge and dual linear array probes.

- 750mm (29.5in) frame bar with ruler
- Dual encoder - scan and index axis
- Suitable for complete mapping of large surfaces
- Lightweight
- Accurate XY position



Figure 12: Compatible with local immersion corrosion mapping for high tolerance to surface roughness and imperfections.

MANUAL ENCODED SOLUTION

The ODI is a manual encoded scanner capable of multiple applications. This C-Clamp device can securely hold wedges measuring up to 55mm (2in) with standard arms or up to 75mm (3in) with the large arms.

- Entry-level solution
- Easy to use
- Versatile
- Lightweight

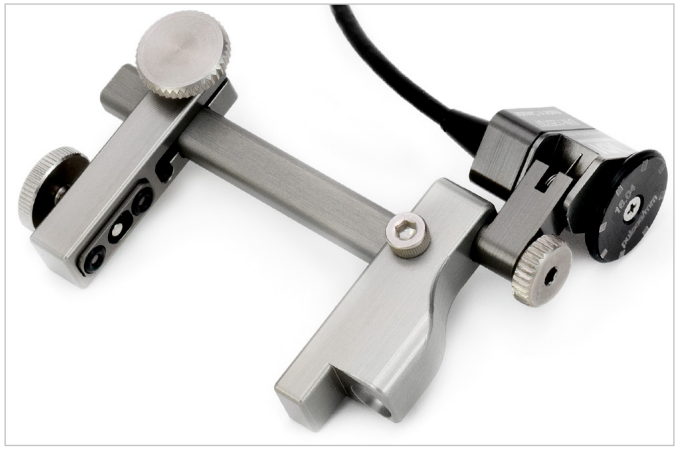


Figure 13: ODI manual encoded scanner.

ORDERING INFORMATION

Automated Two-Axis Corrosion Mapping

Battery operated and fully remote controlled for inspection of pressure vessels, storage tanks, pipelines, spheres, ship hulls plus other critical assets.

ITEM	DESCRIPTION
	Solution kit is compatible with the following instruments: Mantis™, Cypher®, Emerald, Panther™
NAV2-SYSTEM-15M*	Automated, battery operated and remotely controlled crawler system – Includes base crawler, control box, 2 x batteries, umbilical, irrigation, cable management, joystick plus accessories. For diameters 3"+.
AUTO-RASTER-ARM-300MM	Motorized Raster Arm adds two-axis automated scan capabilities to automated crawlers. Can carry many different probes for various types of corrosion scans. Available in 300/600/900/1160mm lengths.
PROBE-SCUT-KIT-15M**	Standard kit for single crystal corrosion inspection. Includes: Single crystal UT probes (5.0MHz-Ø10mm-50FL-SCUT-BNC & 5.0MHz-Ø10mm-75FL-SCUT-BNC), delay line, probe holder compatible with RASTER arm and UT cables - 15m
PROBE-PACM-KIT-15M**	Standard kit for Phased Array UT corrosion inspection. Includes: Phased Array Probe (7.5L64-I4A-64x7-15-IPEX), Aqualock V2, delay lines, probe holder and cart compatible with RASTER arm - 15m.
SCAN-MOTORIZED-PUMP-*	The motorized couplant pump is a powered pumping unit used for supplying couplant fluid to the scanning surface. Output: 690 kPa (100 psi), 3.8 L/min (1.0 GPM). Max fluid viscosity 100 cSt. FCC, ISED, CE and UKCA Certified. NA/EU/UK Plug options.
PROBE-SPARE-FOAM	25 replacement adhesive waterbox foams - 15 white PTFE contact face & 10 clear UHMW contact face for use with Aqualock waterbox.

NOTE: Enquire for Twin crystal and High Temperature (350°C / 662°F) options.

*Available in 5m & 30m length.

**Various frequency, cable lengths and connector types available.

Automated One-Axis Corrosion Mapping

Battery operated and fully remote controlled for inspection of pressure vessels, storage tanks, spheres, ship hulls plus other critical assets.

ITEM	DESCRIPTION
DCP-SWIFT-UT	Swift™ UT portable unit. Incl. a premium-quality 26.4cm (10.4in) multi-touch display and high-capacity 100GB SSD. Software for B-Scan, integrated joystick, AC PS, 2x hot swap. Li-ion batt. w/ charger, manual & transport case. For Scorpion 2 crawler.
SC2-DCP-CRAWLER	Scorpion 2 fast 4-wheel drive battery operated motorized crawler with 5 MHz dry coupled UT wheel probe. Includes encoder, 50m (165ft) umbilical, 2x swappable Li-ion batteries, external battery charger, maintenance kit, manual & transport case. Requires SWIFT-UT.
SC2-SERVICING-KIT	SC2 Comprehensive Servicing Kit, 1 x Silicon Oil, Cleaning Pads, Cork Washer, Pair of probe tyres, includes required circlips, screws, bearings, gasket & wear runner
SC2-DCP-SYST-SP-N3	Scorpion 2 & Swift 3 year Service Plan. Includes annual calibrations and comprehensive servicing for 3 years.

NOTE: Alternative One-Axis options available through use of the Nav2 system. Enquire within for more details.

ORDERING INFORMATION

Semi-Automated Corrosion Mapping

PaintBrush 2 - Handheld live 2-axis encoding for inspection of pipelines, pressure vessels, storage tanks, spheres, composites plus other critical assests. Contact PAUT method.

ITEM	DESCRIPTION
	Solution kit is compatible with the following instruments: Cypher®, TOPAZ
SCAN-PAINTBRUSH2-KIT-5M-LE	PaintBrush2 Kit – Magnetic Corrosion scanner - fitted with 5M LEMO16 encoder plug, For flat or curved surfaces (4'' or bigger in diameter). Kit includes 5DL32-CL-48X5-5IPEX probe, probe shoe, tools for scanner maintenance and transport box.
SCAN-MANUAL-PUMP-7.9L	Manual water pump - 7.9 L - Compatible with SCAN-IRRIG-KIT-4MM & SCAN-IRRIG-KIT-6MM. Supplied as a Pump only. STIX, ROTIX and MICROBE scanners supplied with Irrigation.

High Temperature PaintBrush2 Kit

ITEM	DESCRIPTION
SCAN-PAINTBRUSH2-HT-KIT-5M-LE	PaintBrush2 Elevated Temp Kit – Magnetic Corrosion scanner - 5M LEMO16 encoder plug, For flat or curved surfaces (4'' or bigger in diameter). Kit includes 5DL32-PB2-48x5-5-IPEX-HT-RD probe, tools for scanner maintenance and transport box
SCAN-MANUAL-PUMP-7.9L	Manual water pump - 7.9 L - Compatible with SCAN-IRRIG-KIT-4MM & SCAN-IRRIG-KIT-6MM. Supplied as a Pump only. STIX, ROTIX and MICROBE scanners supplied with Irrigation
SCAN-HT-SLEEVE-5M	5M high temperature zipper cable management sleeve. Surface temperature rating -55C (-67F) to 180C (356F)

NOTE: Rated to 150C up to 25minutes, duty cycling.

ITEM	DESCRIPTION
5DL32-CL-48X5-5-IPEX**	2x32-element dual linear array probe - 5MHz - Active aperture of 48mm x 5mm - Pitch A: 1.5mm - Elevation: 5mm - CL casing - 5m cable - IPEX connector.
SCAN-ACC-DLA-SHOE-CL	Probe holder for small aperture (48mm x 5mm) 1D-Linear Transmit-Receive PA probe (Side-by-Side configuration) – 4x Irrigation Port - Compatible with corrosion probes CL casing for PaintBrush2
SCAN-ACC-DLA-SHOE-CS	Probe holder for large aperture (24mmx5mm) 1D-Linear Transmit-Receive PA probe (Side-by-Side configuration) – 4x Irrigation Port - Compatible with corrosion probes CS casing for PaintBrush2
SCAN-SPARE-PB2-A11-A12-FORK	Pair of toolpost forks for PaintBrush 2 compatible with WSA11-A12-0L-FLAT-20mm-IHC
SCAN-SPARE-PB2-NW1-FORK-KIT	Pair of toolpost forks for PaintBrush 2 compatible with WSNW1-0L-FLAT-20mm-IHC
SCAN-SPARE-PB2-WHEELSET-STRONG	Spare set of replacement extra-magnetic strength wheels for PaintBrush2 scanner - QTY 2 wheels
SCAN-SPARE-PB2-WHEELSET-NONMAG	Spare set of replacement non-magnetic wheels for all non-magnetic material - compatible with PaintBrush2 scanner - QTY 2 wheels
SCAN-SPARE-PB2-DE15-LE	DE15 (F) to LEMO16 (M) adapter for specific use with PaintBrush2 scanner, allowing compatibility of a DE15 type paintbrush 2 with a Lemo16 type Instrument.
SCAN-SPARE-PB2-LE-DE15	LEMO16 (F) to DE15 (M) adapter for specific use with PaintBrush2 scanner, allowing compatibility of a LEMO16 type paintbrush 2 with a DE15 type Instrument.

*Available in 5m & 10m lengths, with and without probe.

ORDERING INFORMATION

Magnetic XY Frame scanner - Handheld 2-axis encoding for inspection of pipelines, pressure vessels, storage tanks, spheres plus other critical assests. Local immersion (Waterbox) & contact testing PAUT methods.

ITEM	DESCRIPTION
Solution kit is compatible with the following instruments: Mantis™, Cypher®, Emerald, Panther™	
SCAN-STIX-CORR-LE	Semi-automated corrosion mapping scanner - 4in to flat. Includes 75cm (29.5") frame, heavy duty probe holder (Aqualock cart and waterbox sold separately), 4mm irrigation, 7.5m Lemo encoder cable, index encoder and cable management.
SCAN-AQUA-CART	Aqualock cart is the perfect solution for securely holding the Aqualock waterbox, which carries the Immersion I4 & I4A probe. Compatible with automated and semi-automated scanners.
7.5L64-I4A-64x7-7.5-IPEX**	64-element linear array probe – 7.5MHz - Active aperture of 64mm x 7mm - Pitch: 1mm - Elevation: 7mm - I4-A casing - 7.5m cable - IPEX connector - Select for use with the Aqualock
PROBE-SPARE-FOAM	25 replacement adhesive waterbox foams - 15 white PTFE contact face & 10 clear UHMW contact face for use with Aqualock waterbox.
SCAN-MANUAL-PUMP-7.9L	Manual water pump - 7.9 L - Compatible with SCAN-IRRIG-KIT-4MM & SCAN-IRRIG-KIT-6MM. Supplied as a Pump only. STIX, ROTIX and MICROBE scanners supplied with Irrigation.
SCAN-SPARE-WATERBOX	Spare V2 Aqualock waterbox for local Immersion zero degree phased array. Includes complete waterbox assembly - 15mm block only.
SCAN-SPARE-WTR-BLK-30	Extended 30mm water column wedge for use with V2 Aqualock. Preferred wedge for wall thicknesses above 25mm or 1".

NOTE: For contact DLA corrosion mapping the following items are required - 5DL32-CL-48X5-5-IPEX, SCAN-SPARE-DLA-ADPT & SCAN-ACC-DLA-SHOE-CL.

**Various frequency, cable lengths and connector types available.

Manual Encoded Corrosion Mapping

ODI - Handheld 1-axis encoding for inspection of pipelines, pressure vessels, storage tanks, spheres, composites plus other critical assets. Contact PAUT method.

ITEM	DESCRIPTION
Solution kit is compatible with the following instruments: Mantis™, Cypher®, Emerald, Panther™	
SCAN-ODI-1PA-LE	ODI scanner - 1 probe - LEMO 16 Encoder connector - Cable length 2.5 m - Max Clamp Width: 55 mm - Encoder Resolution: 16.0 counts/mm.
5DL32-DLA-48X5-5-IPEX-RD-HT	32-element dual linear array probe - 5MHz - Active aperture of 48mm x 5mm - Pitch A: 1.5mm - Elevation: 5mm - DLA casing - 5m cable - IPEX connector - replaceable delay line - high-temperature resistant
REMOVABLE DELAY-CORROSION-FLAT-HT	High-temperature resistant celazole delay for RD-type corrosion probe - (150°- 200°C)
SCAN-MANUAL-PUMP-7.9L	Manual water pump - 7.9 L - Compatible with SCAN-IRRIG-KIT-4MM & SCAN-IRRIG-KIT-6MM. Supplied as a Pump only. STIX, ROTIX and MICROBE scanners supplied with Irrigation.
SCAN-IRRIG-KIT-4MM	(4mm-ID) Irrigation Kit - Fits ROTIX, STIX and LYNCS scanners

*Various frequency, cable lengths and connector types available.

ORDERING INFORMATION

Dual Linear Array Probes

Contact PAUT dual linear array probe options. NOTE: CL type compatible with 65mm (2.56in) probe holder and CS type compatible with 41mm (1.61in) probe holder.

ITEM	DESCRIPTION
5DL32-CL-48X5-2.5-IPEX	2x32-element dual linear array probe - 5MHz - Active aperture of 48mm x 5mm - Pitch A: 1.5mm - Elevation: 5mm - CL casing - 2.5m cable - IPEX connector. Requires ACC-DLA-PRBHOLD-4IR-65mm.
5DL32-CS-24X5-2.5-IPEX	2x32-element dual linear array probe - 5MHz - Active aperture of 24mm x 5mm - Pitch A: 0.75mm - Elevation: 5mm - CS casing - 2.5m cable - IPEX connector. Requires ACC-DLA-PRBHOLD-4IR-41mm.
10DL64-DLA-TFM-24X5-2.5-IPEX	2x64-element dual linear array probe - 10MHz - Active aperture of 24mm x 5mm - Pitch : 0.375mm - Elevation: 5mm - DLA-TFM casing - 2.5m cable - IPEX connector. Requires ACC-DLA-PRBHOLD-4IR-41mm.
7.5DL32-RD-48X5-2.5-IPEX	32-element dual linear array probe - 7.5MHz - Active aperture of 48mm x 5mm - Pitch A: 1.5mm - Elevation: 5mm - RD casing - 2.5m cable - IPEX connector
5DL32-CL-48X5-2.5-IPEX-RD-HT-SW	32-element dual linear array probe - 5MHz - Active aperture of 48mm x 5mm - Pitch A: 1.5mm - Elevation: 5mm - CL casing – 2.5m cable - IPEX connector - replaceable delay line - high-temperature resistant - sequentially wired
5DL32-CS-24X5-2.5-IPEX-SEQ	32-element dual linear array probe - 5MHz - Active aperture of 24mm x 5mm - Pitch A: 0.75mm - Elevation: 5mm - CS casing - 2.5m cable - IPEX connector - Sequentially wired (T:1-32, R:33-64)

*Various frequency, cable lengths and connector types available

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