



ExRDM 39●

Product description

For operation in potentially explosive areas, Schneider Electric Motion offers the 3-phase stepper motors ExRDM 3910 and ExRDM 3913. The explosion-proof 3-phase stepper motors have a robust design and a high torque in relation to their size.

Special features

The motors have protection type EEx d IIC T4. The result is the following characteristics and conditions:

- Ex-protection as per European standards EN 50014 and EN 50018
- Registration as per UL 2279 or ATEX 94/9/EG (EC-type test certification PTB 02 ATEX 1134)
- Device group II
- Explosion group C
- Type of protection pressure-resistant encapsulation "d"
- Temperature class "T4" (135°C)
- Use in potentially explosive atmospheres of zones 1 and 2, device category 2G
- Tested thermistor monitoring devices are required for temperature monitoring.

Product overview

Motor type		ExRDM 3910	ExRDM 3913
Nominal torque M_N	Nm	4.0	5.8
Holding torque M_H	Nm	4.5	6.55
Steps per revolution z ¹⁾		200 / 500 / 1000 / 2000 / 4000 / 5000 / 10000	
Step angle α ¹⁾	°	1.8 / 0.9 / 0.72 / 0.36 / 0.18 / 0.09 / 0.072 / 0.036	

¹⁾ With appropriate control

Technical data				
Motor type		ExRDM 3910N ExRDM 3910NEi	ExRDM 3913N ExRDM 3913NEi	ExRDM 3913NEa
Max. supply voltage U_{max}	V_{AC}	230	230	230
Nominal voltage DC bus U_N	V_{DC}	325	325	325
Max. voltage against PE	V_{AC}	250	250	250
Phase current in S1 operation $I_N^{1)}$	A_{eff}	1.6	1.6	1.6
Winding resistance R_W	Ω	7.5	9.3	9.3
Nominal torque M_N	Nm	4.0	5.8	5.8
Holding torque	Nm	4.5	6.55	6.55
Rotor inertia M_H	$kgcm^2$	2.2	3.3	3.3
Steps per revolution $z^{2)}$	1/min	200 / 400 / 500 / 1000 / 2000 / 4000 / 5000 / 10000		
Step angle $\alpha^{2)}$	$^\circ$	1.8 / 0.9 / 0.72 / 0.36 / 0.18 / 0.09 / 0.072 / 0.036		
Systematic angular tolerance $\Delta\alpha_s^{3)}$	$'$	± 6	± 6	± 6
Max. starting frequency $f_{Aom}^{2)}$	kHz	5.3	5.3	5.3
Current rise time constant τ	ms	~ 9	~ 11	~ 11
Type of protection		EEx d IIC T4	EEx d IIC T4	EEx d IIC T4
Total length l	mm	194	224	250
Weight m	kg	7.4	9.5	9.8
Shaft load				
• Max. radial force F_R (1st shaft end, 100% ED) ⁴⁾	N	110	110	110
• Max. axial force pull F_A	N	170	170	170
• Max. axial force pressure F_A	N	30	30	30
• Press-on force	N	80	80	80
• Nominal bearing life L_{10h}	h	20000	20000	20000

1) S1 operation, as per DIN VDE 0530: continuous operation

2) Depending on controller

3) Measured at 1000 steps/revolution, unit in angular minutes

4) Point of attack of radial force: in the middle of the shaft end

Environmental conditions		
Ambient temperature	$^\circ C$	-20 ... +50
Installation height without power reduction	m a. MSL	< 1000
Transport and storage temperature	$^\circ C$	-25 ... +70
Relative humidity	%	5 ... 85; no condensation permissible
Vibration severity in operation as per DIN EN 60034-14		A
Max. vibration load	m/s^2	20
Degree of protection as per DIN EN 60034-5		
• Gear		IP 54
• Shaft bushing front		IP 44
• Terminal box		IP 56
Heat class as per EN 60034-1		155 (F)
Shaft wobble and axial precision		DIN EN 50347 (IEC 60072-1)
Max. rotary acceleration	Wheel/ s^2	

Temperature monitoring

The explosion-proof motors ExRDM 3910 and ExRDM 3913 are operated with Schneider Electric Motion stepper motor drives. Tested thermistor monitoring devices are obligatory for temperature monitoring of the stepper motors ExRDM 3910 Nxx and ExRDM 3913 Nxx.

The devices are to be installed outside of the potentially explosive area.

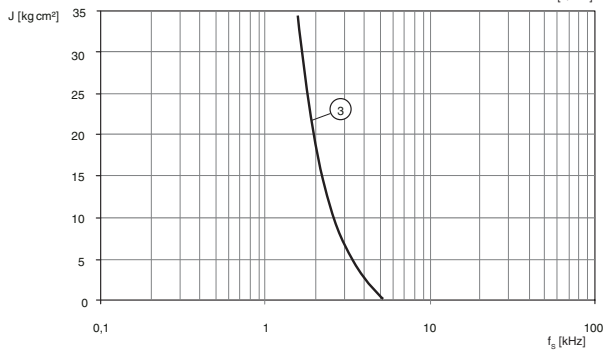
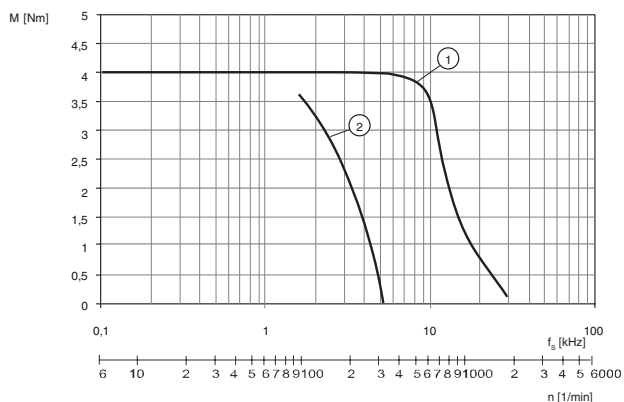
The following devices are recommended:

- Dold MK 9003.12/11120 ATEX 230 V_{AC}
- Möller EMT 6 DBK

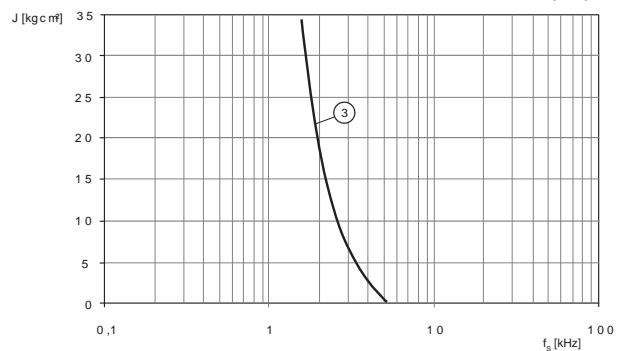
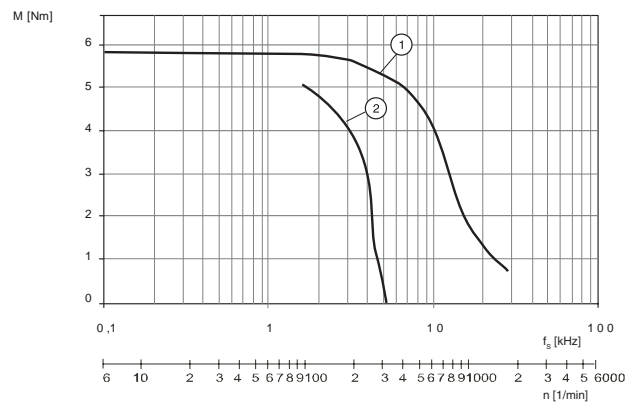
The devices can be purchased from their manufacturers.

Characteristic curves

ExRDM 3910



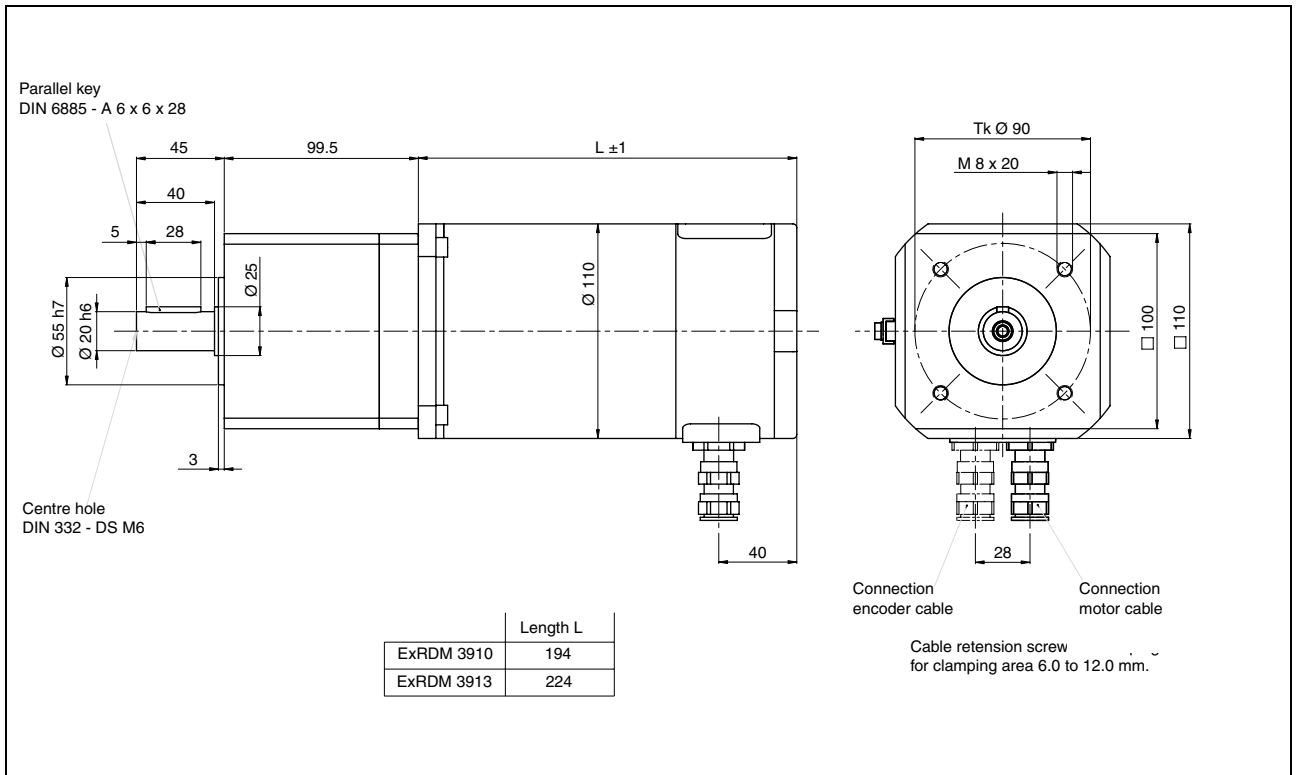
ExRDM 3913



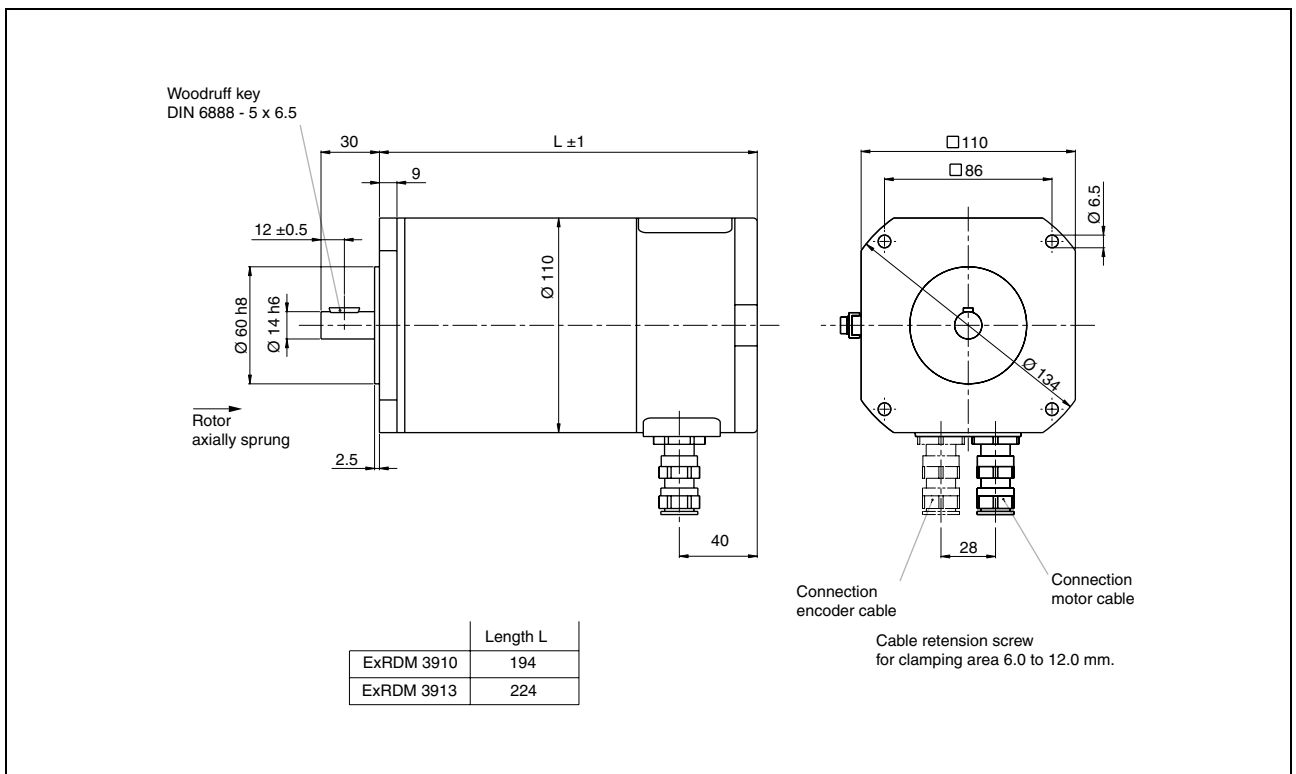
Measurement at 1000 steps/revolution, nominal voltage DC bus U_N and phase current I_N

- (1) Pull-out torque
- (2) Start limit torque
- (3) Maximum load inertia

Dimensional drawings

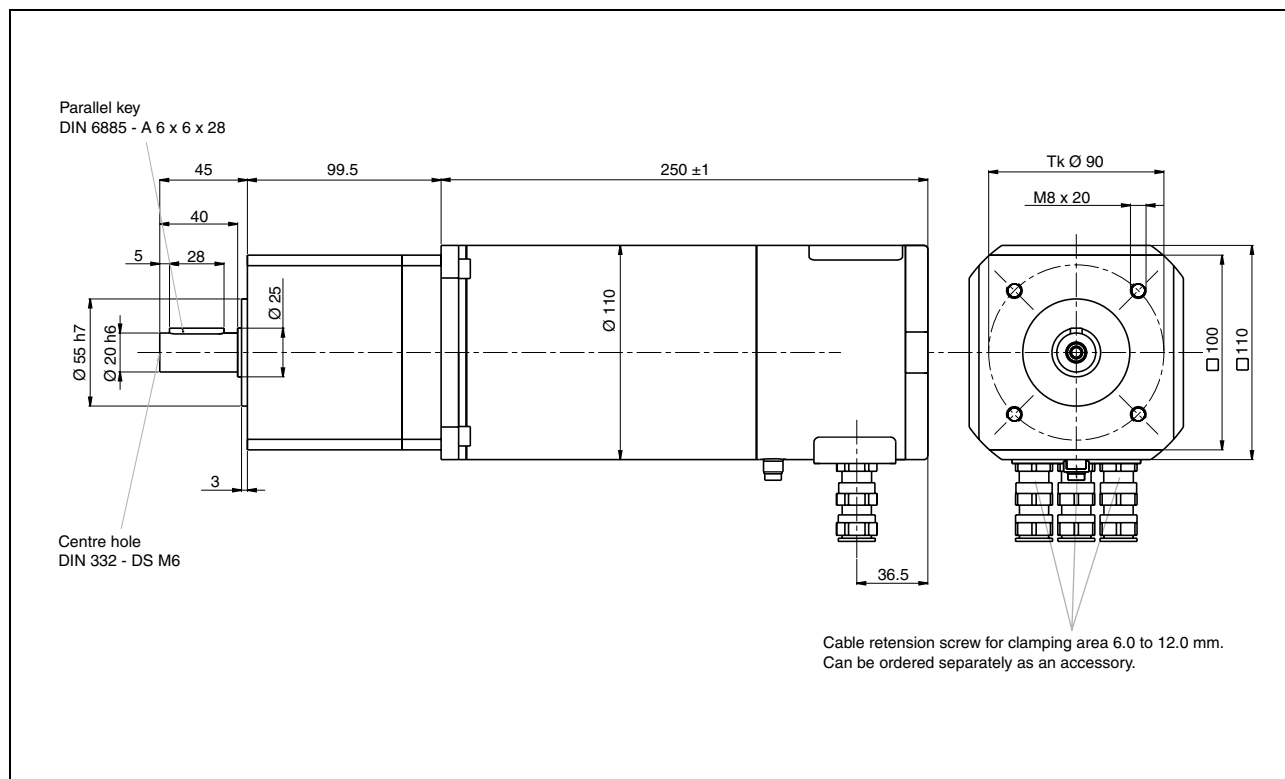


ExRDM 39•NE and ExRDM 39•NEi with gearbox

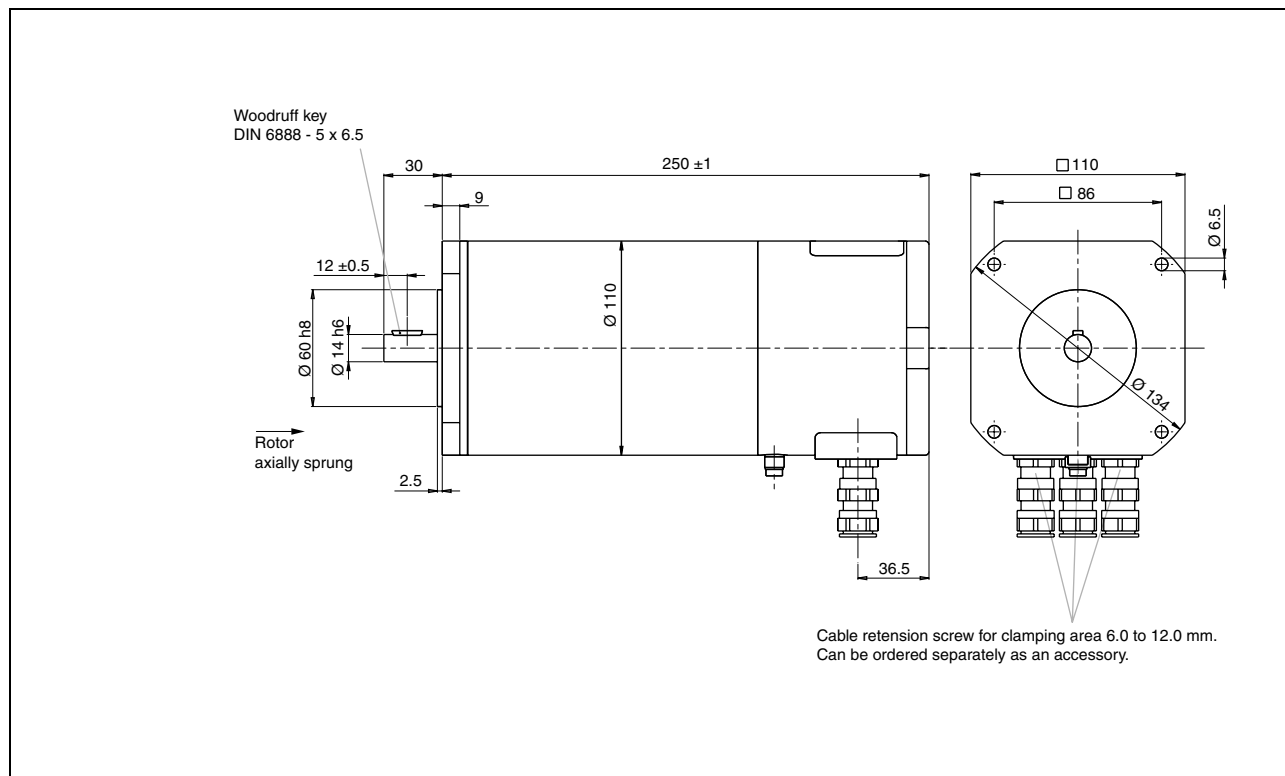


ExRDM 39•NE and ExRDM 39•NEi without gearbox

Dimensional drawings



ExRDM 39•NEa with gearbox



ExRDM 39•NEa without gearbox

Explosion-proof 3-phase stepper motors

ExRDM 39•
Type code

Type code																	
Example:	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Product family ExRDM = Explosion-protected motor	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Phase count 3	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Motor size (Flange) 9 = 85 mm	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Motor length 10 = 194 mm 13 = 224 mm	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Number of pole pairs 50	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
N = No meaning	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Encoders O = Without encoder E = With encoder	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Encoder type A = Absolute I = Incremental	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	5	D4	K	60
Winding (Motor voltage) 7 = 230 V _{AC} (325 V _{DC})	ExRDM	3	9	10	/	50	N	E	I	7	O	IP44	O	O	D4	K	60
Approval A = ATEX U = UL (only with length 13)	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Degree of protection IP44 = IP44 on shaft bushing	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Gearbox type O = Without gearbox U = Planetary gear PL 50/100 /ATEX	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Gear ratio O = Without gearbox 3 = 3:1 5 = 5 :1	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Shaft diameter D4 = 14 mm DO = With gearbox	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Shaft model front K = Woodruff key as per DIN 6888 O = With gearbox	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60
Centring collar 60 = 60 mm OO = With gearbox	ExRDM	3	9	10	/	50	N	E	I	7	A	IP44	O	O	D4	K	60

Options

Encoder

The 3-phase stepper motors from Schneider Electric Motion can be equipped with an encoder. If the control electronics are equipped with rotation monitoring electronics, the encoder is used as a measurement system to acknowledge the actual position of the rotor.

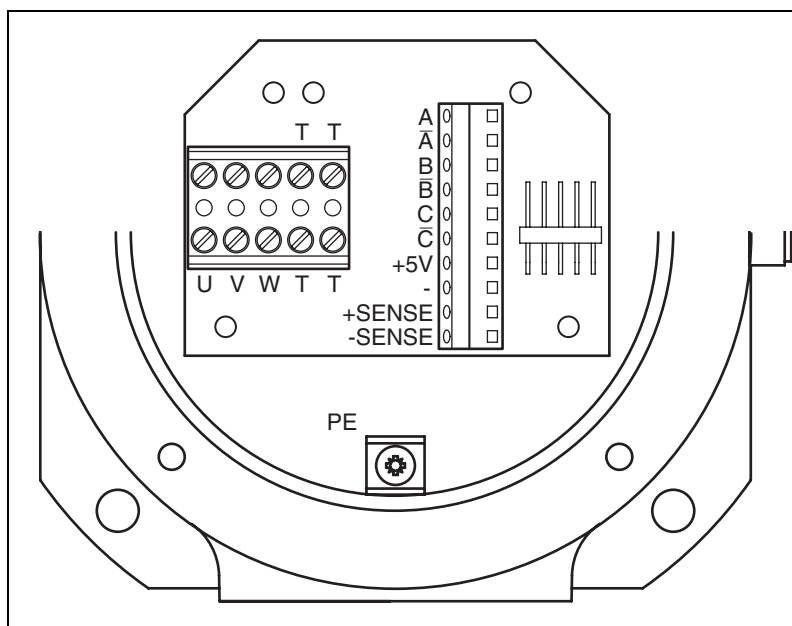
Rotation monitoring compares the set point and actual position of the motor and reports errors if the difference exceeds the tracking error limit. For example, a mechanical overload of the motor can thereby be recorded.

Incremental encoder for ExRDM 39•N- and ExRDM 39•NEi

Technical Data

Resolution	Incr./rpm	1000
Index pulse	Pulse/rpm.	1
Output		RS 422
Signals		A, B, I
Signal shape		Rectangular
Supply voltage	V	5 ± 5%
Supply current	A	max. 0.125

Wiring diagram



Wiring diagram ExRDM 39•N and ExRDM 39•NEi with incremental encoder

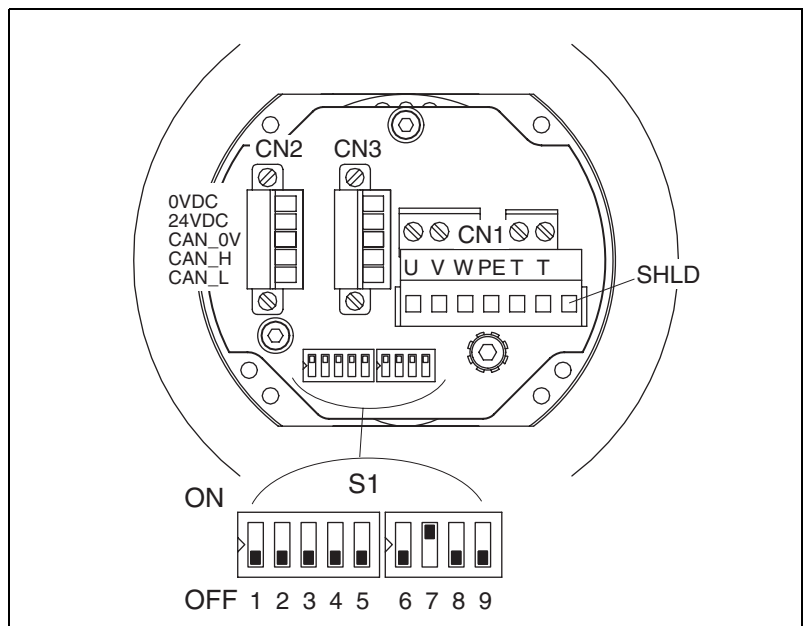
Absolute encoder for ExRDM 39•NEa

Unlike incremental encoders, the current position value is directly available for the absolute encoder. If this encoder is mechanically run in a shut-off state, the current position value can be read out directly after re-start of the power supply.

Technical Data

Supply voltage	V _{DC}	18 ... 30
Max. power consumption	A	< 0.12 at 18 V _{DC} , < 0.07 at 30 V _{DC}
Resolution	Incr./rpm	max. 8192 (13 Bit)
Measurement range	rpm	max. 4096 (12 Bit)
Baud rate	kBaud	250, line length to 250 m
	kBaud	500, line length to 100 m
Encoder interface		CAN-field bus interface (opto-isolated)
	• Data transmission	CAN bus driver (ISO/DIS 11898)
	• Protocol	CANopen device profile for encoder CiA DS-406 V2.0A
	• Output code	Binary
Max. allowable speed	1/min	12000

Wiring diagram



Wiring diagram for ExRDM 39•NEa with absolute encoder

S1 (DIP switch)	Description
1-5	Base ID
6	Memory function 0: All parameters are stored 1: No parameter is stored. After power Off/On, the old values apply again.
7	Baud rate 0: 250 kBaud 1: 500 kBaud
8	Count direction 0: Bus parameter Index 6000 is valid 1: Bus parameter Index 6000 has inverse effect
9	CAN bus termination (terminating resistor 120 Ω ± 5%) 0: powered off 1: connected

Gearbox



Explosion-proof stepper motors by Schneider Electric Motion can also be supplied with a built-in planetary gear PL 50/100/ATEX.

These gearboxes are available in a choice of two gear ratios: 3:1 and 5:1.

The output torque of the gearbox is obtained by multiplying the characteristic values of the motor by the reduction ratio and the efficiency of the gearbox (0.96).

Technical data

Gearbox		PL 50/100/ATEX	
Planetary gear, spur-toothed, suitable for group II as per ATEX 94/9/EC, category 2D/2G/3D/3G; S1-operation			
Gear ratio		3	5
Torsional play	arcmin	12	
Torsional stiffness	Nm/arcmin	5.8	
Nominal output torque ¹⁾	Nm	30	25
Moment of inertia	kgcm ²	0.65	0.15
Max. radial force F_R ²⁾	N	700	
Max. axial force F_A ³⁾	N	700	
Max. allowable press-on force	N	1000	
Weight	kg	2.9	
Gear stages		1	
Max. drive speed	1/min	7000	
Recommended drive speed ⁴⁾	1/min	4,500	
Efficiency for nominal load	%	90	
Min. operating temperature	°C	-20	
Max. operating temperature	°C	+80	
Bearings		Deep-groove ball bearing	
Degree of protection		IP 65	
Lubrication		Grease lubrication	
Service life	h	10000	

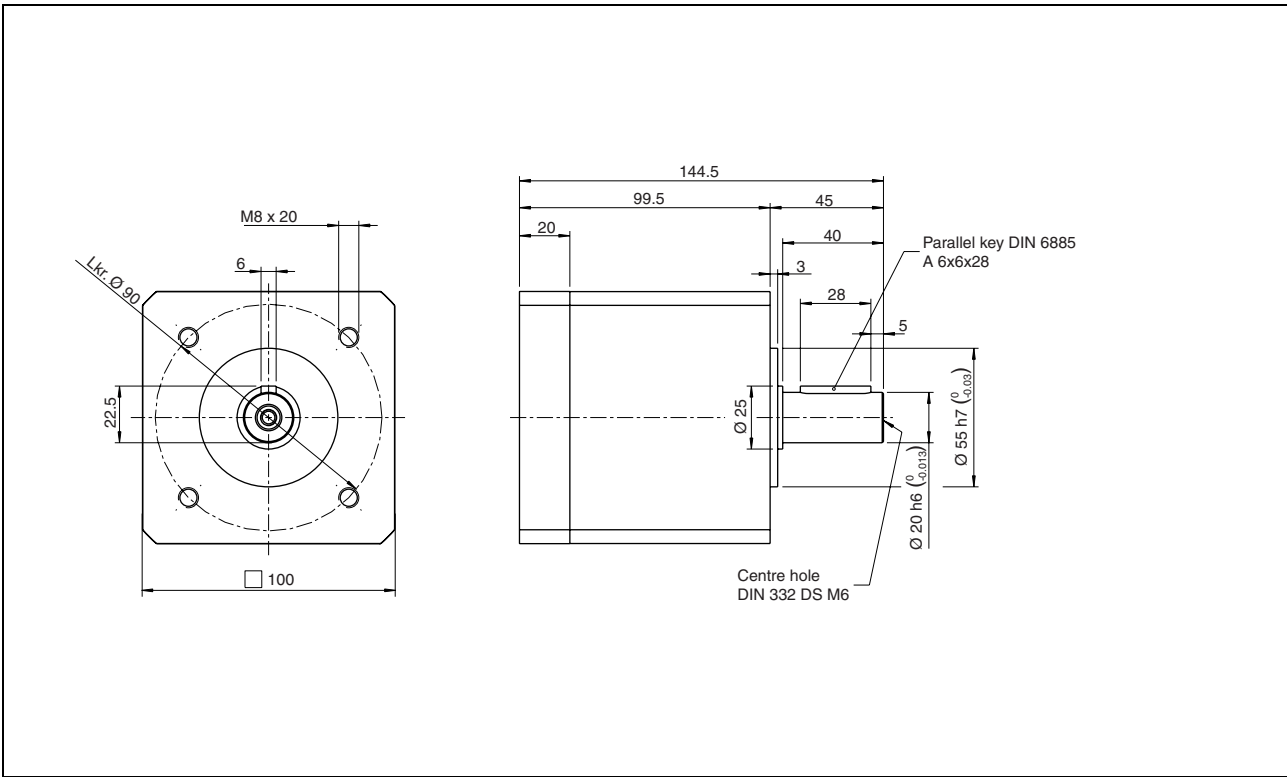
¹⁾ The actual output torque is calculated from the motor torque x gear ratio x efficiency of the gearbox.

²⁾ For N = 200 1/min, $F_A = 0$

³⁾ For N = 200 1/min, $F_R = 0$

⁴⁾ The recommended operating temperature may not be exceeded!

Dimensional drawing



PL 50/100/ATEX gearbox