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FORTiS-N™

enclosed encoder system



Specification

Measuring standard	Renishaw stainless steel scale with single track absolute encoding
Coefficient of thermal expansion (at 20 °C)	10.1 ±0.2 µm/m/°C
Thermal datum	At centre position (encoder position of 0.5 × measuring length)
Measuring lengths available (mm)	70, 120, 170, 220, 270, 320, 370, 420, 470, 520, 570, 620, 670, 720, 770, 820, 920, 1020, 1140, 1240, 1340, 1440, 1540, 1640, 1740, 1840, 2040 (mounting spar available – recommended for > 620 mm length)
Accuracy grades	High grade: ±3 µm Standard grade: ±5 µm
Resolution *	0.5 nm, 1 nm, 1.25 nm, 10 nm, 12.5 nm, 25 nm, 50 nm
Sub-Divisional Error (typical)	±40 nm
Jitter (RMS)	10 nm
Absolute position serial interface	BiSS C, FANUC ($\alpha/\alpha i$), Mitsubishi, Panasonic, Siemens DRIVE-CLiQ (with external interface)
Encoder electrical connection	Cable connector M12 custom
Controller electrical connection	8-way M12, FANUC 20-way, 10-way Mitsubishi, 17-way M23, 9-way D-Type, 14-way LEMO, flying lead
Cable length	Up to 100 m (with extension cable)
Power supply	5 V ±10% 1.25 W maximum (250 mA @ 5 V)
Set-up LED	Signal strength indicator LED
Maximum speed	4 m/s
Acceleration (readhead relative to scale)	< 200 m/s² in measuring direction
Moving force (maximum force required to move the readhead through the seals)	< 4 N
Vibration (55 Hz to 2000 Hz)	Readhead: < 300 m/s² to IEC 60068-2-6 Housing without mounting spar: < 200 m/s² to IEC 60068-2-6 Housing with mounting spar: < 300 m/s² to IEC 60068-2-6
Shock 11 ms half-sine	< 300 m/s² IEC 60068-2-27
Operating temperature	0 °C to 50 °C
Environment protection	IP53 when installed correctly, IP64 with air purge
Air purge requirements	Air supply pressure = 1 bar at encoder At correct supply pressure the supplied air connection fitting restricts the air flow rate to 2 l/min
Weight	0.11 kg + 0.45 kg/m

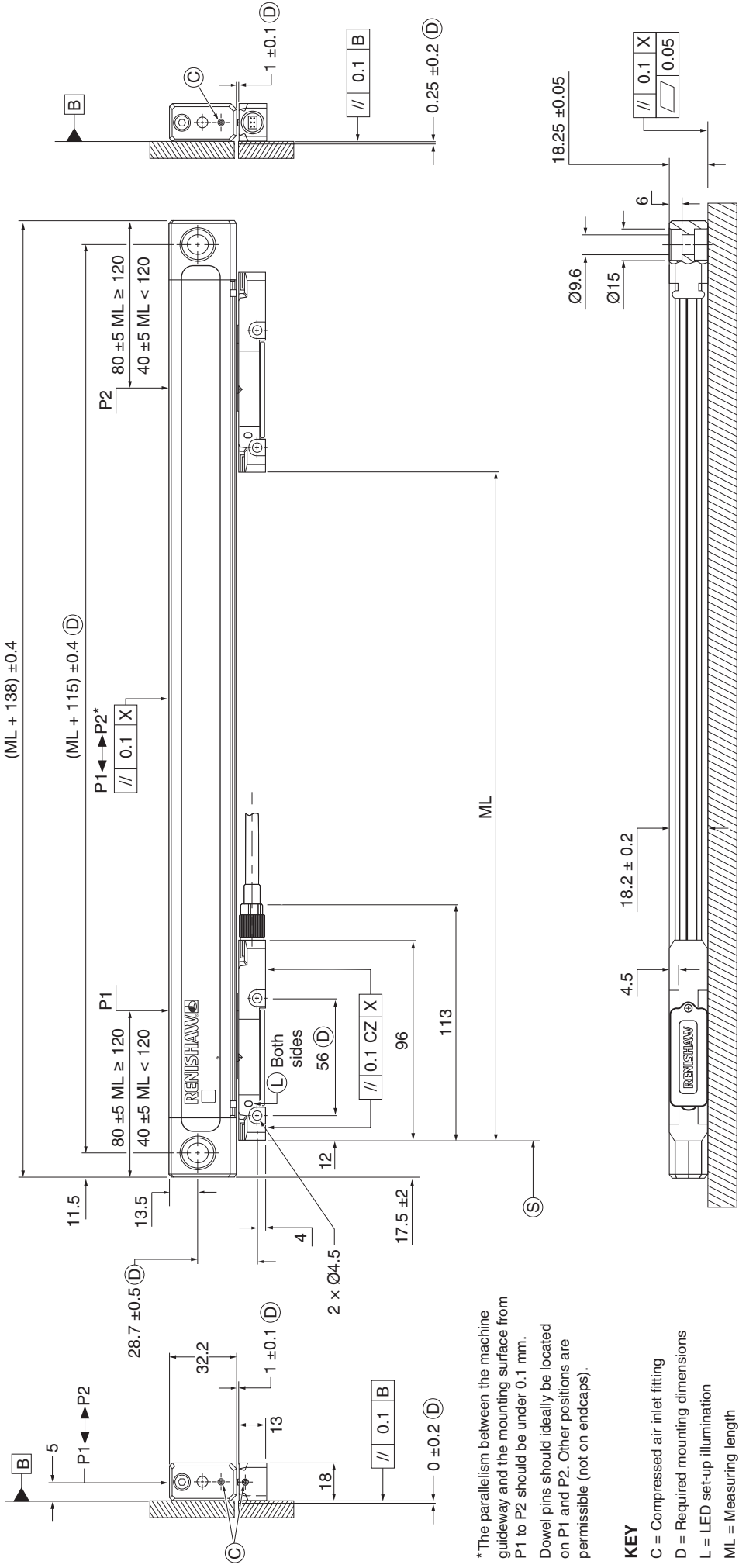
Resolution per accuracy grade and serial interface – standard options

Accuracy grade	Serial interface	Resolution nm	
		Single	Dual
3 μm	BiSS C, Mitsubishi, Panasonic, Siemens DRIVE-CLiQ	1	
	FANUC		1 / 0.5
			10 / 1.25
5 μm	BiSS C, Mitsubishi, Panasonic, Siemens DRIVE-CLiQ	10	
		50	
	FANUC		50 / 12.5
			50 / 25

System installation drawings – standard end caps

(ML 320 mm shown)

Dimensions and tolerances in mm



*The parallelism between the machine guideway and the mounting surface from P1 to P2 should be under 0.1 mm. Dowel pins should ideally be located on P1 and P2. Other positions are permissible (not on endcaps).

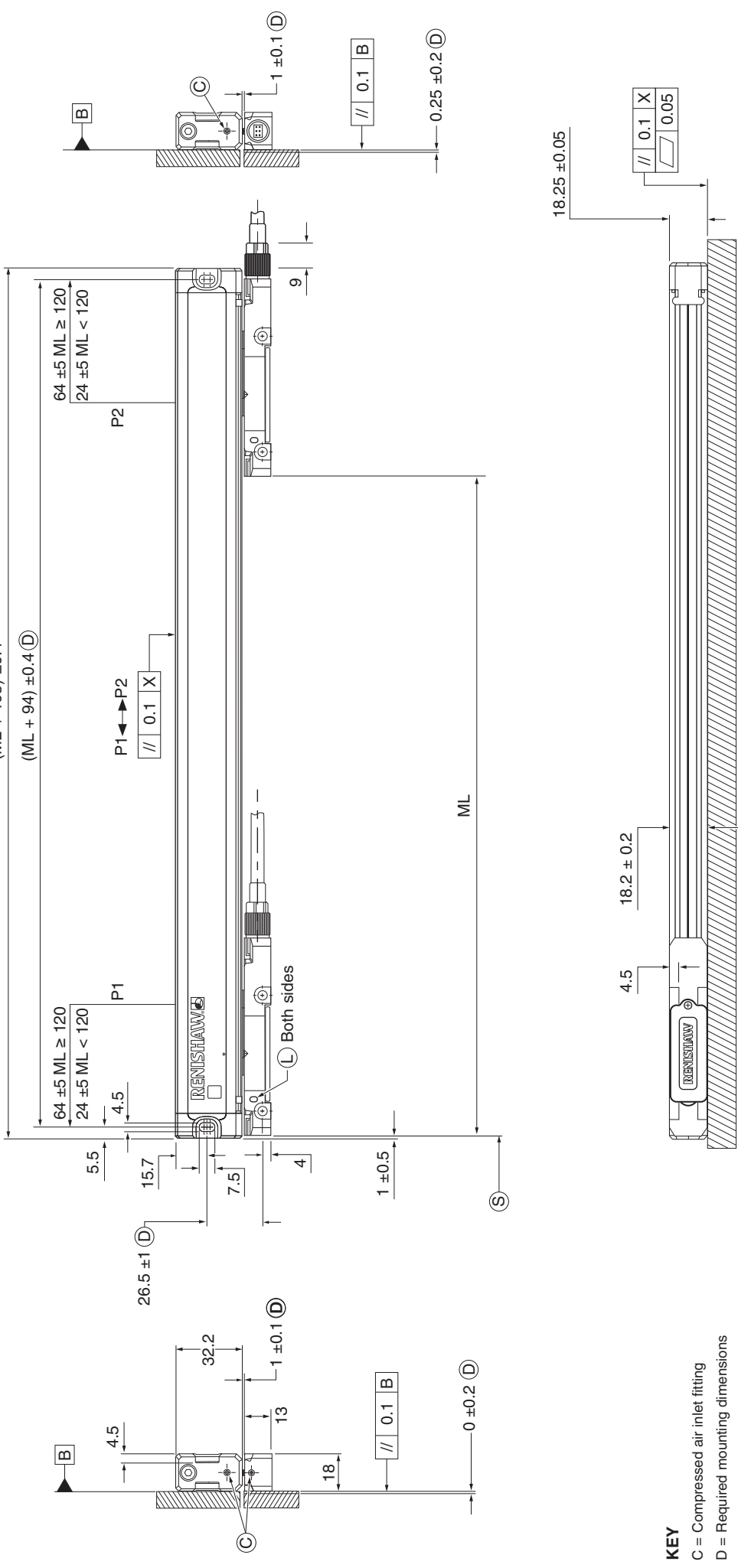
KEY

- C = Compressed air inlet fitting
- D = Required mounting dimensions
- L = LED set-up illumination
- ML = Measuring length
- P = Gauging points for alignment
- S = Start of measuring length
- X = Machine guideway/axis datum

ML	70	120	170	220	270	320	370	420	470	520	570	620	670	720	770	820	920	1020	1140	1240	1340	1440	1540	1640	1740	1840	2040
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System installation drawings – short end caps (ML 320 mm shown)

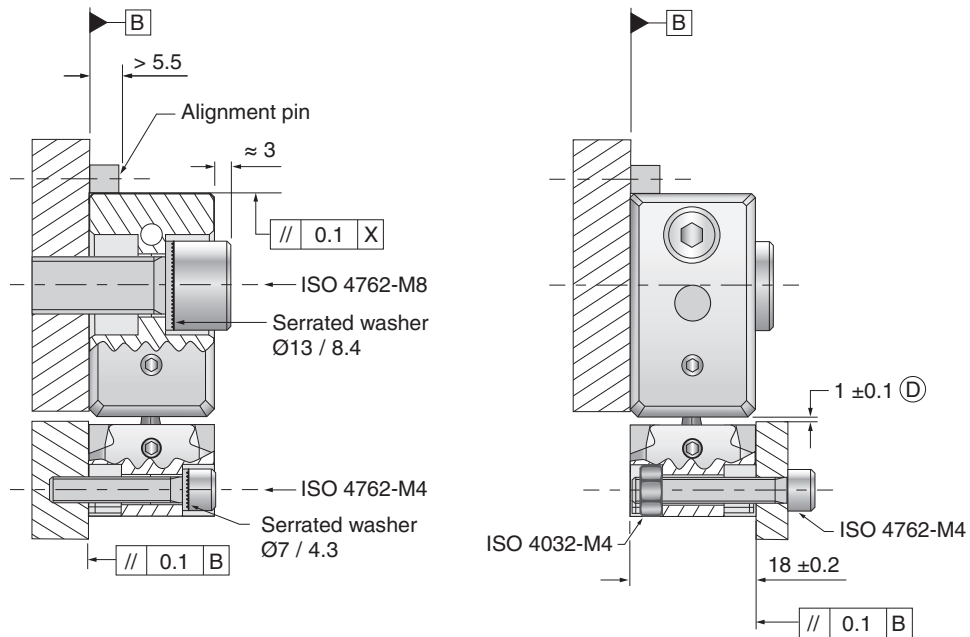
Dimensions and tolerances in mm



ML	70	120	170	220	270	320	370	420	470	520	570	620	670	720	770	820	920	1020	1140	1240	1340	1440	1540	1640	1740	1840	2040
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Mounting orientations – standard end caps

Dimensions and tolerances in mm



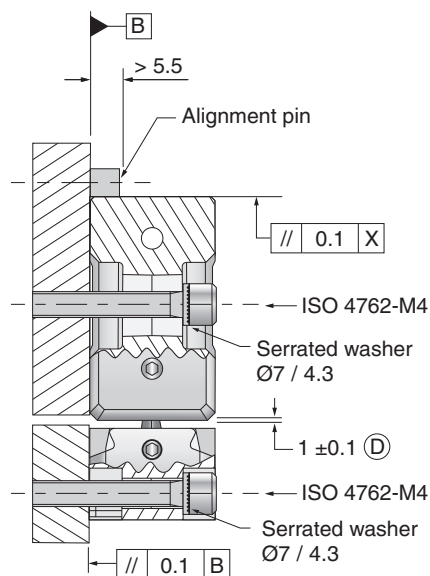
KEY

D = Required mounting dimensions
X = Machine guideway/axis datum

NOTES

- ▶ Side elevations show alternative mounting orientations.
- ▶ Alignment pin and machine edge mounting options to mate directly to the top face of the extrusion.

Mounting orientation – short end caps



KEY

D = Required mounting dimensions
X = Machine guideway/axis datum

NOTES

- ▶ Side elevation shows alternative mounting orientation.
- ▶ Extrusion mounting can be machine edge or dowel pins.

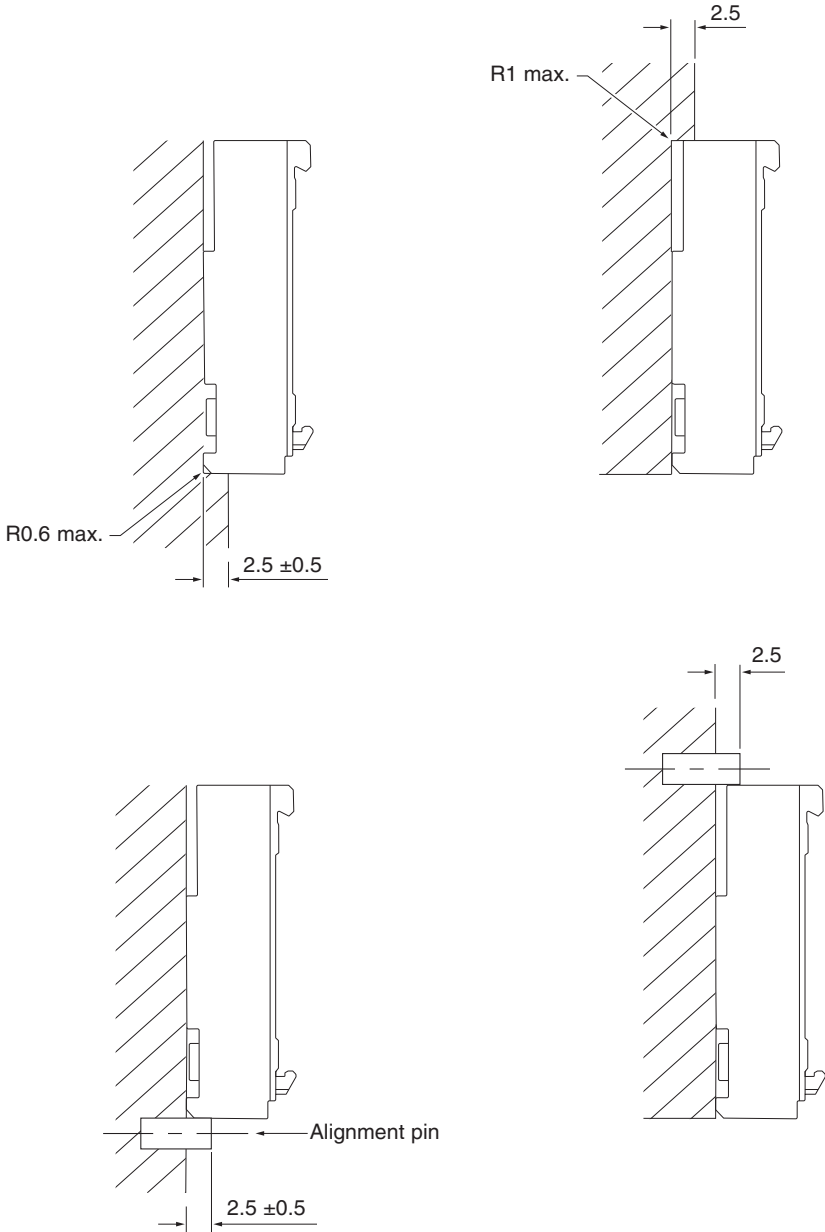
(ML 620 mm shown)

View showing system mounted in reverse

D = Required mounting dimensions
ML = Measuring length
P = Gauging points for alignment
X = Machine guideway/axis datum

ML	770	820	920	1020	1140	1240	1340	1440	1540	1640	1740	1840	2040
L	375	400	450	500	550	640	655	710	760	810	855	910	1010
n	1	1	1	2	2	2	2	3	3	3	3	4	4

6



Nomenclature

	F	N	1	0	0	B	204	S	C	36B	X	001	X
Product _____ F - FORTiS													
Series _____ S - Standard (37 mm) N - Narrow (18 mm)													
Encoder type _____ 1 - Absolute													
Scale type _____ 0 - 30 µm B code RTLA													
End caps _____ 0 - Standard 1 - Small end caps (N type only)													
Lip seal configuration _____ A - DuraSeal™ x 1 B - DuraSeal x 2 (S type only)													
Measuring length* _____ FORTiS-S 014 = 140 mm to 304 = 3040 mm FORTiS-N 007 = 70 mm to 204 = 2040 mm													
System accuracy _____ S - Standard accuracy H - High accuracy													
Thermal datum position _____ C - Centrally located†													
Serial interface _____ 36B - BiSS 36 bit 37F - 37 bit FANUC α and αi 40N - 40 bit Mitsubishi 4 wire 48P - 48 bit Panasonic 28D - Siemens DRIVE-CLiQ 28 bit (50 nm only) 30D - Siemens Drive-CLiQ 30 bit (10 nm only) 34D - Siemens Drive-CLiQ 34 bit (1 nm only)													
Functional Safety _____ X - Standard S - Functional Safety (BiSS Safety and Siemens DRIVE-CLiQ only)													
Resolution _____ 001 - 1 nm (all protocols except FANUC) 010 - 10 nm (all protocols except FANUC) 050 - 50 nm (all protocols except FANUC) T12 - 1 / 0.5 nm (FANUC only) 108 - 10 / 1.25 nm (FANUC only) 502 - 50 / 25 nm (FANUC only) 504 - 50 / 12.5 nm (FANUC only)													
Additional field _____ X - Standard, no option D - Standard encoder with one additional readhead													

* For all permissible measuring length options refer to specification table.

† For other datum requirements contact your local Renishaw representative.

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