Technical Data MarSurf M 400 – SD 26

1. Brief Description

Method of measurement	Stylus instrument for measuring surface texture (as per DIN EN ISO 3274 : 1998)
Evaluation unit MarSurf M 400	Mobile evaluation unit with built-in battery, color display, built-in printer, USB interface, control of the drive unit via cable or *Bluetooth* wireless technology
Probe system MarSurf BFW 250	Inductive skidless probe, stylus tip 2 µm/5 µm, measuring force approx. 0,7 mN, exchangeable probe arm
Drive unit MarSurf SD 26	Drive unit with built-in datum plane, with integrated control and battery. Controlled via cable or *Bluetooth* wireless technology; maximum measuring length 26 mm; automatic zero setting of the probe; manual inclination correction
Unit	metric/inch

2. Evaluation Unit MarSurf M 400

Available parameters:

Parameter	Output	Meaning	Standards
Ra	Ra	Arithmetic mean roughness Ra	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601 : 1994 + 2001
Rq	Rq	Root mean square roughness Rq	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601 : 2001
Rz (as per ISO) **Ry** (JIS) corresponds to **Rz**	Rz	Mean peak-to-valley height Rz or Ry (as per JIS)	
Rz (JIS)	RzJ	Mean height Rz of profile elements of the R-profile	JIS B 0601 : 1994 (formerly: ISO 4287/1 : 1984)
Rmax	Rmax	Maximum peak-to-valley height Rmax	VDA 2006 (DIN 4768 : 1990)
Rp	Rp	Mean profile peak height Rp of the R-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601 : 2001
Rp (ASME)	RpA	Maximum profile peak height Rp of the R-profile	ASME B46.1-2002
Rpm (ASME)	Rpm	Mean profile peak height Rp of the R-profile	
Rv	Rv	Mean profile valley depth Rv of the R-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601 : 2001
Rpk	Rpk	Reduced peak height Rpk	DIN EN ISO 13565-1 : 1998 DIN EN ISO 13565-2 : 1998 ISO 13565-1 :1996 ISO 13565-2 :1996 JIS B 0671-1 : 2002 JIS B 0671-2 : 2002
Rk	Rk	Core roughness depth Rk	
Rvk	Rvk	Reduced valley depth Rvk	
Mr1	Mr1	Smallest material ratio Mr1 of the roughness core profile	
Mr2	Mr2	Largest material ratio Mr2 of the roughness core profile	
A1	A1	Profile peak range A1	
A2	A2	Profile valley range A2	
Vo	Vo	Oil-retaining volume Vo	

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Rt	Rt	Total height Rt of the R-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601 : 2001
R3z	R3z	Arithmetic mean third peak-to-valley height R3z	DB N 31007 : 1983
RPc	RPc	Peak count RPc of the R-profile (dependent on intersection lines C1 and C2): Number of profile elements (see RSm) per cm (or per inch) which exceed the upper intersection line C1 and fall short of the lower intersection line C2	EN 10049 : 2005 ASME B46.1-2002 E DIN EN ISO 4287/A1 : 2007-07(D)
HSC	HSC	Peak count HSC of the R-profile (dependent on intersection line C1): Number of profile elements (see RSm) per cm (or per inch) which exceed the upper intersection line C1	
Rmr tp (JIS, ASME) corresponds to Rmr	Rmr tp	Material ratio Rmr or tp of the R-profile (dependent on reference line CREF and intersection line C or p; 3 individual values can be selected) tp (JIS B 0601 : 1994) corresponds to Rmr	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 ASME B46.1-2002 JIS B 0601 : 2001:
RSm	RSm	Mean width RSm of profile elements of the R-profile (formerly: groove spacing)	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 ASME B46.1-2002 JIS B 0601 : 2001
RS	S	Mean spacing S of local profile peaks of the R-profile	JIS B 0601 : 1994
Rdq	Rdq	Root mean square slope Rdq of the R-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 ASME B 46.1-2002 JIS B 0601 : 2001
Rsk	Rsk	Skewness Rsk of the R-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 ASME B46.1-2002 JIS B 0601 : 2001
Rku	Rku	Kurtosis Rku of the R-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 ASME B46.1-2002 JIS B 0601 : 2001
Rdc Htp	Rdc Htp	Zone width Rdc or Htp of two material ratios of the R-profile (dependent on reference line CREF and intersection line C-MR or H2)	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 ASME B46.1-2002 JIS B 0601 : 2001
Pdc	Pdc	Zone width Pdc of two material ratios of the P-profile (dependent on reference line CREF and intersection line C-MR or H2)	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601 : 2001
Pa	Pa	Arithmetic mean deviation Pa of the P-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601
Pt	Pt	Total height Pt of the P-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601
Pmr Ptp	Pmr Ptp	Material ratio Pmr or Ptp of the P-profile (dependent on reference line CREF and intersection line C or p; 3 individual values can be selected)	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601

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Wa	Wa	Arithmetic mean deviation Wa of the W-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601
Wq	Wq	Root mean square deviation Wq of the W-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601
WSm	WSm	Mean width WSm of profile elements of the W-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601
Wsk	Wsk	Skewness Wsk of the W-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601
Wt	Wt	Total height Wt of the W-profile	DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601
R	R	Mean depth R of roughness motifs	DIN EN ISO 12085 : 1998 ISO 12085 : 1996 JIS B 0631 : 2000
AR	AR	Mean width AR of roughness motifs	
AW	AW	Mean width AW of waviness motifs	
Rx	RX	Maximum depth Rx of the profile irregularity	
Wx	Wx	Maximum depth Wx of waviness motifs	
Wte	Wte	Total depth of waviness Wte	
W	W	Mean depth W of waviness motifs	
NR	NR	Number NR of motifs of the P-profile	
NCRX	NCRX	Number NCRX of valleys of the P-profile	
NW	NW	Number NW of motifs of the upper corrected envelope line	
CPM	CPM	Mean number CPM of valleys per motif (NCRX/NR)	
CR	CR	Zone width CR of the profile peak zone (French "critère de rodage") (dependent on intersection lines Scr1 and Scr2)	Cf. Pδc (Pdc) in: DIN EN ISO 4287 : 1998 ISO 4287 : 1997 JIS B 0601 : 2001
CF	CF	Zone width CF of the profile core zone (French "critère de fonctionnement") (dependent on intersection lines Scf1 and Scf2)	
CL	CL	Zone width CL of the profile valley zone (French "critère de lubrification") (dependent on intersection lines Scl1 and Scl2)	

Filter (as per ISO/JIS)   Phase-correct profile filter (Gaussian filter) as per DIN EN ISO 11562 / ISO/DIS 16610-21,
special filter as per DIN EN ISO 13565-1,
Ls-filter as per DIN EN ISO 3274 (can be disabled)

Cutoff Lc (as per ISO/JIS)   0,08 mm, 0,25 mm, 0,8 mm, 2,5 mm; automatic; user-defined

Traversing length Lt (as per ISO/JIS)   0,48 mm, 0,56 mm, 1,5 mm,1,75 mm, 4,8 mm, 5,6 mm, 15 mm, 17,5 mm; automatic; user-defined

Evaluation length ln   0,4 mm, 1,25 mm, 4,0 mm, 12,5 mm; automatic; user-defined

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Technical Data MarSurf M 400 – SD 26

Number n of sampling lengths	1 to 5, selectable
Traversing length (as per MOTIF)	1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm; user-defined
Short cutoff	Selectable
Calibration function	Dynamic, Ra and Rz
Assistant function	Output of adjustment value for the inclination correction
Languages	German, English, French, Italian, Spanish, Dutch, Portuguese, Swedish, Czech, Polish, Turkish, Russian, Chinese, Korean, Japanese
LC display	High-resolution 3,5" TFT color display, 320 x 240 pixels
Printer	Thermal printer, 8 dots/mm, 20 characters/line
Printing speed	approx. 6 lines/s; approx. 25 mm/s
Vertical scale	Automatic; selectable
Horizontal scale	Automatic (= sampling length); selectable
Record contents	R-profile, W-profile, P-profile, D-profile, ADC and MRC for R-, W- and P-profile; for MOTIF standard: P-profile, P-MRC; parameter results, company logo, company text (can be disabled), text (can be disabled), date/time (can be disabled), measuring conditions, user-specific logo (optional)
Printing	Automatic/manual
Thermal paper	Diameter 40.0 mm (-1.0 mm), width 57.5 mm (-0.5 mm)
Memory capacity	max. 30 profile (file formats PCD, TXT), max. 40,000 results
Other functions	Blocking with code number protection, date/time
Battery	NiMH battery for approx. 1,000 measurements (depending on the number and length of record printouts)
Interfaces	USB slave, MarConnect (RS232): Parity: N XON/XOFF: none 4800 baud 8 data bits 1 stop bit
Bluetooth connection M 400 / SD 26	Transmission power typically 0 dBm (Class 2) *Bluetooth* specification 2.0 compatible

Technical Data MarSurf M 400 – SD 26

3. Probe System MarSurf BFW 250

Functional principle	Skidless probe system, inductive sensor
Measuring range	500 µm (±250 µm) with 45 mm probe arm length until 1,500 µm (±750 µm) with 135 mm probe arm length
Linearity deviation max.	1%
Functional length of the probe arms	45 mm (x 1) 67.5 mm (x 1.5) 90 mm (x 2) 112.5 mm (x 2.5) 135 mm (x 3)
Measuring force F_m	0.7 mN, with 45 mm probe arm length, with standard probe arm 6852403 in all spatial positions
Probe arm coupling	Magnetic, can thus be changed without the need for tools, overload protection

4. Drive Unit MarSurf SD 26

Functional principle	Drive unit with built-in datum plane for skidless probe system
Travel length in X	0.02 mm to 26 mm
Drive speed in X	0.1 mm/s to 5.0 mm/s
Travel length in Z	7.5 mm
Drive speed in Z	2 mm/s
Measuring length Lm	0.48 mm to 26 mm
Measuring speed vt	0.2 mm/s; 0.5 mm/s; 1.0 mm/s
Inclination correction	±1.5°
Profile resolution in Z with 45 mm probe arm	Measuring range 1: 7.6 nm Measuring range 2: 0.76 nm
Profile resolution in X	0.1 µm to 1.5 µm
Guide deviaiton X, MPE_G 0°	0.35 µm / 26 mm 0.15 µm / 5.6 mm
Residual noise Rz_0	0.025 µm with Lc 0.25 mm, Ls 2.5 µm, vt 0.2 mm/s
Battery	Li-ion battery for approx. 250 measurements

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5. General Data

Long-range AC adapter	100 V to 264 V, 50 Hz to 60 Hz, protection class II, double insulated
Protection rating as per IEC 529 and EN 60529	M 400: IP 42 SD 26: IP 40
Storing temperature Working/operating temperature	-15 °C to +55 °C +5 °C to +40 °C
Rel. humidity	30% to 85%, non-condensing
Dimensions (L × W × H)	M 400: 190 mm × 140 mm × 75 mm SD 26: 163 mm × 72 mm × 74 mm
Weight	M 400: approx. 1 kg SD 26: approx. 0.85 kg

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