



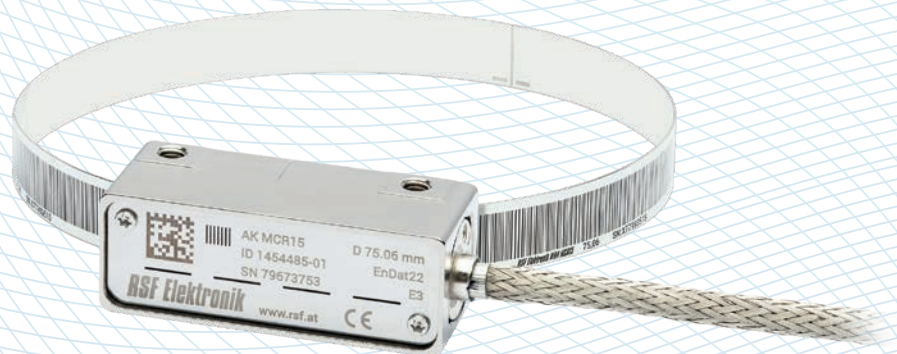
RSF Elektronik

www.rsf.at

Product information

MCR 15 V

Absolute Modular Angle Encoders
for high vacuum

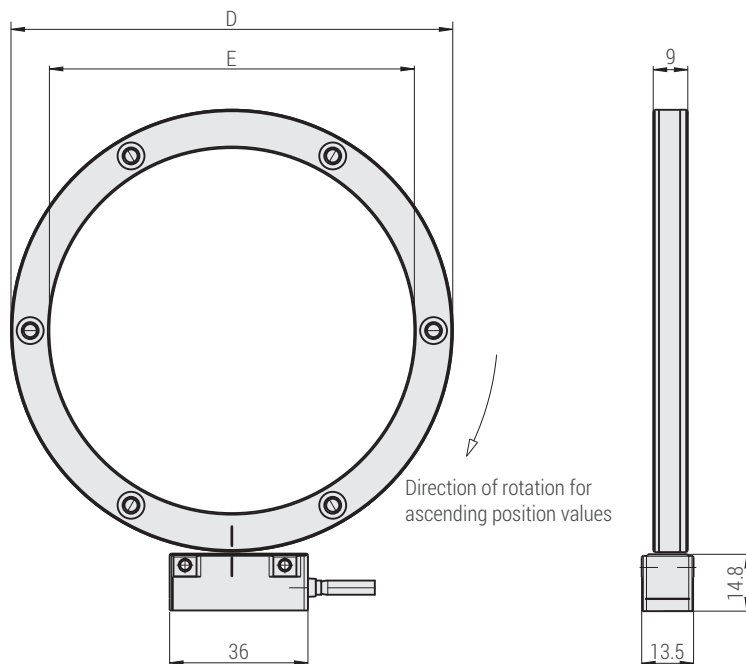


MCR 15 V Scanning head with graduation drum

- Steel- or Aluminum graduation drum
- Mounting: screwable with three-point centering
- Status display directly at the scanning head via LED



Main dimensions without tolerance specifications



Technical drawings and further documents at www.heidenhain.com/documentation



Mating dimensions
ID 1258860

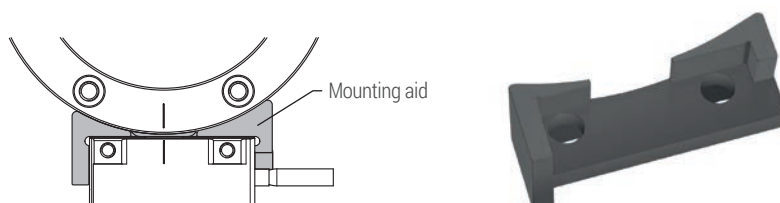
Scanning head	AK MCR 15 V		AK MCR 15 F V	AK MCR 15 M V		AK MCR 15 P V	AK MCR 15 Y V	AK MCR 15 B V
Interface	EnDat 2.2	EnDat 3	Fanuc serial interface ai Interface	Mitsubishi high speed interface		Panasonic serial interface	Yaskawa serial interface	BiSS C unidirectional
Version	EnDat 22	E30-RB*	Fanuc05*	Mit03-2	Mit03-4	Pana02	YEC07*	BiSS/Cu
Calculation time t_{cal}	$\leq 5 \mu s$	--	--	--	--	--	--	--
Clock frequency	$\leq 15 \text{ MHz}$	--	--	--	--	--	--	--
Electrical connection	Cable, 1 m with D-sub connector (female), 15-pin							
Supply voltage	DC 3.6 V to 14 V (3.6 V at least required in the scanning head)							
Power consumption max.	At 3.6 V: $\leq 950 \text{ mW}$ At 14 V: $\leq 1050 \text{ mW}$							
Current consumption typ.	At 5 V: 100 mA (without load)							
Vibration 55 Hz to 2000 Hz	$\leq 500 \text{ m/s}^2$ (EN 60 068-2-6)							
Shock 6 ms	$\leq 1000 \text{ m/s}^2$ (EN 60 068-2-27)							
Temperature	Operating temperature: $-10 \text{ }^\circ\text{C}$ to $70 \text{ }^\circ\text{C}$ Storage temperature: $-20 \text{ }^\circ\text{C}$ to $70 \text{ }^\circ\text{C}$ Max. baking temperature: $100 \text{ }^\circ\text{C}$ (not powered)							
Vacuum class	High vacuum down to 10^{-7} mbar							
Mass	Scanning head: 12 g (without cable), connecting cable: 20 g/m, D-sub connector (female): 63 g							

* multitrurn capable

Scale drum	TTR MCR 15 V S / TTR MCR 15 V A								
Graduation carrier	TTR MCR 15 V S: Steel drum with absolute track for mounting with three-point centering TTR MCR 15 V A: Aluminum drum with absolute track for mounting with three-point centering								
Coefficient of expansion	Steel: $\alpha_{therm} \approx 16 \times 10^{-6} \text{ K}^{-1}$ Aluminum: $\alpha_{therm} \approx 23.4 \times 10^{-6} \text{ K}^{-1}$								
Scanning diameter (D) [mm]	50.00	59.93	75.06	99.96	114.17	150.38	200.35	228.77	
Inside diameter (E) [mm]	30	40	55	80	95	130	180	209	
Permissible speed [rpm]	$\leq 14\,000$	$\leq 12\,200$	$\leq 9\,750$	$\leq 7\,300$	$\leq 6\,400$	$\leq 4\,300$	$\leq 2\,650$	$\leq 2\,300$	
Permissible axial movement	$\leq \pm 1 \text{ mm}$ (drum relative to the scanning head)								
Positions per revolution [bit]	22	22	23	23	23	24	24	24	
Measuring step	0.309"	0.309"	0.154"	0.154"	0.154"	0.077"	0.077"	0.077"	
System accuracy	$\pm 25''$	$\pm 20''$	$\pm 15''$	$\pm 10''$	$\pm 10''$	$\pm 10''$	$\pm 10''$	$\pm 10''$	
Moment of inertia [10^{-3} kgm^2]	S A	≈ 0.03 ≈ 0.01	0.07 0.02	0.15 0.05	0.39 .013	0.58 0.20	1.49 0.51	3.70 1.27	5.24 1.79
Mass [g]	S A	≈ 79 ≈ 27	≈ 101 ≈ 34	≈ 135 ≈ 46	≈ 189 ≈ 65	≈ 234 ≈ 80	≈ 302 ≈ 103	≈ 409 ≈ 140	≈ 459 ≈ 157

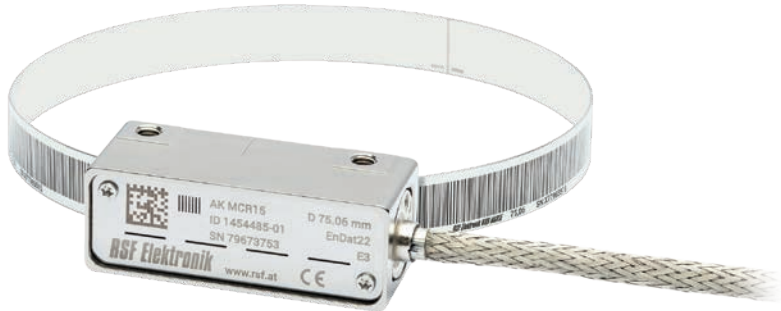
OPTIONAL ACCESSORIES

Mounting aid:

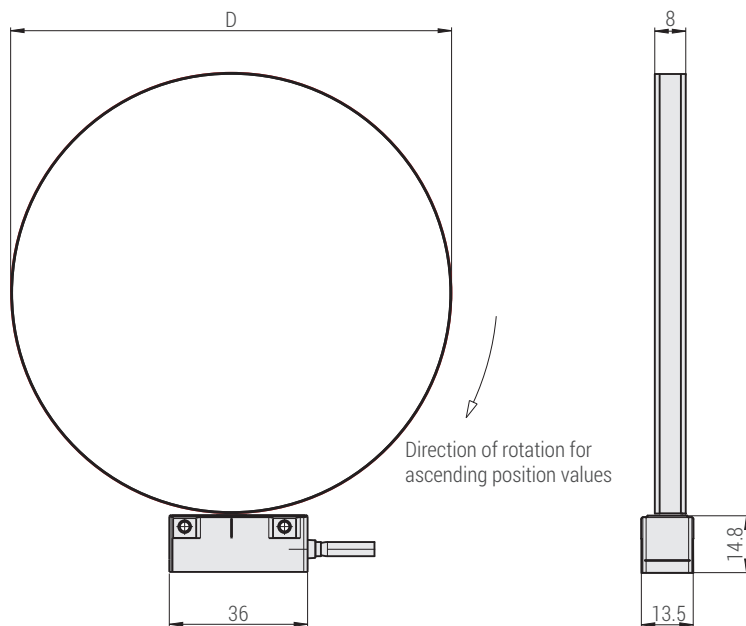


MCR 15 V Scanning head with scale tape ring

- Steel scale tape ring
- Mounting: cylindrical interference fit
- Status display directly at the scanning head via LED



Main dimensions without tolerance specifications



Technical drawings and further documents at www.heidenhain.com/documentation



Mating dimensions
ID 1344425

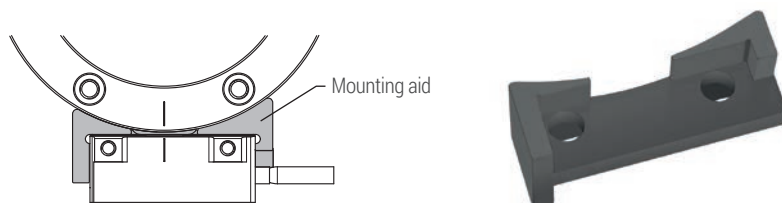
Scanning head	AK MCR 15 V		AK MCR 15 F V	AK MCR 15 M V		AK MCR 15 P V	AK MCR 15 Y V	AK MCR 15 B V
Interface	EnDat 2.2	EnDat 3	Fanuc serial interface ai Interface	Mitsubishi high speed interface		Panasonic serial interface	Yaskawa serial interface	BiSS C unidirectional
Version	EnDat 22	E30-RB*	Fanuc05*	Mit03-2	Mit03-4	Pana02	YEC07*	BiSS/Cu
Calculation time t_{cal}	$\leq 5 \mu s$	--	--	--	--	--	--	--
Clock frequency	$\leq 15 \text{ MHz}$	--	--	--	--	--	--	--
Electrical connection	Cable, 1 m with D-sub connector (female), 15-pin							
Supply voltage	DC 3.6 V to 14 V (3.6 V at least required in the scanning head)							
Power consumption max.	At 3.6 V: $\leq 950 \text{ mW}$ At 14 V: $\leq 1050 \text{ mW}$							
Current consumption typ.	At 5 V: 100 mA (without load)							
Vibration 55 Hz to 2000 Hz	$\leq 500 \text{ m/s}^2$ (EN 60 068-2-6)							
Shock 6 ms	$\leq 1000 \text{ m/s}^2$ (EN 60 068-2-27)							
Temperature	Operating temperature: $-10 \text{ }^\circ\text{C}$ to $70 \text{ }^\circ\text{C}$ Storage temperature: $-20 \text{ }^\circ\text{C}$ to $70 \text{ }^\circ\text{C}$ Max. baking temperature: $100 \text{ }^\circ\text{C}$ (not powered)							
Vacuum class	High vacuum down to 10^{-7} mbar							
Mass	Scanning head: 12 g (without cable), connecting cable: 20 g/m, D-sub connector (female): 63 g							

* multiturn capable

Scale tape ring	MBR MCR 15 V						
Graduation carrier	Steel scale tape ring with absolute track						
Coefficient of expansion	$\alpha_{therm} \approx 10 \times 10^{-6} \text{ K}^{-1}$						
Scanning diameter (D) [mm]	59.93	75.06	99.96	114.17	150.38	200.35	228.77
Permissible speed [rpm]	≤ 3120	≤ 2540	≤ 1900	≤ 1670	≤ 1260	≤ 950	≤ 830
Permissible axial movement	$\leq \pm 1 \text{ mm}$ (scale tape ring relative to the scanning head)						
Positions per revolution [bit]	22	23	23	23	24	24	24
Measuring step	0.309"	0.154"	0.154"	0.154"	0.077"	0.077"	0.077"
System accuracy	$\pm 20''$	$\pm 15''$	$\pm 10''$	$\pm 10''$	$\pm 10''$	$\pm 10''$	$\pm 10''$
Moment of inertia [10^{-3} kgm^2]	≈ 0.003	≈ 0.005	≈ 0.012	≈ 0.018	≈ 0.041	≈ 0.097	≈ 0.144
Mass [g]	≈ 2.9	≈ 3.6	≈ 4.8	≈ 5.5	≈ 7.3	≈ 9.7	≈ 11.0

OPTIONAL ACCESSORIES

Mounting aid:



ENCODERS FOR USE IN A VACUUM

These vacuum-compatible encoders feature the following characteristics:

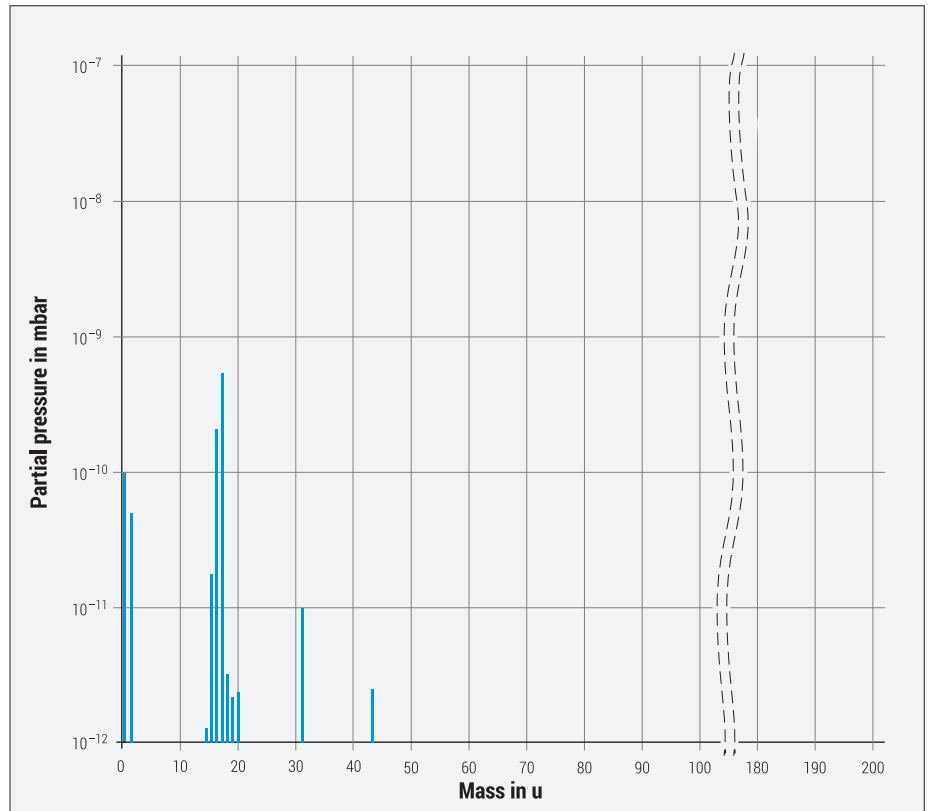
- Air vents
- Specialized cleaning and packaging
- Cable with tin-plated copper braiding

RESIDUAL GAS ANALYSIS

The influence of encoders on the quality of a vacuum can be determined through residual gas analyses. In these analyses, a sample in a vacuum chamber is pumped out to at least 10^{-6} mbar (turbomolecular pump, pumping speed 15 l/s to 200 l/s). The residual gases are measured with a mass spectrometer (Pfeiffer QMA 200) and an absolute pressure sensor (VACOM ATMION).

The outgassing behavior of the examined sample can then be deduced by subtracting the typical residual gases of the empty chamber. The amount of remaining residual gases depends not only on the cleanliness of the sample and the tested materials, but also on the pump type used and its pumping speed. The higher the pumping speed for the measurement is, and the longer the gas is pumped out, the lower the amount of residual gases will be.

To attain the lowest possible outgassing values, RSF Elektronik recommends baking at 100 °C for 48 hours under high vacuum conditions.



Exemplary residual gas spectrum of a scanning head AK MCR 15 V with 1 m cable and D-sub connector after baking at 100°C for 48 h under high vacuum conditions

General information

Encoders from RSF Elektronik are usually integrated as components into complete systems. Applications of this type **require full-system, extensive testing, regardless of the encoder's specifications.**

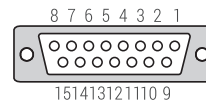
The specifications provided in this brochure apply only to the encoder and not to the entire system.

Any operation of the encoder outside of the specified range or outside of its proper and intended use is at the user's own risk.

In safety-related systems, the encoder's position value must be tested by the higher-level system after switch-on.

PIN ASSIGNMENTS

15-pin D-sub connector (female)



EnDat 2.2					Power supply				Serial data transmission			
	5	12	7	14	4	11	1	9				
EnDat 2.2	Up	Sensor Up	0 V	Sensor 0 V	DATA	$\overline{\text{DATA}}$	CLOCK	$\overline{\text{CLOCK}}$				
	Brown	Turquoise	White	Beige	Grey	Pink	Violet	Black				

EnDat 3					Power supply				Serial data transmission			
	5	12	7	14	4	11	1	9				
E30-RB	Up	Sensor Up	0 V	Sensor 0 V	SD+_NEXT	SD-_NEXT	SD+	SD-				
	Brown	Turquoise	White	Beige	Grey	Pink	Violet	Black				

BiSS C					Power supply				Serial data transmission			
	5	12	7	14	4	11	1	9				
BiSS/Cu	Up	Sensor Up	0 V	Sensor 0 V	SLO+	SLO-	MA+	MA-				
	Brown	Turquoise	White	Beige	Grey	Pink	Violet	Black				

Fanuc					Power supply				Serial data transmission			
	5	12	7	14	4	11	1	9				
Fanuc05 ai Interface	Up	Sensor Up	0 V	Sensor 0 V	Serial Data	$\overline{\text{Serial Data}}$	Request	$\overline{\text{Request}}$				
	Brown	Turquoise	White	Beige	Grey	Pink	Violet	Black				

Mitsubishi					Power supply				Serial data transmission			
	5	12	7	14	4	11	1	9				
Mit03-4	Up	Sensor Up	0 V	Sensor 0 V	Serial Data	$\overline{\text{Serial Data}}$	Request Frame	$\overline{\text{Request Frame}}$				
Mit03-2					Occupied *	Occupied *	Request/ Data	$\overline{\text{Request/ Data}}$				
	Brown	Turquoise	White	Beige	Grey	Pink	Violet	Black				

Panasonic					Power supply				Serial data transmission			
	5	12	7	14	4	11	1	9				
Pana02	Up	Sensor Up	0 V	Sensor 0 V	Occupied *	Occupied *	Request/ Data	$\overline{\text{Request/ Data}}$				
	Brown	Turquoise	White	Beige	Grey	Pink	Violet	Black				

Yaskawa					Power supply				Serial data transmission			
	5	12	7	14	4	11	1	9				
YEC07	Up	Sensor Up	0 V	Sensor 0 V	Occupied *	Occupied *	DATA	$\overline{\text{DATA}}$				
	Brown	Turquoise	White	Beige	Grey	Pink	Violet	Black				

- Up = Power supply voltage
- Sensor: The sensor line is connected in the scanning head with the corresponding power line.
- The shield is connected with the chassis.
- Not connected pins or wires must not be used.
- * Required for adjustment/inspection by PWT 101.

DISTRIBUTION CONTACTS

AUSTRIA <i>Corporate Head Quarters</i>	RSF Elektronik Ges.m.b.H.	A-5121 Tarsdorf 93	☎ +43 62 78 81 92-0 FAX +43 62 78 81 92-79	e-mail: info@rsf.at internet: www.rsf.at
BELGIUM	HEIDENHAIN NV/SA	Pamelse Klei 47 1760 Roosdaal	☎ +32 (54) 34 3158 FAX +32 (54) 34 3173	e-mail: sales@heidenhain.be internet: www.heidenhain.be
FRANCE	HEIDENHAIN FRANCE sarl	2 Avenue de la Christallerie 92310 Sèvres	☎ +33 1 41 14 30 00 FAX +33 1 41 14 30 30	e-mail: info@heidenhain.fr internet: www.heidenhain.fr
GREAT BRITAIN	HEIDENHAIN (GB) Ltd.	200 London Road Burgess Hill West Sussex RH15 9RD	☎ +44 1444 247711 FAX +44 1444 870024	e-mail: sales@heidenhain.co.uk internet: www.heidenhain.co.uk
ITALY	HEIDENHAIN ITALIANA S.r.l.	Via Giuseppe De Notaris 52 20128 Milan	☎ +39 02 27075-1 FAX +39 02 27075-210	e-mail: info@heidenhain.it internet: www.heidenhain.it
NETHERLANDS	HEIDENHAIN NEDERLAND B.V.	Copernicuslaan 34 6716 BM EDE	☎ +31 318-581800 FAX +31 318-581870	e-mail: verkoop@heidenhain.nl internet: www.heidenhain.nl
SPAIN	FARRESA ELECTRONICA S.A	Les Corts 36-38 08028 Barcelona	☎ +34 93 4 092 491 FAX +34 93 3 395 117	e-mail: farresa@farresa.es internet: www.farresa.es
SWEDEN	HEIDENHAIN Scandinavia AB	Rosterigränd 16 SE-117 61 Stockholm	☎ +46 8 531 933 50 FAX +46 8 531 933 77	e-mail: sales@heidenhain.se internet: www.heidenhain.se
SWITZERLAND	HEIDENHAIN (SCHWEIZ) AG	Vieristrasse 14 8603 Schwerzenbach	☎ +41 44 806 27 27 FAX +41 44 806 27 28	e-mail: verkauf@heidenhain.ch internet: www.heidenhain.ch
CHINA	DR. JOHANNES HEIDENHAIN (CHINA) Co., Ltd	No. 6, Tian Wei San Jie, Area A, Beijing Tianzhu Airport Industrial Zone Shunyi District, Beijing 101312	☎ +86 10 80 42-0000	e-mail: sales@heidenhain.com.cn internet: www.heidenhain.com.cn
ISRAEL	MEDITAL Hi-Tech	36 Shacham St., P.O.Box 7772 4951729 Petach Tikva	☎ +972 0 3 923 33 23 FAX +972 0 3 923 16 66	e-mail: avi@medital.co.il internet: www.medital.co.il
JAPAN	HEIDENHAIN K.K.	Hulic Kojimachi Bldg., 9F 3-2 Kojimachi, Chiyoda-ku Tokyo, 102-0083	☎ +81 3 3234 7781 FAX +81 3 3262 2539	e-mail: sales@heidenhain.co.jp internet: www.heidenhain.co.jp
KOREA	HEIDENHAIN LTD.	75, Jeonpa-ro 24beon-gil, Manan-gu, Anyang-si 14087 Gyeonggi-do	☎ +82 31 380 5200 FAX +82 31 380 5250	e-mail: info@heidenhain.co.kr internet: www.rsf.co.kr
SINGAPORE	HEIDENHAIN PACIFIC PTE LTD.	51, Ubi Crescent 408593 Singapore	☎ +65 67 49 32 38 FAX +65 67 49 39 22	e-mail: info@heidenhain.com.sg internet: www.heidenhain.com.sg
TAIWAN	HEIDENHAIN CO., LTD.	No. 29, 33rd Road; Taichung Industrial Park Taichung 40768	☎ +886 4 2358 89 77 FAX +886 4 2358 89 78	e-mail: info@heidenhain.tw internet: www.heidenhain.com.tw
USA	HEIDENHAIN CORPORATION	333 East State Parkway Schaumburg, IL 60173-5337	☎ +1 847 490 11 91	e-mail: info@heidenhain.com internet: www.heidenhain.us

Date 03/2026 ■ Doc.-No.: D1477013-00-C-01 ■ Technical adjustments in reserve!



RSF Elektronik

Ges.m.b.H.

Linear and Angle Encoders
Precision Graduations

Certified acc. to
ISO 9001
ISO 14001

