

MARSURF I MARSURF M 300



SURFACE ROUGHNESS MEASUREMENTS AT THE PRODUCTION SITE


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Mahr

E X A C T L Y

SURFACE ROUGHNESS MEASUREMENTS AT THE PRODUCTION SITE.

MOBILE WITH MARSURF



► | Wherever surface structures influence the function, processing or appearance of components or products, careful testing is essential. But how can surfaces be tested? At the start of the 20th Century, experts still had to test by eye and touch. A practiced eye can detect features in the μm range, and even the much maligned thumbnail test delivered perfectly acceptable results. Now however, we live in an age of exchangeable parts, fits and internationalization, where subjective tests like this are no longer adequate. Today, computer-aided measuring instruments provide objective data. Measurement and evaluation have become considerably easier. For decades, Mahr has been a worldwide pioneer in this area, as demonstrated by the company's numerous innovations and patented solutions in the field of roughness metrology. The interplay between the stylus, drive and measuring setup plays a key role in influencing the quality of surface measurement tasks. This is where Mahr's core expertise comes in, as demonstrated by the company's numerous innovations and patented solutions. Over time, we have succeeded in perfecting the stylus method which is now widespread throughout the world. The cable-free Bluetooth connection between evaluation unit and drive unit is unique in roughness metrology. Even here, Mahr shows that its metrology is up to date with modern needs. Developed with Mahr quality, expertise and know-how, MarSurf is the solution for all your surface metrology needs.

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MarSurf. Handy and Precise for on-site Roughness Measurements

MOBILE ROUGHNESS MEASUREMENT DEVICE MARSURF M 300

► | Mahr has played a key role in ensuring the success of mobile roughness measurement devices. As early as the 1980s, Mahr was setting new standards with the M4P. The products have developed in line with changing production monitoring requirements. Today's devices meet the highest international standards. Mobile roughness measurement devices from Mahr are lightweight with a handy shape, flexible handling, high-precision measurement in different positions and easy positioning using V-blocks.



MarSurf M 300

Highly mobile, high-performance unit



Description

The operation of this instrument is based on the well-proven catalog of functions which enables instrument settings such as measuring conditions, language and record contents to be selected very easily, thus offering a maximum of comfort and flexibility.

The MarSurf M 300 not only meets the requirements for determination and documentation of selected parameters, but also makes most of the parameters and characteristic curves stipulated in DIN/ISO/JIS available for the evaluation of the profile assessed.

Moreover, the MarSurf M 300 offers an integrated memory for up to 40,000 results or 30 profiles, as well as the functions of tolerance monitoring, vertical scale selection and the setting of unsymmetric intersection lines for peak count calculation.

Delivery as a set.

MarSurf M 300-Set

Order No. 6910401

Features

- Measuring range of up to 350 μm (.014 in)
- Units $\mu\text{m}/\mu\text{inch}$ selectable
- Standards: ISO/ASME/JIS and MOTIF selectable
- Traversing length as per DIN EN ISO 4288/ ASME B46.1: 1.75 mm, 5.6 mm, 17.5 mm (0.07 in, 0.22 in, 0.7 in) as per EN ISO 12085 (MOTIF): 1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm
- Number of sampling lengths selectable from 1 to 5
- Automatic selection of filter and traversing length conforming to standards
- Phase-correct profile filter as per DIN EN ISO 11562
- Cutoff 0.25 mm, 0.80 mm, 2.50 mm (.010 in, .032 in, .100 in)
- Short cutoff selectable
- Parameters as per DIN/ISO/SEP: Ra, Rq, Rz, Rmax, Rp, Rt, R3z, Rk, Rvk, Rpk, Mr1, Mr2, Rmr, RSm, RPc (see pg. 17 for additional parameters)
- Tolerance monitoring in display and measuring record
- Automatic or adjustable scaling
- Printing of R-profile (ISO/ASME/JIS), P-profile (MOTIF), material ratio curve, measuring record
- Output of date and/or time of the measurements
- Integrated memory for up to 40,000 results and 30 profiles
- Dynamic calibration function
- Locking and/or password protection for instrument settings

MarSurf M 300. Novelties

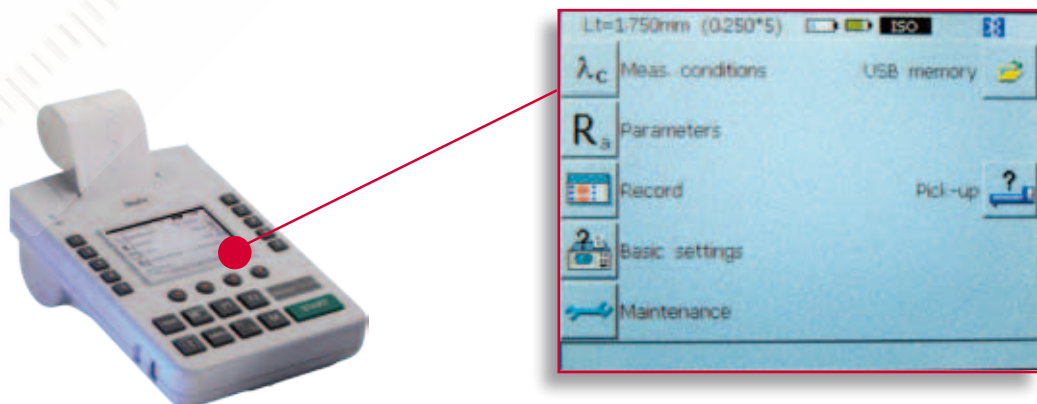
Up to 4 m distance between evaluation unit and drive unit enable high flexibility for you to conduct your measurements. Especially with large, cumbersome parts, the application engineer can work directly at the measuring site. The measurement can be started at the evaluation unit MarSurf M 300 or at the drive unit MarSurf RD 18. The evaluation unit stands in a "safe place" and delivers exact results without influence from the ambient conditions.



Brilliant, illuminated color display

A large, illuminated color display to read the parameters and the profiles so that you can:

- read the correct results in a poorly lit atmosphere



Bluetooth Technology

NEW: Cable-free connection between evaluation unit and drive unit!

A further advantage of the Bluetooth technology:

Connection of several drive units to one evaluation unit. You can select one desired drive unit from a list.



Software "MarSurf PS 1/M 300 Explorer" for mobile roughness devices

The essential functions of the **Software "MarSurf PS1/M 300 Explorer"** are to secure and document your measuring results and profiles.

The data stored in the **MarSurf M 300** can e.g. be printed out in any format.

The measuring data can be displayed in different forms:

- Profile and results
- Results
- Profile + MRK + results
- Statistics, and much more

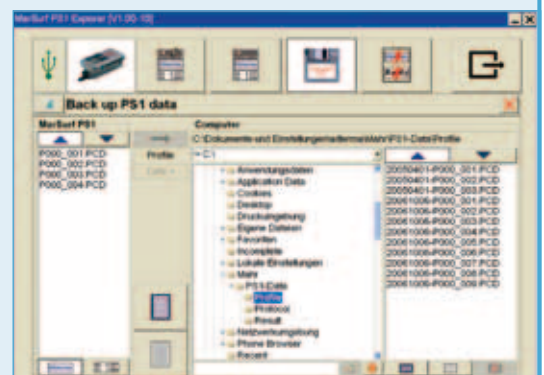
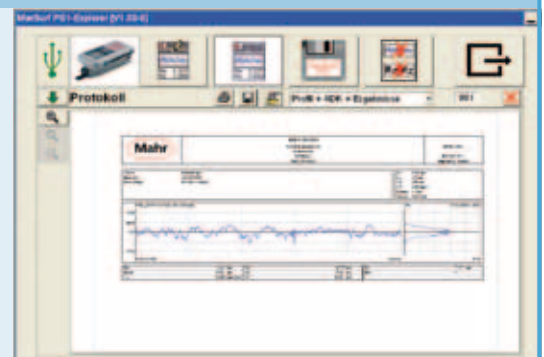
The **Software "MarSurf PS1/M 300 Explorer"** additionally simplifies the securing of data on your PC.

During installation, a MarSurf M 300 directory is automatically created.

The results and profiles saved in the M 300 can simply be moved to that directory or any directory of your choice using "Drag & Drop" and are therefore secured.

Software "MarSurf PS1/M 300 Explorer" to document results and record profiles on a PC

Order No. 6910205



Drive Unit MarSurf RD 18



Description

The drive unit RD18 can be connected to the MarSurf M 300 and is included in a carrying-case set. It can be connected either via Bluetooth or with a cable. The well-proven PHT-skid probes are implemented in the drive unit. To test the standard probe, a testing standard is already integrated in the RD 18 - this gives you the certainty that your results are correct!

To fasten individual accessory elements, 4 inside thread sockets are located on the underside of the RD 18. Furthermore, the prismatic underside offers you the possibility to perfectly position your work-pieces.



MarSurf RD 18 with height adjustment

Technical data

Drive unit RD 18

Tracing direction
Traversing length adjustable on
M 300 as per DIN/ISO
as per EN ISO 12085

Traverse speed
Dimensions
(without probe protection)

Order No. 6910403

lengthwise
1.75 mm, 5.6 mm, 17.5 mm
(0.07 in, 0.22 in, 0.7 in)
1 mm, 2 mm, 4 mm, 8 mm,
12 mm, 16 mm
0.5 mm/s
Ø 24 mm, L = 112 mm



Underside of the MarSurf RD 18

Application Examples



Upside down measurements

Perfect upside down measurements with the MarSurf RD 18. Place parts, start measurement, finished.

Enables the measurement of small workpieces without additional mounts.

No more alignment work necessary.

A solution for a fast and certain measurement.



Measurement with end face vee-block

Flexibility due to extensive accessories that are already included in the standard scope of delivery.

The end face vee-block offers the possibility to give the secure support for different applications.



Measurement with and without cable

Especially when measuring large, cumbersome parts, it is not always possible for the measuring technician to be directly near the evaluation unit or, as shown in this example, the drive unit.

Bluetooth technology gives the advantage of cable-free connection.

An additional factor that simplifies surface measurement.

It is also possible to operate the MarSurf RD 18 under special conditions with a connection cable (without Bluetooth connection).

MARSURF M 300 | ROUGHNESS MEASUREMENTS ON SITE

Roughness measurements on flap tracks
(for landing flaps). Example: Airbus



Pictures in cooperation with: Airbus Deutschland GmbH, Bremen



Flight Engineering | Ship Building | Mechanical Engineering | Automotive Engineering | Precision Engineering

MARSURF M 300 | ROUGHNESS MEASUREMENTS ON SITE



MARSURF M 300 | MEASUREMENTS IN THE PRODUCTION PROCESS

Roughness measurement on ship propellers

The surface properties of ship propellers play a decisive role.

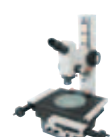
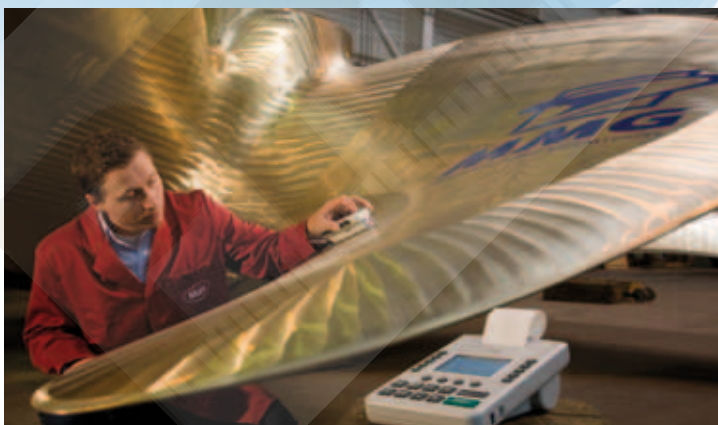
Even a small deviation can lead to a 5 % loss in efficiency.



Pictures in cooperation with: Mecklenburger Metallguss GmbH, Waren (Müritz)



MARSURF M 300 | MEASUREMENTS IN THE PRODUCTION PROCESS



Optional Probes for MarSurf M 300

Probes for various measuring tasks for use with RD 18

The P-probes are characterized by special construction features:

- Stylus tip geometry as per EN ISO 3274, standard $2\ \mu\text{m}/90^\circ$
- Measuring force of approx. 0.7 mN (as per EN ISO 3274)
- Reliable inductive converter
- Robust, rigid housing
- Self-aligning, elastic bearings
- Reliable plug and socket connections



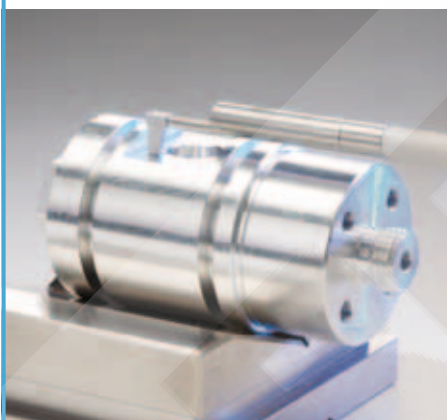
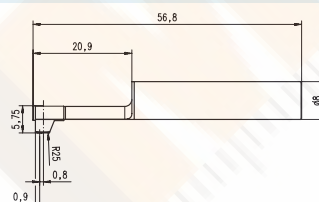
PHT 6-350 pick-up

Type
Skid radius

Contact point
Measuring range
Specification

Order No. 6111520 (standard probe)

single-skid pick-up
25 mm (.984 in) in traversing direction,
2.9 mm (.114 in) at right angles
0.8 mm (.0315 in) in front of the stylus
350 μm (0.014 in)
for plane surfaces, bores with a dia. larger than 6 mm,
(.236 in) and a max. depth of 17 mm (.669 in), grooves with
a width larger than 3 mm (.118 in);
min. workpiece length = traversing length + 1 mm (.0394 in)



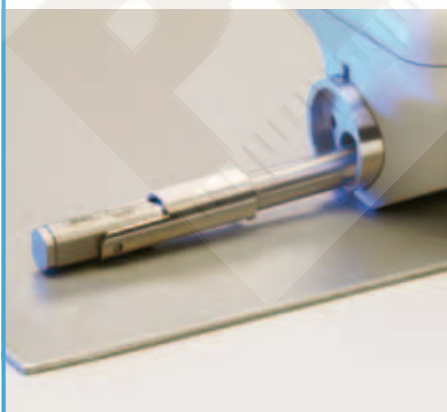
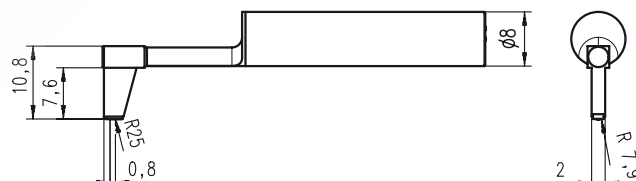
PHT 11-100 pick-up

Type
Skid radius

Contact point
Measuring range
Specification

Order No. 6111524

single-skid pick-up
25 mm (.984 in) in traversing direction,
2.9 mm (.114 in) at right angles
0.8 mm (.0315 in) in front of the stylus
150 μm (.00591 in)
for plane surfaces, bores with a dia. larger than
11 mm (.433 in) and a max. depth of 14 mm (.551 in),
grooves with a width larger than 2.5 mm (.098 in)
min. workpiece length = traversing length + 1 mm (.0394 in)



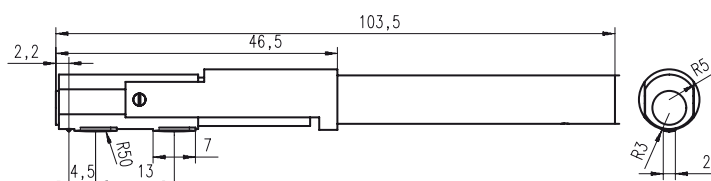
PT 150 pick-up

Type
Skid radius

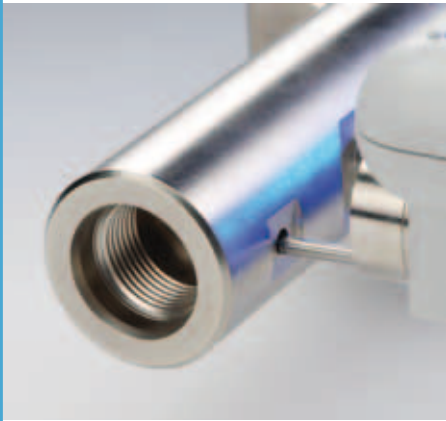
Contact point
Measuring range
Specification

Order No. 6111523

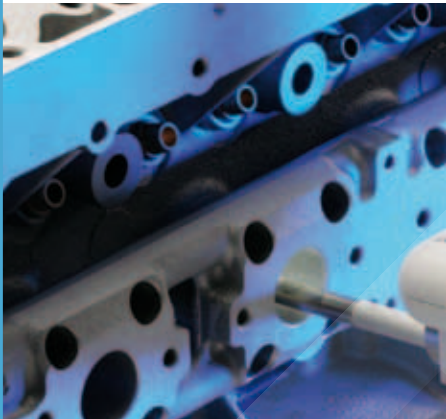
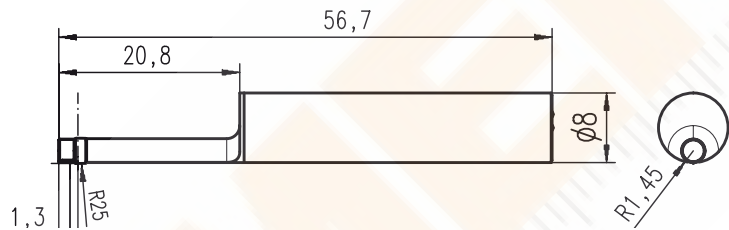
dual-skid pick-up
50 mm (1.969 in) in traversing direction,
3 mm (.118 in) at right angles
4.5 mm (.177 in) in front of the stylus
150 μm (.006 in)
Dual-skid pick-up for measurements on metal sheets and
roller surfaces according to DIN EN 10049 (SEP).
min. workpiece length = tracing length + 5 mm (.197 in)



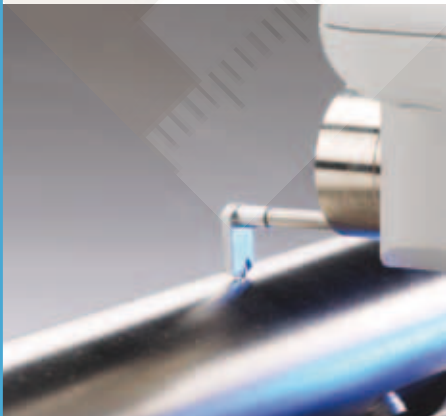
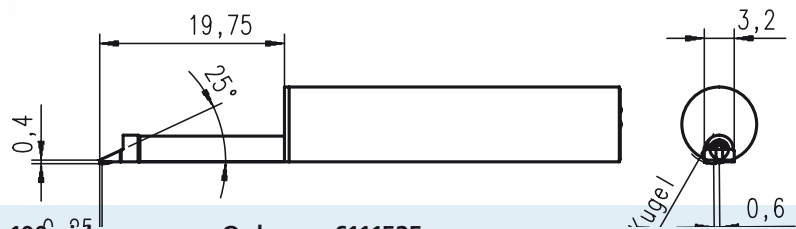
Optional Pick-ups for MarSurf M 300

**PHT 3-350 pick-up****Order no. 6111521**

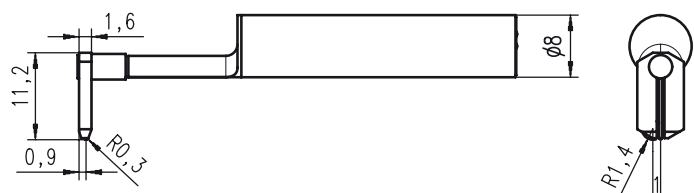
Type	single-skid pick-up
Skid radius	25 mm (.984 in) in traversing direction, 1.45 mm (.0571 in) at right angles
Contact point	0.9 mm (.0354 in) in front of the stylus
Measuring range	350 μ m (0.014 in)
Specification	for bores with a dia. larger than 3 mm (.118 in) and a max. depth of 17 mm (.669 in); min. workpiece length = traversing length + 1 mm (.0394 in)

**Pick-up extension PHT (80 mm), Order no. 6850540 (for P-probes)****PHTF 0.5-100 pick-up****Order no. 6111522**

Type	single-skid pick-up
Skid radius	25 mm (.984 in) in traversing direction, 1.45 mm (.0571 in) at right angles
Contact point	0.6 mm (.0236 in) beside the stylus
Measuring range	100 μ m (.00394 in)
Specification	e.g. for gear tooth flanks with a modulus larger than 0.8

**PHTR-100 pick-up****Order no. 6111525**

Type	Single-skid pick-up with lateral skid
Skid radius	0.3 mm (.012 in) in traversing direction,
Stylus radius	2 μ m (.0008 in), 90°
Specification	for measurements on concave and convex surfaces.



MarSurf M 300 with Measuring Stand



Measuring Stands

Measuring stand ST-D (shown above) Order no. 6710803

Height adjustment of RD 18 mounting device 0 mm to 300 mm
by means of a handwheel
Dimensions (L x W x H) 175 mm x 190 mm x 385 mm
Weight approx. 3 kg

Measuring stand ST-G Order no. 6710807

Grantee plate with a 10 mm (.39 in) T-slot for mounting work-holding devices. Handwheel height adjustment for simply and exactly adjusting the drive unit to the required measuring height.
Height adjustment of RD 18 0 mm to 300 mm
by means of a handwheel
Dimensions (L x W x H) in mm 500 mm x 300 mm x 415 mm
Weight approx. 35 kg



Measuring Stand Accessories

Measuring stand accessories (not included in the delivery scope of the measuring stand):

Mounting device MarSurf RD 18 Order no. 6910201

The drive unit RD 18 can be swivelled and locked due to pivot movements of the mount ($\pm 15^\circ$).



MarSurf M 300. Technical Data

MarSurf M 300

Measuring principle	stylus method
Traversing speed	0.5 mm/s
Measuring ranges	350 µm (0.014 in)
Profile resolution	8 nm
Filter	Gaussian filter, Ls filter
Cutoffs	0.25 mm/0.8 mm/2.5 mm (0.010 in/0.032 in/0.100 in)
Short cutoff	selectable
Traversing lengths as per DIN/ISO	1.75 mm/5.6 mm/17.5 mm (0.07 in/0.22 in/0.70 in)
As per EN ISO 12085 (MOTIF)	1 mm/2 mm/4 mm/8 mm/12 mm/16 mm
Evaluation lengths	1.25 mm/4 mm/12.5 mm (0.05 in/0.16 in/0.5 in)
Number of sampling lengths	selectable 1-5
Standards	DIN/ISO/JIS/ASME
Parameters	DIN/ISO: Ra, Rq, Rz, Rmax, Rp, Rpk, Rk, Rvk, Rv Mr1, Mr2, A1, A2, Vo, Rt, R3z, RPc, Rmr, RSm, Rsk JIS: Ra, Rz, RzJIS, S ASME: Rp, Rpm MOTIF: R, Ar, Rx, W, CR, CL, CF
Vertical scale	automatic/selectable
Horizontal scale	dep. on cutoff
Record contents	R-profile, MRK, R-profile, (MOTIF), results
Printing	automatic/manual record with time
Calibration function	dynamic
Memory	integrated memory for results of up to 40,000 measurements, 30 profiles
Units	metric/inch
Languages	selectable: English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Czech, Polish, Russian, Japanese, Chinese, Korean, Turkish, Hungarian
Blocking for instrum. settings	yes
Password protection	yes
LCD	high resolution color display, 3.5", 320 x 240 pixel
Printer	thermal printer, 384 points/horizontal line, 20 characters/line
Printing speed	approx. 6 lines/second corresponds to approx. 25 mm/s (1 in/s)
Thermal paper	Ø 40.0 mm-1.0 mm, width 57.5 mm-0.5 mm, coated
Interface	USB, MarConnect
Power supply	NiMH battery, capacity: approx. 1,000 measurements (dep. on number and length of record printouts), plug-in power pack with three mains plugs, for input voltages from 90 V to 264 V
Power management	yes
Connections	drive unit, power pack, USB, MarConnect
System of protection	M 300 = IP 42, RD 18 = IP 40
Temperature range for	
– storage	-15 °C to +55 °C
– operation	+5 °C to +40 °C
Relative humidity	30 % to 85 %
Dimensions (L x W x H) M 300	190 mm x 140 mm x 75 mm
Dimensions (L x W x H) RD 18	130 mm x 70 mm x 50 mm
Weight M 300	approx. 1 kg
Weight RD 18	approx. 300 g

MarSurf M 300 Set

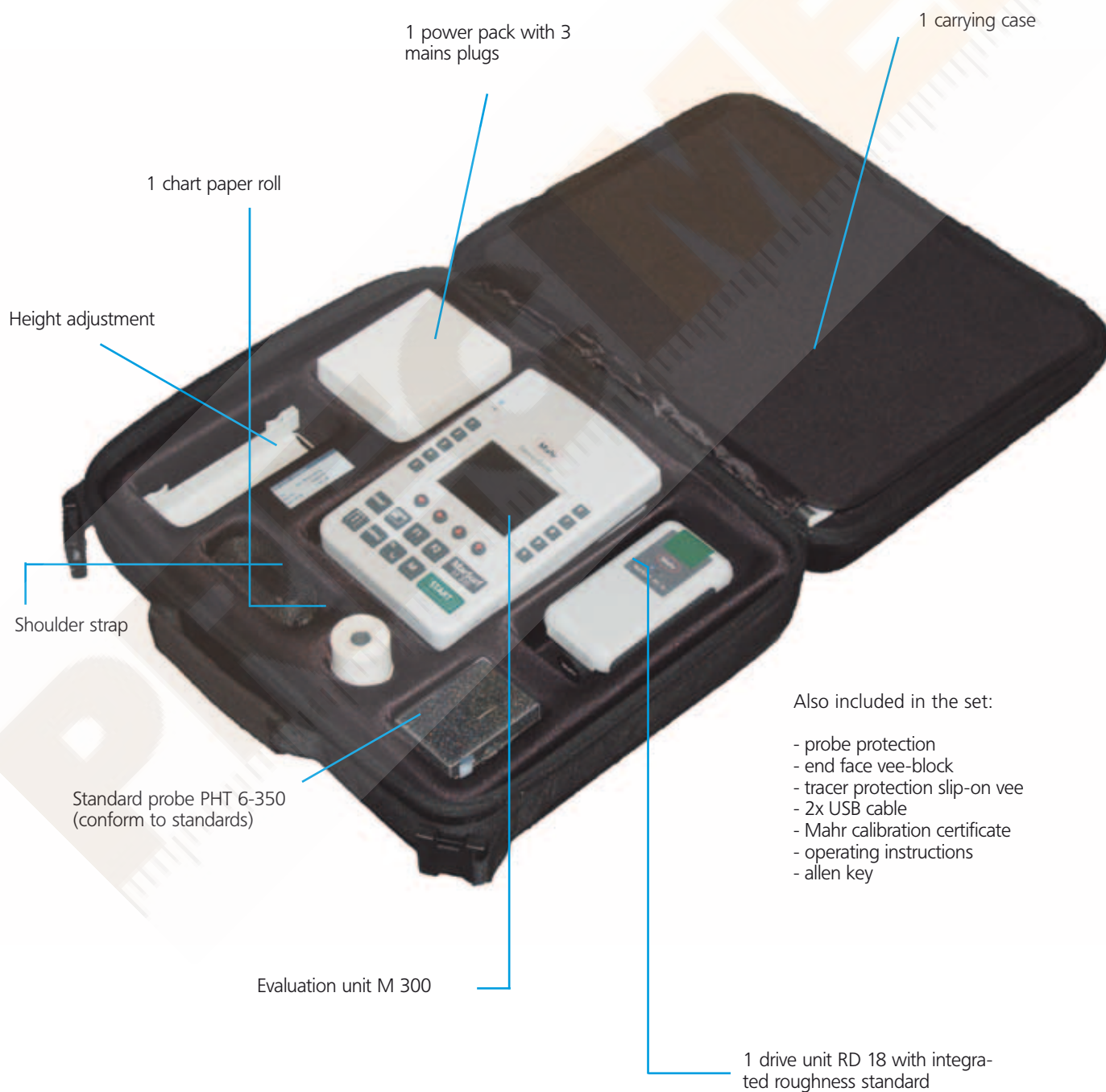
MarSurf M 300 Set

The MarSurf M300 is delivered as a set in a handy carrying case. The instrument is thus safely packed for transport. The components included in the set can be quickly and easily assembled to form a complete measuring station.

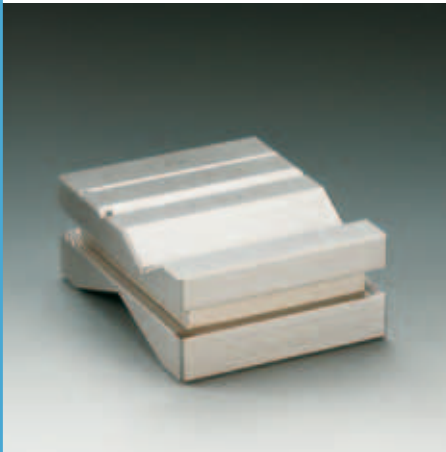
Order no. 6910401

Scope of delivery

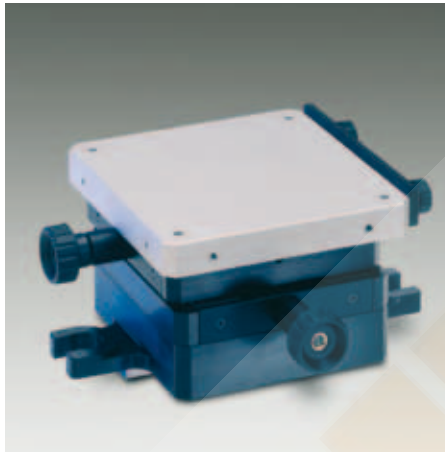
The illustrated accessories form part of the MarSurf M 300 Set.



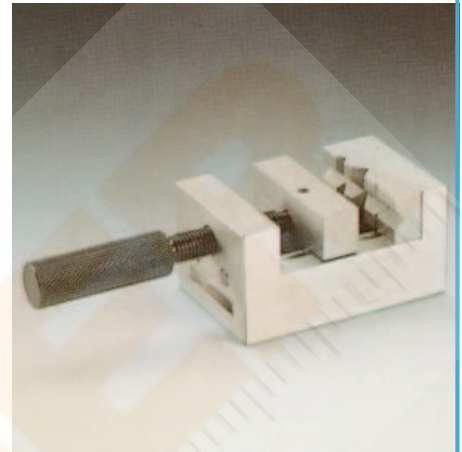
Accessories



PP vee-block Order No. 6710401
with four different prisms for mounting axis-symmetrical workpieces with diameters from 1 mm to 160 mm (.0394 in to 6.30 in). Dimensions (L x W x H) 100 mm x 80 mm x 40 mm (3.91 in x 3.15 in x 1.58 in). Weight 1.5 kg (3.31 lb). Including clamping springs for holding light workpieces in the prism.



XY table CT 120 Order No. 6710529
for mounting and aligning workpieces. Can be adjusted in two coordinates by 15 mm (.591 in). Table surface 120 mm x 120 mm (4.728 in x 4.728 in) with two brackets.



PPS parallel vice Order No. 6710604
for mounting rectangular and cylindrical workpieces. Jaw width 70 mm (2.76 in), jaw height 25 mm (.984 in), span 40 mm (1.58 in), total height 58 mm (2.28 in). Weight 2 kg (4.41 lb).



PGN 3 geometric standard

Surface roughness standard with a sinusoidal groove profile. Profile depth approx. 3 μm (120 μin), groove spacing approx. 0.12 mm (.00472 in). For checking the roughness measuring station.

Mahr calibration certificate for PGN 3
DKD calibration certificate for PGN 3
Geometric standard PGN 1
Geometric standard PGN 10

Order No. 6820601

Order No. 9027715
Order No. 6980102
Order No. 6820602
Order No. 6820605



PRN 10 roughness standard Order No. 6820420

with Mahr calibration certificate. Roughness standard with turned profile, chromed. Profile depth approx. 10 μm (.394 μin). For checking the roughness measuring station.

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EXACTLY

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