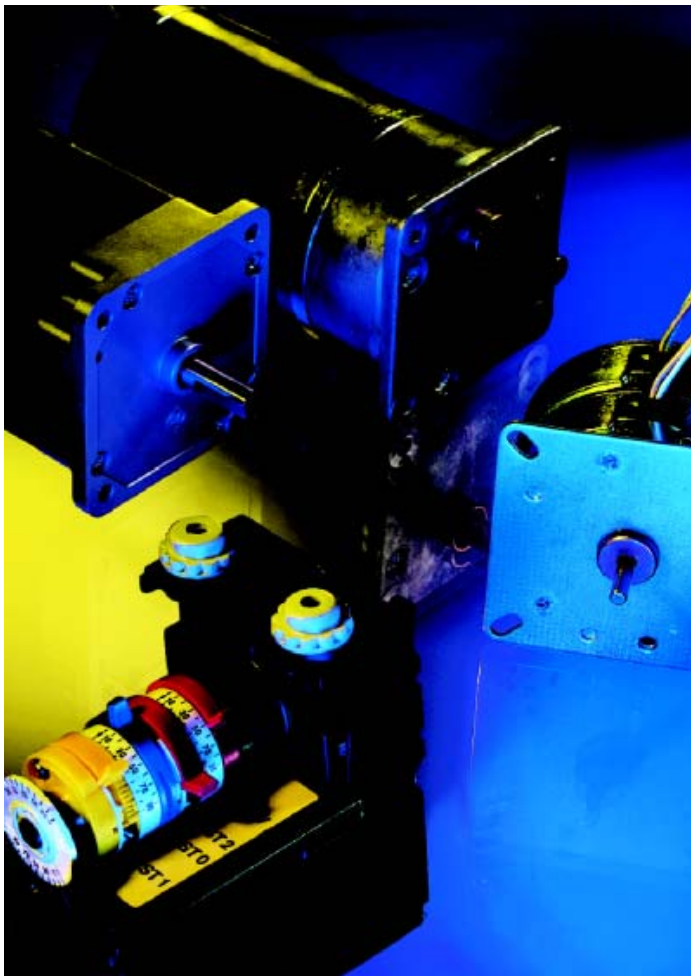
BERGER LAHR



Catalogue
Mechatronic Basis Products

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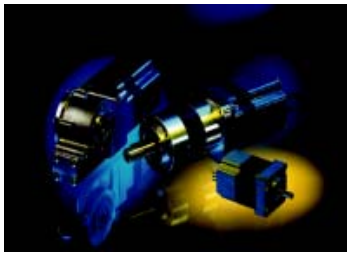
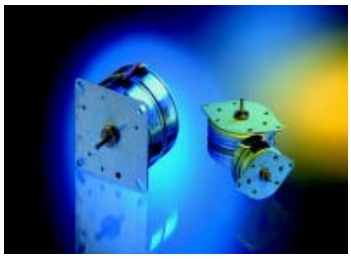
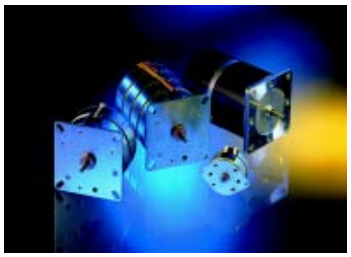
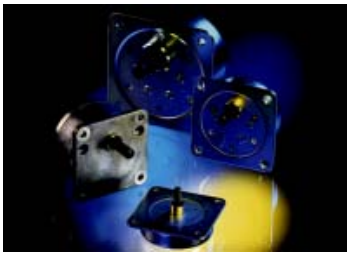
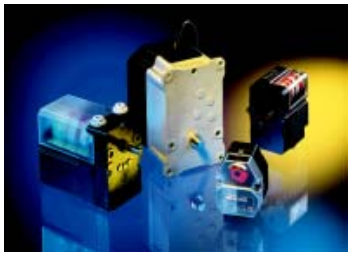


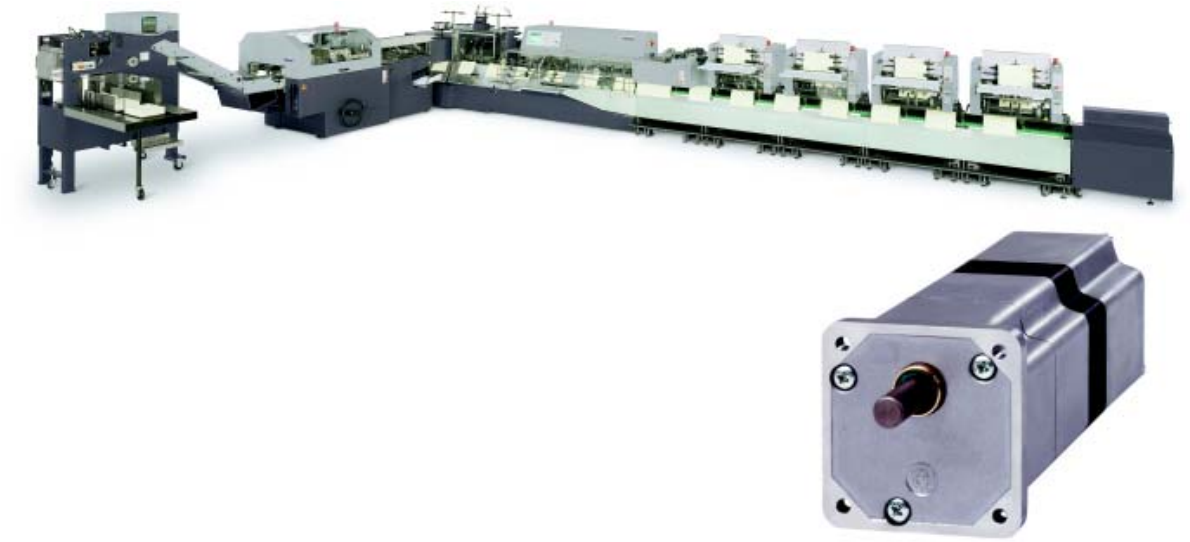








Applications



Format adjuster for binding machine

Heidelberger Druckmaschinen AG is one of the leading solution providers for the print media industry. Heidelberger Druckmaschinen manufactures for example the first binding machine "Stitchmaster ST 400" for industrial brochure production that adjusts itself automatically to the product.

The ST 400 is equipped with an integrated automatic format adjustment. In connection with mobile feeders this results in high flexibility for the production. The paper sheets are folded on the mobile feeders and collated for binding on the collecting conveyor. The automatic setting of the feeders to the various paper formats is done using the intelligent compact drives IclA®, from Berger Lahr.

The intelligent compact drives IclA® include position control, power electronics, motor and gearbox. Integrating the electronics in the drive provides the machine constructor with the following benefits:

- No control cabinet for the control electronics
- Control by field-bus
- Simple installation and initial start-up
- Brief planning periods and low costs.

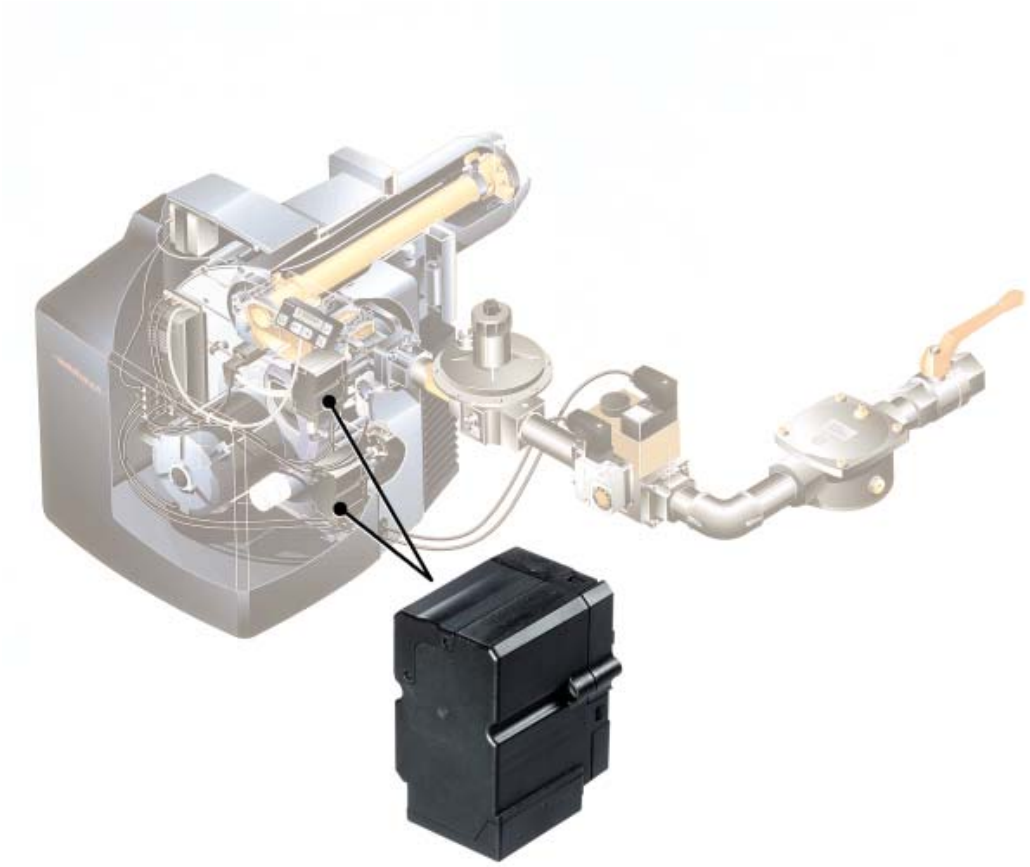
EC motors for textile machines

The Georg Sahm GmbH & Co.KG company is globally a leading manufacturer of precision cross winders, parallel winders, and high performance winders.

Electronically commutated synchronous motors (EC motor for short) made by Berger Lahr are installed in the Georg Sahm spoolers and winders, for instance in the rewinders as drives for the thread guides as well as spool drives.

The thread guides position ("feed") the medium to be wound on the spool, thereby creating diverse spooling patterns and spool shapes.

Implementing Berger Lahr motors makes it possible to synchronise the thread guiding and spool drive by software - no need for complicated mechanics. Speeds of up to 1200 m/min can be reached during rewinding.



Electronic actuator for oil and gas burners

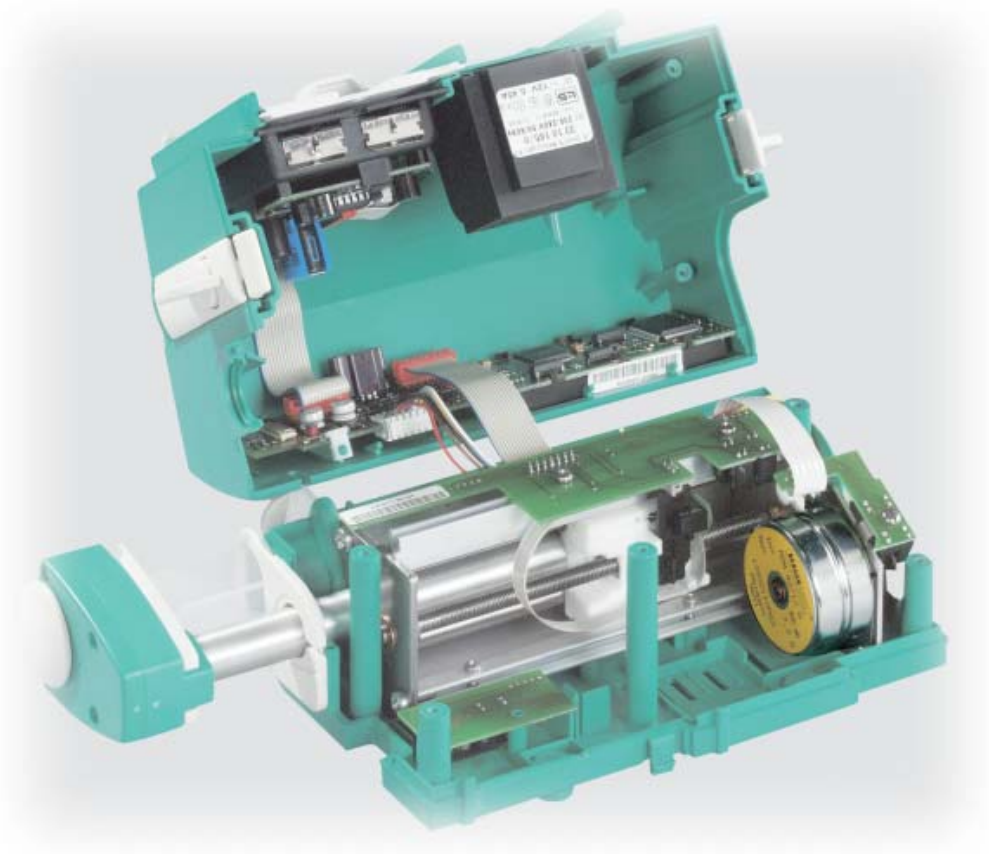
Weishaupt are among the leading manufacturers of burners in Europe, and their research and development institute sets standards in the development of fuel engineering. With their digital burner management system for one of their oil and gas burner series, Weishaupt have taken a further innovative step in the control of air blast burners. The strict emissions standards for oil and gas burners make very precise dosing of air and fuel feeds essential.

Precise metering of air and fuel feeds is achieved by using a microprocessor-controlled combustion manager and an electronic actuator from Berger Lahr.

The elements for controlling fuel and air have to work with a high degree of precision in order to achieve the best possible combustion results over the entire performance range of the burner.

With the new electronic actuator from Berger Lahr, the air flap and gas throttles can be set to within 0.1 degree of accuracy with the aid of its microprocessor control. The drive has an angle of rotation of 90° with a control time of 3 seconds. The drive is electronically controlled step by step via a signal interface. The position of the driven shaft is monitored by the control unit with the aid of an incremental encoder built into the drive.

An RDM 36/6 claw-pole stepping motor with gear mechanism is built into the drive. In order to keep power consumption to a minimum, the phase current to the stepping motor is automatically reduced 20 ms after the last step signal.



Analytical technology

Braun Melsungen AG is known for its innovative, powerful and high-quality products. The newly developed injection pump, Perfusor® compact is used to give patients medication over longer periods of time. For example, it can be used in anaesthesia for controlling the patient's narcosis. Its small size and light weight make the injection pump ideal for mobile applications when transporting patients. Berger Lahr has developed a drive for B.Braun Melsungen's injection pump which operates the pump's tappet. This enables the medication feed to be electronically controlled with great precision.

Berger Lahr supplies the motor and the gear for the Perfusor® compact. The use of an intermediate gearwheel made of special plastic and with optimal teeth characteristics has greatly improved the smoothness of the drive. The drive in the Perfusor® compact displays excellent start characteristics and high precision even with small dosages.

The injection pump uses a claw-pole stepping motor RDM 42/12 G from Berger Lahr. The motor drives the spindle via pinion and an intermediate gear, and the spindle moves the tappet of the shot. The feed rate can be set in a range from 0.1 to 99.9 ml/h. The unit is designed to work from the mains or with batteries whereby battery operating times of >80h can be achieved at a dosage of <10ml/h. The dosing stepping motor is completely maintenance-free.

EC Motors

Berger Lahr's RECM model EC Motors are brushless DC motors that are constructed as electronically commutated 3-phase synchronous motors. The model offers high power delivery and dynamics in a compact design for the most diverse applications. Depending on the requirements, the motors feature a distinct or low self-holding torque, so that there often is no need for a holding brake.

The motors can be equipped with various transmissions such as spur or planetary gears depending on the torque and service life requirements. EC motors are equipped with Hall sensors as standard. For higher positioning resolutions optional encoder systems can be supplied as an alternative. To operate the motors, a selection of various power electronics are available that can be either integrated into the motor or added as external components. They form the basis for developing customised solutions.

The RECM motor series offers a flexible base for constructions made to order.

Overview EC Motors

	Self holding torque	Rated speed [rpm]	Rated torque [Ncm]	Rated power [W]	Described on...
Model RECM 34x					
RECM 343/3	high	4000	0.13	56	Page 13
RECM 345/3	high	4500	0.22	103	Page 17
RECM 343/4	high	4400	0.13	59	Page 15
RECM345/4	low	4225	0.21	95	Page 19
Model RECM 37x					
RECM 372/2	high	4850	0.24	120	Page 21
RECM 374/2	high	4750	0.38	190	Page 25
RECM 375/2	high	5100	0.48	260	Page 29
RECM 377/2	high	5300	0.67	370	Page 34
RECM 372/4	low	4350	0.28	130	Page 23
RECM 374/4	low	4400	0.44	200	Page 27
RECM 375/4	low	4500	0.68	320	Page 31
RECM 377/4	low	4350	0.80	360	Page 35
Options					
Power electronics					Page 37
Geared Motors					Page 41
Encoder systems					Page 47
Holding Brake					Page 49

Type code for EC motors

Example	**RECM 372/ 4 DC 048 AHE B SX 115**
Product family RECM= Reversible Electronic Commutated Motor	**RECM** 372/ 4 DC 048 AHE B SX 115
Number of phases 3 = 3-phase	RECM **3**72/ 4 DC 048 AHE B SX 115
Motor size (Flange) 4 = 42 mm 7 = 65 mm	RECM 3**7**2/ 4 DC 048 AHE B SX 115
Motor size (overall length) RECM 34x 3= stator package 25 mm 5 = stator package 50 mm RECM 37x 2 = stator package 18 mm 4 = stator package 36 mm 5 = stator package 54 mm 7 = stator package 72 mm	RECM 37**2**/ 4 DC 048 AHE B SX 115
Number of pole pairs 2, 3, 4= Number of pole pairs 2, 3, 4	RECM 372/ **4** DC 048 AHE B SX 115
Voltage type (intermediate circuit) DC = direct current, AC = alternating current	RECM 372/ 4 **DC** 048 AHE B SX 115
Voltage rating Example: 024 = 24 V, 048 = 48 V, 325 = 325 V	RECM 372/ 4 DC **048** AHE B SX 115
Mechanical connection mode A = Cable / flying leads B = Terminal box/ for installing electronics C = Plug box	RECM 372/ 4 DC 048 **A**HE B SX 115
Position encoder 0 = No sensor I = Encoder H = Hall-Sensor R = Resolver	RECM 372/ 4 DC 048 A**H**E B SX 115
Integrated electronics E = General M = Torque regulation N = Speed regulation P = Position regulation	RECM 372/ 4 DC 048 AH**E** B SX 115
Holding brake 0 = without holding brake B = with integrated holding brake	RECM 372/ 4 DC 048 AHE **B** SX 115
Transmission type SX = Spur PX = Planetary gearbox WP = Angular gearbox (Planetary) WS = Angular gearbox (worm spur)	RECM 372/ 4 DC 048 AHE B **SX** 115
Gearbox reduction Example: 115 = 115:1	RECM 372/ 4 DC 048 AHE B SX **115**

General technical information

Self-holding torque

In standard versions, the RECM 34x EC motors with 3 pole pairs come with high, and those with 4 pole pairs with low self-holding torque.

RECM 37x EC motors with 2 pole pairs come with high, and those with 4 pole pairs with low self-holding torque in their standard versions.

A different self-holding torque can be supplied on request by means of non-standard magnetisation of the rotor.

Temperatures

The permissible ambient temperatures range from -25 °C to +40 °C. If heat dissipation is normal, then additional ventilation of the motors is not necessary. If ambient temperatures exceeds 40° C, then the permitted load on the motor is reduced.

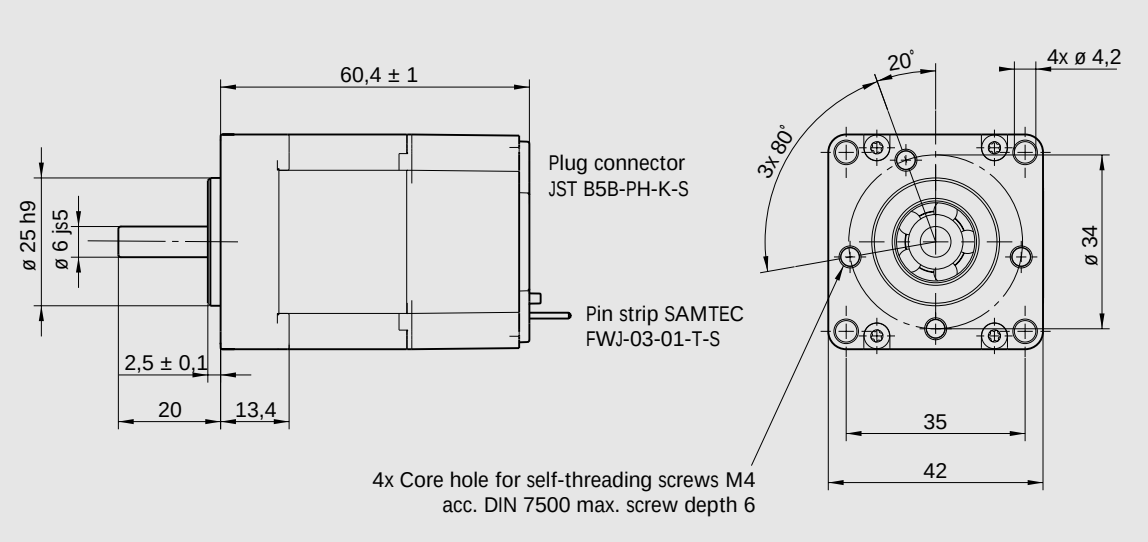
Connection type

The EC motor 34x features connectors and the 37x features flying leads in their standard versions.

Voltage dimensioning

The EC motors can be supplied in various spooling variations for different voltages. Special spooling variations are available on request.

EC Motors

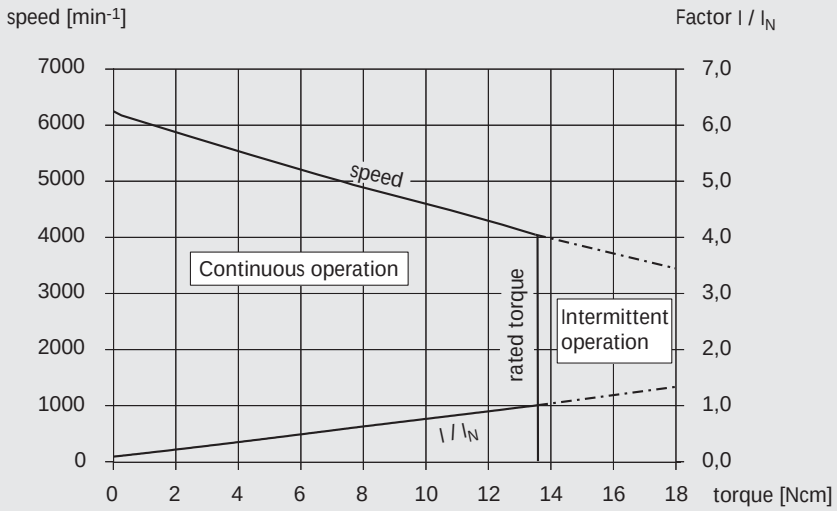


Scale drawing of the RECM 343/3

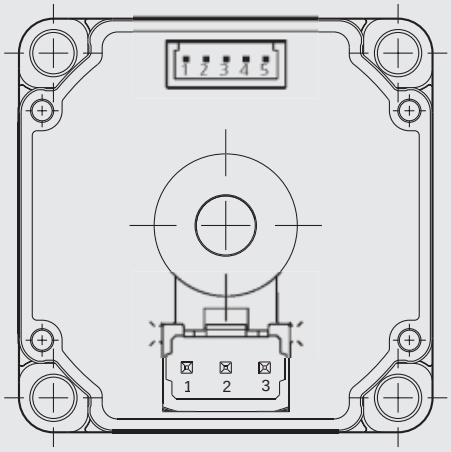
Technical Data

Rated Voltage	**24 V**	**48 V**
Number of pole pairs	3	3
Rated power	56.5 W	56.5 W
Rated torque	13.5 Ncm	13.5 Ncm
Rated speed	4000 rpm	4000 rpm
Rated current	3.1 A	1.55 A
No load speed (at operating temperature)	6250 rpm	6250 rpm
No load current	0.28 A	0.14 A
Starting torque	30 Ncm	30 Ncm
Torque constant	4.4 Ncm / A	8.7 Ncm / A
Voltage stabilizer	2.72 mV / rpm	5.33 mV / rpm
Terminal resistance between two phases at 25°C	1.05 Ω	4.05 Ω
Terminal inductance	0.85 mH	3.27 mH
Rotor moment of inertia	62 gcm^2	62 gcm^2
Thermal resistance between winding and housing	0.75 K / W	0.75 K / W
Max. permitted ambient temperature	40 °C	40 °C
Max. permitted radial stress F_q	50 N	50 N
Max. permitted axial stress F_a	20 N	20 N
Mass	0.35 kg	0.35 kg
Protection grade	IP 41 to DIN EN 60529 IP 54 on request	IP 41 IP 54 on request
Insulation class	B to DIN EN 60034-1	B

RECM 343/3



Characteristic curve RECM 343/3



Pin assignment signal plug

Pin 1 Supply +4 V to +24 V
Pin 2 Supply GND
Pin 3 Hall U
Pin 4 Hall V
Pin 5 Hall W

Pull-Up resistors not integrated

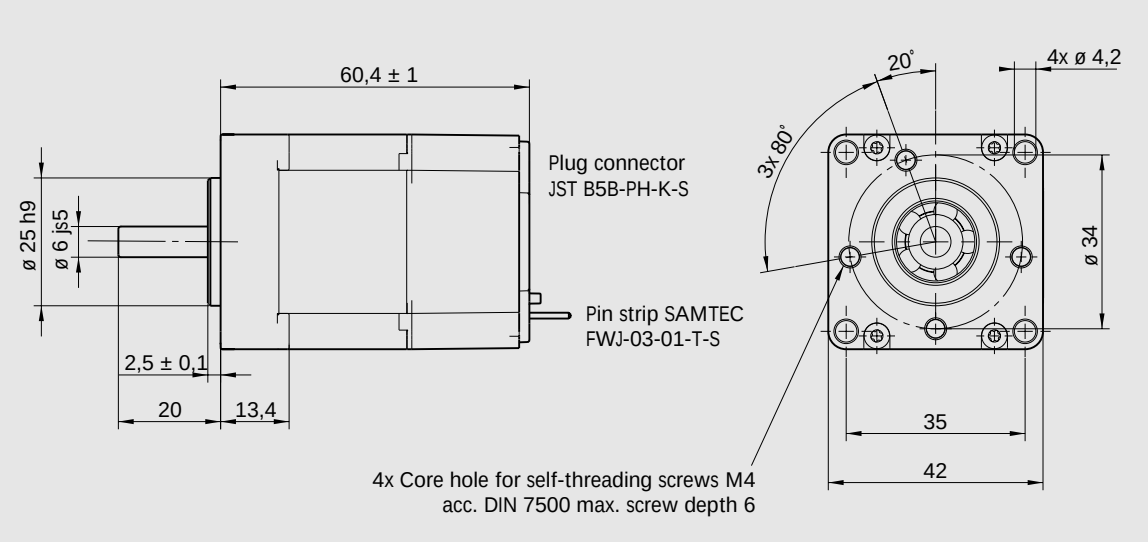
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Pin assignment motor plug
Pin 1 Motor U
Pin 2 Motor V
Pin 3 Motor W

Connections RECM 343/3

Gearbox combinations

You will find gearbox combinations from page 41.

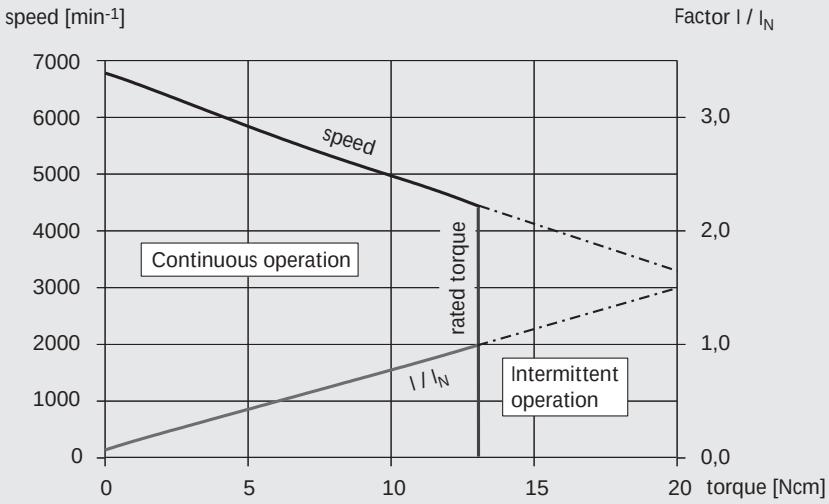


Scale drawing of the RECM 343/4

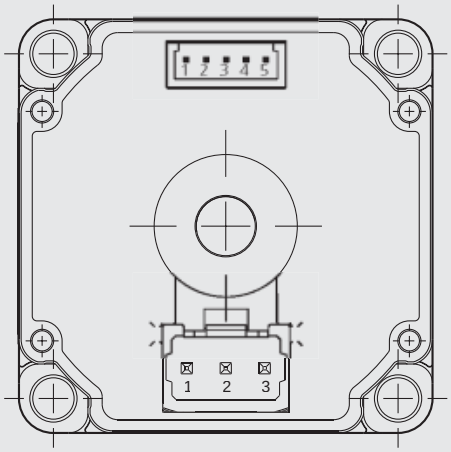
Technical Data

Rated Voltage	**24 V**	**48 V**
Number of pole pairs	4	4
Rated power	59.9 W	59.9 W
Rated torque	13 Ncm	13 Ncm
Rated speed	4400 rpm	4400 rpm
Rated current	3.3 A	1.65 A
No load speed (at operating temperature)	6800 rpm	6800 rpm
No load current	0.22 A	0.11 A
Starting torque	40 Ncm	40 Ncm
Torque constant	3.9 Ncm / A	7.9 Ncm / A
Voltage stabilizer	2.6 mV / rpm	5.2 mV / rpm
Terminal resistance between two phases at 25°C	0.83 Ω	3.32 Ω
Terminal inductance	0.65 mH	2.6 mH
Rotor moment of inertia	62 gcm^2	62 gcm^2
Thermal resistance between winding and housing	0.75 K / W	0.75 K / W
Max. permitted ambient temperature	40 °C	40 °C
Max. permitted radial stress F_q	50 N	50 N
Max. permitted axial stress F_a	20 N	20 N
Mass	0.35 kg	0.35 kg
Protection grade	IP 41 to DIN EN 60529 IP 54 on request	IP 41 IP 54 on request
Insulation class	B to DIN EN 60034-1	B

RECM 343/4



Characteristic curve RECM 343/4



Pin assignment signal plug

Pin 1 Supply +4 V to +24 V
Pin 2 Supply GND
Pin 3 Hall U
Pin 4 Hall V
Pin 5 Hall W

Pull-Up resistors not integrated

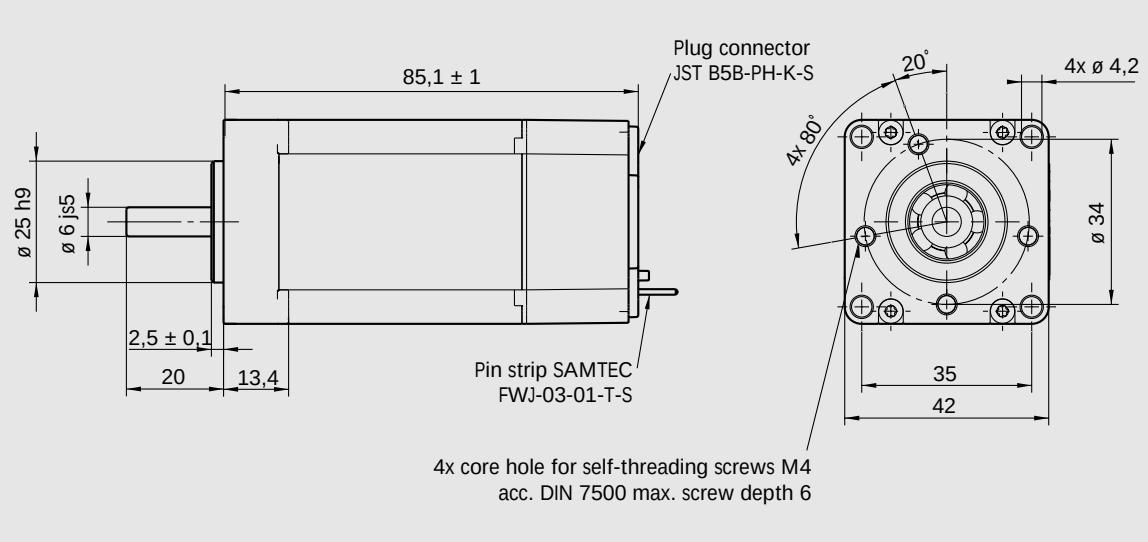
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Pin assignment motor plug
Pin 1 Motor U
Pin 2 Motor V
Pin 3 Motor W

Connections RECM 343/4

Gearbox combinations

You will find gearbox combinations from page 41.

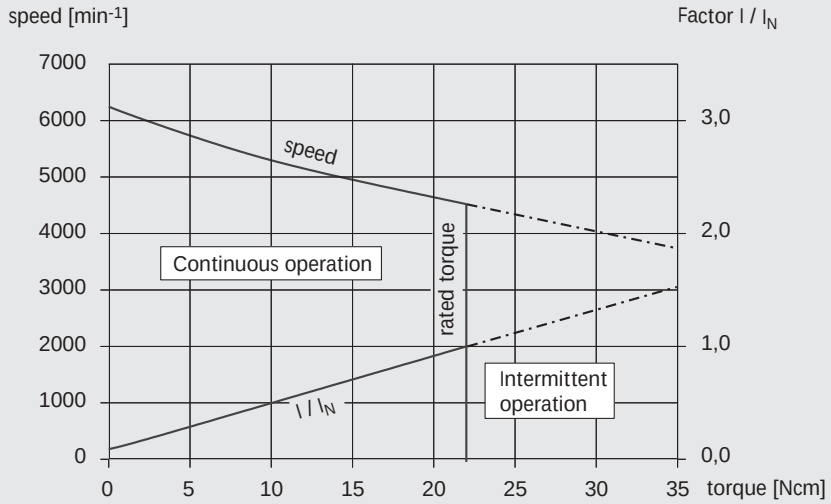


Scale drawing of the RECM 345/3

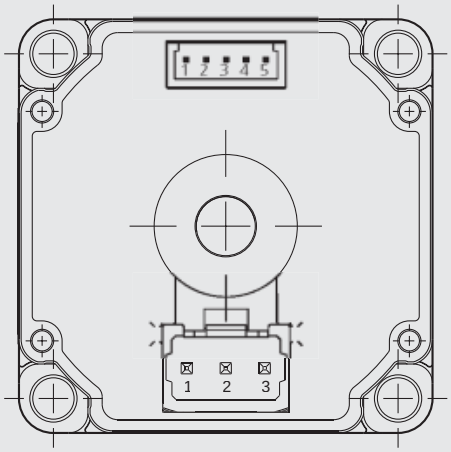
Technical Data

Rated voltage	**24 V**	**48 V**
Number of pole pairs	3	3
Rated power	103.7 W	103.7 W
Rated torque	22 Ncm	22 Ncm
Rated speed	4500 rpm	4500 rpm
Rated current	4.82 A	2.41 A
No load speed (at operating temperature)	6250 rpm	6250 rpm
No load current	0.44 A	0.22 A
Starting torque	60 Ncm	60 Ncm
Torque constant	4.56 Ncm / A	9.13 Ncm / A
Voltage stabilizer	2.8 mV / rpm	5.8 mV / rpm
Terminal resistance between two phases at 25°C	0.46 Ω	2.2 Ω
Terminal inductance	0.43 mH	1.85 mH
Rotor moment of inertia	123 gcm^2	123 gcm^2
Thermal resistance between winding and housing	0.46 K / W	0.46 K / W
Max. permitted ambient temperature	40 °C	40 °C
Max. permitted radial stress F_q	50 N	50 N
Max. permitted axial stress F_a	20 N	20 N
Mass	0.5 kg	0.5 kg
Protection grade	IP 41 to DIN EN 60529 IP 54 on request	IP 41 IP 54 on request
Insulation class	B to DIN EN 60034-1	B

RECM 345/3



Characteristic curve RECM 345/3



Pin assignment signal plug

Pin 1 Supply +4 V to +24 V
Pin 2 Supply GND
Pin 3 Hall U
Pin 4 Hall V
Pin 5 Hall W

Pull-Up resistors not integrated

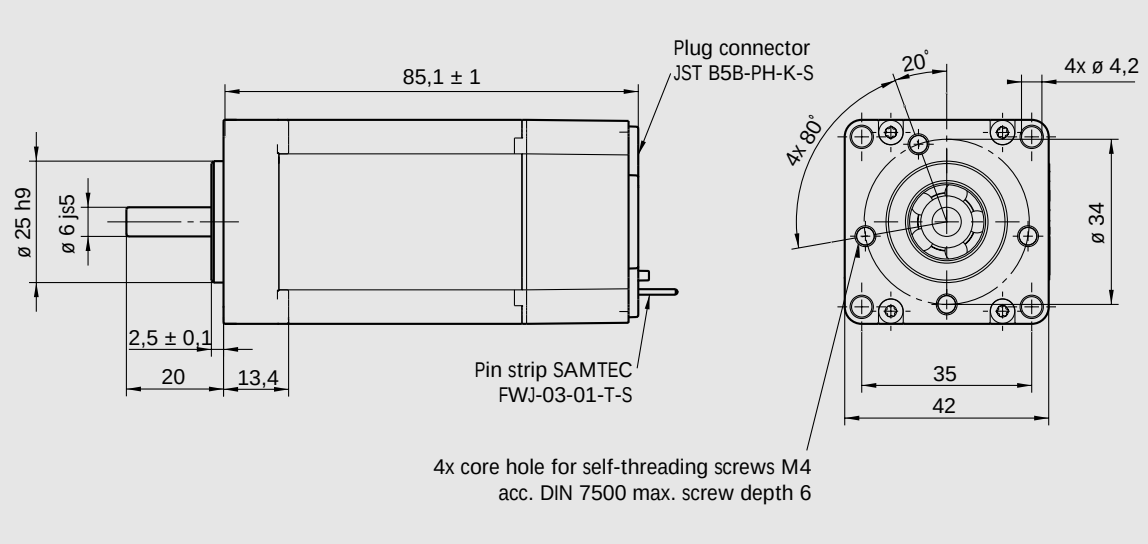
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Pin assignment motor plug
Pin 1 Motor U
Pin 2 Motor V
Pin 3 Motor W

Connections RECM 345/3

Gearbox combinations

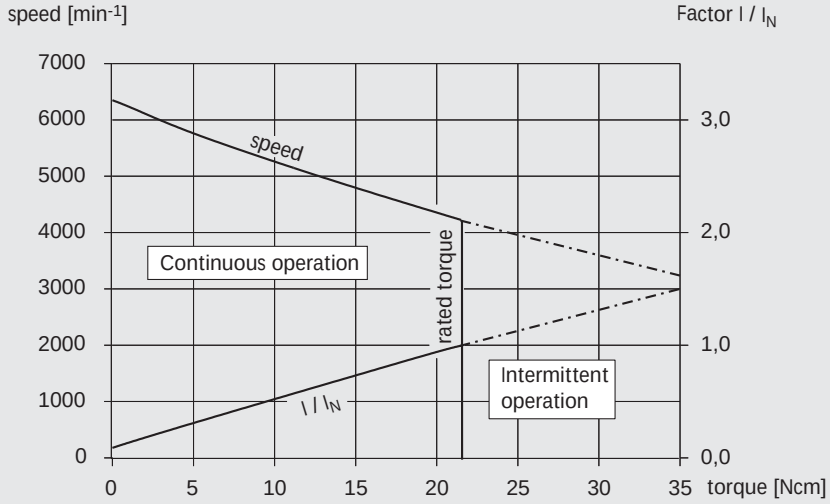
You will find gearbox combinations from page 41.



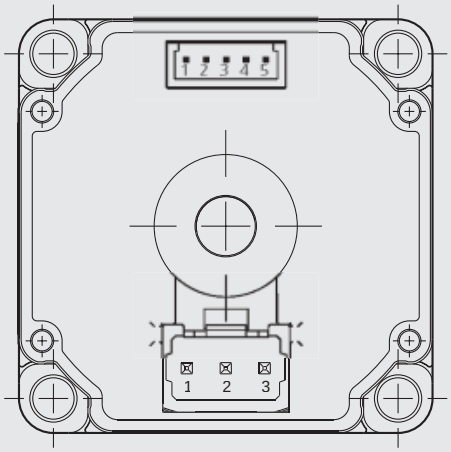
Scale drawing of the RECM 345/4

Technical Data

Rated voltage	**24 V**	**48 V**
Number of pole pairs	4	4
Rated speed	4225 rpm	4225 rpm
Rated torque	21.5 Ncm	21.5 Ncm
Rated current at motor terminals	4.62 A	2.31 A
Rated power	95.1 W	95.1 W
No load speed (at operating temperature)	6350 rpm	6350 rpm
No load current	0.41 A	0.21 A
Starting torque	80 Ncm	80 Ncm
Voltage stabilizer	2.85 mV / rpm	5.44 mV / rpm
Torque constant	4.65 Ncm / A	9.31 Ncm / A
Terminal resistance between two phases at 25°C	0.48 Ω	1.92 Ω
Terminal inductance	0.38 mH	1.38 mH
Rotor moment of inertia	123 gcm^2	123 gcm^2
Thermal resistance between winding and housing	0.46 K / W	0.46 K / W
Max. permitted ambient temperature	40 °C	40 °C
Max. permitted radial stress F_q	50 N	50 N
Max. permitted axial stress F_a	20 N	20 N
Mass	0.5 kg	0.5 kg
Protection grade	IP 41 to DIN EN 60529 IP 54 on request	IP 41 IP 54 on request
Insulation class	B to DIN EN 60034-1	B



Characteristic curve RECM 345/4



Pin assignment signal plug

Pin 1 Supply +4 V to +24 V
Pin 2 Supply GND
Pin 3 Hall U
Pin 4 Hall V
Pin 5 Hall W

Pull-Up resistors not integrated

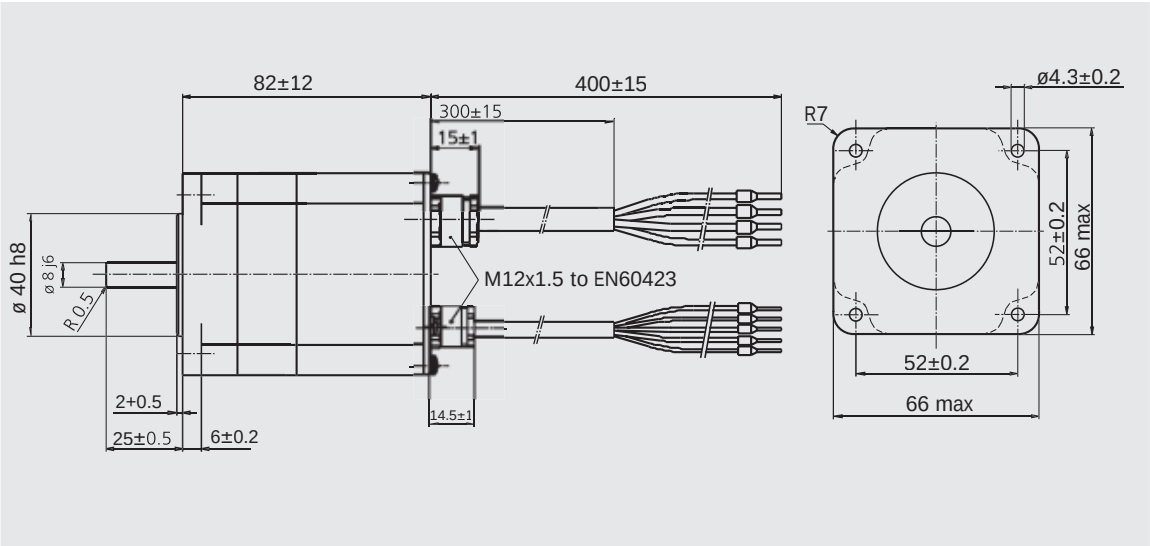
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Pin assignment motor plug
Pin 1 Motor U
Pin 2 Motor V
Pin 3 Motor W

Connections RECM 345/4

Gearbox combinations

You will find gearbox combinations from page 41.

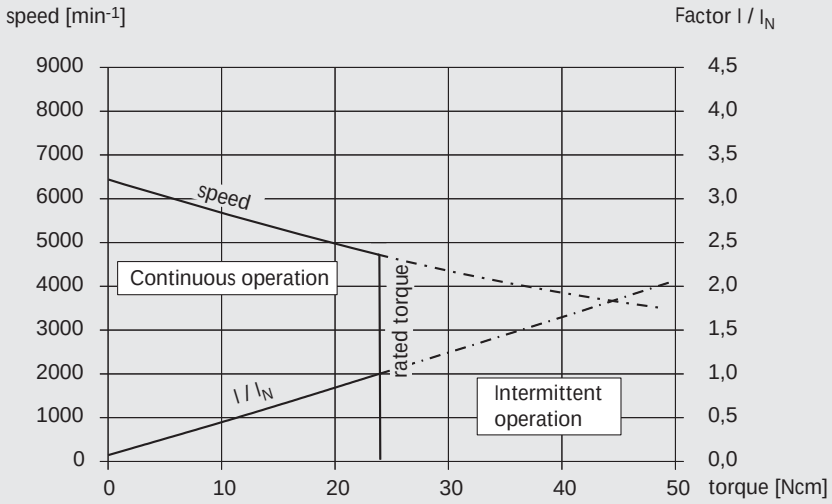


Scale drawing of the RECM 372/2

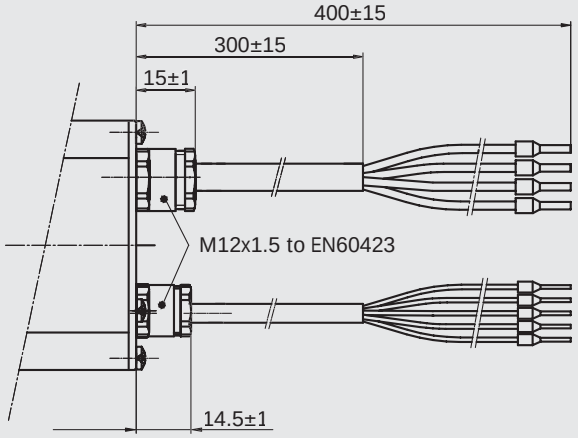
Technical Data

Intermediate circuit voltage	**U_{DC}**	**24 V**	**48 V**	**325 V**
Number of pole pairs	p	2	2	2
Rated power [1]	P_N	120 W	120 W	120 W
Rated torque [1]	M_N	0.24 Nm	0.24 Nm	0.24 Nm
Rated speed [1]	n_N	4850 rpm	4850 rpm	4800 rpm
Rated current [1]	I_N	7.0 A	3.49 A	0.5 A
Rated current [1]	$\hat{I}_N$	8.5 A	4.27 A	0.6 A
No load speed [2]	n_0	6400 rpm	6400 rpm	6300 rpm
No load current [2]	I_0	0.74 A	0.37 A	0.05 A
Permanent holding torque [1]	M_{d0}	0.31 Nm	0.31 Nm	0.31 Nm
Permanent holding current [1]	I_{d0}	8.6 A	4.36 A	0.6 A
Permanent holding current [1]	$\hat{I}_{d0}$	10.5 A	5.34 A	0.8 A
Max. torque [1]	M_{max}	0.70 Nm	0.70 Nm	0.70 Nm
Max. current [1]	I_{max}	20.6 A	10.3 A	1.5 A
Self-holding torque [2]	M_S	0.053 Nm	0.053 Nm	0.053 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.029 Nm/A	0.057 Nm/A	0.387 Nm/A
Generator voltage constant [2]	k_{Ett}	2.602 mV/rpm	5.203 mV/rpm	35.515 mV/rpm
Terminal resistance [2]	R_{tt}	0.19 Ω	0.70 Ω	28.86 Ω
Terminal inductance	L_{tt}	0.787 mH	3.148 mH	146.645 mH
Rotor moment of inertia	J	170 g cm^2	170 g cm^2	170 g cm^2
Thermal resistance (coil / surface)	R_{th1}	1.25 K/W	1.25 K/W	1.25 K/W
Ambient temperature	ϑ_F	-25°C ... 40°C	-25°C ... 40°C	-25°C ... 40°C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	1.05 kg	1.05 kg	1.05 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to DIN EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C



Characteristic curve RECM 372/2



Motor U	Orange	(OR)
Motor V	Black	(BK)
Motor W	White	(WH)
PE Earth	Yellow/Green	(GN/GY)

Pull-up resistors not integrated

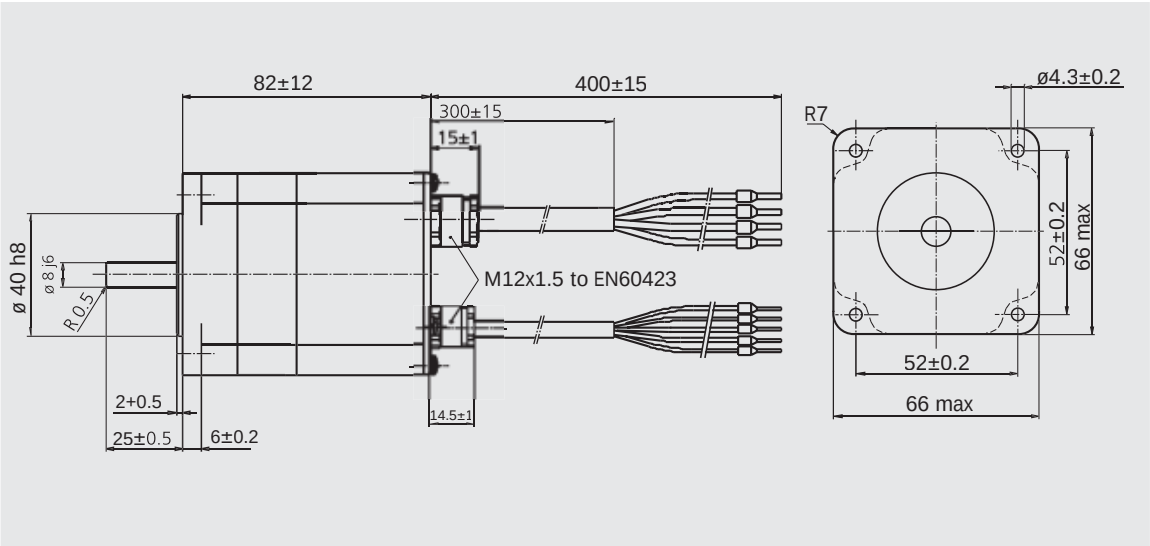
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Supply Vs 4V bis 24V	Red	(RD)
Supply Gnd	Blue	(BU)
Hall U	Orange	(OR)
Hall V	Black	(BK)
Hall W	White	(WH)

Connections RECM 372/2

Gearbox combinations

You will find gearbox combinations from page 41.



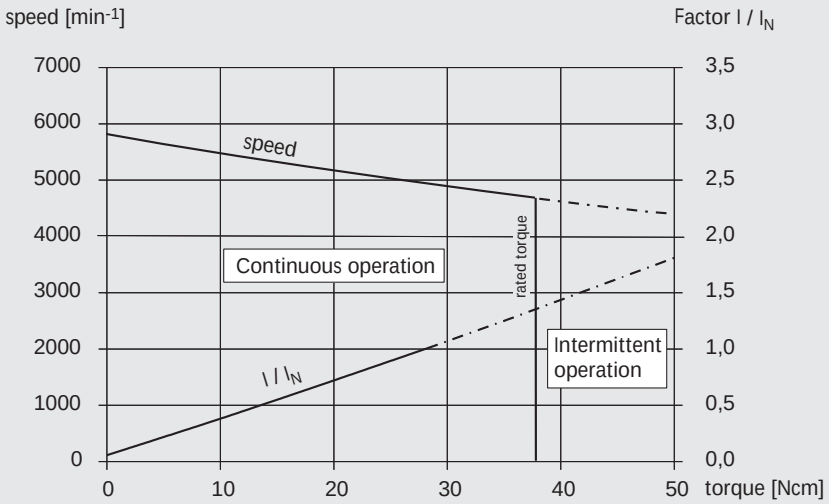
Scale drawing of the RECM 372/4

Technical Data

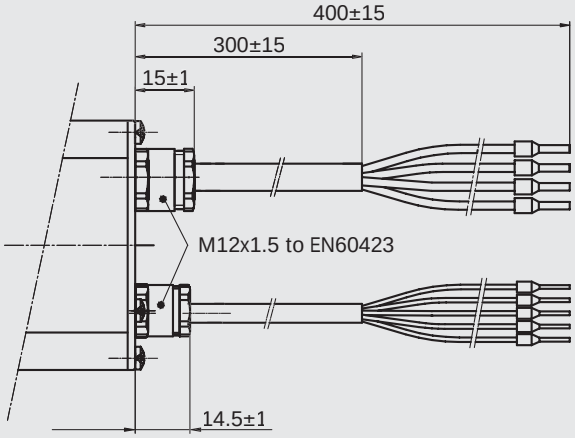
Intermediate circuit voltage	**U_{DC}**	**24 V**	**48 V**	**325 V**
Number of pole pairs	p	4	4	4
Rated power [1]	P_N	130 W	130 W	120 W
Rated torque [1]	M_N	0.28 Nm	0.28 Nm	0.28 Nm
Rated speed [1]	n_N	4350 rpm	4350 rpm	4300 rpm
Rated current [1]	I_N	8.1 A	4.03 A	0.6 A
Rated current [1]	$\hat{I}_N$	9.9 A	4.93 A	0.7 A
No load speed [2]	n_0	6500 rpm	6500 rpm	6450 rpm
No load current [2]	I_0	0.63 A	0.31 A	0.05 A
Permanent holding torque [1]	M_{d0}	0.33 Nm	0.33 Nm	0.33 Nm
Permanent holding current [1]	I_{d0}	9.1 A	4.70 A	0.7 A
Permanent holding current [1]	$\hat{I}_{d0}$	11.2 A	5.76 A	0.9 A
Max. torque [1]	M_{max}	0.7 Nm	0.7 Nm	0.7 Nm
Max. current [1]	I_{max}	20.7 A	10.3 A	1.5 A
Self-holding torque [2]	M_S	0.015 Nm	0.015 Nm	0.015 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.030 Nm/A	0.057 Nm/A	0.386 Nm/A
Generator voltage constant [2]	k_{Ett}	2.583 mV/rpm	5.166 mV/rpm	35.091 mV/rpm
Terminal resistance [2]	R_{tt}	0.17 Ω	0.54 Ω	21.38 Ω
Terminal inductance	L_{tt}	0.619 mH	2.477 mH	114.269 mH
Rotor moment of inertia	J	170 g cm^2	170 g cm^2	170 g cm^2
Thermal resistance (coil / surface)	R_{th1}	1.25 K/W	1.25 K/W	1.25 K/W
Ambient temperature	ϑ_F	-25 °C ... 40 °C	-25 °C ... 40 °C	-25 °C ... 40 °C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	1.05 kg	1.05 kg	1.05 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to DIN EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C

RECM 372/4



Characteristic curve RECM 372/4



Motor U	Orange	(OR)
Motor V	Black	(BK)
Motor W	White	(WH)
PE Earth	Yellow/Green	(GN/GY)

Pull-up resistors not integrated

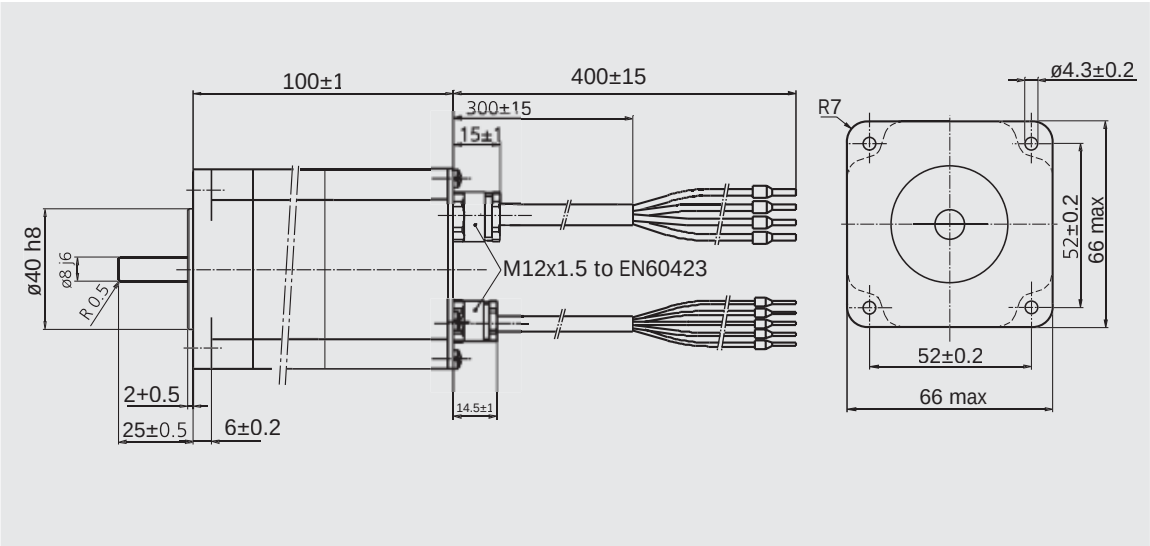
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Supply Vs 4V bis 24V	Red	(RD)
Supply Gnd	Blue	(BU)
Hall U	Orange	(OR)
Hall V	Black	(BK)
Hall W	White	(WH)

Connections RECM 372/4

Gearbox combinations

You will find gearbox combinations from page 41.



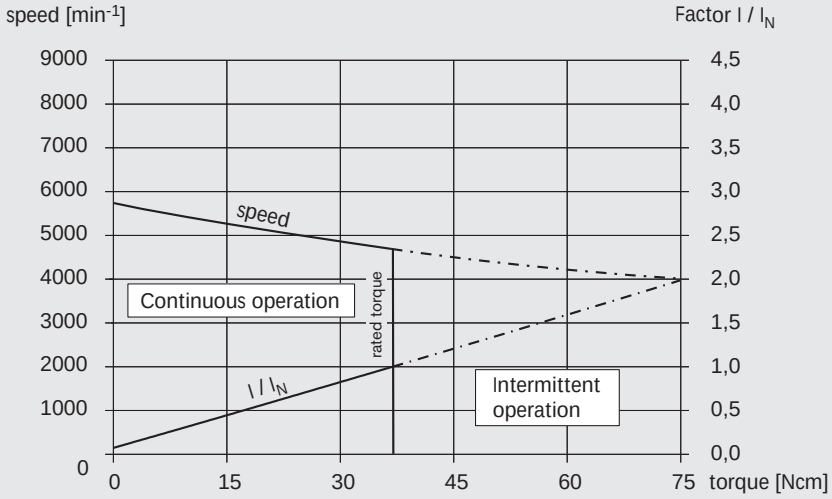
Scale drawing of the RECM 374/2

Technical Data

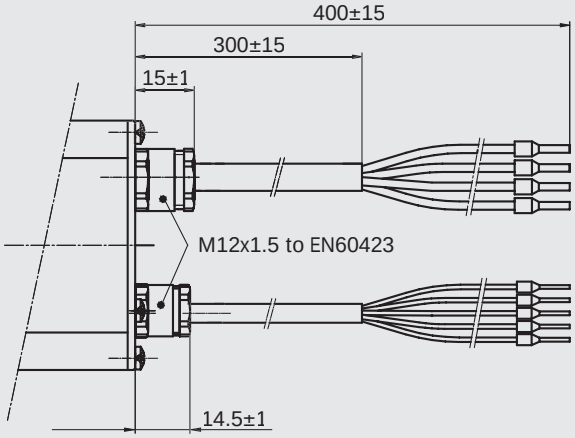
Intermediate circuit voltage	**U_{DC}**	**24 V**	**48 V**	**325 V**
Number of pole pairs	p	2	2	2
Rated power [1]	P_N	190 W	190 W	180 W
Rated torque [1]	M_N	0.38 Nm	0.38 Nm	0.38 Nm
Rated speed [1]	n_N	4750 rpm	4750 rpm	4500 rpm
Rated current [1]	I_N	9.7 A	4.84 A	0.6 A
Rated current [1]	$\hat{I}_N$	11.9 A	5.93 A	0.8 A
No load speed [2]	n_0	5800 rpm	5800 rpm	5450 rpm
No load current [2]	I_0	1.20 A	0.60 A	0.08 A
Permanent holding torque [1]	M_{d0}	0.53 Nm	0.53 Nm	0.53 Nm
Permanent holding current [1]	I_{d0}	13.1 A	6.87 A	1.0 A
Permanent holding current [1]	$\hat{I}_{d0}$	16.1 A	8.41 A	1.2 A
Max. torque [1]	M_{max}	1.40 Nm	1.40 Nm	1.40 Nm
Max. current [1]	I_{max}	37.1 A	18.5 A	2.6 A
Self-holding torque [2]	M_S	0.106 Nm	0.106 Nm	0.106 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.033 Nm/A	0.064 Nm/A	0.446 Nm/A
Generator voltage constant [2]	k_{Ett}	2.891 mV/rpm	5.781 mV/rpm	41.296 mV/rpm
Terminal resistance [2]	R_{tt}	0.12 Ω	0.39 Ω	15.55 Ω
Terminal inductance	L_{tt}	0.389 mH	1.557 mH	79.430 mH
Rotor moment of inertia	J	340 g cm^2	340 g cm^2	340 g cm^2
Thermal resistance (coil / surface)	R_{th1}	0.63 K/W	0.63 K/W	0.63 K/W
Ambient temperature	ϑ_F	-25°C ... 40°C	-25°C ... 40°C	-25°C ... 40°C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	1.4 kg	1.4 kg	1.4 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C

RECM 374/2



Characteristic curve RECM 374/2



Motor U	Orange	(OR)
Motor V	Black	(BK)
Motor W	White	(WH)
PE Earth	Yellow/Green	(GN/GY)

Pull-up resistors not integrated

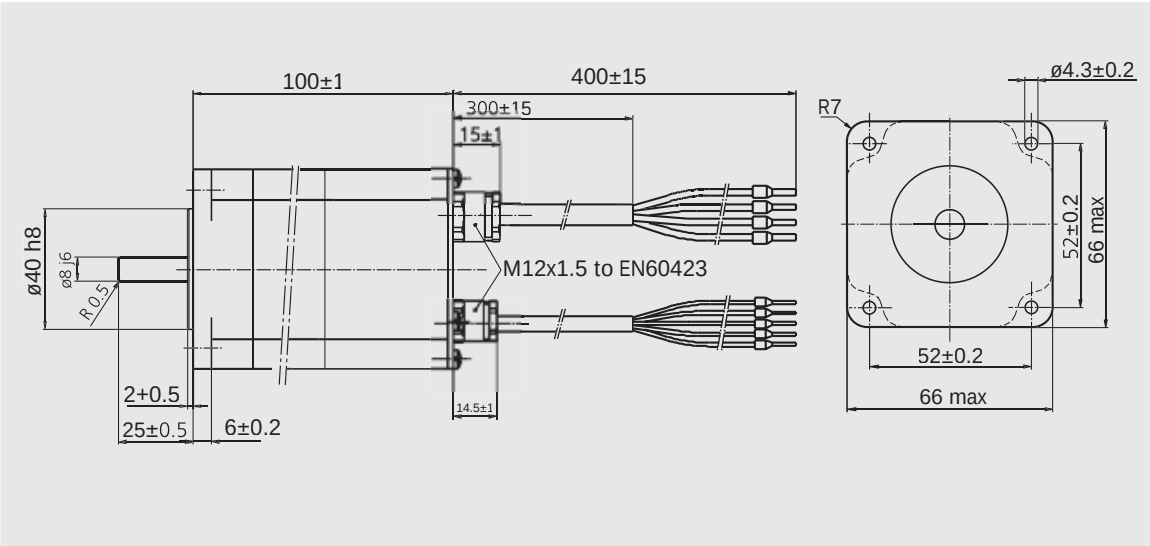
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Supply Vs 4V bis 24V	Red	(RD)
Supply Gnd	Blue	(BU)
Hall U	Orange	(OR)
Hall V	Black	(BK)
Hall W	White	(WH)

Connections RECM 374/2

Gearbox combinations

You will find gearbox combinations from page 41.



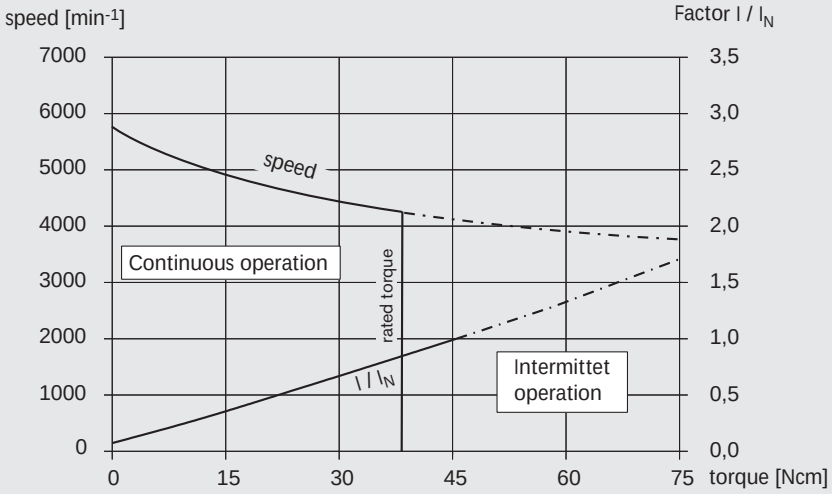
Scale drawing of the RECM 374/4

Technical Data

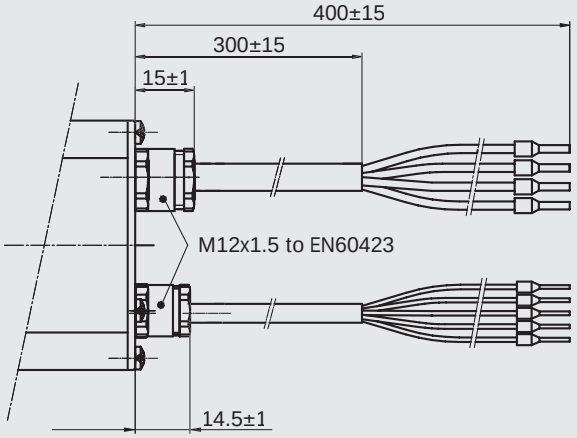
Intermediate circuit voltage	**U_{DC}**	**24 V**	**48 V**	**325 V**
Number of pole pairs	p	4	4	4
Rated power [1]	P_N	160 W	200 W	200 W
Rated torque [1]	M_N	0.37 Nm	0.44 Nm	0.44 Nm
Rated speed [1]	n_N	4250 rpm	4350 rpm	4400 rpm
Rated current [1]	I_N	9.2 A	5.54 A	0.8 A
Rated current [1]	$\hat{I}_N$	11.3 A	6.78 A	1.0 A
No load speed [2]	n_0	5800 rpm	5800 rpm	5850 rpm
No load current [2]	I_0	0.63 A	0.46 A	0.07 A
Permanent holding torque [1]	M_{d0}	0.58 Nm	0.58 Nm	0.58 Nm
Permanent holding current [1]	I_{d0}	11.9 A	7.29 A	1.2 A
Permanent holding current [1]	$\hat{I}_{d0}$	14.5 A	8.92 A	1.4 A
Max. torque [1]	M_{max}	1.40 Nm	1.40 Nm	1.40 Nm
Max. current [1]	I_{max}	36.5 A	18.3 A	2.7 A
Self-holding torque [2]	M_S	0.030 Nm	0.030 Nm	0.030 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.040 Nm/A	0.065 Nm/A	0.406 Nm/A
Generator voltage constant [2]	k_{Ett}	2.924 mV/rpm	5.848 mV/rpm	38.990 mV/rpm
Terminal resistance [2]	R_{tt}	0.11 Ω	0.28 Ω	9.85 Ω
Terminal inductance	L_{tt}	0.318 mH	1.272 mH	56.514 mH
Rotor moment of inertia	J	340 g cm^2	340 g cm^2	340 g cm^2
Thermal resistance (coil / surface)	R_{th1}	0.63 K/W	0.63 K/W	0.63 K/W
Ambient temperature	ϑ_F	-25°C ... 40°C	-25°C ... 40°C	-25°C ... 40°C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	1.4 kg	1.4 kg	1.4 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to DIN EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C

RECM 374/4



Characteristic curve RECM 374/4



Motor U	Orange	(OR)
Motor V	Black	(BK)
Motor W	White	(WH)
PE Earth	Yellow/Green	(GN/GY)

Pull-up resistors not integrated

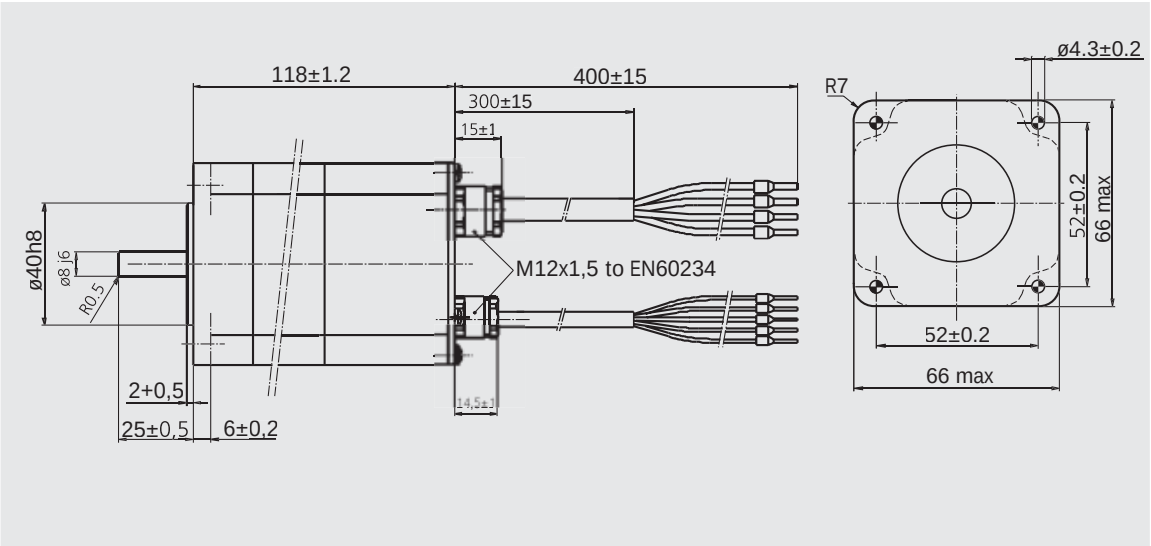
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Supply Vs 4V bis 24V	Red	(RD)
Supply Gnd	Blue	(BU)
Hall U	Orange	(OR)
Hall V	Black	(BK)
Hall W	White	(WH)

Connections RECM 374/4

Gearbox combinations

You will find gearbox combinations from page 41.

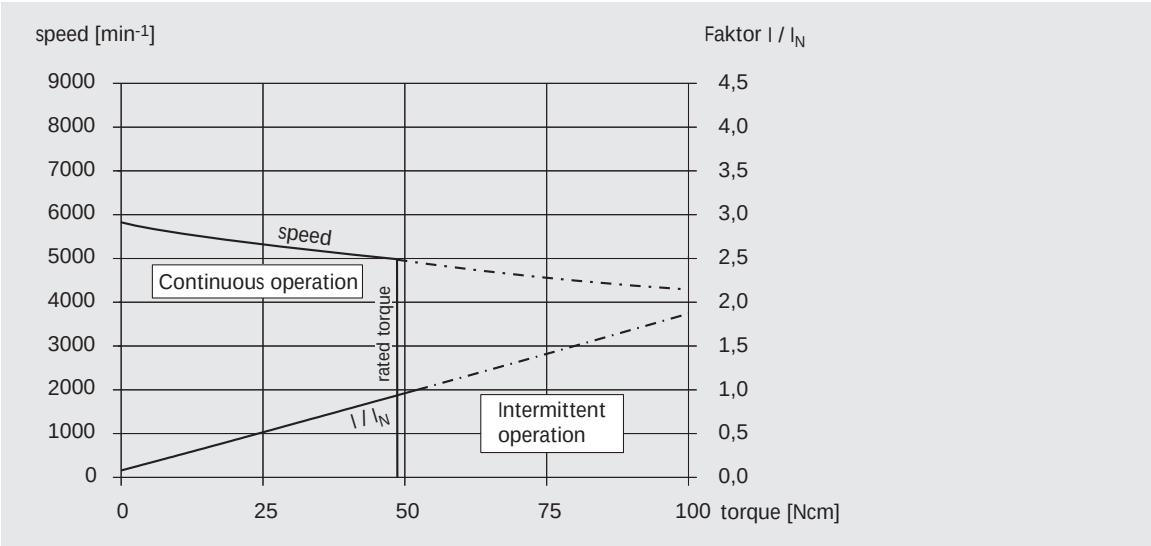


Scale drawing of the RECM 375/2

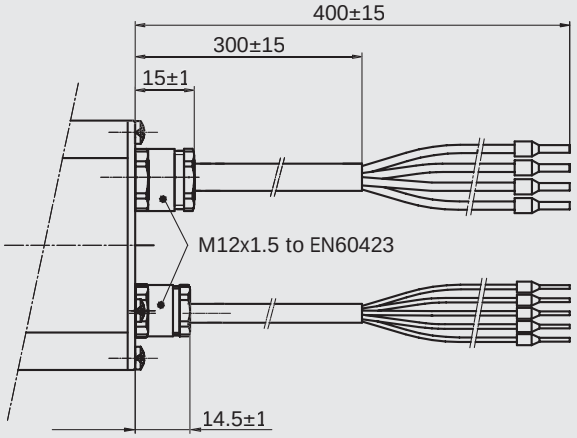
Technical Data

Intermediate circuit voltage	**U_{DC}**	**48 V**	**60 V**	**325 V**
Number of pole pairs	p	2	2	2
Rated power [1]	P_N	250 W	260 W	250 W
Rated torque [1]	M_N	0.48 Nm	0.48 Nm	0.48 Nm
Rated speed [1]	n_N	5000 rpm	5100 rpm	5000 rpm
Rated current [1]	I_N	6.37 A	5.4 A	0.9 A
Rated current [1]	$\hat{I}_N$	7.8 A	6.6 A	1.2 A
No load speed [2]	n_0	5900 rpm	6050 rpm	5900 rpm
No load current [2]	I_0	0.91 A	0.76 A	0.13 A
Permanent holding torque [1]	M_{d0}	0.81 Nm	0.81 Nm	0.81 Nm
Permanent holding current [1]	I_{d0}	10.51 A	9.0 A	1.7 A
Permanent holding current [1]	$\hat{I}_{d0}$	12.87 A	11.0 A	2.1 A
Max. torque [1]	M_{max}	2.10 Nm	2.10 Nm	2.10 Nm
Max. current [1]	I_{max}	28.2 A	23.2 A	4.2 A
Self-holding torque [2]	M_S	0.158 Nm	0.158 Nm	0.158 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.063 Nm/A	0.073 Nm/A	0.382 Nm/A
Generator voltage constant [2]	k_{Ett}	5.699 mV/rpm	6.938 mV/rpm	38.405 mV/rpm
Terminal resistance [2]	R_{tt}	0.22 Ω	0.31 Ω	7.33 Ω
Terminal inductance	L_{tt}	0.925 mH	1.371 mH	42.011 mH
Rotor moment of inertia	J	510 g cm^2	510 g cm^2	510 g cm^2
Thermal resistance (coil / surface)	R_{th1}	0.42 K/W	0.42 K/W	0.42 K/W
Ambient temperature	ϑ_F	-25°C ... 40°C	-25°C ... 40°C	-25°C ... 40°C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	1.7 kg	1.7 kg	1.7 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to DIN EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C



Characteristic curve RECM 375/2



Motor U	Orange	(OR)
Motor V	Black	(BK)
Motor W	White	(WH)
PE Earth	Yellow/Green	(GN/GY)

Pull-up resistors not integrated

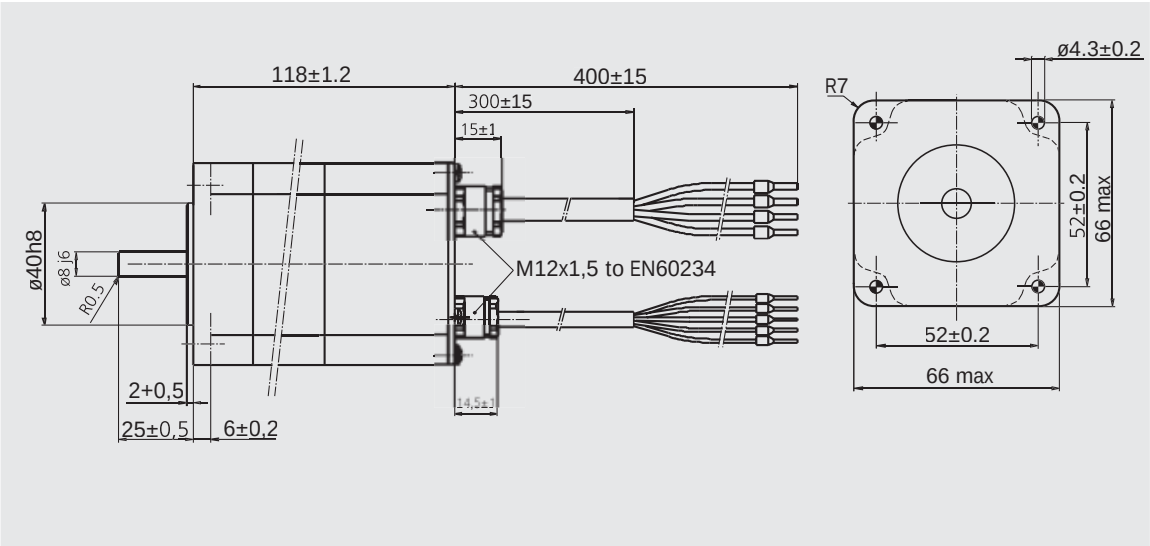
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Supply Vs 4V bis 24V	Red	(RD)
Supply Gnd	Blue	(BU)
Hall U	Orange	(OR)
Hall V	Black	(BK)
Hall W	White	(WH)

Connections RECM 375/2

Gearbox combinations

You will find gearbox combinations from page 41.



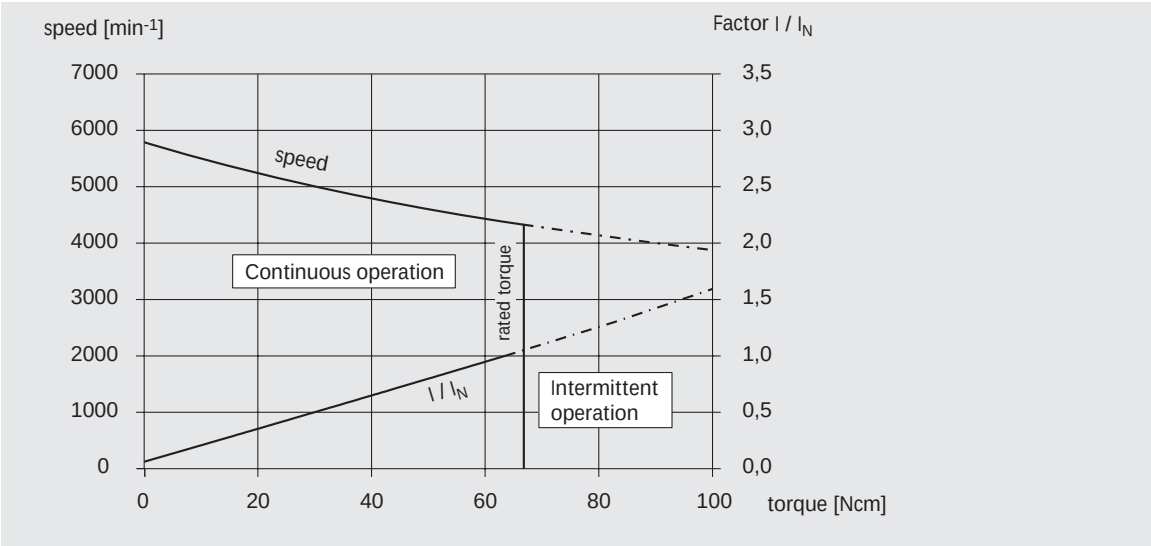
Scale drawing of the RECM 375/4

Technical data

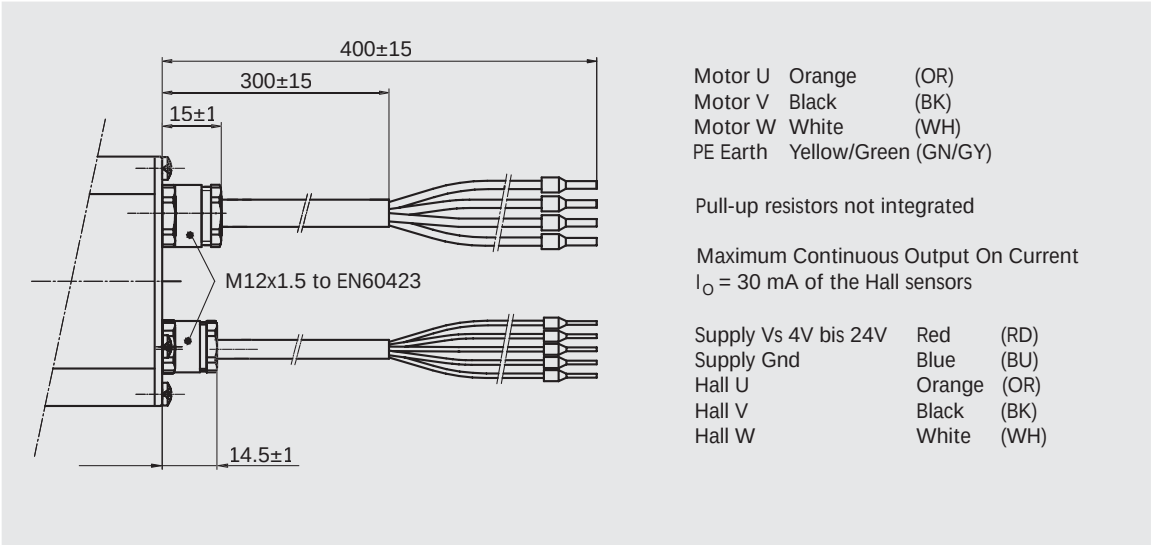
Intermediate circuit voltage	**U_{DC}**	**48 V**	**60 V**	**325 V**
Number of pole pairs	p	4	4	4
Rated power [1]	P_N	310 W	310 W	320 W
Rated torque [1]	M_N	0.68 Nm	0.68 Nm	0.68 Nm
Rated speed [1]	n_N	4350 rpm	4350 rpm	4500 rpm
Rated current [1]	I_N	8.42 A	6.7 A	1.3 A
Rated current [1]	$\hat{I}_N$	10.31 A	8.2 A	1.6 A
No load speed [2]	n_0	5850 rpm	5850 rpm	6050 rpm
No load current [2]	I_0	0.63 A	0.51 A	0.10 A
Permanent holding torque [1]	M_{d0}	0.88 Nm	0.88 Nm	0.88 Nm
Permanent holding current [1]	I_{d0}	11.10 A	9.1 A	1.9 A
Permanent holding current [1]	$\hat{I}_{d0}$	13.59 A	11.1 A	2.3 A
Max. torque [1]	M_{max}	2.10 Nm	2.10 Nm	2.10 Nm
Max. current [1]	I_{max}	27.4 A	21.9 A	4.2 A
Self-holding torque [2]	M_S	0.045 Nm	0.045 Nm	0.045 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.065 Nm/A	0.079 Nm/A	0.379 Nm/A
Generator voltage constant [2]	k_{Ett}	5.848 mV/rpm	7.311 mV/rpm	38.015 mV/rpm
Terminal resistance [2]	R_{tt}	0.18 Ω	0.25 Ω	5.52 Ω
Terminal inductance	L_{tt}	0.778 mH	1.215 mH	32.854 mH
Rotor moment of inertia	J	510 g cm^2	510 g cm^2	510 g cm^2
Thermal resistance (coil / surface)	R_{th1}	0.42 K/W	0.42 K/W	0.42 K/W
Ambient temperature	ϑ_F	-25°C ... 40°C	-25°C ... 40°C	-25°C ... 40°C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	1.7 kg	1.7 kg	1.7 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to DIN EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C

RECM 375/4



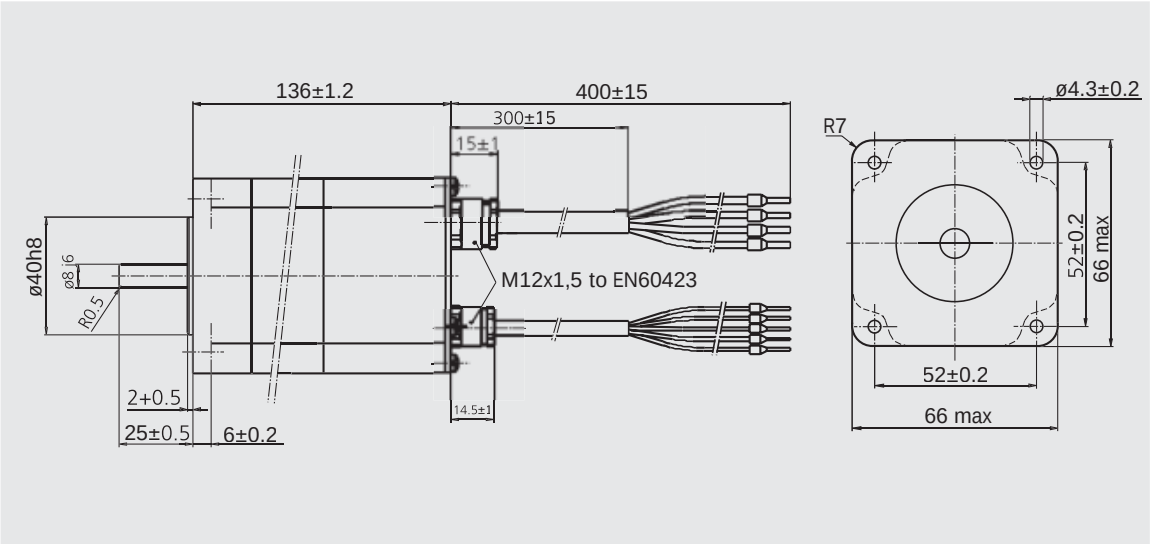
Characteristic curve RECM 375/4



Connections RECM 375/4

Gearbox combinations

You will find gearbox combinations from page 41.



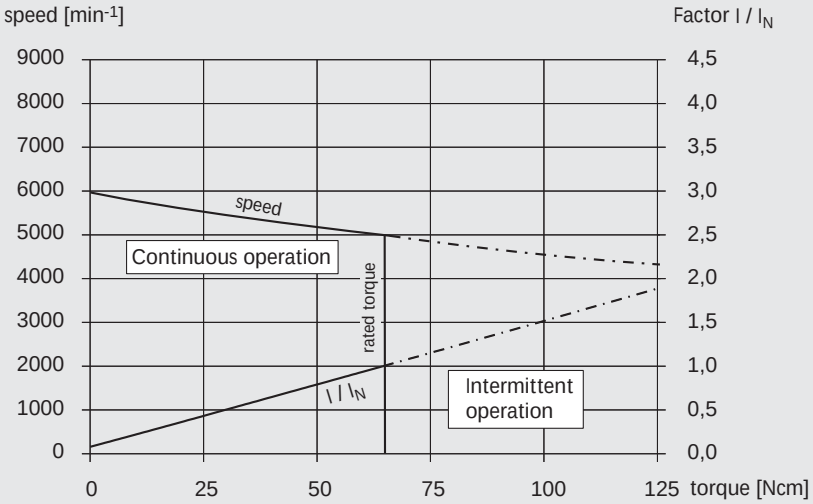
Scale drawing of the RECM 377/2

Technical Data

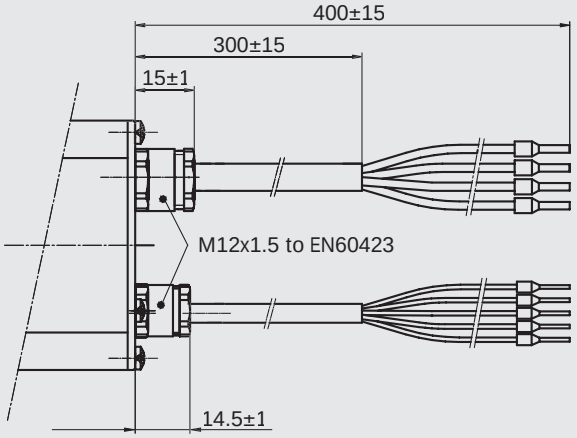
Intermediate circuit voltage	**U_{DC}**	**48 V**	**60 V**	**325 V**
Number of pole pairs	p	2	2	2
Rated power [1]	P_N	350 W	370 W	360 W
Rated torque [1]	M_N	0.67 Nm	0.67 Nm	0.67 Nm
Rated speed [1]	n_N	5000 rpm	5300 rpm	5200 rpm
Rated current [1]	I_N	8.91 A	8.0 A	1.4 A
Rated current [1]	$\hat{I}_N$	10.92 A	9.8 A	1.8 A
No load speed [2]	n_0	6000 rpm	6350 rpm	6250 rpm
No load current [2]	I_0	1.24 A	1.12 A	0.20 A
Permanent holding torque [1]	M_{d0}	1.08 Nm	1.08 Nm	1.08 Nm
Permanent holding current [1]	I_{d0}	14.33 A	13.0 A	2.5 A
Permanent holding current [1]	$\hat{I}_{d0}$	17.55 A	15.9 A	3.1 A
Max. torque [1]	M_{max}	2.80 Nm	2.80 Nm	2.80 Nm
Max. current [1]	I_{max}	38.2 A	32.4 A	5.9 A
Self-holding torque [2]	M_S	0.211 Nm	0.211 Nm	0.211 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.062 Nm/A	0.068 Nm/A	0.352 Nm/A
Generator voltage constant [2]	k_{Ett}	5.616 mV/rpm	6.607 mV/rpm	36.341 mV/rpm
Terminal resistance [2]	R_{tt}	0.16 Ω	0.21 Ω	5.08 Ω
Terminal inductance	L_{tt}	0.643 mH	0.891 mH	26.940 mH
Rotor moment of inertia	J	680 g cm^2	680 g cm^2	680 g cm^2
Thermal resistance (coil / surface)	R_{th1}	0.31 K/W	0.31 K/W	0.31 K/W
Ambient temperature	ϑ_F	-25°C ... 40°C	-25°C ... 40°C	-25°C... 40°C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	2.05 kg	2.05 kg	2.05 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to DIN EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C

RECM 377/2



Characteristic curve RECM 377/2



Motor U	Orange	(OR)
Motor V	Black	(BK)
Motor W	White	(WH)
PE Earth	Yellow/Green	(GN/GY)

Pull-up resistors not integrated

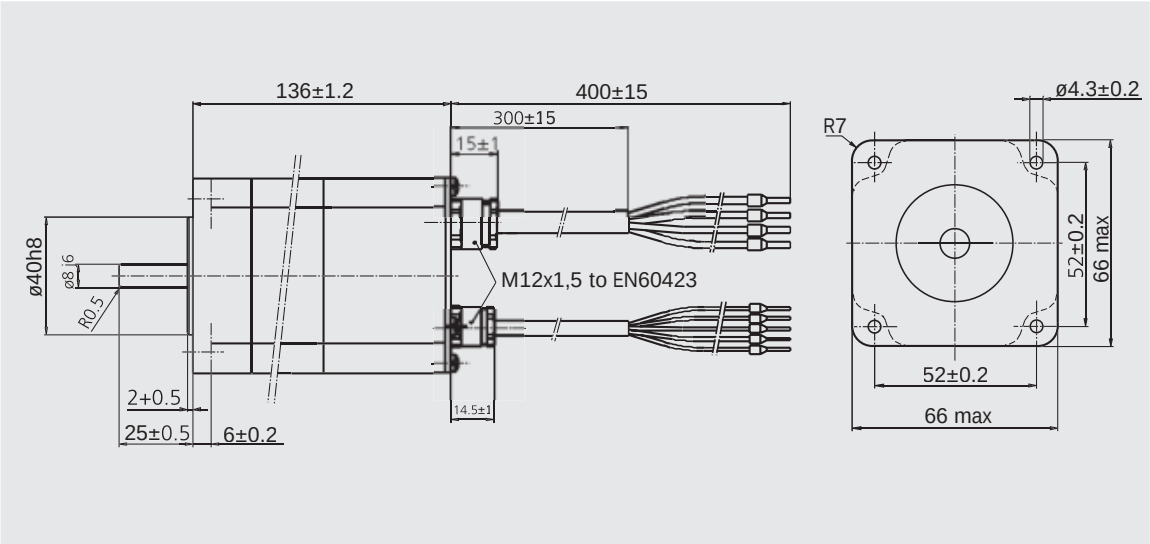
Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Supply Vs 4V bis 24V	Red	(RD)
Supply Gnd	Blue	(BU)
Hall U	Orange	(OR)
Hall V	Black	(BK)
Hall W	White	(WH)

Connections RECM 377/2

Gearbox combinations

You will find gearbox combinations from page 41.

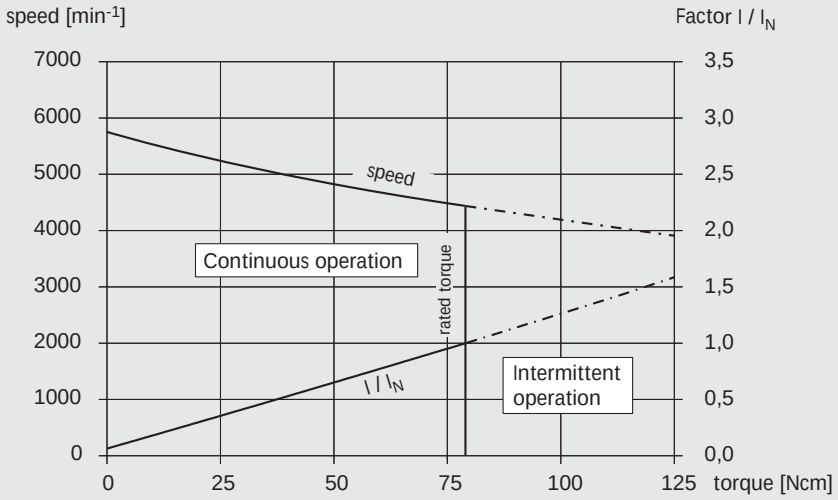


Scale drawing of the RECM 377/4

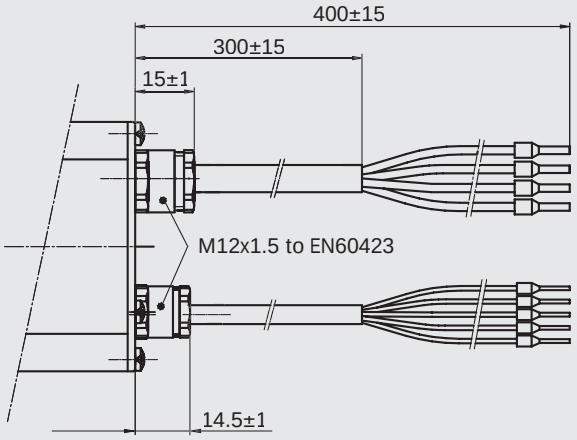
Technical Data

Intermediate circuit voltage	**U_{DC}**	**48 V**	**60 V**	**325 V**
Number of pole pairs	p	4	4	4
Rated power [1]	P_N	370 W	360 W	340 W
Rated torque [1]	M_N	0.80 Nm	0.80 Nm	0.80 Nm
Rated speed [1]	n_N	4450 rpm	4350 rpm	4100 rpm
Rated current [1]	I_N	9.94 A	7.7 A	1.3 A
Rated current [1]	$\hat{I}_N$	12.17 A	9.4 A	1.5 A
No load speed [2]	n_0	5850 rpm	5750 rpm	5400 rpm
No load current [2]	I_0	0.83 A	0.64 A	0.10 A
Permanent holding torque [1]	M_{d0}	1.09 Nm	1.09 Nm	1.09 Nm
Permanent holding current [1]	I_{d0}	13.69 A	11.0 A	2.0 A
Permanent holding current [1]	$\hat{I}_{d0}$	16.76 A	13.5 A	2.4 A
Max. torque [1]	M_{max}	2.80 Nm	2.80 Nm	2.80 Nm
Max. current [1]	I_{max}	36.5 A	28.8 A	5.0 A
Self-holding torque [2]	M_S	0.060 Nm	0.060 Nm	0.060 Nm
Torque constant (Md0 / îd0) [2]	k_M	0.065 Nm/A	0.081 Nm/A	0.453 Nm/A
Generator voltage constant [2]	k_{Ett}	5.848 mV/rpm	7.408 mV/rpm	42.888 mV/rpm
Terminal resistance [2]	R_{tt}	0.15 Ω	0.21 Ω	5.08 Ω
Terminal inductance	L_{tt}	0.577 mH	0.894 mH	29.949 mH
Rotor moment of inertia	J	680 g cm^2	680 g cm^2	680 g cm^2
Thermal resistance (coil / surface)	R_{th1}	0.31 K/W	0.31 K/W	0.31 K/W
Ambient temperature	ϑ_F	-25°C ... 40°C	-25°C ... 40°C	-25°C ... 40°C
Max. permitted radial stress	F_q	80 N	80 N	80 N
Max. permitted axial stress	F_a	30 N	30 N	30 N
Mass	m	2.05 kg	2.05 kg	2.05 kg
Protection grade to DIN EN 60529		IP 41	IP 41	IP 41
Insulation to DIN EIN 60034-1		F	F	F
Utilization acc. to insulating material class to DIN EN 60334-1		B	B	B

1 Temperature acc. to insulating class
2 at 25° C



Characteristic curve RECM 377/4



Motor U	Orange	(OR)
Motor V	Black	(BK)
Motor W	White	(WH)
PE Earth	Yellow/Green	(GN/GY)

Pull-up resistors not integrated

Maximum Continuous Output On Current
I_O = 30 mA of the Hall sensors

Supply Vs 4V bis 24V	Red	(RD)
Supply Gnd	Blue	(BU)
Hall U	Orange	(OR)
Hall V	Black	(BK)
Hall W	White	(WH)

Connections RECM 377/4

Gearbox combinations

You will find gearbox combinations from page 41.

EC Motors

External drive electronics BL-SCx

The power electronics of the BL-SCx series are specially adapted to the EC motor models RECM 34x and 37x from Berger Lahr. They permit a simple speed control using the Hall sensors of the EC motors. The top level BL-SC-11-50-A, featuring a maximum power output of 550 Watt, is capable of covering all basic types of the RECM models. Individually adapted variations are available for motor constructions made to order.

The power electronics are protected from overvoltage, overheating, and short circuits of the motor lines. The input voltage range is 24 to 48 V.

The connection means by terminal stripes for direct device or control cabinet mounting are standard. Variable mounting possibilities by means of fixing clips.

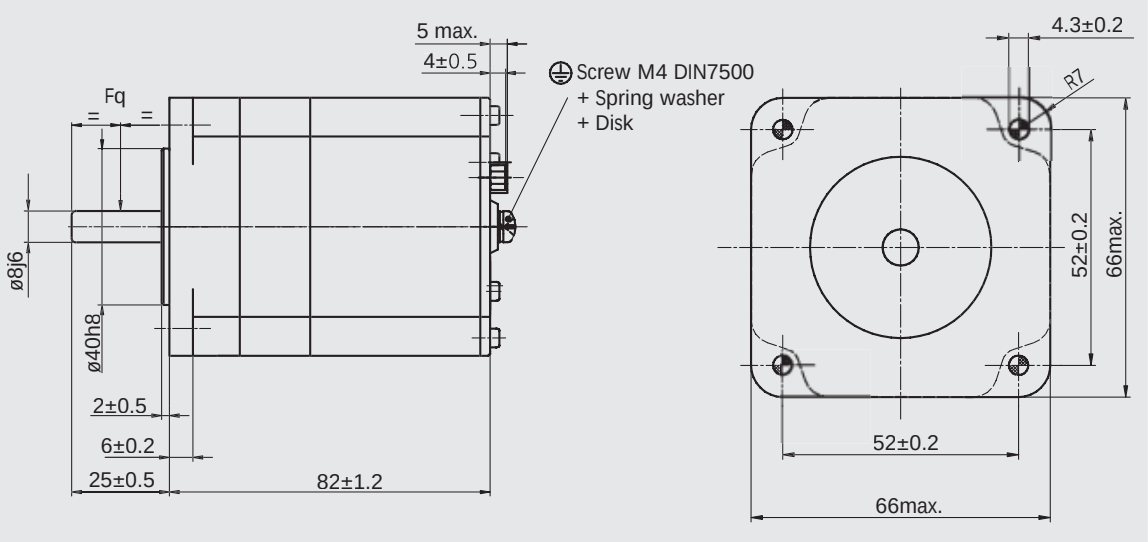
Technical Data BL-SCx

Electrical Data	**Operating voltage**	**24...48 V**
	Pulse current (temporary)	22 A
	Continuous current	11 A
	PWM frequency	20 kHz
	Efficiency	95 %
Inputs	Speed setpoint	-10 ... +10 V
	Max. current	0 ... 10 V
	Control amplifier	0 ... 10 V
	Release	0 V (low-active)
Outputs	Speed monitor	12 pulses/rotation (in combination with 4-pole-paired motor)
	Monitoring output	LED
	Auxiliary voltage / Hall sensors	12 V; 30 mA
Display	2-colour LED	Green: Ready / Red: Error
Mass	With connection terminals	500 g
Size	Length x width x height	110 x 105 x 44 mm
Temperature	Operation	0 ... +40 °C
	Bearings	-40 ... +80 °C
Humidity	Not condensing	20 % ... 80 % rel. humidity

EC Motors

EC Motors

RECM 372/4 with integrated electronics



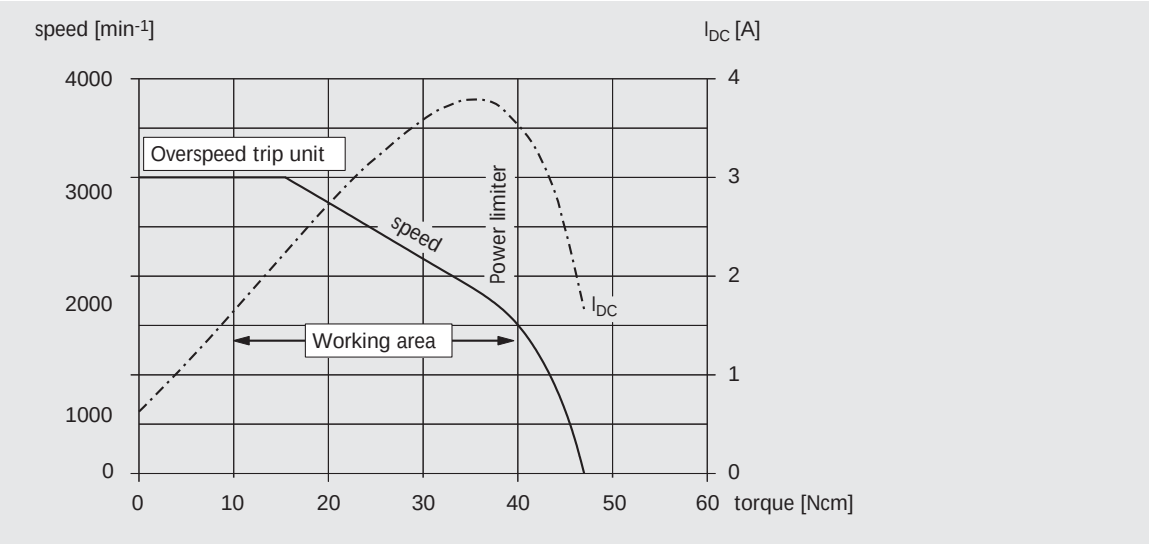
Scale drawing of the RECM 372/4 with integrated electronics

Technical Data

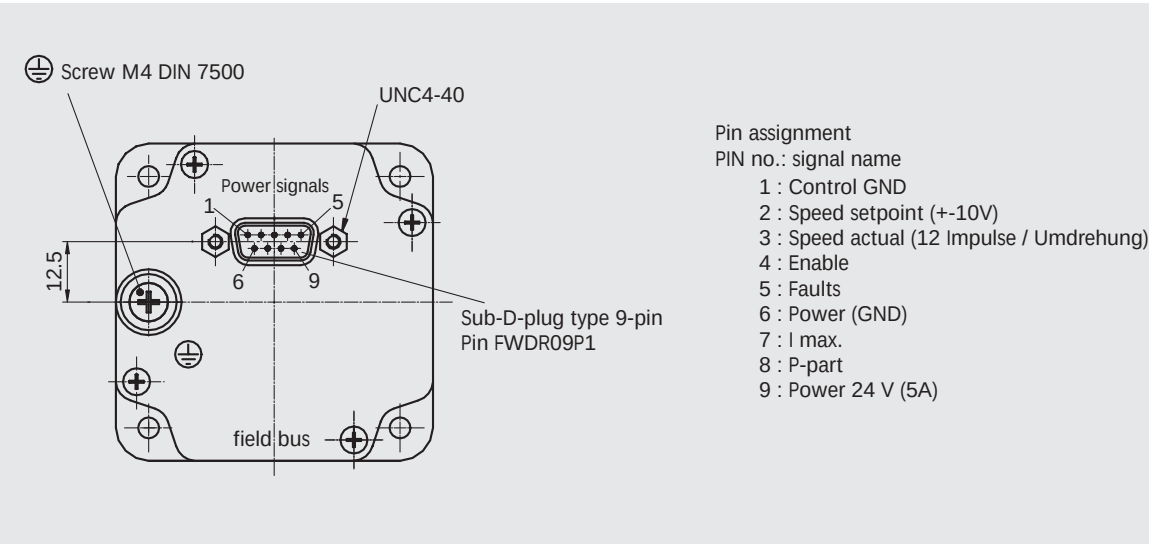
	Rated Voltage[1] **24 V**
Number of Pole Pairs	4
Rated speed	2000 rpm
Rated torque	35 Ncm
Rated current	4 A
Rated power	70 W
No load speed	3000 rpm
No load current	0.33 A
Starting torque	50 Ncm
Rotor moment of inertia	170 gcm^2
Thermal resistance between winding and housing	1.25 K/W
Max. permitted ambient temperature	40 °C
Max. permitted radial stress	80 N
Max. permitted axial stress	30 N
Mass	1.05 kg
Sense of rotation	Reversible
Bearings of driven shaft	Ball bearings
Protection grade	IP 40 to DIN EN 60529 IP 54 on request
Insulation class	B to DIN EN 60034-1
Dielectric strength	Test voltage to DIN EN 60034-1

1 Further voltage dimensioning available on request

RECM 372/4 with integrated electronics



Characteristic curve RECM 372/4 with integrated electronics

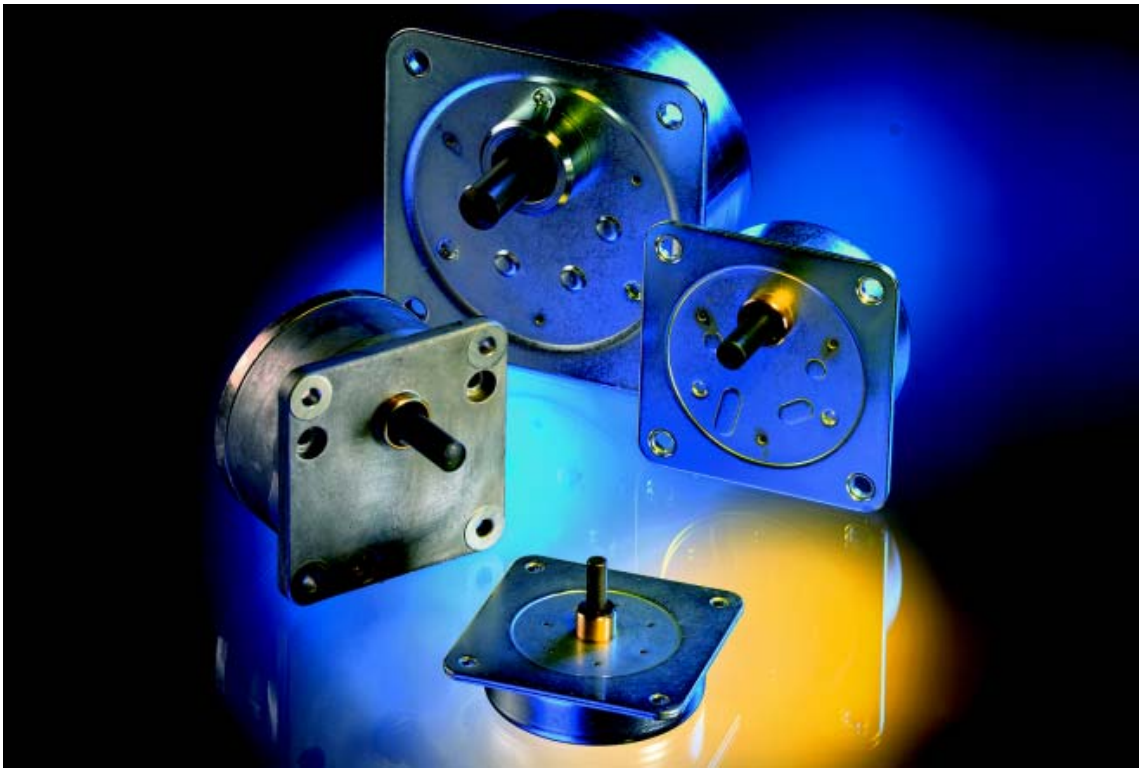


Connections (Analogue inputs/outputs)

Gearbox combinations

You will find gearbox combinations from page 41.

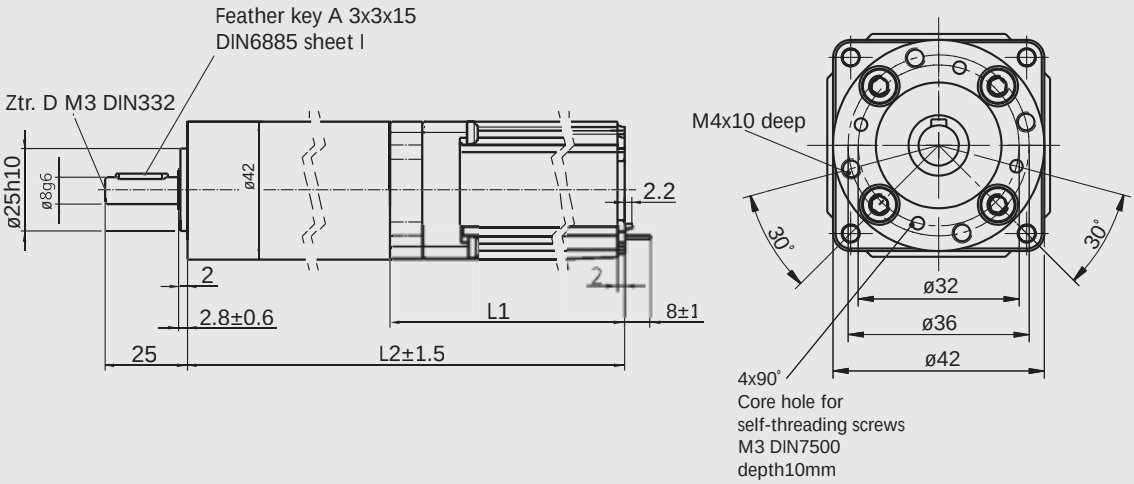
EC Motors
Overview geared motors



Motor/ Gearbox combinations electrical commutated motors

Motor type	Gearbox type				
	P42	PK42	HL	P62	PLE60
343/3	✓	✓			
343/4	✓	✓			
345/3	✓	✓			
345/4	✓	✓			
372/2			✓	✓	✓
372/4			✓	✓	✓
374/2			✓	✓	✓
374/4			✓	✓	✓
375/2			✓	✓	✓
375/4			✓	✓	✓
377/2			✓	✓	✓
377/4			✓	✓	✓

RECM 34x with planetary gearbox P42



Dimensions for combinations with RECM 343/x and 345/x

Motor type	Length L with 1-stage transmission	Length L with 2-stage transmission	Length L with 3-stage transmission
RECM 343/x	109.2 mm	122.2 mm	135.2 mm
RECM 345/x	134.2 mm	147.2 mm	160.2 mm

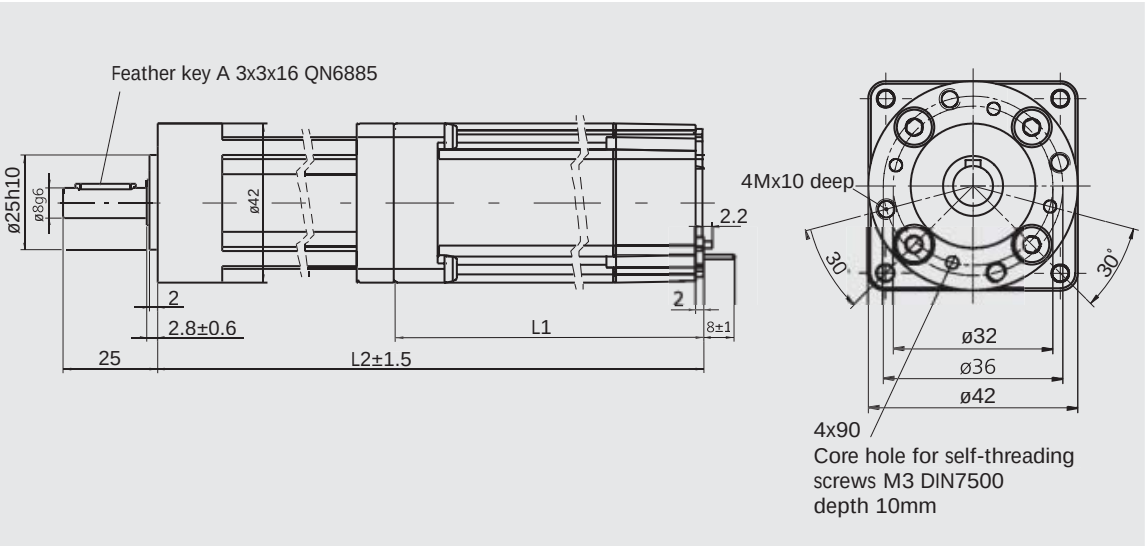
Technical Data gearbox type P42

	Values
Housing and Teeth	Steel
Bearings	Ball bearings
Driven Shaft	With feather key DIN 6885
Seal at shaft exit	Shaft sealing ring IP54
Recommended number of revolutions	3000 rpm
Operating temperature	- 30 °C to + 140 °C
Duration of life	Depending on the load profile 2500h on average

Number of steps	Transmission ratio i	Max. duration torque [N]	Efficiency [%]	Permitted radial stress [N]	Permitted axial stress [N]
1	7	300	80	160	50
2	25	750	75	230	80
2	46	750	75	230	80
3	93	1500	70	300	110
3	169	1500	70	300	110
3	308	1500	70	300	110

EC Motors

RECM 34x with planetary gearbox Pk42



Dimensions for combinations with RECM 343/x and 345/x

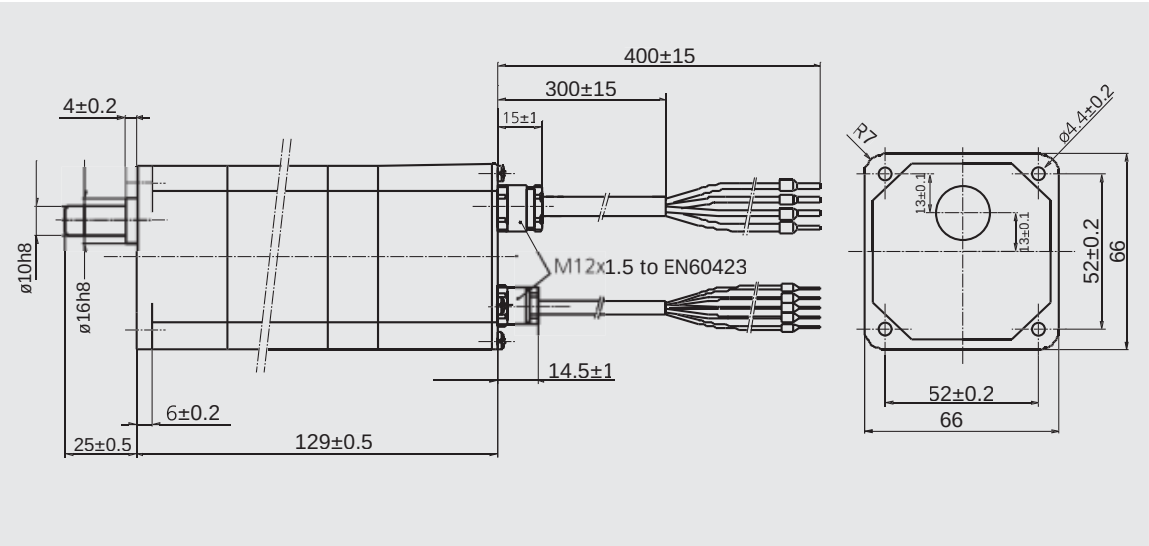
Motor type	Length L with 1-stage transmission	Length L with 2-stage transmission	Length L with 3-stage transmission
RECM 343/x	109.2 mm	122.2 mm	135.2 mm
RECM 345/x	134.2 mm	147.2 mm	160.2 mm

Technical Data gearbox type Pk42

	Values
Housing and teeth	Plastic
Bearings	Ball bearings
Driven shaft	With feather key DIN 6885
Seal at shaft exit	Shaft sealing ring IP54
Recommended number of revolutions	3000 rpm
Operating temperature	- 15 °C to + 65 °C
Duration of life	Depending on the load profile 2500h on the average

Number of steps	Transmission ratio i	Max. duration torque [Ncm]	Efficiency [%]	Permitted radial stress [N]	Permitted axial stress [N]
1	7	80	75	15	5
2	25	200	70	30	10
2	46	200	70	30	10
3	93	400	65	45	15
3	169	400	65	450	15
3	308	400	65	450	15

RECM 37x with spurwheel gearbox HL



Dimensions for combinations with RECM 372/x and 374/x

Motor type	Length L
RECM 372/x	130 mm
RECM 374/x	130 mm

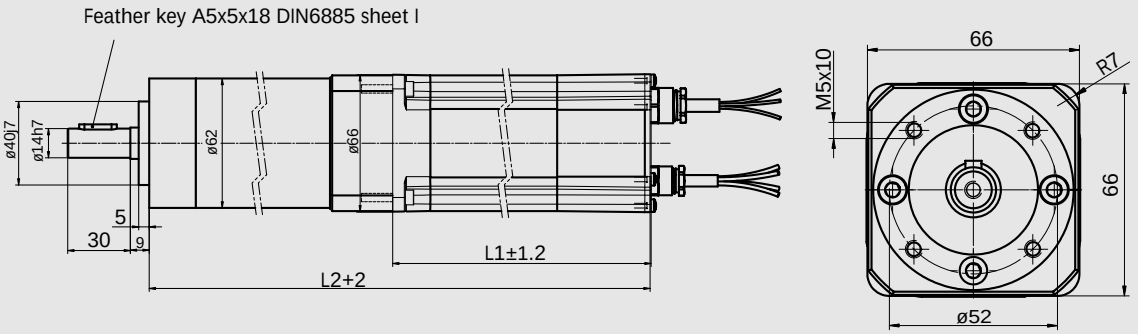
Technical Data gearbox type HL

	Values
Housing and teeth	Steel
Driven shaft	Hardened smooth with feather key DIN 6885
Bearings	Roller bearing
Seal at shaft exit	Shaft sealing ring IP54
Recommended number of revolutions	2500 rpm
Max. backlash	< 1° (<1.5° at i=7)
Operating temperature	- 15 °C to + 65 °C
Duration of life	Depending on the load profile 2500h on average

Number of steps	Transmission ratio i	Max. duration torque [Ncm]	Efficiency [%]	Permitted radial stress [N]	Sense of rotation	Permitted axial stress [N]	Max. overload moment [Nm]
2	7	250	85	200	R	10	3
3	18	350	80	200	L	10	4.75
3	38	600	80	200	L	10	9
4	54	600	75	200	R	10	9
4	115	800	75	200	R	10	12

EC Motors

RECM 37x with planetary gearbox P62



Gear data

Gear motor	L1 motor			
	RECM 372	RECM374	RECM375	RECM377
L2 1-step	173	191	209	227
L2 2-step	189	207	225	243
L2 3-step	205	223	241	259

Dimensions for combinations with RECM 37x

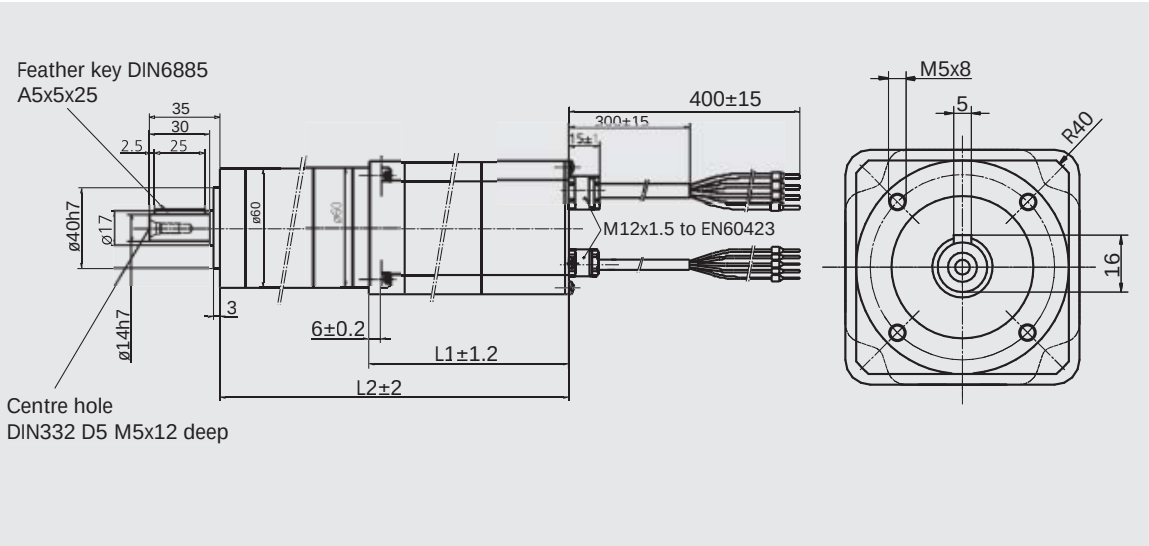
Motor type	Length L with 1-stage transmission	Length L with 2-stage transmission	Length L with 3-stage transmission
RECM 372/x	153	169	185
RECM 374/x	171	187	203
RECM 375/x	189	205	221
RECM 377/x	207	223	239

Technical Data gearbox type P62

	Values
Housing and teeth	Steel
Bearings	Roller bearing
Driven shaft	With feather key DIN 6885
Seal at shaft exit	Shaft sealing ring
Max. backlash	1° (1-stage), 1.5° (2-stage), 2.0° (3-stage)
Recommended number of revolutions	3000 rpm
Operating temperature	- 15 °C to + 65 °C
Duration of life	Depending on the load profile 3500h on the average

Number of steps	Transmission ratio i	Max. duration torque [Ncm]	Efficiency [%]	Permitted radial stress [N]	Permitted axial stress [N]
1	7	800	80	240	50
2	16	2500	75	360	70
2	25	2500	75	360	70
3	93	5000	70	520	120
3	115	5000	70	520	120
3	308	5000	70	520	120

RECM 37x with planetary gearbox PLE60



Dimensions for combinations with RECM 37x

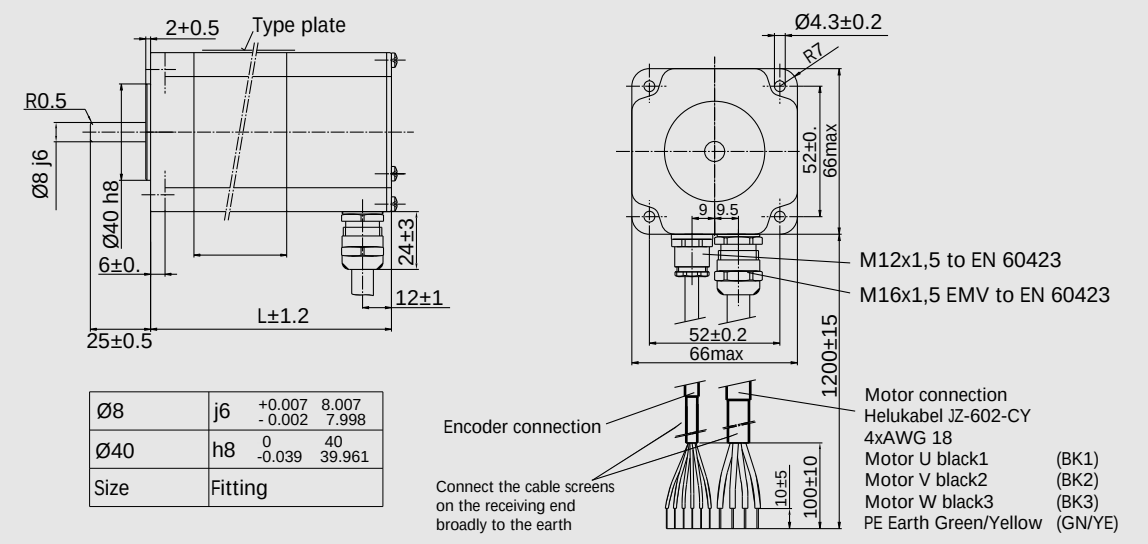
Motor type	Length L with 2-stage transmission	Length L with 3-stage transmission
RECM 372/x	168	181
RECM 374/x	186	199
RECM 375/x	204	217
RECM 377/x	222	235

Technical Data gearbox type PLE60

	Values
Housing and teeth	Steel
Bearings	Roller bearing
Driven Shaft	With feather key DIN 6885
Seal at shaft exit	Shaft sealing ring IP54
Max. backlash	0.58° (2-stage); 0.67° (3-stage)
Recommended number of revolutions	3000 rpm
Operating temperature	- 25 °C to +120 °C
Duration of life	Depending on the load profile 10000h on average

Number of steps	Transmission ratio i	Max. duration torque [Ncm]	Efficiency [%]	Permitted radial stress [N]	Permitted axial stress [N]
2	16	4400	94	500	600
2	40	4400	94	500	600
3	60	4000	90	500	600
3	120	4000	90	500	600

EC Motors
RECM 37x with Encoder



Ø8	j6	+0.007 - 0.002	8.007 7.998
Ø40	h8	0 -0.039	40 39.961
Size	Fitting		

Encoder

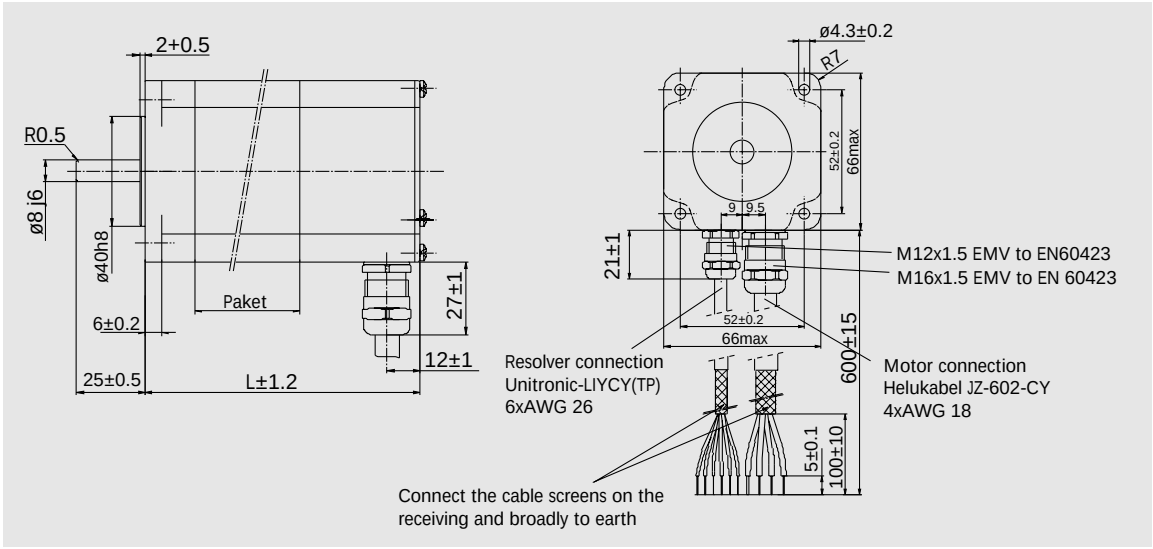
The RECM 37x motors can be optionally delivered with a digital encoder. The digital encoder is an optical incremental rotator with the following features:

- Encoder integrated in the motor
- Second shaft end available on request.
- Pulses/rev. 1000; 1024
- with 4- or 8-pole commutating signals

Technical Data

	Values
Output signals	5V Open Collector or RS 422
Operating temperature	-40° C to +120° C
Max. speed	12000 rpm

RECM 37x with Resolver



Resolver

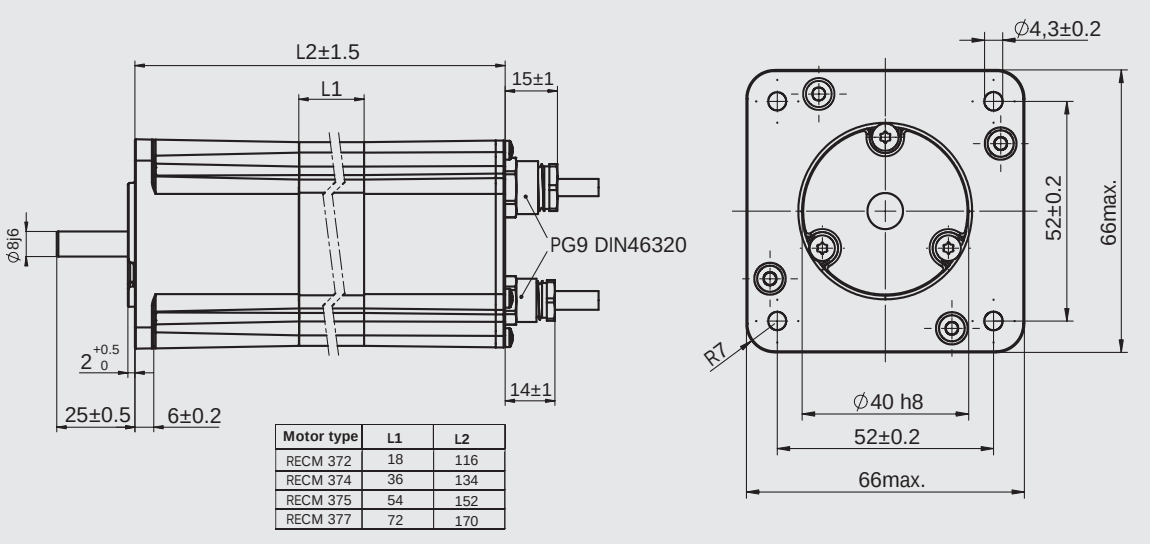
The RECM 37x motors can be optionally delivered with an analogue resolver. The analogue resolver is a magnetic rotary encoder with the following features:

- Resolver integrated in the motor
- Second shaft end available on request.
- Number of pole pairs p=1

Technical Data

	Values
Output signals	Sinus/Cosinus
Operating temperature	-55° C to +155° C
Max. speed	20000 rpm
Absolute accuracy	10'

EC Motors
RECM 37x with holding brake



Motor type	L1	L2
RECM 372	18	116
RECM 374	36	134
RECM 375	54	152
RECM 377	72	170

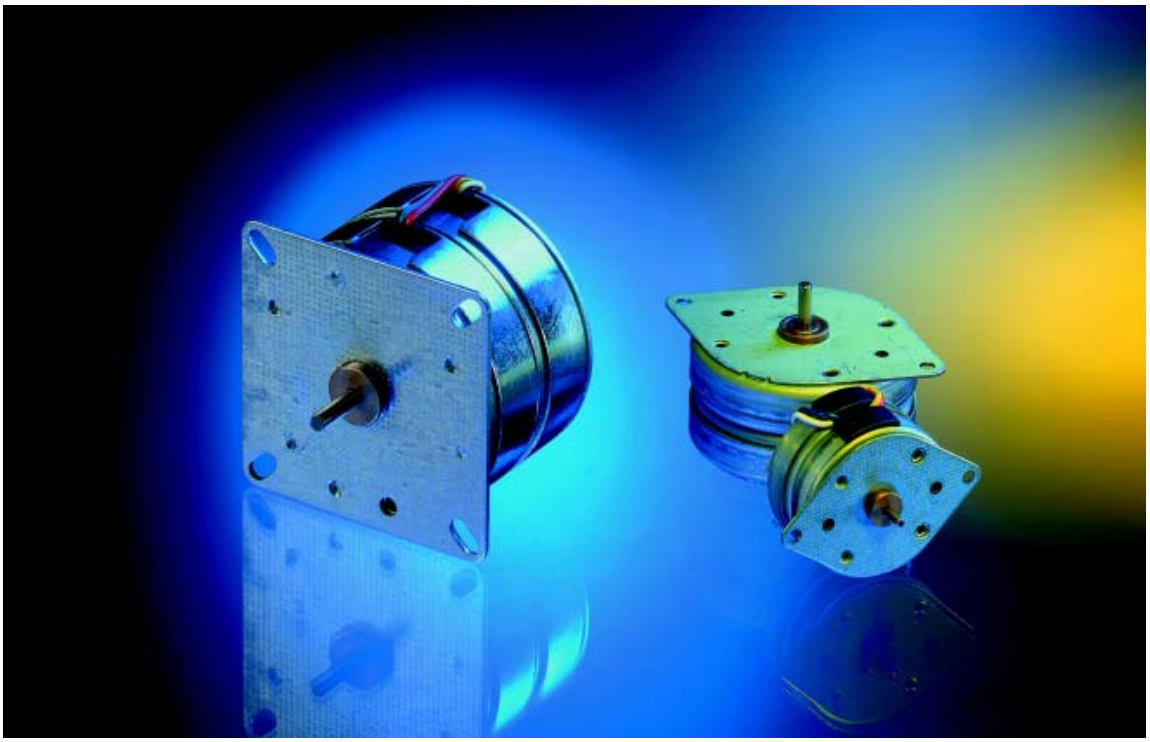
Holding brake

The RECM 37x motors can be optionally delivered with a holding brake. The holding brake is an electromagnetic spring-pressure brake for locking the motor.

Features:
- Brake integrated in the motor
- Locks the motor at stand-still (no service brake)
- Contributes to the overall safety after the motor current is switched off, for example after an emergency off (power on = open, power off = closed).

Technical Data

	Values
Rated currency	24 V
Rated power	7.5 W
Ambient temperature	-5 °C to +120 °C
Holding torque	1.1 Nm
Max. speed	10000 rpm
Mass	0.23 kg



2-phase stepping motors

With the stepping motors from Berger Lahr, positioning problems can be solved in a precise, simple and cost-effective manner. Berger Lahr provides hybrid stepping motors and claw-pole stepping motors. These stepping motors are being used in their millions around the world and have proved their worth.

On request we will be happy to tell you of more motor/gearbox options besides those presented here.

Overview of 2-phase stepping motors

	Step angle [°]	Max. torque bipolar [Ncm]	Max. torque unipolar [Ncm]	Described on...
RDM 36/6	15	1.24	0.75	Page 53
RDM 36/8	11.25	1.27	0.7	Page 55
RDM 36/10	9	1.18	0.73	Page 57
RDM 36/12	7.5	1.18	0.6	Page 59
RDM 42/12	7.5	4.1	3.1	Page 61
RDM 51/6	15	5.5	3.1	Page 63
RDM 51/8	11.25	6.8	4.1	Page 65
RDM 51/12	7.5	6.9	4.9	Page 67
RDM 63/10	9	22.5	12.5	Page 69
RDM 63/12	7.5	25.5	15	Page 71

2-phase stepping motors

Type code for 2-phase stepping motors

Example	**RDM 36/10 G A2 62 mA - L 25:1**
Product family RDM= Reversible Digital Motor (2-Phase)	**RDM** 36/10 G A2 62mA - L 25:1
Motor size (diameter) Example 36 = 36 mm diameter 42 = 42 mm diameter 51 = 51 mm diameter 63 = 63 mm diameter	RDM **36**/10 G A2 62mA - L 25:1
Number of pole pairs 6= number of polepairs p = 6 8= number of polepairs p = 8 10 = number of polepairs p = 10 12= number of polepairs p = 12	RDM 36/**10** G A2 62mA - L 25:1
Bearings G = Plain bearing	RDM 36/10 **G** A2 62mA - L 25:1
Switching / winding A1 = bipolar A2 = unipolar	RDM 36/10 G **A2** 62mA - L 25:1
Max. current per winding Example: 62mA = 0.62 A	RDM 36/10 G A2 **62mA** - L 25:1
Gearbox type Gearbox type L Gearbox type T Gearbox type G Gearbox type P	RDM 36/10 G A2 62mA - **L** 25:1
Gearbox reduction Example 25 :1	RDM 36/10 G A2 62mA - L **25:1**

General technical information

Bearing designs

The claw-pole stepping motors, RDM 36/x, 42/x, 51/x and 63/x are fitted with plain bearings.

Temperatures

The permissible ambient temperature for the synchronous motors lies in the range from - 20°C to + 60°C.

In locations with poor heat dissipation, e.g. in closed plastic housings, a check should be made to see if the permissible winding temperature is being exceeded.

Type of connection

Claw-pole stepping motors are available with flying leeds. The flying leads are hard-wired, bared, tin-plated and 200 mm in length.

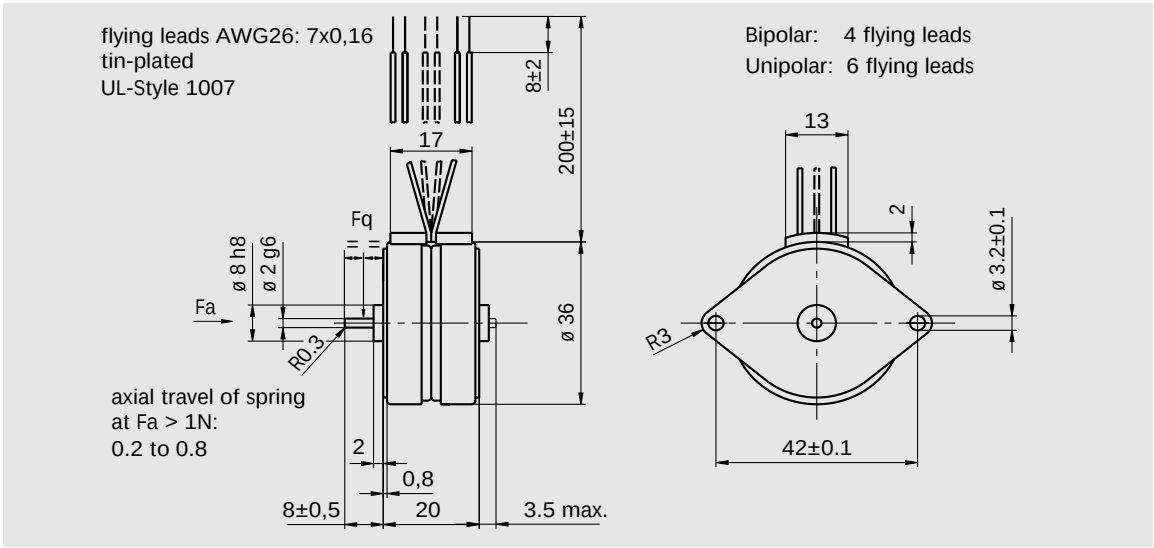
Switching characteristics of the bipolar design

The distinctive characteristic of a bipolar arrangement is that each motor phase consists of one winding (coil). This means that the whole volume of copper on the coil contributes to the formation of torque.

Switching characteristics of the unipolar design

In a unipolar arrangement, each motor phase (coil) consists of two winding halves. In operation only one winding ever carries current at one time. The switching power required in the amplifier is 50% less than for the bipolar arrangement. This means that motor controls can be realised more cost effectively.

2-phase stepping motors
RDM 36/6



Scale drawing RDM 36/6

Technical data

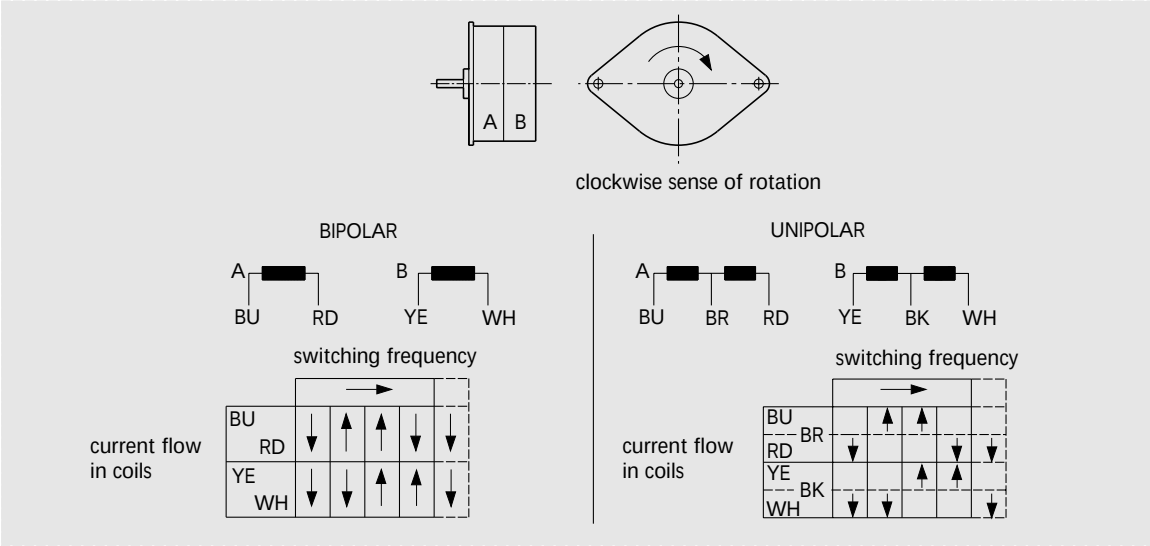
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	24	24
Step angle	15°	15°
Step angle tolerance	± 4%	± 4%
Max. torque	1.24 Ncm	0.75 Ncm
Holding torque (excited)	1.9 Ncm	1.4 Ncm
Rotor moment of inertia	2 gcm^2	2 gcm^2
Max. current per winding	0.23 A	0.115 A
Resistance per winding	26 Ω	105 Ω
Permitted shaft load	Axial stress F_a = 1 N, radial stress F_q = 3 N	
Weight approx.	0.075 kg	0.075 kg
Protection grade	IP 41	IP 41
Insulation class	E to VDE 0530	E to VDE 0530
Insulation class	Momentary test: test voltage to VDE 0530	

Gearbox combinations

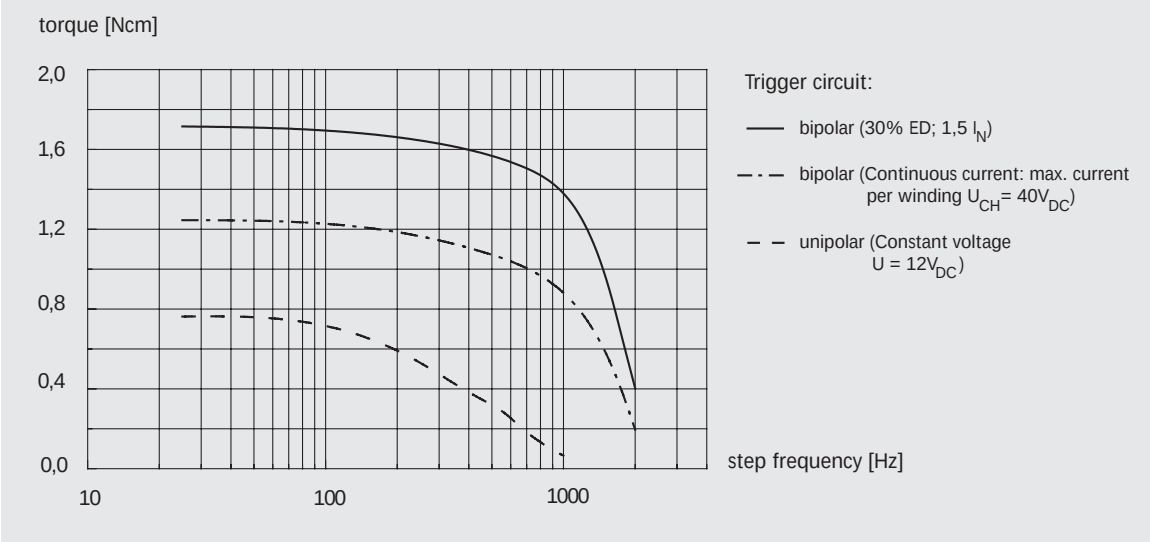
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 36/6

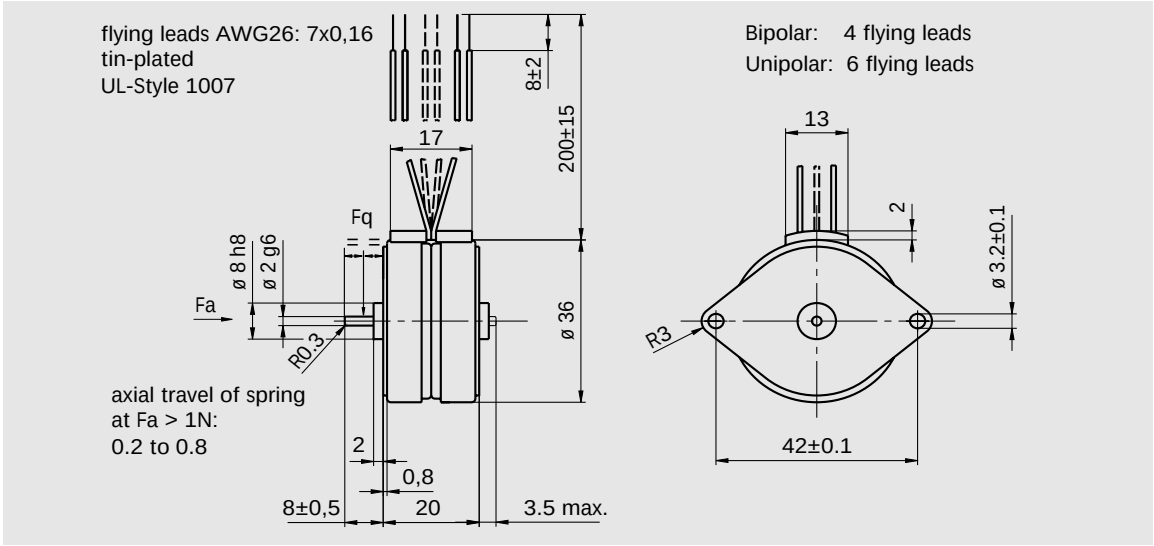


Connections RDM 36/6



Characteristic curve RDM 36/6

2-phase stepping motors
RDM 36/8



Scale drawing RDM 36/8

Technical Data

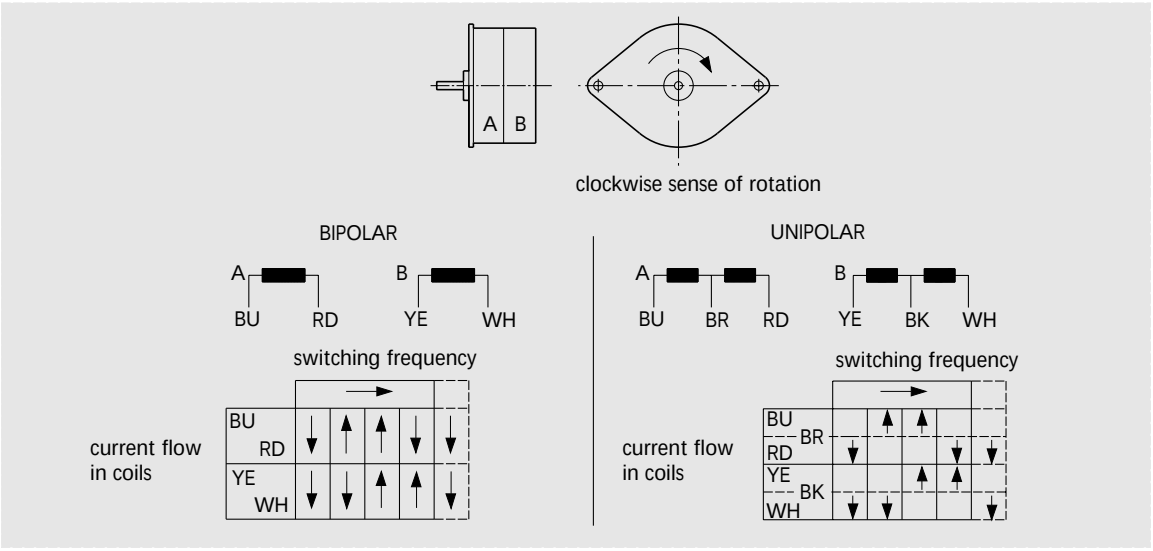
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	32	32
Step angle	11.25°	11.25°
Step angle tolerance	± 4%	± 4%
Max. torque	1.27 Ncm	0.7 Ncm
Holding torque (excited)	1.6 Ncm	1.1 Ncm
Rotor moment of inertia	2 gcm^2	2 gcm^2
Max. current per winding	0.23 A	0.115 A
Resistance per winding	26 Ω	105 Ω
Permitted shaft load	Axial stress F_a = 1 N, radial $stress_q$ = 3 N	
Weight approx.	0.075 kg	0.075 kg
Protection grade	IP 41	IP 41
Insulation class	E to DIN EN 60034-1	E
Insulation class	Dielectric strength	

Gearbox combinations

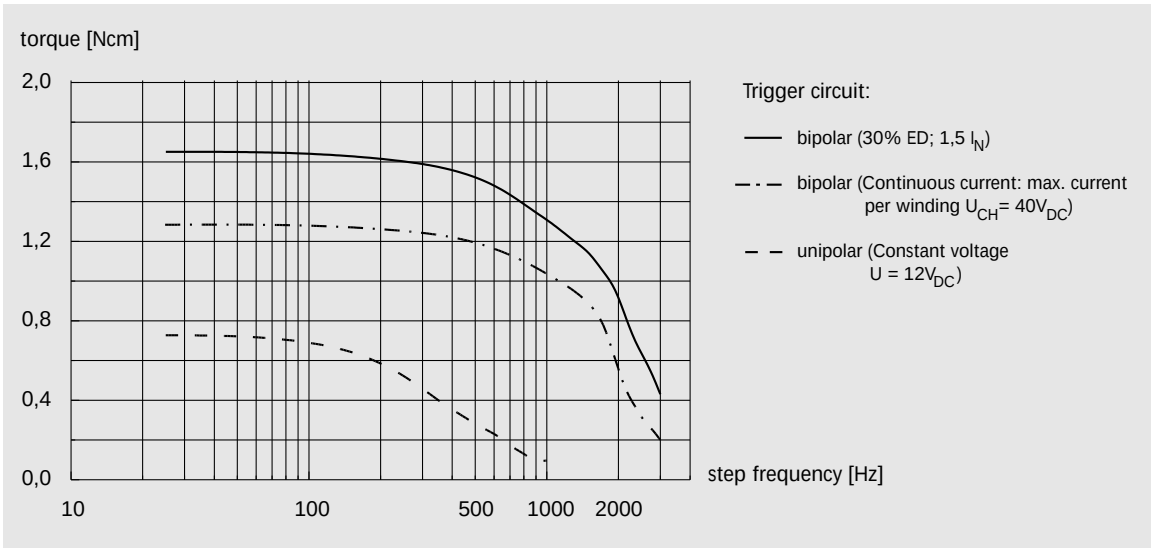
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 36/8

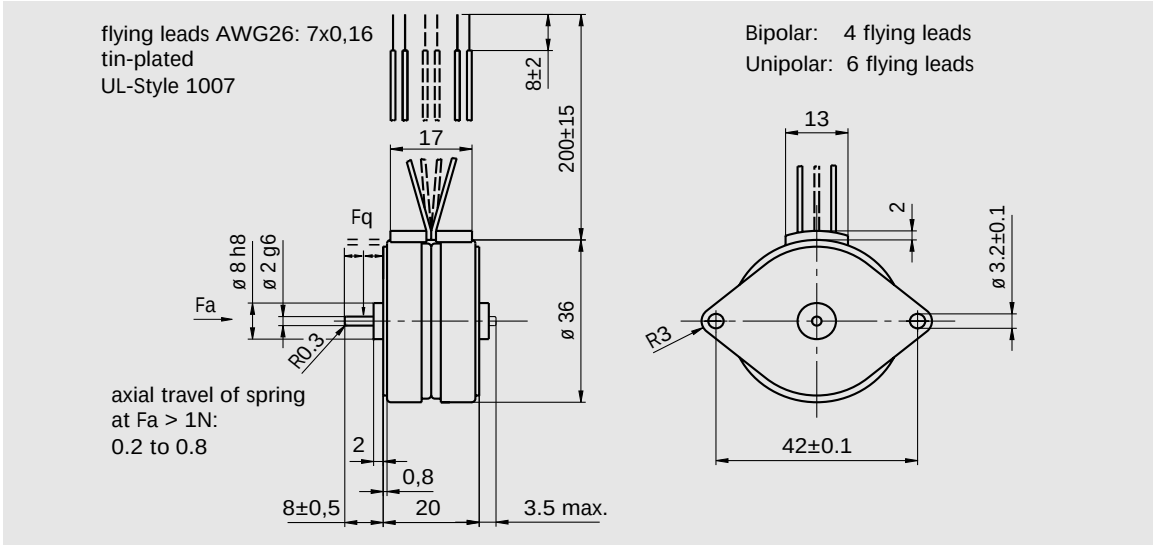


Connections RDM 36/8



Characteristic curve RDM 36/8

2-phase stepping motors
RDM 36/10



Scale drawing RDM 36/10

Technical Data

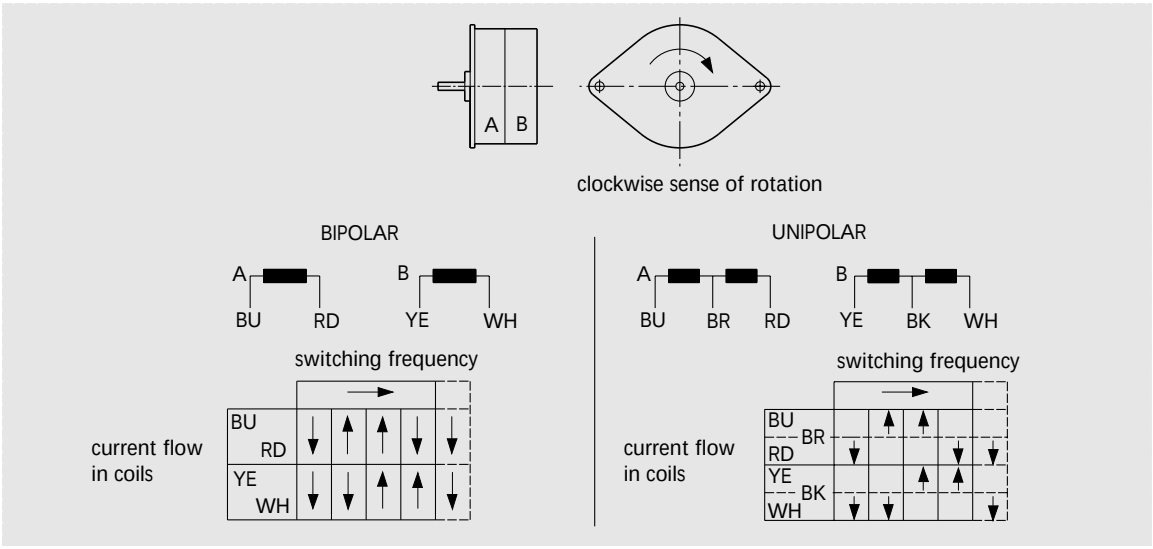
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	40	40
Step angle	9°	9°
Step angle tolerance	± 5%	± 6%
Max. torque	1.18 Ncm	0.73 Ncm
Holding torque (excited)	1.6 Ncm	1.0 Ncm
Rotor moment of inertia	2 gcm^2	2 gcm^2
Max. current per winding	0.23 A	0.115 A
Resistance per winding	26 Ω	105 Ω
Permitted shaft load	Axial stress F_a = 1 N, radial stress F_q = 3 N	
Weight approx.	0.075 kg	0.075 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

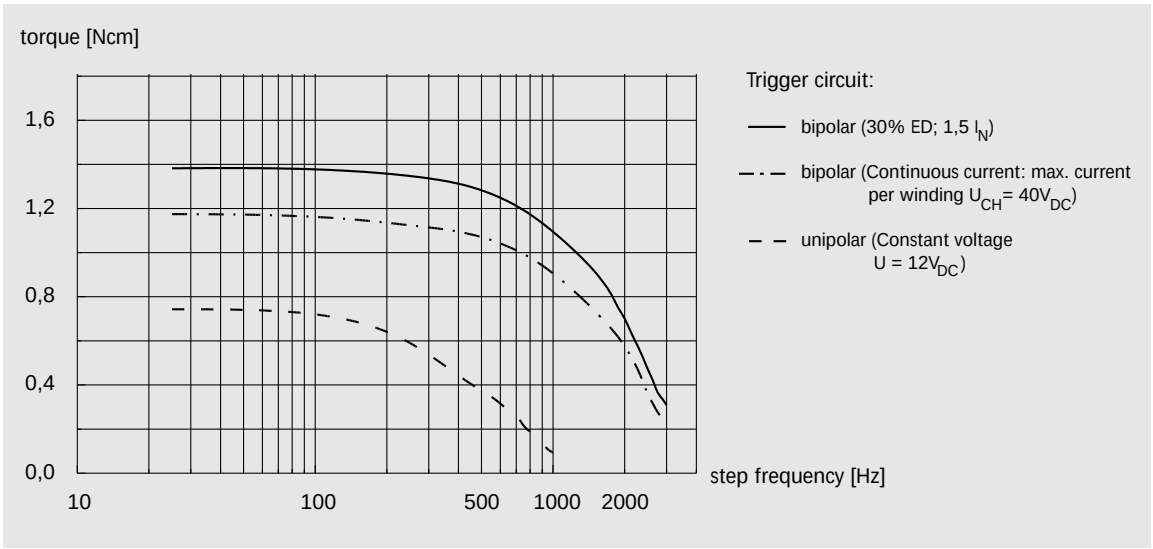
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 36/10

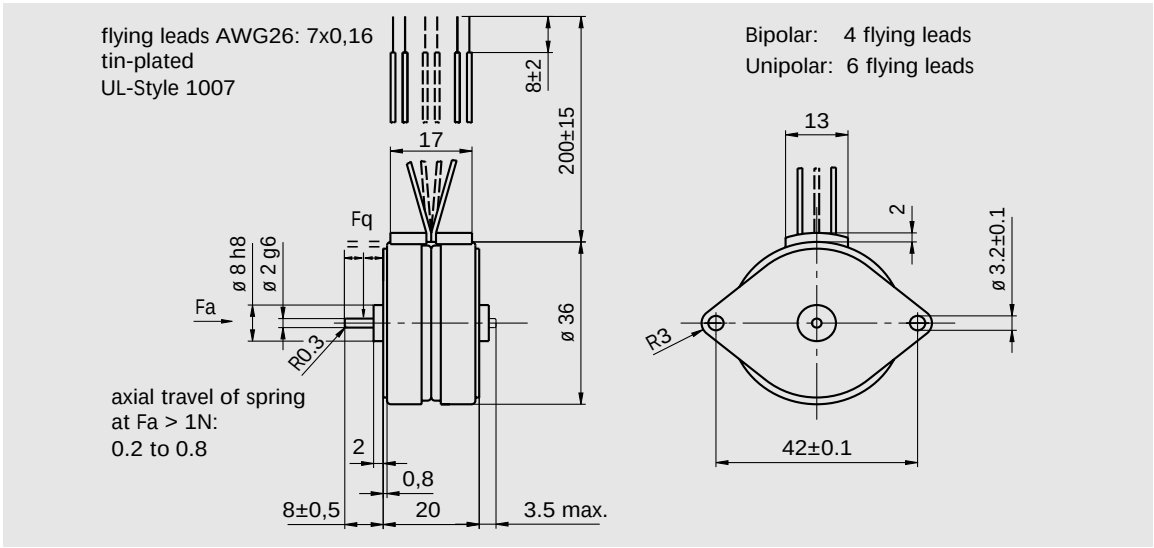


Connections RDM 36/10



Characteristic curve RDM 36/10

2-phase stepping motors
RDM 36/12



Scale drawing RDM 36/12

Technical Data

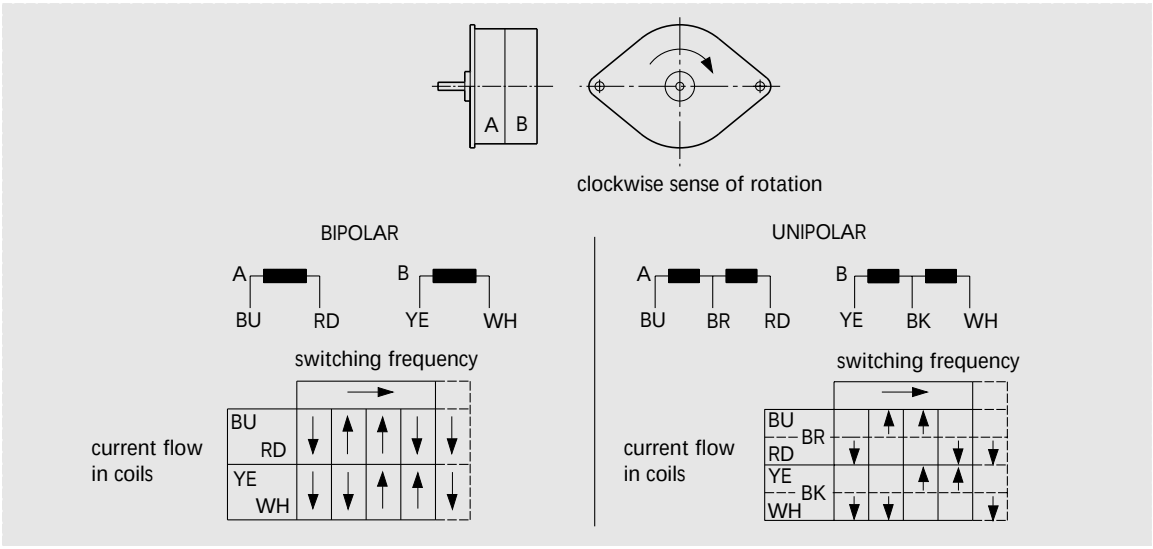
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	48	48
Step angle	7.5°	7.5°
Step angle tolerance	± 5%	± 6%
Max. torque	1.18 Ncm	0.6 Ncm
Holding torque (excited)	1.6 Ncm	0.9 Ncm
Rotor moment of inertia	2 gcm^2	2 gcm^2
Max. current per winding	0.23 A	0.115 A
Resistance per winding	26 Ω	105 Ω
Permitted shaft load	Axial stress F_a = 1 N, radial stress F_q = 3 N	
Weight approx.	0.075 kg	0.075 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

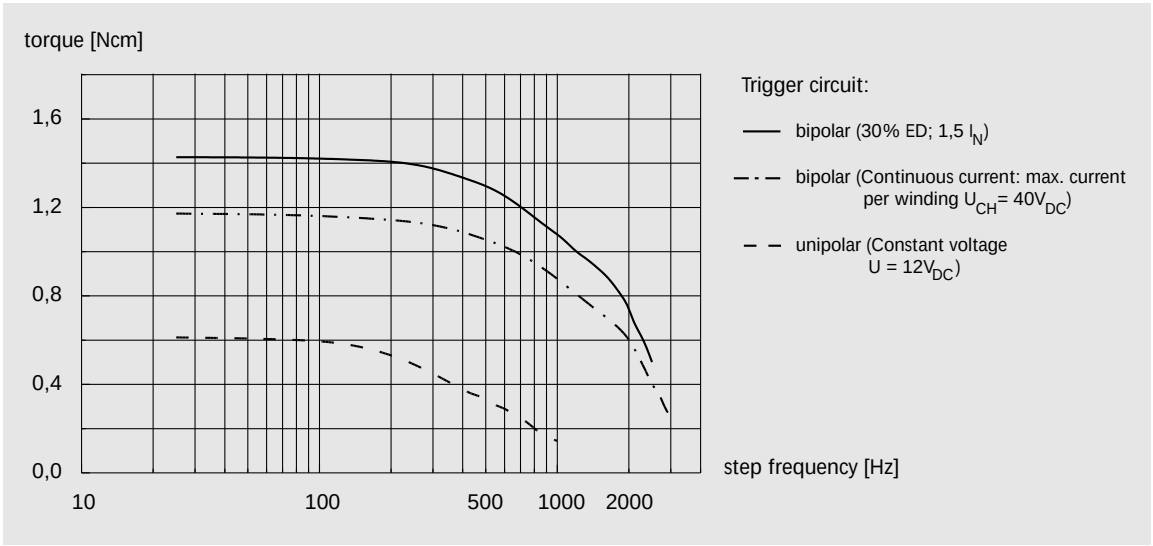
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 36/12

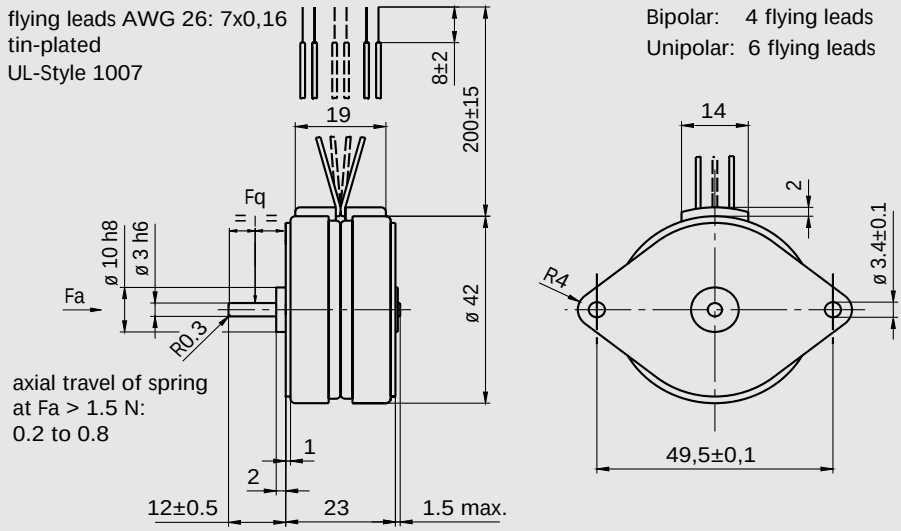


Connections RDM 36/12



Characteristic curve RDM 36/12

2-phase stepping motors
RDM 42/12



Scale drawing RDM 42/12

Technical Data

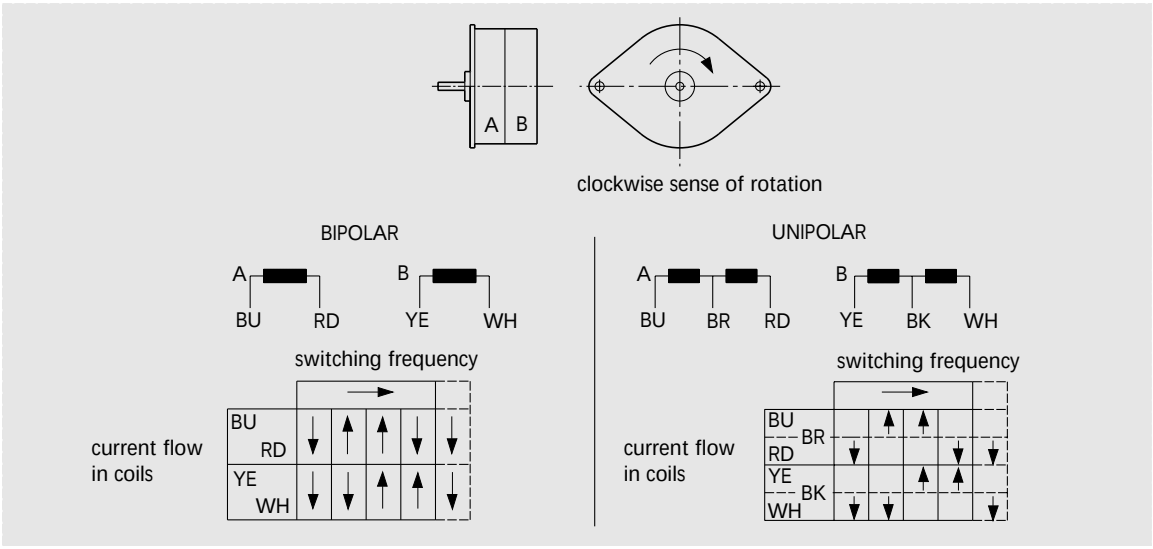
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	48	48
Step angle	7.5°	7.5°
Step angle tolerance	± 4 %	± 5 %
Max. torque	4.1 Ncm	3.1 Ncm
Holding torque (excited)	5.3 Ncm	3.9 Ncm
Rotor moment of inertia	7.2 gcm^2	7.2 gcm^2
Max. current per winding	0.335 A	0.165 A
Resistance per winding	18 Ω	72 Ω
Permitted shaft load	Axial stress F_a = 1.5 N, radial stress F_q = 5 N	
Weight approx.	0.143 kg	0.143 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

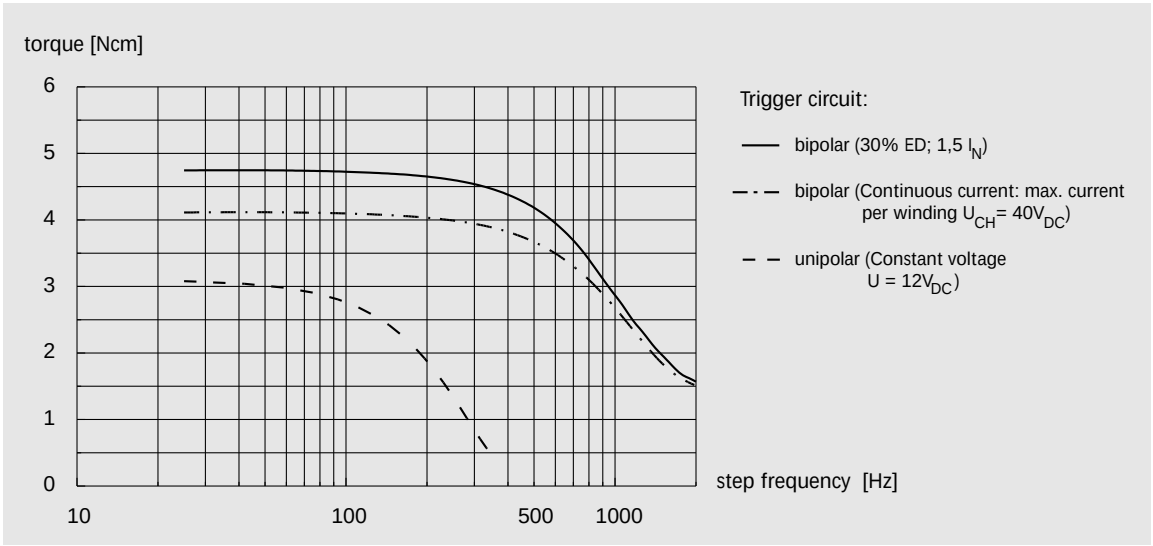
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 42/12

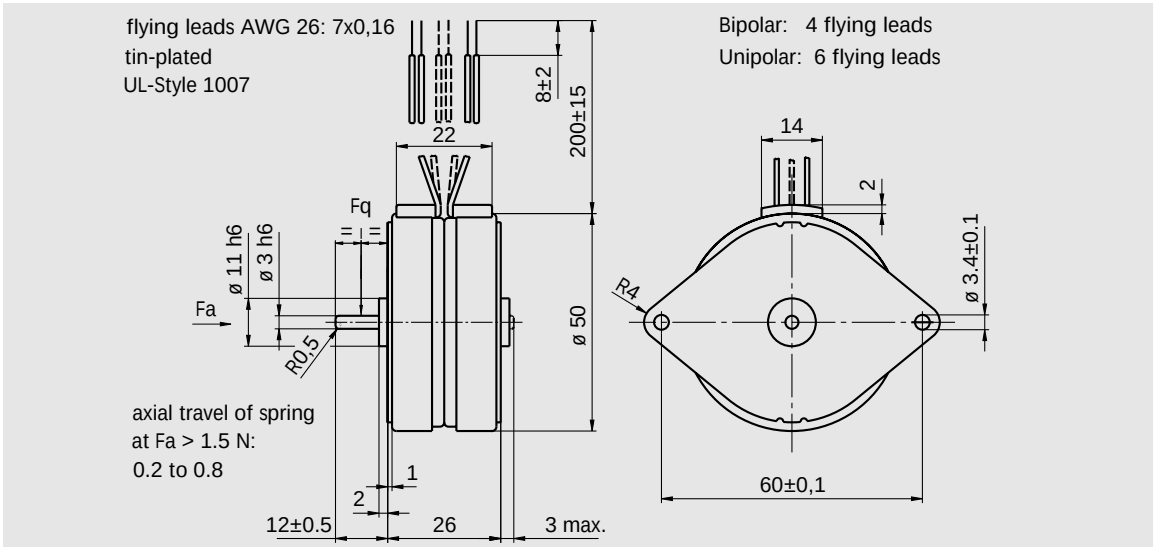


Connections RDM 42/12



Characteristic curve RDM 42/12

2-phase stepping motors
RDM 51/6



Scale drawing RDM 51/6

Technical Data

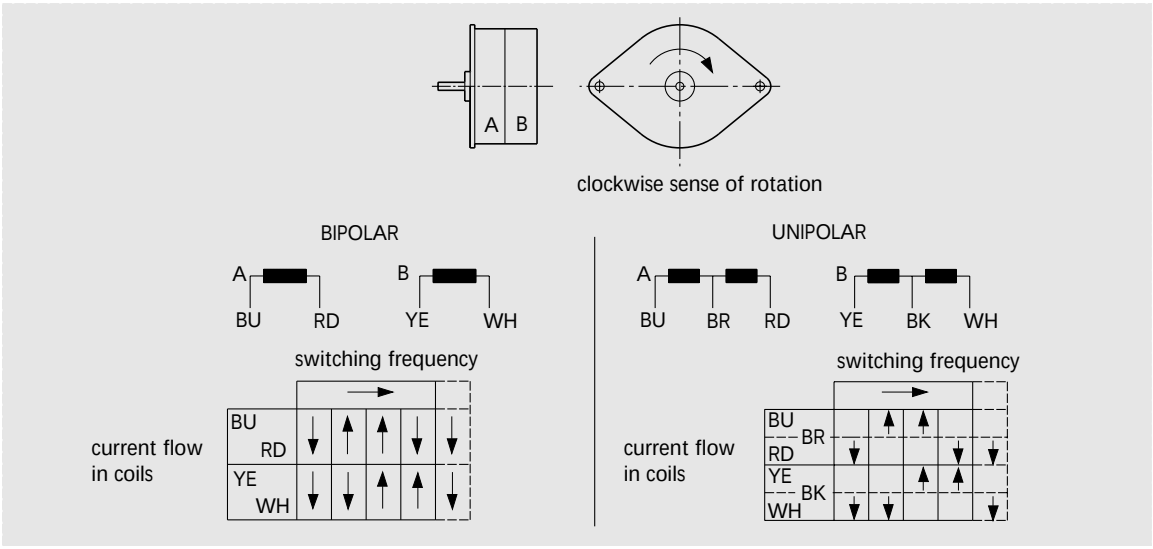
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	24	24
Step angle	15°	15°
Step angle tolerance	± 3%	± 4%
Max. torque	5.5 Ncm	3.1 Ncm
Holding torque (excited)	7.2 Ncm	5 Ncm
Rotor moment of inertia	17 gcm^2	17 gcm^2
Max. current per winding	0.4 A	0.2 A
Resistance per winding	15 Ω	60 Ω
Permitted shaft load	Axial stress F_a = 2 N, radial stress F_q = 5 N	
Weight approx.	0.2 kg	0.2 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

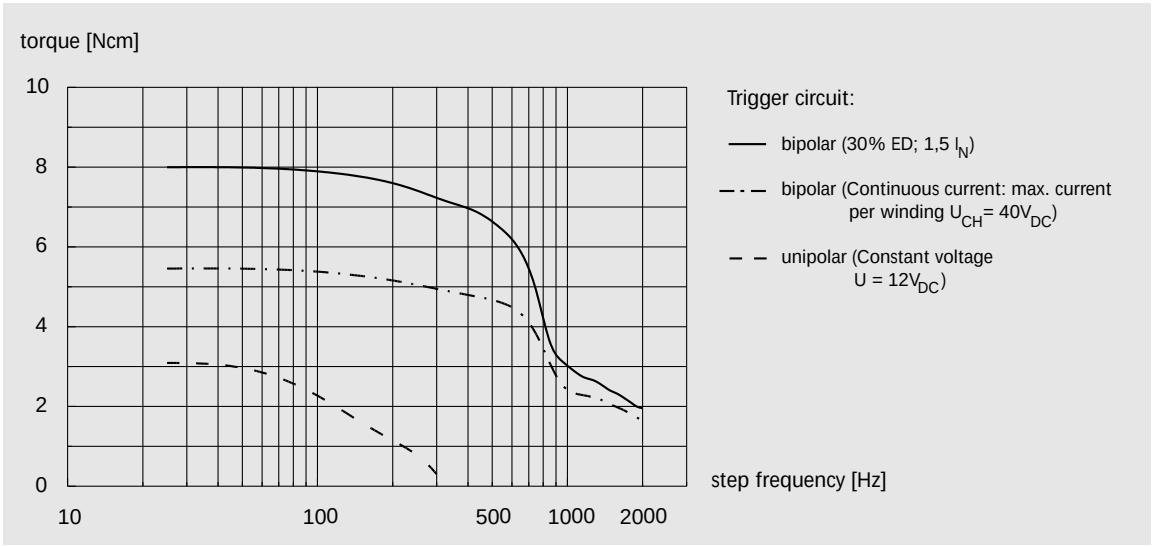
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 51/6

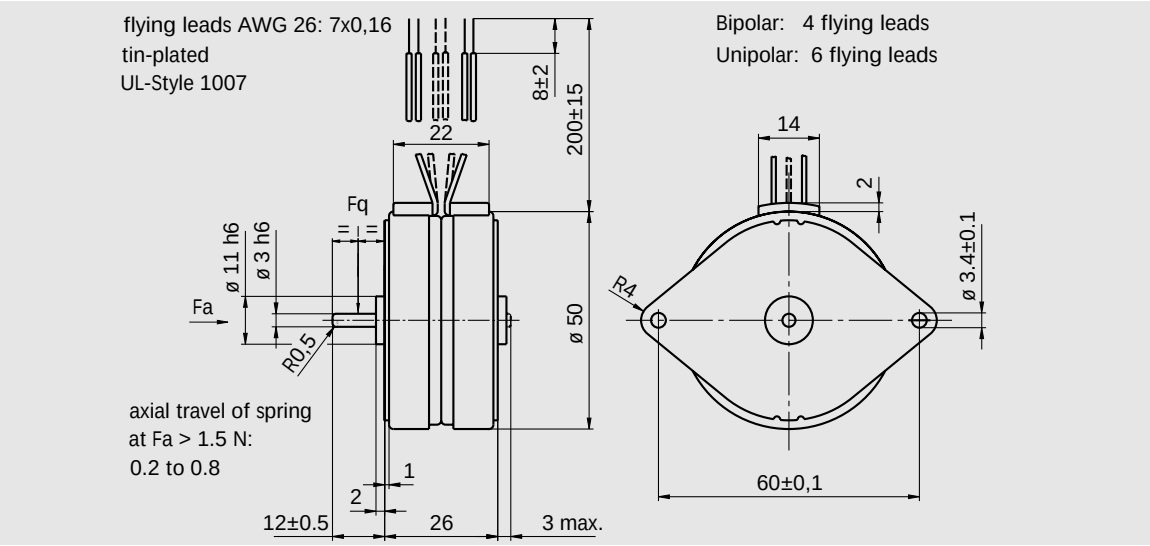


Connections RDM 51/6



Characteristic curve RDM 51/6

2-phase stepping motors
RDM 51/8



Scale drawing RDM 51/8

Technical Data

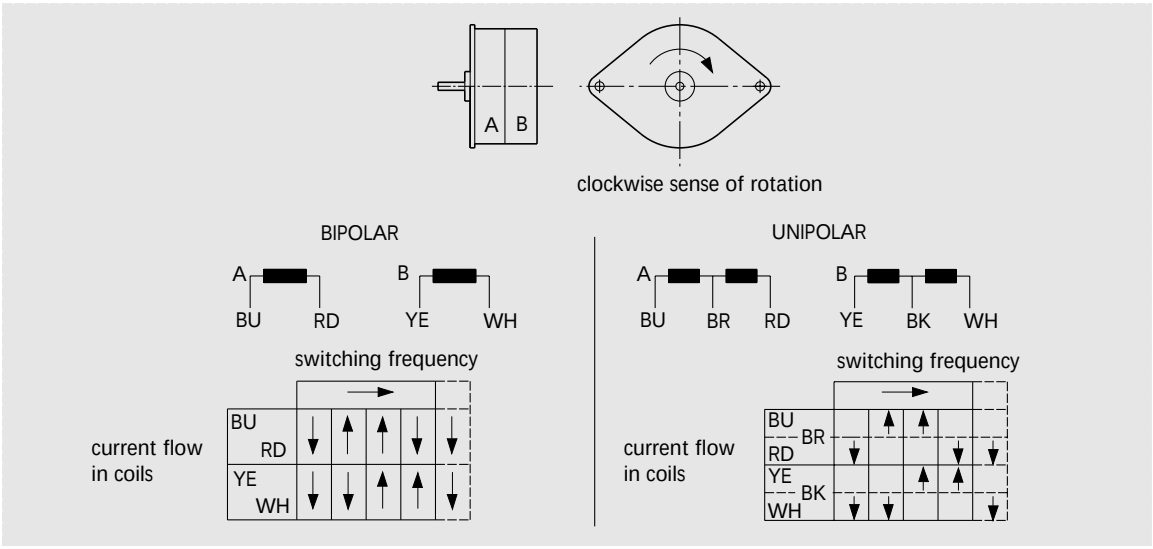
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	32	32
Step angle	11.25°	11.25°
Step angle tolerance	± 3%	± 4%
Max. torque	6.8 Ncm	4.1 Ncm
Holding torque (excited)	8.2 Ncm	5.7 Ncm
Rotor moment of inertia	17 gcm^2	17 gcm^2
Max. current per winding	0.4 A	0.2 A
Resistance per winding	15 Ω	60 Ω
Permitted shaft load	Axial stress F_a = 2 N, radial stress F_q = 5 N	
Weight approx.	0.2 kg	0.2 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

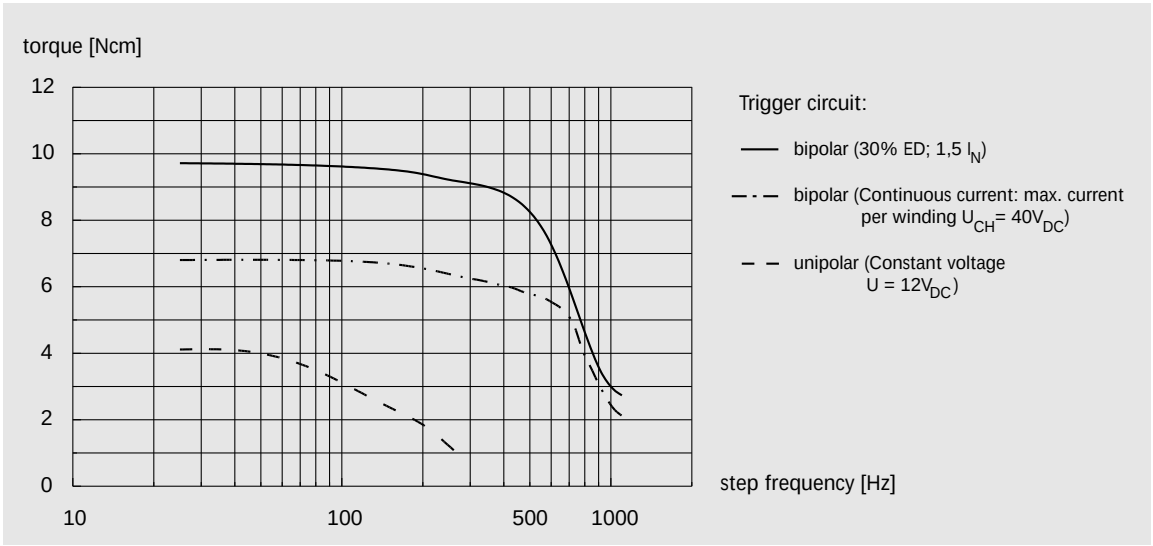
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 51/8

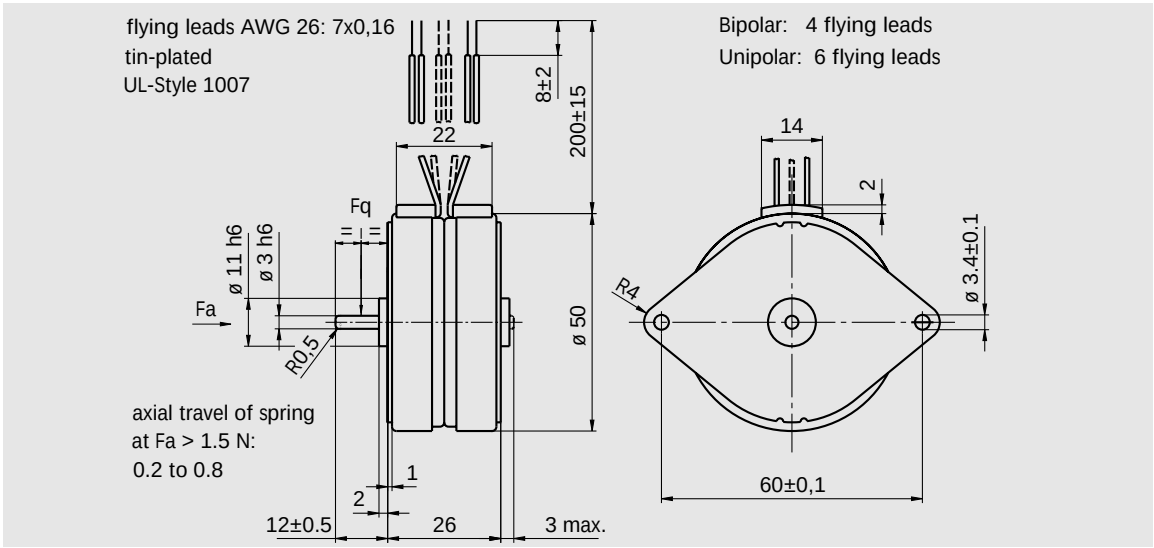


Connections RDM 51/8



Characteristic curve RDM 51/8

2-phase stepping motors
RDM 51/12



Scale drawing RDM 51/12

Technical Data

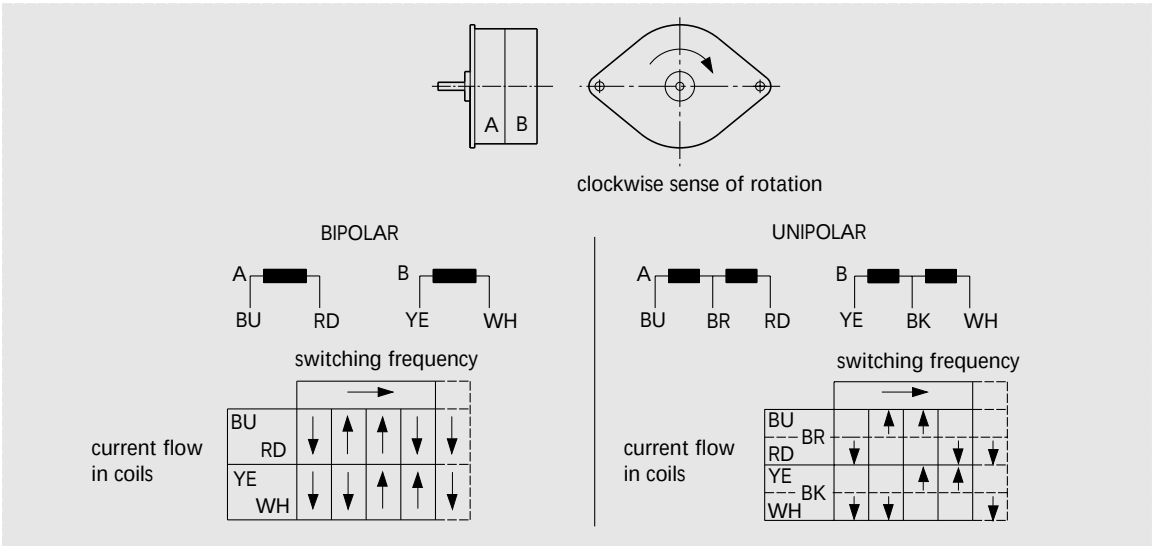
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	48	48
Step angle	7.5°	7.5°
Step angle tolerance	± 3%	± 4%
Max. torque	6.9 Ncm	4.9 Ncm
Holding torque (excited)	8.8 Ncm	6.2 Ncm
Rotor moment of inertia	17 gcm^2	17 gcm^2
Max. current per winding	0.4 A	0.2 A
Resistance per winding	15 Ω	60 Ω
Permitted shaft load	Axial stress F_a = 2 N, radial stress F_q = 5 N	
Weight approx.	0.2 kg	0.2 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

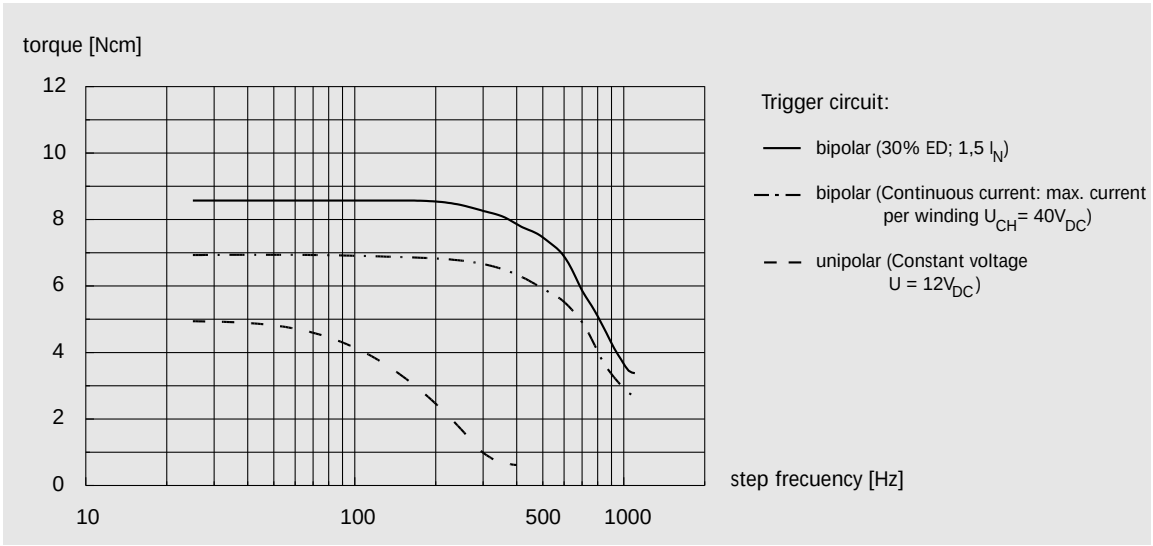
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 51/12

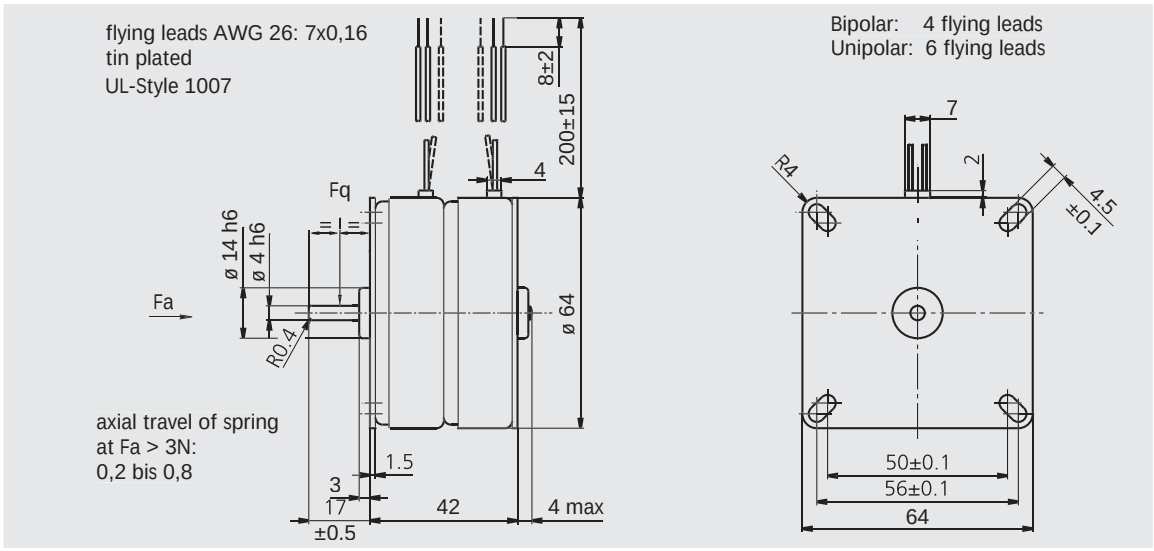


Connections RDM 51/12



Characteristic curve RDM 51/12

2-phase stepping motors
RDM 63/10



Scale drawing RDM 63/10

Technical Data

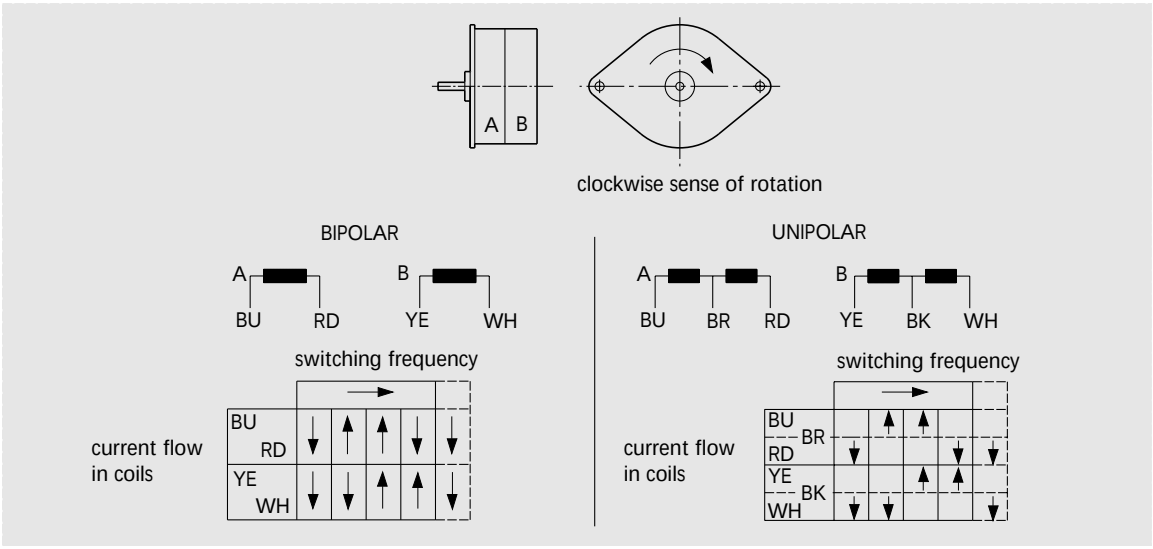
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	40	40
Step angle	9°	9°
Step angle tolerance	± 3%	± 4%
Max. torque	22.5 Ncm	12.5 Ncm
Holding torque (excited)	29 Ncm	20 Ncm
Rotor moment of inertia	150 gcm^2	150 gcm^2
Max. current per winding	0.65 A	0.31 A
Resistance per winding	9.6 Ω	41 Ω
Permitted shaft load	Axial stress F_a = 3 N, radial stress F_q = 10 N	
Weight approx.	0.46 kg	0.46 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

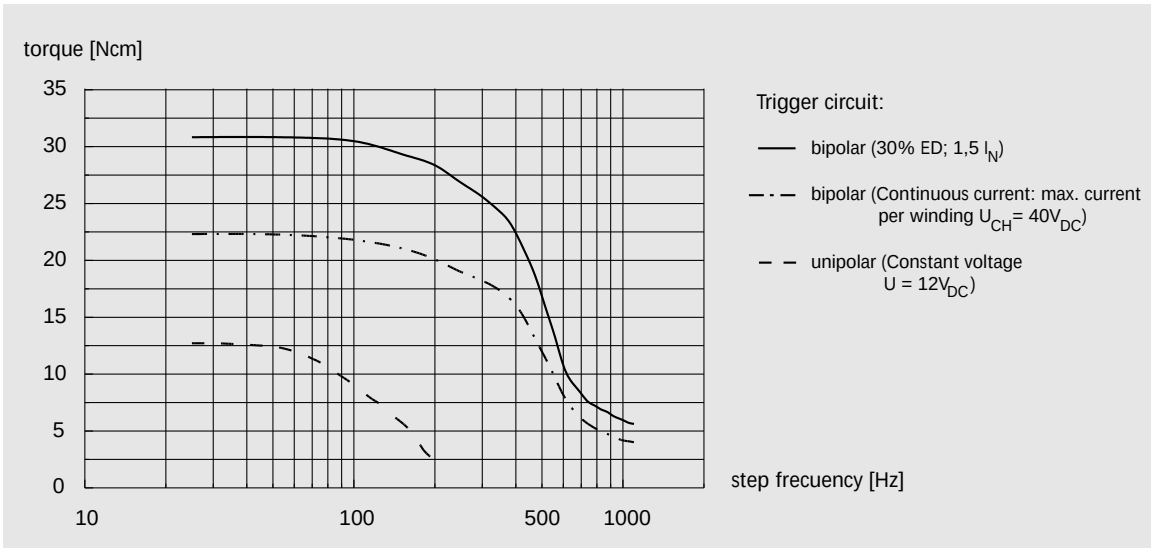
You will find gearbox combinations from page 127.

2-phase stepping motors

RDM 63/10

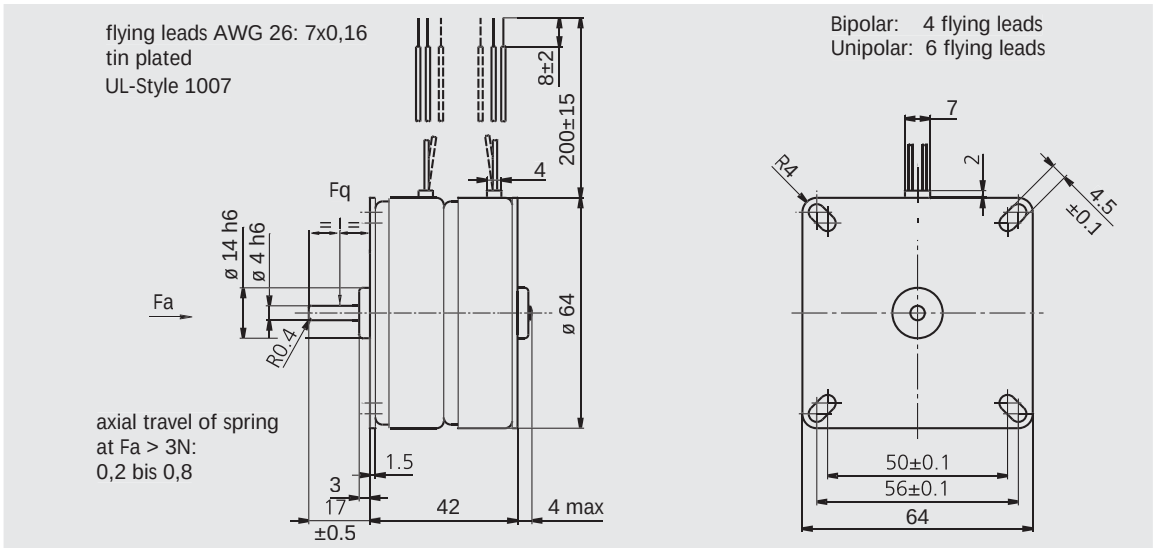


Connections RDM 63/10



Characteristic curve RDM 63/10

2-phase stepping motors
RDM 63/12



Scale drawing RDM 63/12

Technical Data

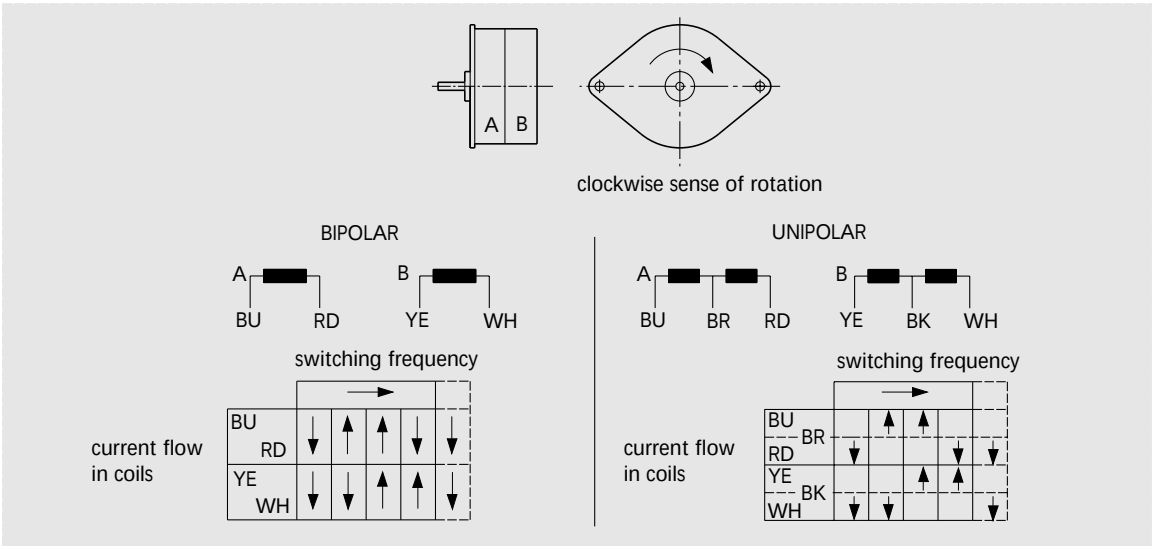
	Control diagram	
	Bipolar	**Unipolar**
Steps / revolution	48	48
Step angle	7.5°	7.5°
Step angle tolerance	± 3%	± 4%
Max. torque	25.5 Ncm	15 Ncm
Holding torque (excited)	32 Ncm	22 Ncm
Rotor moment of inertia	150 gcm^2	150 gcm^2
Max. current per winding	0.65 A	0.31 A
Resistance per winding	9.6 Ω	41 Ω
Permitted shaft load	Axial stress F_a = 3 N, radial stress F_q = 10 N	
Weight approx.	0.47 kg	0.47 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test: test voltage to DIN EN 60034-1	

Gearbox combinations

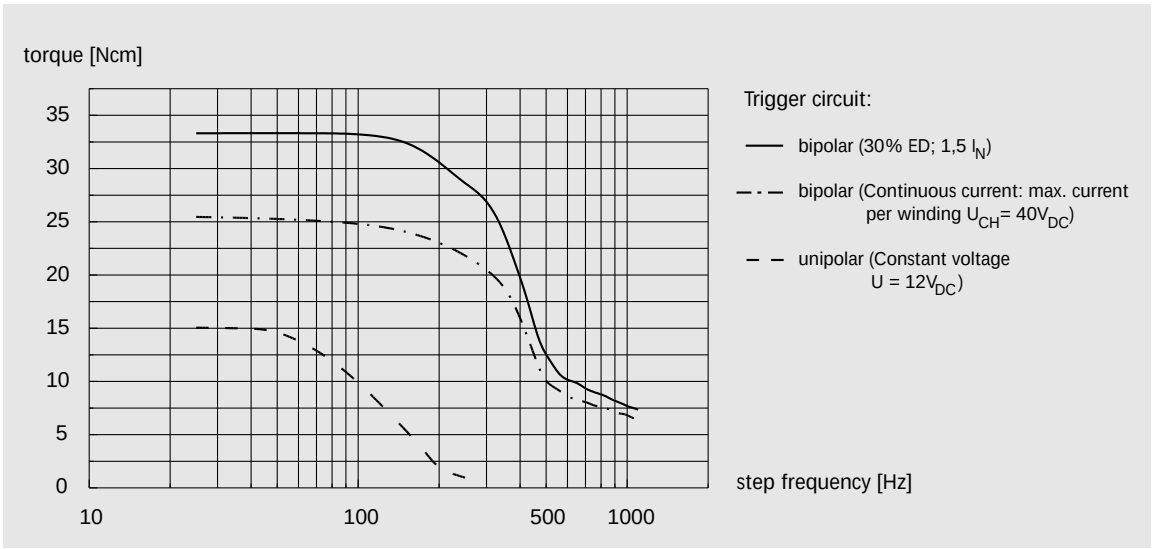
You will find gearbox combinations from page 127.

2-phase stepping motors

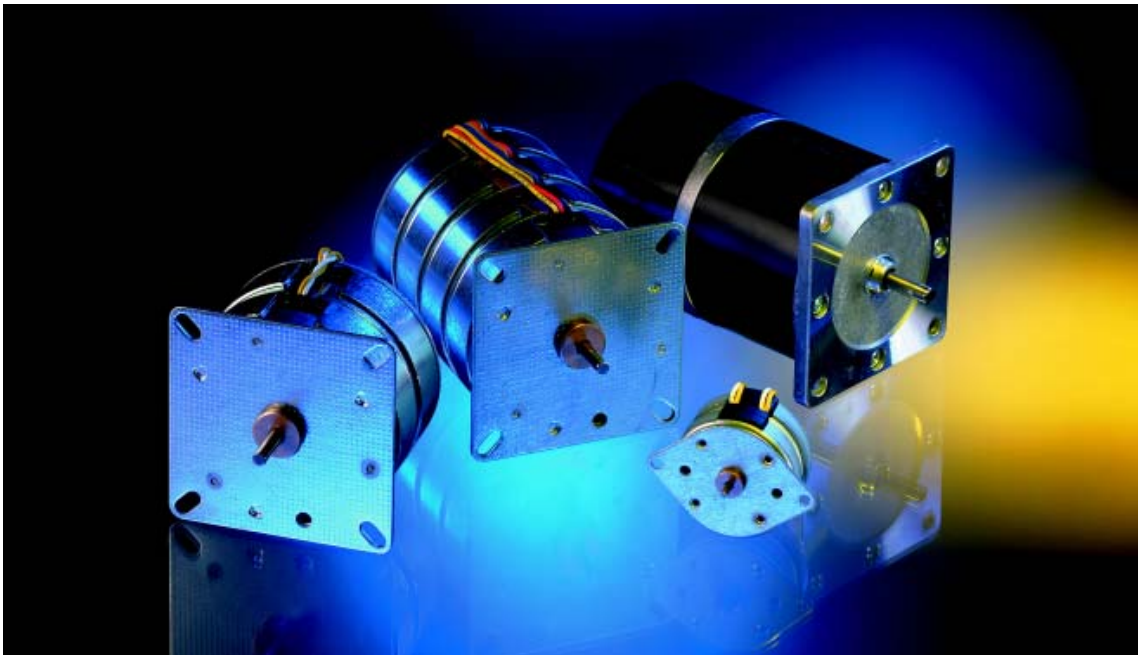
RDM 63/12



Connections RDM 63/12



Characteristic curve RDM 63/12



Synchronous motors

Synchronous motors from Berger Lahr are robust and work with great precision. The motors can be operated on a 50 Hz or 60 Hz AC mains without any additional control electronics. In our well-matched range you will find the right motor to meet any requirement. Synchronous motors from Berger Lahr are small, strong and good value for money. We will be happy to tell you of further motor and gearbox options on request.

Overview of synchronous motors

	Speed [r.p.m.]		Torque [Ncm]		Described on ...
	50 Hz	60 Hz	50 Hz	60 Hz	
RSM 36/6 F	500	600	0.95	0.91	Page 77
RSM 36/8 F	375	450	0.77	0.72	Page 79
RSM 36/10 F	300	360	0.76	0.73	Page 81
RSM 36/12 F	250	300	0.75	0.74	Page 83
RSM 42/6 N	500	600	3.26	3.17	Page 85
RSM 42/8 F	375	450	3.08	2.91	Page 87
RSM 42/12 N	250	300	3.17	2.91	Page 89
RSM 51/6 F	500	600	3.8	3.25	Page 91
RSM 51/8 F	375	450	4	3.75	Page 93
RSM 51/12 F	250	300	5	4.4	Page 95
RSM 63/8 F	375	450	13	11.7	Page 97
RSM 63/10 F	300	360	13.2	10	Page 99
RSM 63/12 F	250	300	13.5	10.4	Page 101
RSM 828/3 F	1000	1200	8.4	7.8	Page 103
RSM 842/3 F	1000	1200	9.6	9	Page 105
RSM 856/3 F	1000	1200	13.2	12.6	Page 107
RSM 884/3 F	1000	1200	18.1	15.3	Page 109
RSM 884/3 S	1000	1200	33	31	Page 111

Synchronous motors

Type code for Synchronous motors

Example	**RSM 36/12 NdG 230V 50Hz - G 10:1**
Product family RSM= Reversible Synchronous Motor	**RSM** 36/12 NdG 230V 50Hz - G 10:1
Motor size (diameter) Example 36 = 36 mm diameter 42 = 42 mm diameter 51 = 51 mm diameter 63 = 63 mm diameter	RSM **36**/12 NdG 230V 50Hz - G 10:1
Number of pole pairs 6= number of pole pairs p = 6 8= number of pole pairs p = 8 10 = number of pole pairs p = 10 12= number of pole pairs p = 12	RSM 36/**12** NdG 230V 50Hz - G 10:1
Winding Layout N = Standard layout F = Frequency layout S = Special layout	RSM 36/12 **N**dG 230V 50Hz - G 10:1
Operating Capacitor d = without operating capacitor a = with operating capacitor	RSM 36/12 N**d**G 230V 50Hz - G 10:1
Bearings G = Plain bearing	RSM 36/12 Nd**G** 230V 50Hz - G 10:1
Voltage rating 024V = 24 VAC, 042V = 42 VAC 110V = 110 VAC, 230V = 230 VAC	RSM 36/12 NdG **230V** 50Hz - G 10:1
Frequency 50 Hz 60 Hz	RSM 36/12 NdG 230V **50Hz** - G 10:1
Gearbox type Gearbox type L Gearbox type T Gearbox type G Gearbox type P	RSM 36/12 NdG 230V 50Hz - **G** 10:1
Gearbox reduction Example 10 :1	RSM 36/12 NdG 230V 50Hz - G **10:1**

General technical information

Bearing designs

Synchronous motors constructed on the claw-pole principle, RSM 36/x, 42/x, 51/x and 63/x, are fitted with plain bearings, the packaged synchronous motors RSM 8xx with ball bearings.

Temperatures

The permissible ambient temperature for the synchronous motors lies in the range from -20°C to +60°C. In locations with poor heat dissipation, e.g. in closed plastic housings, a check should be made to see if the permissible winding temperature is being exceeded.

Type of connection

The synchronous motors are available with flying leads. The flying leads are hard-wired, bared, tin-plated and 200 mm in length. Packaged synchronous motors are available with terminal boxes as standard.

Voltages

Synchronous motors are available depending on the type for rated voltages of 24, 42, 110 and 230 VAC.

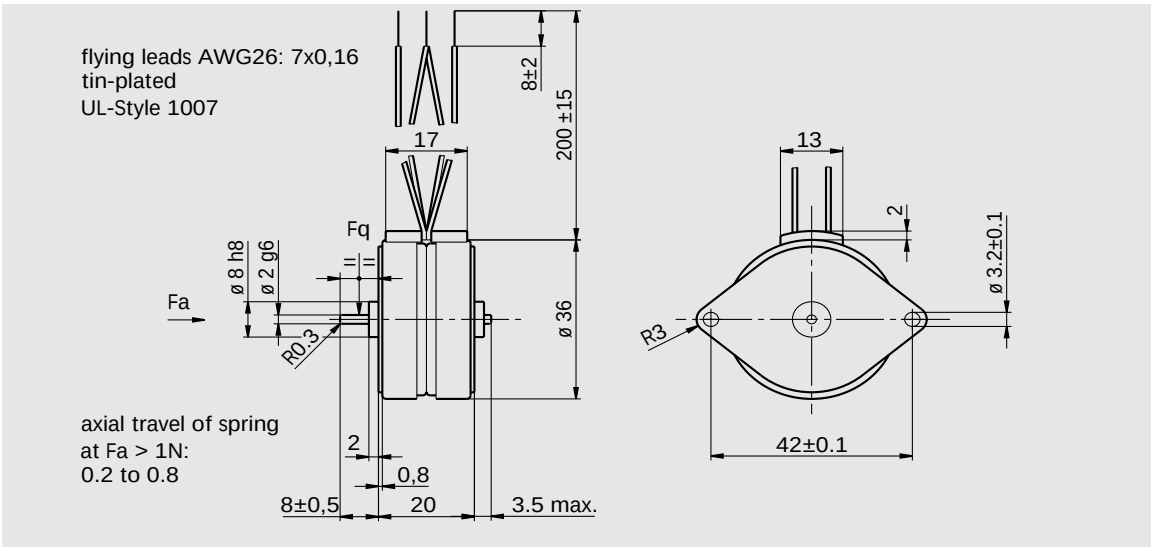
Windings

With the exception of the motors with S windings, the synchronous motors are made to VDE 0530 in operating mode S1 (continuous operation).

– Normal design N: Motors of this design have different capacitance values for 50 Hz and 60 Hz at the same operating voltage.
– Frequency design F: The same operating capacitors are used for 50 Hz and 60 Hz at the same operating voltage.

Operating capacitors for all rated voltages are available as an option. For all RSM 36 units an external device (capacitor or resistor) is required for the 230 V version. These are also available as an option.

Synchronous motors
RSM 36/6 F



Scale drawing RSM 36/6

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	500 rpm	600 rpm
Synchronous torque	0.95 Ncm	0.91 Ncm
Delivery of power	0.5 W	0.57 W
Power consumption	1.96 W	2.1 W
Rated current (110 V) with external device in series RV or CV for 230 V	17.8 mA	19.1 mA
Operating capacitor	0.25 µF	0.25 µF
Maximum externally permitted mass moment of inertia	13.5 gcm^2	8.3 gcm^2
Self-holding torque, type	0.25 Ncm	0.25 Ncm
Excess winding temperature	38 K	40 K
Permitted radial stress F_q	3 N	3 N
Permitted axial stress F_a	1 N	1 N
Weight	0.09 kg	0.09 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

Rated voltage	**230 V***		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.25 µF	0.25 µF	1.8 µF	1.8 µF	6.8 µF	6.8 µF
Rated current	17.8 mA	19.1 mA	44.3 mA	47.5 mA	87.9 mA	94.3 mA

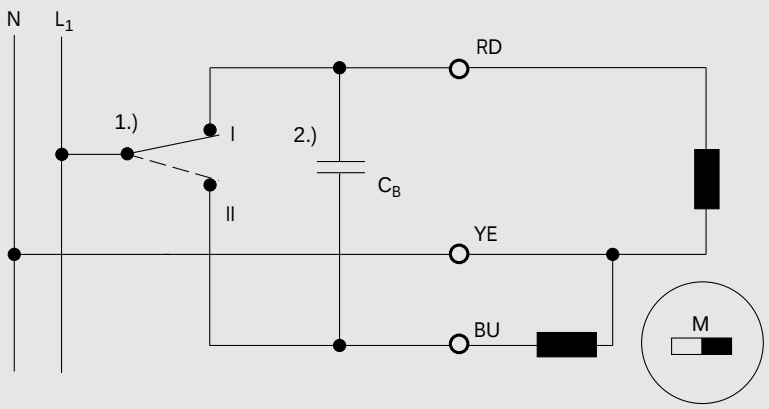
* External series devices R_V 5.6 kΩ, 3W or C_V 0.3µF, 220V~ necessary

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

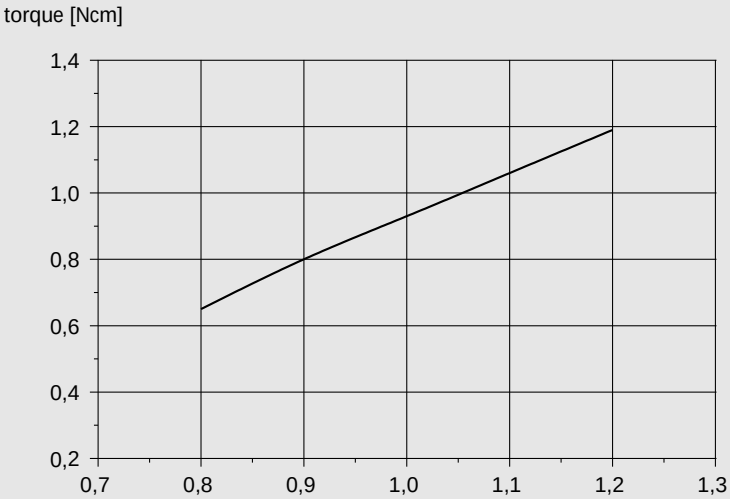
RSM 36/6 F



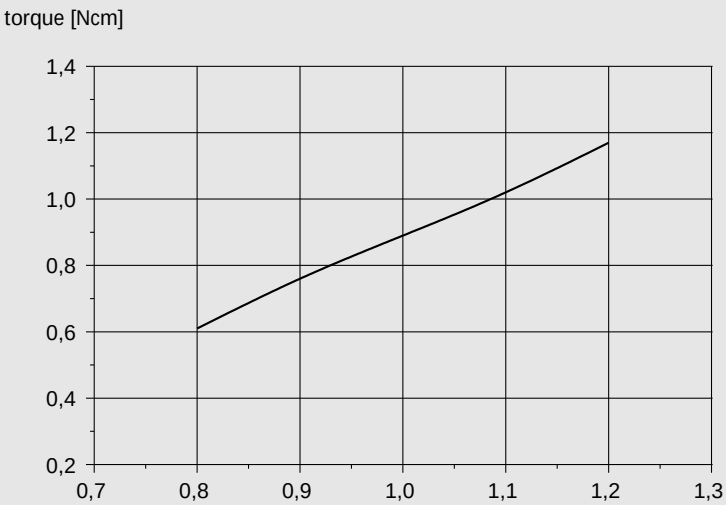
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 36/6

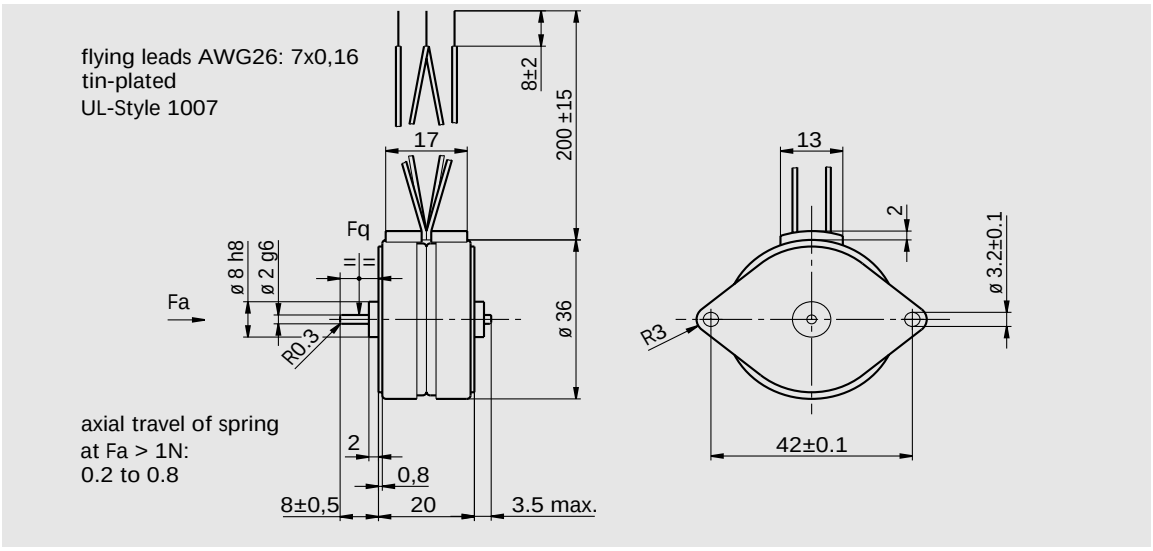


Characteristic curve RSM 36/6 at 50 Hz



Characteristic curve RSM 36/6 at 60 Hz

Synchronous motors
RSM 36/8 F



Scale drawing RSM 36/8

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	375 rpm	450 rpm
Synchronous torque	0.77 Ncm	0.72 Ncm
Delivery of power	0.3 W	0.34 W
Power consumption	1.1 W	1.2 W
Rated current (110 V) with external device in series RV or CV for 230 V	10 mA	10.6 mA
Operating capacitor	0.15 µF	0.15 µF
Maximum externally permitted mass moment of inertia	25.5 gcm^2	8.8 gcm^2
Self-holding torque, type	0.2 Ncm	0.2 Ncm
Excess winding temperature	20 K	27 K
Permitted radial stress F_q	3 N	3 N
Permitted axial stress F_a	1 N	1 N
Weight	0.09 kg	0.09 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

Rated voltage	**230 V***		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.15 µF	0.15 µF	1 µF	1 µF	3 µF	3 µF
Rated current	10 mA	10.6 mA	22.5 mA	23.9 mA	45.2 mA	47.9 mA

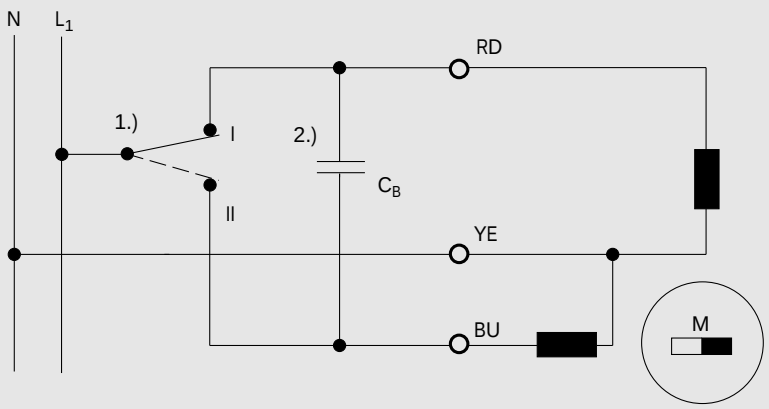
* External series devices R_V 10 kΩ, 1.5 W or C_V 0.15 µF, 220V~ necessary

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

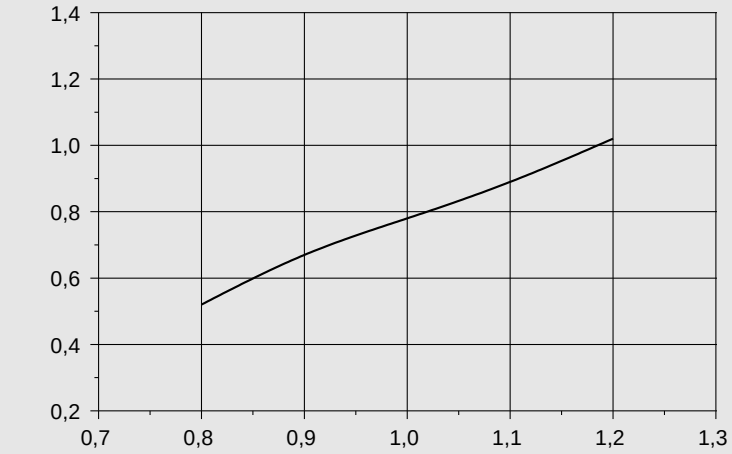
RSM 36/8 F



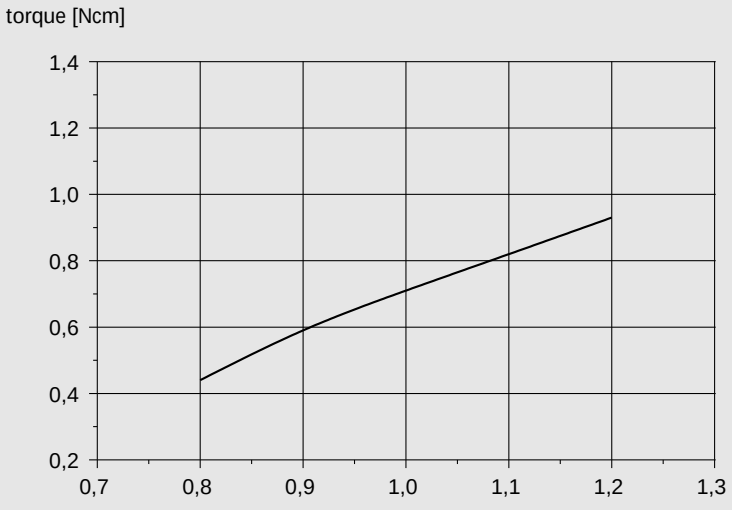
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 36/8

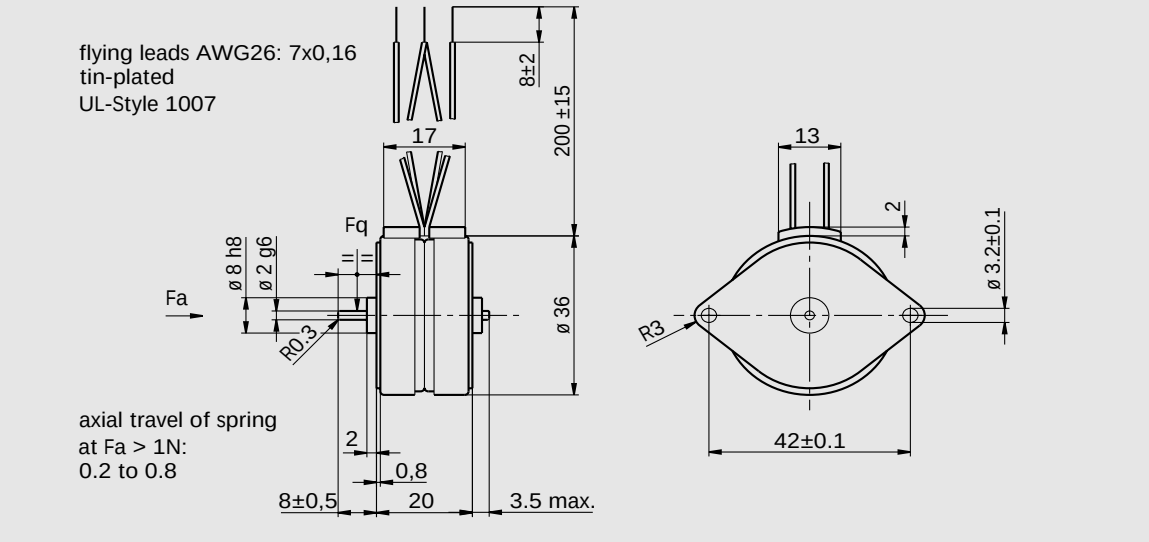


Characteristic curve RSM 36/8 at 50 Hz



Characteristic curve RSM 36/8 at 60 Hz

Synchronous motors
RSM 36/10 F



Scale drawing RSM 36/10

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	300 rpm	360 rpm
Synchronous torque	0.76 Ncm	0.73 Ncm
Delivery of power	0.24 W	0.28 W
Power consumption	1.05 W	1.1 W
Rated current (110 V) with external device in series RV or CV for 230 V	9.5 mA	10.2 mA
Operating capacitor	0.135 µF	0.135 µF
Maximum externally permitted mass moment of inertia	13.8 gcm^2	10 gcm^2
Self-holding torque, type	0.18 Ncm	0.18 Ncm
Excess winding temperature	22 K	29 K
Permitted radial stress F_q	3 N	3 N
Permitted axial stress F_a	1 N	1 N
Weight	0.09 kg	0.09 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

Rated voltage	**230 V***		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.135 µF	0.135 µF	0.68 µF	0.68 µF	2.2 µF	2.2 µF
Rated current	9.5 mA	10.2 mA	21.4 mA	23 mA	38 mA	40.8 mA

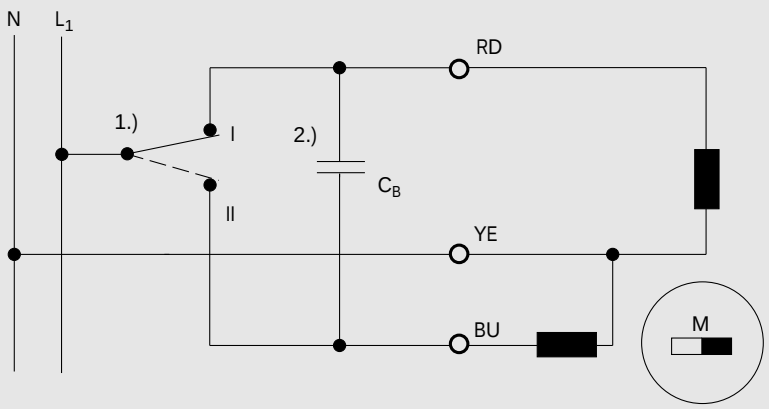
* External series devices R_V 15 kΩ, 1.5 W oder C_V 0.15 µF, 220V~ notwendig

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

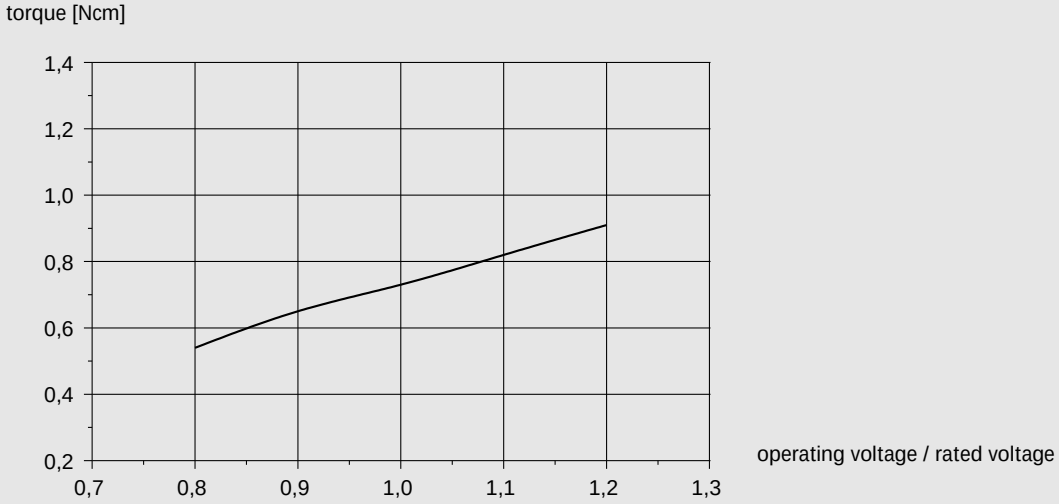
RSM 36/10 F



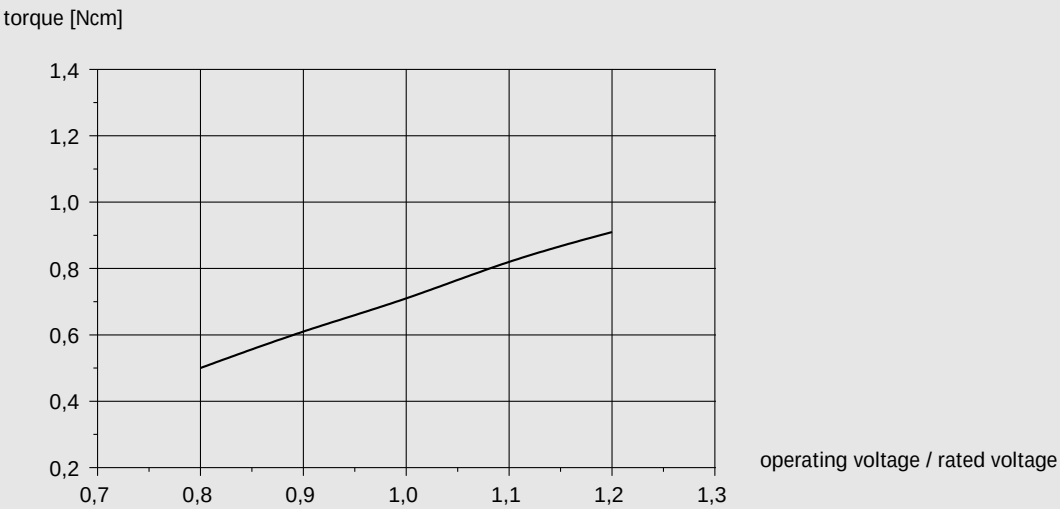
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 36/10

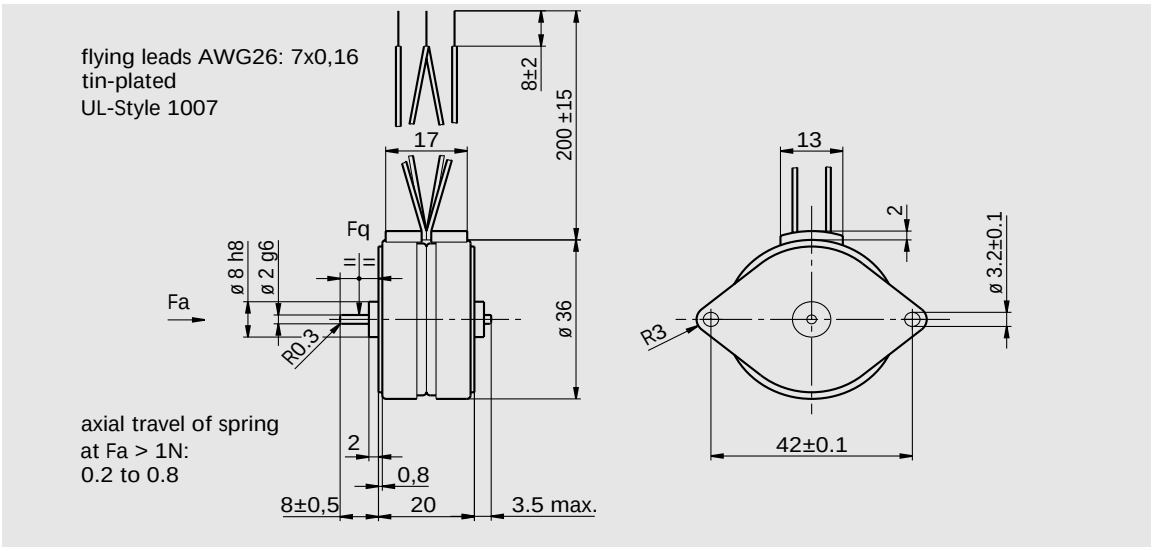


Characteristic curve RSM 36/10 at 50 Hz



Characteristic curve RSM 36/10 at 60 Hz

Synchronmotoren
RSM 36/12 F



Scale drawing RSM 36/12

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	250 rpm	300 rpm
Synchronous torque	0.75 Ncm	0.74 Ncm
Delivery of power	0.2 W	0.23 W
Power consumption	1.17 W	1.28 W
Rated current (110 V) with external device in series RV or CV for 230 V	10.6 mA	11.6 mA
Operating capacitor	0.15 µF	0.15 µF
Maximum externally permitted mass moment of inertia	13.8 gcm^2	12.5 gcm^2
Self-holding torque, type	0.1 Ncm	0.1 Ncm
Excess winding temperature	25 K	32 K
Permitted radial stress F_q	3 N	3 N
Permitted axial stress F_a	1 N	1 N
Weight	0.09 kg	0.09 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

Rated voltage	**230 V***		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.15 µF	0.15 µF	1 µF	1 µF	3 µF	3 µF
Rated current	10.6 mA	11.6 mA	26.3 mA	28.8 mA	47.9 mA	52.4 mA

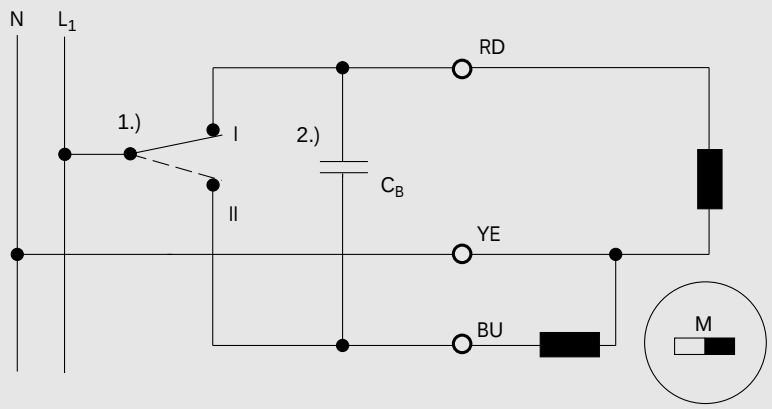
* External series devices R_V 10 kΩ, 1.5 W or C_V 0.15 µF, 250V~ necessary !

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

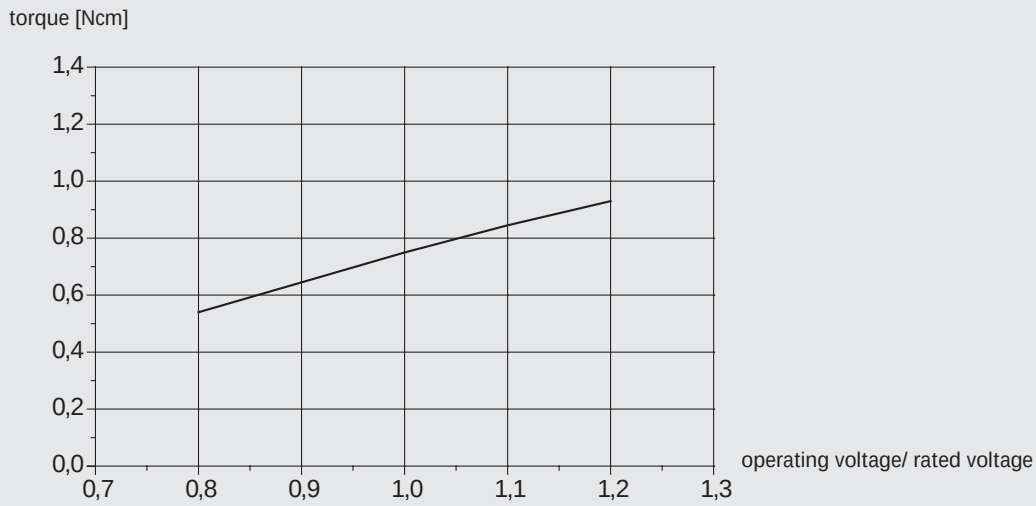
RSM 36/12 F



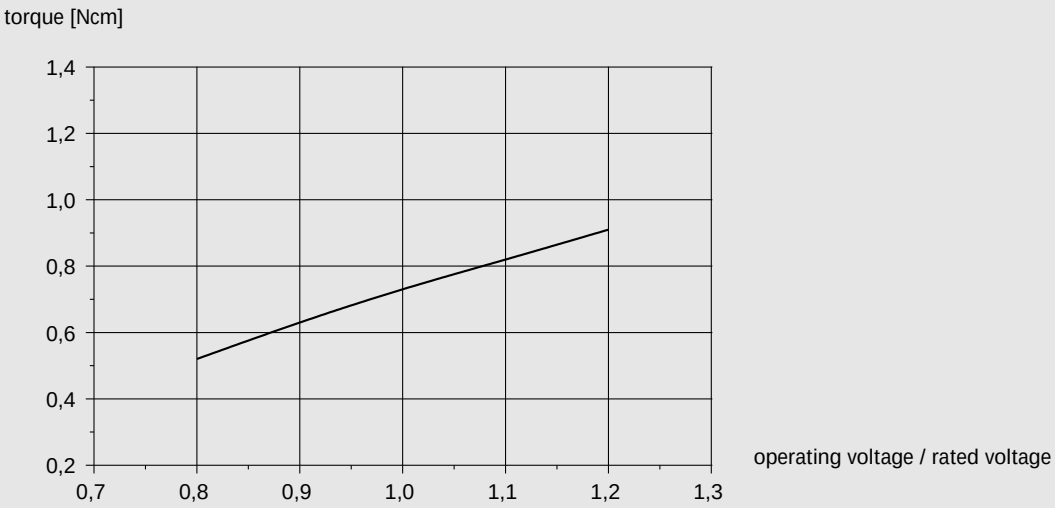
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 36/12

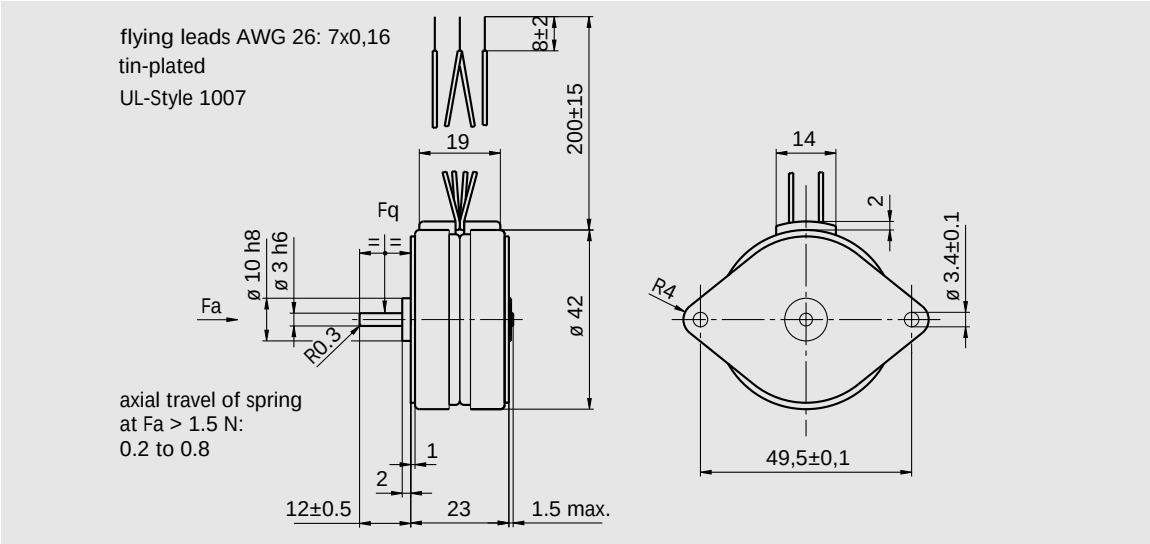


Characteristic curve RSM 36/12 at 50 Hz



Characteristic curve RSM 36/12 at 60 Hz

Synchronous motors
RSM 42/6 N



Scale drawing RSM 42/6

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	500rpm	600 rpm
Synchronous torque	3.41 Ncm	3.17 Ncm
Delivery of power	1.78 W	1.99 W
Power consumption	5.9 W	5.78 W
Rated current (230 V)	25.3 mA	24.6 mA
Operating capacitor	0.18 µF	0.15 µF
Maximum externally permitted mass moment of inertia	31 gcm^2	25 gcm^2
Self-holding torque, type	0.55 Ncm	0.55 Ncm
Excess winding temperature	74 K	72 K
Permitted radial stress F_q	5 N	5 N
Permitted axial stress F_a	1.5 N	1.5 N
Weight	0.15 kg	0.15 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

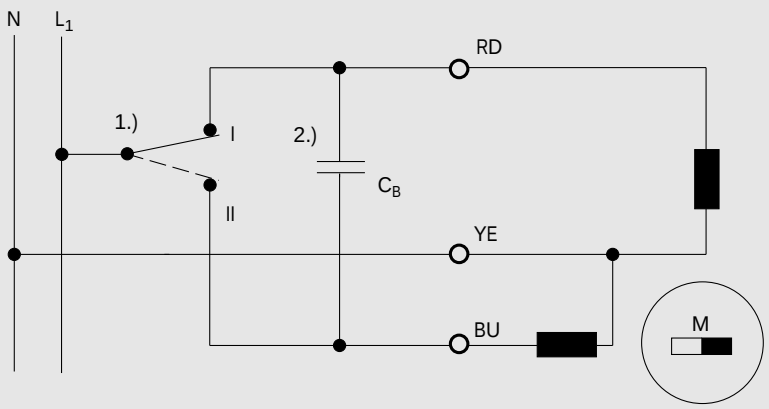
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.68 µF	0.56 µF	5.6 µF	4.7 µF	14 µF	12 µF
Rated current	51.0 mA	49.6 mA	140 mA	137 mA	210 mA	221 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

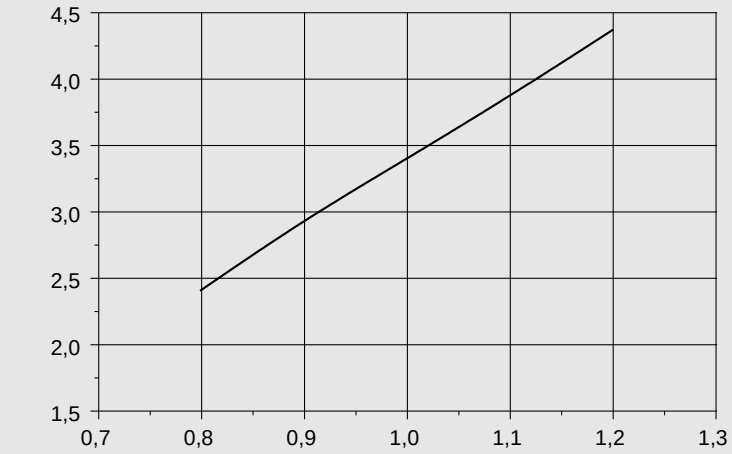
RSM 42/6 N



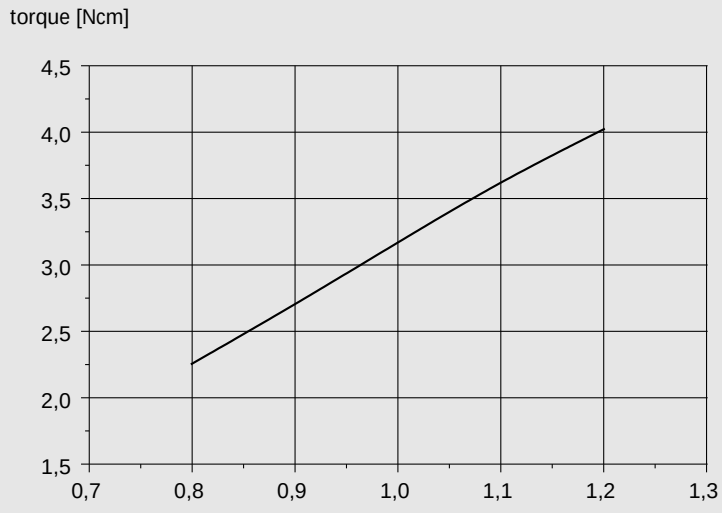
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 42/6

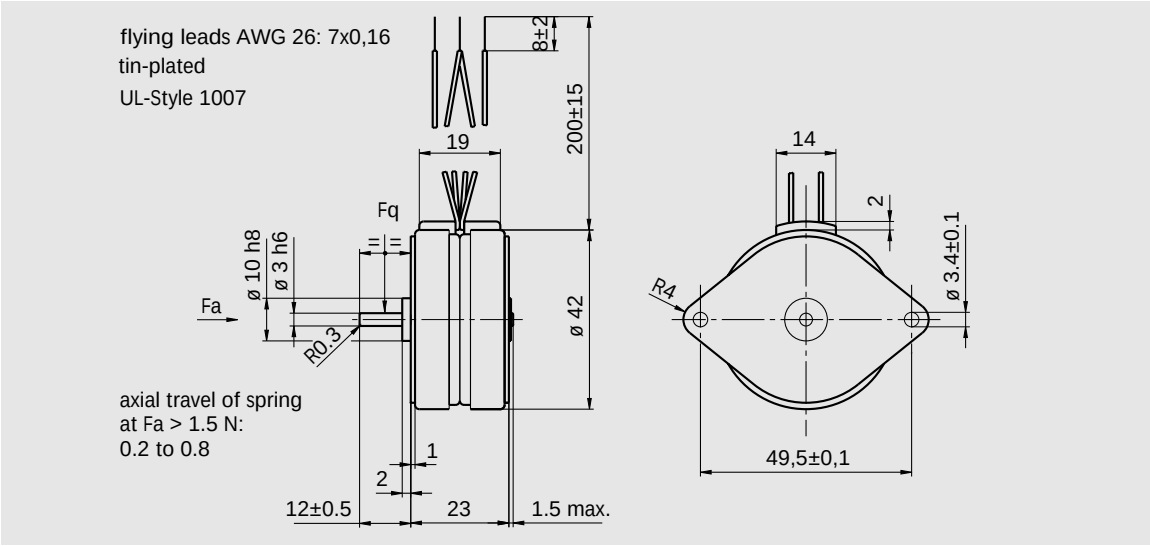


Characteristic curve RSM 42/6 at 50 Hz



Characteristic curve RSM 42/6 at 60 Hz

Synchronous motors
RSM 42/8 F



Scale drawing RSM 42/8

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	375 rpm	450 rpm
Synchronous torque	3.08 Ncm	2.91 Ncm
Delivery of power	1.21 W	1.37 W
Power consumption	3.44 W	3.81 W
Rated current (230 V)	14.4 mA	16 mA
Operating capacitor	0.1 µF	0.1 µF
Maximum externally permitted mass moment of inertia	46 gcm^2	30 gcm^2
Self-holding torque, type	0.5 Ncm	0.5 Ncm
Excess winding temperature	44 K	48 K
Permitted radial stress F_q	5 N	5 N
Permitted axial stress F_a	1.5 N	1.5 N
Weight	0.15 kg	0.15 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

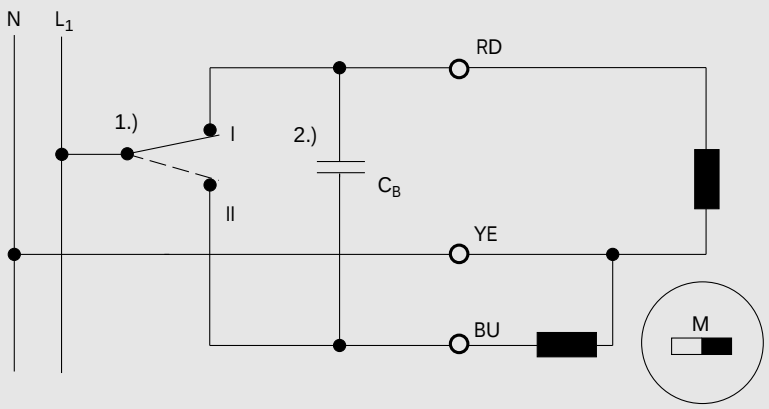
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.39 µF	0.39 µF	2.5 µF	2.5 µF	7 µF	7 µF
Rated current	29 mA	32 mA	71.1 mA	79 mA	120 mA	134 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

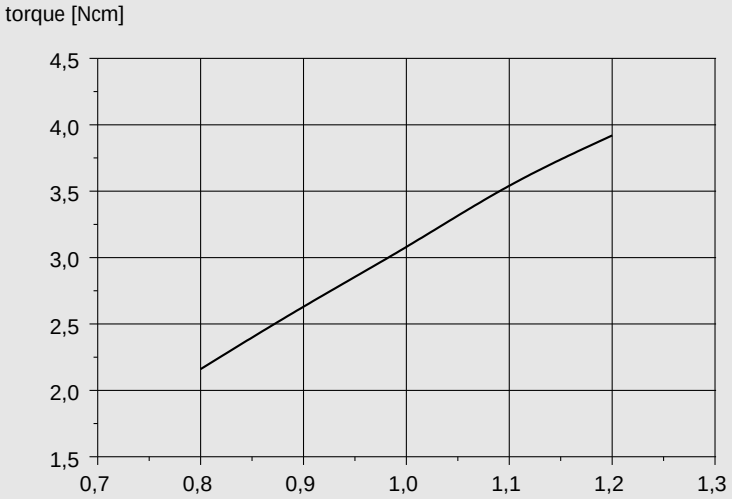
RSM 42/8 F



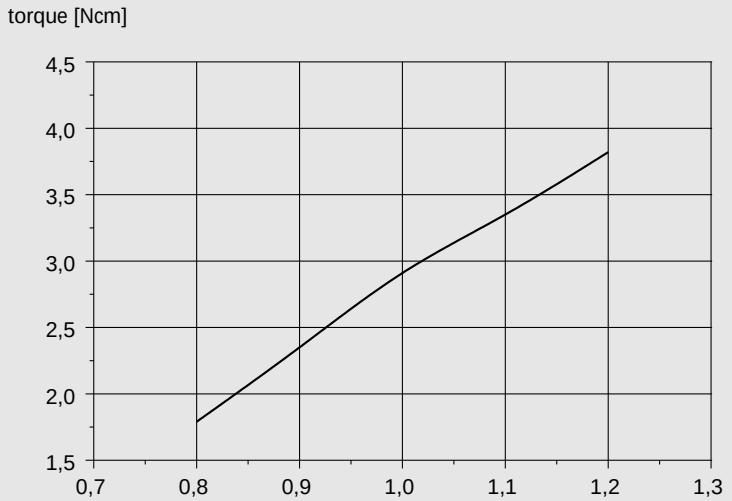
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 42/8

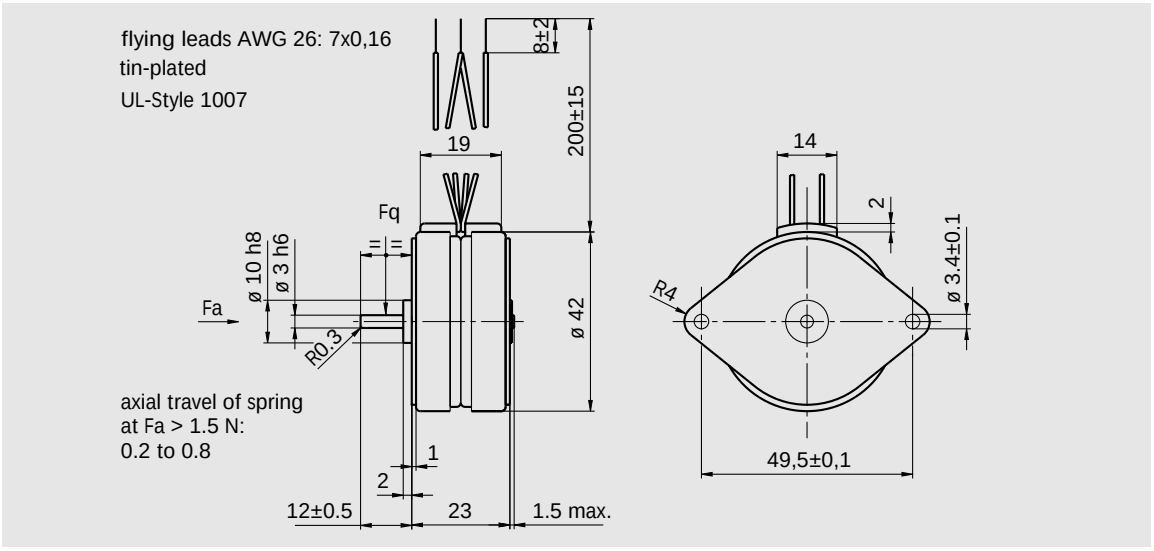


Characteristic curve RSM 42/8 at 50 Hz



Characteristic curve RSM 42/8 at 60 Hz

Synchronous motors
RSM 42/12 N



Scale drawing RSM 42/12

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	250 rpm	300 rpm
Synchronous torque	3.17 Ncm	2.91 Ncm
Delivery of power	0.83 W	0.91 W
Power consumption	2.89 W	2.5 W
Rated current (230 V)	12.2 mA	10.7 mA
Operating capacitor	0.082 µF	0.068 µF
Maximum externally permitted mass moment of inertia	50 gcm^2	45 gcm^2
Self-holding torque, type	0.5 Ncm	0.5 Ncm
Excess winding temperature	36 K	41 K
Permitted radial stress F_q	5 N	5 N
Permitted axial stress F_a	1.5 N	1.5 N
Weight	0.15 kg	0.15 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

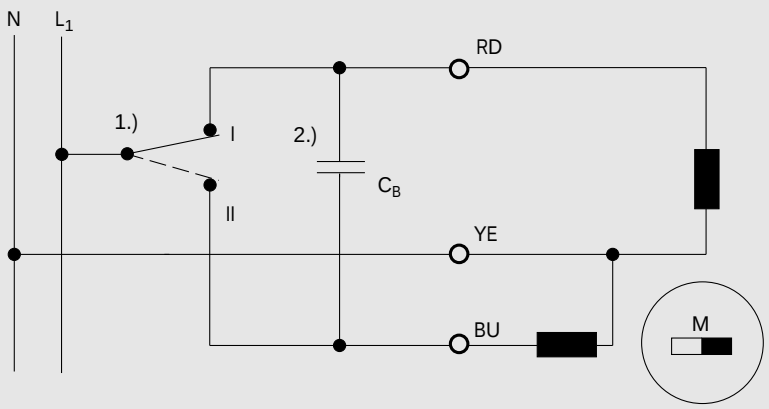
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.33 µF	0.25 µF	2.2 µF	1.8 µF	6.8 µF	5 µF
Rated current	23.9 mA	21 mA	60.3 mA	52.8 mA	103 mA	89.3 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

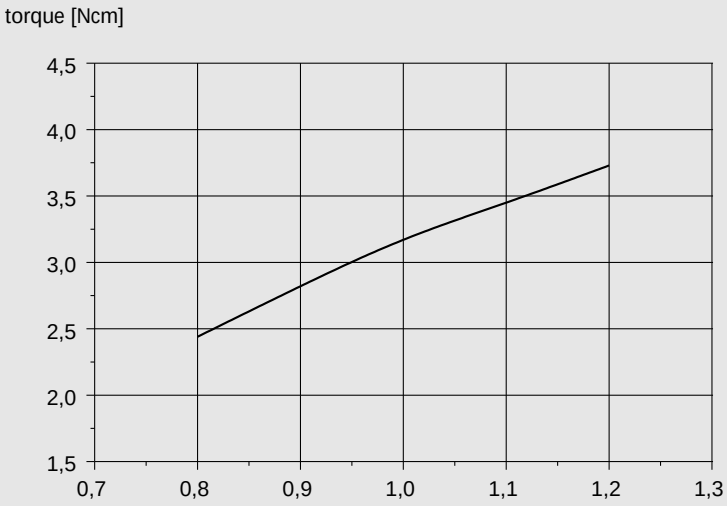
RSM 42/12 N



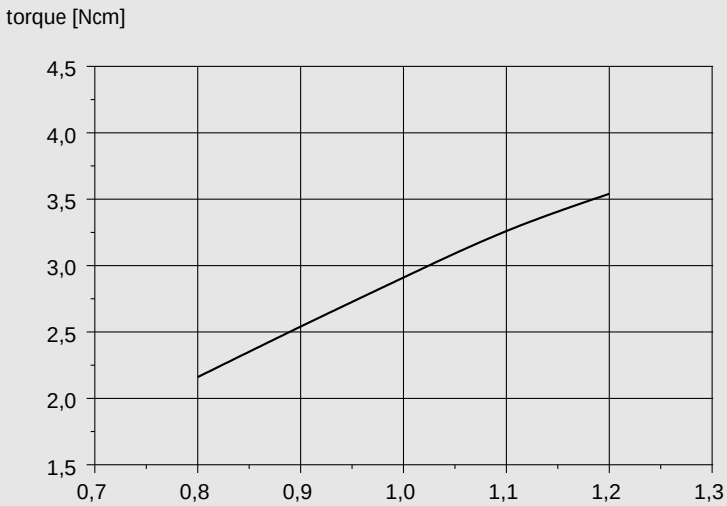
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 42/12

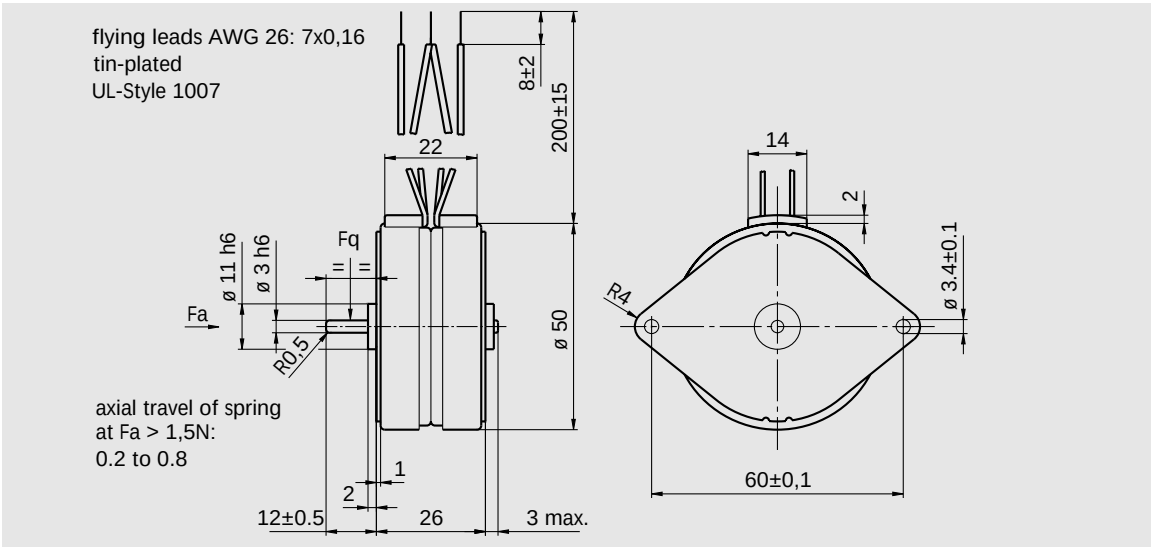


Characteristic curve RSM 42/12 at 50 Hz



Characteristic curve RSM 42/12 at 60 Hz

Synchronous motors
RSM 51/6 F



Scale drawing RSM 51/6

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	500 rpm	600 rpm
Synchronous torque	3.8 Ncm	3.25 Ncm
Delivery of power	2 W	2 W
Power consumption	4.9 W	5.4 W
Rated current (230 V)	21 mA	23 mA
Operating capacitor	0.15 µF	0.15 µF
Maximum externally permitted mass moment of inertia	60 gcm^2	40 gcm^2
Self-holding torque, type	0.8 Ncm	0.8 Ncm
Excess winding temperature	55 K	63 K
Permitted radial stress F_q	5 N	5 N
Permitted axial stress F_a	2 N	2 N
Weight	0.2 kg	0.2 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

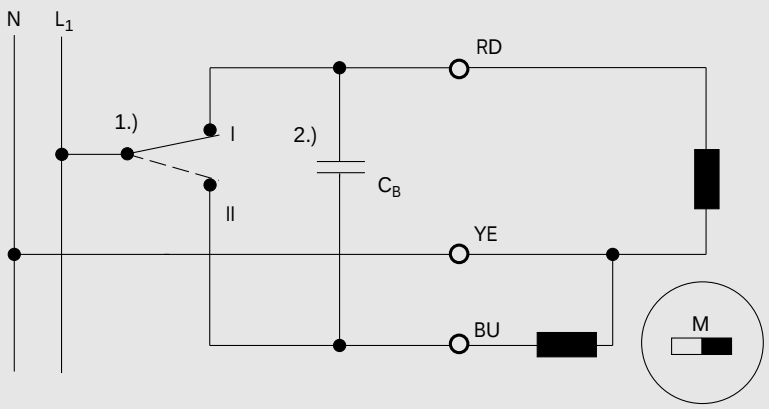
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.56 µF	0.56 µF	4.7 µF	4.7 µF	16 µF	16 µF
Rated current	42.9 mA	47 mA	117 mA	128 mA	217 mA	238 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

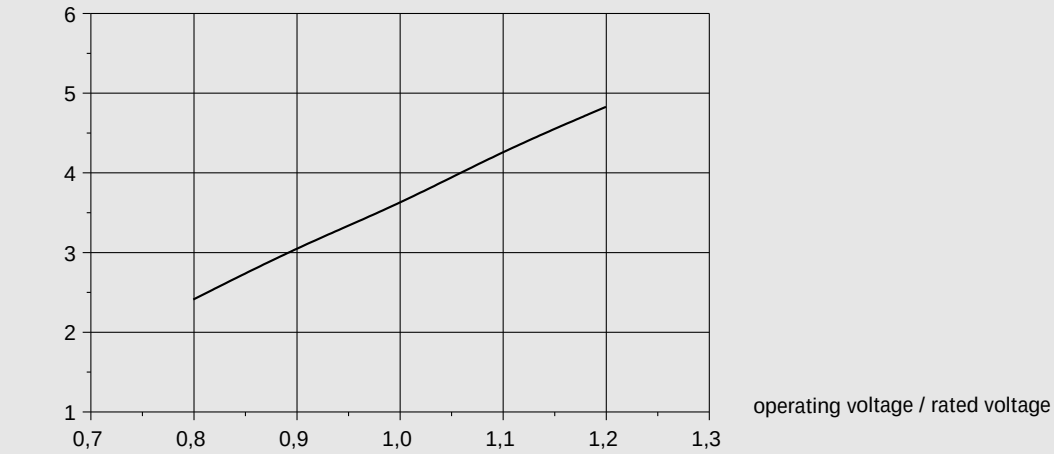
RSM 51/6 F



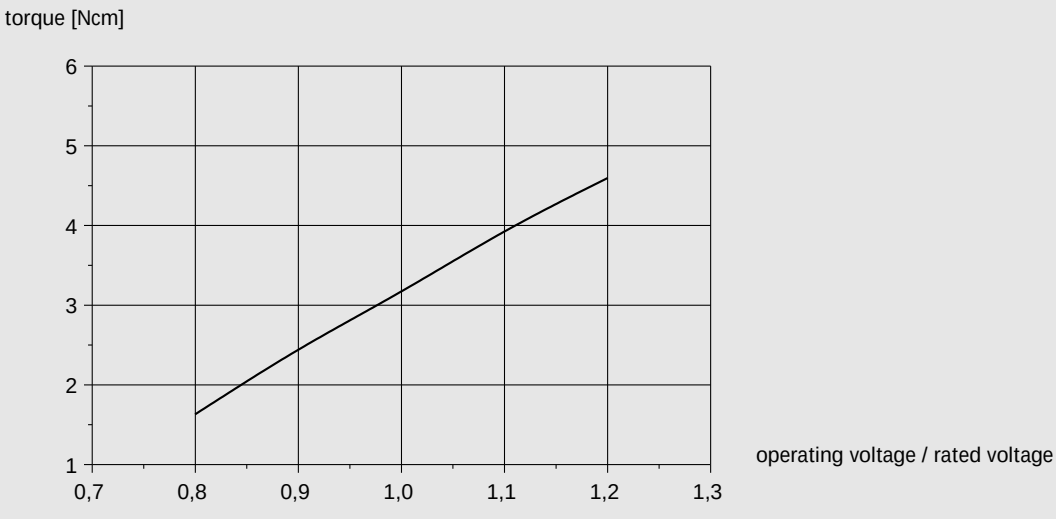
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 51/6

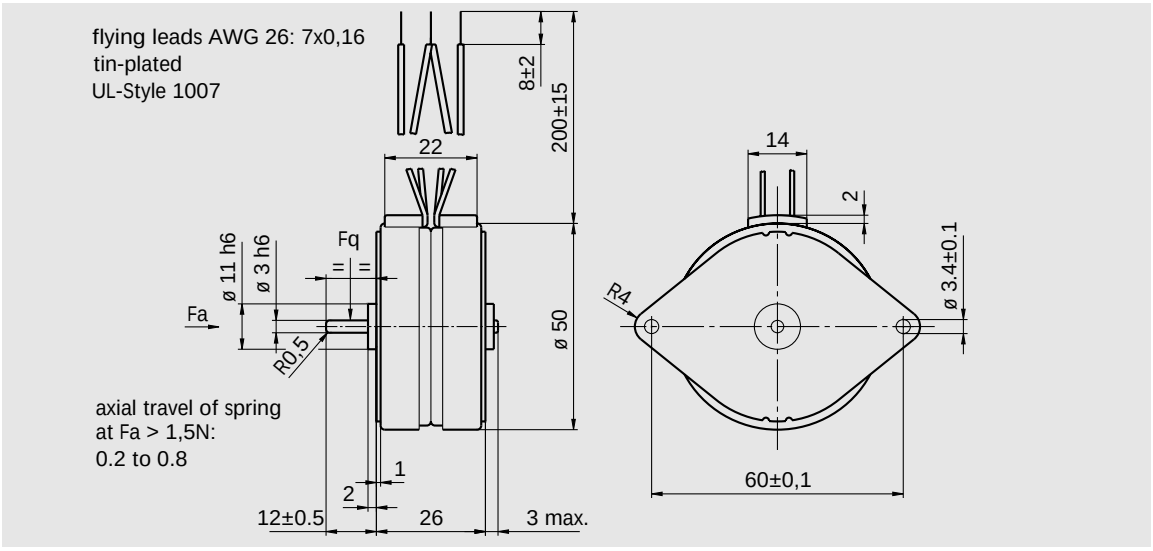


Characteristic curve RSM 51/6 at 50 Hz



Characteristic curve RSM 51/6 at 60 Hz

Synchronous motors
RSM 51/8 F



Scale drawing RSM 51/8

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	375 rpm	450 rpm
Synchronous torque	4 Ncm	3.75 Ncm
Delivery of power	1.57 W	1.77 W
Power consumption	3.9 W	4.3 W
Rated current (230 V)	17 mA	18.7 mA
Operating capacitor	0.12 µF	0.12 µF
Maximum externally permitted mass moment of inertia	90 gcm^2	58 gcm^2
Self-holding torque, type	0.5 Ncm	0.5 Ncm
Excess winding temperature	50 K	58 K
Permitted radial stress F_q	5 N	5 N
Permitted axial stress F_a	2 N	2 N
Weight	0.2 kg	0.2 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

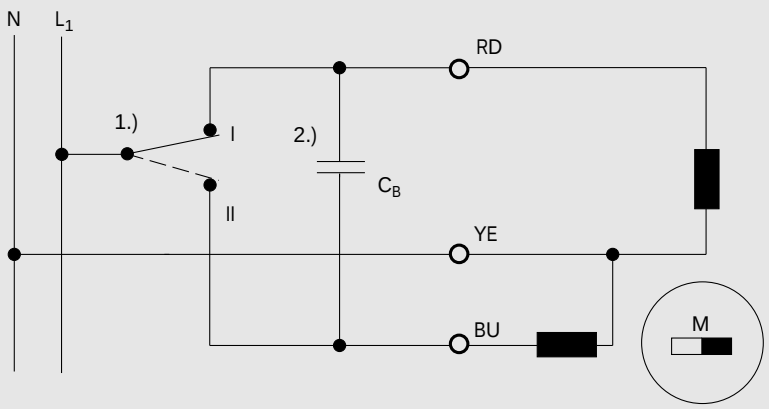
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.5 µF	0.5 µF	3.9 µF	3.9 µF	12 µF	12 µF
Rated current	34.7 mA	38.2 mA	94.5 mA	104 mA	157 mA	172 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

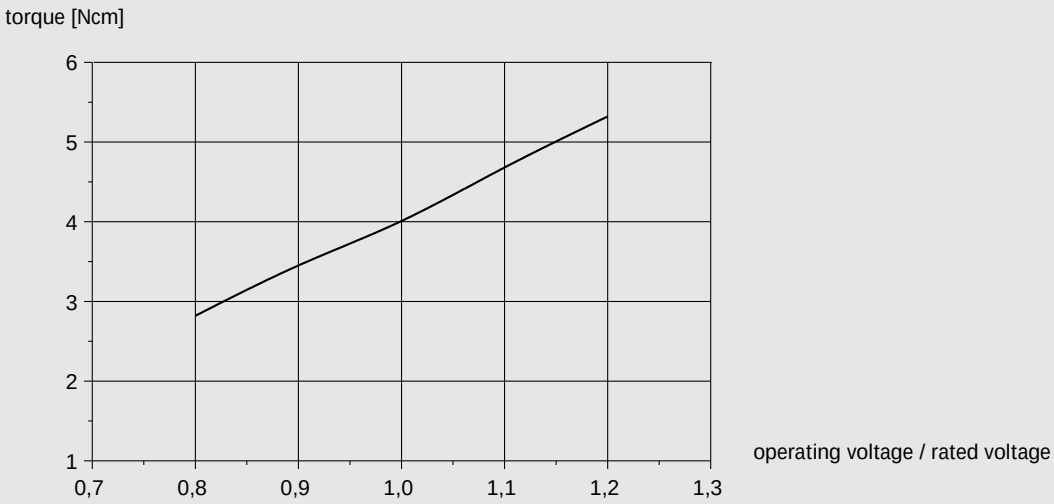
RSM 51/8 F



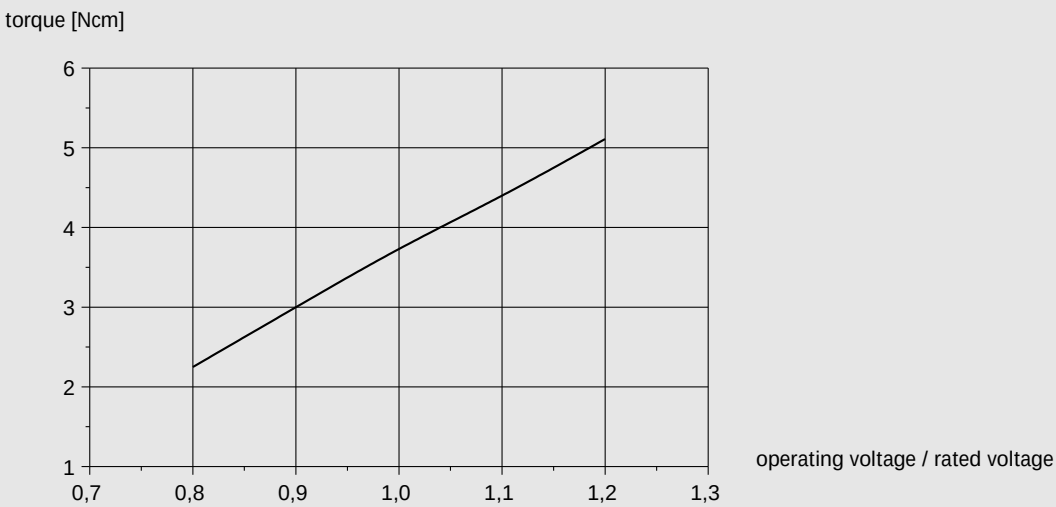
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 51/8

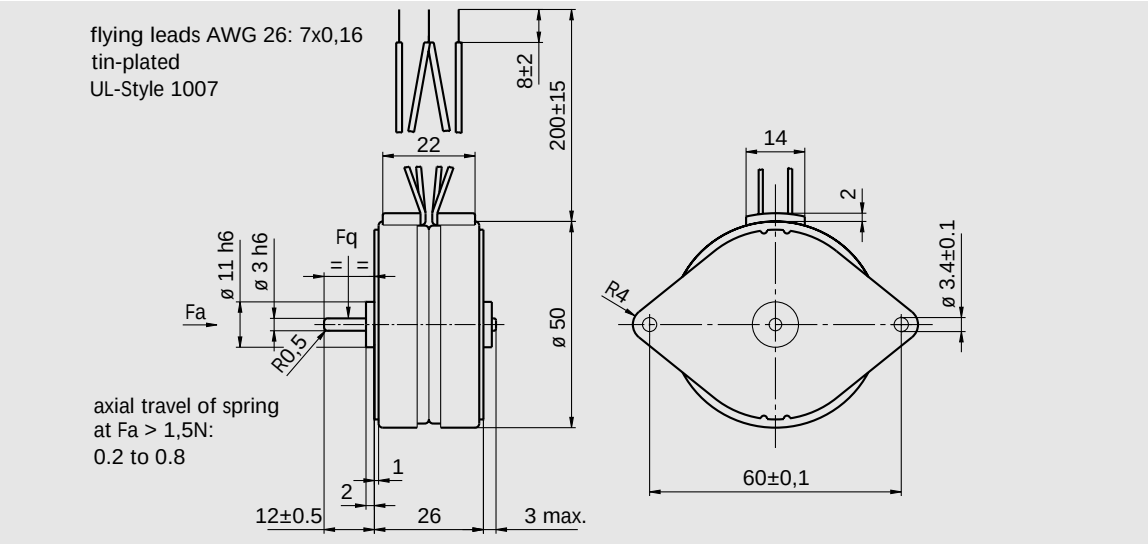


Characteristic curve RSM 51/8 at 50 Hz



Characteristic curve RSM 51/8 at 60 Hz

Synchronous motors
RSM 51/12 F



Scale drawing RSM 51/12

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	250 rpm	300 rpm
Synchronous torque	5 Ncm	4.4 Ncm
Delivery of power	1.3 W	1.4 W
Power consumption	3.7 W	3.6 W
Rated current (230 V)	16 mA	15.6 mA
Operating capacitor	0.12 µF	0.1 µF
Maximum externally permitted mass moment of inertia	120 gcm^2	80 gcm^2
Self-holding torque, type	0.75 Ncm	0.75 Ncm
Excess winding temperature	48 K	46 K
Permitted radial stress F_q	5 N	5 N
Permitted axial stress F_a	2 N	2 N
Weight	0.2 kg	0.2 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

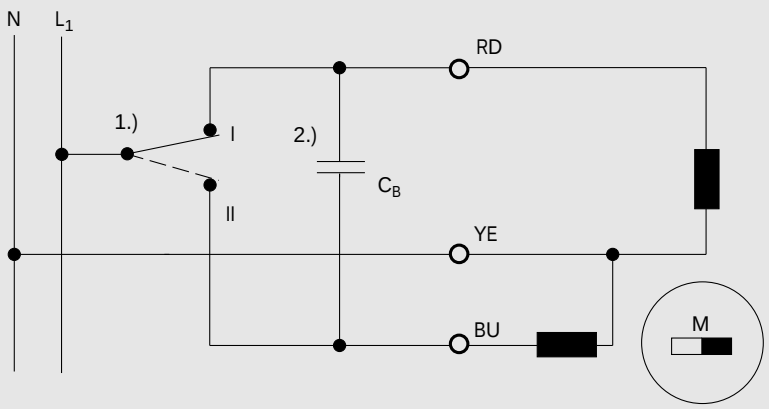
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	0.5 µF	0.43 µF	3.9 µF	3.3 µF	10 µF	8.2 µF
Rated current	33 mA	32 mA	90 mA	87 mA	150 mA	145 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

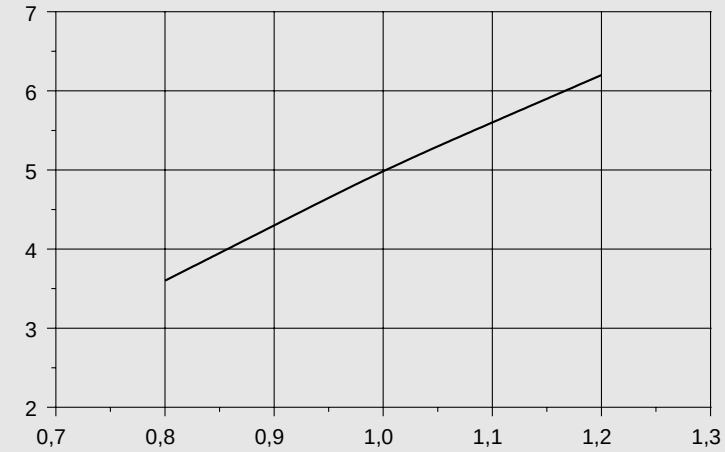
RSM 51/12 F



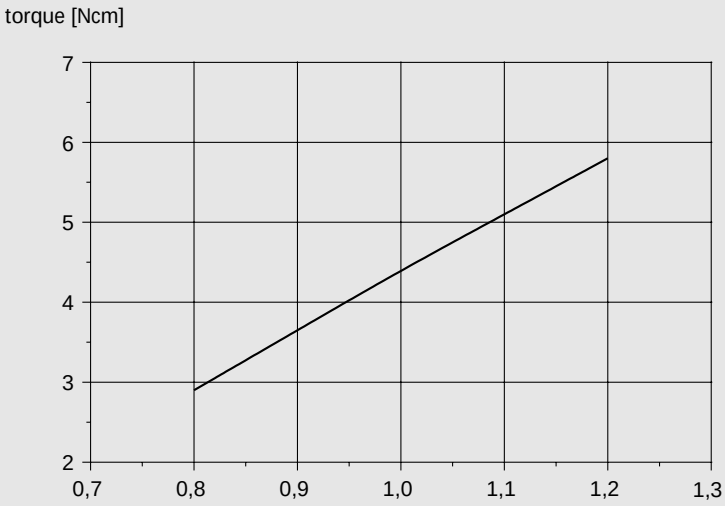
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 51/12

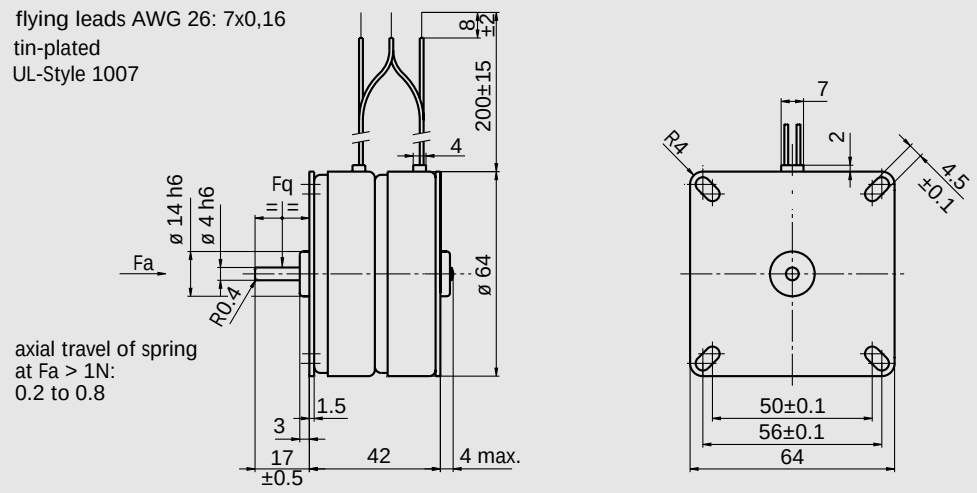


Characteristic curve RSM 51/12 at 50 Hz



Characteristic curve RSM 51/12 at 60 Hz

Synchronous motors
RSM 63/8 F



Scale drawing RSM 63/8

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	375 rpm	450 rpm
Synchronous torque	13 Ncm	11.7 Ncm
Delivery of power	5.1 W	5.5 W
Power consumption	11 W	11.7 W
Rated current (230 V)	48 mA	51 mA
Operating capacitor	0.33 µF	0.33 µF
Maximum externally permitted mass moment of inertia	250 gcm^2	180 gcm^2
Self-holding torque, type	5 Ncm	5 Ncm
Excess winding temperature	45 K	52 K
Permitted radial stress F_q	10 N	10 N
Permitted axial stress F_a	3 N	3 N
Weight	0.46 kg	0.46 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

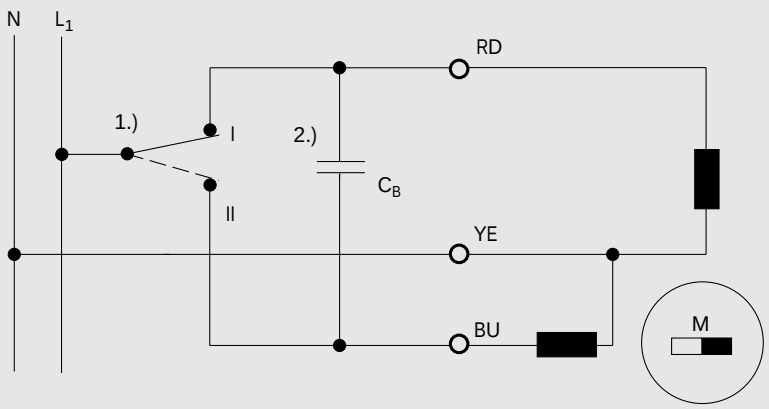
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	1.5 µF	1.5 µF	10 µF	10 µF	32 µF	32 µF
Rated current	100 mA	106 mA	266 mA	283 mA	464 mA	493 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

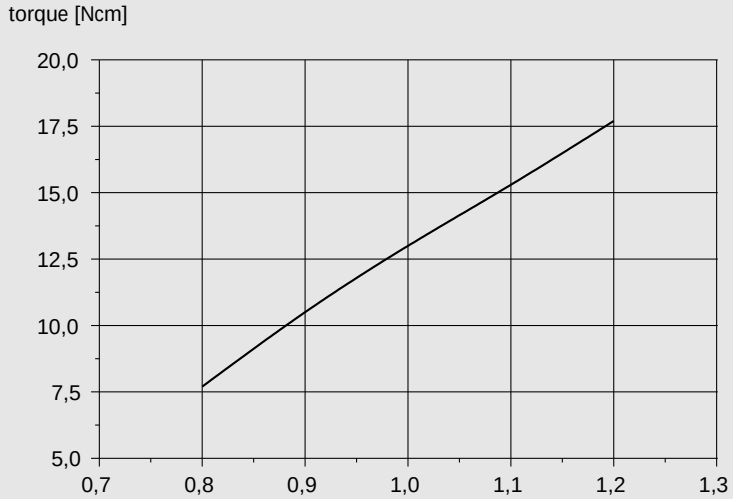
RSM 63/8 F



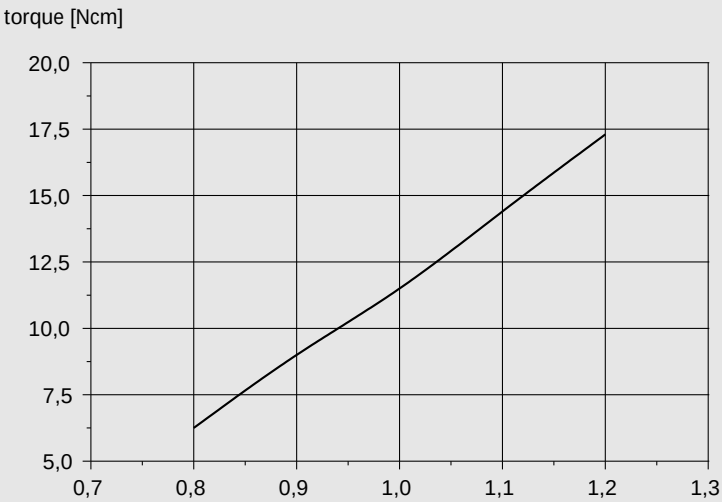
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 63/8

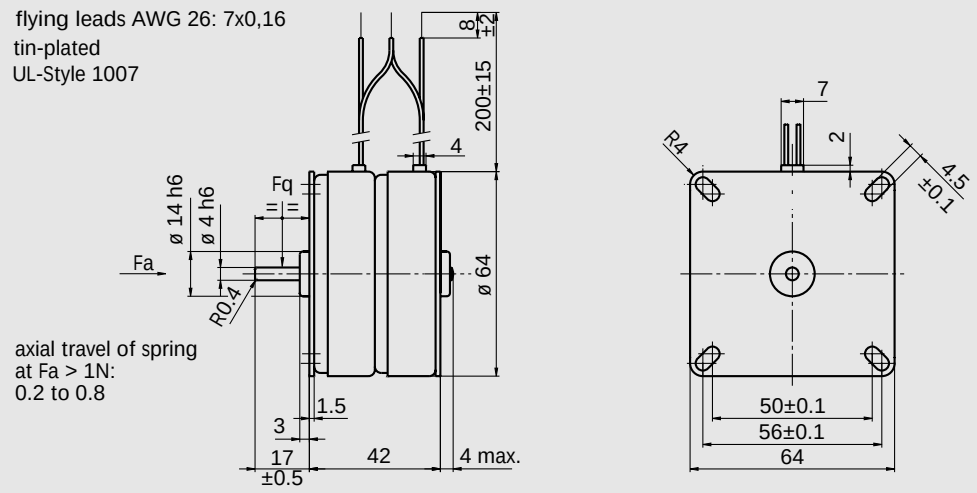


Characteristic curve RSM 63/8 at 50 Hz



Characteristic curve RSM 63/8 at 60 Hz

Synchronous motors
RSM 63/10 F



Scale drawing RSM 63/10

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	300 rpm	360 rpm
Synchronous torque	13.2 Ncm	10 Ncm
Delivery of power	4.2 W	3.8 W
Power consumption	10.2 W	10 W
Rated current (230 V)	45 mA	44 mA
Operating capacitor	0.33 µF	0.33 µF
Maximum externally permitted mass moment of inertia	230 gcm^2	160 gcm^2
Self-holding torque, type	2.1 Ncm	2.1 Ncm
Excess winding temperature	73 K	80 K
Permitted radial stress F_q	10 N	10 N
Permitted axial stress F_a	3 N	3 N
Weight	0.46 kg	0.46 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

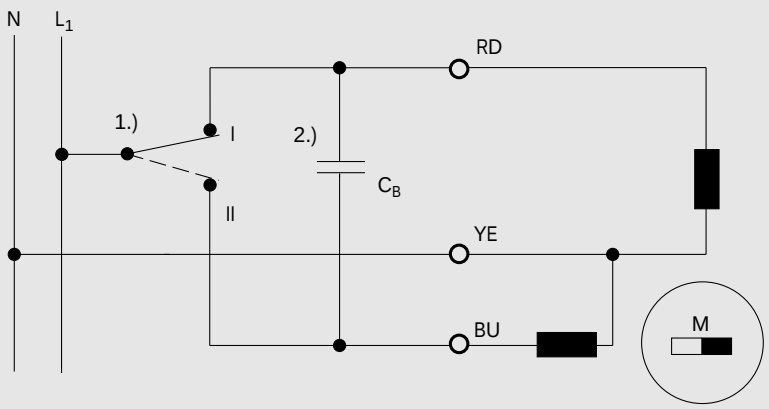
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	1.5 µF	1.5 µF	10 µF	10 µF	32 µF	32 µF
Rated current	97.9 mA	95.7 mA	254 mA	248 mA	439 mA	430 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

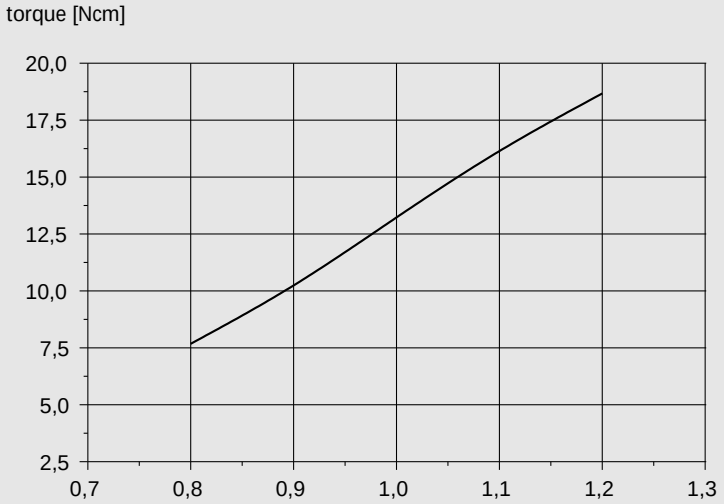
RSM 63/10 F



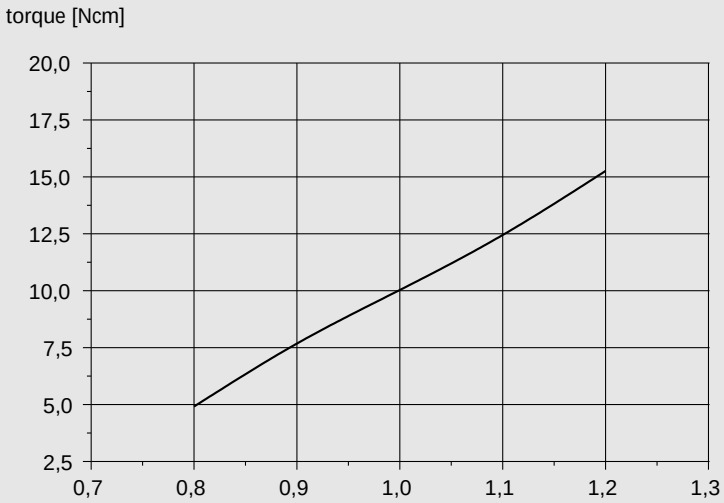
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 63/10

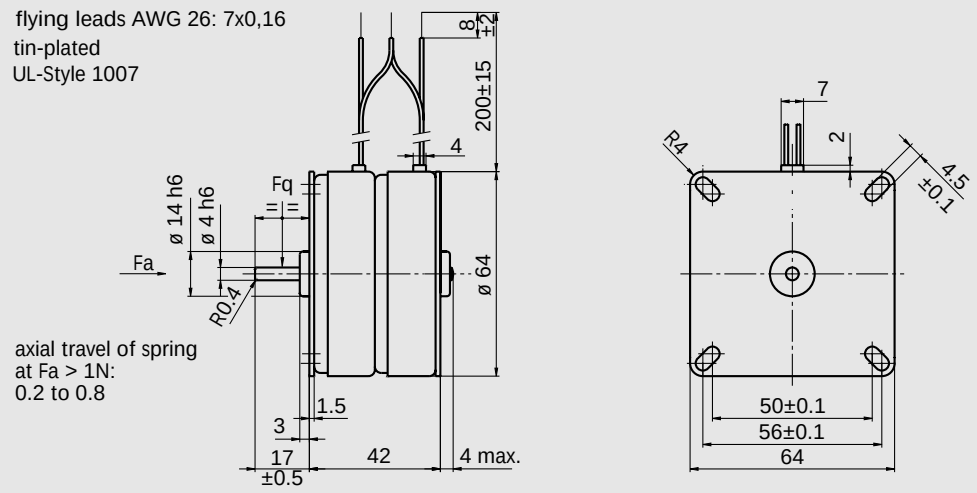


Characteristic curve RSM 63/10 at 50 Hz



Characteristic curve RSM 63/10 at 60 Hz

Synchronous motors
RSM 63/12 F



Scale drawing RSM 63/12

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	250 rpm	300 rpm
Synchronous torque	13.5 Ncm	10.4 Ncm
Delivery of power	3.5 W	3.25 W
Power consumption	8 W	7.7 W
Rated current (230 V)	36 mA	37 mA
Operating capacitor	0.25 µF	0.25 µF
Maximum externally permitted mass moment of inertia	270 gcm^2	240 gcm^2
Self-holding torque, type	1.5 Ncm	1.5 Ncm
Excess winding temperature	62 K	72 K
Permitted radial stress F_q	10 N	10 N
Permitted axial stress F_a	3 N	3 N
Weight	0.46 kg	0.46 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	E to DIN EN 60034-1	E
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

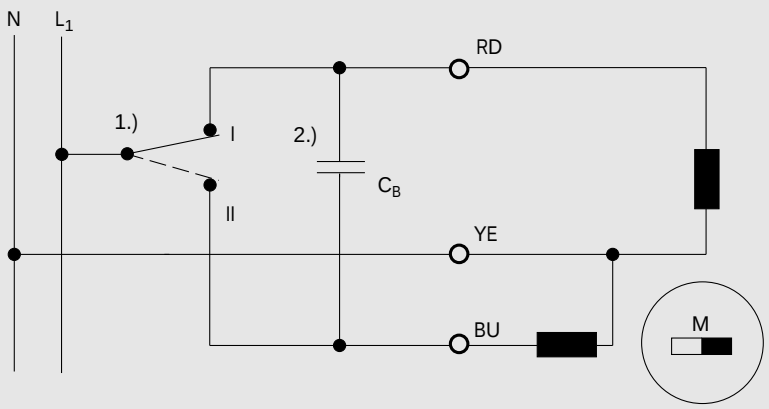
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	1.2 µF	1.2 µF	8.2 µF	8.2 µF	25 µF	25 µF
Rated current	78.3 mA	80.5 mA	203 mA	209 mA	352 mA	361 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

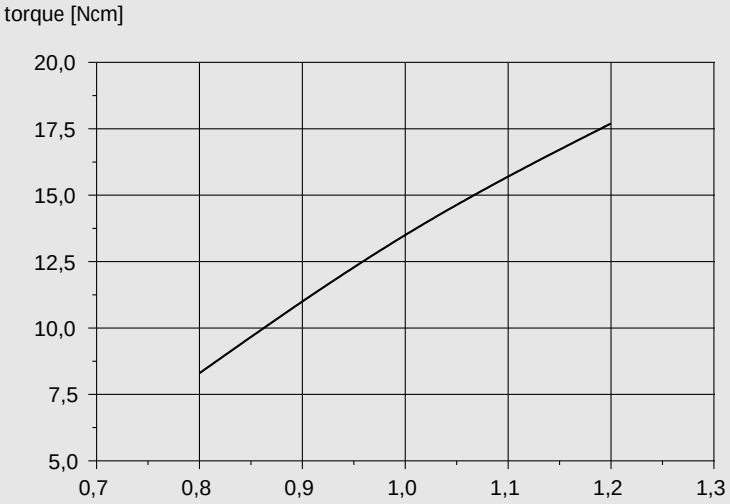
RSM 63/12 F



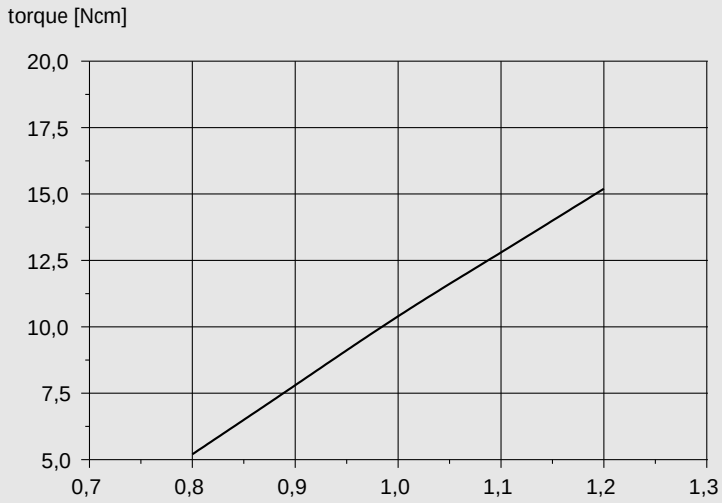
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 63/12

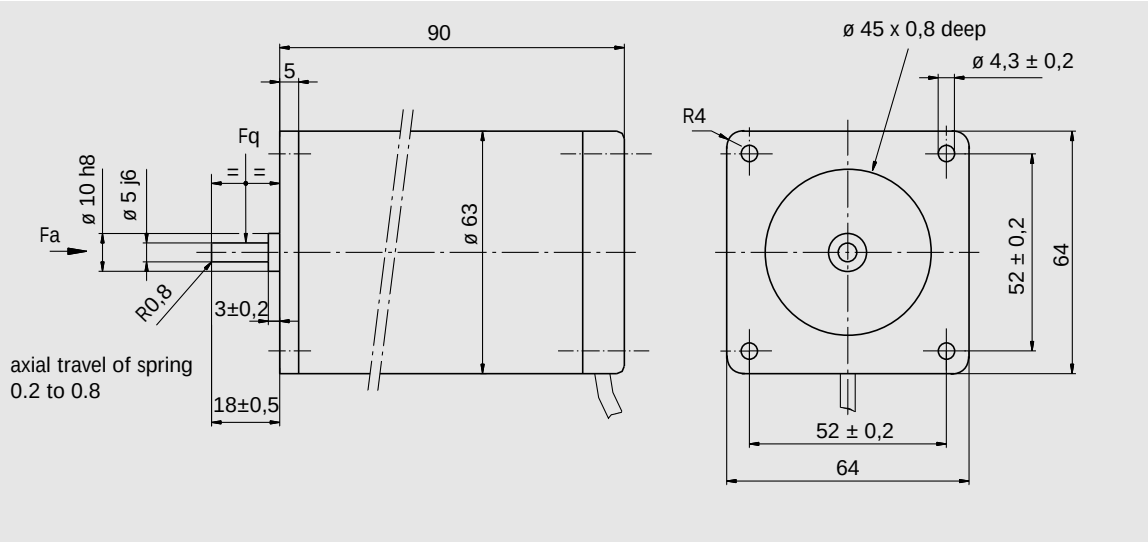


Characteristic curve RSM 63/12 at 50 Hz



Characteristic curve RSM 63/12 at 60 Hz

Synchronous motors
RSM 828/3 F



Scale drawing RSM 828/3

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	1000 rpm	1200 rpm
Synchronous torque	8.4 Ncm	7.8 Ncm
Delivery of power	8.8 W	9.9 W
Power consumption	17.1 W	19.3 W
Rated current (230 V)	75 mA	85 mA
Operating capacitor	0.5 µF	0.5 µF
Maximum externally permitted mass moment of inertia	55 gcm^2	30 gcm^2
Self-holding torque, type	2 Ncm	2 Ncm
Excess winding temperature	75 K	85 K
Permitted radial stress F_q	40 N	40 N
Permitted axial stress F_a	20 N	20 N
Weight	0.55 kg	0.55 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	B gemäß DIN EN 60034-1	B
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

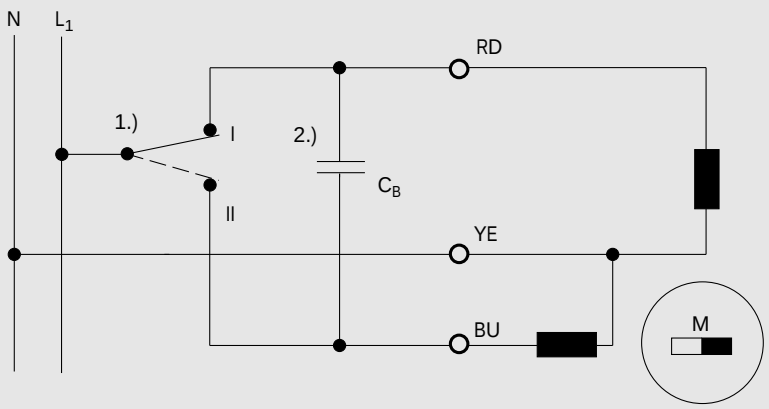
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	2 µF	2 µF	14 µF	14 µF	42 µF	42 µF
Rated current	145 mA	164 mA	370 mA	420 mA	726 mA	823 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

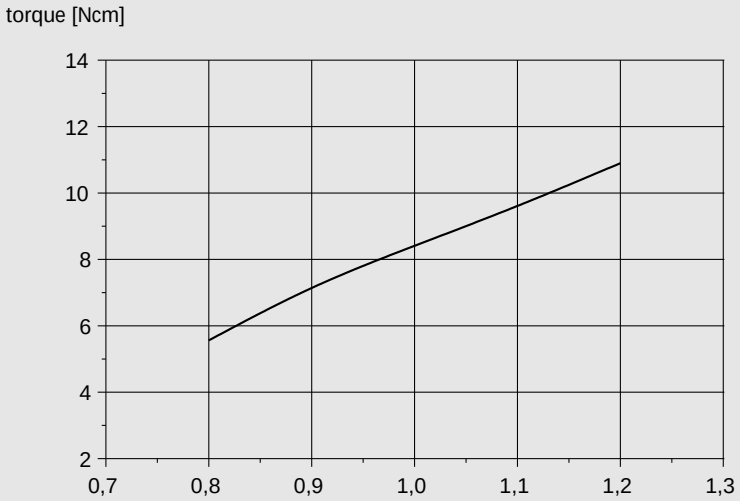
RSM 828/3 F



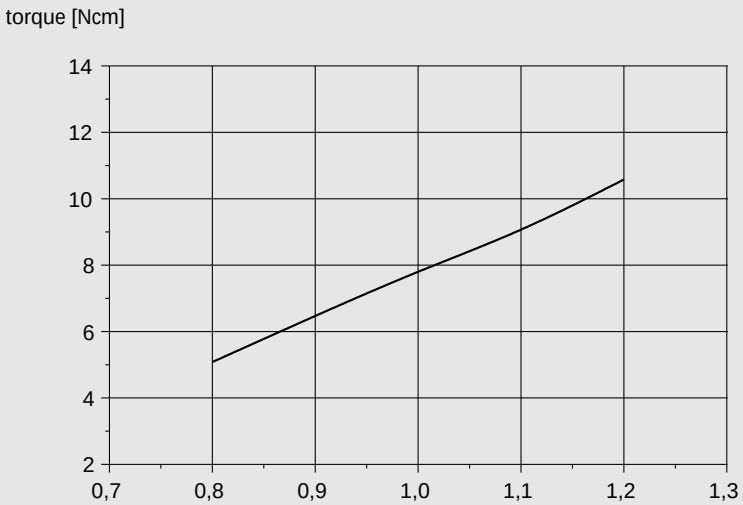
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 828/3

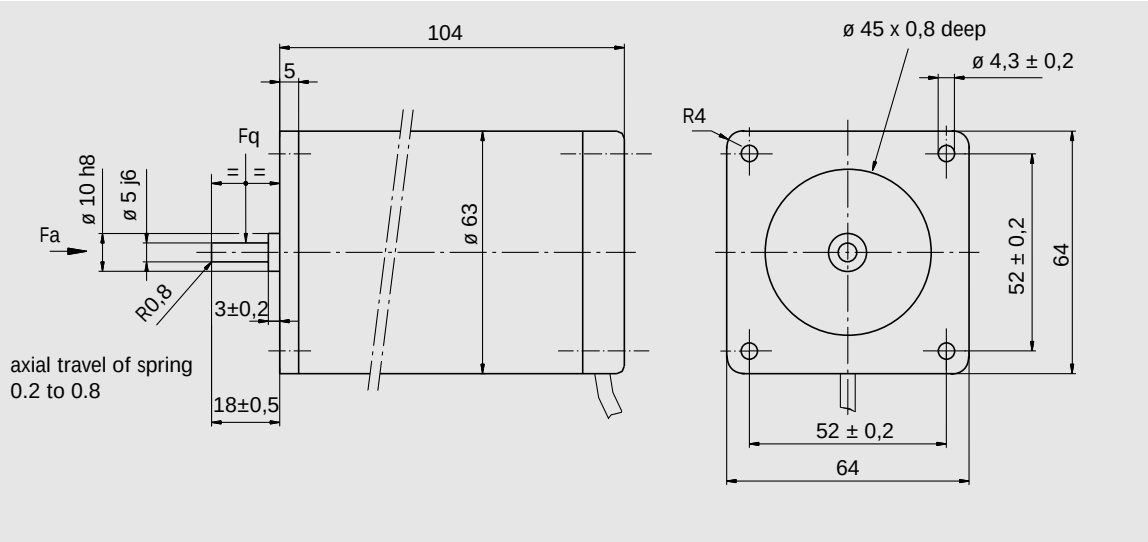


Characteristic curve RSM 828/3 at 50 Hz



Characteristic curve RSM 828/3 at 60 Hz

Synchronous motors
RSM 842/3 F



Scale drawing RSM 842/3

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	1000 rpm	1200 rpm
Synchronous torque	9.6 Ncm	9 Ncm
Delivery of power	10.1 W	11.3 W
Power consumption	20.7 W	23.7 W
Rated current (230 V)	92 mA	105 mA
Operating capacitor	0.6 µF	0.6 µF
Maximum externally permitted mass moment of inertia	80 gcm^2	40 gcm^2
Self-holding torque, type	3.4 Ncm	3.4 Ncm
Excess winding temperature	85 K	95 K
Permitted radial stress F_q	40 N	40 N
Permitted axial stress F_a	20 N	20 N
Weight	0.75 kg	0.75 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	B gemäß DIN EN 60034-1	B
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

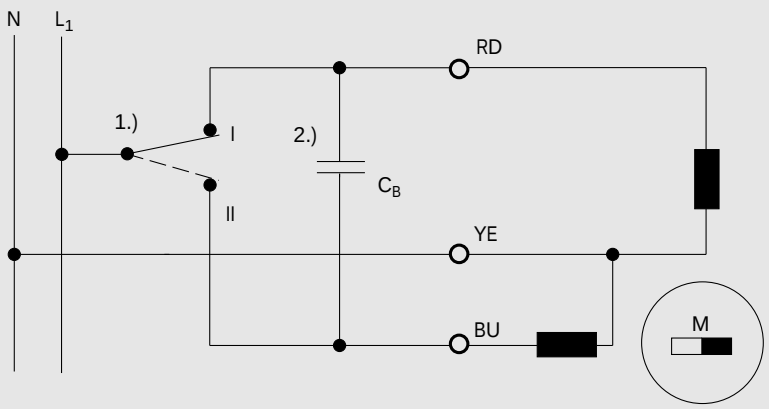
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	2.5 µF	2.5 µF	16 µF	16 µF	48 µF	48 µF
Rated current	180 mA	206 mA	462 mA	563 mA	828 mA	945 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

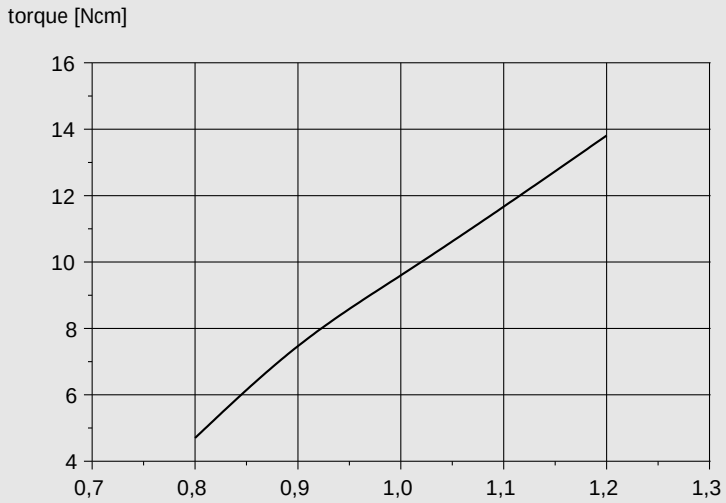
RSM 842/3 F



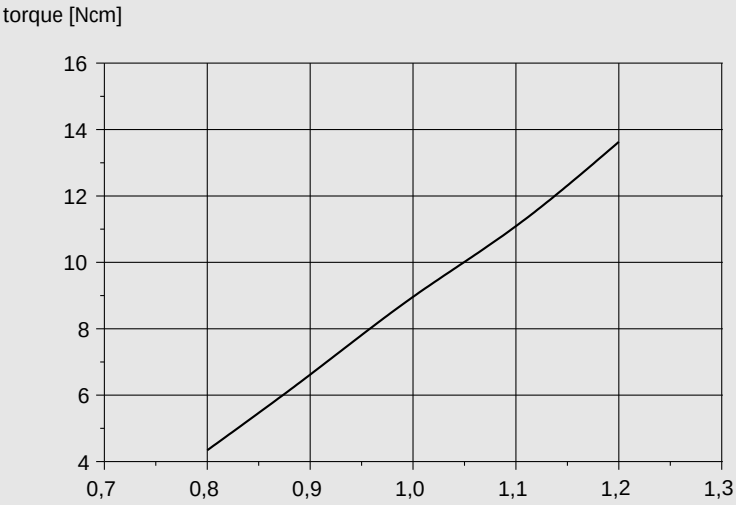
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 842/3

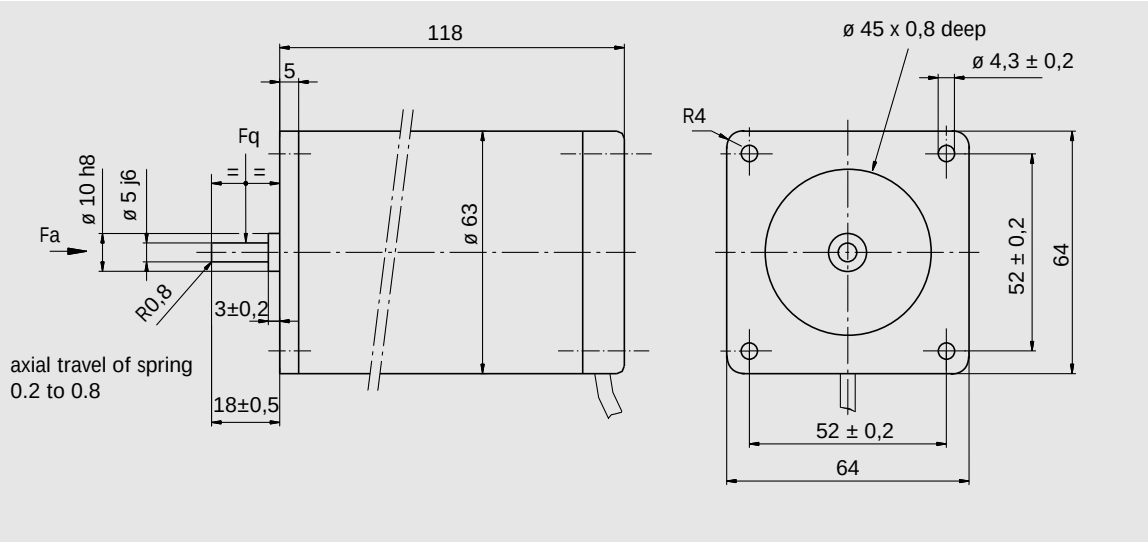


Characteristic curve RSM 842/3 at 50 Hz



Characteristic curve RSM 842/3 at 60 Hz

Synchronous motors
RSM 856/3 F



Scale drawing RSM 856/3

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	1000 rpm	1200 rpm
Synchronous torque	13.2 Ncm	12.6 Ncm
Delivery of power	13.9 W	15.8 W
Power consumption	24.6 W	27.6 W
Rated current (230 V)	109 mA	121 mA
Operating capacitor	0.68 µF	0.68 µF
Maximum externally permitted mass moment of inertia	140 gcm^2	65 gcm^2
Self-holding torque, type	4.1 Ncm	4.1 Ncm
Excess winding temperature	80 K	85 K
Permitted radial stress F_q	40 N	40 N
Permitted axial stress F_a	20 N	20 N
Weight	0.9 kg	0.9 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	B gemäß DIN EN 60034-1	B
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

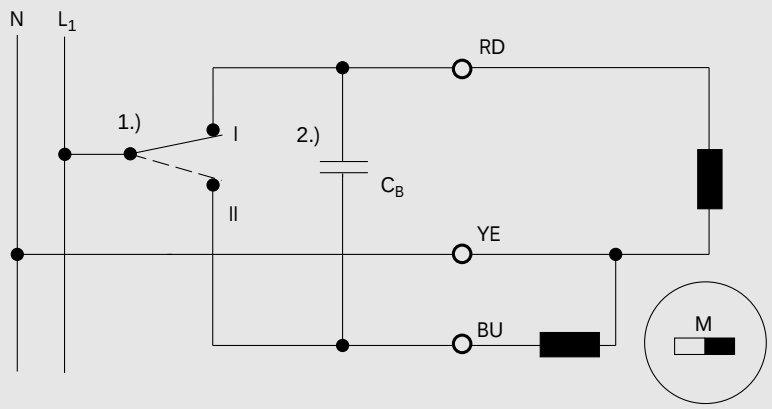
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	2.7 µF	2.7 µF	18 µF	18 µF	57 µF	57 µF
Rated current	214 mA	237 mA	545 mA	607 mA	981 mA	1089 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

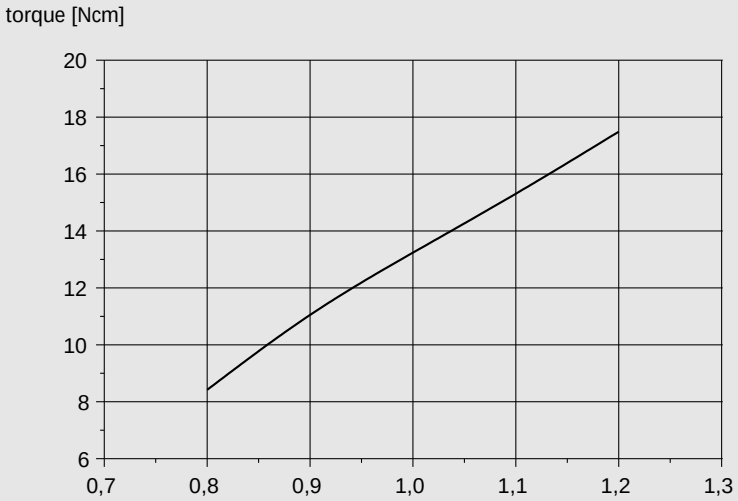
RSM 856/3 F



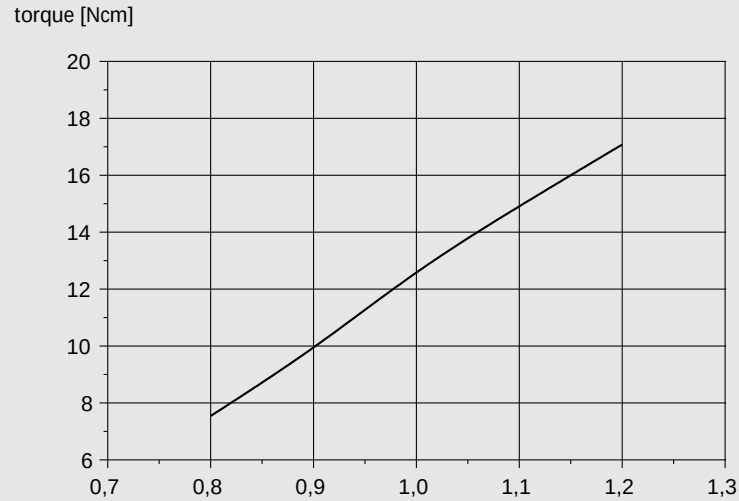
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 856/3

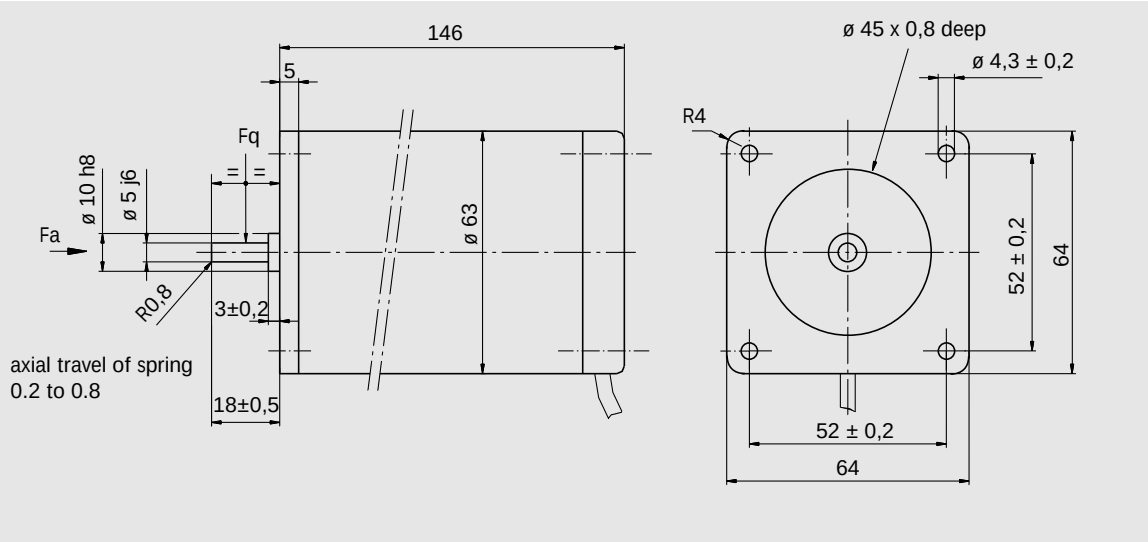


Characteristic curve RSM 856/3 at 50 Hz



Characteristic curve RSM 856/3 at 60 Hz

Synchronous motors
RSM 884/3 F



Scale drawing RSM 884/3

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	1000 rpm	1200 rpm
Synchronous torque	18.1 Ncm	15.3 Ncm
Delivery of power	18.9 W	19.2 W
Power consumption	30.1 W	33.7 W
Rated current (230 V)	134 mA	149 mA
Operating capacitor	0.82 µF	0.82 µF
Maximum externally permitted mass moment of inertia	150 gcm^2	70 gcm^2
Self-holding torque, type	6 Ncm	6 Ncm
Excess winding temperature	70 K	80 K
Permitted radial stress F_q	40 N	40 N
Permitted axial stress F_a	20 N	20 N
Weight	1.25 kg	1.25 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	B gemäß DIN EN 60034-1	B
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

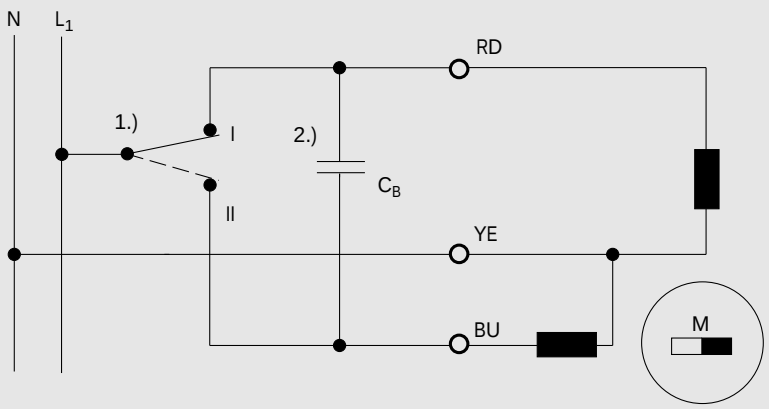
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	3.3 µF	3.3 µF	27 µF	27 µF	70 µF	70 µF
Rated current	278 mA	309 mA	763 mA	849 mA	1231 mA	1368 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

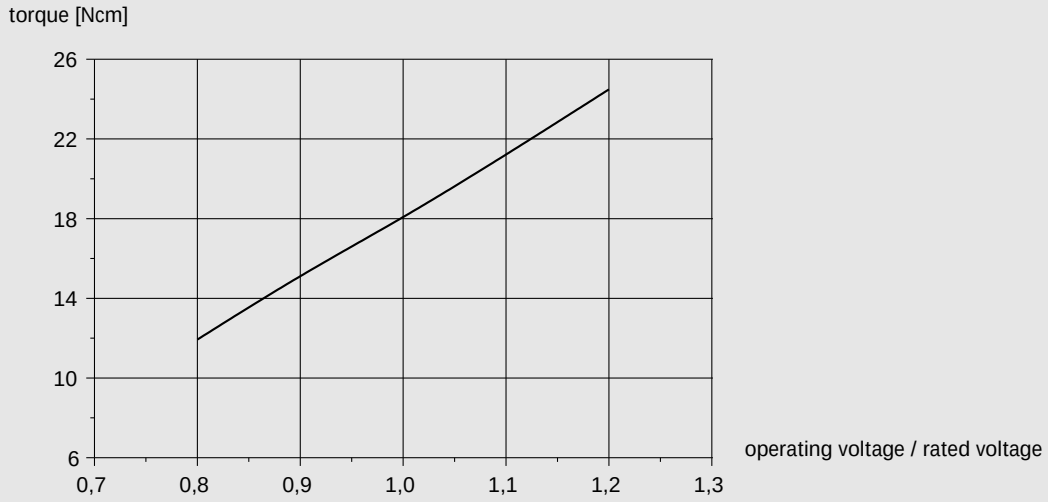
RSM 884/3 F



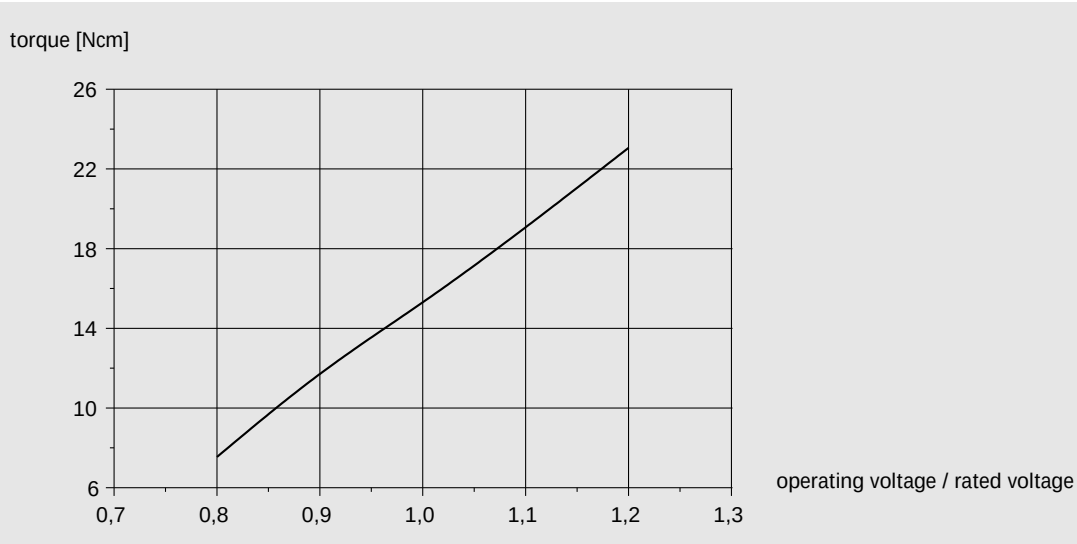
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 884/3

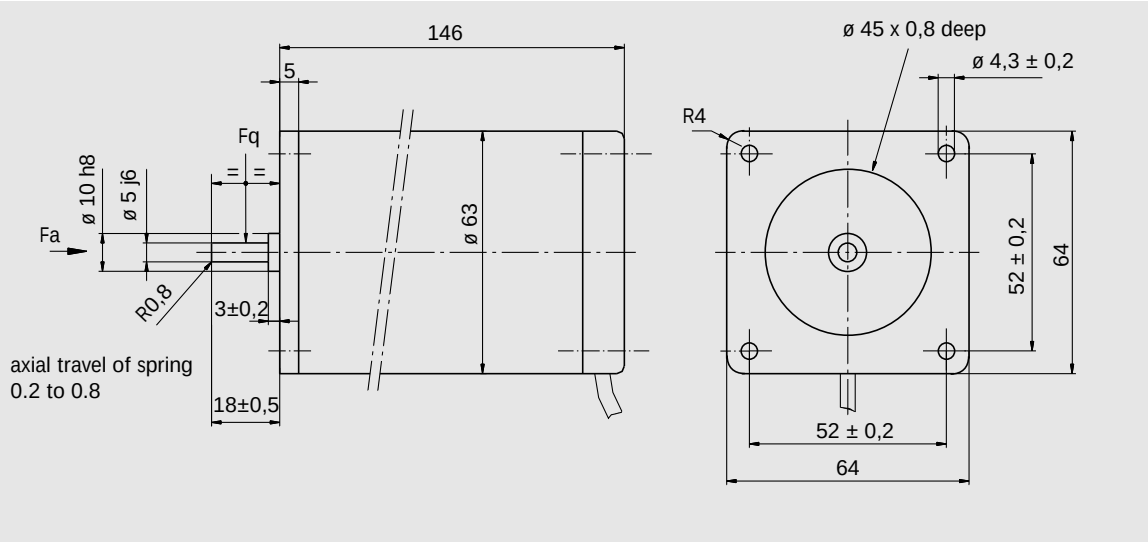


Characteristic curve RSM 884/3 at 50 Hz



Characteristic curve RSM 884/3 at 60 Hz

Synchronous motors
RSM 884/3 S



Scale drawing RSM 884/3 S

Technical Data

	Frequency	
	50 Hz	**60 Hz**
Speed	1000 rpm	1200 rpm
Synchronous torque	33 Ncm	31 Ncm
Delivery of power	35 W	32 W
Power consumption	70 W	74 W
Rated current (230 V)	308 mA	323 mA
Operating capacitor	2.2 µF	1.8 µF
Maximum externally permitted mass moment of inertia	250 gcm^2	150 gcm^2
Self-holding torque, type	6 Ncm	6 Ncm
Excess winding temperature in short-time operation	max. 85 K	max. 85 K
Permitted radial stress F_q	40 N	40 N
Permitted axial stress F_a	20 N	20 N
Weight	1.25 kg	1.25 kg
Protection grade	IP 41 to DIN EN 60529	IP 41
Insulation class	B gemäß DIN EN 60034-1	B
Dielectric strength	Momentary test, test voltage to DIN EN 60034-1	

Voltages

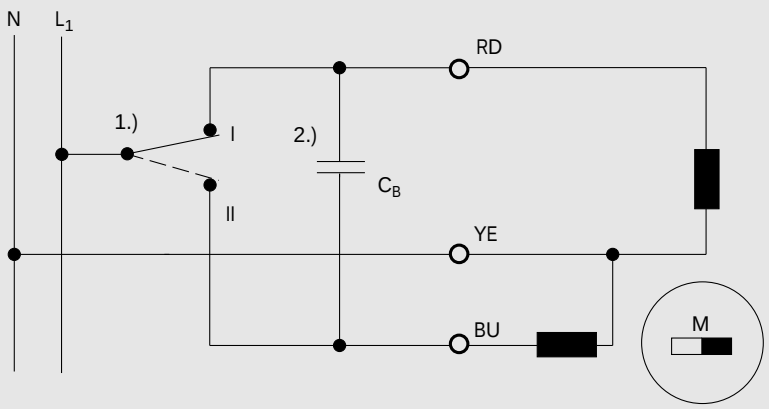
Rated voltage	**110 V**		**42 V**		**24 V**	
Frequency	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**	**50 Hz**	**60 Hz**
Operating capacitor	10 µF	8.2 µF	68 µF	56 µF	180 µF	150 µF
Rated current	670 mA	703 mA	1692 mA	1774 mA	2715 mA	2847 mA

Gearbox combinations

You will find gearbox combinations from page 113.

Synchronous motors

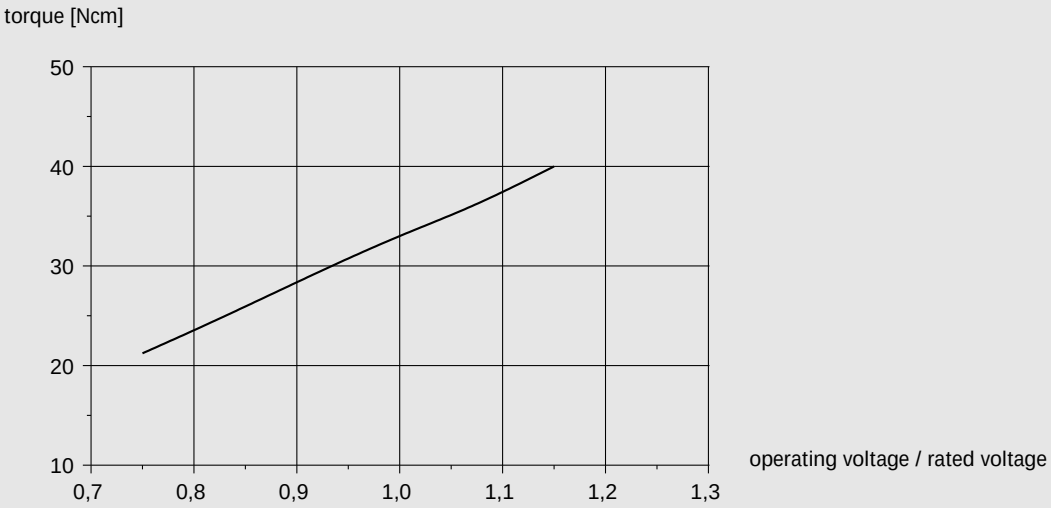
RSM 884/3 S



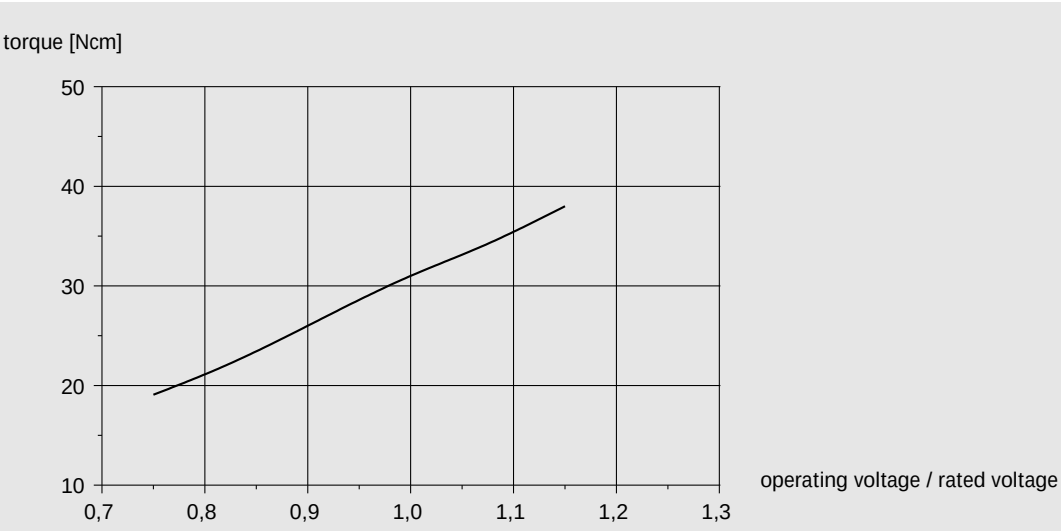
1.) switch position I = clockwise rotation
switch position II = anti-clockwise rotation

2.) C_B = operating capacitor

Connections RSM 884/3 S

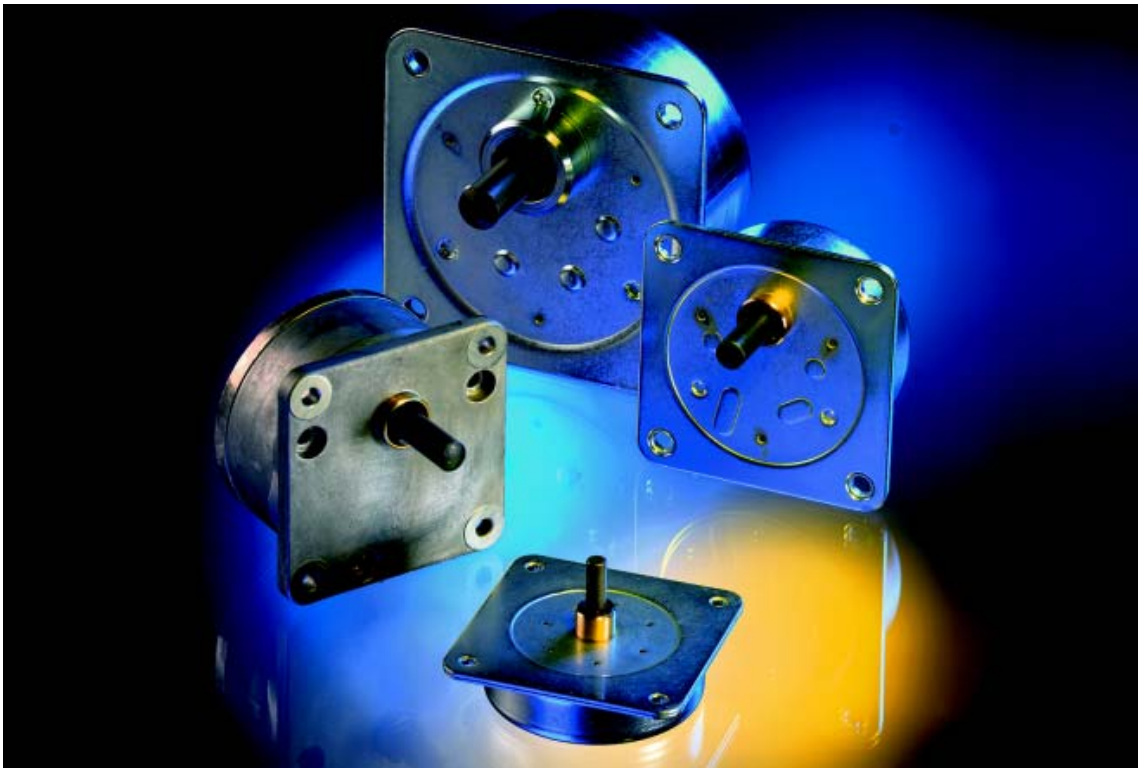


Characteristic curve RSM 884/3 S at 50 Hz



Characteristic curve RSM 884/3 S at 60 Hz

Synchronous motors
with geared motors

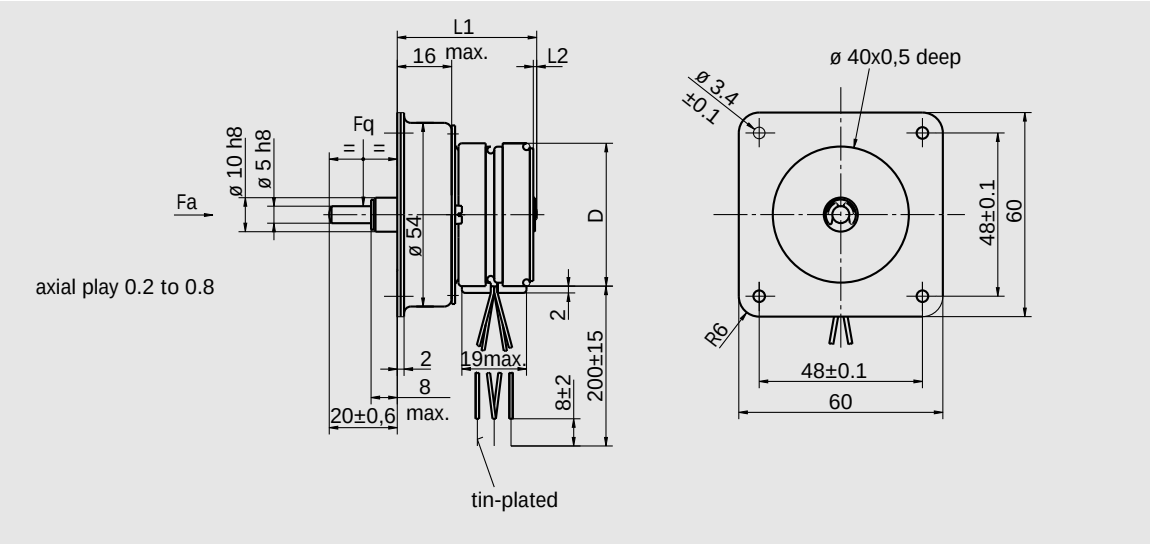


Motor-/ Gearbox combination Synchronous motors (RSM)

Motor type RSM	Gearbox type			
	L	T	G	P
36/8	✓	✓	✓	
36/10			✓	
42/8	✓	✓	✓	
51/8	✓	✓	✓	
63/8			✓	
63/10		✓	✓	
828			✓	✓
842			✓	
856			✓	
884			✓	
884 S			✓	✓

Synchronous motors

Synchronous motors
with gearbox type L



The illustration shows the combination of an RSM 42/8 with gearbox type L and stands for all following combinations of motor and gearbox.

Dimensions for combinations with RSM 36/8, 42/8 and 51/8

Motor type	D	L1	L2
RSM 36/8	36 mm	max. 40 mm	max. 3.5 mm
RSM 42/8	42 mm	max. 41 mm	max. 1.5 mm
RSM 51/8	50 mm	max. 45 mm	max. 3 mm

Gearbox type L

	Values
Max. torque M on the driven shaft	30 Ncm Danger of gear breaking if exceeded!
Permitted radial stress F_q	5 N
Permitted axial stress F_a	2 N
Corrosion protection	Housing finish zinc-plated
Driven Shaft	Nitrided
Bearings	Plain bearings
Seal at shaft exit	none

Synchronous motors

with gearbox type L

Gearbox type L withRSM 36/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	4 Ncm	4 Ncm	60 rpm	72 rpm	6.25
24 V	16 Ncm	15 Ncm	15.0 rpm	18.0 rpm	25
24 V	19 Ncm	18 Ncm	12.5 rpm	15.0 rpm	30
24 V	max. 30 Ncm	max. 30 Ncm	5.0 rpm	6.0 rpm	75
24 V, 230 V	max. 30 Ncm	max. 30 Ncm	1.0 rpm	1.2 rpm	375

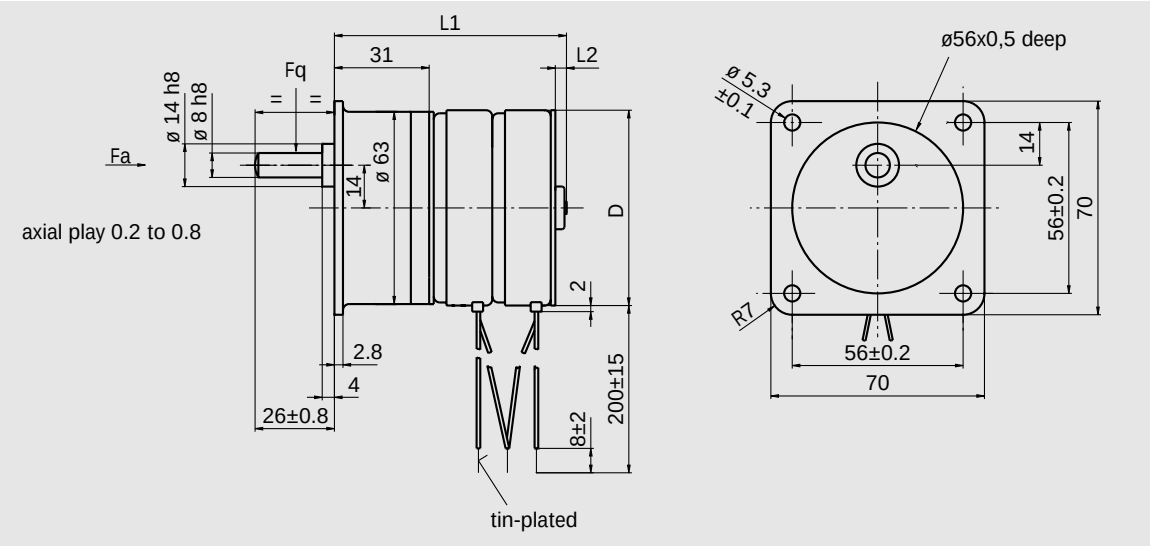
Gearbox type L with RSM 42/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	13 Ncm	12 Ncm	75.0 rpm	90.0 rpm	5
24 V, 230 V	16 Ncm	15 Ncm	60.0 rpm	72.0 rpm	6.25
24 V, 230 V	max. 30 Ncm	30 Ncm	30.0 rpm	36.0 rpm	12.5
24 V, 230 V	max. 30 Ncm	max. 30 Ncm	25.0 rpm	30.0 rpm	15
24 V, 230 V	max. 30 Ncm	max. 30 Ncm	15.0 rpm	18.0 rpm	25
24 V, 230 V	max. 30 Ncm	max. 30 Ncm	12.5 rpm	15.0 rpm	30

Gearbox type L with RSM 51/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	max. 30 Ncm	max. 30 Ncm	3.0 rpm	3.6 rpm	125

Synchronous motors
with gearbox type T



The illustration shows the combination of an RSM 63/8 with gearbox type T and stands for all following combinations of motor and gearbox.

Dimensions for combinations with RSM 36/8, 42/8, 51/8 and 63/10

Motor type	D	L1	L2
RSM 36/8	36 mm	max. 55 mm	max. 3.5 mm
RSM 42/8	42 mm	max. 56 mm	max. 1.5 mm
RSM 51/8	50 mm	max. 60 mm	max. 3 mm
RSM 63/10	63 mm	max. 77 mm	max. 4 mm

Gearbox type T

	Values
Max. torque M on the driven shaft	300 Ncm Danger of gear breaking if exceeded!
Permitted radial stress F_q	30 N
Permitted axial stress F_a	20 N
Corrosion protection	Housing finish zinc-plated
Driven shaft	Nitrided
Bearings	Plain bearings
Seal at shaft exit	Washer

Synchronous motors
with gearbox type T

Gearbox type T with RSM 36/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V	76 Ncm	71 Ncm	2.5 rpm	3.0 rpm	150
230 V	95 Ncm	89 Ncm	2.0 rpm	2.4 rpm	187.5
24 V	189 Ncm	177 Ncm	1.0 rpm	1.2 rpm	375

Gearbox type T with RSM 42/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	56 Ncm	53 Ncm	15.0 rpm	18.0 rpm	25
24 V, 230 V	84 Ncm	80 Ncm	10.0 rpm	12.0 rpm	37.5
230 V	112 Ncm	106 Ncm	7.5 rpm	9.0 rpm	50
24 V, 230 V	168 Ncm	159 Ncm	5.0 rpm	6.0 rpm	75
24 V, 230 V	189 Ncm	179 Ncm	4.0 rpm	4.8 rpm	93.75
230 V	max. 300 Ncm	286 Ncm	2.5 rpm	3.0 rpm	150
230 V	max. 300 Ncm	max. 300 Ncm	1.0 rpm	1.2 rpm	375

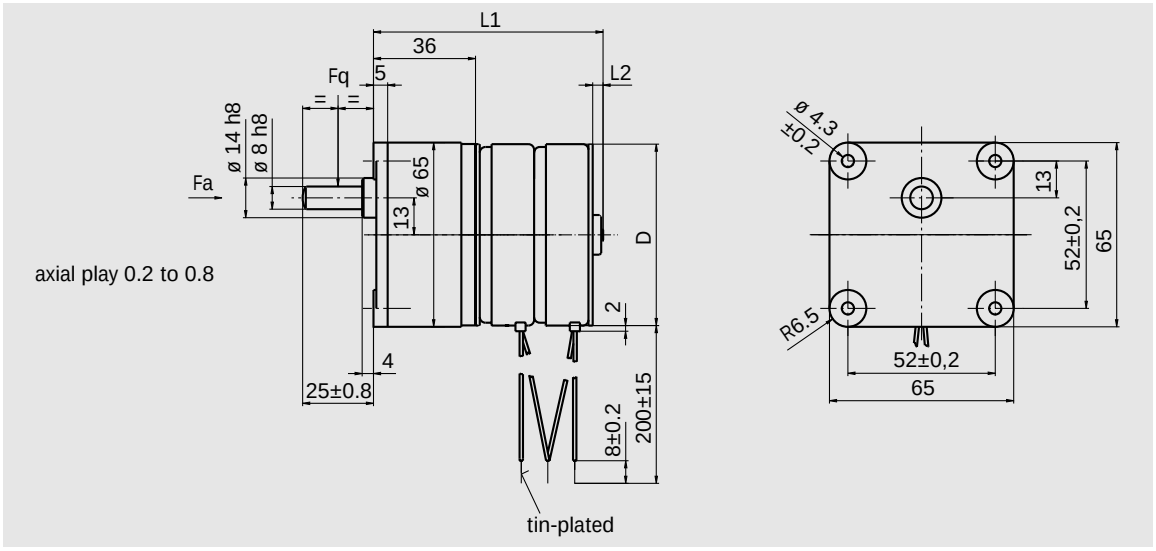
Gearbox type T with RSM 51/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	36 Ncm	34 Ncm	30.0 rpm	36.0 rpm	12.5
230 V	109 Ncm	103 Ncm	10.0 rpm	12.0 rpm	37.5
230 V	219 Ncm	205 Ncm	5.0 rpm	6.0 rpm	75
230 V	max. 300 Ncm	max. 300 Ncm	2 rpm	2.40 rpm	187.5
230 V	max. 300 Ncm	max. 300 Ncm	0.5 rpm	0.6 rpm	750

Gearbox type T with RSM 63/10

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	30 Ncm	23 Ncm	120.0 rpm	144.0 rpm	2.5
24 V, 230 V	67 Ncm	51 Ncm	48.0 rpm	57.6 rpm	6.25
24 V, 230 V	80 Ncm	61 Ncm	40.0 rpm	48.0 rpm	7.5
24 V, 230 V	180 Ncm	137 Ncm	16.0 rpm	19.2 rpm	18.75
24 V, 230 V	max. 300 Ncm	273 Ncm	8.0 rpm	9.6 rpm	37.5

Synchronous motors
with gearbox type G



The illustration shows the combination of an RSM 63/8 with gearbox type G and stands for all following combinations of motor and gearbox.

Dimensions for combinations with RSM 36/x, 42/8, 51/8 und 63/x

Motor type	D	L1	L2
RSM 36/x	36 mm	max. 70 mm	max. 3.5 mm
RSM 42/x	42 mm	max. 60 mm	max. 1.5 mm
RSM 63/x	63 mm	max. 88 mm	max. 4 mm

Gearbox type G

	Values
Max. torque M on the driven shaft	600 Ncm Danger of gear breaking if exceeded!
Permitted radial stress F_q	40 N
Permitted axial stress F_a	20 N
Corrosion protection	Housing finish zinc-plated
Driven shaft	Nitrided
Bearings	Plain bearings
Seal at shaft exit	Washer

Synchronous motors
with gearbox type G

Gearbox type G with RSM 36/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	max. 600 Ncm	max. 600 Ncm	7.5 h^{-1}	9.0 h^{-1}	3000

Gearbox type G with RSM 36/10

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	max. 600 Ncm	582 Ncm	12.0 h^{-1}	14.4 h^{-1}	1500
230 V	max. 600 Ncm	max. 600 Ncm	6.0 h^{-1}	7.2 h^{-1}	3000
24 V, 230 V	max. 600 Ncm	max. 600 Ncm	1.0 h^{-1}	1.2 h^{-1}	18000
230 V	max. 600 Ncm	max. 600 Ncm	0.33 h^{-1}	0.4 h^{-1}	54000
24 V	max. 600 Ncm	max. 600 Ncm	0.08 h^{-1}	0.1 h^{-1}	216000

Gearbox type G with RSM 42/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V	max. 600 Ncm	max. 600 Ncm	1.0 rpm	1.2 rpm	375
24 V	max. 600 Ncm	max. 600 Ncm	15.0 h^{-1}	18.0 h^{-1}	1500

Gearbox type G with RSM 51/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	55 Ncm	51 Ncm	20.0 rpm	24.0 rpm	18.75
230 V	73 Ncm	68 Ncm	15.0 rpm	18.0 rpm	25
230 V	146 Ncm	137 Ncm	7.5 rpm	9.0 rpm	50
230 V	164 Ncm	154 Ncm	6.0 rpm	7.2 rpm	62.5
230 V	197 Ncm	185 Ncm	5.0 rpm	6.0 rpm	75
230 V	246 Ncm	231 Ncm	4.0 rpm	4.8 rpm	93.75
230 V	354 Ncm	332 Ncm	2.5 rpm	3.0 rpm	150
230 V	max. 600 Ncm	max. 600 Ncm	1.0 rpm	1.2 rpm	375

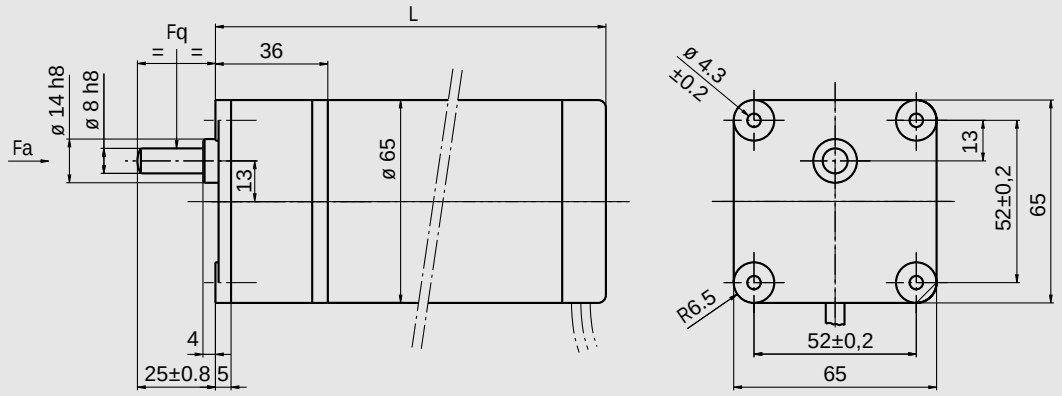
Gearbox type G with RSM 63/8

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	237 Ncm	213 Ncm	15.0 rpm	18.0 rpm	25
24 V, 230 V	474 Ncm	427 Ncm	7.5 rpm	9.0 rpm	50
24 V, 230 V	533 Ncm	480 Ncm	6.0 rpm	7.2 rpm	62.5

Gearbox type G with RSM 63/10

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	481 Ncm	365 Ncm	6.0 rpm	7.2 rpm	50
24 V, 230 V	max. 600 Ncm	max. 600 Ncm	2.0 rpm	2.4 rpm	150

Synchronous motors
with gearbox type G



axial play 0.2 to 0.8

Dimensions for combinations with RSM 8xx

Motor type	L
RSM 828	126 mm
RSM 842	140 mm
RSM 856	154 mm
RSM 884	182 mm

Gearbox type G

	Values
Max. torque M on the driven shaft	600 Ncm Danger of gear breaking if exceeded!
Permitted radial stress F_q	40 N
Permitted axial stress F_a	20 N
Corrosion protection	Housing finish zinc plated
Driven shaft	Nitrided
Bearings	Plain bearings
Seal at shaft exit	Washer

Synchronous motors
with gearbox type G

Gearbox type G with RSM 828

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	43 Ncm	40 Ncm	160 rpm	192 rpm	6.25
24 V, 230 V	61 Ncm	57 Ncm	100.0 rpm	120.0 rpm	10
24 V, 230 V	77 Ncm	71 Ncm	80.0 rpm	96.0 rpm	12.5
24 V, 230 V	102 Ncm	95 Ncm	60.0 rpm	72.0 rpm	16.66
24 V, 230 V	123 Ncm	114 Ncm	50.0 rpm	60.0 rpm	20
24 V, 230 V	184 Ncm	171 Ncm	30.0 rpm	36.0 rpm	33.3
24 V, 230 V	230 Ncm	213 Ncm	24.0 rpm	28.8 rpm	41.66
24 V, 230 V	367 Ncm	341 Ncm	15.0 rpm	18.0 rpm	66.66
24 V, 230 V	459 Ncm	426 Ncm	12.0 rpm	14.4 rpm	83.33
24 V, 230 V	496 Ncm	461 Ncm	10.0 rpm	12.0 rpm	100
24 V, 230 V	max. 600 Ncm	576 Ncm	8.0 rpm	9.6 rpm	125
24 V, 230 V	max. 600 Ncm	max. 600 Ncm	6.0 rpm	7.2 rpm	166.66
24 V, 230 V	max. 600 Ncm	max. 600 Ncm	5.0 rpm	6.0 rpm	200
24 V, 230 V	max. 600 Ncm	max. 600 Ncm	4.0 rpm	4.8 rpm	250
230 V	max. 600 Ncm	max. 600 Ncm	3.0 rpm	3.6 rpm	333.33

Gearbox type G with RSM 842

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	71 Ncm	66 Ncm	100.0 rpm	120.0 rpm	10
24 V, 230 V	117 Ncm	109 Ncm	60.0 rpm	72.0 rpm	16.66
24 V, 230 V	140 Ncm	131 Ncm	50.0 rpm	60.0 rpm	20
24 V, 230 V	175 Ncm	164 Ncm	40.0 rpm	48.0 rpm	25
24 V, 230 V	210 Ncm	197 Ncm	30.0 rpm	36.0 rpm	33.33
24 V, 230 V	262 Ncm	246 Ncm	24.0 rpm	28.8 rpm	41.66
24 V, 230 V	420 Ncm	394 Ncm	15.0 rpm	18.0 rpm	66.66
230 V	525 Ncm	492 Ncm	12.0 rpm	14.4 rpm	83.33
24 V, 230 V	567 Ncm	531 Ncm	10.0 rpm	12.0 rpm	100
230 V	max. 600 Ncm	max. 600 Ncm	8.0 rpm	9.6 rpm	125

Gearbox type G with RSM 856

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	54 Ncm	51 Ncm	200.0 rpm	240.0 rpm	5
24 V, 230 V	160 Ncm	153 Ncm	60.0 rpm	72.0 rpm	16.66
24 V, 230 V	289 Ncm	276 Ncm	30.0 rpm	36.0 rpm	33.33
24 V, 230 V	433 Ncm	413 Ncm	20.0 rpm	24.0 rpm	50
24 V, 230 V	max. 600 Ncm	max. 600 Ncm	10.0 rpm	12.0 rpm	100
230 V	max. 600 Ncm	max. 600 Ncm	8.0 rpm	9.6 rpm	125
230 V	max. 600 Ncm	max. 600 Ncm	6.0 rpm	7.2 rpm	166.66

Synchronous motors
with gearbox type G

Gearbox type G with RSM 884

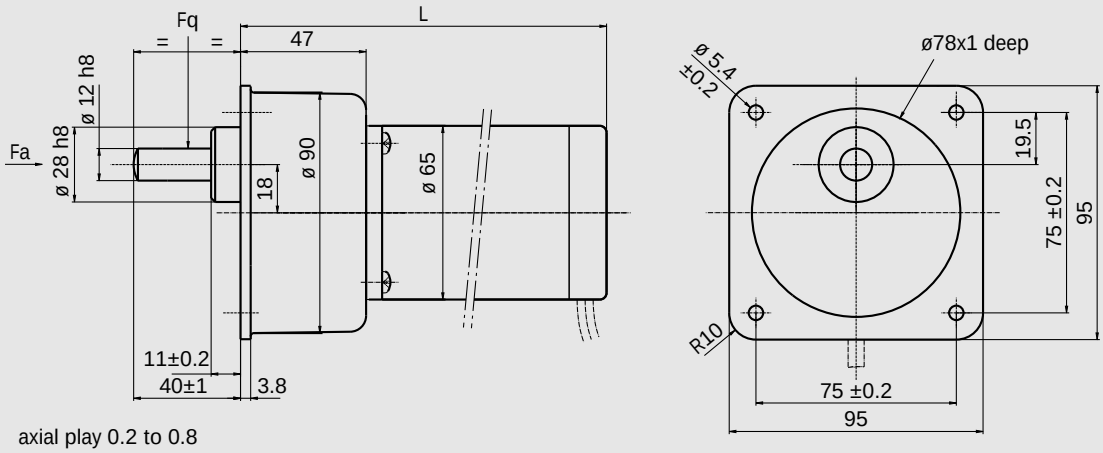
Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	132 Ncm	112 Ncm	100.0 rpm	120.0 rpm	10
24 V, 230 V	220 Ncm	186 Ncm	60.0 rpm	72.0 rpm	16.66
24 V, 230 V	264 Ncm	223 Ncm	50.0 rpm	60.0 rpm	20
24 V, 230 V	330 Ncm	279 Ncm	40.0 rpm	48.0 rpm	25
24 V, 230 V	396 Ncm	335 Ncm	30.0 rpm	36.0 rpm	33.33
230 V	495 Ncm	418 Ncm	24.0 rpm	28.8 rpm	41.66

Gearbox type G with RSM 884 S

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
230 V	134 Ncm	126 Ncm	200.0 rpm	240.0 rpm	5
230 V	167 Ncm	157 Ncm	160.0 rpm	192.0 rpm	6.25
230 V	241 Ncm	226 Ncm	100.0 rpm	120.0 rpm	10
24 V, 230 V	301 Ncm	283 Ncm	80.0 rpm	96.0 rpm	12.5
230 V	401 Ncm	377 Ncm	60.0 rpm	72.0 rpm	16.66
230 V	481 Ncm	452 Ncm	50.0 rpm	60.0 rpm	20
24 V	max. 600 Ncm	565 Ncm	40.0 rpm	48.0 rpm	25
24 V, 230 V	max. 600 Ncm	max. 600 Ncm	30.0 rpm	36.0 rpm	33.33
230 V	max. 600 Ncm	max. 600 Ncm	24.0 rpm	28.8 rpm	41.66
230 V	max. 600 Ncm	max. 600 Ncm	20.0 rpm	24.0 rpm	50
230 V	max. 600 Ncm	max. 600 Ncm	10.0 rpm	12.0 rpm	100

Synchronous motors

with gearbox type P



axial play 0.2 to 0.8

Dimensions for combinations with RSM 828 und 884 S

Motor type	L
RSM 828	137 mm
RSM 884 S	193 mm

Gearbox type P

	Values
Max. torque M on the driven shaft	1000 Ncm Danger of gear breaking if exceeded!
Permitted radial stress F_q	60 N
Permitted axial stress F_a	40 N
Corrosion protection	Housing finish zinc-plated
Driven shaft	Nitrided
Bearings	Plain bearings
Seal at shaft exit	Washer

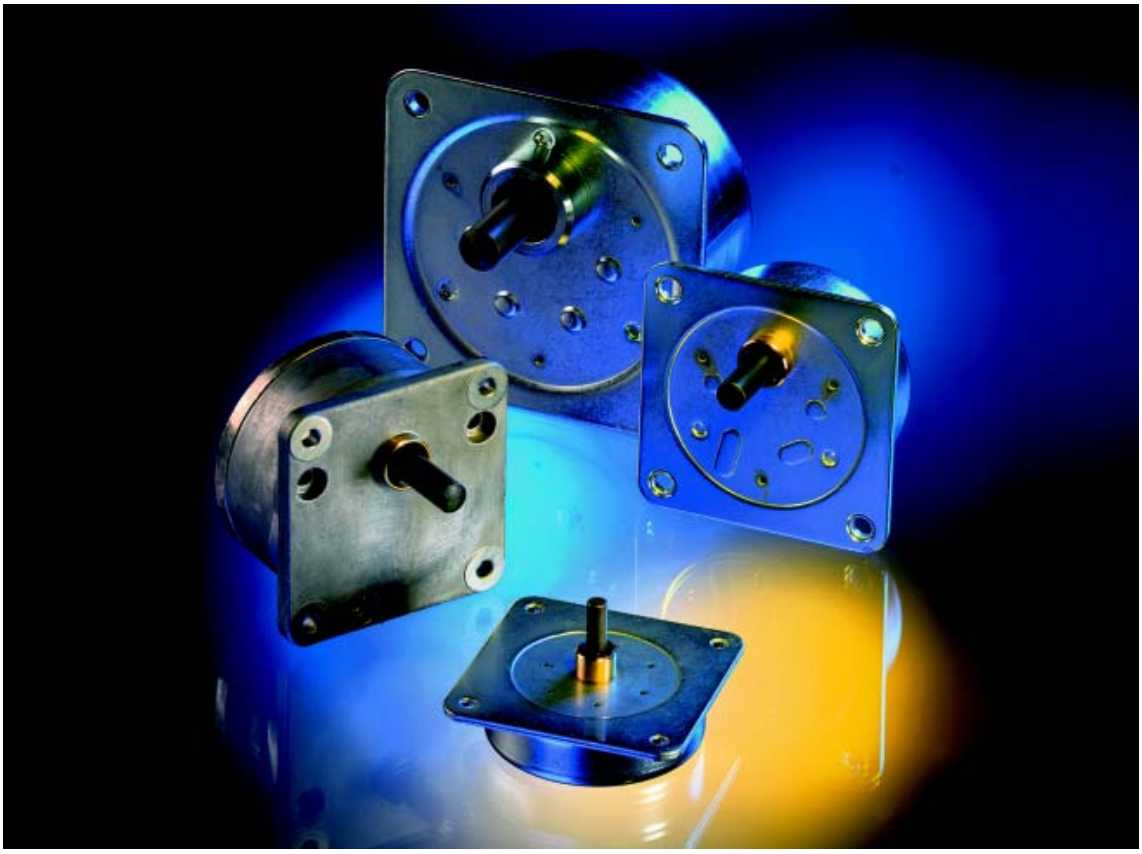
Synchronous motors
with gearbox type P

Gearbox type P with RSM 828

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	345 Ncm	320 Ncm	16.0 rpm	19.2 rpm	62.5
24 V, 230 V	689 Ncm	640 Ncm	8.0 rpm	9.6 rpm	125
24 V, 230 V	max. 1000 Ncm	max. 1000 Ncm	4.0 rpm	4.8 rpm	250
24 V, 230 V	max. 1000 Ncm	max. 1000 Ncm	2.5 rpm	3.0 rpm	400
24 V, 230 V	max. 1000 Ncm	max. 1000 Ncm	2.0 rpm	2.4 rpm	500

Gearbox type P with RSM 884 S

Motor voltage	Torque M on driven shaft		Driven shaft speed n		Transmission ratio i
	50 Hz	60 Hz	50 Hz	60 Hz	
24 V, 230 V	601 Ncm	565 Ncm	40.0 rpm	48.0 rpm	25
230 V	902 Ncm	848 Ncm	26.7 rpm^{-1}	32.0 rpm	37.5
24 V, 230 V	max. 1000 Ncm	max. 1000 Ncm	20.0 rpm	24.0 rpm	50
24 V, 230 V	max. 1000 Ncm	max. 1000 Ncm	16.0 rpm	19.2 rpm	62.5
230 V	max. 1000 Ncm	max. 1000 Ncm	13.3 rpm	16.0 rpm	75
24 V, 230 V	max. 1000 Ncm	max. 1000 Ncm	10.7 rpm	12.8 rpm	93.75
24 V, 230 V	max. 1000 Ncm	max. 1000 Ncm	10.0 rpm	12.0 rpm	100
230 V	max. 1000 Ncm	max. 1000 Ncm	6.7 rpm	8.0 rpm	150



Geared motors

Gear motors from Berger Lahr ensure precise movement in many areas of drive technology. Different gearbox types in connection with synchronous motors (RSM) or EC motors (RECM) make a wide variety of transmission options available specially tailored to individual customer needs. You can also obtain further motor/gearbox combinations with different torques, driven shaft speeds or transmission ratios on request.

Overview of gearbox types

Gearbox type	Max. continuous torque [Ncm]	Permitted radial stress F_q [N]	Permitted axial stress F_a [N]	Described on...
L	30	5	2	Page 115
T	300	30	20	Page 117
G	600	40	20	Page 119
P	1000	60	40	Page 124
P42	1500	300	100	Page 42
PK42	400	450	110	Page 43
HL	800	200	10	Page 44
P62	5000	520	120	Page 45
PLE60	4400	500	600	Page 46

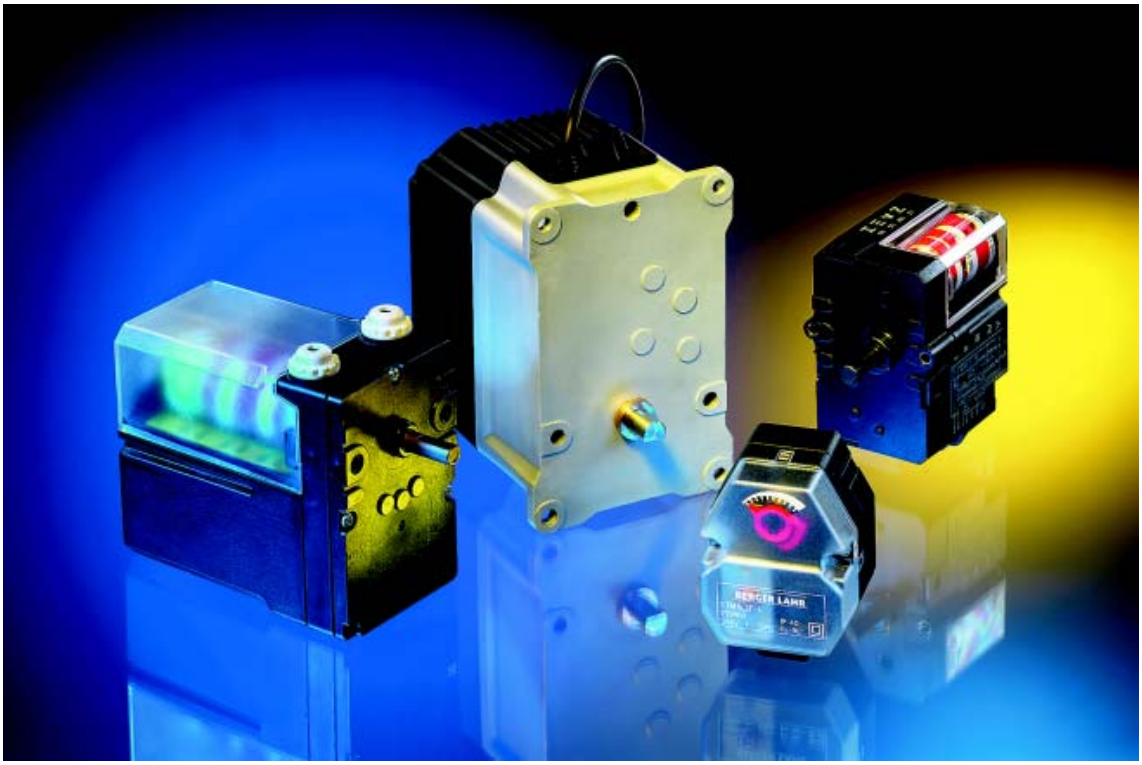
Motor /Gearbox combinations

Motors with gearbox type		Gearbox type								
		L	T	G	P	P42	PK42	HL	P62	PLE60
Synchronous motors (RSM)	36/8	✓	✓	✓						
	36/10			✓						
	42/8	✓	✓	✓						
	51/8	✓	✓	✓						
	63/8			✓						
	63/10		✓	✓						
	828			✓	✓					
	842			✓						
	856			✓						
	884			✓						
	884 S			✓	✓					
Electronic commutated RECM	343/3					✓	✓			
	343/4					✓	✓			
	345/3					✓	✓			
	345/4					✓	✓			
	372/2							✓	✓	✓
	372/4							✓	✓	✓
	374/2							✓	✓	✓
	374/4							✓	✓	✓
	375/2							✓	✓	✓
	375/4							✓	✓	✓
	377/2							✓	✓	✓
	377/4							✓	✓	✓

Combinations of stepping motors (RDM) and gearboxes

The 2-phase stepping motors are largely of the same construction as the synchronous motors, and can be coupled to the gearboxes for special applications. This significantly increases the resolution of the stepping motors.

The torque-speed behaviour of the stepping motors depends on an adjustable operating point. It is important, therefore, to define the operating point of the motor before specifying the gearbox. We are happy to advise you on this.



Actuators

You can use the actuators from Berger Lahr to position flaps, valves or slides with great precision. Inside the compact servo drive housing there is a motor, a gearbox and a control unit. There is a choice of three actuator types to solve your positioning problems: STM, STA and STE.

Overview actuators

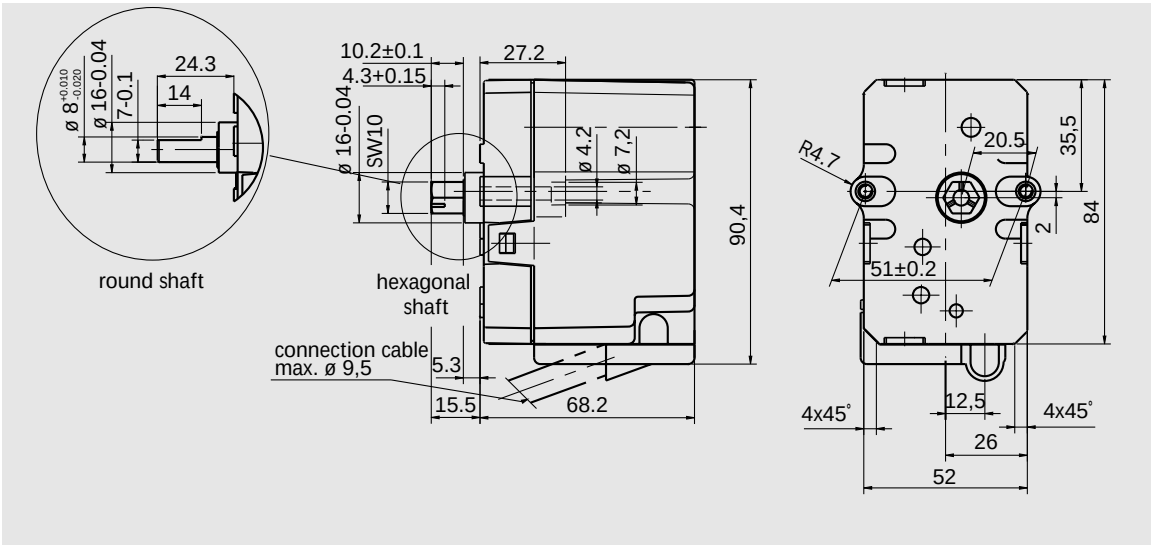
Actuator type	Description	Described on ...
STE	Actuators of type STE are controlled by analogue signals (current or voltage). The angle of rotation of the shaft can be set via analogue signals. The operating range can be freely defined between 0 and 90×. Any angle of rotation can be selected within the defined operating range. Depending on the version, the setpoint can be set as a voltage from 0 to 10 V or as a current from 4 to 20 mA. The limits of the operating range can also be safeguarded by two limit switches.	Page 133 Scale drawings page 131
STA	Actuators of type STA are available with 3, 4 or 5 cams. Two cams serve to define the limits, and the others are available for controlling external devices. The cams are continuously adjustable. Actuators of type STA are also fitted with 1 or 2 relays. Switching actions for controlling the motor are controlled via these relays. STA actuators are used to move air flaps in oil and gas burners. Various wiring arrangements are available for connecting to standard burners. Actuators of type STA can be supplied to run clockwise or anti-clockwise.	Page 137 Scale drawings page 131
STM	Actuators of type STM are constructed in the same way as actuators of type STA. They differ in having no relays. Actuators of type STM are available in clockwise and anti-clockwise versions.	Page 147 Scale drawings page 131

Type code for Actuators

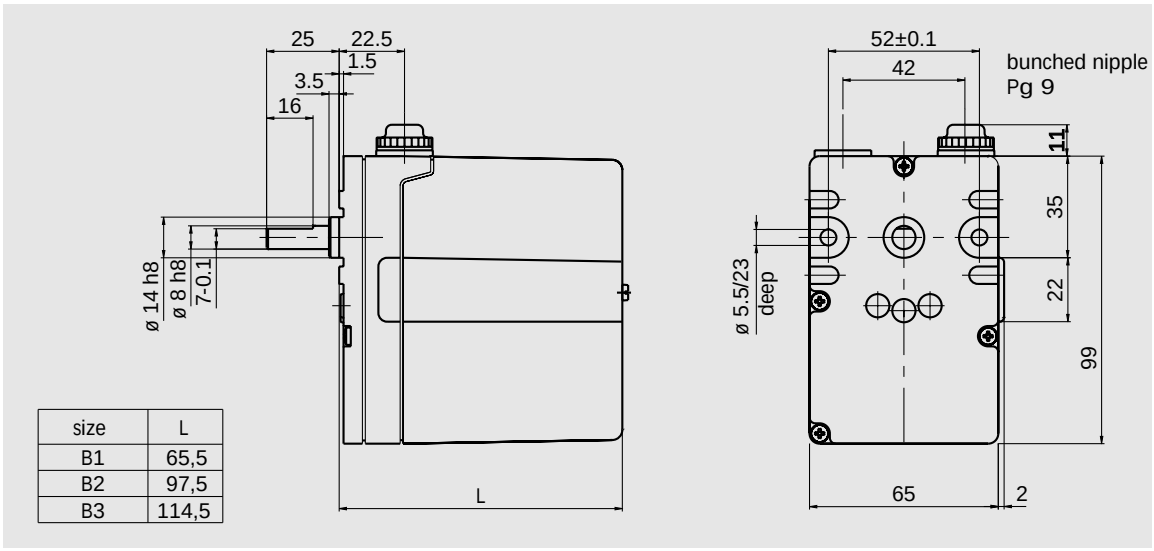
Example	**STM30 B3.37/6 – 51N R P**
Product family Actuators	
Actuator type STE = electronic actuator STA = actuator with cams and relais STM = actuator with cams	**STM**30 B3.37/6 – 51N R P
Running time for 90° Example: 30 = 30 seconds for running time for 90°	STM**30** B3.37/6 – 51N R P
Size / case B0, B1, B2, B3, Q3	STM30 **B3**.37/6 – 51N R P
Motor type : RSM 36/8, RSM 36/12, RSM 37/6, RSM 41/6, RSM 42/6, RSM 51/6	STM30 B3.**37/6** – 51N R P
Operation program / wiring Example: 51N 5 = Number of function cams 1 = Counter number N = Cams	STM30 B3.37/6 – **51N** R P
Sense of rotation R = Right L = Left	STM30 B3.37/6 – 51N **R** P
Potentiometer installation P = Prepared for potentiometer installation POT = Potentiometer integrated (if no P or POT => not prepared for potentiometer installation, no potentiometer integrated)	STM30 B3.37/6 – 51N R **P**

Areas of application

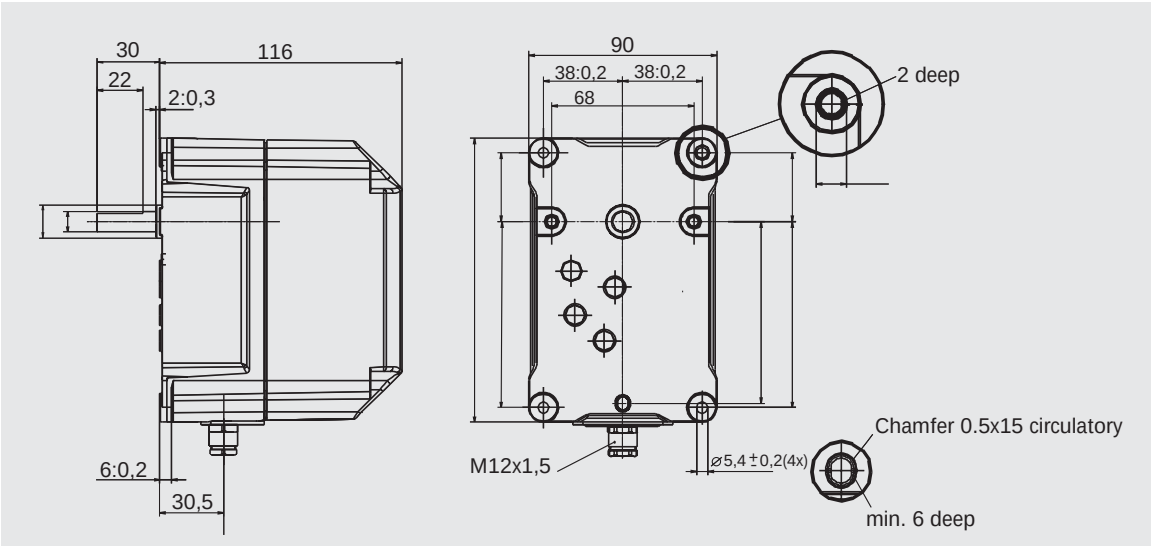
- Air valves for oil and gas burners
- Exhaust valves on boilers
- Mixing valves
- Electrically adjustable armatures
- Slide movements
- Part-turn valve actuators
- Positioning tasks in the construction of apparatus and machines
- Valves for water treatment
- Electrical engineering, open and closed loop control tasks
- Weighing and dosing technology
- Drive technology
- Control technology: Control of ball valves, flow control



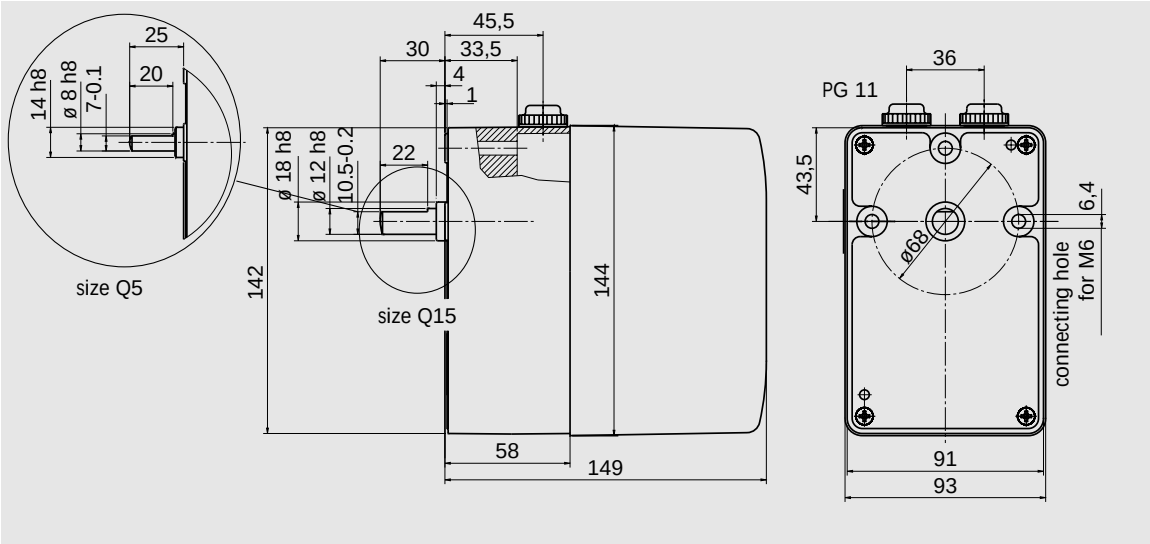
Size B0



Sizes B1, B2, B3



Sizes Q3


45,5
30
33,5
4
1
25
20
14 h8
ø 8 h8
7-0.1
size Q5
ø 18 h8
ø 12 h8
10.5-0.2
22
142
size Q15
144
58
149
36
PG 11
43,5
6,4
ø68
connecting hole
for M6
91
93

Sizes Q5, Q15

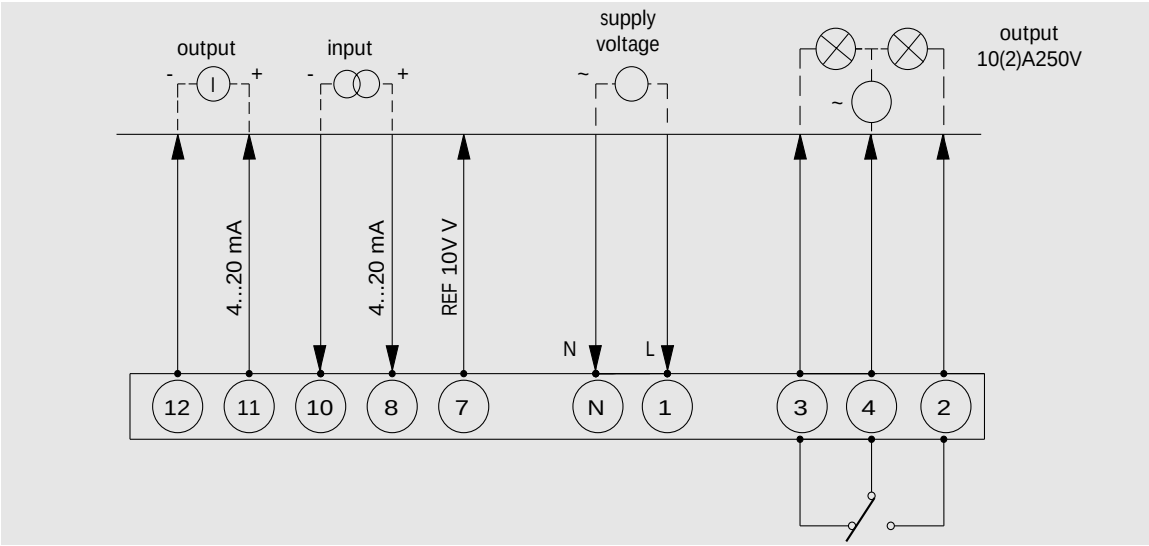
Characteristics of actuators of type STE

- Actuators of type STE work with a power supply of 230 V AC. They can be connected directly to the mains.
- The angle of rotation is set by means of a potentiometer. This permits simple adjustment of the angular area on site.
- Short start/stop times allow precise switching times and improve dynamic performance.
- Precise movements are made possible by speeds which are not affected by changes in voltage or load.
- As the actuator displays high holding torque when de-energized, no additional brake elements are required.
- Through its compact construction, the actuator takes up little room.
- The actuators can be installed in any position, allowing for free flexibility.
- Connection to the mains is made via screw terminals for the B3, Q3 and Q15 and via plug for the B0. This does away with the need for any adaptors.
- The actuators are lubricated for life, and no on-site maintenance is required.

General data for actuator type STE

	Values
Power supply	230 V AC / 50 Hz
Switching power of auxiliary switches	10(2) A 250 V (to CEE 24 / VDE 0630)
Number of limit switches	2
Number of auxiliary switches	1
Degree of noise suppression	N (to VDE 0875)
Protection grade	STE ... B3: DIN 40050, IP 40 STE ... Q3: DIN 40050, IP 40; IP 54 on request
Permitted ambient temperature	Operation: 0 ... 50 °C Transport and storage: -20 ... +60 °C

STE IO1



STE with I01 wiring – control via current signals

In heating technology, the STE actuator with I01 wiring can be used for the following components:

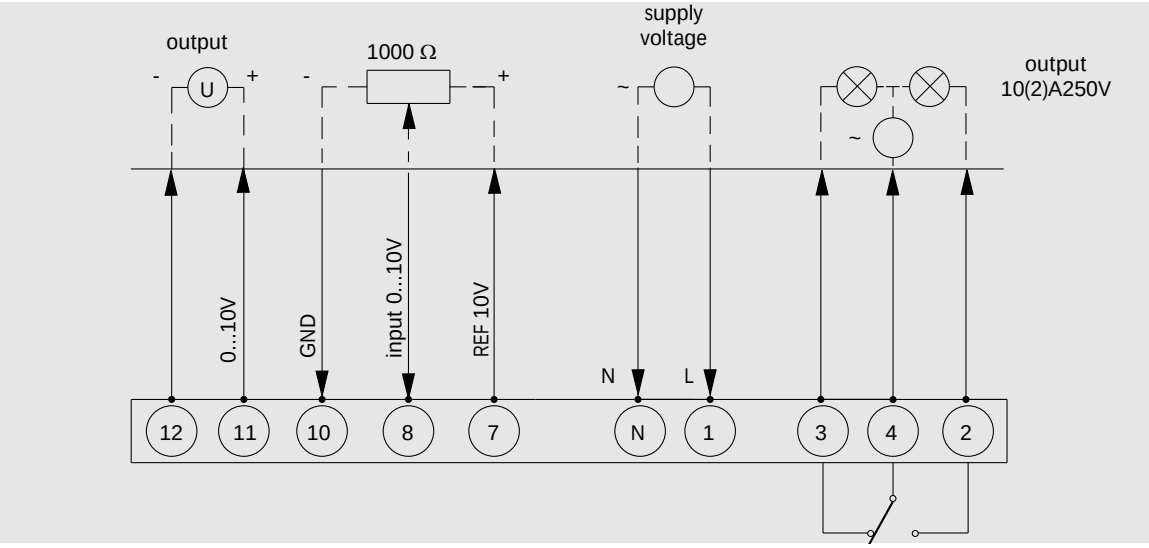
– Positioning valves.

In control technology, the STE actuator with I01 wiring can be used for the following areas of application:

– Moving ball valves
– Flow control.

Technical Data

Actuator type	Sense of rotation	Position-ing signal	Actual value	Auxiliary size	Running time for 90°	Rated torque	Static holding torque
STE30 B3.37/6 - I01	R / L	4 ... 20 mA	4 ... 20 mA	10 V	30 s	3 Nm	2 Nm
STE30 Q3.51/12	R / L	4 ... 20 mA	4 ... 20 mA	10 V	30 s	10 Nm	6.5 Nm
STE30 Q15 51/6 - IO1	R / L	4 ... 20 mA	4 ... 20 mA	10 V	30 s	15 Nm	10 Nm



STE with U01 wiring – control via current signal

In heating technology, the STE actuator with U01 wiring can be used for the following components:

– Positioning valves.

In control technology, the STE actuator with U01 wiring can be used for the following areas of application:

– Moving ball valves
– Flow control.

Technical Data

Actuator type	Sense of rotation	Position-ing signal	Actual value	Auxiliary size	Running time for 90°	Rated torque	Static holding torque
STE30 B3.37/6 - U01	R / L	0 ... 10 V	0 ... 10 V	—	30 s	3 Nm	2 Nm
STE30 Q3.51/12 - U01	R / L	0 ... 10 V	0 ... 10 V	—	30 s	10 Nm	6.5 Nm
STE30 Q15.51/6 - U01	R / L	0 ... 10 V	0 ... 10 V	—	30 s	15 Nm	10 Nm

Actuators

Characteristics of actuators of type STA

- The cams can be continuously adjusted by hand, fine tuning with a screw-driver. This makes on-site adjustment easier.
- Short start/stop times allow precise switching times and ensure good dynamic performance.
- Precise movements are made possible by speeds which are not affected by changes in voltage or load.
- As the actuator displays high holding torque when de-energized, no additional brake elements are required.
- Through its compact construction, the actuator takes up little room.
- Actuators can be installed in any plane.
- Connection to the mains is made via screw terminals for the B1, B2 and B3 and by plug for the B0. This does away with the need for any adaptors.
- The optional version with a potentiometer allows a feedback signal on the angle of rotation to be evaluated.
- The actuators are lubricated for life, and no on-site maintenance is required.

General data for actuator type STA

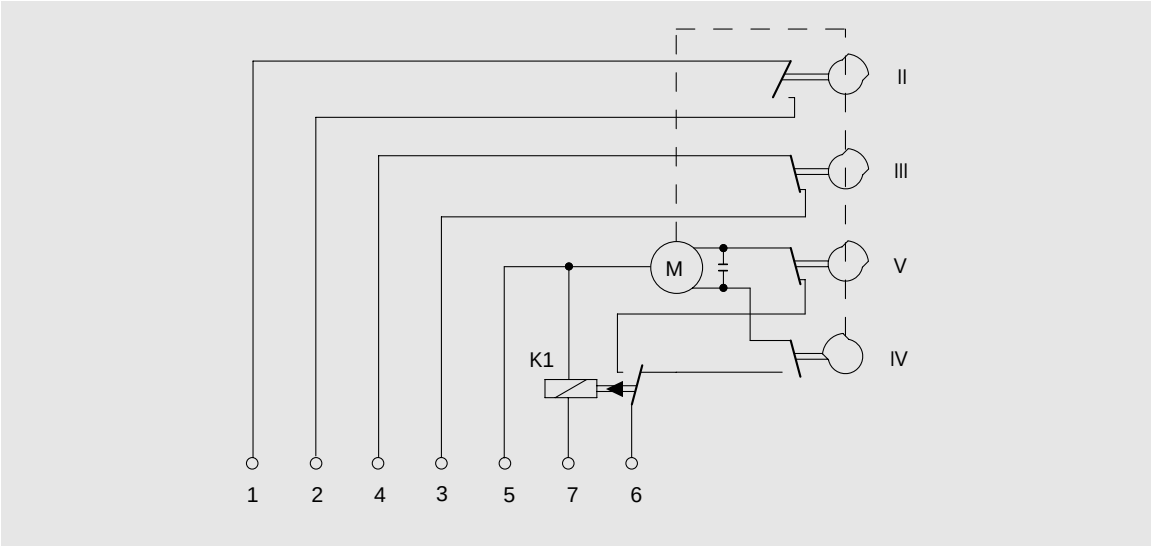
	Values
Power supply	230 V AC / 50Hz
Switching power of auxiliary switches	10(2) A 250 V (to CEE 24 / VDE 0630)
Protection grade	DIN 40050, IP 40 STA, STM ... Q3 ... are available with IP 54
Permitted ambient temperature	Operation: 0 ... 60 °C Transport and storage: -20 ... +60 °C

Accessories: potentiometer installation set

The angle of rotation of the actuators can be recorded by a mechanically coupled potentiometer and passed to an external control unit for further processing. All actuators whose type code ends in a "P" can be retro-fitted with a potentiometer.

Potentiometer installation sets with resistor values of 100Ω and 1000Ω through 90° are available.

STA 2N36



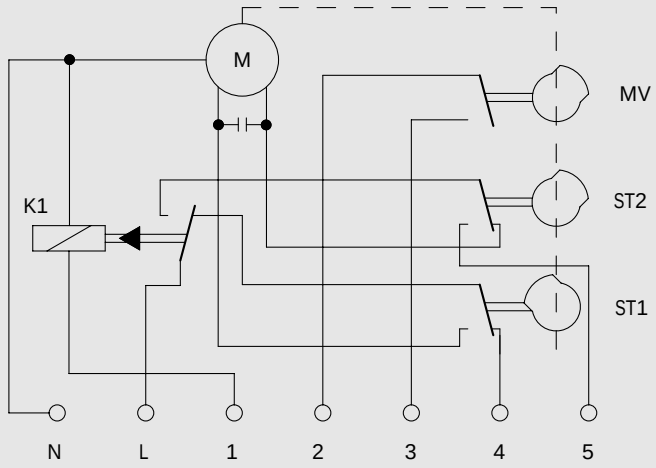
STA with 2N36 wiring

In heating technology, the STA actuator with 2N36 wiring can be used for the following components:

– For **small** and **medium** power burners
– For air valves **with no** air seal.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3.5 B0.37/6 - 2N36	R / L	3.5 s	0.8 Nm	0.3 Nm
STA5 B0.36/8 - 2N36	R / L	5 s	0.6 Nm	0.2 Nm
STA13 B0.36/8 - 2N36	R / L	13 s	1.0 Nm	0.6 Nm



STA with 2N13 wiring

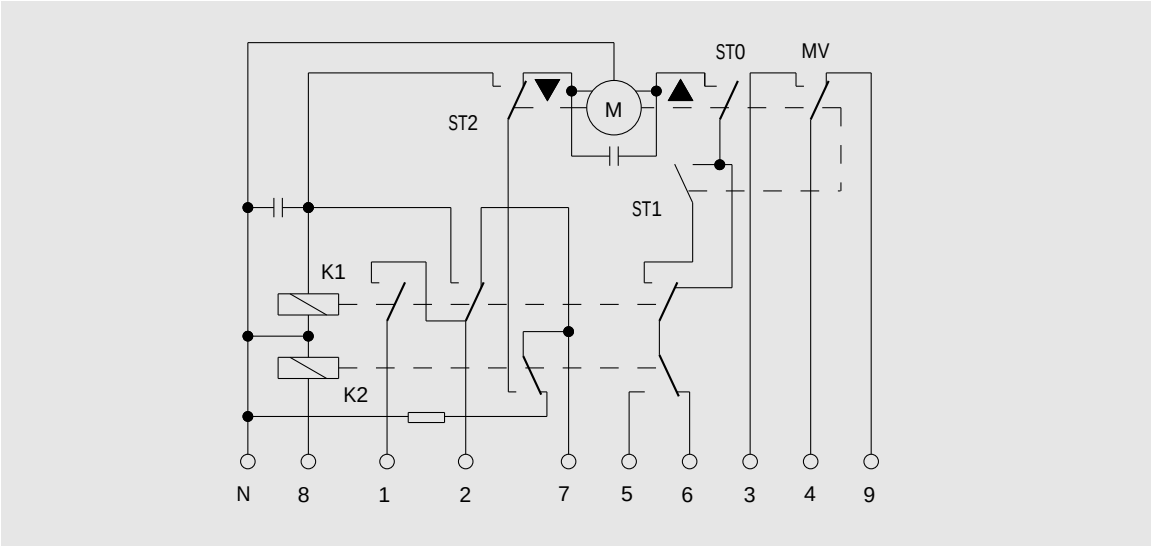
In heating technology, the STA actuator with 2N13 wiring can be used for the following components:

– For **small** and **medium** power burners
– For air valves **with no** air seal.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3 B2.41/6 - 2N13	R / L	3 s	1.6 Nm	0.4 Nm
STA6 B2.41/6 - 2N13	R / L	6 s	3.0 Nm	0.8 Nm
STA12 B1.37/6 - 2N13	R / L	12 s	2.6 Nm	1.1 Nm
STA30 B1.37/6 - 2N13	R / L	30 s	3.0 Nm	2.0 Nm

STA 3N21



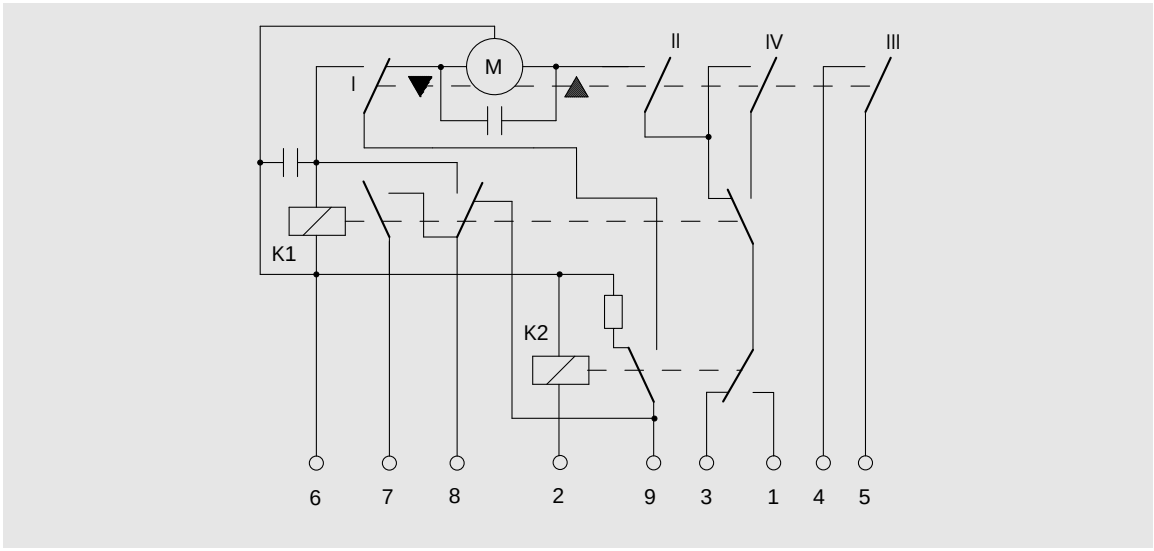
STA with 3N21 wiring

In heating technology, the STA actuator with 3N21 wiring can be used for the following components:

- For two-stage **gas**burners of **medium** and **high** power
- For controlling air valves
- For burner equipment with or without air valve monitoring.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3 B3.42/ 6-3N21	R / L	3 s	1.6 Nm	0.4 Nm
STA6 B2.37/ 6-3N21	R / L	6 s	1.4 Nm	0.6 Nm
STA6 B3.42/6-3N21	R / L	6 s	2.6 Nm	1.0 Nm
STA12 B2.37/6-3N21	R / L	12 s	3.0 Nm	1.1 Nm
STA30 B2.37/6-3N21	R / L	30 s	3.0 Nm	2.0 Nm



STA with 3N23 wiring

In heating technology, the STA actuator with 3N23 wiring can be used for the following components:

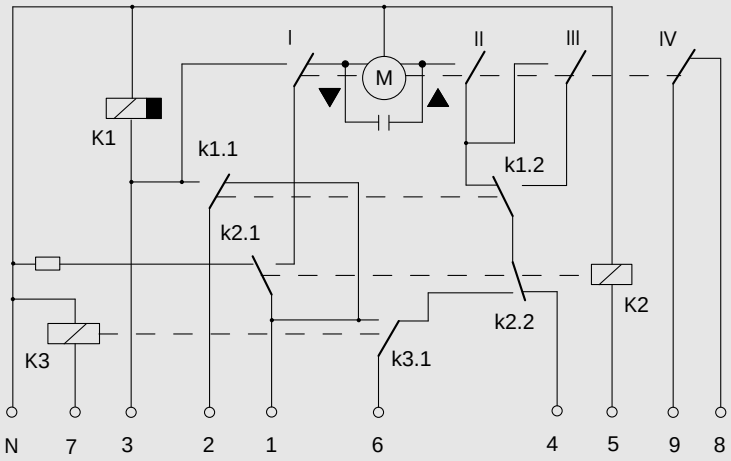
– For two-stage **gas**burners of **small** and **medium** power
– For controlling air valves.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3.5 B0.37/6 - 3N23	R / L	3.5 s	0.8 Nm	0.3 Nm
STA5 B0.36/8 - 3N23	R / L	5 s	0.6 Nm	0.2 Nm
STA13 B0.36/8 - 3N23	R / L	13 s	1.0 Nm	0.6 Nm

Actuators

STA 3N27



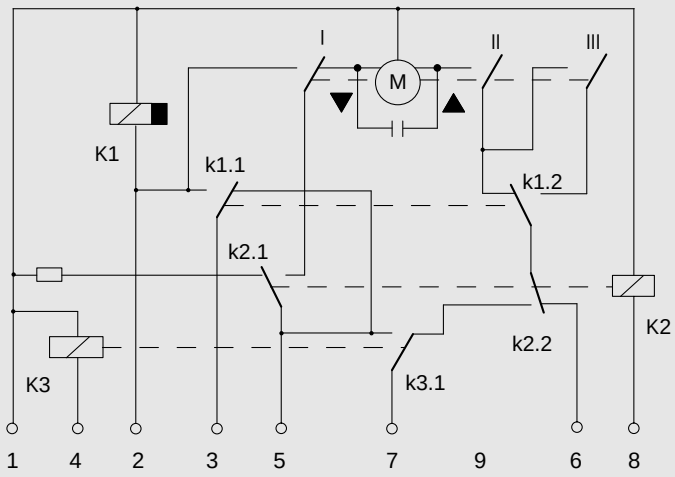
STA with 3N27 wiring

In heating technology, the STA actuator with 3N27 wiring can be used for the following components:

- For two-stage **gas**burners of **medium** and **high** power
- For controlling air valves
- For burner equipment with or without air valve monitoring.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3 B3.42/6 - 3N27	R / L	3 s	1.6 Nm	0.4 Nm
STA6 B2.37/6 - 3N27	R / L	6 s	1.4 Nm	0.6 Nm
STA6 B3.42/6 - 3N27	R / L	6 s	2.6 Nm	1.0 Nm
STA12 B2.37/6 - 3N27	R / L	12 s	3.0 Nm	1.1 Nm
STA30 B2.37/6 - 3N27	R / L	30 s	3.0 Nm	2.0 Nm



STA with 3N28 wiring

In heating technology, the STA actuator with 3N28 wiring can be used for the following components:

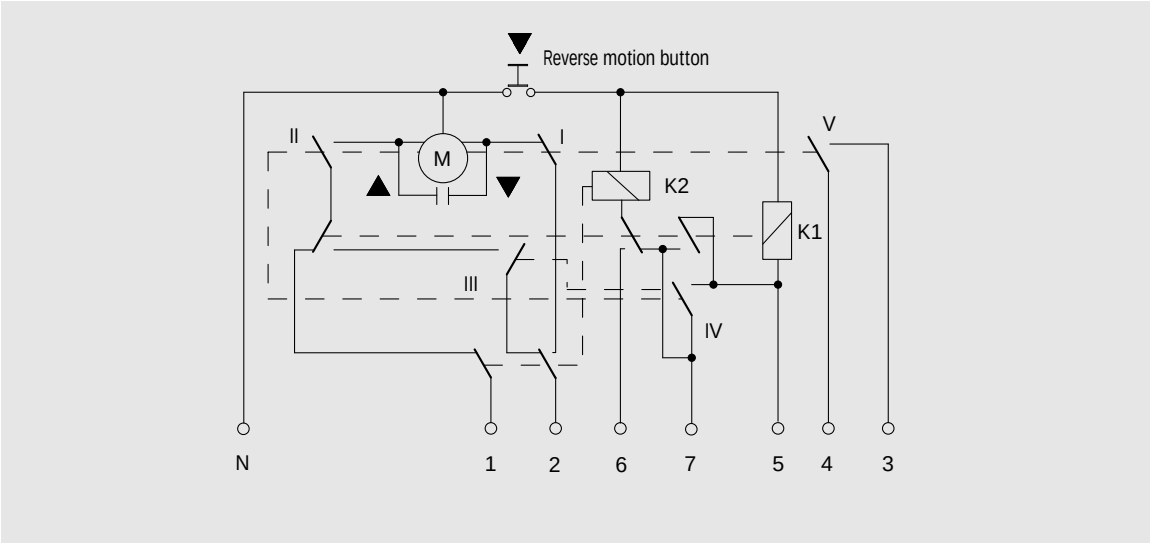
- For two-stage **gas**burners of **medium** and **high** power
- For controlling air valves
- For burner equipment with or without air valve monitoring.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3 B3.42/6 - 3N28	R / L	3 s	1.6 Nm	0.4 Nm
STA6 B2.37/6 - 3N28	R / L	6 s	1.4 Nm	0.6 Nm
STA6 B3.42/6 - 3N28	R / L	6 s	2.6 Nm	1.0 Nm
STA12 B2.37/6 - 3N28	R / L	12 s	3.0 Nm	1.1 Nm
STA30 B2.37/6 - 3N28	R / L	30 s	3.0 Nm	2.0 Nm

Actuators

STA 4N18



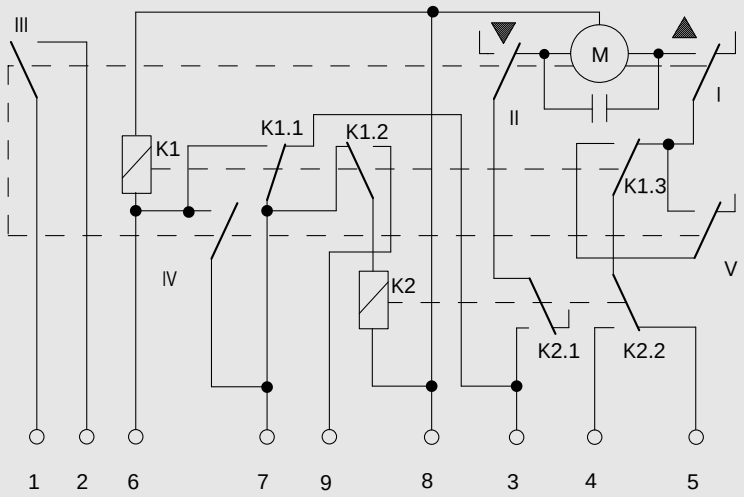
STA with 4N18 wiring

In heating technology, the STA actuator STA with 4N18 wiring can be used for the following components:

- For **oil** and **gas**burners of **small** and **medium** power
- For controlling air valves
- Two-stage or modulating operating mode.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3 B3.42/6 - 4N18	R / L	3 s	1.6 Nm	0.4 Nm
STA6 B2.37/6 - 4N18	R / L	6 s	1.4 Nm	0.6 Nm
STA6 B3.42/6 - 4N18	R / L	6 s	2.6 Nm	1.0 Nm
STA12 B2.37/6 - 4N18	R / L	12 s	3.0 Nm	1.1 Nm
STA30 B2.37/6 - 4N18	R / L	30 s	3.0 Nm	2.0 Nm



STA with 4N22 wiring

In heating technology, the STA actuator with 4N22 wiring can be used for the following components:

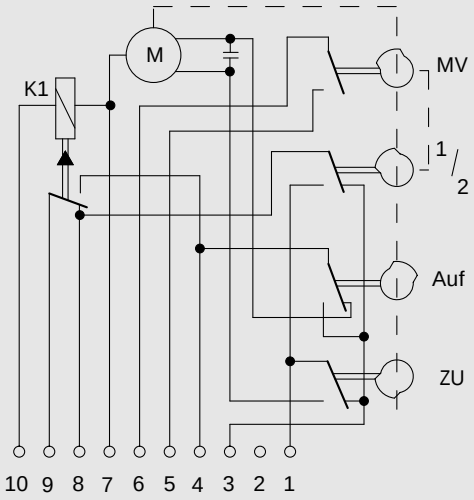
- For **oil** and **gas**burners of **small** and **medium** power
- For controlling air valves
- Two-stage or modulating operating mode.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3.5 B0.37/6 - 4N22	R / L	3.5 s	0.8 Nm	0.3 Nm
STA5 B0.36/8 - 4N22	R / L	5 s	0.6 Nm	0.2 Nm
STA13 B0.36/8 - 4N22	R / L	13 s	1.0 Nm	0.6 Nm

Actuators

STA 3N12



STA with 3N12 wiring

In heating technology, the STA actuator STA with 4N18 wiring can be used for the following components:

- For **oil** and **gas**burners of **small** and **medium** power
- For controlling air valves
- Two-stage or modulating operating mode.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STA3 B3.42/6 - 3N12	R / L	3 s	1.6 Nm	0.4 Nm
STA6 B2.37/6 - 3N12	R / L	6 s	1.4 Nm	0.6 Nm
STA6 B3.42/6 - 3N12	R / L	6 s	2.6 Nm	1.0 Nm
STA12 B2.37/6 - 3N12	R / L	12 s	3.0 Nm	1.1 Nm
STA30 B2.37/6 - 3N12	R / L	30 s	3.0 Nm	2.0 Nm

Characteristics of actuators of type STM

- The cams can be continuously adjusted by hand, fine tuning with a screw-driver. This makes on-site adjustment easier.
- Short start/stop times allow precise switching times and ensure good dynamic performance.
- Precise movements are made possible by speeds which are not affected by changes in voltage or load.
- As the actuator displays high holding torque when de-energized, no additional brake elements are required.
- Through its compact construction, the actuator takes up little room.
- Actuators can be installed in any plane.
- Connection to the mains is made via screw terminals for the B1, B2, B3 and Q3 by plug for the B0. This does away with the need for any adaptors.
- The optional version with a potentiometer allows a feedback signal on the angle of rotation to be evaluated.
- The actuators are lubricated for life, and no on-site maintenance is required.

General data for actuator type STM

	Values
Power supply	230 V AC / 50Hz
Switching power of auxiliary switches	10(2) A 250 V (to CEE 24 / VDE 0630)
Protection grade	DIN 40050, IP 40 STA, STM ... Q3 ... are available with IP 54
Permitted ambient temperature	Operation: 0 ... 60 °C Transport and storage: -20 ... +60 °C

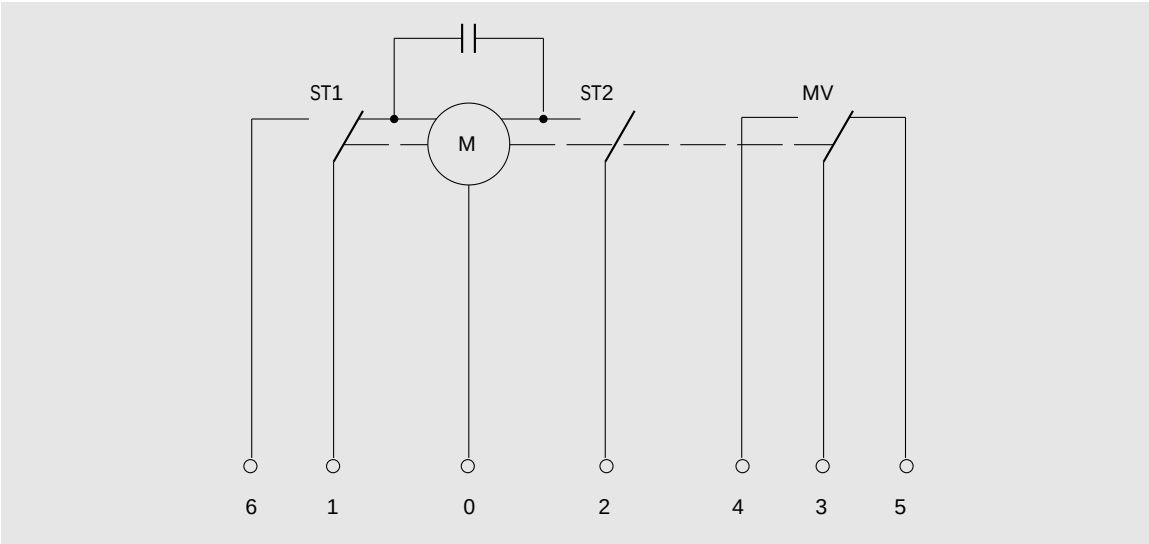
Accessories: potentiometer installation set

The angle of rotation of the actuators can be recorded by a mechanically coupled potentiometer and passed to an external control unit for further processing. All actuators whose type code ends in a "P" can be retro-fitted with a potentiometer.

Potentiometer installation sets with resistor values of 100Ω and 1000Ω through 90° are available.

Actuators

STM 31N



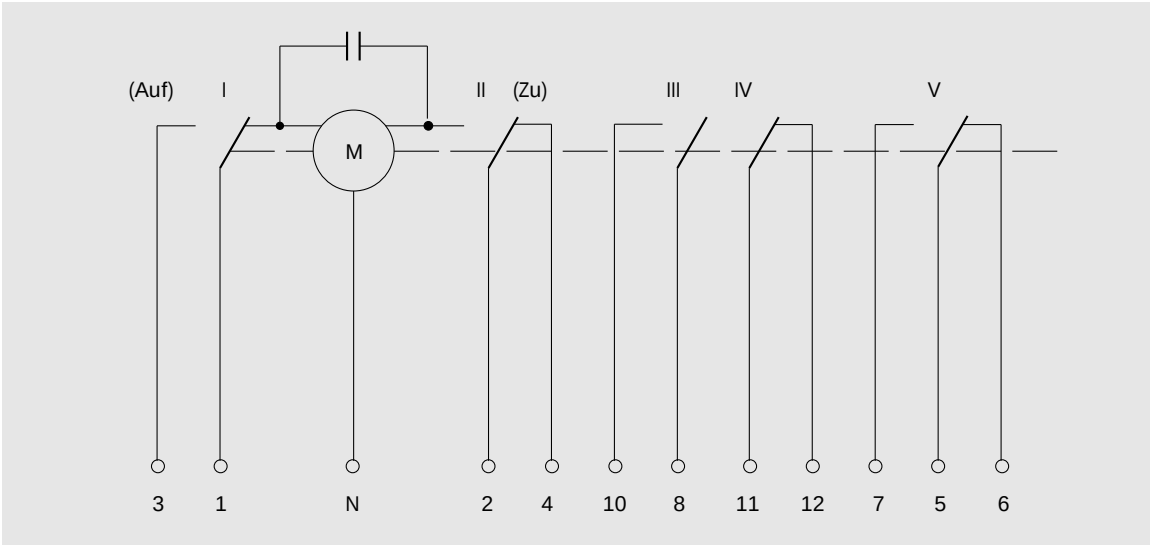
STM with 31N wiring

STM actuators are used in all industries, especially the following:

- Apparatus construction
- Electrical engineering for open and closed loop control tasks
- Weighing and dosing technology for movement tasks
- Heating, air conditioning and ventilation engineering.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STM3 B2.41/6 - 31N	R / L	3 s	1.6 Nm	0.4 Nm
STM6 B2.41/6 - 31N	R / L	6 s	2.6 Nm	0.8 Nm
STM12 B1.37/6 - 31N	R / L	12 s	3 Nm	1.1 Nm
STM30 B1.37/6 - 31N	R / L	30 s	3 Nm	2 Nm



STM with 51N wiring

STM actuators are used in all industries, especially the following:

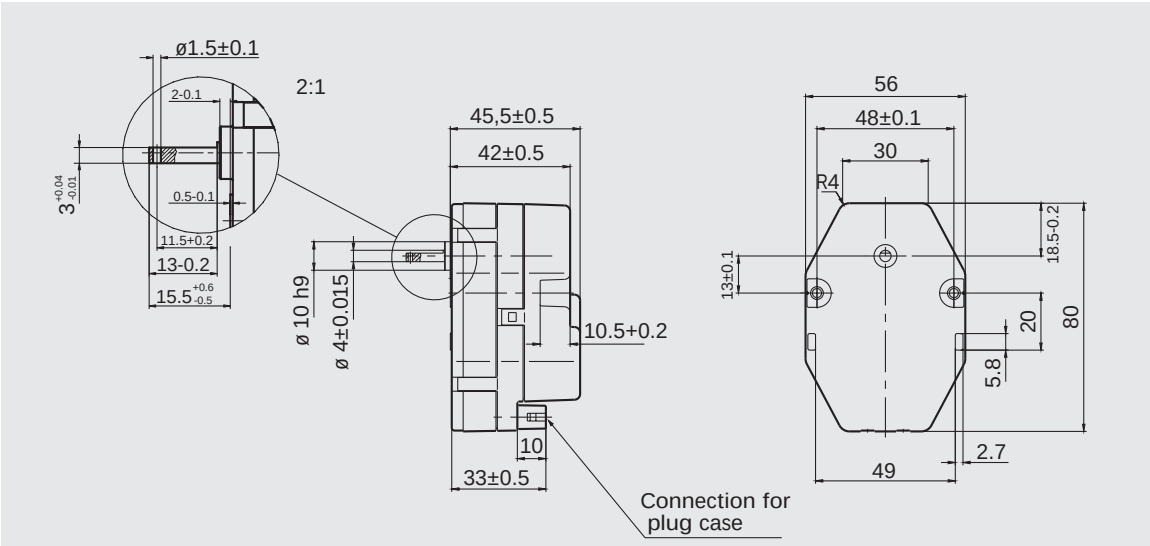
- Apparatus construction
- Electrical engineering for open and closed loop control tasks
- Weighing and dosing technology for movement tasks
- Heating, air conditioning and ventilation engineering.

Technical Data

Actuator type	Sense of rotation	Running time for 90°	Rated torque	Static holding torque
STM4.5 Q3.51/6 - 51N [1]	R / L	4.5 s	3 Nm	1.5 Nm
STM9 Q3.51/12 - 51N [1]	R / L	9 s	4 Nm	1.5 Nm
STM12 B2.37/6 - 51N	R / L	12 s	3 Nm	1.1 Nm
STM15 Q3.51/6 - 51N [1]	R / L	15 s	9 Nm	6 Nm
STM30 B3.37/6 - 51N [1]	R / L	30 s	3 Nm	2 Nm
STM30 Q3.51/12 - 51N [1]	R / L	30 s	10 Nm	6.5 Nm

1 Potentiometer installation possible

STM 6SF-L



STM 6SF-L

In the simple version of the actuators, the STM 6SF, an anti-blocking asynchronous motor is used as the drive. This actuator moves to a preset limit and the power remains on. When de-energized, the shaft is reset by means of a mechanical spring – a safety precaution in the event of a power failure.

The STM 6SF-L actuator is particularly suited to moving air valves in heating burners in the lower performance range.

Technical Data

	Values
Rated voltage	230 VAC -15% +10%
Rated frequency	50 Hz
Current consumption	24 mA
Apparent power	5.5 VA
Sense of rotation	anti-clockwise
Control time	6 s
Driving torque	26 Ncm
Reverse torque	1 Ncm
Weight	200 g
Ambient temperature	0 ... 60 °C
Operating mode S1	100% ED
Protection grade	IP 40, to DIN 40 050
Insulation class	E, to VDE 0530

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13.201 GB 16/8/04 Riedel GmbH München/VTD · Technische Änderungen vorbehalten · Printed in Germany