



Technical
Specifications

SWIFT AND SCORPION 2

Remote-access tank shell inspection solution

The Swift™ and Scorpion®2 remote-access tank shell ultrasonic inspection solution improves efficiency and data when inspecting such structures as storage tanks, vessels, and offshore installations.

The Swift and Scorpion2 dry-coupled remote-access ultrasonic crawler bring major efficiency and data improvements to tank shell inspections and other structures such as vessels and offshore installations. API 650/653 compliant, this powerful duo is the perfect solution for in-service inspection of your assets.

BEST ULTRASONIC PERFORMANCE

Scorpion2 is equipped with the best ultrasonic electronics and software the industry has to offer. With its advanced filtering, it can inspect materials 2.5–100mm (0.1–4in) quickly and accurately. The software enables unique ultrasonic gate processing, such as floating and tracking gates, ensuring correct wall thickness measurements under most circumstances.

ROBOTIC CRAWLER

The battery-powered crawler is designed to go where no one can go. The simple controls and long umbilical minimize the need to handle the crawler. Combined with speeds that can reach 180mm/s (7in/s), you can complete inspections faster and more efficiently than ever before.

PROBE DESIGN

The unique dry-coupled, ultrasonic wheel probe of Scorpion2 removes the need for additional couplant or a constant water supply, unlike typical ultrasonic probes. It uses a twin crystal ultrasonic probe design with a unique rolling face.



PROBE CARRIAGE

The carriage enables recording thickness measurements within 25mm (1in) of weld caps, making inspecting critical heat affected zones (HAZ) possible. The four independently powered magnetic wheels with their treaded tires profer Scorpion2 the advantages of easily driving over 12.7mm (0.5in) bumps and excellent grip in any condition.

ACTIVE LIFT AND BALANCE

Unique to Scorpion2, active lift raises the wheel probe off the surface under test when measurements are not recorded, extending its lifespan. The balance is adjusted automatically, making it easier to set up the probe, shortening inspections, and increasing repeatability.

BATTERY POWER

Scorpion2 comes with two lithium-ion batteries for continuous onsite operation. The batteries reside inside the crawler, which removes the need for a separate power pack on the ground, while reducing the umbilical and the overall system weight.

A TRUE, ALL-IN-ONE SOLUTION: RUGGED, PORTABLE, AND BATTERY POWERED

When you combine Swift, the field-proven and robust ultrasonic data acquisition instrument, with Scorpion2, you unleash the most advanced, full-featured B-scan inspection system on the market.

UNMATCHED FEATURES

With a large, 26.4cm (10.4in), non-reflective, multi-touch display, Swift offers crystal-clear views under any lighting condition.

Swift is equipped with a powerful ultrasonic card, which works seamlessly with the onboard B-scan software. Setting up inspections and specifying its details has never been so easy.

The instrument is sealed and designed for IP65. Its magnesium alloy casing is tough, as well as water and dust resistant. Combined with a 3mm (1/8in) strengthened glass, Swift is perfect for harsh environmental conditions.

Swift comes with two lithium-ion, hot-swappable batteries, enabling a full day's work.

An optional harness is also available to support the use of the system for longer periods of time. The adjustable rear stand, the top handle, and the four corner anchor points all make Swift incredibly practical for on-site inspections.



Figure 1: Annotated breakdown of Scorpion2.

DATA ACQUISITION SOFTWARE

The Swift B-scan acquisition software features several powerful data review, reporting, and printing tools. You can easily review saved data at any time through the active A-scan and B-scan displays. Simply moving the cursor on any part of a B-scan profile shows its corresponding A-scan trace.

You can display an adjustable reporting threshold indicator on the B-scan profile, which will help you quickly identify reportable defects and rapidly analyze the complete scan. The full amplitude B-scan mode helps you characterize wall loss which, in turn, allows for a more detailed post-inspection analysis and accurate corrosion assessment.

Inspection data can simply be exported as CSV, A-scan and B-scan image, or CMX files which you can import into the CMAP inspection management software. When you do, all the scans are automatically positioned based on X, Y coordinates, providing a complete overview of the inspection.



Figure 2: Scorpion2 performing tank roof inspection.

EEMUA AND API RECOMMENDATIONS

Traditional techniques used to randomly measure the thickness of tank shells can prove misleading because of their low probability of detection (PoD). This may result in incomplete corrosion rate calculations. Scorpion2 records thickness measurements along a vertical line even in the HAZ, as recommended by the Engineering Equipment and Materials Users Association (EEMUA), yielding higher PoD and more accurate corrosion assessments.

EEMUA states that walking on tank roofs can be hazardous. The condition and thickness of roof plates should be confirmed before access is permitted. Scorpion2 can remotely perform this task, reducing the need for roof access.

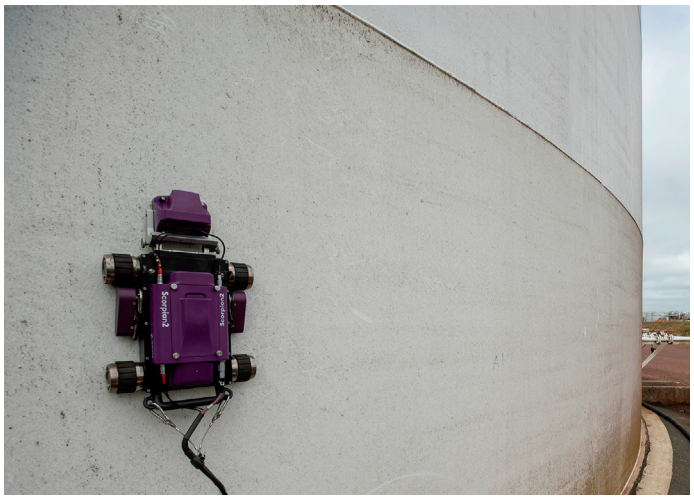

Figure 4: Scorpion2 performing in-service tank inspection.



Figure 3: Annotated breakdown of Swift.

SPECIFICATIONS

SCORPION2 PERFORMANCE

External longitudinal diameter	3.0m (10ft)
External circumferential diameter	3.0m (10ft)
Internal longitudinal diameter	5.0 (17ft)
Internal circumferential diameter	3.0m (10ft)
Minimum material thickness	4.7mm (0.20in)
Maximum material thickness	100m (4in)
Maximum paint thickness	1mm (0.05in)
Maximum step weld	12.7mm (0.50in)

SCORPION2

Dimensions (W × H × D)		494 × 294 × 130mm (19.5 × 11.6 × 5.1in)
Weight	With batteries	10.5kg (23lb)
	Without batteries	10.0kg (22lb)
Umbilical length and weight		50m (164ft), 4.3kg (9.4lb)
Power requirements		Lithium-ion, rechargeable, DOT compliant
Power supply		Onboard battery
Batteries	Type	Li-ion, rechargeable, DOT compliant
	Typical life	4 hours
Maximum scan speed		180mm/s (7in/s)
Drive		4 × independent active steering 12VDC motor
Adhesion		4 × neodymium-iron-boron magnetic wheels
Transducer		Dry-coupled, 5MHz twin element
Near-surface resolution		2.5mm (0.1in)
Probe normalization		Self-normalizing probe
IP rating		Designed for IP62

SWIFT

Dimensions (W × H × D)		355 × 288 × 127mm (14.0 × 11.3 × 5.0in)
Weight	With batteries	6.6kg (14.5lb)
	Without batteries	5.7kg (12.5lb)
Volume		13L (791in^3)
Power requirements		100–240VAC, 50–60Hz
Power supply		Direct VAC or onboard batteries
Batteries	Type	Li-ion, rechargeable, DOT compliant
	Typical life	6–8 hours
Display		26.4cm (10.4in) Non-reflective (AR coating) Anti-fingerprint (oleophobic coating) 3mm (1/8in), strengthened glass cover Optically bonded LCD and touchscreen
Storage		SSD, 100GB
Connectivity		Gigabit Ethernet, Wi-Fi, Bluetooth®, USB 2.0
IP rating		Designed for IP65

SWIFT ULTRASONICS

Internal pulser/receiver	1 × Tx/Rx, 1 × Tx (for pitch and catch)
Transducer frequency	2.25–20.00MHz
Maximum pulse rate	Application dependent. Capable of up to 20kHz
Pulse voltage	–75V to –200V, 25V steps
Pulse width	25–225ns, 2.5ns increments
Damping	50Ω
Filter, waveform	FIR filter, full rectify
Sampling rate	100MHz
Resolution	16bits
Waveform length	Up to 16328 samples
Trigger source	Internal or encoder-based
Transducer range	2.25–20MHz

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