

RMG 4015
Crack Depth Measurement

HKMedQC
Wellcome Technology Co., Limited

Email:ivylin@hkmedqc.com
web:http://www.hkmedqc.com
19H Maxgrand plaza,No.3 Tai Yau Street,
San Po Kong,Kowloon,hk

KARL DEUTSCH

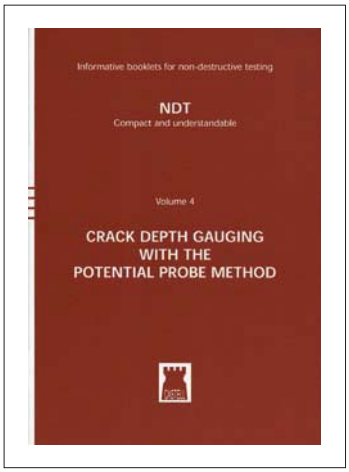
RMG 4015
Principle of Measurement



The crack depth meter: RMG 4015



Delivery in a sturdy hard case



Technical literature written by
Prof. Dr. V. Deutsch

You are looking for an easy-to-use instrument to measure the depth of surface cracks in metals which you have detected by e.g. Magnetic Particle Testing (MT) or Penetrant Testing (PT)? You want to evaluate the extension, the orientation or the inclination angle of the crack so you are able to make a decision on a possible rework on the specimen? Or you want to monitor the growth of a crack with increasing operation time?

Then we recommend the crack depth gauge RMG 4015.

Advantages of the RMG

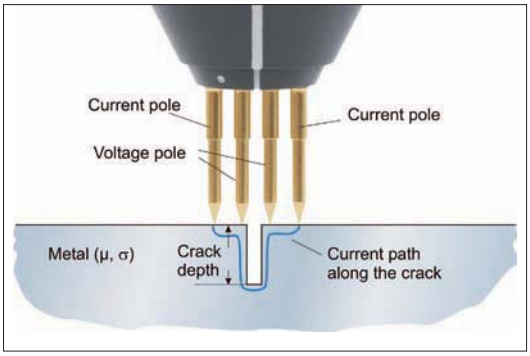
Since alternating current (AC) is used, the measurement takes advantage of the skin effect: The current is urged to flow close to the surface and thus follows the contour of the crack to a great extent. An additional advantage: Due to low pulsed current the required result is achieved and possible burnt contact spots on the specimen can be avoided. The small, battery-operated handheld unit combines current generation, measurement technique and microprocessor-based evaluation and can be taken along conveniently to any job site.

The RMG is optimized for the use on steel, iron and austenitic material. A material specific calibration adapts the instrument to distinct electrical and magnetical properties. For this purpose the RMG offers various calibration methods: In the simplest case it is sufficient to execute a comparison measurement at a crack-free spot of the specimen. Higher precision is achieved by means of a comparison measurement at a reference notch with a depth close to the expected crack depth. A multiple point calibration over reference notches with varying depth covering the whole measuring range leads to the best results.

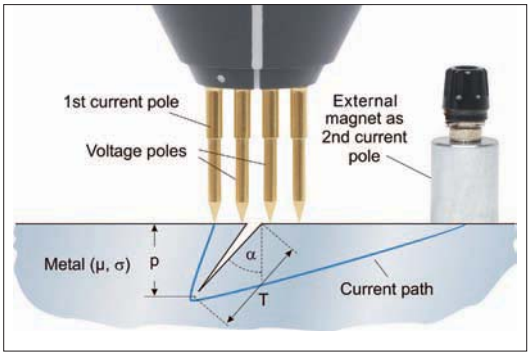
The crack depth gauge RMG 4015 can also be used on copper, brass, aluminium or other metallic material (however measuring range and resolution might be reduced). For difficult applications it is possible to adapt a special probe to specific requirements (on request).

Measurement Technique

The RMG uses the potential drop method with alternating current: Via two current poles located left and right to the crack a constant alternating current is passed into the workpiece. The voltage drop between two additional poles positioned left and right to the crack is proportional to the crack depth. Conditions for a reliable measurement: The electrical and magnetical properties of the material surrounding the crack are sufficiently homogenous. The width of the crack has almost no influence on the measurement (Fig. left). For a crack depth measurement of inclined cracks the frequency of the alternating current is automatically lowered so that the electric current covers a wider area in the workpiece. Depending on the position of the external current pole (positioned either left or right with respect to the crack) different voltage drops result which are used to calculate the angle α (Fig. right).



Crack depth measurement at normal cracks



Angle and depth determination of inclined cracks

Key Properties and Probes

All RMG properties at a glance

- Ideal accessory for MT or PT
- Small, battery-operated mobile instrument
- Low weight (225 g / 8 oz)
- Display of the crack depth in mm or inch
- Menu-guided operation
- Crack depth measurement also for inclined cracks in ferromagnetic material; resolution of 10° in steel is possible
- Orientation of inclined cracks determinable with special probe setup
- Robust probe design
- Easy choice of the right probe: Three standard probes are suitable for most workpieces
- Special probes for surfaces of complex shape and difficult to access crack locations
- Sturdy, exchangeable and gold plated contact pins
- Interface for printer and PC
- Memory for measured crack depths
- Fast evaluation (1 measurement per second)
- Single and continuous measurement operation
- Wide range of accessories: Control blocks, polishing fleece, self-twisting or needle contact pins
- Technical literature “Crack depth gauging with the potential probe method” is included
- Service: Repeated acceptance checks of instrument and probes possible
- Advice and knowledge: Our specialists will be glad to support you

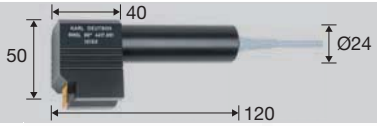
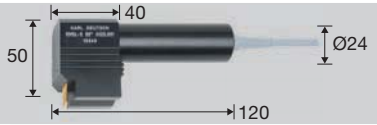


Crack depth measurement of an inclined crack after angle determination



Measurement of a normal crack on a small area

A solution for every problem:

Standard probes (all dimensions in mm)	Specification	Order no.
	Probe RMSQ 0° Square arrangement of the pins for measurement of normal cracks at difficult to access locations. Incl. 1 set of spare contact pins (standard pins)	4418.001
	Probe RMSL 90° 90° right-angled probe with linear arrangement of contact pins for measurement of normal cracks (e.g. inside of bore holes, inside of tubes). Incl. 1 set of spare contact pins (standard pins)	4417.001
	Probe RMSL-S 0° Linear arrangement of contact pins for measurement of inclined and normal cracks. The design of the probe allows for measurement at difficult to access locations. Incl. external magnet as 2nd current pole, cable and 1 set of spare contact pins (standard pins)	4421.001
	Probe RMSL-S 90° 90° right-angled probe with linear arrangement of contact pins for measurement of inclined and normal cracks (e.g. inside of bore holes, inside of tubes). Incl. external magnet as 2nd current pole, cable and 1 set of spare contact pins (standard pins)	4420.001
	Probe RMSL 0° Linear arrangement of contact pins for measurement of normal cracks. The design of the probe allows for measurement at difficult to access locations. Incl. 1 set of spare contact pins (standard pins)	4416.001
Special probes (all dimensions in mm)	**Specification**	**Order no.**
	Special probe RMSL 90° 90° right-angled probe with linear arrangement of contact pins for measurement of normal cracks. With a special arrangement of the pins it is possible to measure cracks with a width of more than 2.54 mm (0.1 inch).	4498.004
	Special probe RMSQ 90° 90° right-angled probe with square arrangement of the pins to measure particularly small, normal cracks in very narrow gaps.	4498.007
	Special probe RMSQ 0° Square arrangement of the pins to measure normal cracks at very difficult to access locations (e.g. inside deep bore holes, grooves).	4498.010

Gladly we support you concerning the solution of your problem and can suggest an appropriate special probe if required.

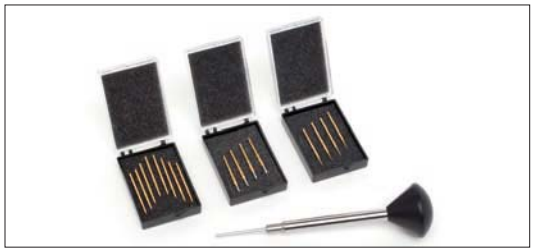
RMG 4015
Accessories – Order Data – Technical Data

Order Data

	Order no.
Crack depth gauge RMG 4015	4015.003
Probes (incl. 1 set spare standard contact pins)	
Crack depth probe RMSQ 0°	4418.001
Crack depth probe RMSL 0°	4416.001
Crack depth probe RMSL 90°	4417.001
Probe sets (for inclined cracks)	
Crack depth probe RMSL-S 0° incl. external magnet and cable	4421.001
Crack depth probe RMSL-S 90° incl. external magnet and cable	4420.001
Special characteristic curve for non ferrous metals (NFe)	4901.001

Accessories	Order no.
RMG reference block (0 – 10 mm crack)	4720.002
Charger (230 V) for inserted rechargeable batteries	2806.001
Rechargeable battery set NiMH (2 x 1.2 V, size AA)	6016.001
External charger 230 V for NiCd/NiMH batteries (4 x size AA)	6015.001
Matrix printer (incl. 230 V mains unit, paper roll, printer ribbon)	6010.001
Printer cable RMG 4015 for matrix printer 6010	1657.305
PC cable RMG 4015 for RS232C interface (PC)	1657.307
Fitting tool to replace probe contact pins	4816.001
Protective bag for RMG 4015	4825.001
Literature: Crack depth measurement by Prof. Dr. V. Deutsch	6607.041

Software	Order no.
STATWIN 2002, PC software for processing (for Windows 9x/XP/ME/2000/NT4.0)	2904.001
EasyExport, PC software for data transfer (for Windows XP/2000)	2905.001
Consumption material	
8 contact pins (standard)	4815.001
4 contact pins (needle)	4815.002
4 contact pins (self-twisting)	4815.003
Polishing fleece (5 pcs.) for control block	4820.001
Mains/charger unit (230 V) for printer 6010	6013.001



Spare contact pins and fitting tool



Control block and polishing fleece



STATWIN 2002 with PC cable and probe RMSQ 0°

Technical data of RMG 4015

Application	Depth measurement of surface cracks in electrically conducting materials
Principle of measurement	AC electrical potential drop method
Dimensions (W x H x D)	83 mm x 151 mm x 35 mm / 3.3 inch x 5.9 inch x 1.4 inch
Weight	225 g / 8 oz
Power supply	2 x 1.5 V Alkali-Manganese dry cells, size AA (mignon), alternatively 2 x 1.2 V NiCd or NiMH rechargeable batteries, size AA. Optical alarm in case of empty batteries.
Operating time	At least 11.5 hrs with Alkali-Manganese cells.
Data storage	A total number of approx. 3850 values can be stored in up to 300 batches. For each batch, a statistical evaluation can be printed out. This evaluation determines the minimum value, the maximum value, the average value and the standard deviation.
Measuring range	0 mm to 99.9 mm / 0 inch to 3.9 inch for ferrous material, 0 mm to 12 mm / 0 inch to 0.5 inch for aluminium, copper, brass.
Measurement accuracy	Depending on material and measuring range. Typical figure for two-point material correction: Ferromagnetic material 3 to 15 %, austenitic material 3 to 25 %.
Serial interface	RS232C to KARL DEUTSCH printer or PC: 4800 bauds, 8 data bits, 1 stop bit, no parity bit. USB-adapter available.
Environmental conditions	Operating temperature: From 0° C to 45° C, storage temperature: -20° C to 60° C with removed batteries, From 0° C to 45° C with inserted batteries (depending on battery type and brand).

Leaflet P 4015 E · Subject to change without notice · Printed in Germany 06/07 · 7499.P4015.EN.0607

DIN EN ISO 9001:2000 certified

HKMedQC
Wellcome Technology Co., Limited

Email:ivylin@hkmedqc.com
web:http://www.hkmedqc.com
19H Maxgrand plaza,No.3 Tai Yau Street,
San Po Kong,Kowloon,hk

KARL DEUTSCH