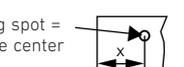


Probes FD13H / FDW13H / D-FN Data Sheet



Probe models	FD13H	FDW13H	D-FN
Part no. ¹	604-508	604-800	1006632
Measurement tasks	<ul style="list-style-type: none"> ■ Coating thickness on steel or iron base material (FE); NC/FE or NF/FE ■ Coating thickness on non-ferrous metal base material (NF); NC/NF 		
Applications	Probes for measurements on virtually all metals. The probes work with two test methods and are therefore able to measure coating thicknesses on non-ferrous metals (NF) as well as on ferrous metals (FE). Because of the large pole tip the probes are also well suited for measurements on rough (blasted) surfaces.		
Examples	Steel or iron base material (FE) <ul style="list-style-type: none"> ■ Paint, varnish, rubber or plastic coatings on steel, iron or cast iron (NC/FE) ■ Copper, brass, zinc, tin and chrome coatings on steel or iron (NF/FE) ■ Both electro-galvanized and hot galvanized coatings on steel, iron or cast iron (NF/FE) 	Non-ferrous metal base materials (NF) <ul style="list-style-type: none"> ■ Paint, varnish or plastic coatings on aluminium, copper or brass (NC/NF) 	
Features	<ul style="list-style-type: none"> ■ Preferably for measurements on flat surfaces ■ Excellently suited for measurements on rough surfaces, measurements on smooth surfaces are of course also possible ■ Wear-resistant probe pole tip ■ Probe model FD13H also available as digital probe (D-FN), in which the measurement signal is already converted into the measured value directly in the probe ■ Probe D-FN: Humidity protection 		
Restrictions	<p>-</p> <p>Non-ferrous metal base materials (NF)</p> <ul style="list-style-type: none"> ■ The probes measure with a high-precision conductivity compensation developed by Helmut Fischer, so different electrical conductivities of the base material (particularly various aluminium alloys) have no effect on the coating thickness measurement. ■ Strong influence due to surface curvatures 		
Measuring ranges*	Steel or iron base material (FE) 0 ... 2000 µm (0 ... 78.74 mils)	Non-ferrous metal base materials (NF) 0 ... 2000 µm (0 ... 78.74 mils)	
*	<p><i>The values for measurement range, trueness, repeatability precision and measurement deviations are valid for electrically non-conductive coating materials on steel or iron (NC/FE). The values may differ for measurements on non-ferrous coating materials (NF).</i></p> <p><i>The specifications for trueness) and repeatability precision apply to ambient and specimen temperatures at the time of calibration. The values for trueness and repeatability may increase compared to the values specified here if the temperature during measurement differs from the temperature during calibration.</i></p>		
Trueness*	Steel or iron base material (FE) 0 ... 75 µm: ≤ 1.5 µm 75 ... 1000 µm: ≤ 2 % of nominal value 1000 ... 2000 µm: ≤ 3 % of nominal value (0 ... 2.95 mils: ≤ 0.06 mils) (2.95 ... 39.37 mils: ≤ 2 % of nominal value) (39.37 ... 78.74 mils: ≤ 3 % of nominal value)	Non-ferrous metal base materials (NF) 0 ... 50 µm: ≤ 1 µm 50 ... 1000 µm: ≤ 2 % of nominal value 1000 ... 2000 µm: ≤ 3 % of nominal value (0 ... 1.97 mils: ≤ 0.039 mils) (1.97 ... 39.37 mils: ≤ 2 % of nominal value) (39.37 ... 78.74 mils: ≤ 3 % of nominal value)	

Probes FD13H / FDW13H / D-FN

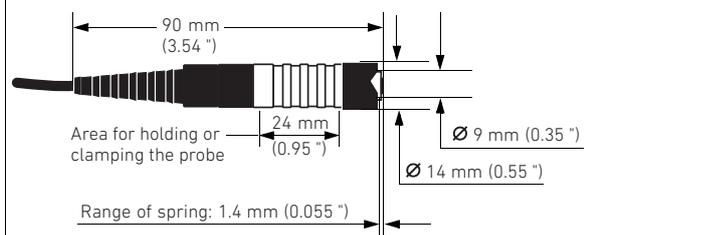
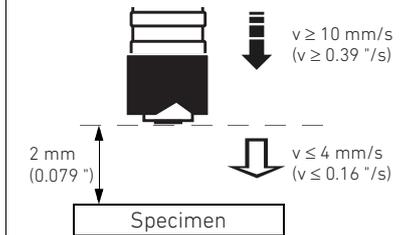
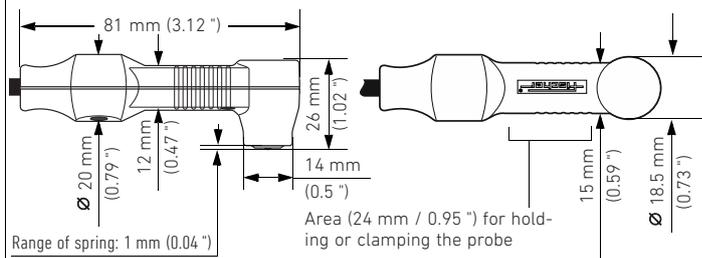
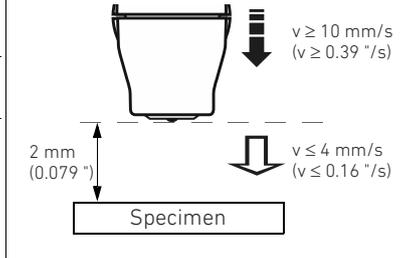
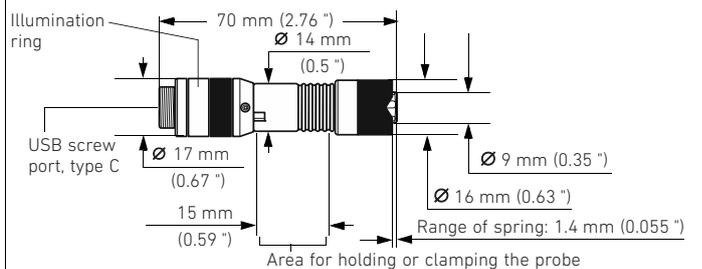
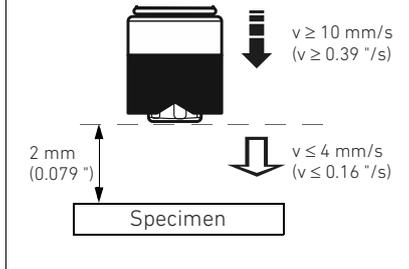
Repeatability precision* based on Fischer factory calibration standards at 20 °C (68 °F) for specimen and ambient temperature	Steel or iron base material (FE) 0 ... 50 µm: ≤ 0.25 µm 50 ... 2000 µm: ≤ 0.5 % of reading (0 ... 1.97 mils: ≤ 0.0098 mils) (1.97 ... 78.74 mils: ≤ 0.5 % of reading)	Non-ferrous metal base materials (NF) 0 ... 100 µm: ≤ 0.5 µm 100 ... 2000 µm: ≤ 0.5 % of reading (0 ... 3.94 mils: ≤ 0.02 mils) (3.94 ... 78.74 mils: ≤ 0.5 % of reading)
Influence* The following values are valid for a coating thickness with a nominal value of 75 µm (2.95 mils). The quantity of influences are stated with the expanded measurement uncertainty U with the expanded factor of k = 2 (defines an interval with the confidence level of 95.45 %) – according to ISO/IEC Guide 98-3:2008-09 "Guide to the expression of uncertainty in measurement".	Steel or iron base material (FE)	Non-ferrous metal base materials (NF)
Curvature (R), measurement deviation from nominal value with reference to a calibration on flat surface Measuring spot 	No influence within the scope of trueness from $R = 55 \text{ mm} \pm 9 \text{ mm}$ ($R = 2.17'' \pm 0.35''$) Measurement deviation of 10 % for $R = 28 \text{ mm} \pm 1.6 \text{ mm}$ ($R = 1.10'' \pm 0.063''$) FD13H and FDW13H probes require a minimum of $R = 25 \text{ mm}$ (support stand necessary) ($R = 0.98''$) D-FN probe requires a minimum of $R = 29 \text{ mm}$ (support stand necessary) ($R = 1.14''$)	No influence within the scope of trueness from $R = 550 \text{ mm} \pm 56 \text{ mm}$ ($R = 21.65'' \pm 2.2''$) Measurement deviation of 10 % for $R = 110 \text{ mm} \pm 5.6 \text{ mm}$ ($R = 4.33'' \pm 0.22''$)
Curvature (R), measurement deviation from nominal value with reference to a calibration on flat surface Measuring spot 	No influence within the scope of trueness from $R = 80 \text{ mm} \pm 5 \text{ mm}$ ($R = 3.14'' \pm 0.2''$) Measurement deviation of 10 % for $R = 16 \text{ mm} \pm 1.2 \text{ mm}$ ($R = 0.63'' \pm 0.047''$) FD13H and D-FN probes needs a minimum of $R = 1.5 \text{ mm}$ (support stand necessary) ($R = 0.06''$) FDW13H probe needs a minimum of $R = 2 \text{ mm}$ (support stand necessary) ($R = 0.08''$)	No influence within the scope of trueness from $R = 447 \text{ mm} \pm 28 \text{ mm}$ ($R = 17.6'' \pm 1.1''$) Measurement deviation of 10 % for $R = 92 \text{ mm} \pm 3.4 \text{ mm}$ ($R = 3.62'' \pm 0.13''$)
Edge distance (R), specification from probe tip center, measurement deviation from nominal value Measuring spot in the center of the circular surface 	No influence within the scope of trueness from $R = 11.5 \text{ mm} \pm 0.3 \text{ mm}$ ($R = 0.45'' \pm 0.012''$) Measurement deviation of 10 % for $R = 6.4 \text{ mm} \pm 0.3 \text{ mm}$ ($R = 0.25'' \pm 0.012''$) FD13H and FDW13H probes require a minimum of $R = 7 \text{ mm}$ (support stand necessary) ($R = 0.28''$) D-FN probe requires a minimum of $R = 8 \text{ mm}$ (support stand necessary) ($R = 0.32''$)	No influence within the scope of trueness from $R = 3.2 \text{ mm} \pm 0.2 \text{ mm}$ ($R = 0.13'' \pm 0.0079''$) Measurement deviation of 10 % for $R = 2.4 \text{ mm} \pm 0.04 \text{ mm}$ ($R = 0.094'' \pm 0.0016''$)
Edge distance (X), specification from probe tip center, measurement deviation from nominal value Measuring spot = Probe pole center 	No influence within the scope of trueness from $X = 3.6 \text{ mm} \pm 0.3 \text{ mm}$ ($X = 0.14'' \pm 0.012''$) Measurement deviation of 10 % for $X = 1.0 \text{ mm} \pm 0.05 \text{ mm}$ ($X = 0.039'' \pm 0.002''$)	No measurement deviation within the trueness - for FD13H and D-FN probe as of $X = 2.2 \text{ mm} \pm 0.05 \text{ mm}$ ($X = 0.087'' \pm 0.002''$) - for FDW13H probe as of $X = 2.2 \text{ mm} \pm 0.1 \text{ mm}$ ($X = 0.087'' \pm 0.004''$) Measurement deviation of 10 % for $X = 1.9 \text{ mm} \pm 0.04 \text{ mm}$ ($X = 0.075'' \pm 0.0016''$)
Base material thickness (D), measurement deviation from nominal value Measuring spot 	Steel or iron base material (FE) No influence within the scope of trueness from $D = 1.0 \text{ mm} \pm 0.1 \text{ mm}$ ($D = 39.4 \text{ mils} \pm 3.94 \text{ mils}$) Measurement deviation of 10 % for $D = 0.5 \text{ mm} \pm 0.03 \text{ mm}$ ($D = 19.7 \text{ mils} \pm 1.18 \text{ mils}$)	Base material Aluminium No influence within the scope of trueness from $D = 0.1 \text{ mm} \pm 0.01 \text{ mm}$ ($D = 3.94 \text{ mils} \pm 0.39 \text{ mils}$) Measurement deviation of 10 % for $D = 0.02 \text{ mm} \pm 0.001 \text{ mm}$ ($D = 0.79 \text{ mils} \pm 0.039 \text{ mils}$)
Base material	Steel or iron base material (FE) Influence on base material (FE) permeability in regard to Fischer calibration standards (master calibration): No measurement error for a ferrite content from 137 FN ± 0.2 FN onwards. Measurement error of 10 % for ferrite content of 123 FN ± 0.8 FN.	Non-ferrous metal base materials (NF) Influence of the el. conductivity of the base material (NF) in the range from 30 to 100 % IACS: Measurement deviation ≤ 2 %, valid for the total measurement range.

NDT Supply.com, Inc.
 7952 Nieman Road
 Lenexa, KS 66214-1560 USA

Phone: 913-685-0675, Fax: 913-685-1125
 e-mail: sales@ndtsupply.com, www.ndtsupply.com



Probes FD13H / FDW13H / D-FN

<p>Probe design</p> <p>FD13H probe Single pole axial probes with spring-loaded measuring system</p> <p>Probe pole tip</p> <ul style="list-style-type: none"> ■ wear-resistant ■ material: hard metal ■ radius: 2 mm (0.079 ") ■ not replaceable 	<p>Dimensions</p>  <p>Probe cable length: 1.5 m (59.06 "), other cable lengths on request¹ Bending radius: ≥ 30 mm (1.18 ")</p>	<p>Approach and touchdown speed for automated measurement</p>  <p>Lift-off distance between 2 measurements ≥ 8 mm (≥ 0.32 ")</p>
<p>FDW13H probe Single pole angle probe with spring-loaded measuring system</p> <p>Probe pole tip</p> <ul style="list-style-type: none"> ■ wear-resistant ■ material: hard metal ■ radius: 2 mm (0.079 ") ■ not replaceable 	 <p>Probe cable length: 1.5 m (59.06 "), other cable lengths on request¹ Bending radius: ≥ 30 mm (1.18 ")</p>	 <p>Lift-off distance between 2 measurements ≥ 8 mm (≥ 0.32 ")</p>
<p>D-FN probe</p> <ul style="list-style-type: none"> ■ Single pole axial probes with spring-loaded measuring system ■ Humidity protection <p>Probe pole tip</p> <ul style="list-style-type: none"> ■ wear-resistant ■ material: hard metal ■ radius: 2 mm (0.079 ") ■ not replaceable 	 <p>Probe cable length: 1.5 m (59.06 "), other cable lengths on request¹ Bending radius: ≥ 30 mm (1.18 ")</p>	 <p>Lift-off distance between 2 measurements ≥ 8 mm (≥ 0.32 ")</p>
<p>Measuring methods</p>	<p>Steel or iron base material (FE)</p> <p>Magnetic induction test method according to ISO 2178, ASTM D7091</p>	<p>Non-ferrous metal base materials (NF)</p> <p>Amplitude-sensitive eddy current test method according to ISO 2360, ASTM D7091</p>
<p>Calibration – Calibration foils</p> <p>1-Point calibration</p> <p>Use following foil thickness for calibration</p>	<p>Steel or iron base material (FE)</p> <p><i>The 1-Point-Calibration is practicably in the lower measuring range only. This calibration method provides the best measuring accuracy in a small coating thickness range close by the stated foil thickness.</i></p> <p>max. 500 µm (19.69 mils)</p>	<p>Non-ferrous metal base materials (NF)</p> <p>max. 1000 µm (39.37 mils)</p>
<p>2-Point calibration</p> <p>Use following foil thickness pairings for calibration</p>	<p><i>The calibration using two calibration foils provides on the one hand the best measuring accuracy in the coating thickness range limited by the two foil thicknesses and on the other hand two calibration foils are necessary for calibrating the upper measurement range.</i></p> <p>Foil 1: ≤ 300 µm (11.8 mils); Foil 2: ≥ 800 µm (31.5 mils)</p>	<p>Foil 1: ≤ 600 µm (23.6 mils); Foil 2: ≥ 1000 µm (39.37 mils)</p>
<p>Admissible ambient temperature at operation</p>	<p>-10 °C ... +40 °C (+14 °F ... +104 °F)</p>	
<p>Admissible specimen temperature</p>	<p>max. +40 °C (+104 °F)</p>	

Probes FD13H / FDW13H / D-FN

Probes work with

FD13H and FDW13H
(analog probes)

- Hand-held instruments: all DUALSCOPE® instruments of the FMP series
- FD13H: all DUALSCOPE® instruments of the DMP series by using DMP-F-Probe-Adapter (1007336)
- Bench top instruments: FISCHERSCOPE® MMS® PC and FISCHERSCOPE® MMS® PC2 both with PERMASCOPE® F-Probe module (604-293, 12-pin connecting socket)

D-FN (digital probe)

- Hand-held instruments: all DUALSCOPE® instruments of the DMP series

Scope of delivery

- All: Probe with connecting cable, calibration foil sets 605-413 (metal plate NF/FE for instrument check, 2 calibration foils with thicknesses of approx. 9 µm (0.35 mils) (CuBe) and 125 µm (4.92 mils)) and 605-415 (metal plate NC/NF for instrument check, 2 calibration foils with thicknesses of approx. 24 µm (0.95 mils) and 250 µm (9.84 mils))
- FD13H, additional: prism adapter for measurements on pipes and bars
- D-FN: probe connecting cable with screwable USB C plugs

Options

- Calibration foils: various foil thickness are available up to 1500 µm (59.06 mils); suitable calibration foil thicknesses are specified in section Calibration – Calibration foils
- Manufacturer Certificate M according to DIN 55350-18 (only in connection with measuring instrument)
- Support stand V12 BASE, 604-420, with mechanical probe lowering device;
FD13H: suitable probe clamp 602-370 included in support stand delivery
D-FN: suitable probe clamp 600-213
FDW13H: no probe clamp available
- Support stand V12 MOT, 604-374, with motorized probe lowering device for highest repeatability;
FD13H: suitable probe clamp 602-370 included in support stand delivery
D-FN: suitable probe clamp 600-213
FDW13H: no probe clamp available

¹ Probes with special cable lengths have own part no. and probe model names. This data sheet also applies to these probes.
Probe D-FN: max. cable length 3 m (118 "), it not allowed to use a USB connection cable to connect probe to instrument!

FE08.1/08 doc2023-03-10

DUALSCOPE®, PERMASCOPE® und FISCHERSCOPE® are registered trade marks of the Helmut Fischer GmbH Institut für Elektronik und Messtechnik in Germany and other countries.

Note: Designations not marked with ® or ™ may also be protected by law.

NDT Supply.com, Inc.

7952 Nieman Road
Lenexa, KS 66214-1560 USA

Phone: 913-685-0675, Fax: 913-685-1125
e-mail: sales@ndtsupply.com, www.ndtsupply.com

