DEUTROFLUX UMT

Universal Stationary Magnetic Particle Crack Detectors

KARL DEUTSCH

DEUTROFLUX UMT – At a glance

The DEUTROFLUX UMT crack detection system sets new standards in magnetic particle crack detection. Two phase-shifted AC magnetic fields reliably detect cracks of all orientations. The clamping length of the detector can be easily adjusted – even after long periods of use, as the adjustment mechanism is located outside the spray area. The modular machine construction allows many designs in order to optimally adapt the testing system to your testing task.

A MEMORY Control

The test parameters are managed via an (optional) touch panel and incorrect operation is avoided.

B Contacts

Two combined contacts for current and field flow.

C UV lamp

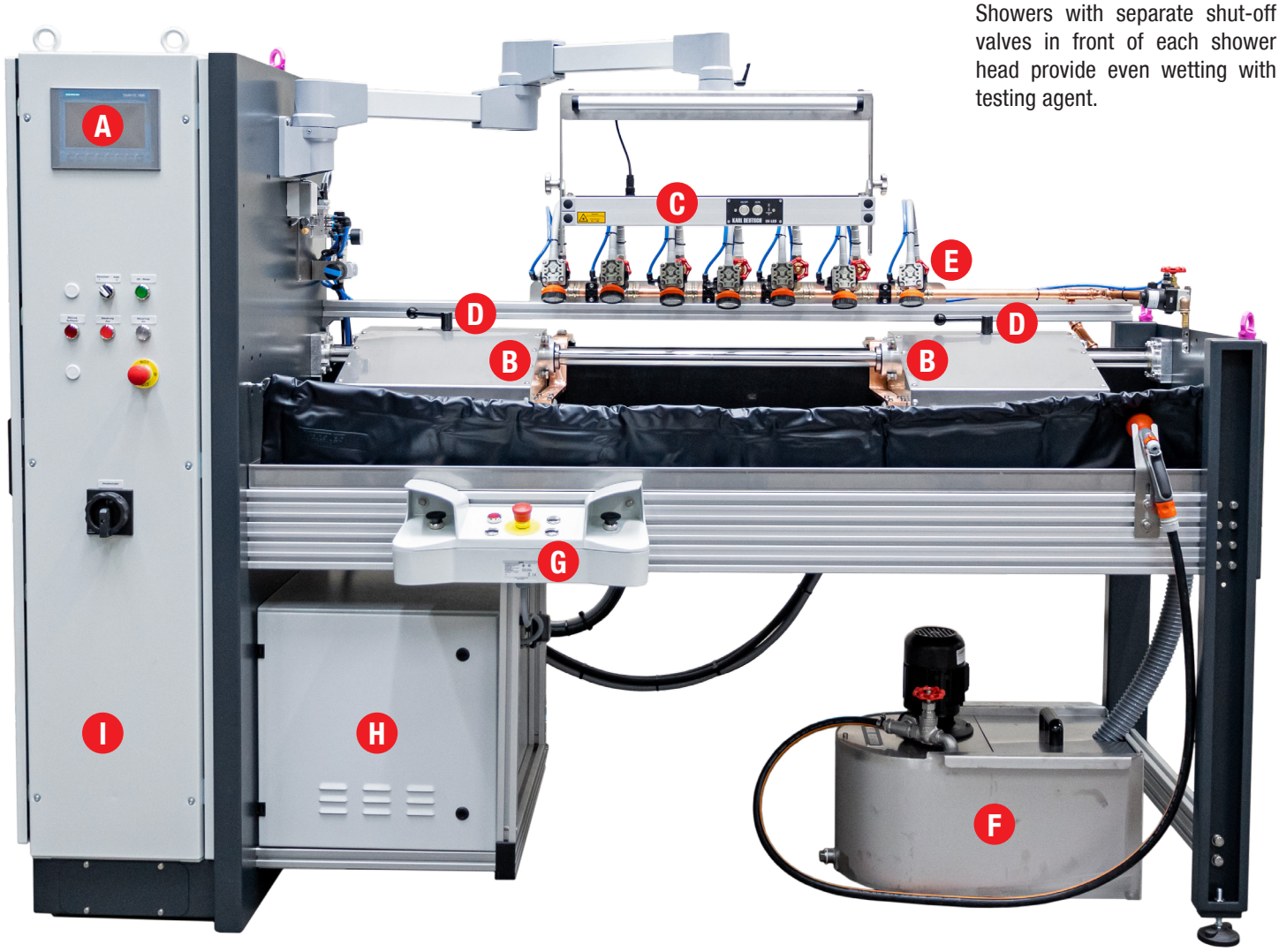
The UV-LED large-area lamp enables convenient and energy-saving work (option: freely adjustable).

D Adjustment of the clamping length

Quick and easy adjustment is ensured via one (optionally two) clamping levers.

E Wetting

Showers with separate shut-off valves in front of each shower head provide even wetting with testing agent.



UMT 900 with optional equipment (MEMORY CONNECT, two-hand operation, UV lamp with flexible lamp holder and clamping length adjustment (left))

I Control cabinet

The control cabinet contains high-quality components from Siemens and other well-known manufacturers. The control system can be adapted very individually to your wishes.

H Transformers

Powerful transformers ensure many years of trouble-free operation, even in three-shift operation.

G Two-hand operation

Start the test cycle using an optional two-hand control or a foot switch (standard).

F Container for testing agent

The stainless steel testing agent container with circulation pump and coarse dirt filter ensures testing agent in top form.

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DEUTROFLUX UMT – Specifications and Options

Four clamping lengths

The clamping length depends on the maximum component length. Four sizes are available: 350, 600, 900 and 1100 mm.

UMT 350

UMT 600

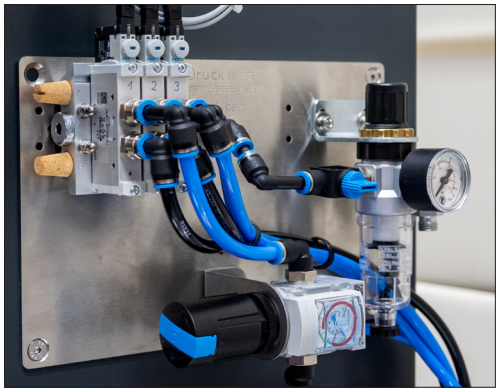
UMT 900

UMT 1100

Adjustable test cycle

A test cycle includes several phases: Clamping, magnetising, rinsing, re-magnetising, demagnetising if necessary (optional) and unclamping. In total, the magnetic particle crack detection usually takes between 8 and 10 seconds. All process parameters can be freely selected and thus optimally adapted to the respective testing task.

The UMT 1100 also uses the patented 2-step magnetisation for the field flow of long components to counteract over-magnetisation at the component ends. In the test cycle, the entire component is first wet using a magnetisation strength that is sufficient for the ends. The outer wetting showers are then switched off and the magnetisation strength is increased so that the middle part of the test specimen is also sufficiently magnetised. This enables a more even field distribution for long components.



High-quality and durable components

KARL DEUTSCH relies exclusively on high-quality machine components from renowned manufacturers. In addition to Siemens controls and switchgear, pneumatic components from FESTO are used.

Container for testing agents, machine tub and machine parts in contact with the agent

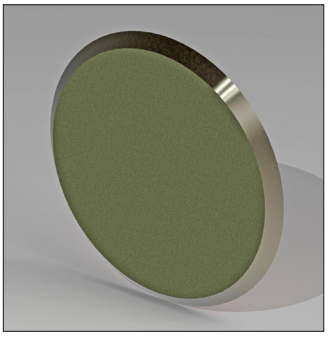
The machine tub, the container for testing agent and covers in the wet area of the system are made of stainless steel. All other machine elements in contact with the agent are made of rustproof materials. Corrosion is thus avoided in the long term.

Container for testing agent: The magnetic particles are continuously moved by the circulation so subsiding to the bottom of the container is impossible. With the additionally available trolley, cleaning of the stainless steel container is now even easier.

Machine tub: All surfaces of the one-piece machine tub are inclined towards the centre and the drain. This leads to a rapid run-off of the testing agent and thus to a reduced settling of the magnetic particles. Deposits are reduced as a result.

Contact plates

The contact plate between the machine and the test part is crucial for stable and reliable magnetisation. Manufacturing possibilities at KARL DEUTSCH ensure the optimum transition even for very complex shapes. Our contact plates are characterised by particularly long service lives. In particular, the possibility of rotating the round contact plate allows it to be worn evenly over the entire circumference and thus enables very long operating times.



Contact plate, round (standard)

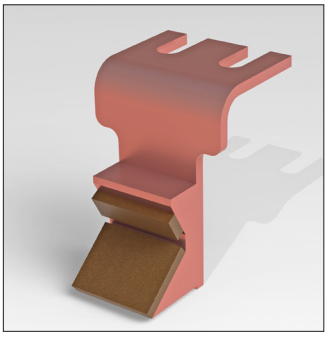
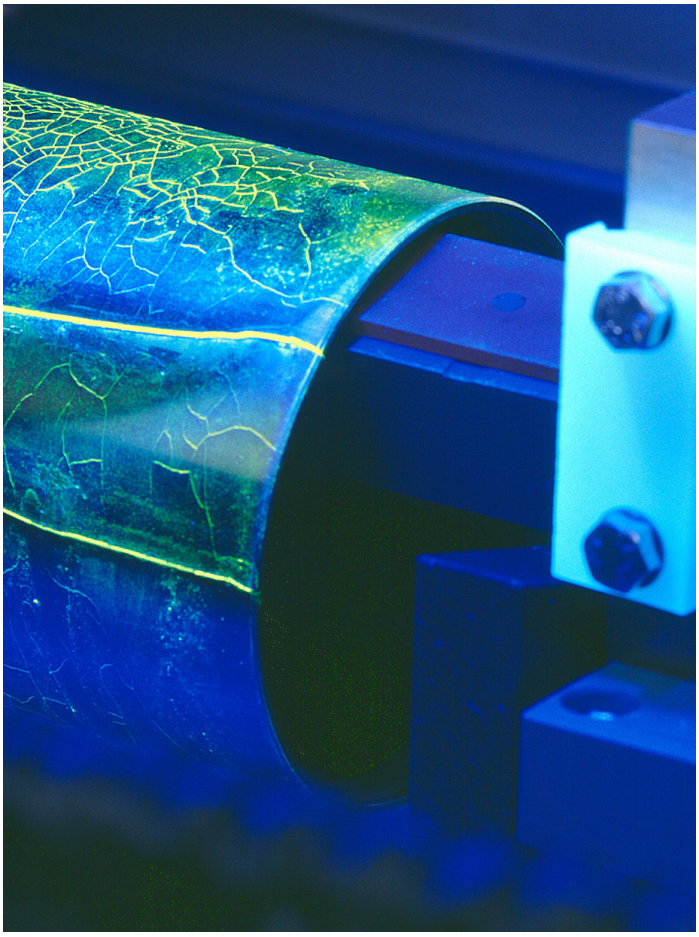


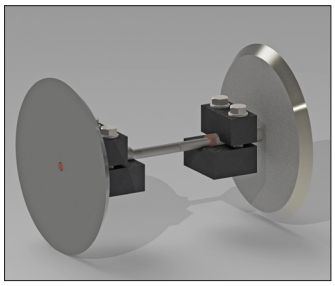
Plate for con-rod, cranked (option)

DEUTROFLUX UMT – Extensive Options

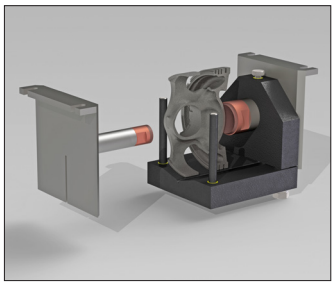
We offer an extensive portfolio of options and extensions for all KARL DEUTSCH machine types:

- Customised test piece holders
- Contact plates built to part shapes
- Magnetic mandrels in a wide variety of designs
- Contact rockers for testing fork-shaped parts
- Motorised rotating devices for rotationally symmetrical parts
- Clamping stroke extensions and double-sided execution of the stroke movement
- Trolley for the container of testing agent
- The control cabinet can be flanged to either side of the machine frame (without surcharge). Alternatively, a free-standing control cabinet is also possible.
- UV lamp holder optionally axially movable or freely adjustable in any direction with support arm
- Circuit of testing agent executed as circular rinsing (to prevent deposits of testing agent during testing breaks)
- Flow monitoring in the testing agent circuit for maximum control, constant process quality and early recognition of malfunctions in the testing agent circuit
- Special rinsing for complex geometries
- Fitting the testing agent circuit for the use of oil-based testing agents (safety devices: fire and explosion protection to prevent oil ignition in the event of sparking or overtemperature)
- Magnetising circuits in DC technology
- Special paint
- Transport rollers on the machine frame for easy transport to different locations (testing services)
- Remote maintenance via network or mobile communications

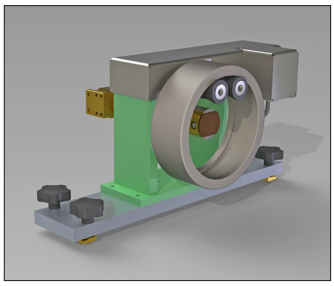




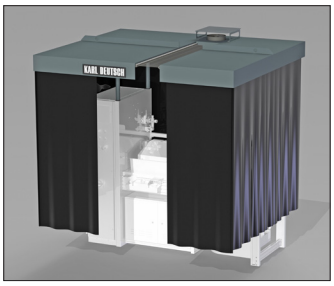
Inspection of small parts



Fixtures for parts to be tested



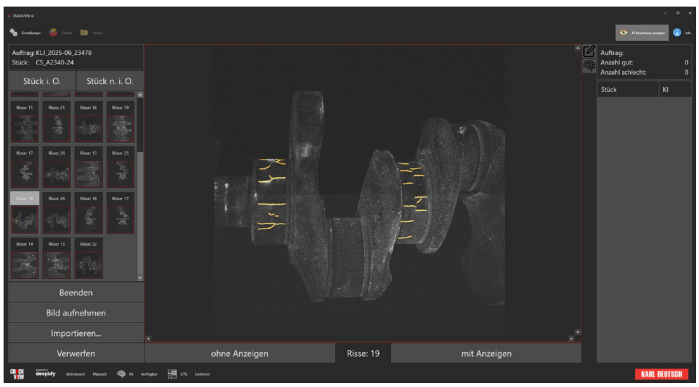
El. rotating device for ring testing



Darkening cabin

CRACKVIEW AI

CRACKVIEW AI digitises magnetic particle testing. Industrial cameras are used to fully capture the surfaces of the test pieces prepared with fluorescent magnetic powder under UV light. The system uses a neural network (AI) to analyse the images in real time. The shape, position and number of possible crack indications are determined and evaluated. The training of the AI is based on a KARL DEUTSCH data set consisting of tens of thousands of images of crack indications, so that only a limited amount of customer-specific training data is required to specialise the system for a new task. Components can thus be sorted by OK/NOK without a human inspector. The inspection accuracy is constant regardless of work duration or time of day and is not subject to human influence. In addition, traceability of the test results is possible for the first time, as the individual test results of the components can be documented and archived together with the order and test piece data.



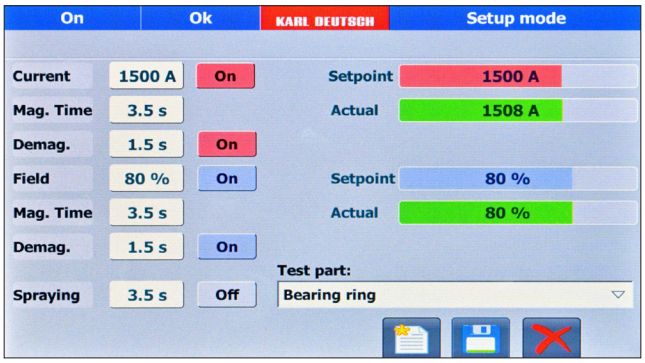
CRACKVIEW AI user interface

DEUTROFLUX MEMORY – Parameter Storage

We offer three different controls for our UMT series:

Conventional control

- Simple controls with analogue indications for current and field flow
- Rotary switches to activate / deactivate both field directions
- Potentiometer for infinitely variable adjustment of the field intensity
- Adjustable minimum value monitoring of the current flow
- Three toggle switches to preselect the automatic demagnetisation of the respective circuits or demagnetisation as a single function without a preceding magnetisation cycle
- Switchable cycle control for manual control of the magnetisation and wetting times during testing
- Time relay in the control cabinet to set the times



MEMORY: 7“ touch panel for setting all parameters

MEMORY

- 7“ Siemens Basic touch panel instead of analogue controls as central control element
- Setup mode with digital settings for nominal values for current and field intensity as well as magnetisation and wetting times for 500 test pieces
- Automatic mode with test piece selection
- PID controller for current and field flow
- Digital bar charts for current and field
- Cycle monitoring with error messages in plain text
- Counter for OK / NOK test pieces
- User management with authorisation levels
- Operating languages: English / German

MEMORY CONNECT

- All functions of the MEMORY module
- 9“ Siemens Comfort touch panel instead of analogue controls as central control element
- Network connection for continuous data exchange of testing parameters and statistics
- Exporting test results in CSV format to USB flash drives
- Interfaces for data exchange with robots, higher-level controls or safety installations for automated processes
- Implementation of barcode or DMC scanners and personal transponders
- Option for remote maintenance

MEMORY CONNECT: 9“ touch panel with extended connectivity

Customised

Additional customer requirements can be met individually, as we develop the PLC software in-house. For this purpose, e.g. pictures of components can be displayed or the test instruction can be digitally mapped in the machine. Also extended requirements on the testing technology, e.g. aviation requirements (e.g. NADCAP), can be implemented. In addition, we offer comprehensive monitoring devices to ensure a stable inspection process for fully automated and interlinked applications.

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DEUTROFLUX UMT – Technical Data

	UMT 350	UMT 600	UMT 900	UMT 1100
Maximum length of test piece*	350 mm	600 mm	900 mm	1100 mm
Maximum diameter of test piece*	470 mm	470 mm	470 mm	470 mm
Maximum weight of test piece	100 kg	100 kg	100 kg	100 kg
Current flow (maximum current)	2,000–5,000 A	2,000–5,000 A	2,000–5,000 A	2,000–5,000 A
Field flow (maximum flow density)	> 1 Tesla (10,000 AT)	> 1 Tesla (10,000 AT)	> 1 Tesla (14,000 AT)	> 1 Tesla (20,000 AT)
Mains supply	400 V / 50 Hz	400 V / 50 Hz	400 V / 50 Hz	400 V / 50 Hz
Maximum current consumption	43 A	50 A	70 A	125 A
Maximum power consumption	18 kVA	20 kVA	28 kVA	50 kVA
Control voltage	24 V =			
Control type	SIMATIC PLC			
Relative duty cycle	40 % (optional 60 %)			
Compressed air	5–6 bar			
Air consumption per cycle	1.2 standard litre			
Clamping stroke	8 mm			
Number of wetting showers	3 pcs.	5 pcs.	7 pcs.	8 pcs.
Total weight (with control cabinet and container for testing agent)	550 kg	650 kg	780 kg	880 kg
Size (L x W x H)	2050 mm x 890 mm x 1750 mm	2300 mm x 890 mm x 1750 mm	2600 mm x 890 mm x 1750 mm	2800 mm x 890 mm x 1750 mm

* These values show the maximum space available in the machine for the test piece.
Depending on the dimensions of the test pieces and the inspection task, special equipment may be necessary.

Further information on our website www.karldeutsch.de » Products » Magnetic Particle Crack Detection

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