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BSH servo motors

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Lexium 05 servo drive



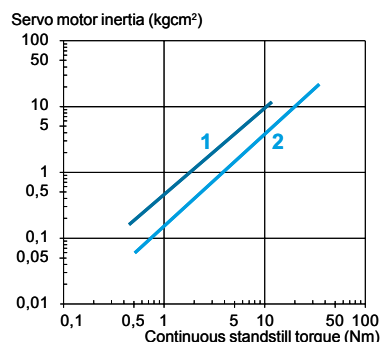
BRH servo motor



Lexium 05 servo drive



BSH servo motor

Lexium 05: A servo drive offer from
Schneider ElectricInertia of BRH 1 and BSH 2 servo motors as
a function of the continuous standstill torque

A comprehensive offer

When used in combination with BRH and BSH servo motors, Lexium 05 servo drives satisfy requirements for high speed, speed accuracy and high dynamic performance.

This offer covers a wide range of supply voltages and power ratings:

■ Lexium 05 servo drives:

- 100...120 V single-phase, 0.4 to 0.85 kW (LXM 05●●●●F1)
- 200...240 V single-phase, 0.4 to 2.5 kW (LXM 05CU70M2, LXM 05●D●●M2)
- 200...240 V three-phase, 0.75 to 3.2 kW (LXM 05●●●●M3X)
- 380...480 V three-phase, 1.4 to 6 kW (LXM 05●●●●N4)

■ BRH servo motors:

- Nominal torque: 0.41 to 10 Nm
- Nominal speed: 1500 to 6000 rpm

■ BSH servo motors:

- Nominal torque: 0.43 to 28.2 Nm
- Nominal speed: 1500 to 6000 rpm

The Lexium 05 offer also includes GBX planetary gearboxes. These are available in 15 reduction ratios ranging from 3:1 to 100:1.

GBX gearboxes are cost-effective, easy to mount and lubricated for life and are designed for applications which are not susceptible to mechanical backlash.

The Lexium 05 offer can also be used with Lexium Controllers. This combination constitutes a simple, cost-effective solution that offers the exact level of performance for compact or modular machines requiring axis synchronization.

Lexium 05 servo drives comply with EN 50178 and IEC/EN 61800-3 international standards and carry UL (USA) and cUL (Canada) approvals and CE marking.

Dynamic and powerful

BRH and BSH servo motors are synchronous three-phase motors. They feature a SinCos Hiperface® encoder and are available with or without a holding brake.

The high dynamic performance of BSH servo motors and the speed accuracy of BRH servo motors are enhanced by the fast sampling time of the Lexium 05 servo drive control loops:

- 62.5 µs for the current loop
- 250 µs for the speed loop
- 250 µs for the position loop

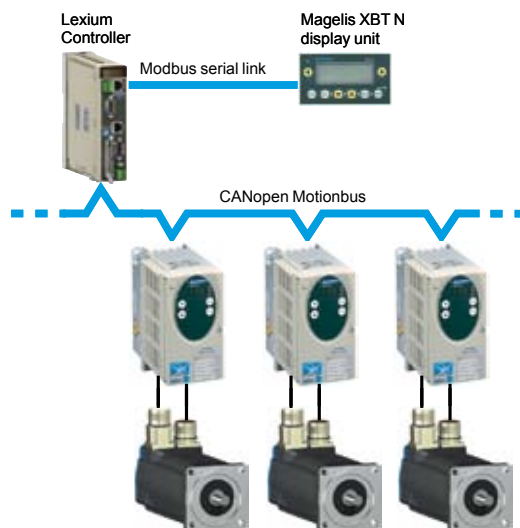
BRH servo motors

BRH servo motors are designed in particular to satisfy the requirements for high speed and speed accuracy thanks to the rotor inertia 1.

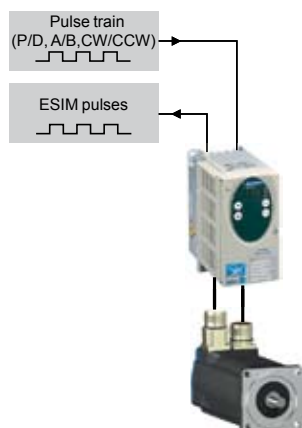
BSH servo motors

Thanks to their new winding technology based on salient poles, BSH servo motors are compact and offer a high power density.

The low rotor inertia 2 satisfies the requirements for high dynamic performance.



Lexium 05A servo drive controlled by the Lexium Controller via the CANopen Motionbus



Electronic gearing mode (pulse position control)

A complete unit

The Lexium 05 offer integrates functions and components that are usually external, thus saving space and making it easier to integrate the servo drive into control enclosures or machines.

Electromagnetic compatibility (EMC)

The incorporation of class A EMC filters in LXM 05●●●●F1, LXM 05●●●●M2 and LXM 05●●●●N4 servo drives simplifies installation provides a very economical means of complying with CE marking requirements.

LXM 05●●●●M3X servo drives do not include an EMC filter. Filters are available as an option and can be installed by the user to reduce emission levels (see page 2/41).

Safety

LXM 05A●●●●●● and LXM 05B●●●●●● servo drives are incorporated into an installations's safety system. They integrate the Power Removal safety function which prevents unintended operation of the motor.

This function complies with machine safety standard ISO 13849-1, performance level "d" (PL d), standard IEC/EN 61508 SIL2 governing electrical installations and the power drive systems standard IEC/EN 61800-5-2.

Braking

The Lexium 05 servo drive integrates a resistor as standard, which does away with the need to use an external braking resistor in most applications.

Control and interfaces

Lexium 05 servo drives can be controlled by numerous operating modes:

- Point-to-point mode: Relative and absolute movements
- Motion sequence mode: Sequencing configurable relative and absolute movements
- Electronic gearing mode (pulse position control)
- Speed control with acceleration/deceleration ramp
- Instantaneous speed control
- Current control

The Lexium 05 servo drive also features conventional adjustment modes, such as manual mode (JOG), for easy setup.

Depending on the model, the Lexium 05 servo drive has four control interfaces as standard:

- One interface for the CANopen, Modbus or PROFIBUS DP communication buses and networks
- One interface for the CANopen Motionbus
- A maximum of 2 ± 10 V analog setpoint inputs to give the speed or current setpoint and limit the speed or current
- A maximum of 2 RS 422 inputs (pulse/direction signals (P/D), A/B or CW/CCW type encoder signals) The RS 422 input can be:
 - Connected to an external encoder, which can be used as a reference for position control
 - Configured as an ESIM (Encoder SIMulation) output for encoder emulation

These interfaces are supplemented by logic I/O which can be used as follows in order to adapt to the different axis controllers available on the market:

- In positive logic (Sink input, Source output)
- In negative logic (Source input, Sink output)

Lexium 05A or 05B servo drive/BRH or BSH servo motor combinations

Servo motors

Lexium 05A and 05B servo drives

100...120 V single-phase supply voltage with integrated EMC filter

2

BRH
(IP 41 or IP 56)BSH
(IP 50 or IP 65)

LXM 05AD10F1, BD10F1

Continuous output current: 4 A rms

BRH 0571T

BSH 0551T

BRH 0572P

BSH 0552T

BRH 0573P

BSH 0553T

BRH 0574P

BSH 0701T

BRH 0851P

BSH 0702T

BRH 0852P

BSH 0703T

BRH 0853P

BSH 1001T

BRH 0854P

Nominal operating point

Standstill torques

Nominal
torqueNominal
speedNominal
power $M_0 / M_{max}^{(1)}$

Nm

rpm

W

Nm/Nm

0.43

3000

135

0.46/1.15

0.46

3000

150

0.5/1.4

0.73

1500

120

0.76/2.07

0.8

3000

250

0.9/1.77

1.2

3000

380

1.4/2.42

(1) - M_0 : Continuous standstill torque- M_{max} : Peak standstill torque



LXM 05AD17F1, BD17F1
Continuous output current: 8 A rms

Nominal operating point			Standstill torques
Nominal torque	Nominal speed	Nominal power	$M_0 / M_{max} \text{ (1)}$
Nm	rpm	W	Nm/Nm
0.8	3000	250	0.9/2.7
1	1500	160	1.05/3.9
1.1	3000	350	1.3/3.31
1.22	1500	190	1.3/4.73
1.76	1500	280	1.86/4.61
1.83	3000	570	2.12/4.14

LXM 05AD28F1, BD28F1
Continuous output current: 15 A rms

Nominal operating point			Standstill torques
Nominal torque	Nominal speed	Nominal power	$M_0 / M_{max} \text{ (1)}$
Nm	rpm	W	Nm/Nm
2.4	3000	750	2.8/7.38
2.78	1500	440	3.1/8.7
3.16	1500	500	3.4/8.5
3.65	1500	570	4.2/9.7
4.71	1500	740	5.3/13

Lexium 05A, 05B or 05C servo drive/BRH or BSH servo motor combinations

Servo motors

Lexium 05A, 05B and 05C servo drives

200...240 V single-phase supply voltage with integrated EMC filter

2

BRH
(IP 41 or IP 56)BSH
(IP 50 or IP 65)

LXM 05CU70M2

Continuous output current: 3 A rms

Nominal operating point

Standstill torques

		Nominal torque	Nominal speed	Nominal power	$M_0 / M_{max} \text{ (1)}$
		Nm	rpm	W	
BRH 0571T		0.41	6000	260	0.46/0.88
BRH 0571P		0.43	3000	135	0.46/1.26
	BSH 0551T	0.46	3000	150	0.5/1.08
BRH 0572P		0.7	3000	220	0.76/1.55
	BSH 0552T	0.77	3000	240	0.77/1.31
	BSH 0552P	0.81	3000	250	0.9/2.17
	BSH 0552M	0.85	1500	130	0.9/2.3
BRH 0573P					
BRH 0574P					
	BSH 0553P				
	BSH 0553T				
	BSH 0553M				
	BSH 0701P				
	BSH 0701T				
BRH 0851P					
BRH 0851M					
	BSH 0702P				
	BSH 0702T				
	BSH 0702M				
BRH 0852P					
	BSH 0703P				
	BSH 0703T				
BRH 0852M					
BRH 0853P					
	BSH 0703M				
	BSH 1001T				
BRH 0853M					
BRH 0854P					
BRH 0854M					
BRH 1101P					
	BSH 1002P				
	BSH 1003P				
BRH 1102P					
BRH 1103P					

(1) - M_0 : Continuous standstill torque
- M_{max} : Peak standstill torque



LXM 05AD10M2, BD10M2, CD10M2 Continuous output current: 4 A rms			
Nominal operating point			Standstill torques
Nominal torque	Nominal speed	Nominal power	$M_0 / M_{max} (1)$
Nm	rpm	W	Nm/Nm
0.41	6000	260	0.46/1.15
0.43	6000	270	0.5/1.4
0.7	3000	220	0.76/2.07
0.71	6000	450	0.9/1.77
0.81	3000	250	0.9/2.7
0.85	1500	130	0.9/2.3
0.91	4500	430	1.05/2.43
1.1	3000	350	1.3/3.18
1.2	1500	190	1.3/3.5
1.3	3000	400	1.4/2.66
1.66	3000	520	1.86/3.4
1.9	3000	600	2.12/4.57
2	1500	300	2.12/5.63
2.63	1500	400	2.8/8.6

LXM 05AD17M2, BD17M2, CD17M2 Continuous output current: 8 A rms			
Nominal operating point			Standstill torques
Nominal torque	Nominal speed	Nominal power	$M_0 / M_{max} (1)$
Nm	rpm	W	Nm/Nm
1.08	4500	510	1.3/4.73
1.1	3000	350	1.3/3.31
1.3	3000	400	1.4/3.19
1.55	4500	730	1.86/4.61
1.9	3000	600	2.12/5.63
1.9	3000	600	2.12/4.14
2.4	3000	750	2.8/7.16
2.45	3000	770	3.1/7.81

LXM 05AD28M2, BD28M2, CD28M2 Continuous output current: 15 A rms			
Nominal operating point			Standstill torques
Nominal torque	Nominal speed	Nominal power	$M_0 / M_{max} (1)$
Nm	rpm	W	Nm/Nm
1.9	3000	600	2.12/6.8
2.13	4500	1000	3.1/8.7
2.4	3000	750	2.8/10.3
2.4	3000	750	2.8/7.38
2.55	4500	1200	4.2/9.7
2.9	3000	900	3.4/8.5
3.1	3000	970	4.2/13
4	3000	1250	5.3/13
4	3000	1250	5.3/15.8
4.5	3000	1400	5.2/14
4.96	1500	780	5.5/16
6.73	1500	1100	7.8/19.69
7.83	1500	1250	9/18.4
10	1500	1550	12/21

Lexium 05A or 05B servo drive/BRH or BSH servo motor combinations

Servo motors

Lexium 05A and 05B servo drives

200...240 V three-phase supply voltage without integrated EMC filter

2

BRH
(IP 41 or IP 56)BSH
(IP 50 or IP 65)LXM 05AD10M3X, BD10M3X
Continuous output current: 4 A rms

BRH 0571T

BSH 0551T

BRH 0572P

BSH 0552T

BSH 0552P

BSH 0552M

BRH 0573P

BRH 0574P

BSH 0553P

BSH 0553T

BSH 0553M

BSH 0701T

BSH 0701P

BSH 0701M

BRH 0851P

BRH 0851M

BSH 0702P

BSH 0702T

BSH 0702M

BRH 0852P

BSH 0703P

BSH 0703T

BRH 0852M

BRH 0853P

BSH 0703M

BSH 1001T

BRH 0853M

BSH 1001P

BRH 0854M

BRH 0854P

BSH 1002T

BRH 1101P

BSH 1002P

BSH 1003P

BSH 1401T

BRH 1102P

BSH 1004P

BSH 1402T

BRH 1103P

BSH 1402P

Nominal operating point

Standstill torques

Nominal
torqueNominal
speedNominal
power M_0 / M_{max}

Nm

rpm

W

Nm/Nm

0.41

6000

260

0.46/1.15

0.43

6000

270

0.5/1.4

0.64

6000

400

0.76/2.07

0.71

6000

450

0.9/1.77

0.81

3000

250

0.9/2.7

0.85

1500

130

0.9/2.3

0.91

4500

430

1.05/2.43

1.1

3000

350

1.3/3.18

1.2

1500

190

1.3/3.5

1.3

3000

400

1.4/2.42

1.3

3000

400

1.4/2.66

1.36

1500

210

1.4/2.66

1.9

3000

600

2.12/4.57

2

1500

300

2.12/5.63

2.63

1500

400

2.8/8.6

(1) - M_0 : Continuous standstill torque
- M_{max} : Peak standstill torque



LXM 05AD17M3X, BD17M3X			
Continuous output current: 8 A rms			
Nominal operating point			Standstill torques
Nominal torque	Nominal speed	Nominal power	M ₀ / M _{max}
Nm	rpm	W	Nm/Nm
1.08	4500	510	1.3/4.73
1.1	3000	350	1.3/3.31
1.3	3000	400	1.4/3.19
1.55	4500	730	1.86/4.61
1.66	3000	520	1.86/5.27
1.9	3000	600	2.12/5.63
2.4	3000	750	2.8/7.16
2.45	3000	770	3.1/7.81
3.1	3000	970	4.2/7.73
3.16	1500	500	3.4/7.1
4	3000	1250	5.3/9.2
4.96	1500	780	5.5/11.23

[illegible]

Lexium 05A, 05B or 05C servo drive/BRH or BSH servo motor combinations

Servo motors

Lexium 05A, 05B and 05C servo drives

380...480 V three-phase supply voltage with integrated EMC filter

2

BRH
(IP 41 or IP 56)BSH
(IP 50 or IP 65)LXM 05AD14N4, BD14N4, CD14N4
Continuous output current: 6 A rmsBRH 0571P
BRH 0572P

BSH 0552P

BRH 0573P
BRH 0574P

BSH 0553P

BRH 0851M
BRH 0851P
BRH 0852M
BRH 0852P

BSH 0702P

BRH 0853M
BRH 0854P
BRH 0854MBSH 0703M
BSH 0703P
BSH 1001P
BSH 1001M

BRH 1101P

BSH 1002P

BRH 1102P

BSH 1002M
BSH 1003P
BSH 1003M
BSH 1401P
BSH 1004P

BRH 1103P

BSH 1402P
BSH 1404P
BSH 1403P
BSH 1402M
BSH 1403M
BSH 1404M
BSH 2051M

Nominal operating point

Standstill torques

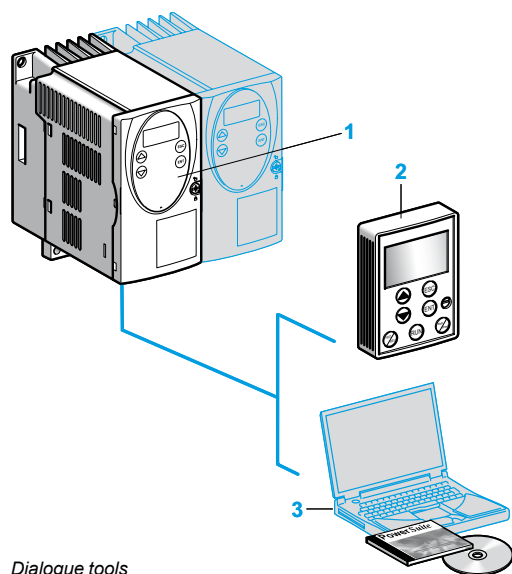
Nominal torque	Nominal speed	Nominal power	$M_0 / M_{max} \quad (1)$
Nm	rpm	W	Nm/Nm
0.41	6000	260	0.46/1.39
0.64	6000	400	0.76/2.46
0.81	3000	250	0.9/2.7
0.87	6000	550	1.05/3
1.1	3000	350	1.3/3.87
1.45	6000	910	1.86/4.05
1.9	3000	600	2.12/5.63
2.4	3000	750	2.8/8.6
3.16	1500	500	3.4/7.1
4.96	1500	780	5.5/13.3

(1) - M_0 : Continuous standstill torque
- M_{max} : Peak standstill torque

[illegible]

LXM 05AD34N4, BD34N4, CD34N4 Continuous output current: 15 A rms			
Nominal operating point			Standstill torques $M_0 / M_{max} \ (1)$
Nominal torque	Nominal speed	Nominal power	
Nm	rpm	W	Nm/Nm
1.8	6000	1150	3.1/7.95
2	6000	1250	4.2/12
2.2	6000	1400	5.3/14.5
4.04	4500	1900	5.2/13
4.58	4500	2150	9/16.7
5.7	3000	1800	7.8/23.01
6.9	3000	2200	11.4/23.33
7.1	3000	2200	9.31/23.47
7.5	3000	2360	12/18.9
15	1500	2350	19.2/47.5
17.2	1500	2700	25.4/68

[illegible]



Dialogue tools

Simplicity

Integration

The high level of integration, compact size, facility to mount the servo drives side-by-side and their ability to operate at ambient temperatures of 50°C without derating, all mean that enclosures can be smaller.

Low-power servo drives can be mounted on DIN rails.

Wiring

Spring terminals are used to reduce wiring time and avoid periodic checking of tightening torques.

Setup

Using the SinCos Hiperface® encoders on BRH and BSH servo motors, the Lexium 05 servo drive automatically receives data from the servo motor.

The servo motor parameters do not need to be set manually.

The “Simply Start” menu available with the PowerSuite software workshop ensures that the installation can function within a few seconds.

The Lexium 05 auto-tuning function and its new algorithm automatically define the optimum gains of the control loops in accordance with the mechanics for different types of movement, including vertical movements.

The oscilloscope function in the PowerSuite software workshop is used to display the electrical and mechanical values of the axis. The Fourier series transform (FFT) can be used for fine analysis of the signals from the machine.

Dialogue tools

Integrated 7-segment display terminal 1

The Lexium 05 servo drive is supplied with an integrated 7-segment display terminal, which is used for setting the servo drive parameters, displaying errors and monitoring.

It can also be used to control the servo drive in manual mode.

Remote LCD display terminal 2

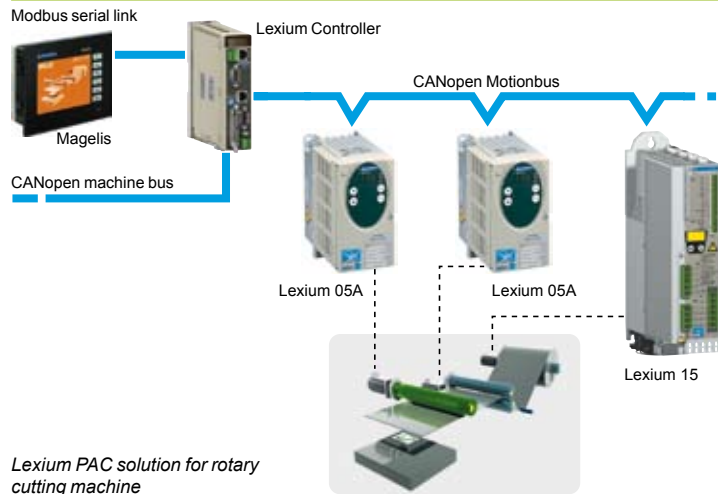
Available as an option, this can be mounted on an enclosure door so that the monitoring and adjustment functions and the manual mode are always accessible. Its IP 65 protection makes it suitable for use in difficult environments.

PowerSuite software workshop 3

The PowerSuite software workshop is used to configure, adjust and debug the Lexium 05 axis in the same way as for all other Schneider Electric variable speed drives and starters.

It can be used with a direct connection or a Bluetooth® wireless connection. See page 2/74.

Example of a Lexium PAC solution



Presentation

The Lexium PAC offer is Schneider Electric's axis coordination and synchronization solution.

This comprehensive, cost-effective, high-performance solution is based on combining the Lexium Controller motion controller with the Lexium 05 and Lexium 15 offers.

Applications

The Lexium PAC solution is dedicated to the following types of application:

- Handling equipment (conveyors, palletizers, storage and retrieval systems) and transfer machines (gantry cranes, etc.)
- Assembly machines (tool fitting, clamping, etc.)
- Inspection and quality control machines (testing machines, etc.)
- Machines for working "on the fly" (flying shear, printing, marking, etc.)

Control and motion control functions

This solution can be used to perform standard control and motion control functions:

- Control and command of up to 8 synchronized real axes with a maximum cycle time of 2 ms for 4 axes and 4 ms for 8 axes
- Speed and torque control
- Relative or absolute positioning
- Cam profiles for slave axes and programmable cam switch control
- Virtual axis function
- Electronic gearing function for speed and position
- Linear and circular interpolations (2½D)
- Master axis via external encoder
- Distance measurement and position capture on high-speed (30µs) discrete input
- Motion position sequencing with a preset end speed (blending)

Application function block library

This function block library, specially developed by Schneider Electric, integrates global application functions and thus significantly reduces programming and setup time.

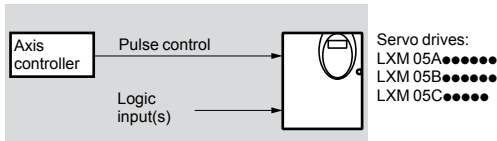
The function blocks available in the library are:

- Flying shear
- Rotary knife
- Grouping/ungrouping
- Clamping with torque control

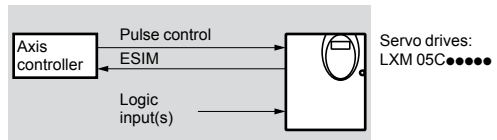
Lexium 05 motion control

Lexium 05A, 05B and 05C servo drives

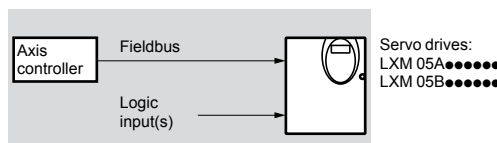
Presentation



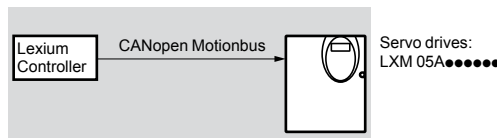
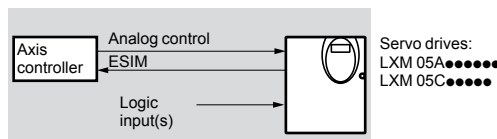
Pulse control



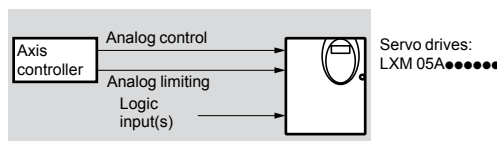
Pulse control and ESIM (Encoder SIMulation) output



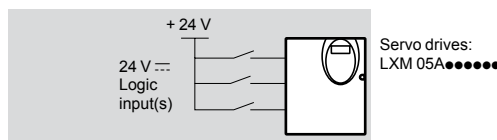
Control via fieldbus

Control via CANopen Motionbus
(see Lexium PAC solution on page 2/13)

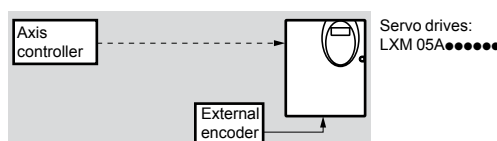
Control via analog input



Control with limiting via analog input



Standalone operation via logic inputs

Closed position loop operation
via external encoder

The Lexium 05A, 05B and 05C servo drive range

The Lexium 05A servo drive: Versatility in terms of architectures

The versatility offered by the Lexium 05A servo drive's characteristics means that it can be used with a number of different axis controllers available on the market and integrated into numerous architectures.

It can also be used in standalone operation, without an axis controller.

The Lexium 05A servo drive comprises:

- 1 RS 422 interface
- 2 analog inputs
- 6 x 24 V $\overline{\text{V}}$ logic inputs, 3 of which are reassignable
- 2 reassignable 24 V $\overline{\text{V}}$ logic outputs
- Interfaces for CANopen machine bus, CANopen Motionbus and Modbus serial link

The Lexium 05B servo drive: Control via PROFIBUS DP

The Lexium 05B servo drive features a PROFIBUS DP bus control interface. In addition to this control interface, the Lexium 05B servo drive can also be controlled via an RS 422 interface and logic I/O.

It also has a Modbus serial link interface allowing easy configuration via the PowerSuite software workshop.

The Lexium 05C servo drive: Control via I/O

The Lexium 05C servo drive is ideal for control via I/O or pulse train.

It includes numerous I/O and interfaces:

- 1 analog input
- 6 x 24 V $\overline{\text{V}}$ logic inputs, 5 of which are reassignable
- 3 reassignable 24 V $\overline{\text{V}}$ logic outputs
- 2 RS 422 interfaces, one of which features a pulse control input and an ESIM (Encoder SIMulation) output

Like the Lexium 05A and Lexium 05B servo drives, it has the Modbus serial link interface for easy configuration via the PowerSuite software workshop.

Possible architectures

Lexium 05 servo drives are designed for use in different types of architecture. The table below shows the types of architecture available for each servo drive:

Architecture	Servo drive		
	Lexium 05A	Lexium 05B	Lexium 05C
Pulse control			
Pulse control and ESIM output			
Control via fieldbus			
Control via CANopen Motionbus			
Control via analog input			
Control with limiting via analog input			
Standalone operation via logic inputs			
Closed position loop operation via an encoder (external or servo motor)			

Architecture available
 Architecture not available

Lexium 05 motion control

Lexium 05A, 05B and 05C servo drives

Main functions

Main functions				
Type of servo drive		LXM 05A...F1, LXM 05A...M2, LXM 05A...M3X, LXM 05A...N4	LXM 05B...F1, LXM 05B...M2, LXM 05B...M3X, LXM 05B...N4	LXM 05C...M2, LXM 05C...N4
Communication	Integrated	Modbus		
		CANopen, CANopen Motionbus	PROFIBUS DP	–
	Operating modes	Manual (JOG), speed control, current control, electronic gearing (pulse position control)		
		Homing, point to point, speed profile		
	Functions	Motion sequence		
24 V ⎓ logic inputs (1) (number and assignment)	Assigned inputs	Auto-tuning, monitoring, stopping, conversion		
		Stop window, rapid entry of position values		
	Reassignable inputs	–		
		–		
24 V ⎓ logic inputs (1) (number and assignment)	Assigned outputs	3, assigned to the following functions: power bridge enable, Power Removal (negative logic)		
		6, assigned to the following functions: servo motor stop, Power Removal, limit switches and homing switches, rapid entry of position values		
	Reassignable outputs	1, assigned to the power bridge enable function		
		5 - Possible assignments: fault reset/acknowledgement, servo motor stop, authorizing servo motor motion (in positive or negative direction), manual movement (positive/negative, fast/slow), speed limiting, inversion of the analog setpoint, starting a motion sequence, limit switches and homing switches, rapid entry of position values		
Analog inputs (number and assignment)	Assigned outputs	–		
		2, assigned to the following functions: servo drive fault, control of holding brake controller		
	Reassignable outputs	–		
		3 - Possible assignments: servo drive fault, servo drive ready, servo motor motion blocked, position (or speed) error in configured range, stop acknowledgement, HBC control, servo motor current value less than configured value, servo motor speed value less than configured value, acknowledgement on motion sequence start request, motor stopped		
RS 422 interfaces (number and configuration)	Assigned inputs	2, assigned to: speed or current setpoint, speed or current limiting		
		–		
	Reassignable inputs	1, assigned to the speed or current setpoint		
		–		
Human/Machine Interface (HMI)	Assigned outputs	1, configurable as: ■ Electronic gearing input (A/B, P/D or CW/CCW signals) or ■ Input for external encoder to close the position loop (A/B signals) or ■ ESIM (Encoder SIMulation) output (A/B signals)		
		1, configurable as: ■ Electronic gearing input (A/B or CW/CCW signals) or ■ ESIM (Encoder SIMulation) output (A/B signals)		
	Reassignable outputs	2, configurable as: ■ 1 electronic gearing input (A/B, P/D or CW/CCW signals) and ■ 1 ESIM (Encoder SIMulation) output (A/B signals)		
		–		
Human/Machine Interface (HMI)	Via integrated 7-segment display terminal	Manual movement (positive or negative, fast/slow), auto-tuning, simple startup, display of information and errors		
		Homing		

(1) Unless otherwise stated, the logic I/O can be used in positive logic (Sink inputs, Source outputs) or negative logic (Source inputs, Sink outputs).

General overview of Lexium 05 functions

The Lexium 05 servo drive integrates a large number of functions, enabling it to be used in a wide range of industrial applications.

There are two main function families:

■ Conventional adjustment functions, such as:

- Homing
- Manual mode (JOG)
- Auto-tuning of the servo drive/servo motor combination

■ Operating modes:

- Position control:
 - Point-to-point mode
 - Motion sequence mode
 - Electronic gearing mode (pulse position control mode)
- Speed control:
 - Speed control with acceleration/deceleration ramp
 - Instantaneous speed control
- Current control:
 - Current regulation

Two types of operation are possible:

- Local
- Via communication buses and networks

In local mode:

The servo drive parameters are defined via:

- The user interface
- The remote display terminal
- The PowerSuite software workshop

Movements are then determined by:

- Analog signals (± 10 V)
- RS 422 type signals (pulse/direction (P/D), A/B or CW/CCW signals)

In this mode, limit switches and homing switches are not managed by the servo drive. It is, however, possible to limit movement by assigning a logic input, see pages 2/66 and 2/62

Via communication buses and networks:

All the servo drive parameters and those associated with the operating modes can be accessed via:

- The communication buses and networks, in addition to the access via the user interface
- The remote display terminal
- The PowerSuite software workshop

The following table indicates the control type and the sources of setpoint values available for each of the operating modes.

Available for each of the operating modes:			
Operating modes	Control		Setpoint value via
	Via communication buses and networks	Local	
Adjustment functions			
Homing			Communication buses and networks or PowerSuite software workshop
Manual mode (JOG)			Via communication buses and networks, PowerSuite software workshop or user interface
Auto tune			Communication buses and networks or PowerSuite software workshop
Operation modes			
Point-to-point mode			Communication buses and networks or PowerSuite software workshop
Motion sequence mode			Communication buses and networks or PowerSuite software workshop
Electronic gearing mode (pulse position control)			Pulse/direction (P/D), A/B or CW/CCW signals
Speed control with ramp			Communication buses and networks or PowerSuite software workshop
Current control			Analog input, communication buses and networks or PowerSuite software workshop

Functions available
Functions not available

Homing

Note: Available with Lexium 05A and Lexium 05B servo drives

Before performing an absolute movement in point-to-point mode, a homing operation must be carried out.

Homing consists of associating an axis position with a known mechanical position. This position then becomes the reference position for any subsequent movement of the axis.

Homing is carried out by:

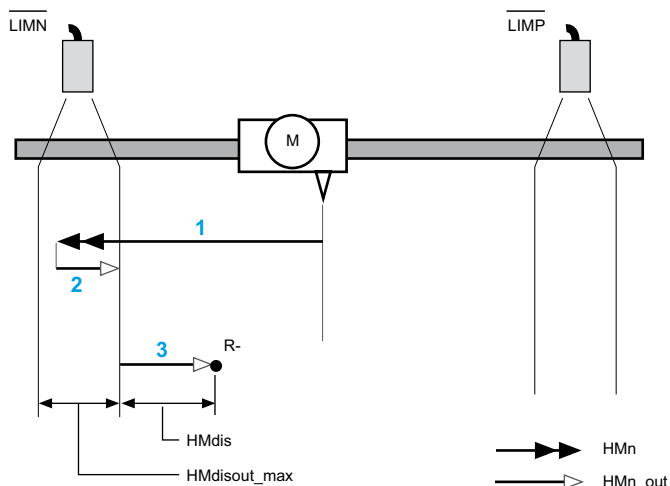
- Immediately writing the actual position register
- Movements up to a reference sensor

Homing with search for sensors

Four types of homing with movement to sensors are possible:

- Homing on - limit switch, "LIMN"
- Homing on + limit switch, "LIMP"
- Homing on reference contact "REF" with initial movement in negative direction of rotation
- Homing on reference contact "REF" with initial movement in positive direction of rotation

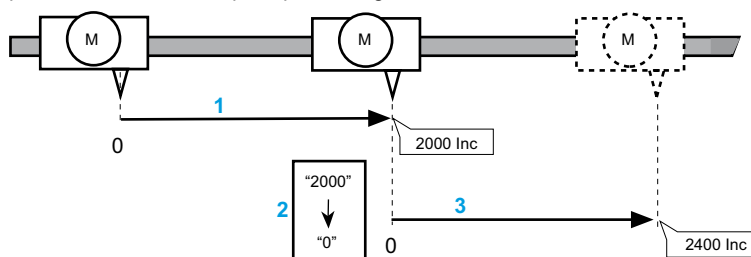
These homing movements can be executed with or without taking the "Zero marker" pulse into account.



Homing operating mode: Example with limit switch and clearance from sensor edge

Forced homing

Forced homing consists of setting the current motor position as the new reference point to which all subsequent positioning data refer.



Forced homing operating mode

Homing parameters

The homing parameters are transmitted via the communication buses and networks, or using the PowerSuite software workshop.

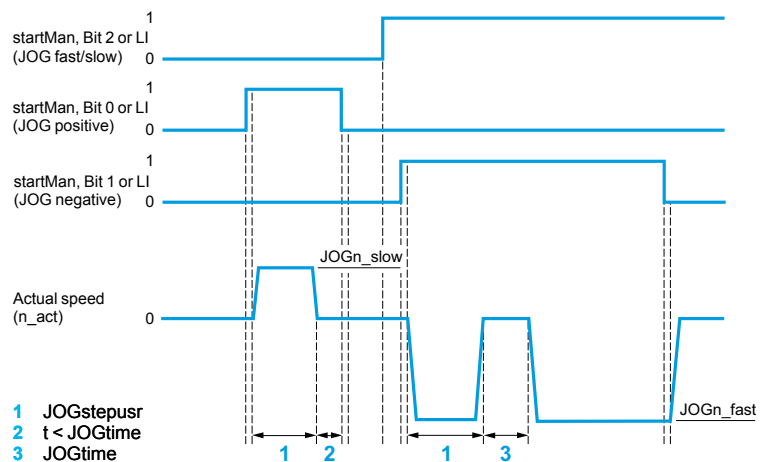
Manual mode (JOG)

Note: Available with Lexium 05A, Lexium 05B and Lexium 05C servo drives

This mode enables an axis to be moved manually. The movement can be carried out over one movement step or continuously, at constant speed. Two speeds of movement are available (slow or fast). Various parameters are used to configure the manual movement.

Setpoint value

The parameters are transmitted via the fieldbus, the PowerSuite software workshop or the servo drive user interface.



Machine adjustment in manual mode (JOG)

Manual mode works in local mode via the reassignable logic inputs LI● (only applies to Lexium 05A and Lexium 05C servo drives) or via communication buses and networks using a bit from the control word (Bit 0, Bit 1, etc.).

When a high logic level is applied to the "JOG positive" or "JOG negative" logic input, or to a rising edge of a bit from the control word (Bit 0, Bit 1), a movement step is carried out at low or high speed. The choice between low and high speed is defined by the logic state of the "JOG fast/slow" input or by the logic level of a bit from the control word (Bit 2).

Auto-tuning of the servo drive/servo motor combination

Note: Available with Lexium 05A, Lexium 05B and Lexium 05C servo drives

The auto-tuning function integrated in the servo drive enables automatic tuning of the servo control parameters to be performed after the initial configuration.

This function is activated via:

- The user interface
- The remote display terminal
- The PowerSuite software workshop

This procedure requires the servo motor to be coupled to its mechanism.

Additional parameters can be used to:

- Define mechanical rigidity depending on the type of coupling
- Limit the amplitude and the direction of the movements performed during the auto-tuning phase

The PowerSuite software workshop also provides screens for carrying out these servo control adjustments conventionally.

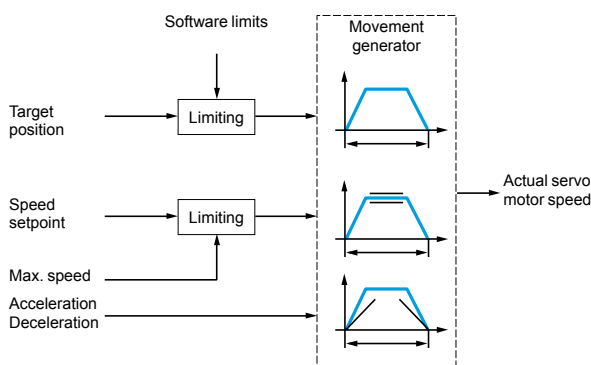
Point-to-point mode

Note: Available with Lexium 05A and Lexium 05B servo drives

This mode, also referred to as PTP (Point To Point), is used to move the axis from a position A to a position B. The movement can be absolute: this consists of expressing position B in relation to a home position (the axis must have previously been referenced), or relative: in this case the movement is performed in relation to the current position of the axis (A). The movement is performed according to acceleration, deceleration and speed parameters.

Setpoint value

The setpoint value is transmitted via the communication buses and networks, or using the PowerSuite software workshop.



Point-to-point mode, absolute and relative movements

Possible applications

A motion controller for coordinated axes or a PLC can manage several axes controlled via communication buses and networks.

This mode is often used in:

- Material handling
- Automated inspection

For multi-axis applications requiring fast and precise sequences, we recommend using the motion sequence operating mode, see page 2/20.

Motion sequence mode

Note: Available with the Lexium 05A servo drive

This mode is used for programming the parameters required for executing rapid movements. It allows absolute or relative movement of the axis from a point A to a point B, in accordance with a predefined movement, and then from point B to a point C, in accordance with another movement.

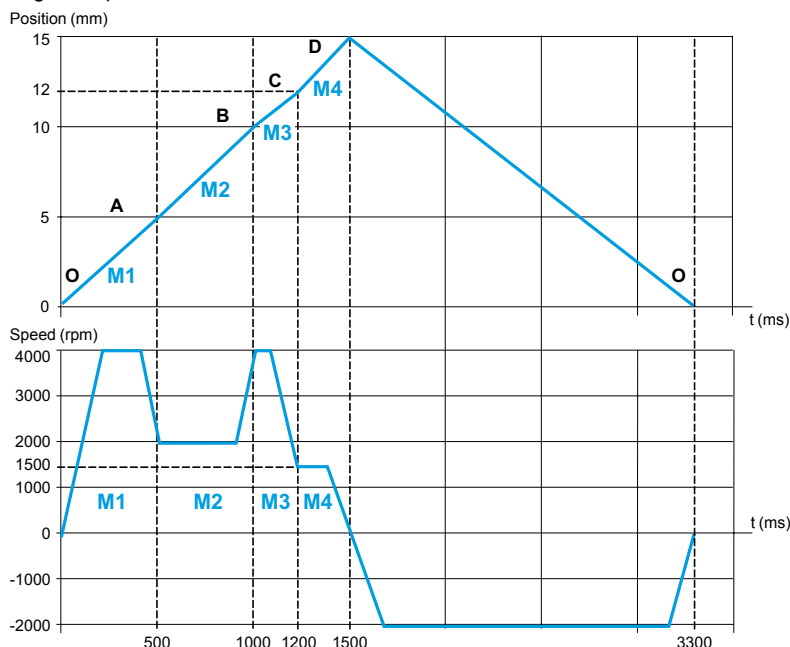
The movement is executed according to the selected acceleration, deceleration and speed parameters.

It is also possible to choose the type of sequencing for the various movements.

Example of movement sequencing

The movement executed below is made up of 5 parameterized movement stages:

- Movement 1 is used to move from initial point O to point A in 500 ms
- Movement 2 is used to move from point A to point B in 500 ms
- Movement 3 is used to move from point B to point C in 200 ms
- Movement 4 is used to move from point C to point D in 300 ms
- Movement 5 is used to move from point D to the initial point O in 1800 ms at negative speed.



Example of a movement executed using 5 movement stages

Note: It is also possible to keep the axis in position (zero speed) between 2 movement stages

Possible applications

This mode is used for applications requiring fast, precise sequences, and where movements are being made over short distances:

- Material handling
- Automated inspection
- Punching
- Drilling, etc.

Electronic gearing mode (pulse position control mode)

Note: Available with Lexium 05A, Lexium 05B and Lexium 05C servo drives

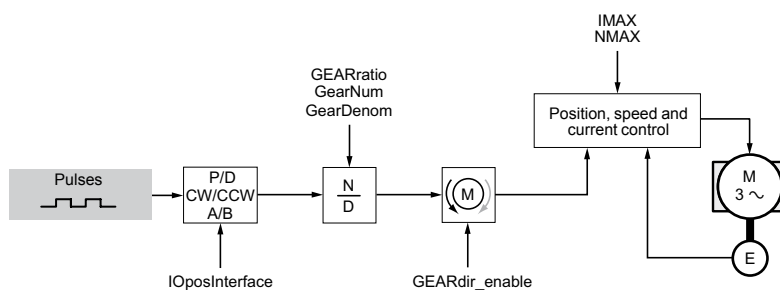
In this mode, a master/slave relationship is established between a number of Lexium 05 servo drives or between a Lexium 05 servo drive and an external master (external A/B encoder, pulse/direction signals (P/D)).

This mode is used for position control via pulse train (pulse/direction (P/D) or CW/CCW signals, depending on the servo drive) sent by an axis controller (PLC, motion controller, numerical controller, etc.).

The Lexium 05 servo drive's integrated electronic reduction ratio makes it possible to adapt the pulse train frequency to the frequency of the servo drive input. This means that the servo motor's full speed range can be utilized.

This reduction ratio, which can be either fixed or variable, is determined by the Lexium 05 servo drive's "Gearnum" and "GearDenom" parameters.

The ratio and direction of operation parameters can be accessed dynamically via the communication buses and networks.



Electronic gearing mode

Possible applications

- Handling
- Conveying
- Packing
- Cutting to length
- Applications in the fields of plastics and fibres

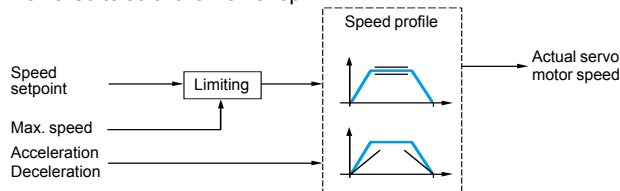
Speed control with acceleration/deceleration ramp

Note: Available with Lexium 05A and Lexium 05B servo drives

In this operating mode, the speed setpoint is applied according to an acceleration/deceleration ramp that can be adjusted using parameters. The speed setpoint can be modified during the movement. Current limiting is also possible. The position control that is present in the background allows flexible synchronization of two axes that are in speed control mode, and enables position control mode to be entered on the fly.

Setpoint value

The setpoint value is transmitted via the communication bus and networks, or via the PowerSuite software workshop.



Speed control with acceleration/deceleration ramp operating mode

Possible applications

This mode is mainly used with infinite axes.

Examples include turntable management, printing, labelling applications.

Instantaneous speed control

Note: Available with Lexium 05A, Lexium 05B and Lexium 05C servo drives

In this mode, the Lexium 05 servo drive can be used with an analog output motion controller. It is suitable for all other high-performance speed control requirements.

Setpoint value

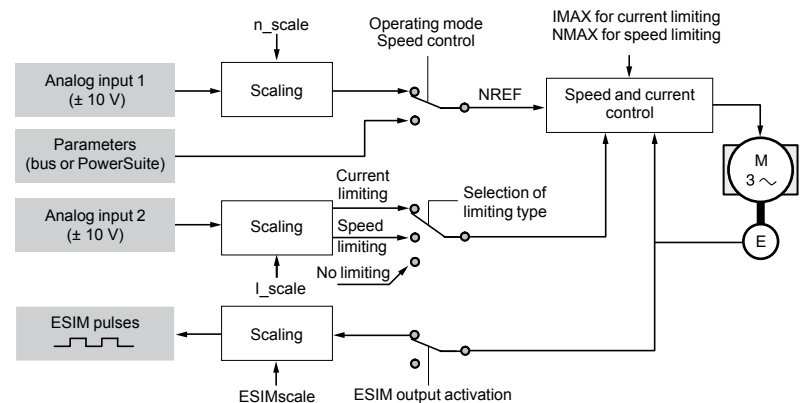
The setpoint value is transmitted:

- Via analog input 1 or a parameter for Lexium 05A and Lexium 05C servo drives
- Via a parameter for the Lexium 05B servo drive

Speed or current limiting is transmitted:

- Via analog input 2 or a parameter for the Lexium 05A servo drive
- Via a parameter for Lexium 05B and Lexium 05C servo drives

Note: A reassignable logic input can also be used to limit speed, although this only applies to Lexium 05A and Lexium 05C servo drives.



Instantaneous speed control operating mode with current limiting via analog input 2.

Use with analog output motion controller

Axis position feedback can be supplied to the axis controller (PLC, motion controller, numerical controller, etc.) by the ESI (Encoder SIMulation) output on the RS 422 interface.

Instantaneous speed control (continued)

Possible applications

- Handling
- Packaging
- Cutting to length
- Winding and unwinding applications

Current control

Note: Available with Lexium 05A, Lexium 05B and Lexium 05C servo drives

Current control is necessary for servo motor torque control. This mode, which can be added onto the other modes, is used in machine phases where torque control is crucial.

Setpoint value

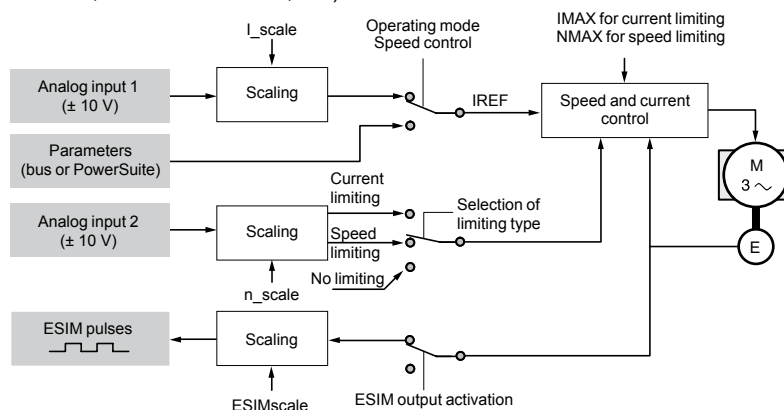
The setpoint value is transmitted:

- Via analog input 1 or a parameter for Lexium 05A and Lexium 05C servo drives
- Via a parameter for the Lexium 05B servo drive

Speed or current limiting is transmitted:

- Via analog input 2 or a parameter for the Lexium 05A servo drive
- Via a parameter for Lexium 05B and Lexium 05C servo drives

The ESIM (Encoder SIMulation) output on the RS 422 interface can be used to transmit the position and speed of the servo motor to the axis controller (PLC, motion controller, numerical controller, etc.).



Current control operating mode with speed limiting via analog input 2

Possible applications


- Car assembly applications (tool fixing machine)
- Special machines

Other functions


- Control functions:
 - Status monitoring in movement mode
 - Monitoring of the axis signals
 - Monitoring of the internal signals specific to the servo drive
 - Monitoring switching
 - Monitoring the communication on the communication buses and networks (only applies to Lexium 05A and Lexium 05B servo drives)
- Entering the various scaling factors
- Adjusting the movement generator
- Activating the STOP signal
- Triggering the fast stop function (Quick-Stop)
- Activating the motor brake via the HBC (Holding Brake Controller)
- Reversing the direction of rotation of the motor
- Reading the analog input values
- Determining the logic of the signals
- Possible replacement of the servo motor encoder with an external encoder to close the position loop (only applies to the Lexium 05A servo drive).

These functions can be activated and parameterized via:

- The logic inputs/outputs, some of which are reassignable (only applies to Lexium 05A and Lexium 05C servo drives)
- The communication buses and networks (only applies to Lexium 05A and Lexium 05B servo drives)
- The PowerSuite software workshop
- The servo drive user interface

Environmental characteristics			
Conformity to standards			Lexium 05 servo drives have been developed to conform to the strictest international standards and the recommendations relating to electrical industrial control equipment (IEC, EN), including: low voltage, IEC/EN 61800-5-1, IEC/EN 50178, IEC/EN 61800-3 (conducted and radiated EMC immunity and emissions).
EMC immunity			IEC/EN 61800-3, environments 1 and 2 IEC/EN 61000-4-2 level 3 IEC/EN 61000-4-3 level 3 IEC/EN 61000-4-4 level 4 IEC/EN 61000-4-5 level 3
Conducted and radiated EMC emissions for servo drives	LXM 05●●●●F1 LXM 05●●●●M2 LXM 05●●●●N4		IEC/EN 61800-3, environments 1 and 2, categories C2, C3 EN 55011 class A group 2, IEC/EN 61800-3 category C3 With additional EMC filter (1): ■ EN 55011 class A group 1, IEC/EN 61800-3 category C2 ■ EN 55011 class A group 2, IEC/EN 61800-3 category C3
	LXM 05●●●●M3X		With additional EMC filter (1): ■ EN 55011 class A group 1, IEC/EN 61800-3 category C2 ■ EN 55011 class A group 2, IEC/EN 61800-3 category C3
CE marking			The servo drives are CE marked in accordance with the European low voltage (2006/95/EC) and EMC (89/336/EEC) directives.
Product certification			UL (USA), cUL (Canada)
Degree of protection			IEC/EN 61800-5-1, IEC/EN 60529
Vibration resistance	LXM 05●●●●F1 LXM 05●●●●M2 LXM 05●●●●M3X LXM 05●●●●N4		IP 41 on the upper part with protective cover in place IP 20 after removal of the protective cover, see page 2/70
	LXM 05●●●●F1 LXM 05●●●●M2 LXM 05●●●●M3X LXM 05●●●●N4		According to IEC/EN 60068-2-6: 1.5 mm peak to peak from 3 Hz to 13 Hz 1 gn from 13 Hz to 150 Hz
Shock resistance			According to IEC/EN 61131 paragraph 6.3.5.2 15 gn for 11 ms conforming to IEC/EN 60028-2-27
Maximum ambient pollution			Degree 2 conforming to IEC/EN 61800-5-1
Environmental conditions			IEC 60721-3-3 category 3C1
Relative humidity			According to IEC 60721-3-3, category 3K3, 5% to 93%, without condensation
Ambient air temperature around the device	Operation	°C	0... + 50 Temperature derating and limitations: see mounting recommendations page 2/70
	Storage	°C	- 25... + 70
Type of cooling	LXM 05●D10F1 LXM 05CU70M2, ●D10M2 LXM 05●D10M3X		Natural convection
	LXM 05●D17F1, ●D28F1 LXM 05●D17M2, ●D28M2 LXM 05●D17M3X, ●D42M3X LXM 05●●●●N4		Fan
Maximum operating altitude		m	1000 without derating Up to 2000 under the following conditions: ■ Temperature 40°C max. ■ Mounting distance between servo drives > 50 mm ■ Protective cover removed
Operating position Maximum permanent angle in relation to the normal vertical mounting position			10° 10° 

(1) See table on page 2/41 to check permitted cable lengths.

Drive characteristics				
Switching frequency		kHz	4 or 8 depending on rating and associated servo motor. See pages 2/78 and 2/112	
Electrical power characteristics				
Power supply	Voltages	V	100 - 15%...120 + 10% single-phase for LXM 05●●●●F1 200 - 15%...240 + 10% single-phase for LXM 05●●●●M2 200 - 15%...240 + 10% three-phase for LXM 05●●●●M3X 380 - 15%...480 + 10% three-phase for LXM 05●●●●N4	
	Frequency	Hz	50 - 5%...60 + 5%	
	Transient overvoltage		Overvoltage category III	
	Inrush current	A	< 60	
	Leakage current	mA	< 30	
External 24 V  power supply (not provided) (1)	Input voltage	V	24 (-15/+20%)	
	Input current (no-load)	A	1	
	Ripple		≤ 5%	
Signalling			1 red LED: LED lit indicates the presence of servo drive voltage	
Output voltage			Maximum three-phase voltage equal to line supply voltage	
Electrical isolation			Between power and control (inputs, outputs, power supplies)	
Connection cable characteristics				
Recommended cable type for mounting in an enclosure			Single-strand IEC cable, ambient temperature 45°C, copper 90°C XLPE/EPR or copper 70°C PVC	
Connection characteristics (terminals for the power supply, the DC bus, and the servo motor)				
Servo drive terminals		R/L1, S/L2, T/L3 (power supply)	PA/+, PBI, PBe (external braking resistor)	U/T1, V/T2, W/T3 (servo motor)
Maximum wire size and tightening torque for the power supply, braking resistor, DC bus and servo motor.	LXM 05●D10F1 LXM 05CU70M2, ●D10M2 LXM 05●D10M3X	2.5 mm ² (AWG 14) 0.8 Nm	2.5 mm ² (AWG 14) 0.8 Nm	See characteristics of VW3 M5 10● R●●● and VW3 M5 30● R●●●● cables on pages 2/94 and 2/137
	LXM 05●D17F1, ●D28F1 LXM 05●D17M2, ●D28M2 LXM 05●D17M3X, ●D42M3X LXM 05●D14N4, ●D34N4	6.0 mm ² (AWG 10) 1.2 Nm	6.0 mm ² (AWG 10) 1.2 Nm	
	LXM 05●D57N4	16.0 mm ² (AWG 6) 2.2 Nm	16.0 mm ² (AWG 6) 2.2 Nm	

(1) Please consult our specialist catalogue "Phaseo power supplies and transformers".

Control signal characteristics				
Type of servo drive		LXM 05A●●●●●●	LXM 05B●●●●●●	LXM 05C●●●●●●
Protection	Inputs	Against reverse polarity		
	Outputs	Against short circuits		
Electrical link		Presence of an electrical link on the 0 V ---		
24 V --- I/O logic		Positive logic (Sink input/Source output) or negative logic (Source input/Sink output). Positive logic is default setting.		
Logic inputs				
Type		24 V --- logic inputs with positive (Sink) or negative (Source) logic		
Number		6, of which 3 are reassignable, see page 2/60	4	6, of which 5 are reassignable, see page 2/62
Power supply	V ---	24		
Sampling period	ms	0.25		
Debounce filtering	ms	1		
Positive logic (Sink)		State 0 if < 5 V or input not wired, state 1 if > 15 V Logic inputs conforming to standard IEC/EN 61131-2 type 1		
Negative logic (Source)		State 0 if > 19 V or input not wired, state 1 if < 9 V		
Safety inputs				
Type		Inputs for the Power Removal safety function		
Number		2 (PWRR_A, PWRR_B)		–
Power supply	V ---	24		
Input filtering	ms	1		
Response time	ms	≤ 10		
Positive logic (Sink)		State 0 if < 5 V or input not wired, state 1 if > 15 V Logic inputs conforming to standard IEC/EN 61131-2 type 1		
Logic outputs				
Type		24 V --- logic outputs with positive (Source) or negative (Sink) logic.		
Number		2, reassignable, see page 2/60	2	3, reassignable, see page 2/62
Output voltage	V	≤ 30, conforming to standard IEC/EN 61131-2		
Sampling period	ms	1		
Max. breaking current	mA	50		
Voltage drop	V	1 (at 50 mA load)		
Analog inputs				
Type		±10 V differential analog inputs		
Resolution	bit	14		
Number		2 (ANA 1+/ANA 1–, ANA 2+/ANA 2–)	–	1 (ANA 1+/ANA 1–)
Input resistance	kΩ	≥ 10		
Sampling period	μs	250		
Absolute error		Less than ±1% at 25°C, less than ±2% over the operating temperature range		
Linearity		Less than ±0.5%		

Control signal characteristics (continued)					
Type of servo drive		LXM 05A●●●●●●		LXM 05B●●●●●●	LXM 05C●●●●●●
Pulse/direction (P/D), A/B, CW/CCW signals					
Type			RS 422 link		
Number			1 interface for P/D, A/B, CW/CCW signals	1 interface for P/D, A/B signals	2 interfaces for P/D, A/B, CW/CCW signals
Common mode range		V	- 7...+ 12		
Input resistance		kΩ	5		
Signal input frequency	Pulse/direction (P/D)	kHz	≤ 400		
	A/B	kHz	≤ 400		
	CW/CCW	kHz	≤ 400	–	≤ 400
ESIM (Encoder SIMulation) output signals					
Logic level			RS 422 link		
Output frequency		kHz	≤ 400		
Servo motor encoder feedback signals					
Voltages	Encoder power supply	V	+ 10/100 mA		
	SinCos input signals	V	1 V _{SS} with 2.5 V offset 0.5 V _{SS} at 100 kHz		
Input resistance		Ω	120		
Operational safety characteristics					
Type of servo drive		LXM 05A●●●●●●		LXM 05B●●●●●●	LXM 05C●●●●●●
Protection	Of the machine		“Power Removal” (PWR) safety function which forces stopping and/or prevents unintended restarting of the servo motor, conforming to standard ISO 13849-1, performance level “d” (PL d), and standard IEC/EN 61800-5-2		–
	Of the system process		“Power Removal” (PWR) safety function which forces stopping and/or prevents unintended restarting of the servo motor, conforming to standard IEC/EN 61508 level SIL2 and standard IEC/EN 61800-5-2		–

Communication port characteristics

CANopen and CANopen Motionbus protocols (only applies to LXM 05A●●●●●● servo drives)

Protocol type		CANopen	CANopen Motionbus
Structure	Connectors	RJ45 (labelled CN4) or spring terminals (labelled CN1)	
	Network management	Slave	
	Transmission speed	Transmission speed depends on the length of the bus: <ul style="list-style-type: none"> ■ 50 kbps for bus lengths of up to 1000 m ■ 125 kbps for bus lengths of up to 500 m ■ 250 kbps for bus lengths of up to 250 m ■ 500 kbps for bus lengths of up to 100 m ■ 1 Mbps for bus lengths of up to 4 m, where no segment is no longer than 0.3 m 	
	Address (Node ID)	1 to 127, configurable via the display terminal or the PowerSuite software workshop	
	Polarization	Line termination impedances are integrated in the servo drive and are switchable.	
Service	PDO (Process Data Objects)	Implicit exchange of PDO: <ul style="list-style-type: none"> ■ 3 PDO conforming to DSP 402 modes (position control and speed profile modes) ■ 1 configurable mapping PDO 	Implicit exchange of PDO: <ul style="list-style-type: none"> ■ 2 PDO conforming to DSP 402 (position control mode)
	PDO modes	Event-triggered, Time-triggered, Remotely-requested, Sync (cyclic), Sync (acyclic)	Sync (cyclic)
	PDO mapping	1 configurable PDO	–
	Number of SDO (Service Data Objects)	Explicit exchange of SDO: <ul style="list-style-type: none"> ■ 2 receive SDO ■ 2 transmit SDO 	Explicit exchange of SDO: <ul style="list-style-type: none"> ■ 1 receive SDO ■ 1 transmit SDO
	Emergency	Yes	
	Profile	CiA DSP 402: CANopen "Device Profile Drives and Motion Control"	
	Communication monitoring	Node guarding, heartbeat	Position control mode
Diagnostics	Using LEDs	2 LEDs: "RUN" and "ERROR" on integrated 7-segment display terminal Display of faults Full diagnostics with the PowerSuite software workshop	
Description file		A single eds file for the whole range is supplied on the documentation CD-ROM. This file contains the description of the servo drive parameters	

Modbus protocol (LXM 05A●●●●●●, LXM 05B●●●●●●, LXM 05C●●●●●● servo drives)

Structure	Connector	RJ45 (labelled CN4)
	Physical interface	2-wire RS 485 multidrop
	Transmission mode	RTU
	Transmission speed	Configurable via the display terminal or the PowerSuite software workshop: 9600 bps, 19.2 kbps or 38.4 kbps for serial links of up to 400 m
	Format	Configurable via the display terminal or the PowerSuite software workshop: <ul style="list-style-type: none"> ■ 8 bits, odd parity, 1 stop ■ 8 bits, even parity, 1 stop ■ 8 bits, no parity, 1 stop ■ 8 bits, no parity, 2 stop
	Polarization	No polarization impedances These must be provided by the wiring system (for example, in the master)
	Number of servo drives	31 Lexium 05 servo drives maximum
	Address	1 to 247, configurable via the display terminal or the PowerSuite software workshop
Services	Messaging	Read Holding Registers (03) 63 words maximum Write Single Register (06) Write Multiple Registers (16) 61 words maximum Read/Write Multiple Registers (23) 63/59 words maximum Read Device Identification (43) Diagnostics (08)
	Communication monitoring	Monitoring function (node guarding) can be activated "Time out" can be set between 0.1 s and 10 s
Diagnostics		Display of faults on integrated 7-segment display terminal

Communication port characteristics (continued)		
PROFIBUS DP protocol (only applies to LXM 05B●●●●●● servo drives)		
Structure	Connector	Spring terminals (labelled CN1)
	Physical interface	2-wire RS 485 multidrop
	Transmission speed	Transmission speed depends on the length of the bus: <ul style="list-style-type: none"> ■ 9.6 kbps, 19.2 kbps, 45.45 kbps, 93.75 kbps for bus lengths of up to 1200 m ■ 187.5 kbps for bus lengths of up to 1000 m ■ 500 kbps for bus lengths of up to 400 m ■ 1.5 Mbps for bus lengths of up to 200 m ■ 3 Mbps, 6 Mbps, 12 Mbps for bus lengths of up to 100 m
	Address	1 to 126, configurable via the integrated 7-segment display terminal or the PowerSuite software workshop
Services	Periodic variables	PPO type 2 8 PKW bytes 12 Process Data bytes
	Communication monitoring	Can be inhibited "Time out" can be set via the PROFIBUS DP bus configurator
Diagnostics		Two LEDs: RUN and ERR Display of faults on integrated 7-segment display terminal Full diagnostics with the PowerSuite software workshop
Description file		A single gsd file for the whole range is supplied on the documentation CD-ROM. This file does not contain the description of the servo drive parameters

Lexium 05 motion control

Lexium 05A, 05B and 05C servo drives



LXM 05●D10F1
LXM 05CU70M2
LXM 05●D10M2
LXM 05●D10M3X



LXM 05●D17F1
LXM 05●D17M2
LXM 05●D17M3X
LXM 05●D14N4



LXM 05●D28F1
LXM 05●D28M2
LXM 05●D42M3X
LXM 05●D22N4
LXM 05●D34N4



LXM 05●D57N4

Lexium 05A, 05B and 05C servo drives

Output current		Nominal power		Line current		Max. prospective line Isc	Reference (1) (2)	Weight
Continuous (RMS)	Peak (RMS) (3)			at U1	at U2			
at 4 kHz	at 8 kHz	at 4 kHz	at 8 kHz	at 4 kHz	at 4 kHz			
A	A	A	A	kW	A	kA		kg
Single-phase supply voltage: 100...120 V ~ (4) 50/60 Hz, with integrated EMC filter								
4	3.2	7	6	0.4	7.6	7	1	LXM 05AD10F1 1.100
								LXM 05BD10F1 1.100
8	7	12	11	0.65	11.5	10.5	1	LXM 05AD17F1 1.400
								LXM 05BD17F1 1.400
15	13	20	20	0.85	22.6	20.7	1	LXM 05AD28F1 2.000
								LXM 05BD28F1 2.000
Single-phase supply voltage: 200...240 V ~ (4) 50/60 Hz, with integrated EMC filter								
3	2.4	5	4.3	0.4	4.8	4	1	LXM 05CU70M2 1.100
4	3.2	7	6	0.75	8.1	6.7	1	LXM 05AD10M2 1.100
								LXM 05BD10M2 1.100
								LXM 05CD10M2 1.100
8	7	12	11	1.2	12.7	10.5	1	LXM 05AD17M2 1.400
								LXM 05BD17M2 1.400
								LXM 05CD17M2 1.400
15	13	20	20	2.5	23	19.2	1	LXM 05AD28M2 2.000
								LXM 05BD28M2 2.000
								LXM 05CD28M2 2.000
Three-phase supply voltage: 200...240 V ~ (4) 50/60 Hz, without integrated EMC filter (5)								
4	3.2	7	6	0.75	5.2	4.3	5	LXM 05AD10M3X 1.100
								LXM 05BD10M3X 1.100
8	7	12	11	1.4	9	7.5	5	LXM 05AD17M3X 1.300
								LXM 05BD17M3X 1.300
17	15	30	30	3.2	19	15.8	5	LXM 05AD42M3X 1.900
								LXM 05BD42M3X 1.900
Three-phase supply voltage: 380...480 V ~ (4) 50/60 Hz, with integrated EMC filter								
6	5	10	7.5	1.4	4.2	3.3	5	LXM 05AD14N4 1.400
								LXM 05BD14N4 1.400
								LXM 05CD14N4 1.400
9	7	16	14	2	6.3	5	5	LXM 05AD22N4 2.000
								LXM 05BD22N4 2.000
								LXM 05CD22N4 2.000
15	11	24	18	3	9.7	7.7	5	LXM 05AD34N4 2.000
								LXM 05BD34N4 2.000
								LXM 05CD34N4 2.000
25	20	40	30	6	17.7	14	22	LXM 05AD57N4 4.800
								LXM 05BD57N4 4.800
								LXM 05CD57N4 4.800

EMC conformity kits (2)

Description	Used for	Reference	Weight kg
EMC conformity kits provide a connection compliant with EMC standards, see page 2/67	LXM 05●D10F1 LXM 05CU70M2, LXM 05●D10M2 LXM 05●D10M3X	VW3 M2 101	—
The kit consists of:	LXM 05●D17F1, ●D28F1 LXM 05●D17M2, ●D28M2 LXM 05●D17M3X, ●D42M3X LXM 05●D14N4, ●D34N4 LXM 05●D57N4	VW3 M2 102	—
■ EMC plate ■ Clamps ■ Fixing accessories		VW3 M2 103	—

(1) For information on the various functions of LXM 05A●●●●●●, LXM 05B●●●●●● and LXM 05C●●●●●● servo drives, see page 2/15.

(2) LXM 05A●●●●●● and LXM 05B●●●●●● servo drives come with an EMC conformity kit. For LXM 05C●●●●●● servo drives, the kit is available as an option and can be ordered separately.
Additional kits can also be ordered separately for any of the Lexium 05 servo drives.

(3) Maximum value for 3 seconds.

(4) Nominal supply voltage, min. U1, max. U2: 100 (U1)...120 V (U2), 200 (U1)...240 V (U2), 380 (U1)...480 V (U2)

(5) Additional EMC filters available as an option, see page 2/41.

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VW3 A31101

Separate parts

The Lexium 05 servo drive can be connected to a remote display terminal. The remote display terminal can be mounted on the door of an enclosure with IP 65 protection on the front panel.

The terminal provides access to the same functions as the integrated display and keypad on the the front panel of the servo drive.

It can be used to:

- Configure, adjust and control the servo drive remotely
- Provide a remote display

Description	Used for	Reference	Weight kg
Remote display terminal Supplied with one 5 m cable fitted with 2 connectors, and with seal and screws for IP 65 mounting on an enclosure door	LXM 05●●●●●●●●	VW3 A31101	0.380
Plates for mounting on L rail, width 35 mm	LXM 05●D10F1 LXM 05CU72M2, ●D10M2 LXM 05●D10M3X	VW3 A11851	0.200
	LXM 05●D17F1, LXM 05●D17M2, LXM 05●D17M3X, LXM 05●D14N4	VW3 A31852	0.220

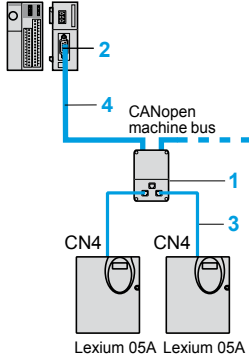
Documentation (1)

Description	Reference	Weight kg
Simplified Lexium 05 user's manual	(2)	—
CD-ROM, containing: <ul style="list-style-type: none"> ■ A variables user's manual ■ A Modbus and CANopen user's manual ■ A Profibus DP user's manual 	VW3 M8 703	—

(1) The manuals and quick reference guides for servo drives and servo motors are available on our website: www.schneider-electric.com.

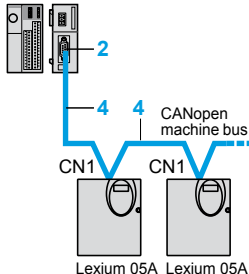
(2) Supplied with every Lexium 05 drive

Twido + TWD NC01M

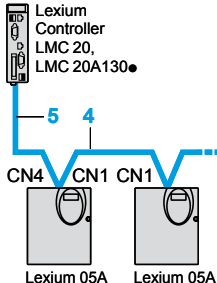


Connection to Lexium 05A via RJ45 connector (CN4)

Twido + TWD NC01M



Connection to Lexium 05A via spring terminals (CN1)



Connection to the CANopen Motionbus

CANopen machine bus for the Lexium 05A servo drive

The Lexium 05A servo drive can be connected directly to the CANopen machine bus via a spring terminal, or using an RJ45 connector.

The communication function provides access to the servo drive's configuration, adjustment, control and monitoring functions.

Each servo drive incorporates line terminators that can be disconnected via a switch.

Connection accessories (1)

Description	Use	Item no.	Reference	Weight kg
CANopen IP20 junction box 2 RJ45 ports	Tap-off from trunk cable for RJ45 cabling	1	VW3 CAN TAP2	0.480
IP 20 SUB-D connectors, 90° angled, 9-way female SUB-D. Switch for line terminator.	Connecting the trunk cable to the Twido programmable controller and the Premium PLC	2	TSX CAN KCDF 90T	0.046

Cables (1)

Description	Use	Item no.	Length	Reference	Weight	
	From		To			m
CANopen cables fitted with 2 RJ45 connectors	LXM 05A●●●●●●●● servo drive (connector CN4)	VW3 CAN TAP2 junction box	3	0.3	VW3 CAN CARR03	0.050
			1	VW3 CAN CARR1	0.500	
CANopen cables (1) Standard cables, Cé marking Low smoke emission, halogen-free Flame retardant (IEC 60332-1)	LXM 05A●●●●●●●● servo drive (terminal CN1)	VW3 CAN TAP2 junction box TSX CAN KCDF 90T CANopen connector LXM 05A●●●●●●●● servo drive (terminal CN1)	4	50	TSX CAN CA 50	4.930
			100	TSX CAN CA 100	8.800	
			300	TSX CAN CA 300	24.560	
	VW3 CAN TAP2 junction box	TSX CAN KCDF 90T CANopen connector				
	CANopen cables (1) UL certification, Cé marking Flame retardant (IEC 60332-2)	LXM 05A●●●●●●●● servo drive (terminal CN1)	VW3 CAN TAP2 junction box TSX CAN KCDF 90T CANopen connector LXM 05A●●●●●●●● servo drive (terminal CN1)	4	50	TSX CAN CB 50
100				TSX CAN CB 100	7.840	
300				TSX CAN CB 300	21.870	
VW3 CAN TAP2 junction box		TSX CAN KCDF 90T CANopen connector				
CANopen cables (1) Cables for harsh environment (2) or mobile installation, Cé marking. Low smoke emission, halogen-free Flame retardant (IEC 60332-1)		LXM 05A●●●●●●●● servo drive (terminal CN1)	VW3 CAN TAP2 junction box TSX CAN KCDF 90T CANopen connector LXM 05A●●●●●●●● servo drive (terminal CN1)	4	50	TSX CAN CD 50
	100			TSX CAN CD 100	7.770	
	300			TSX CAN CD 300	21.700	
	VW3 CAN TAP2 junction box	TSX CAN KCDF 90T CANopen connector				

CANopen Motionbus for the Lexium 05A servo drive

CANopen Motionbus can be used, with the Lexium Controller, to control the motion of up to 8 Lexium 05A servo drives.

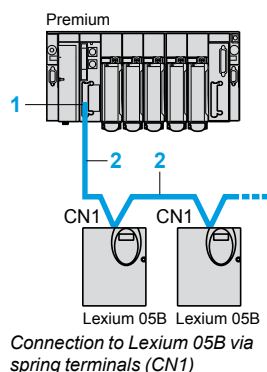
Connecting cable

Description	Use		Item no.	Length m	Reference	Weight kg
	From	To				
Cable fitted with one 9-way female SUB-D connector with integrated line terminator and one RJ45 connector	Motion controller LMC 20, LMC 20A130● Lexium controller	LXM 05A●●●●●●● servo drive (connector CN4)	5	1	VW3 M3 805R010	—

(1) For other CANopen machine bus connection accessories, please consult our catalogue "Machines & installations with CANopen".

(2) Harsh environment:

- Resistance to hydrocarbons, industrial oils, detergents, solder splashes
- Relative humidity up to 100%
- Saline atmosphere
- Significant temperature variations
- Operating temperature between -10°C and +70°C



PROFIBUS DP fieldbus for the Lexium 05B servo drive

The Lexium 05B servo drive can be connected directly to the PROFIBUS DP bus via a spring terminal (CN1). The communication function provides access to the functions already described for the CANopen machine bus.

Connection accessories (1)

Description	Use	Item no.	Reference	Weight kg
IP 20 SUB-D connectors, 90° angled, 9-way female SUB-D. Switch for line terminator.	Connecting the trunk cable to the Twido programmable controller and the Premium PLC	1	TSX CAN KCDF 90T	0.046

Cables

Description	Use	Item no.	Length m	Reference	Weight kg
From	To				
PROFIBUS DP trunk cables	Servo drive LXM 05B●●●●●●	2	100	TSX PBS CA 100	—
	Servo drive LXM 05B●●●●●●, connector TSX CAN KCDF 90T		400	TSX PBS CA 400	—

Modbus serial link for Lexium 05A, 05B and 05C servo drives

Every Lexium 05 servo drive can be connected directly to the Modbus serial link using an RJ45 connector. The communication function provides access to the servo drive's configuration, adjustment, control and monitoring functions.

Connection accessories

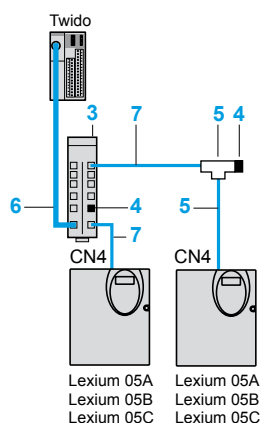
Description	Use	Item no.	Length m	Unit reference	Weight kg	
Junction box 3 screw terminals, RC line terminator	To be connected using cable VW3 A8 306 D30	—	—	TSX SCA 50	0.520	
Subscriber socket Two 15-way female SUB-D connectors and 2 screw terminals, RC line terminator	To be connected using cable VW3 A8 306	—	—	TSX SCA 62	0.570	
Modbus splitter box 10 RJ45 connectors and 1 screw terminal	For connecting up to 8 Lexium 05 servo drives to the Modbus serial link using RJ45 connectors	3	—	LU9 GC3	0.500	
Modbus line terminators (2)	For RJ45	R = 120 Ω, C = 1 nf	4	—	VW3 A8 306 RC	0.200
		R = 150 Ω	4	—	VW3 A8 306 R	0.200
	For screw terminals	R = 120 Ω, C = 1 nf	—	—	VW3 A8 306 DRC	0.200
		R = 150 Ω	—	—	VW3 A8 306 DR	0.200
Modbus RJ45 T-junction boxes (with integrated cable)	Branching off from Modbus serial link		5	0.3	VW3 A8 306 TF03	0.190
				1	VW3 A8 306 TF10	0.210

Connection cables

Description	Use		Item no.	Length	Reference	Weight
	From	To		m		kg
Cables for Twido controller serial link (1) fitted with a mini-DIN and an RJ45 connector	Twido programmable controller	LXM 05●●●●●● servo drive Modbus splitter box LU9 GC3	6	0.3	TWD XCA RJ 003	—
				1	TWD XCA RJ 010	0.090
				3	TWD XCA RJ 030	0.160
Cable for Modbus serial link fitted with one RJ45 connector and one free wire end	LXM 05●●●●●● servo drive (CN4)	TSX SCA 50 junction box	—	3	VW3 A8 306 D30	0.150
Cable for Modbus serial link fitted with one RJ45 connector and one 15-way male SUB-D connector	LXM 05●●●●●● servo drive (CN4)	TSX SCA 62 subscriber socket	—	3	VW3 A8 306	0.150
Cables for Modbus serial link fitted with 2 RJ45 connectors	LXM 05●●●●●● servo drive (CN4) Modbus splitter box LU9 GC3 Modbus T-junction box VW3 M8 306 TF●●	Modbus splitter box LU9 GC3 Modbus T-junction box VW3 M8 306 TF●●	7	0.3	VW3 A8 306 R03	0.025
				1	VW3 A8 306 R10	0.060
				3	VW3 A8 306 R30	0.130
RS 485 double shielded twisted pair Modbus cables Supplied without connector	Modbus splitter box LU9 GC3	Modbus splitter box LU9 GC3	—	100	TSX SCA 100	5.680
				200	TSX SCA 200	10.920
				500	TSX SCA 500	30.000

(1) For connection to other PLCs, please consult our automation products catalogues.

(2) Order in multiples of 2.



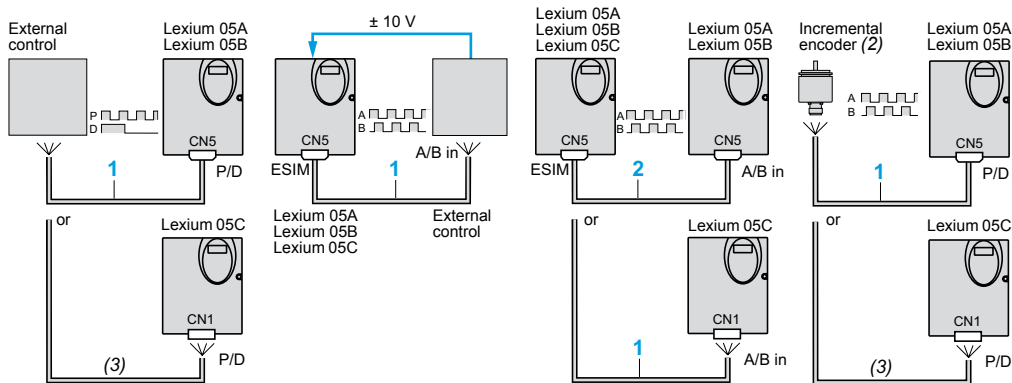
Lexium 05 motion control

Lexium 05A, 05B and 05C servo drives

Cables for Modicon Premium motion control modules (1)

Description	Use		Item no.	Length m	Reference	Weight kg
	From	To				
Cables for TSX CAY ●● Premium module fitted with a 10-way Molex connector and a 15-way SUB-D connector	LXM 05●●●●●●●● servo drives (CN5: ESIM (Encoder SIMulation))	TSX CAY ●● Premium module (15-way, SUB-D)	—	0.5	VW3 M8 203 R05	0.020
				1.5	VW3 M8 203 R15	0.030
				3	VW3 M8 203 R30	0.040
				5	VW3 M8 203 R50	0.050
Cables for TSX CFY ●● Premium module fitted with a 10-way Molex connector and a 15-way SUB-D connector	Servo drives LXM 05A●●●●●●●●, LXM 05B●●●●●●●● (CN5 input: pulse/ direction signals (P/D))	TSX CFY ●● Premium module (15-way, SUB-D)	—	0.5	VW3 M8 204 R05	0.020
				1.5	VW3 M8 204 R15	0.030
				3	VW3 M8 204 R30	0.040
				5	VW3 M8 204 R50	0.050
Cables for TSX CFY ●● Premium module fitted with a 15-way SUB-D connector	LXM 05C●●●●●● servo drives, (CN1 input: pulse/ direction signals (P/D))	TSX CFY ●● Premium module (15-way, SUB-D)	—	0.5	VW3 M8 214 R05	—
				1.5	VW3 M8 214 R15	—
				3	VW3 M8 214 R30	—
				5	VW3 M8 214 R50	—

Cables for RS 422 control



Description	Use		Item no.	Length m	Reference	Weight kg
	From	To				
RS 422 control cables fitted with a 10-way Molex connector	LXM 05A●●●●●●●●, LXM 05B●●●●●●●● servo drives (CN5 input: pulse/ direction signals (P/D) or A/B)	External control (pulse/direction signals), External encoder (A/B signals)	1	0.5	VW3 M8 201 R05	0.020
				1.5	VW3 M8 201 R15	0.030
				3	VW3 M8 201 R30	0.040
				5	VW3 M8 201 R50	0.050
RS 422 control cables fitted with two 10-way Molex connectors	LXM 05●●●●●●●● servo drives, (CN5: ESIM (Encoder SIMulation))	External control (A/B signals)	2	0.5	VW3 M8 202 R05	0.025
				1.5	VW3 M8 202 R15	0.035
				3	VW3 M8 202 R30	0.045
				5	VW3 M8 202 R50	0.055
RS 422 control cables fitted with two 10-way Molex connectors	LXM 05●●●●●●●● servo drives, (CN5: ESIM (Encoder SIMulation))	LXM 05C●●●●●● servo drives with master/slave link (CN1 input: A/B signals)	2	0.5	VW3 M8 202 R05	0.025
				1.5	VW3 M8 202 R15	0.035
				3	VW3 M8 202 R30	0.045
				5	VW3 M8 202 R50	0.055

Note: ESIM (Encoder SIMulation) designates encoder output signals simulated by the servo drives (available on the CN5 connector of Lexium 05 servo drives, configured as output).

(1) For other Modicon Premium connection cables, please consult our "Automation platform Modicon Premium and Unity - PL7 software" specialist catalogue

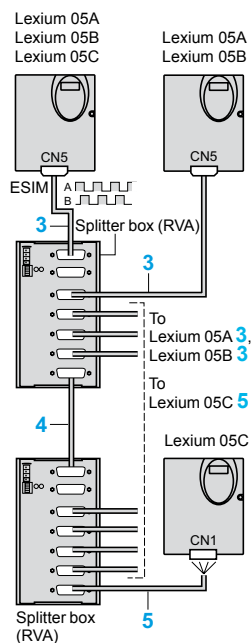
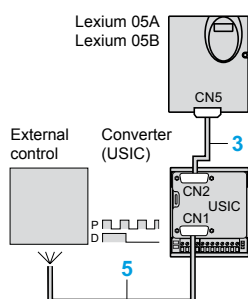
(2) Option to use Osicoder® XCC14, XCC15 or XCC19 incremental encoders; please consult our "Rotary encoders - Osicoder®" specialist catalogue

(3) Cable not supplied; see specification in the Lexium 05 user's manual available on our website at "www.schneider-electric.com"

568040



VW3 M3 102 (USIC)



Replacement connectors

Description	Use	Reference	Weight kg
Molex connectors (sold in lots of 5)	10-way female connectors for the CN5 connector of the Lexium 05 servo drive	VW3 M8 212	—

Other connection components

RS 422 interface accessories

Description	Use	Reference	Weight kg
Splitter box for encoder signals (RVA)	For distributing A/B encoder signals or pulse/direction (P/D) signals to five Lexium 05 servo drives. Includes a 24 V/5 V --- power supply for external encoder.	VW3 M3 101	0.700
RS 422 converter (USIC)	For adapting 24 V control signals to RS 422 standard	VW3 M3 102	—

Cables

Description			Use	Item no.	Length	Reference	Weight
			From	To	m		kg
Cables for RS 422 interface fitted with a 10-way Molex connector and a 15-way SUB-D connector	Servo drives LXM 05A●●●●●●, LXM 05B●●●●●● (CN5 input)	Splitter box VW3 M3 101 (RVA) for ESIM distribution	3	0.5	VW3 M8 209 R05	0.020	
				1.5	VW3 M8 209 R15	0.030	
				3	VW3 M8 209 R30	0.040	
				5	VW3 M8 209 R50	0.050	
	LXM 05●●●●●● servo drives (CN5: ESIM (Encoder SIMulation))	Splitter box VW3 M3 101 (RVA) for ESIM distribution					

Cable fitted with two 15-way female SUB-D connectors For cascading two splitter boxes	VW3 M3 101 (RVA) splitter box	VW3 M3 101 (RVA) splitter box	4	0.5	VW3 M8 211 R05	—
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Cables for PLC fitted with a 15-way female SUB-D connector For pulse/direction signals	PLC or external control	Converter VW3 M3 102 (USIC) (15-way, SUB-D)	5	0.5	VW3 M8 210 R05	—
		Splitter box VW3 M3 101 (RVA) for ESIM distribution	1.5	1.5	VW3 M8 210 R15	—
		LXM 05C●●●●●● servo drive (CN1 input)	3	3	VW3 M8 210 R30	—
		LXM 05C●●●●●● servo drive (CN1 input)	5	5	VW3 M8 210 R50	—

Pulse/direction control cables fitted with a 10-way Molex connector (for Lexium 05 servo drive) and an adapted 9-way SUB-D connector	Servo drives LXM 05A●●●●●●, LXM 05B●●●●●● (CN5 input)	Siemens S5 IP 247	—	3	VW3 M8 205 R30	—
		Siemens S5 IP 267	—	3	VW3 M8 206 R30	—

Pulse/direction control cables fitted with a 10-way Molex connector (for Lexium 05 servo drive) and an adapted 15-way SUB-D connector	Servo drives LXM 05A●●●●●●, LXM 05B●●●●●● (CN5 input)	Siemens S7 FM 353	—	3	VW3 M8 207 R30	—
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Encoder feedback cables fitted with a 10-way Molex connector (for Lexium 05 servo drive) and a 15-way SUB-D connector	LXM 05●●●●●● servo drives, (CN5: ESIM (Encoder Simulation))	Siemens S7 FM 354	—	3	VW3 M8 208 R30	—
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Note: ESIM (Encoder Simulation) designates encoder output signals simulated by the servo drives (available on the CN5 connector of Lexium 05 servo drives, configured as output).

Braking resistors

Internal braking resistor

A braking resistor is built into the servo drive to absorb the braking energy. If the DC bus voltage in the servo drive exceeds a specified value, this braking resistor is activated. The restored energy is converted into heat by the braking resistor.

External braking resistor

When the servo motor has to be braked frequently, an external braking resistor must be used to dissipate the excess braking energy.

If an external braking resistor is used, the internal braking resistor must be deactivated. To do this, the shunt between PA/+ and PBI must be removed and the external braking resistor connected between PA/+ and PBE, see page 2/66.

Two or more external braking resistors can be connected in parallel.
The servo drive monitors the power dissipated in the braking resistor.

Sizing the braking resistor

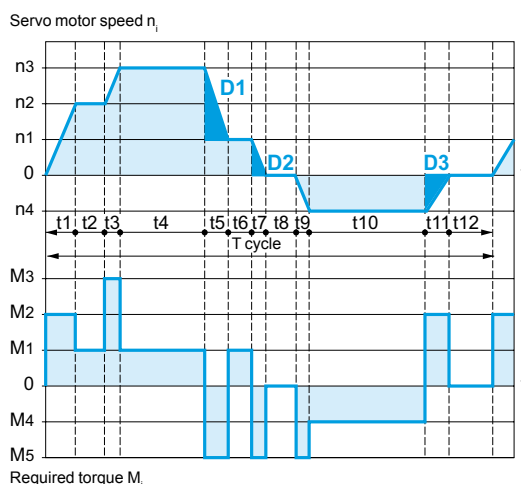
During braking or deceleration requested by the servo drive, the kinetic energy of the moving load must be absorbed by the servo drive. The energy generated by deceleration charges the capacitors integrated in the servo drive.

When the voltage at the capacitor terminals exceeds the permitted threshold, the braking resistor (internal or external) will be activated automatically in order to dissipate this energy.

In order to calculate the power to be dissipated by the braking resistor, the user needs a knowledge of the timing diagram giving the servo motor torques and speeds as a function of time in order to identify the curve segments in which the servo drive decelerates the load.

Servo motor cycle timing diagram

These curves are the same as those used on page 6/2 for selecting the size of the servo motor. The curve segments during which the servo drive is decelerating must be taken into account (D_1).



Sizing the braking resistor (continued))**Calculation of the constant deceleration energy**

To do this, the user must know the total inertia, defined as follows:

J_t : Total inertia

where:

$J_t = J_m$ (servo motor inertia) + J_c (load inertia). For J_m , see pages 2/78 and 2/112

The energy E_i of each segment is defined as follows:

$$E_i = \frac{1}{2} J_t \cdot \omega_i^2 = \frac{1}{2} J_t \cdot \left(\frac{2\pi n_i}{60} \right)^2$$

Which gives the following for the various segments:

$$E_1 = \frac{1}{2} J_t \cdot \left(\frac{2\pi [n_3 - n_1]}{60} \right)^2$$

$$E_2 = \frac{1}{2} J_t \cdot \left(\frac{2\pi n_1}{60} \right)^2$$

$$E_3 = \frac{1}{2} J_t \cdot \left(\frac{2\pi n_4}{60} \right)^2$$

where E_i is in joules, J_t in kgm^2 , ω in radians and n_i in rpm.

Energy absorbed by the internal capacitor

The energy absorption capacity of the servo drive **Edrive** (without using an internal or external braking resistor) is given for each servo drive in the table on page 2/38.

In the remainder of the calculation, only take account of the D_i segments for which the energy E_i is greater than the absorption capacity **Edrive**. This additional energy E_{Di} must be dissipated in the resistor (internal or external):

$E_{Di} = E_i - \text{Edrive}$ (in joules).

Calculation of the continuous power

The continuous power P_c is calculated for each machine cycle:

$$P_c = \frac{\sum E_{Di}}{T_{\text{cycle}}}$$

where P_c is in W, E_{Di} in joules and T_{cycle} in s.

Selecting the braking resistor (internal or external)

Note: This is a simplified selection method. In extreme applications, for example with vertical axes, this method is inadequate. In this case, please consult your Regional Sales Office.

The selection is carried out in two steps:

- 1 The internal braking resistor is adequate if the following two conditions are met:
 - The maximum energy during a braking procedure must be less than the peak energy that can be absorbed by the internal braking resistor ($E_{Di} < EP_k$),
 - The continuous power must be lower than the continuous power of the internal braking resistor ($P_c < PPr$)
- 2 If one of the above conditions is not met, an external braking resistor must be used to satisfy these two conditions.
 The value of the external braking resistor must be between the minimum and maximum values given in the table on page 2/38. If this range of values is not respected, the servo drive may be subject to disturbance and the load can no longer be braked safely.

Characteristics

Braking resistors used with LXM 05●●●●F1 servo drives

Type of servo drive			LXM 05●D10F1	LXM 05●D17F1	LXM 05●D28F1
Supply voltage		V ~	115		
Number of phases			Single-phase		
Load threshold		V ---	250		
Energy absorption of the internal capacitors		Edrive Joules (Ws)	10.8	16.2	26
Internal resistor	Resistance	Ω	40		10
	Continuous power	PPr W	20	40	60
	Peak energy	EPk Joules (Ws)	500		1000
External resistor	Minimum resistance	Ω	27	20	10
	Maximum resistance	Ω	45	27	20

Braking resistors used with LXM 05●●●●M2 servo drives

Type of servo drive			LXM 05CU70M2	LXM 05●D10M2	LXM 05●D17M2	LXM 05●D28M2
Supply voltage		V ~	230			
Number of phases			Single-phase			
Load threshold		V ---	430			
Energy absorption of the internal capacitors		Edrive Joules (Ws)	17.7		26.6	43
Internal resistor	Resistance	Ω	40			20
	Continuous power	PPr W	20		40	60
	Peak energy	EPk Joules (Ws)	900			1600
External resistor	Minimum resistance	Ω	50		27	16
	Maximum resistance	Ω	75		45	27

Braking resistors used with LXM 05●●●●M3X servo drives

Type of servo drive			LXM 05●D10M3X	LXM 05●D17M3X	LXM 05●D42M3X
Supply voltage		V ~	230		
Number of phases			Three-phase		
Load threshold		V ---	430		
Energy absorption of the internal capacitors		Edrive Joules (Ws)	17.7	26.6	43
Internal resistor	Resistance	Ω	40		20
	Continuous power	PPr W	20	40	60
	Peak energy	EPk Joules (Ws)	900		1600
External resistor	Minimum resistance	Ω	50	27	10
	Maximum resistance	Ω	75	45	20

Braking resistors used with LXM 05●●●●N4 servo drives

Type of servo drive			LXM 05●D14N4		LXM 05●D22N4		LXM 05●D34N4		LXM 05●D57N4	
Supply voltage		V ~	400	480	400	480	400	480	400	480
Number of phases			Three-phase							
Load threshold		V ---	770							760
Energy absorption of the internal capacitors		Edrive Joules (Ws)	26	6	52	12	52	12	104	10
Internal resistor	Resistance	Ω	40		30				20	
	Continuous power	PPr W	40		60				100	
	Peak energy	EPk Joules (Ws)	1000		1600				2000	
External resistor	Minimum resistance	Ω	60		25				10	
	Maximum resistance	Ω	80		36				21	

General characteristics

Type of braking resistor			VW3 A7 601 R●...607 R●
Ambient air temperature around the device	Operation	°C	0...+ 50
	Storage	°C	- 25...+ 85
Degree of protection of the casing			IP 65

Connection characteristics

Maximum wire size	VW3 A7 601 R●...607 R●	Supplied with connection cable for servo drive
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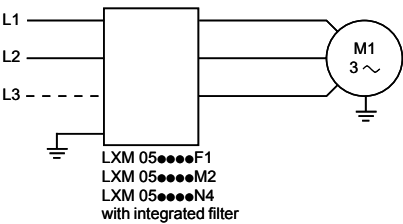
References



VW3 A7 60● R●

Value	Continuous power PPr	Peak energy EPk			Length of connection cable	Reference	Weight
		115 V	230 V	400 V			
Ω	W	Ws	Ws	Ws	m		kg
10	400	18,800	13,300	7300	0.75	VW3 A7 601 R07	1.420
					2	VW3 A7 601 R20	1.470
					3	VW3 A7 601 R30	1.620
27	100	4200	3800	1900	0.75	VW3 A7 602 R07	0.630
					2	VW3 A7 602 R20	0.780
					3	VW3 A7 602 R30	0.900
	200	9700	7400	4900	0.75	VW3 A7 603 R07	0.930
					2	VW3 A7 603 R20	1.080
					3	VW3 A7 603 R30	1.200
	400	25,500	18,100	11,400	0.75	VW3 A7 604 R07	1.420
					2	VW3 A7 604 R20	1.470
					3	VW3 A7 604 R30	1.620
72	100	5500	3700	2500	0.75	VW3 A7 605 R07	0.620
					2	VW3 A7 605 R20	0.750
					3	VW3 A7 605 R30	0.850
	200	14,600	9600	6600	0.75	VW3 A7 606 R07	0.930
					2	VW3 A7 606 R20	1.080
					3	VW3 A7 606 R30	1.200
	400	36,600	24,700	16,200	0.75	VW3 A7 607 R07	1.420
					2	VW3 A7 607 R20	1.470
					3	VW3 A7 607 R30	1.620

Note: The total continuous power dissipated in the external braking resistor(s) must be less than or equal to the nominal power of the Lexium 05 servo drive, see page 2/30.



Integrated EMC filter

Function

All Lexium 05 servo drives, with the exception of the LXM 05...M3X models, have integrated radio interference input filters to comply with the EMC standard for variable speed electrical power drive "products" IEC/EN 61800-3, edition 2, category C3 in environment 2, and to comply with the European directive on EMC (electromagnetic compatibility).

For servo drive

Maximum servo motor cable length conforming to

EN 55011, class A, Gr2
IEC/EN 61800-3, category C3 in environment 2
Switching frequency 4 kHz (default)

m

Single-phase supply voltage: 110...120 V ~ 50/60 Hz

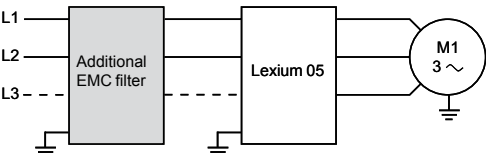
LXM 05...F1 10

Single-phase supply voltage: 200...240 V ~ 50/60 Hz

LXM 05...M2 10

Three-phase supply voltage: 380...480 V ~ 50/60 Hz

LXM 05...N4 10



Additional EMC input filters

Applications

When combined with LXM 05...F1, LXM 05...M2, LXM 05...M3X and LXM 05...N4 servo drives, additional EMC filters can be used to meet more stringent requirements and are designed to reduce conducted emissions on the line supply below the limits of standard IEC 61800-3, edition 2, categories C2 and C3; see page 2/41.

The additional EMC filters can be mounted beside or under the device. They act as a support for the servo drives and are attached to them via tapped holes.

Use according to the type of line supply

These integrated or additional filters can only be used on TN (neutral connection) and TT (neutral to earth) type supplies.

The filters must not be used on IT (impedance or isolated neutral) type supplies. For servo drives with an integrated filter (LXM 05...F1, LXM 05...M2 and LXM 05...N4), the filter must be disconnected using a jumper or wiring depending on the particular model; see page 2/67.

Standard IEC/EN 61800-3, appendix D2.1, states that on IT (isolated or impedance earthed neutral) type supplies, filters can adversely affect the operation of the insulation monitors. In addition, the effectiveness of additional filters on this type of line supply depends on the type of impedance between neutral and earth, and therefore cannot be predicted.

Note: If a machine is to be installed on an IT supply, one solution is to insert an isolation transformer in order to re-create a TT system on the secondary side.

Characteristics of servo drive/EMC filter mounting				
Conforming to standards			EN 133200	
Degree of protection			IP 41 on the upper part with protective cover in place IP 20 after removal of the protective cover, see page 2/70	
Relative humidity			According to IEC 60721-3-3, class 3K3, 5% to 85%, without condensation or dripping water	
Ambient air temperature around the device	Operation	°C	0...+ 50	
	Storage	°C	- 25...+ 70	
Altitude		m	1000 m without derating Up to 2000 m under the following conditions: ■ Max. temperature 40°C ■ Mounting distance between servo drives > 50 mm ■ Protective cover removed	
Vibration resistance		Conforming to IEC 60068-2-6	10 Hz to 57 Hz: amplitude 0.075 mm 57 Hz to 150 Hz: 1 g	
Shock resistance		Conforming to IEC 60068-2-27	15 gn for 11 ms	
Maximum nominal voltage	Single-phase 50/60 Hz	V	120 + 10 % 240 + 10 %	
	Three-phase 50/60 Hz	V	240 + 10 % 480 + 10 %	
Application, category: EN 61800-3: 2001-02 ; IEC 61800-3, Ed. 2			Description	
Category C2 in environment 1			Restricted distribution, for domestic use, sale conditioned by the competence of the user and the distributor on the subject of EMC compatibility	
Category C3 in environment 2			Use in industrial premises	

References

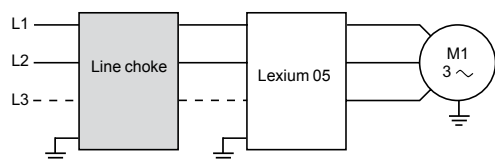
535768



VW3 A31402

Additional EMC input filters					
For servo drive	Maximum servo motor cable length conforming to			Reference	Weight
	EN 55011 class A Gr1	EN 55011 class A Gr2			
	IEC/EN 61800-3 category C2 in environment 1	IEC/EN 61800-3 category C3 in environment 2			
	Switching frequency 4 kHz (default)	Switching frequency 4 kHz (default)	Switching frequency 8 kHz		
	m	m	m		kg
Single-phase supply voltage					
LXM 05●D10F1	20	40	100	VW3 A31401	0.600
LXM 05CU70M2, ●D10M2					
LXM 05●D17F1	20	40	100	VW3 A31403	0.775
LXM 05●D17M2					
LXM 05●D28F1	20	40	100	VW3 A31405	1.130
LXM 05●D28M2					
Three-phase supply voltage					
LXM 05●D10M3X	20	40	100	VW3 A31402	0.550
LXM 05●D17M3X	20	40	100	VW3 A31404	0.900
LXM 05●D14N4					
LXM 05●D42M3X	20	40	100	VW3 A31406	1.350
LXM 05●D22N4					
LXM 05●D34N4					
LXM 05●D57N4	20	40	100	VW3 A31407	3.150

Line chokes



A line choke can be used to provide improved protection against overvoltages on the line supply and to reduce harmonic distortion of the current produced by the servo drive.

The recommended chokes limit the line current.

They have been developed in line with standard EN 50178 (VDE 0160 level 1 high energy overvoltages on the line supply).

The inductance values are defined for a voltage drop between 3% and 5% of the nominal line voltage. Values higher than this will cause loss of torque.

These chokes must be installed upstream of the servo drive.

One line choke can be connected to a number of servo drives. In such cases, the current consumption of all the servo drives at nominal voltage must not exceed the nominal current of the line choke.

Applications

The use of line chokes is recommended in particular under the following circumstances:

- Close connection of several servo drives in parallel
- Line supply with significant disturbance from other equipment (interference, overvoltages)
- Line supply with voltage imbalance between phases that is more than 1.8% of the nominal voltage
- Servo drive supplied by a line with very low impedance (in the vicinity of a power transformer 10 times more powerful than the servo drive rating)
- Installation of a large number of servo drives on the same line
- Reduction of overloads on the $\cos \varphi$ correction capacitors, if the installation includes a power factor correction unit

General characteristics

Type of line choke		VZ1 L007UM50	VZ1 L018UM20	VW3 A4 551	VW3 A4 552	VW3 A4 553
Conformity to standards		EN 50178 (VDE 0160 level 1 high-energy overvoltages on the line supply)				
Voltage drop		Between 3% and 5% of the nominal supply voltage. Values higher than this will cause loss of torque				
Degree of protection	Choke	IP 00				
	Terminals	IP 20				
Inductance value	mH	5	2	10	4	2
Nominal current	A	7	18	4	10	16
Losses	W	20	30	45	65	75

References

550203



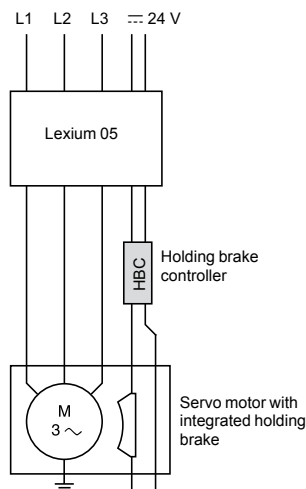
VW3 A4 550

Line chokes

For servo drive	Line current without choke		Line current with choke		Reference	Weight
	U min.	U max.	U min.	U max.		
	A	A	A	A		
Single-phase supply voltage: 100...120 V 50/60 Hz (1)						
LXM 05●D10F1	7.6	7	5.9	5.4	VZ1 L007UM50	0.880
LXM 05●D17F1	11.5	10.5	9.7	8.9	VZ1 L018UM20	1.990
LXM 05●D28F1	15.7	14.4	13.3	12.2		
Single-phase supply voltage: 200...240 V 50/60 Hz (1)						
LXM 05CU70M2, ●D10M2	8.1	6.7	6.3	5.3	VZ1 L007UM50	0.880
LXM 05●D17M2	12.7	10.5	10.7	8.9	VZ1 L018UM20	1.990
LXM 05●D28M2	23	19.2	20.2	16.8		
Three-phase supply voltage: 200...240 V 50/60 Hz (1)						
LXM 05●D10M3X	5.2	4.2	2.7	2.2	VW3 A4 551	1.500
LXM 05●D17M3X	9	7.5	5.2	4.3	VW3 A4 552	3.000
LXM 05●D42M3X	19	15.8	12.2	10.2	VW3 A4 553	3.500
Three-phase supply voltage: 380...480 V 50/60 Hz (1)						
LXM 05●D14N4	4.2	3.3	2.2	1.8	VW3 A4 551	1.500
LXM 05●D22N4	6.3	5	3.4	2.7		
LXM 05●D34N4	9.7	7.7	5.8	4.6	VW3 A4 552	3.500
LXM 05●D57N4	17.7	14	9.8	7.8		

(1) Nominal supply voltage: U min...U max.

Holding brake controller



If a servo motor has a holding brake, it must be given an appropriate control logic (HBC, Holding Brake Controller), which releases the brake when power is supplied to the servo motor and immobilizes the servo motor shaft when it is stationary.

The holding brake controller amplifies the braking control signal transmitted by the Lexium 05 servo drive, so that the brake is deactivated quickly. It then reduces this control signal so as to decrease the power dissipated by the holding brake.

General characteristics

Mounting on rail		└┐ 55
Degree of protection		IP 20
Supply voltage		V ~ 19.2...30
Input current		A Brake nominal current + 0.5
Brake output	Voltages	Before power reduction V ~ 23...25
	After power reduction	V ~ 17...19
Maximum current		A 1.6
Time before voltage reduction		ms 1000

Note: Electrical isolation between the 24 V power supply, the control input and the brake control output.

References



VW3 M3 103

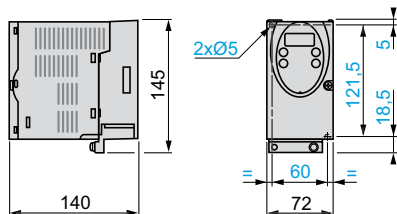
Holding brake controller

Designation	Description	Reference	Weight kg
Holding brake controller	24 V ~ power supply Max. power 50 W IP 20, for mounting on 55 mm └┐ rail	VW3 M3 103	0.600

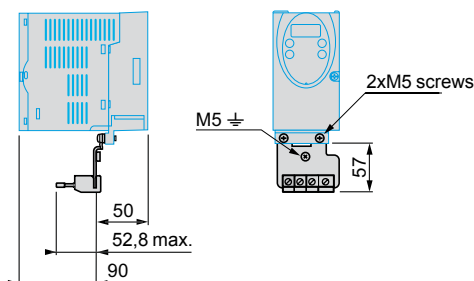
Dimensions

LXM 05●D10F1, LXM 05CU70M2, ●D10M2, LXM 05●D10M3X servo drives

Servo drive only

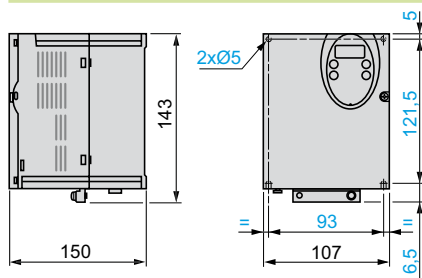


Servo drive with EMC conformity kit (1)

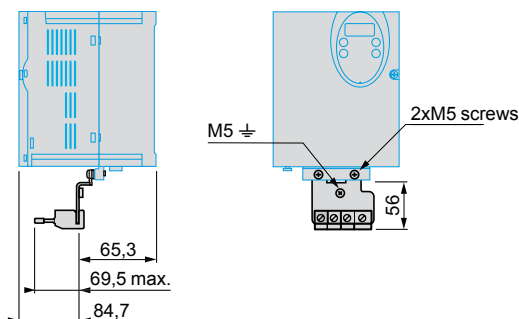


LXM 05●D17F1, LXM 05●D17M2, LXM 05●D17M3X, LXM 05●D14N4 servo drives

Servo drive only

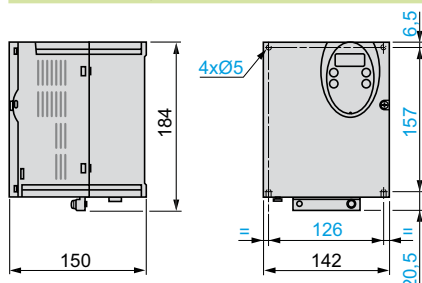


Servo drive with EMC conformity kit (1)

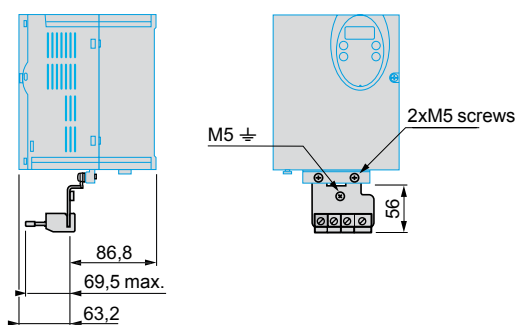


LXM 05●D28F1, LXM 05●D28M2, LXM 05●D42M3X, LXM 05●D22N4, ●D34N4 servo drives

Servo drive only

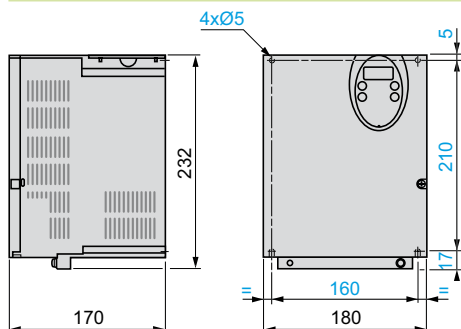


Servo drive with EMC conformity kit (1)

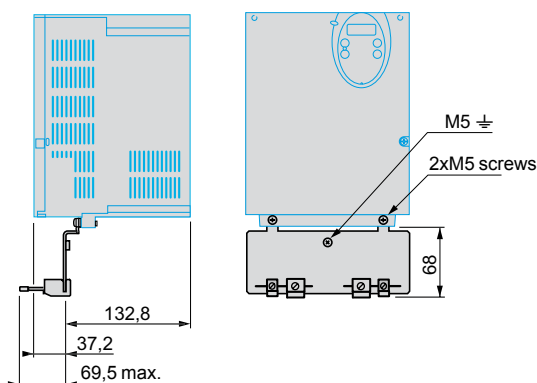


LXM 05●D57N4 servo drives

Servo drive only



Servo drive with EMC conformity kit (1)

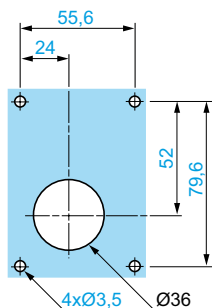


(1) The kit is supplied with LXM 05A●●●●● and LXM 05B●●●●● servo drives; it must be ordered separately for LXM 05C●●●●● servo drives.

Dimensions (continued)

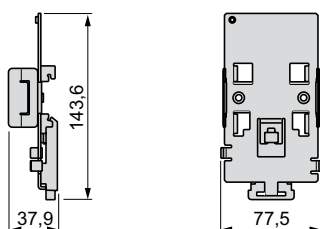
Remote display terminal

VW3 A31101

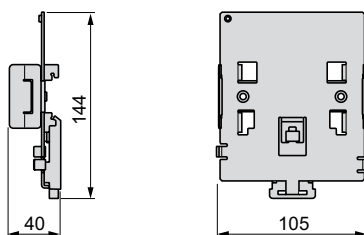


Plates for mounting on rail

VW3 A11851

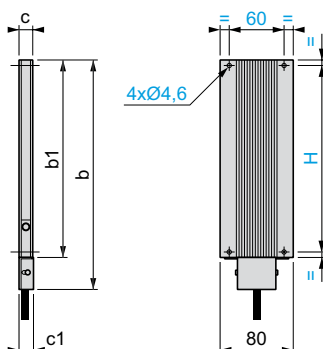


VW3 A31852



Braking resistors

VW3 A7 60● R●●

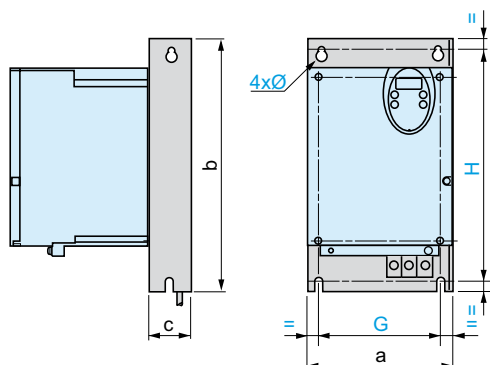


VW3	b	b1	c	c1	H
A7 602, 605	145	110	15	15.5	98
A7 603, 606	251	216	15	15.5	204
A7 601, 604, 607	257	216	30	—	204

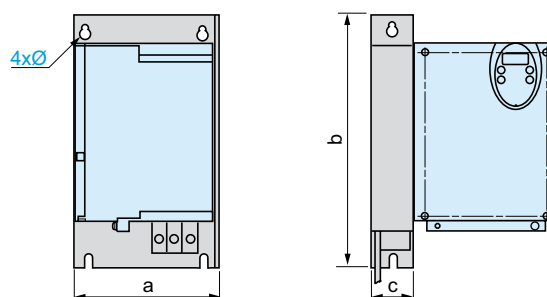
Dimensions (continued)

Additional EMC input filters VW3 A31401...407

Mounting the filter under the servo drive



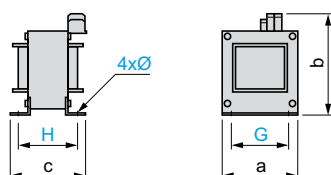
Mounting the filter next to the servo drive



VW3	a	b	c	G	H	Ø
A31401, 402	72	195	37	52	180	4.5
A31403	107	195	35	85	180	4.5
A31404	107	195	42	85	180	4.5
A31405	140	235	35	120	215	4.5
A31406	140	235	50	120	215	4.5
A31407	180	305	60	140	285	5.5

Single-phase line chokes

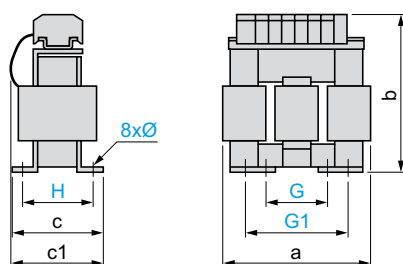
VZ1 L007UM50, VZ1 L018UM20



VZ1	a	b	c	G	H	Ø
L007UM50	60	100	95	50	60	4 x 9
L018UM20	85	120	105	70	70	5 x 11

Three-phase line chokes

VW3 A4 551...553

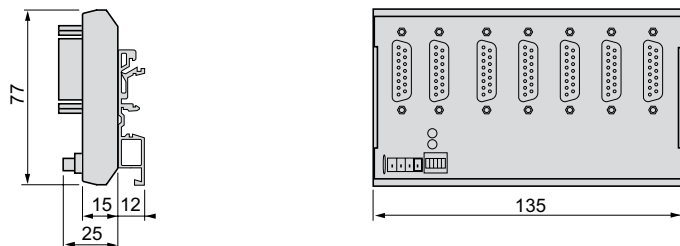


VW3	a	b	c	c1	G	G1	H	Ø
A4 551	100	135	55	60	40	60	42	6 x 9
A4 552	130	155	85	90	60	80.5	62	6 x 12
A4 553	130	155	85	90	60	80.5	62	6 x 12

Dimensions (continued)

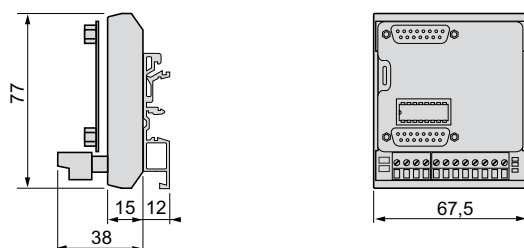
Splitter box

VW3 M3 101



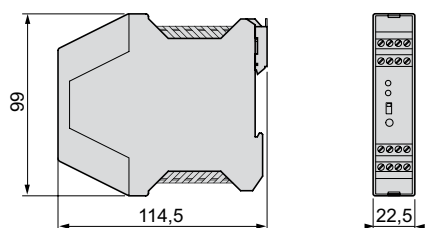
RS 422 converter (USIC)

VW3 M3 102



Holding brake controller

VW3 M3 103



“Power Removal” safety function

Lexium 05A and Lexium 05B servo drives integrate the "Power Removal" safety function which prevents unintended restarting of the servo motor. The servo motor no longer produces any torque.

- This safety function:
- Complies with the machine safety standard ISO 13849-1, performance level “d” (PL d)
 - Complies with the standard for functional safety IEC/EN 61508, SIL2 capability (safety control-signalling applied to processes and systems)
The SIL (Safety Integrity Level) capability depends on the connection diagram for the servo drive and for the safety function. Failure to observe the setup recommendations could inhibit the SIL capability of the "Power Removal" safety function.
 - Complies with the product standard IEC/EN 61800-5-2 for both stop functions:
 - Safe Torque Off “STO”
 - Safe Stop 1 “SS1”. This controlled stop requires a Preventa XPS AV safety module with time delay (1).

The “Power Removal” safety function has a redundant electronic architecture (2) which is monitored continuously by a diagnostics function.

This PL d and SIL2 safety function is certified as conforming to these standards by the TÜV certification body under a program of voluntary certification.

Performance level (PL) according to ISO 13849-1

Performance level PL	Mean probability of hazardous failure per hour 1/h
a	$\geq 10^{-5}$ to $< 10^{-4}$
b	$\geq 3 \times 10^{-6}$ to $< 10^{-5}$
c	$\geq 10^{-6}$ to $< 3 \times 10^{-6}$
d	$\geq 10^{-7}$ to $< 10^{-6}$
e	$\geq 10^{-8}$ to $< 10^{-7}$

Note: In addition to the mean probability of undetected hazardous failure per hour, other measures are also necessary in order to achieve the PL (performance level).

Note: Lexium 05A and Lexium 05B servo drives can be used up to performance level “d” (PL d).

Safety Integrity Levels (SIL) according to IEC/EN 61508

SIL1 according to standard IEC/EN 61508 is comparable with performance levels “b” and “c” (PL b and PL c) according to ISO 13849-1 (SIL1: mean probability of undetected hazardous failure per hour between 10^{-5} and 10^{-6}).

SIL2 according to standard IEC/EN 61508 is comparable with performance level “d” (PL d) according to ISO 13849-1 (SIL2: mean probability of undetected hazardous failure per hour between 10^{-6} and 10^{-7}).

(1) Please refer to the “Safety functions and solutions using Preventa” catalogue.
(2) Redundant: Consists of mitigating the effects of the failure of one component by means of the correct operation of another, assuming that faults do not occur simultaneously on both.

"Power Removal" safety function considerations

The "Power Removal" safety function cannot be considered as a means of electrical disconnection of the servo motor (no electrical isolation); if necessary, a Vario switch disconnecter must be used.

The "Power Removal" safety function is not designed to compensate for any malfunction in the servo drive process control or application functions.

The output signals available on the servo drive must not be considered as safety-related signals (e.g. "Power Removal" active); these are Preventa-type safety module outputs (1) which must be integrated into a safety control-signalling circuit.

The schemes on the following pages take into account conformity to standard IEC/EN 60204-1, which defines three stopping categories:

- Category 0: Stopping by immediate removal of the power from the actuators (e.g. uncontrolled stop)
- Category 1: Controlled stop maintaining the power on the actuators until the machine stops, then removal of the power when the actuators stop once the machine has stopped
- Category 2: Controlled stop maintaining the power on the actuators

Connection diagrams and applications

Conformity to performance levels "b" and "c" (PL b and PL c) according to ISO 13849-1 and to SIL1 according to IEC/EN 61508

Use of the connection diagrams on page 2/50 which use a line contactor or a Vario switch disconnecter between the servo drive and the servo motor. In this case, the "Power Removal" safety function is not used and the servo motor stops in accordance with **category 0** of standard IEC/EN 60204-1.

Conformity to performance level "d" (PL d) according to ISO 13849-1 and to SIL2 according to IEC/EN 61508

The connection diagrams use the "Power Removal" safety function of the Lexium 05A and Lexium 05B servo drives combined with a Preventa safety module to monitor the emergency stop circuits.

Machines with short freewheel stopping times (low inertia or high resistive torque, see page 2/51).

When the activation command is given on the $\overline{\text{PWRR_A}}$ and $\overline{\text{PWRR_B}}$ inputs with the controlled servo motor, the servo motor power supply is immediately switched off and the motor stops according to **category 0** of standard IEC/EN 60204-1.

Restarting is not permitted even when the activation command is given after the servo motor has come to a complete stop.

This safe stop is maintained for as long as the $\overline{\text{PWRR_A}}$ and $\overline{\text{PWRR_B}}$ inputs remain activated.

For hoisting activities it is necessary to add a Preventa XPS AC-type safety module (1) (see page 2/52).

On a "Power Removal" command, the servo drive requires the brake to be engaged, but a Preventa safety module contact must be inserted in series in the brake control circuit to engage it safely when a request is made to activate the "Power Removal" safety function.

Machines with long freewheel stopping times (high inertia or low resistive torque, see page 2/53).

When the activation command is given, deceleration of the servo motor controlled by the servo drive is first requested, then, following a time delay controlled by a Preventa XPS AV-type safety module (1) which corresponds to the deceleration time, the "Power Removal" safety function is activated by the $\overline{\text{PWRR_A}}$ and $\overline{\text{PWRR_B}}$ inputs. The servo motor stops according to **category 1** of standard IEC/EN 60204-1 ("SS1").

Periodic test

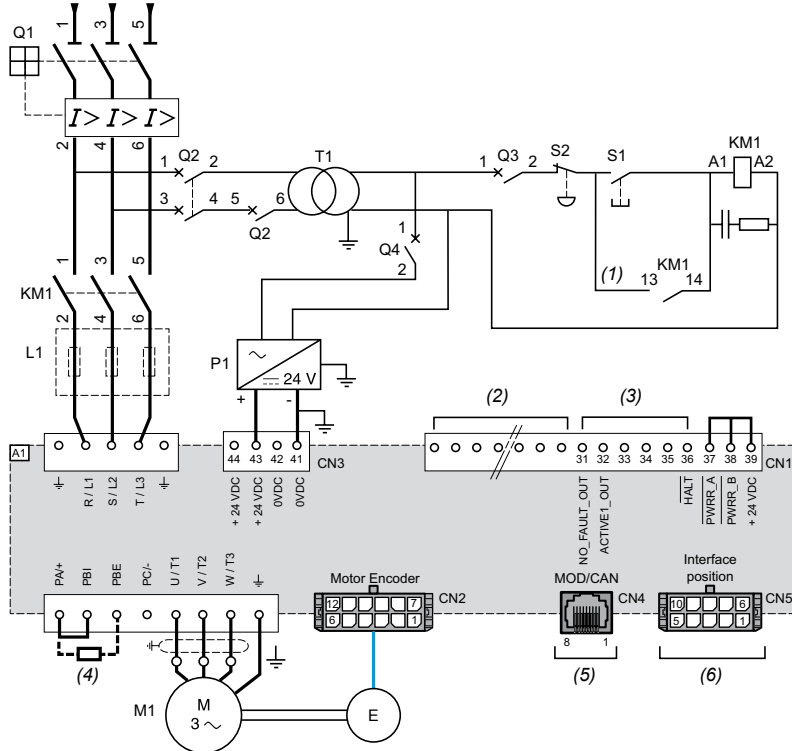
The "Power Removal" safety input must be activated at least once a year for preventive maintenance purposes. The servo drive must be switched off before preventive maintenance takes place, and then powered up again. If the power supply to the servo motor is not switched off during testing, safety integrity is no longer assured for the "Power Removal" safety function. The servo drive must therefore be replaced to ensure the operational safety of the machine or the system process.

(1) Please refer to the "Safety functions and solutions using Preventa" catalogue.

Schemes conforming to standards ISO 13849-1, PL b and PL c, IEC/EN 61508 SIL1 capability, in stopping category 0 according to IEC/EN 60204-1

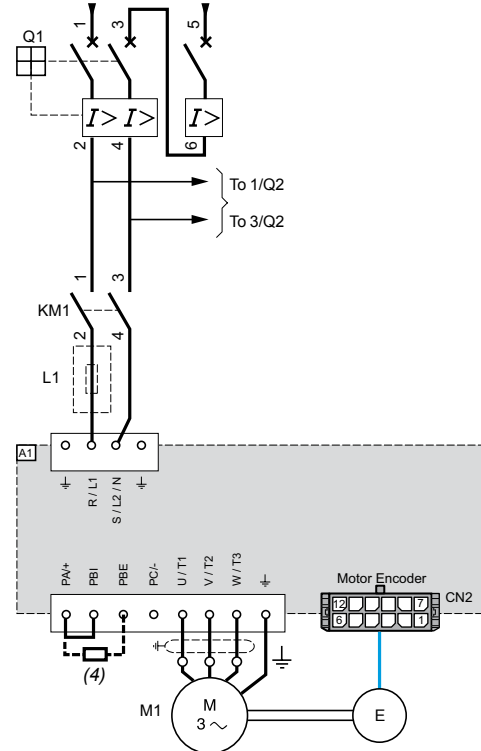
LXM 05A●●●M3X, B●●●M3X, LXM 05A●●●N4, B●●●N4

Three-phase power supply with upstream breaking via contactor



LXM 05A●●●F1, B●●●F1, LXM 05A●●●M2, B●●●M2

Power section for single-phase power supply



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" catalogue).

Ref.	Description
A1	Lexium 05A or Lexium 05B servo drive (see page 2/30)
KM1	Line contactor (see motor starters on page 2/68)
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V $\overline{\text{---}}$, please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3, Q4	GB2 CB05 thermal magnetic circuit breakers
S1, S2	XB4 B or XB5 A "Start" and "Emergency stop" pushbuttons
T1	220 V secondary transformer

(1) Insert (in series) a contact of the relay driven by the "NO_FAULT_OUT" (31) logic output: on a servo drive fault, KM1 (line contactor) opens.

(2) Specific spring terminals according to the type of servo drive (see page 2/59).

(3) 4 logic inputs and 2 logic outputs 24 V $\overline{\text{---}}$. For Lexium 05A servo drives these logic I/O are reassignable (see page 2/59).

(4) External braking resistor (see page 2/39).

(5) CANopen machine bus or Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

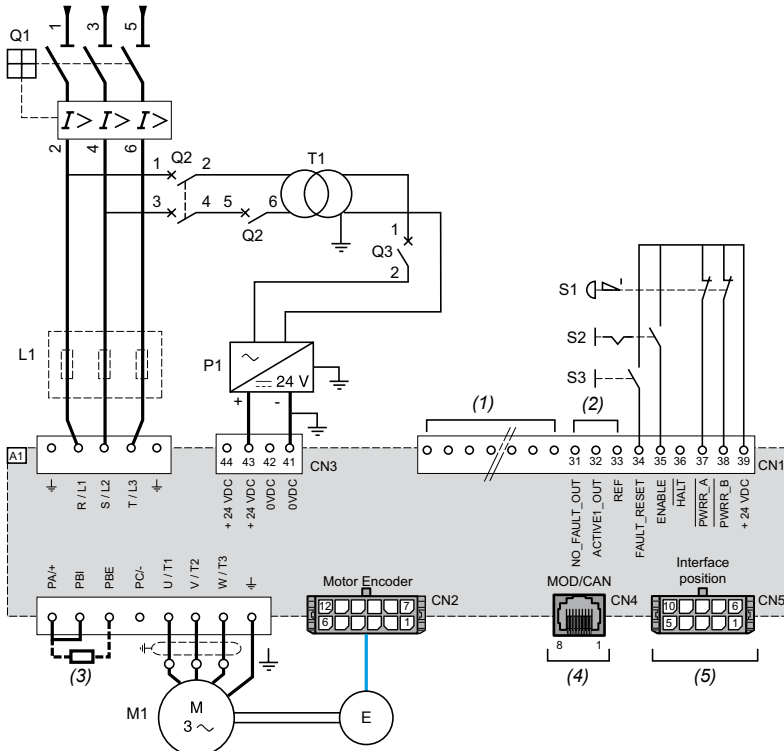
(6) Molex connector for connecting A/B encoder signals or pulse/direction (P/D) signals (see page 2/64).

Schemes conforming to standards ISO 13849-1, PL d, IEC/EN 61508 SIL2 capability, in stopping category 0 according to IEC/EN 60204-1

The scheme below is shown in local control mode via logic I/O. In communication network control mode, the inputs marked 34 and 35 on the CN1 spring terminals must be controlled via the network. In this network control mode, inputs 34 and 35 have the assignments "LIMN" and "LIMP".

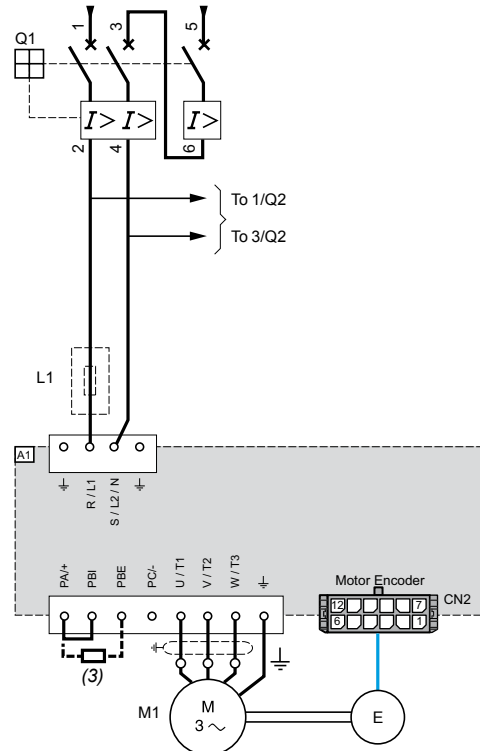
LXM 05A...M3X, B...M3X, LXM 05A...N4, B...N4

Three-phase power supply, low inertia machine



LXM 05A...F1, B...F1, LXM 05A...M2, B...M2

Power section for single-phase power supply



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" catalogue).

Ref.	Description
A1	Lexium 05A or Lexium 05B servo drive (see page 2/30)
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V $\bar{\text{---}}$, please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3	GB2 CB05 thermal magnetic circuit breaker
S1	XB4 B or XB5 A "Emergency stop" dual contact pushbutton
S2	XB4 B or XB5 A "Enable" stay-put pushbutton
S3	XB4 B or XB5 A "Reset" pushbutton
T1	220 V secondary transformer

(1) Specific spring terminals according to the type of servo drive (see page 2/59).

(2) 1 logic input and 2 logic outputs 24 V $\bar{\text{---}}$. For Lexium 05A servo drives these logic I/O are reassignable (see page 2/59).

(3) External braking resistor (see page 2/39).

(4) CANopen machine bus or Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

(5) Molex connector for connecting A/B encoder signals or pulse/direction (P/D) signals (see page 2/64).

Schemes conforming to standards ISO 13849-1, PL d, IEC/EN 61508 SIL2 capability, in stopping category 0 according to IEC/EN 60204-1 (continued)

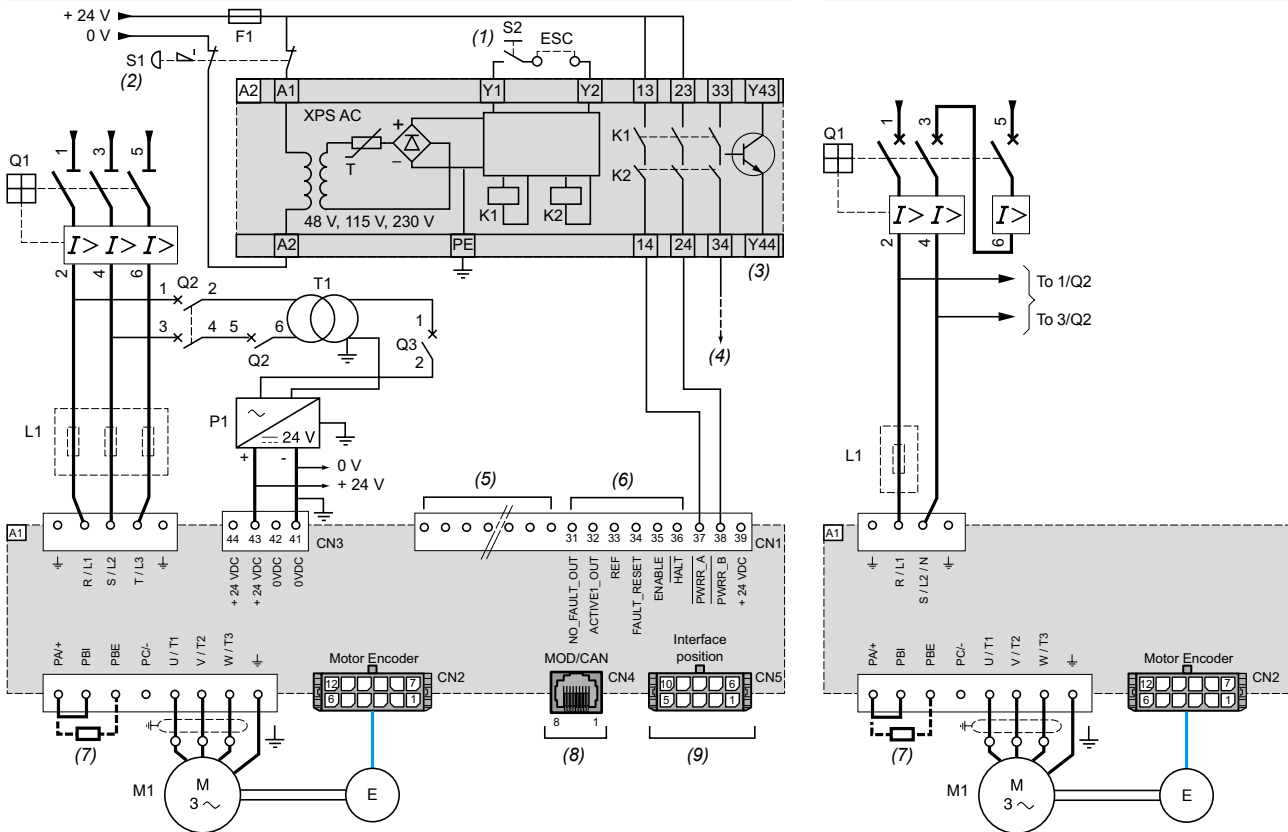
The scheme below is shown in local control mode via logic I/O. In communication network control mode, the inputs marked 34 and 35 on the CN1 spring terminals must be controlled via the network. In this network control mode, inputs 34 and 35 have the assignments "LIMN" and "LIMP".

LXM 05A●●●M3X, B●●●M3X, LXM 05A●●●N4, B●●●N4

Three-phase power supply, low inertia machine, vertical movement

LXM 05A●●●F1, B●●●F1, LXM 05A●●●M2, B●●●M2

Power section for single-phase power supply



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" and "Safety functions and solutions using Preventa" catalogues).

Ref.	Description
A1	Lexium 05A or Lexium 05B servo drive (see page 2/30)
A2	Preventa XPS AC safety module for monitoring emergency stops and switches. The XPS AC safety module can manage the "Power Removal" function of several servo drives on the same machine.
F1	Fuse
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V $\bar{\square}$, please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3	GB2 CB05 thermal magnetic circuit breaker
S1	XB4 B or XB5 A "Emergency stop" pushbutton with 2 contacts
S2	XB4 B or XB5 A spring return pushbutton
T1	220 V secondary transformer

(1) S2: Resets the XPS AC module on power-up or after an emergency stop. ESC can be used to set external starting conditions.

(2) S1: Requests uncontrolled stopping of the movement and activates the "Power Removal" safety function.

(3) The logic output can be used to indicate that the machine is in a safe stop state.

(4) To "Power Removal" safety function of an Altivar 71 variable speed servo drive (for example).

(5) Specific spring terminals according to the type of servo drive (see page 2/59).

(6) 4 logic inputs and 2 logic outputs 24 V $\bar{\square}$. For Lexium 05A servo drives these logic I/O are reassignable (see page 2/59).

(7) External braking resistor (see page 2/39).

(8) CANopen machine bus or Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

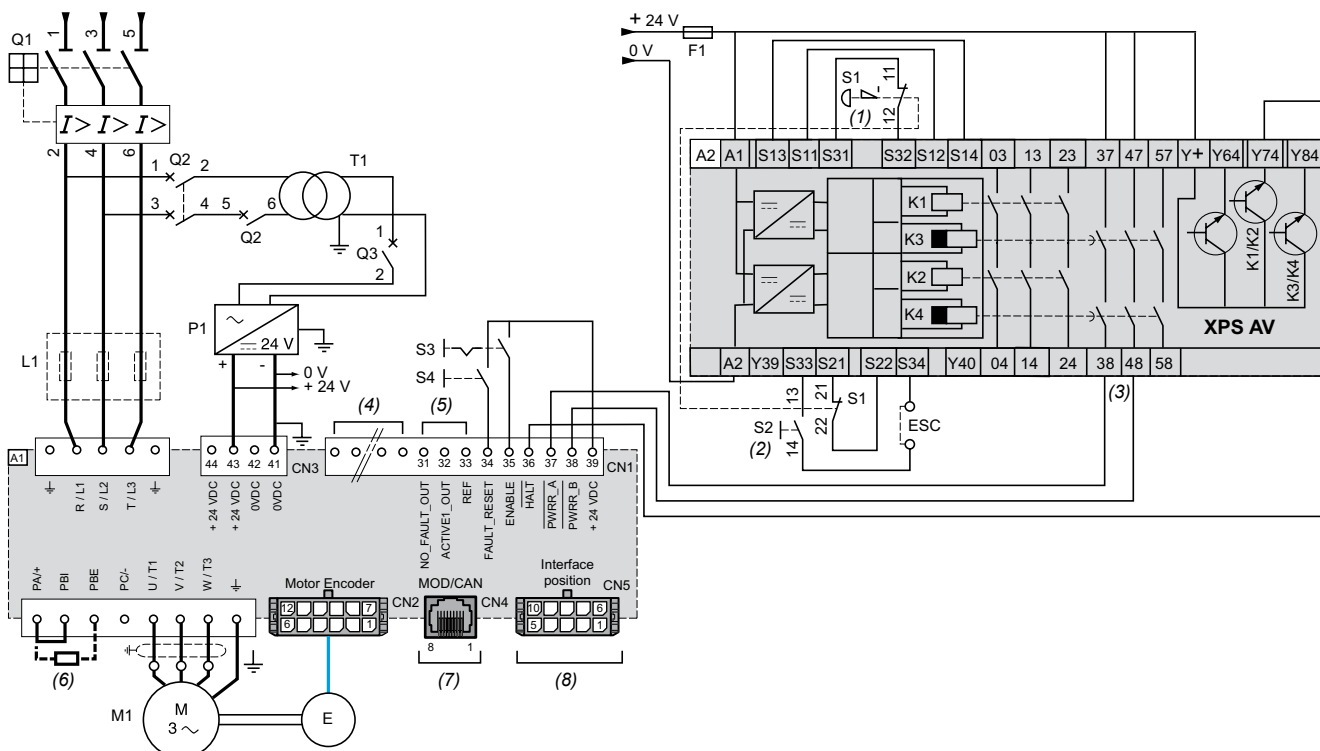
(9) Molex connector for connecting A/B encoder signals or pulse/direction (P/D) signals (see page 2/64).

Schemes conforming to standards ISO 13849-1, PL d, IEC/EN 61508 SIL2 capability, in stopping category 1 according to IEC/EN 60204-1

The scheme below is shown in local control mode via logic I/O. In communication network control mode, the inputs marked 34 and 35 on the CN1 spring terminals must be controlled via the network. In this network control mode, inputs 34 and 35 have the assignments "LIMN" and "LIMP".

LXM 05A●●●M3X, B●●●M3X, LXM 05A●●●N4, B●●●N4

Three-phase power supply, high inertia machine



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" and "Safety functions and solutions using Preventa" catalogues).

Ref.	Description
A1	Lexium 05A or Lexium 05B servo drive (see page 2/30)
A2	Preventa XPS AV safety module for monitoring emergency stops and switches. One safety module can manage the "Power Removal" safety function of several servo drives on the same machine, but the time delay must be adjusted on the servo drive controlling the servo motor that requires the longest stopping time.
F1	Fuse
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V \square , please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3	GB2 CB05 thermal magnetic circuit breaker
S1	XB4 B or XB5 A "Emergency stop" dual contact pushbutton
S2	XB4 B or XB5 A "Start" pushbutton
S3	XB4 B or XB5 A "Enable" stay-put pushbutton
S4	XB4 B or XB5 A "Reset" pushbutton
T1	220 V secondary transformer

(1) S1: Requests controlled stopping of the movement and activates the "Power Removal" safety function.

(2) S2: Resets the XPS AV module on power-up or after an emergency stop. ESC can be used to set external starting conditions.

(3) Time-delayed opening safety outputs, 300 seconds max. (stopping category 1).

(4) Specific spring terminals according to the type of servo drive (see page 2/59).

(5) 1 logic input and 2 logic outputs 24 V \square . For Lexium 05A servo drives these logic I/O are reassignable (see page 2/59).

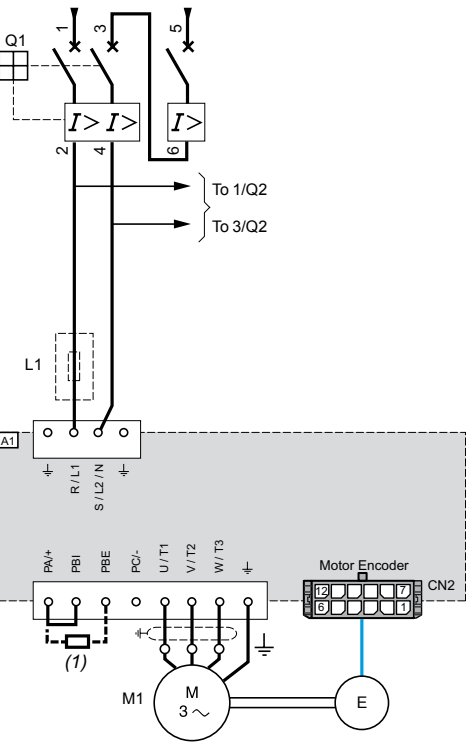
(6) External braking resistor (see page 2/39).

(7) CANopen machine bus or Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

(8) Molex connector for connecting A/B encoder signals or pulse/direction (P/D) signals (see page 2/64).

Schemes conforming to standards ISO 13849-1, PL d, IEC/EN 61508 SIL2 capability, in stopping category 1 according to IEC/EN 60204-1 (continued)

LXM 05A●●●F1, B●●●F1, LXM 05A●●●M2, B●●●M2
Power section for single-phase power supply, high inertia machine



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" and "Safety functions and solutions using Preventa" catalogues).

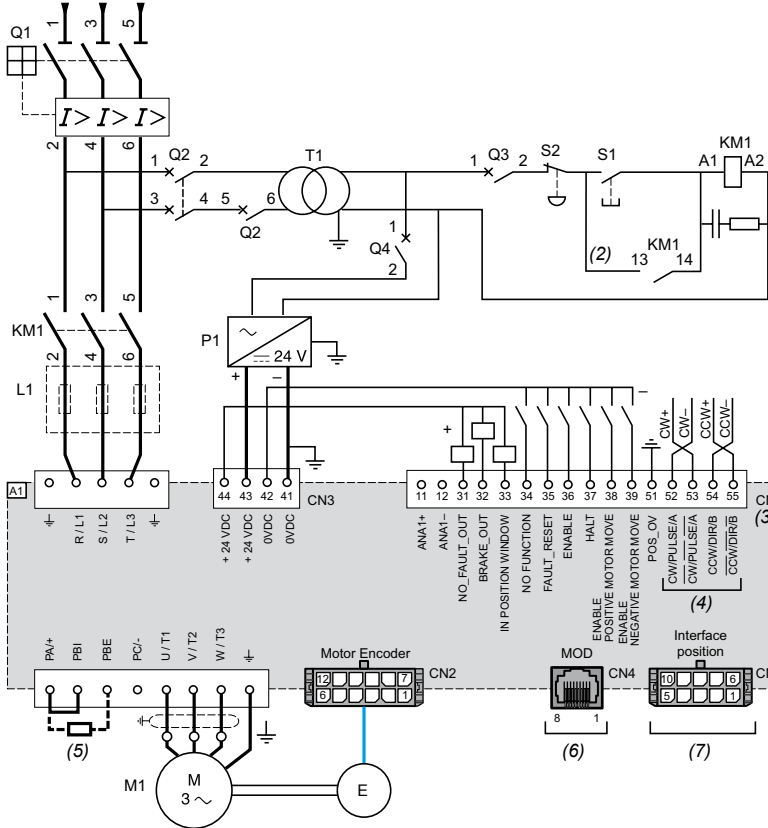
Ref.	Description
A1	Lexium 05A or Lexium 05B servo drive (see page 2/30)
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1

(1) External braking resistor (see page 2/39).

Schemes for pulse position control (example with Lexium 05C servo drive) (1)

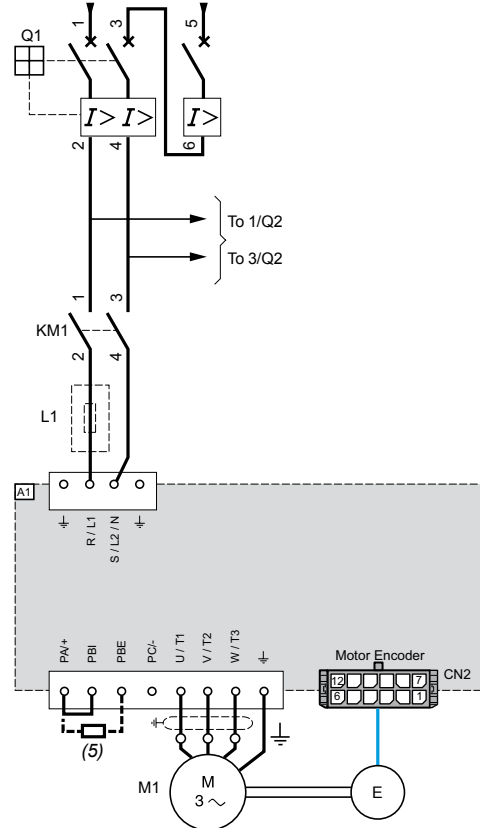
LXM 05C...N4

Three-phase power supply with upstream breaking via contactor



LXM 05C...M2

Power section for single-phase power supply



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" catalogue).

Ref.	Description
A1	Lexium 05C (this example), Lexium 05A (1) or Lexium 05B (1) servo drive (see page 2/30)
KM1	Line contactor (see motor starters on page 2/68)
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V ---, please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3, Q4	GB2 CB05 thermal magnetic circuit breakers
S1, S2	XB4 B or XB5 A "Start" and "Emergency stop" pushbuttons
T1	220 V secondary transformer

(1) To connect Lexium 05A and Lexium 05B servo drives (connectors CN1 and CN5), please refer to the user manuals, which are available on our website at "www.schneider-electric.com".

(2) Insert (in series) a contact of the relay driven by the "NO_FAULT_OUT" (31) logic output: on a servo drive fault, KM1 (line contactor) opens.

(3) Example of logic I/O assignment for pulse position control with a Lexium 05C servo drive.

The name of the logic I/O differs depending on which assignment is selected and the servo drive type (Lexium 05A, Lexium 05B or Lexium 05C). See pages 2/59 to 2/62.

(4) The pulse train configuration is CW/CCW by default (Lexium 05C servo drives only).

(5) External braking resistor (see page 2/39).

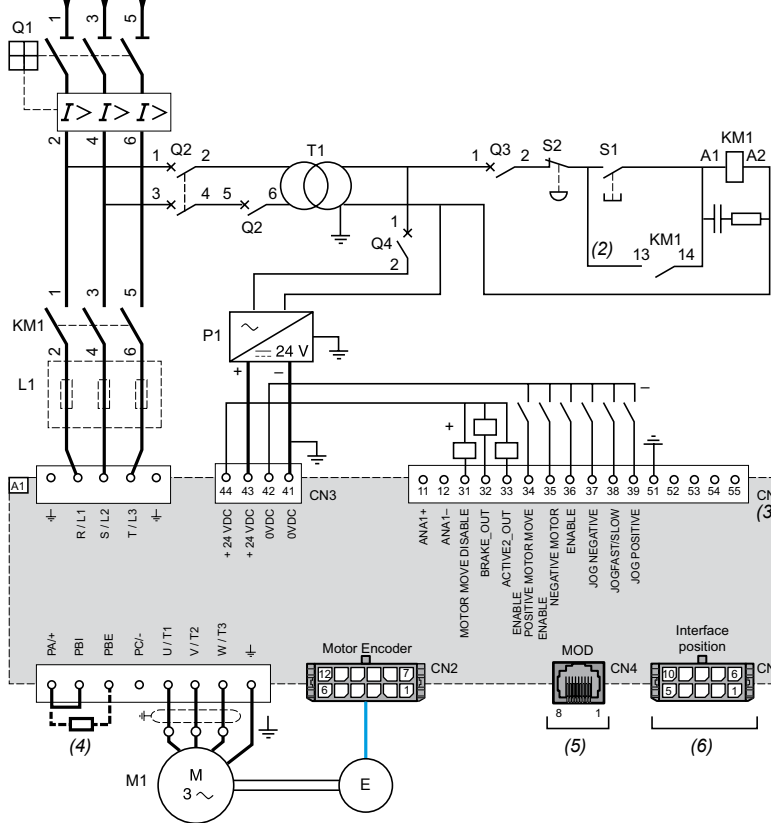
(6) Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

(7) Molex connector for the ESIM (Encoder SIMULATION) output on the RS 422 interface (see page 2/65)

Schemes for manual mode (JOG) in local control mode (example with Lexium 05C servo drive) (1)

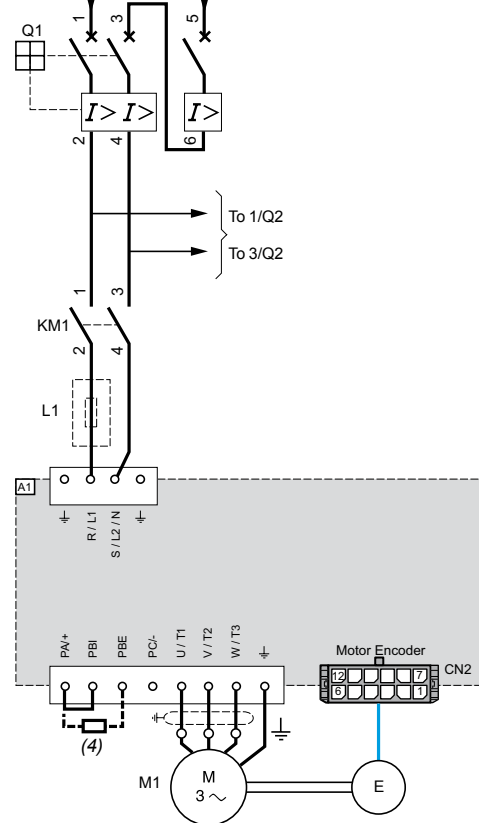
LXM 05C●●●N4

Three-phase power supply with upstream breaking via contactor



LXM 05C●●●M2

Power section for single-phase power supply



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" catalogue).

Ref.	Description
A1	Lexium 05C (this example) or Lexium 05A (1) servo drive (see page 2/30)
KM1	Line contactor (see motor starters on page 2/68)
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V $\bar{\bar{~}}$, please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3, Q4	GB2 CB05 thermal magnetic circuit breakers
S1, S2	XB4 B or XB5 A "Start" and "Emergency stop" pushbuttons
T1	220 V secondary transformer

(1) To connect a Lexium 05A servo drive (connectors CN1 and CN5), please refer to the user manual, which is available on our website at "www.schneider-electric.com".

(2) Insert (in series) a contact of the relay driven by the "MOTOR MOVE DISABLE" (31) logic output: on a servo drive fault, KM1 (line contactor) opens.

(3) Example of logic I/O assignment for manual mode (JOG) with a Lexium 05C servo drive.

The name of the logic I/O differs depending on which assignment is selected (Lexium 05A and Lexium 05C servo drives only). See pages 2/60 and 2/62.

(4) External braking resistor (see page 2/39).

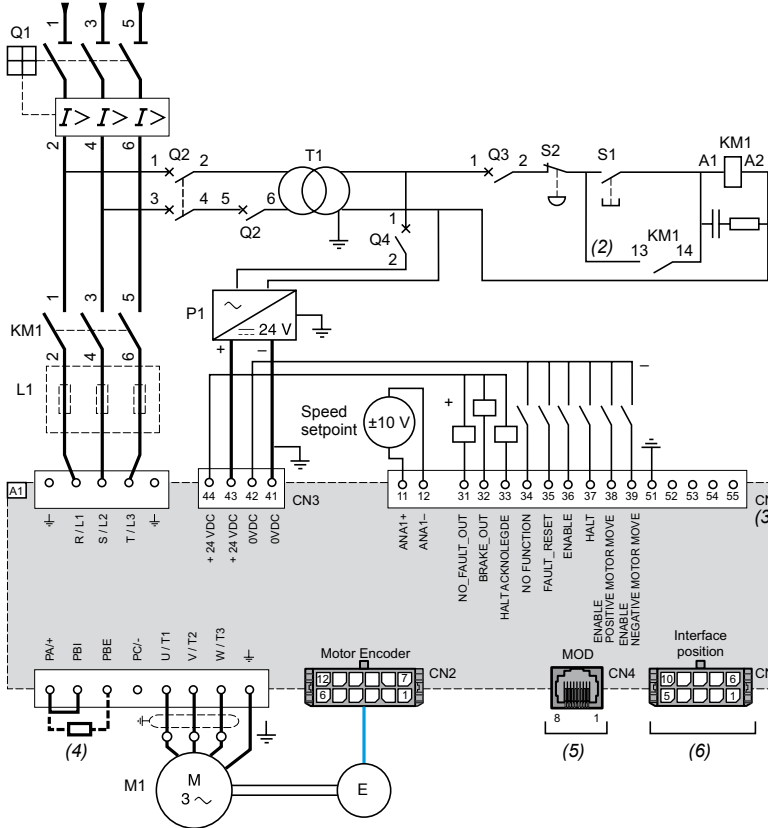
(5) Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

(6) Molex connector for the ESIM (Encoder SIMULATION) output on the RS 422 interface (see page 2/65)

Schemes for speed control mode in local control mode (example with Lexium 05C servo drive) (1)

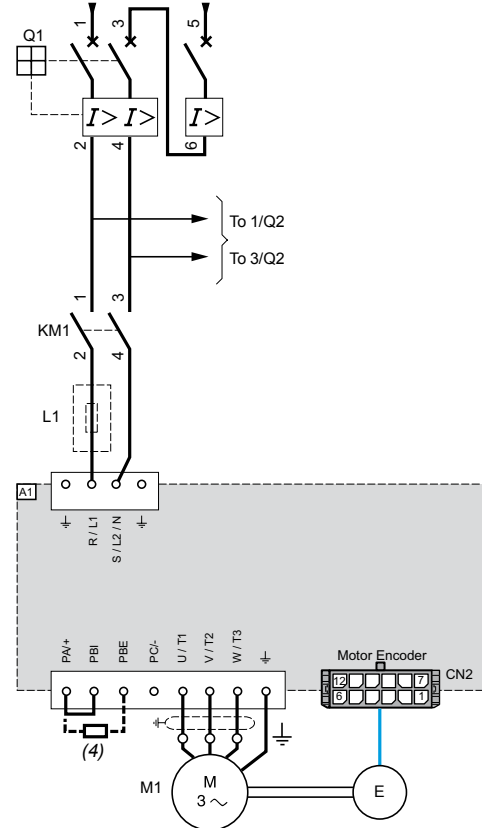
LXM 05C...N4

Three-phase power supply with upstream breaking via contactor



LXM 05C...M2

Power section for single-phase power supply



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" catalogue).

Ref.	Description
A1	Lexium 05C (this example) or Lexium 05A (1) servo drive (see page 2/30)
KM1	Line contactor (see motor starters on page 2/68)
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V ---, please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3, Q4	GB2 CB05 thermal magnetic circuit breakers
S1, S2	XB4 B or XB5 A "Start" and "Emergency stop" pushbuttons
T1	220 V secondary transformer

(1) To connect a Lexium 05A servo drive (connectors CN1 and CN5), please refer to the user manual, which is available on our website at "www.schneider-electric.com".

(2) Insert (in series) a contact of the relay driven by the "NO_FAULT_OUT" (31) logic output: on a servo drive fault, KM1 (line contactor) opens.

(3) Example of logic I/O assignment for speed control mode with a Lexium 05C servo drive.

The name of the logic I/O differs depending on which assignment is selected (Lexium 05A and Lexium 05C servo drives only). See pages 2/60 and 2/62.

(4) External braking resistor (see page 2/39).

(5) Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

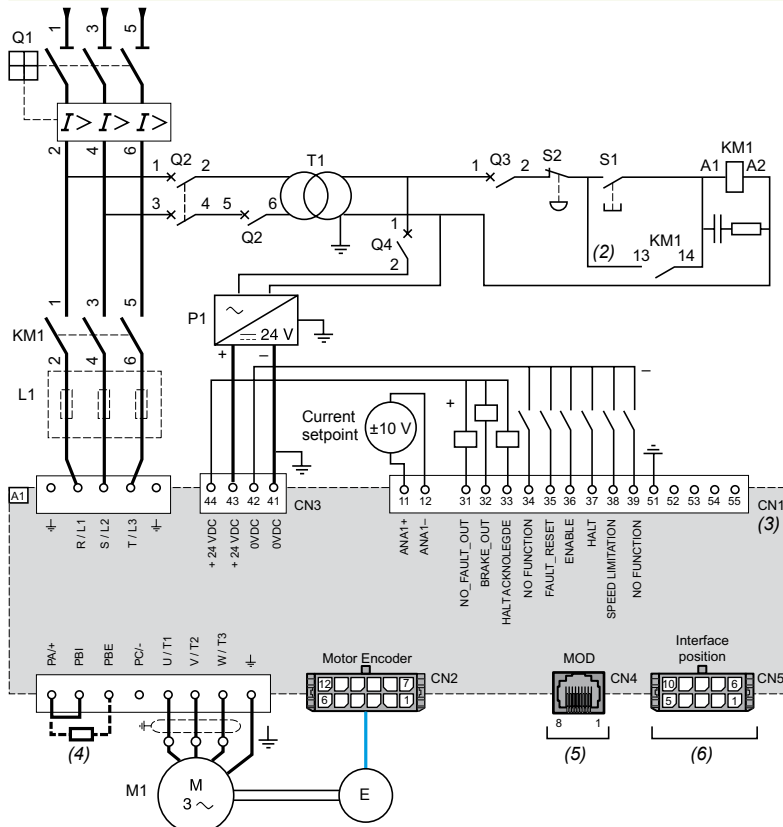
(6) Molex connector for the ESIM (Encoder SIMulation) output on the RS 422 interface (see page 2/65)

Schemes for current control mode for torque control applications in local control mode

(example with a Lexium 05C servo drive) (1)

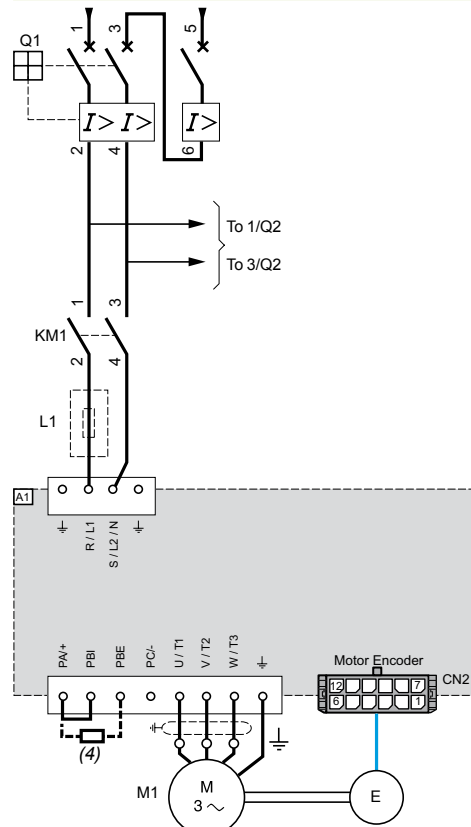
LXM 05C...N4

Three-phase power supply with upstream breaking via contactor



LXM 05C...M2

Power section for single-phase power supply



Note: All terminals are located at the bottom of the servo drive. Fit interference suppressors to all inductive circuits near the servo drive or connected on the same circuit, such as relays, contactors, solenoid valves, fluorescent lighting, etc.

Compatible components (for a complete list of references, please refer to the "Motor starter solutions - Control and protection components" catalogue).

Ref.	Description
A1	Lexium 05C (this example) or Lexium 05A (1) servo drive (see page 2/30)
KM1	Line contactor (see motor starters on page 2/68)
L1	Line choke (see page 2/42)
M1	BRH or BSH servo motor (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V \sim , please refer to the "Phaseo power supplies and transformers" catalogue
Q1	Circuit breaker (see motor starters on page 2/68)
Q2	GV2-L magnetic circuit-breaker rated at twice the nominal primary current of T1
Q3, Q4	GB2 CB05 thermal magnetic circuit breakers
S1, S2	XB4 B or XB5 A "Start" and "Emergency stop" pushbuttons
T1	220 V secondary transformer

(1) To connect Lexium 05A servo drives (connectors CN1 and CN5), please refer to the user manual, which is available on our website at "www.schneider-electric.com".

(2) Insert (in series) a contact of the relay driven by the "NO_FAULT_OUT" (31) logic output: on a servo drive fault, KM1 (line contactor) opens.

(3) Example of logic I/O assignment for current control mode for torque control applications with a Lexium 05C servo drive.

The name of the logic I/O differs depending on which assignment is selected (Lexium 05A and Lexium 05C servo drives only). See pages 2/60 and 2/62.

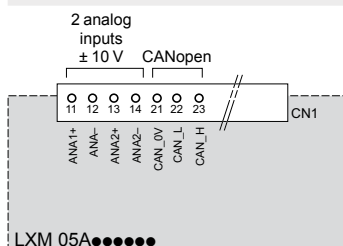
(4) External braking resistor (see page 2/39).

(5) Modbus serial link on RJ45 connector. Can also be used to connect a PC terminal (equipped with PowerSuite software workshop) or the remote terminal VW3 A31101.

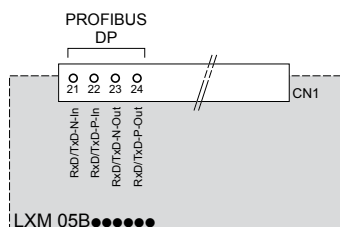
(6) Molex connector for the ESIM (Encoder SIMULATION) output on the RS 422 interface (see page 2/65)

Specific spring terminals on Lexium 05A and Lexium 05B servo drives

LXM 05A●●●●●●



LXM 05B●●●●●●



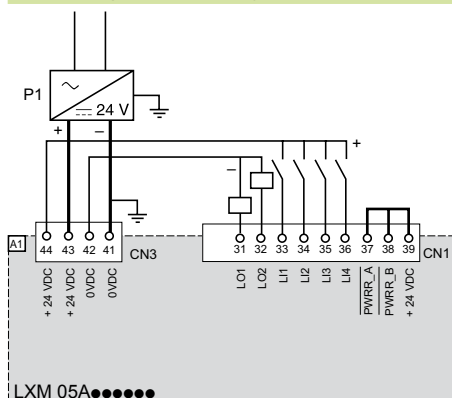
Logic I/O

The servo drive parameters are used to adapt the logic operation of the logic I/O (24 V $\overline{\text{---}}$) to the technology of the peripherals connected to the servo drive I/O (sensors, preactuators, PLC I/O, etc.):

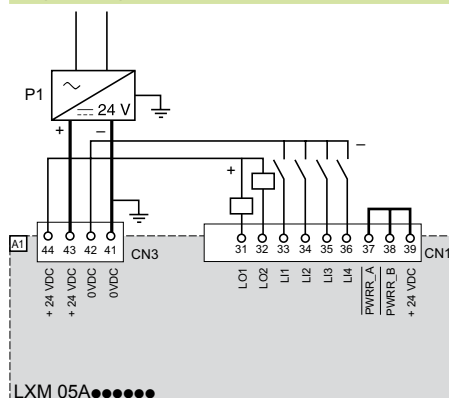
- Positive logic (default logic) (1) for connection to PNP transistor sensors
- Negative logic (2) for connection to NPN transistor peripherals

Logic I/O on the Lexium 05A servo drive

Positive logic (default setting) (1)



Negative logic (2)



Compatible components

Ref.	Description
A1	Lexium 05A servo drive (see page 2/30)
P1	Phaseo (SELV) power supply 24 V $\overline{\text{---}}$, please refer to the "Phaseo power supplies and transformers" catalogue

(1) Positive logic: Sink input, Source output


(2) Negative logic: Source input, Sink output


Logic I/O (continued)

Assignment of logic I/O on the Lexium 05A servo drive

Functions		6 logic inputs 24 V ---						2 logic outputs 24 V ---	
Name	Description	LI1	LI2	LI3	LI4	LI5	LI6	LO1	LO2
No function/free available	No function assigned/freely available								
ENABLE	Power bridge enable			(1)					
Enable negative motor move	Authorization of servo motor movement in the negative direction								
Enable positive motor move	Authorization of servo motor movement in the positive direction								
FAULT_RESET	Fault reset/acknowledgement								
HALT	Servo motor stop (stopping category 1)				(1)				
JOG fast/slow	Fast/slow manual movement								
JOG negative	Negative manual movement								
JOG positive	Positive manual movement								
Speed limitation	Speed limitation according to a set value								
DataSet Start	Motion sequence start (motion sequence mode)								
DataSet Select	Motion sequence restart (motion sequence mode)								
Start profile positioning	Start of point-to-point movement								
Invert ANA1	Inversion of analog input ANA1								
Power Removal	Power Removal function					(1)	(1)		
ACTIVE2_OUT	Servo drive ready								
BRAKE_OUT	Holding brake controller VW3 M3 103 command								
Current threshold reached	Servo motor current value below a set value								
Halt acknowledge	Acknowledgement of stop								
In position window	Position deviation within set range								
In speed window	Speed deviation within set range								
Motor move disable	Servo motor movement disabled in requested direction								
NO_FAULT_OUT	Servo drive fault								
DataSet Start acknowledge	Acknowledgement of start request (motion sequence mode)								
Motor standstill	Servo motor stopped								
Speed threshold reached	Servo motor speed value below a set value								

(1) Default assignment

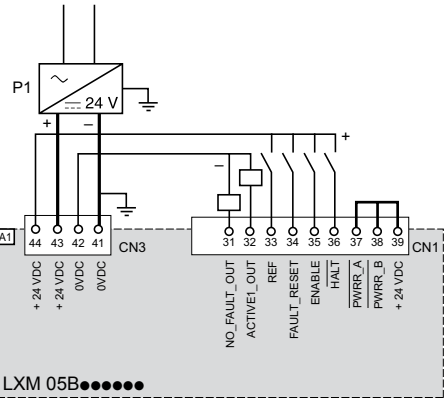
 Assignable function

 Unassignable function

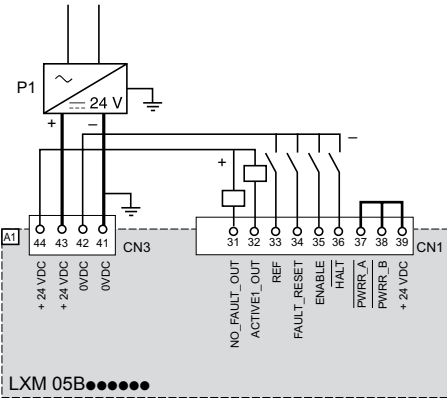
Logic I/O (continued)

Logic I/O on the Lexium 05B servo drive

Positive logic (default setting) (1)



Negative logic (2)



Compatible components

Ref.	Description
A1	Lexium 05B servo drive (see page 2/30)
P1	Phaseo (SELV) power supply 24 V ~, please refer to the "Interfaces, I/O splitter boxes and power supplies" catalogue

Assignment of logic I/O on the Lexium 05B servo drive

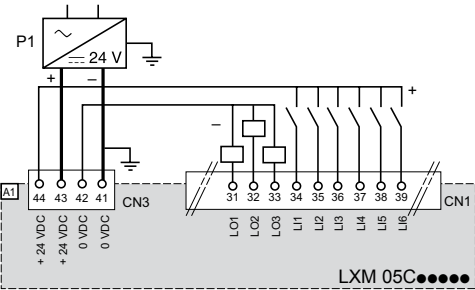
Functions		Logic input	Logic output
Name	Description	Ref.	Ref.
REF	Not used (3)	33	—
FAULT_RESET	Fault reset/acknowledgement (3)	34	—
ENABLE	Power bridge enable (3)	35	—
HALT	Servo motor stop (stopping category 1)	36	—
NO_FAULT_OUT	Servo drive fault	—	31
ACTIVE1_OUT	Holding brake controller VW3 M3 103 command	—	32

(1) Positive logic: Sink input, Source output
(2) Negative logic: Source input, Sink output
(3) If the servo drive is controlled via a communication network, these inputs have different assignments; please refer to the user manual, which is available on our website at "www.schneider-electric.com".

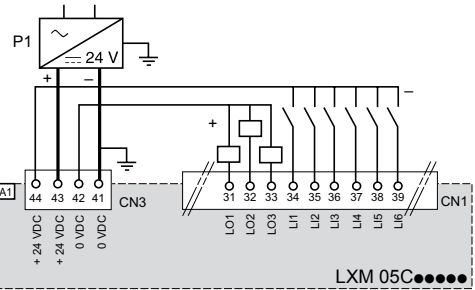
Logic I/O (continued)

Logic I/O on the Lexium 05C servo drive

Positive logic (default setting) (1)



Negative logic (2)



Compatible components

Ref.	Description
A1	Lexium 05C servo drive (see page 2/30)
P1	Phaseo (SELV) power supply 24 V ~, please refer to the "Phaseo power supplies and transformers" catalogue

Assignment of logic I/O on the Lexium 05C servo drive

Reassignable functions		6 logic inputs 24 V ~						3 logic outputs 24 V ~		
Name	Description	LI1	LI2	LI3	LI4	LI5	LI6	LO1	LO2	LO3
No function/free available	No function assigned/freely available									
ENABLE	Power bridge enable			(3)						
Enable negative motor move	Authorization of servo motor movement in the negative direction									
Enable positive motor move	Authorization of servo motor movement in the positive direction									
FAULT_RESET	Fault reset/acknowledgement		(3)							
HALT	Servo motor stop (stopping category 1)				(3)					
JOG fast/slow	Fast/slow manual movement									
JOG negative	Negative manual movement									
JOG positive	Positive manual movement									
Speed limitation	Speed limitation according to a set value									
ACTIVE2_OUT	Servo drive ready									
BRAKE_OUT	Holding brake controller VW3 M3 103 command								(3)	
Current threshold reached	Servo motor current value below a set value									
Halt acknowledge	Acknowledgement of stop									
In position window	Position deviation within set range									
In speed window	Speed deviation within set range									
Motor move disable	Servo motor movement disabled in requested direction									
NO_FAULT_OUT	Servo drive fault							(3)		
Speed threshold reached	Servo motor speed value below a set value									

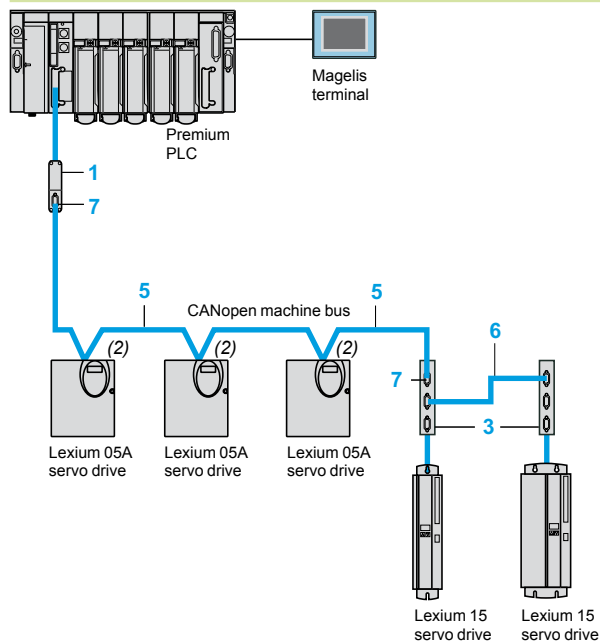
(1) Positive logic: Sink input, Source output
(2) Negative logic: Source input, Sink output
(3) Default assignment

Assignable function Unassignable function

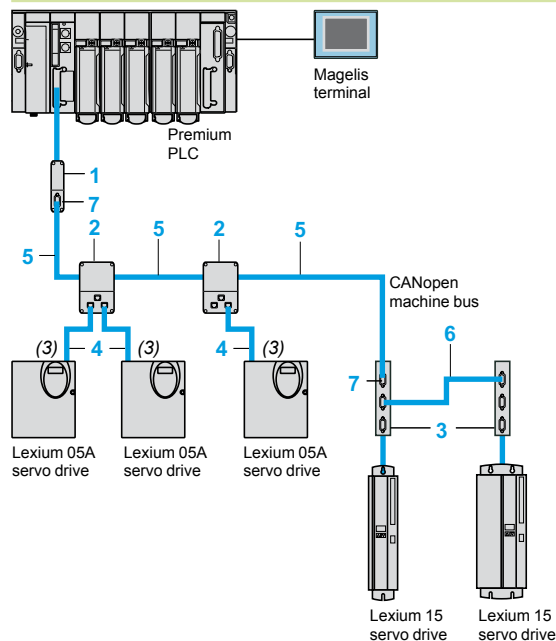
Lexium 05A servo drive control by Modicon Premium automation platform (1)

Via CANopen machine bus

Example of daisy chain connection



Example of tap junction connection



Ref.	Description
1	PCMCIA card assembly with tap junction and cable L = 0.5 m, TSX CPP 110
2	Junction box with 2 RJ45 ports, VW3 CAN TAP2 (4) (see page 2/32)
3	CANopen bus adaptor for Lexium 15 servo drive (CANopen standard hardware interface), AM0 2CA 001V000
4	Cable fitted with 2 RJ45 connectors, VW3 CAN CARR03, 1 (L = 0.3 or 1 m) (see page 2/32)
5	CANopen cables, TSX CAN C 50, 100, 300 (L = 50, 100 or 300 m), with flying leads at both ends (see page 2/32)
6	Cable fitted with 2 SUB-D connectors (9-way, 1 male and 1 female), TLA CD CBA 005, 015, 030, 050 (L = 0.5, 1.5, 3 or 5 m)
7	9-way female SUB-D IP 20 connector with line terminator, TSX CAN KCDF 180T, 90T, 90TP (right-angled, straight or right-angled with SUB-D for diagnostic tool) (see page 2/32)

(1) For Lexium 05A servo drive control by Twido programmable controller or Lexium Controller motion controller, see page 2/32.

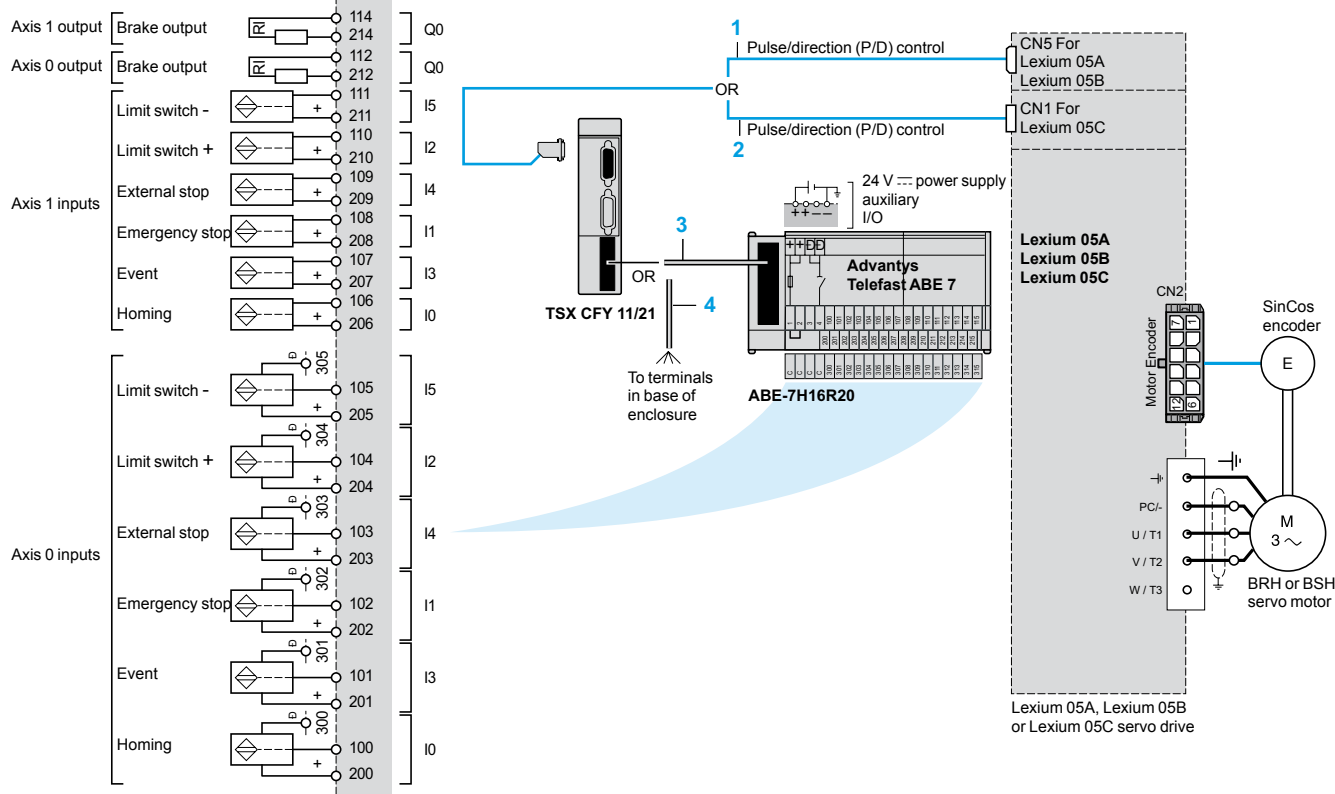
(2) Connection to spring terminal (CN1)

(3) Connection to RJ45 connector (CN4)

(4) Disconnect the line termination resistors from the junction box VW3 CAN TAP2 (included in the Lexium 05A servo drive).

Lexium 05A, Lexium 05B and Lexium 05C servo drive control by Modicon Premium automation platform

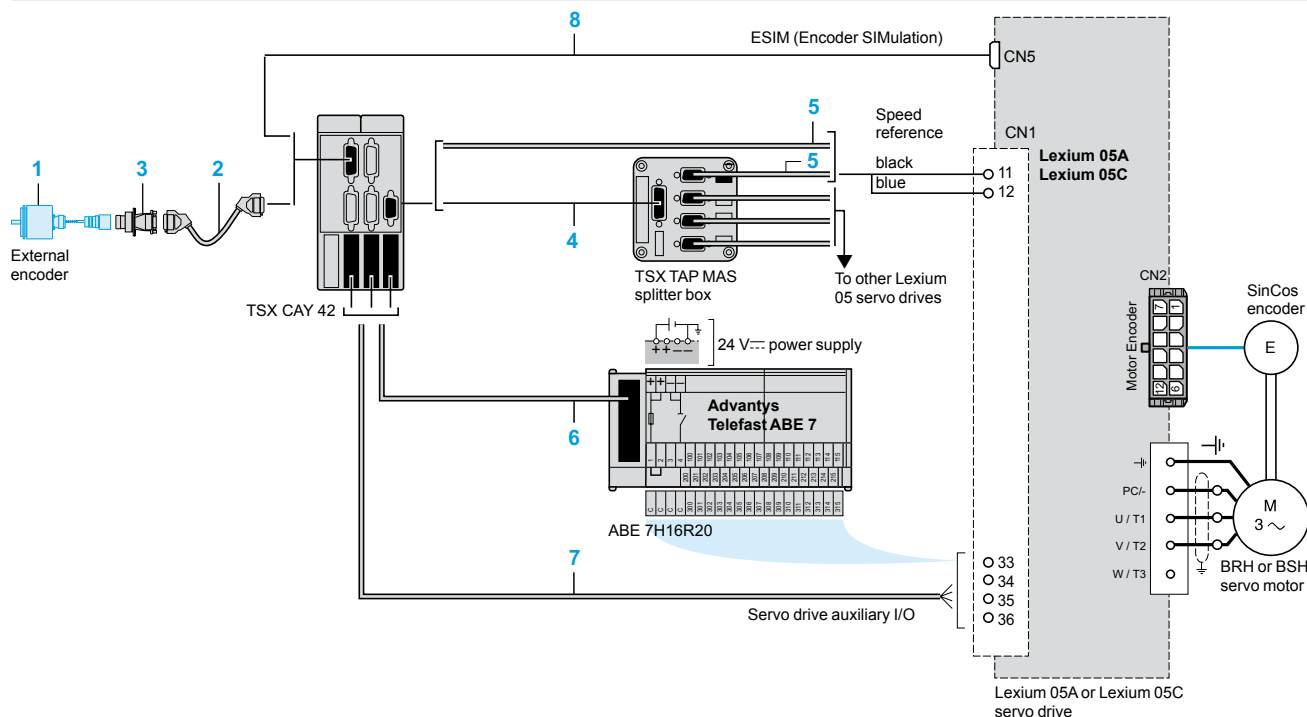
Connection example for TSX CFY 11/21 motion control module



Ref.	Description
1	Cable with connectors VW3 M8 204 R05/R15/R30/R50 (L = 0.5, 1.5, 3 or 5 m) Lexium 05A and Lexium 05B servo drives (see page 2/34)
2	Cable with connectors VW3 M8 214 R05/R15/R30/R50 (L = 0.5, 1.5, 3 or 5 m) for Lexium 05C servo drive (see page 2/34)
3	Cable with connectors TSX CDP 053/103/203/303/503 (L = 0.5, 1, 2, 3 or 5 m)
4	Stranded cable with connector at one end and flying leads at the other TSX CDP 301/501/1001 (L = 3, 5 or 10 m). Please refer to the TSX CFY installation manual, which is available on our website at "www.schneider-electric.com".

Lexium 05A and Lexium 05C servo drive control by Modicon Premium automation platform (continued)

Connection example for TSX CAY 21/41/22/42/33 motion control module



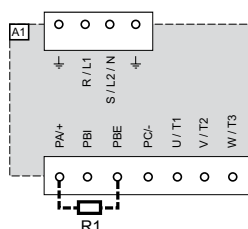
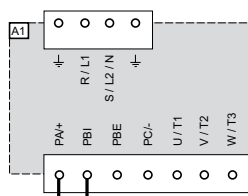
Ref.	Description
1	Absolute or incremental encoder. Option to use Osicoder® XCC 14, XCC 15 and XCC 19 incremental encoders or XCC 25 and XCC 29 absolute encoders; please refer to the "Rotary encoders – Osicoder®" catalogue.
2	Cable with connectors TSX CCP S15 050/100 and TSX CCP S15 (L = 0.5, 1 or 2.5 m)
3	Connector TSX TAP S15 05
4	Cable with connectors TSX CXP 213/613 (L = 2.5 or 6 m)
5	Cable with connectors TSX CDP 611 (L = 6 m)
6	Cable with connectors TSX CDP 053/103/203/303/503 (L = 0.5, 1, 2, 3 or 5 m)
7	Stranded cable with connector at one end and flying leads at the other TSX CDP 301/501/1001 (L = 3, 5 or 10 m).
8	Cables VW3 M8 203 R05/R15/R30/R50 (L = 0.5, 1.5, 3 or 5 m) (see page 2/34)

2

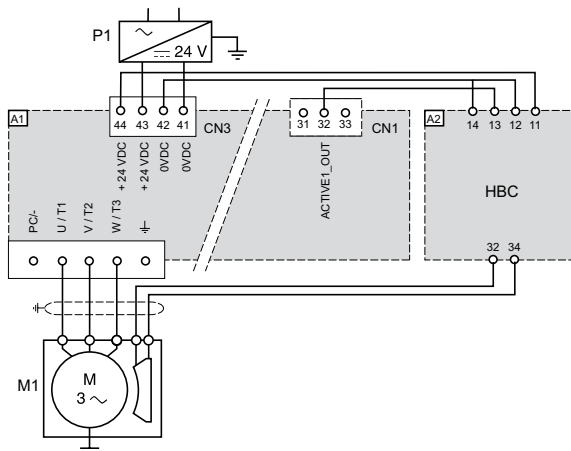
Braking resistor VW3 A7 60● R●●

Internal resistor

External resistor



Holding brake controller VW3 M3 103

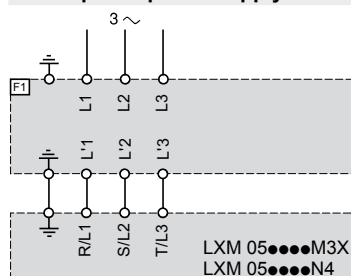


Compatible components

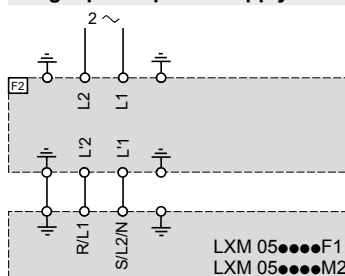
Ref.	Description
A1	Lexium 05 servo drive (see page 2/30)
A2	Holding brake controller VW3 M3 103 (see page 2/43)
M1	BRH or BSH servo motor with holding brake (see page 2/96 or 2/138)
P1	Phaseo (SELV) power supply 24 V ~, please refer to the "Phaseo power supplies and transformers" catalogue
R1	External braking resistor VW3 A7 60● R●● (see page 2/39)

Additional EMC input filters VW3 A3140●

Three-phase power supply



Single-phase power supply



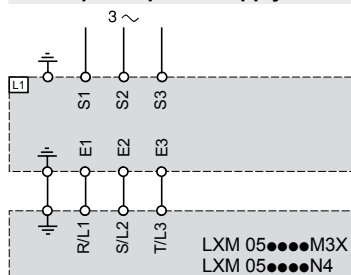
Compatible components

Ref.	Description
F1	Additional three-phase EMC input filter VW3 A31402, 404, 406, 407 (see page 2/41)
F2	Additional single-phase EMC input filter VW3 A31401, 403, 405 (see page 2/41)

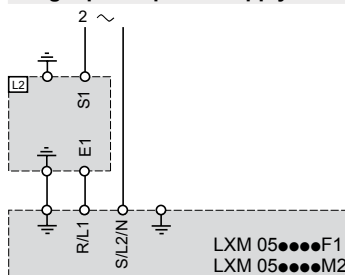
Note: The additional EMC input filters are connected as close as possible to the servo drive, directly upstream of the drive.

Line chokes VW3 A4 552...554, VZ1 L0●●UM●0

Three-phase power supply



Single-phase power supply



Compatible components

Ref.	Description
L1	Three-phase line choke VW3 A4 552, 553, 554 (see page 2/42)
L2	Single-phase line choke VZ1 L0●●UM●0 (see page 2/42)

Connections for ensuring conformity to EMC standards

Principle

- The earths between the servo drive, servo motor and cable shielding must have “high frequency” equipotentiality.
- Use shielded cables with shielding connected to earth throughout 360° at both ends for the servo motor cable, the braking resistor cable and the control-signalling cables. Conduit or metal ducting can be used for part of the shielding length provided that there is no break in the continuity of the earth connections.
- Ensure maximum separation between the power supply cable (line supply) and the motor cable.

Installation diagram for servo drives

This installation requires the EMC conformity kit.

This kit is supplied with Lexium 05A and Lexium 05B servo drives; for Lexium 05C servo drives it must be ordered separately (see page 2/30).

The kit comprises:

- An EMC plate **1**
- Clamps **5** and fixing accessories
- 1** Steel plate to be mounted on the Lexium 05 servo drive (earthed casing)
- 2** Lexium 05 servo drive
- 3** Unshielded power supply wires or cable
- 4** Unshielded wires for the output of the fault relay contacts
- 5** Attach and earth the shielding of cables **6**, **7**, **8**, **9** and **10** as close as possible to the servo drive:
 - Strip the shielding.
 - Attach the cable to the plate **1** by attaching the clamp to the stripped part of the shielding.
 The shielding must be clamped tightly enough to the steel plate to ensure good contact.
- 6** Shielded cable for connecting the BRH or BSH servo motor power
- 7** Shielded cable for connecting the BRH or BSH servo motor encoder
- 8** Shielded cable for connecting the position interface signals (CW/CCW, pulse/direction or A/B signals)
- 9** Shielded cable for connecting the communication network
- 10** Shielded cable for connecting the braking resistor
 - For cables **6**, **7**, **8**, **9**, **10**, the shielding must be connected to earth at both ends. The shielding must be continuous, and if intermediate terminals are used, they must be placed in EMC shielded metal boxes.
- 11** Earth screw for servo motor cable

Note: The HF equipotential earth connection between the servo drive, servo motor and cable shielding does not remove the need to connect the PE protective conductors (green-yellow) to the appropriate terminals on each unit.

If using an additional EMC input filter, it should be mounted beneath the servo drive and connected directly to the line supply via an unshielded cable. Link **3** on the servo drive is via the filter output cable.

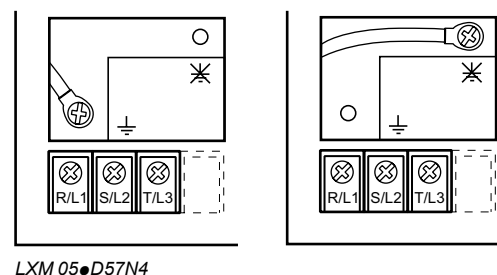
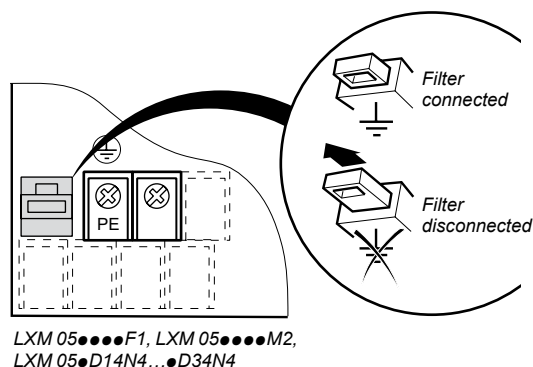
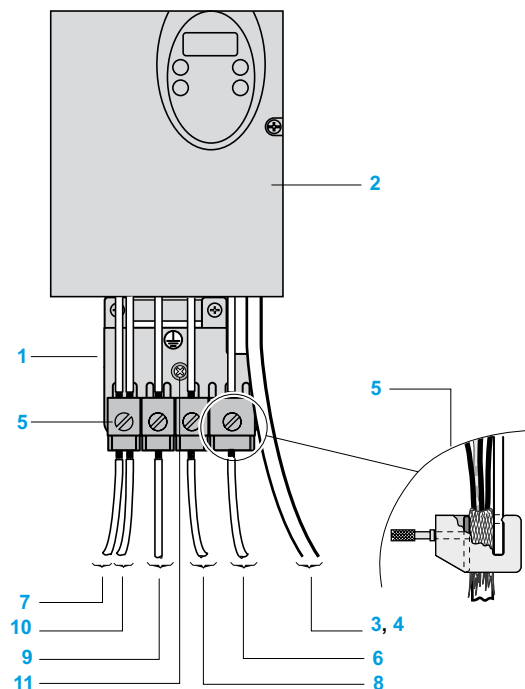
Operation on an IT system

Principle

IT system: Isolated or impedance earthed neutral

Use a permanent insulation monitor compatible with non-linear loads, such as a Schneider Electric type XM200 (please consult your Regional Sales Office).

LXM 05●●●●F1, LXM 05●●●●M2 and LXM 05●●●●N4 servo drives have an integrated EMC filter. These filters must be isolated from earth for use on an IT system. For this disconnection see opposite, depending on the model.





GV2 L16
+
LC1 K0610●●
+
LXM 05●D34N4

Applications

The combinations listed below can be used to create a complete motor starter unit comprising a circuit breaker, a contactor and a Lexium 05 servo drive.

The circuit breaker provides protection against accidental short-circuits, disconnection and, if necessary, isolation.

The contactor is responsible for starting up and managing any safety features, as well as isolating the servo motor on stopping.

The servo drive controls the servo motor, provides protection against short-circuits between the servo drive and the servo motor and protects the motor cable against overloads. The overload protection is provided by the motor thermal protection of the servo drive.

Motor starters for Lexium 05 servo drives

Servo drive		Circuit breaker		Max. prsp. line Isc	Contactor
Reference	Nominal power	Reference	Rating		Reference (1) (2)
	kW		A	kA	
Single-phase supply voltage: 100...120 V ~ 50/60 Hz					
LXM 05●D10F1	0.4	GV2 L14	10	1	LC1 K0610●●
LXM 05●D17F1	0.65	GV2 L16	14	1	LC1 K0610●●
LXM 05●D28F1	1.4	GV2 L20	18	1	LC1 K0610●●

Single-phase supply voltage: 200...240 V ~ 50/60 Hz					
LXM 05CU70M2	0.4	GV2 L14	10	1	LC1 K0610●●
LXM 05●D10M2	0.75	GV2 L14	10	1	LC1 K0610●●
LXM 05●D17M2	1.2	GV2 L16	14	1	LC1 K0610●●
LXM 05●D28M2	2.5	GV2 L22	25	1	LC1 D09●●

Three-phase supply voltage: 200...240 V ~ 50/60 Hz					
LXM 05●D10M3X	0.75	GV2 L10	6.3	5	LC1 K0610●●
LXM 05●D17M3X	1.4	GV2 L16	14	5	LC1 K0610●●
LXM 05●D42M3X	3.2	GV2 L22	25	5	LC1 D09●●

Three-phase supply voltage: 380...480 V ~ 50/60 Hz					
LXM 05●D14N4	1.4	GV2 L14	10	5	LC1 K0610●●
LXM 05●D22N4	2	GV2 L14	10	5	LC1 K0610●●
LXM 05●D34N4	3	GV2 L16	14	5	LC1 K0610●●
LXM 05●D57N4	6	GV2 L22	25	5	LC1 D09●●

(1) Composition of contactors:

LC1 K06: 3 poles + 1 "N/O" auxiliary contact

LC1 D09: 3 poles + 1 N/O auxiliary contact + 1 N/C auxiliary contact

(2) Replace ●● with the control circuit voltage reference given in the table below:

	Volts ~	24	48	110	220	230	240
LC1 K	50/60 Hz	B7	E7	F7	M7	P7	U7
	Volts ~	24	48	110	220/230	230	230/240
LC1 D	50 Hz	B5	E5	F5	M5	P5	U5
	50 Hz	B6	E6	F6	M6	–	U6
	50/60 Hz	B7	E7	F7	M7	P7	U7

For other available voltages between 24 V and 660 V, or for a DC control circuit, please consult your Regional Sales Office.

Protection using class J fuses (UL standard)

Servo drive		Fuse to be placed upstream
Reference	Nominal power kW	A
Single-phase supply voltage: 100...120 V ~ 50/60 Hz		
LXM 05●D10F1	0.4	10
LXM 05●D17F1	0.65	15
LXM 05●D28F1	1.4	25
Single-phase supply voltage: 200...240 V ~ 50/60 Hz		
LXM 05CU70M2	0.4	10
LXM 05●D10M2	0.75	10
LXM 05●D17M2	1.2	15
LXM 05●D28M2	2.5	25
Three-phase supply voltage: 200...240 V ~ 50/60 Hz		
LXM 05●D10M3X	0.75	10
LXM 05●D17M3X	1.4	15
LXM 05●D42M3X	3.2	25
Three-phase supply voltage: 380...480 V ~ 50/60 Hz		
LXM 05●D14N4	1.4	10
LXM 05●D22N4	2	15
LXM 05●D34N4	3	15
LXM 05●D57N4	6	25

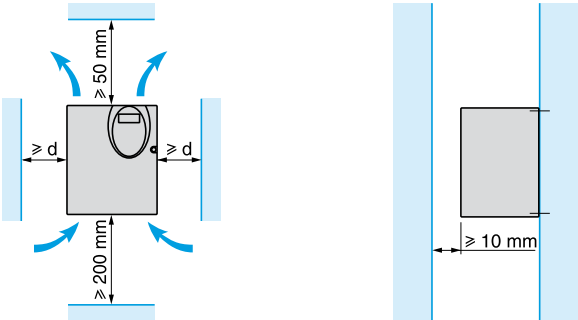
Mounting recommendations

LXM 05●D10F1, LXM 05CU70M2, ●D10M2 and LXM 05●D10M3X servo drives are cooled by natural convection.

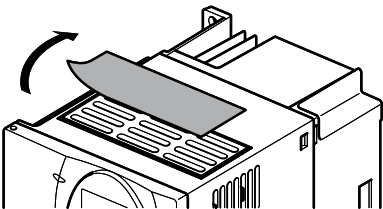
LXM 05●D17F1, ●D28F1, LXM 05●D17M2, ●D28M2, LXM 05●D17M3X, ●D42M3X and LXM 05●●●●N4 servo drives have an integrated fan.

When installing the servo drive in the electrical enclosure, the instructions below should be followed with regard to the temperature and protection index:

- Provide sufficient cooling of the servo drive by complying with the minimum mounting distances
- Do not mount the servo drive near heat sources
- Do not mount the servo drive on flammable materials
- Do not heat the servo drive cooling air by currents of hot air from other equipment and components, for example from an external braking resistor
- If the servo drive is used above its thermal limits, the control stops due to overtemperature
- When IP 20 protection is sufficient, we recommend that the protective cover is removed once installation is complete.
- Mount the servo drive vertically ($\pm 10\%$).



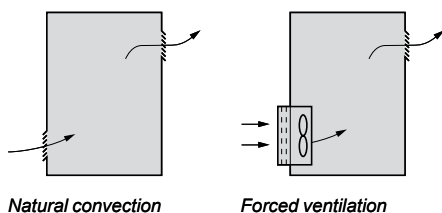
Note: For cables that are connected via the underside of the servo drive, a free space ≥ 200 mm is required under the unit to comply with the bending radius of the connection cables.



Remove the protective cover if IP 20 is sufficient

Ambient temperature Mounting distances		Instructions to be followed
0°C...+ 40°C	$d > 50$ mm	–
	$10 < d < 50$ mm	Remove the protective cover
	$0 < d < 10$ mm	Remove the protective cover
+ 40°C...+ 50°C	$d > 50$ mm	Remove the protective cover
	$d < 50$ mm	Remove the protective cover Reduce the output current by 2.2% per °C above 40°C

Note: Do not use insulated enclosures, as they have a poor level of conductivity.



Recommendations for mounting in a wall-mounted or floor-standing enclosure

To ensure good air circulation in the servo drive:

- Fit ventilation grilles on the enclosure.
- Ensure that ventilation is adequate: if not install a forced ventilation unit with a filter.
- Any apertures and/or fans must provide a flow rate at least equal to that of the servo drive fans (see below).
- Use special filters with IP 54 protection
- Remove the protective cover attached to the upper part of the servo drive

Dissipated power and fan flow rate compatible with the servo drive rating

Servo drive	Dissipated power W	Ventilation	Flow rate m³/min
LXM 05•D10F1 LXM 05CU70M2 LXM 05•D10M2 LXM 05•D10M3X	43 38 48 43	Natural convection	0.3
LXM 05•D17F1 LXM 05•D17M2 LXM 05•D17M3X LXM 05•D14N4	76 74 68 65	Integrated fan	0.55
LXM 05•D28F1 LXM 05•D28M2 LXM 05•D42M3X LXM 05•D22N4 LXM 05•D34N4	150 142 132 90 147	Integrated fan	1.55
LXM 05•D57N4	240	Integrated fan	1.75

Metal dust and damp proof wall-mounted or floor-standing enclosure (IP 54 degree of protection)

The servo drive must be mounted in a dust and damp proof enclosure in certain environmental conditions, such as dust, corrosive gases, high humidity with risk of condensation and dripping water, splashing liquid, etc.

In these cases, Lexium 05 servo drives can be installed in an enclosure where the internal temperature must not exceed 50°C.

Calculating the dimensions of the enclosure

Maximum thermal resistance R_{th} (°C/W)

The thermal resistance is defined by the following formula:

$$R_{th} = \frac{\theta^{\circ} - \theta_e}{P}$$

θ° = maximum temperature inside the enclosure in °C
 θ_e = maximum external temperature in °C
 P = total power dissipated in the enclosure in W

Power dissipated by the servo drive: see table above. Add the power dissipated by the other equipment components.

Useful heat exchange area of enclosure S (m²)

For a wall-mounted enclosure, the useful heat exchange area is defined as the sum of the areas of the two sides + top + front panel.

$$S = \frac{k}{R_{th}}$$

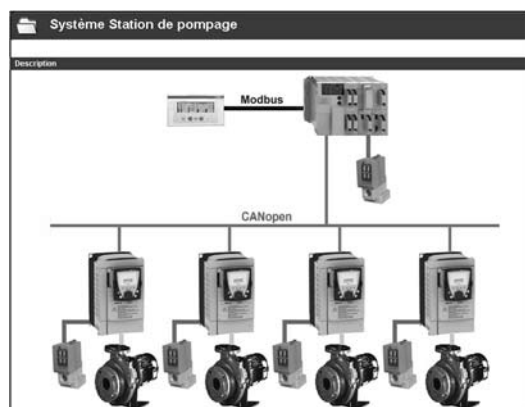
k = thermal resistance per m² of the enclosure

For metal enclosures:

- $k = 0.12$ with internal fan
- $k = 0.15$ without fan

Note: Do not use insulated enclosures, as they have a poor level of conductivity.

534513



PowerSuite screen on PC

Presentation

The PowerSuite software workshop for PC is a user-friendly tool designed for setting up the Schneider Electric control device motors:

- TeSys U starter-controllers
- TeSys T motor management systems
- Altistart soft start/soft stop units
- Altivar variable speed drives
- Lexium 05 servo drives

It includes various functions designed for setup phases such as:

- Preparing configurations
- Start-up
- Maintenance

To facilitate start-up and maintenance, the PowerSuite software workshop is compatible with the Bluetooth® wireless link.

Functions (1)

Preparing configurations

The PowerSuite software workshop can be used on its own to generate the device configuration, which can be saved, printed and exported to office automation software.

The PowerSuite software workshop can also be used to convert an Altivar 58 or Altivar 58F drive configuration into one that is compatible with an Altivar 71.

Start-up

When the PC is connected to the device, the PowerSuite software workshop can be used to:

- Transfer the generated configuration
- Adjust
 - The oscilloscope
 - The high-speed oscilloscope (minimum time base: 2 ms)
 - The FFT (*Fast Fourier Transform*) oscilloscope
 - Display of communication parameters
- Control
- Save the final configuration

Maintenance

To facilitate maintenance operations, the PowerSuite software workshop can be used to:

- Compare the configuration of a device currently being used with a saved configuration
- Manage the user's installed equipment base, in particular:
 - Organize the installed base into folders (electrical equipment, machinery, workshops, etc.)
 - Store maintenance messages
 - Facilitate Modbus TCP connection by storing the IP address

User interface

The PowerSuite software workshop can be used to:

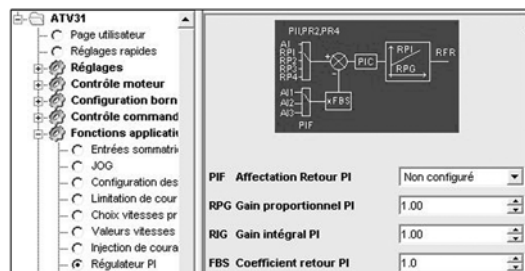
- Present the device parameters (arranged by function) in the form of illustrated views of diagrams or simple tables
- Customize the parameter names
- Create:
 - A user menu (choice of particular parameters)
 - Monitoring control panels with graphic elements (cursors, gauges, bar charts)
- Perform sort operations on the parameters
- Display text in five languages (English, French, German, Italian and Spanish). The language changes immediately and there is no need to restart the program.

It also features online contextual help:

- On the PowerSuite tool
- On the device functions by direct access to the user manuals

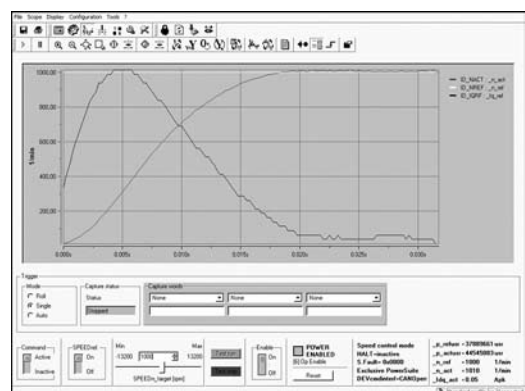
(1) Certain functions are not available for all devices. See the table of available functions, page 2/73.

533181



PowerSuite screen on PC
View of PI regulator function parameters

572706



View of the FFT oscilloscope

Functions available for the PowerSuite software workshop

Functions not listed in the table are available for all devices.

Function available with devices	Controller	Starter-controller	Soft start/soft stop unit	Drives				Servo drive
	TeSys T	TeSys U	ATS 48	ATV 11	ATV 31	ATV 61	ATV 71	LXM 05
Monitoring								
Oscilloscope								
High-speed oscilloscope								
FFT oscilloscope								
Display of communication parameters								
Control								
Customization of parameter names								
Creation of a user menu								
Creation of monitoring control panels								
Sort operation on parameters								
Custom logic editor								

■ Functions available
■ Functions not available

Connections (1)

Modbus serial link

The PowerSuite software workshop can be connected directly to the device terminal port or Modbus network port via the serial port on the PC.

Two types of connection are possible:

- With a single device (point-to-point connection), use a VW3 A8 106 PC serial port connection kit.
- With a number of devices (multidrop connection), use the XGS Z24 interface.

Modbus TCP communication network

The PowerSuite software workshop can be connected to a Modbus TCP network. In this case, the devices can be accessed:

- Using a VW3 A3 310 communication card for the Altivar 61 and 71 drives
- Using a TSX ETG 100 Modbus TCP/Modbus gateway

Bluetooth® wireless link

The PowerSuite software workshop can communicate via a Bluetooth® radio link if the device is equipped with a Bluetooth® Modbus VW3 A8 114. The adapter plugs into the device connector terminal port or Modbus network port and has a range of 10 m (class 2).

If the PC does not feature Bluetooth® technology, use the VW3 A8 115 USB - Bluetooth® adapter.

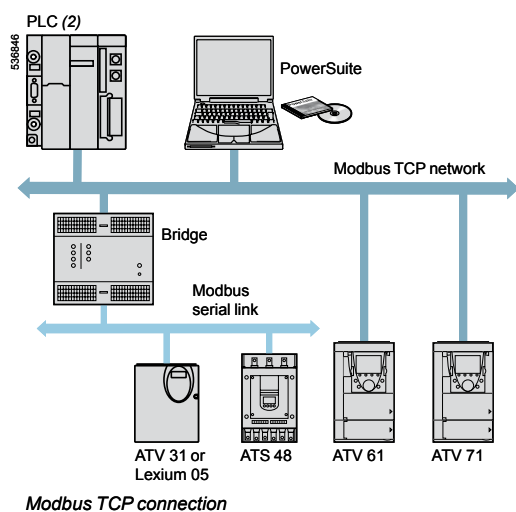
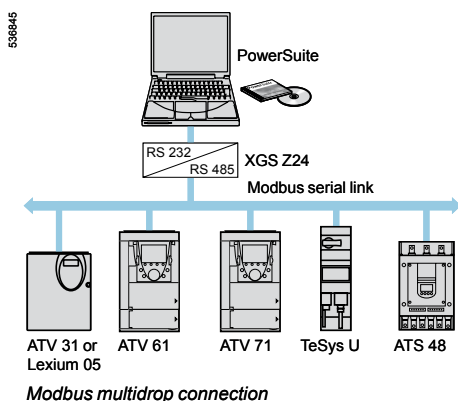
Remote maintenance

A simple Modbus TCP connection is all that is required for the PowerSuite software workshop to support remote monitoring and diagnostics.

When devices are not connected to the Modbus TCP network, or it is not directly accessible, various remote transmission solutions may be used instead (modem, teleprocessing gateway, etc.). Please consult your Regional Sales Office.

(1) Please refer to the compatibility table on page 2/75.

(2) Please refer to our specialist "Automation platform Modicon Premium and Unity - PL7 software" and "Automation platform Modicon M340" catalogues.



PowerSuite software workshop

Description	Composition	Reference	Weight kg
PowerSuite CD-ROM	<ul style="list-style-type: none"> 1 program for PC in English, French, German, Italian and Spanish Variable speed drive, starter and servo drive technical manuals 	VW3 A8 104	0.100
PowerSuite update CD-ROM (1)	<ul style="list-style-type: none"> 1 program for PC in English, French, German, Italian and Spanish Variable speed drive and starter technical manuals 	VW3 A8 105	0.100
PC serial port connection kit for point-to-point Modbus connection	<ul style="list-style-type: none"> 1 x 3 m cable with 1 RJ45 connector on starter-controller or drive side and 1 RS 232/RS 485 converter with 1 9-way female SUB-D connector on PC side For the ATV 11 drive: 1 converter with one 4-way male SUB-D connector and 1 RJ45 connector For ATV 38/58/58F drives: 1 RJ45/9-way male SUB-D adapter 	VW3 A8 106	0.350
RS 232/RS 485 interface for multidrop Modbus connection	<ul style="list-style-type: none"> 1 Modbus multidrop converter for connection to screw terminals. Requires a 24 V $\overline{\text{---}}$ (20...30 V), 20 mA power supply (2) 	XGS Z24	0.105
Modbus-Bluetooth® adapter (3)	<ul style="list-style-type: none"> 1 Bluetooth® adapter (10 m range, class 2) with 1 RJ45 connector For PowerSuite: 1 x 0.1 m cable with 2 RJ45 connectors For TwidoSoft: 1 x 0.1 m cable with 1 RJ45 connector and 1 mini DIN connector For ATV 38/58/58F drives: 1 RJ45/9-way male SUB-D adapter 	VW3 A8 114	0.155
USB - Bluetooth® adapter for PC	This adapter is required in the case of a PC that does not feature Bluetooth® technology. It is connected to a USB port on the PC. 10 m range (class 2)	VW3 A8 115	0.290



(1) Updates a version \geq V1.40 with the latest available version. For versions $<$ V1.40, you should order the PowerSuite CD-Rom, VW3 A8 104.

(2) Please refer to the "Interfaces, I/O splitter boxes and power supplies" catalogue.

(3) Can also be used to communicate between a Twido PLC and the TwidoSoft software workshop.

Compatibilité de l'atelier logiciel PowerSuite avec les appareils (1)

Connexion	Controller	Starter-controller	Soft start/soft stop unit	Drives				Servo drives		
	TeSys T	TeSys U (2)	ATS 48	ATV 11	ATV 31	ATV 61	ATV 71	LXM 05A	LXM 05B	LXM 05C
Modbus	V2.5	V1.40	V1.30	V1.40	V2.0	V2.3	V2.2	V2.2	V2.4	V2.5
Modbus TCP (device equipped with Modbus TCP card)						V2.3	V2.2			
Modbus TCP via Modbus TCP/Modbus gateway			V1.50		V2.0	V2.3	V2.2	V2.2	V2.4	V2.5
Bluetooth®			V2.2		V2.2	V2.3	V2.2	V2.2	V2.4	V2.5

 Compatible software versions
 Incompatible software versions

Hardware and software environments

The PowerSuite software workshop can operate in the following PC environments and configurations:

- Microsoft Windows® XP SP1, SP2,
- Pentium III, 800 MHz, hard disk with 300 MB available, 128 MB RAM
- SVGA or higher definition monitor

(1) Minimum software version.

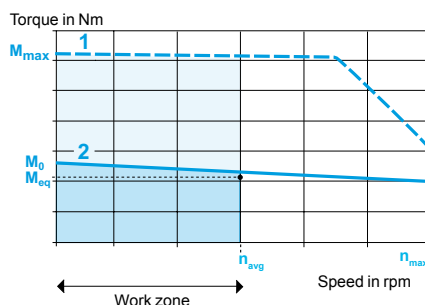
(2) TeSys U starter-controller without communication module or with Modbus LUL C031, C032 or C033 communication module.



BRH servo motor with straight connectors




BRH servo motor with rotatable angled connectors



Presentation

BRH servo motors offer an excellent solution to the requirements for high speed and speed precision. With three flange sizes and a variety of lengths, there is a suitable solution for most applications, covering a continuous stall torque range from 0.46 to 12 Nm and catering for speeds of up to 8000 rpm.

Available for use with BRH servo motors, Lexium 05 servo drives deliver a sinusoidal wave, ensuring perfect rotation even at low speed.

BRH servo motors are available in three flange sizes: 57, 85 and 110 mm. Thermal protection is provided by a temperature probe integrated into the servo motors. They are certified as "Recognized"  by the Underwriters Laboratories and conform to UL 1004 standards as well as to European directives (CE marking).

BRH servo motors are available with the following variants:

- IP 41 or IP 56 degree of protection
- With or without holding brake
- Straight or angled connectors
- Single turn or multiturn SinCos encoder
- Untapped or keyed shaft end

Torque/speed characteristics

BRH servo motors provide torque/speed curve profiles similar to the example shown on the left with:

- 1 Peak torque, depending on the servo drive model
- 2 Continuous torque, depending on the servo drive model

where:

- n_{max} (in rpm) corresponds to the servo motor's maximum speed
- M_{max} (in Nm) represents the peak stall torque value
- M_0 (in Nm) represents the continuous stall torque value

Principle for determining servo motor size according to the application

The torque/speed curves can be used to determine the correct servo motor size:

- 1 Locate the work zone of the application in terms of speed.
- 2 Verify, using the servo motor cycle timing diagram, that the torques required by the application during the various phases of the cycle are located within the area bounded by curve 1 in the work zone.
- 3 Calculate the average speed n_{avg} and the equivalent thermal torque M_{eq} (see page 6/2).
- 4 The point defined by n_{avg} and M_{eq} must be located below curve 2 in the work zone.

Note: For sizing of servo motors, see page 6/2.

Functions

General functions

BRH servo motors have been developed to meet the following requirements:

- Functional characteristics, ruggedness, safety, etc. in accordance with IEC/EN 60034-1
- Ambient operating temperature:
 - - 20...40°C according to DIN 50019R14.
 - Maximum 55°C with derating from 40°C of 1% of the nominal output power per additional °C
- Relative humidity: ≤ 75% based on an annual average/95% based on a period of 30 days, without condensation
- Maximum operating altitude: 1000 m without derating, 2000 m with $k = 0.86$, 3000 m with $k = 0.8$ (1)
- Storage and transport temperature: - 25...60°C,
- Winding insulation class: F (maximum temperature for windings 150°C) according to DIN VDE 0530
- Power and encoder connection via straight or angled connectors
- Thermal protection by built-in PTC thermistor probe, controlled by the Lexium 05 servo drive
- Out-of-round, concentricity and perpendicularity between flange and shaft according to DIN 42955, class N
- Flange compliant with standard EN 50347:2001-07
- Permitted mounting positions: no mounting restrictions for IMB5 - IMV1 and IMV3 according to DIN 42950
- Polyester resin-based paint: Opaque black paint RAL 9005

(1) k : derating factor

Functions (continued)

General functions (continued)

- Degree of protection:
 - Casing: IP 56 in accordance with IEC/EN 60529
 - Shaft end: IP 41 or IP 56 in accordance with IEC/EN 60529 (1)
- Integrated sensor: SinCos Hiperface® single turn or multiturn high-resolution encoder
- Untapped or keyed shaft end in standard sizes (according to EN 50347:2001-07)

Holding brake

BRH servo motors can be equipped with a failsafe electro-magnetic holding brake.



Do not use the holding brake as a dynamic brake for deceleration, as this will rapidly damage the brake.

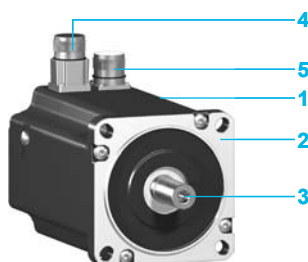
Integrated encoder

If required, BRH servo motors can be equipped with one of the following SinCos Hiperface® high-resolution absolute encoders:

- Single turn encoder (16,384 points/turn) (2) providing angular precision to within ± 4.8 arc minutes.
- Single turn encoder (131,072 points/turn) (2) providing angular precision to within ± 1.3 arc minutes.
- Multiturn encoder (131,072 points/turn x 4096 turns) (2) providing angular precision to within ± 1.3 arc minutes.

This encoder performs the following functions:

- Gives the angular position of the rotor so that flows can be synchronized
- Measures the servo motor speed via the associated Lexium 05 servo drive. This information is used by the speed controller of the servo drive.
- Measures the position information for the servo drive position controller
- Measures and sends position information in incremental format for the position feedback of a motion control module (ESIM (Encoder SIMulation) output of the RS 422 interface)



Description

BRH servo motors with a 3-phase stator and a 10-pole rotor with Neodymium Iron Boron (NdFeB) magnets consisting of:

- 1 A casing protected by RAL 9005 opaque black paint
- 2 A 4-point axial fixing flange in accordance with DIN 42948
- 3 A standard shaft end in accordance with DIN 42948, untapped or keyed (depending on the model)
- 4 A threaded dust and damp proof male straight connector for connecting the power cable (3)
- 5 A threaded dust and damp proof male straight connector for connecting the control cable (encoder) (3)

Connectors to be ordered separately, for connection to Lexium 05 servo drives, see page 2/98.

Schneider Electric has taken particular care to ensure compatibility between BRH servo motors and Lexium 05 servo drives. This compatibility can only be assured by using cables and connectors sold by Schneider Electric, see page 2/98.

(1) IP 41 mounted in position IMV3 (vertical mounting with shaft end at the top)

(2) Encoder resolution given for use with a Lexium 05 servo drive

(3) Other model with rotatable angled connector

Characteristics of BRH 0571P/0571T servo motors

Type of servo motor				BRH 0571P		BRH 0571T			
Associated with Lexium 05 servo drive				LXM 05 CU70M2	LXM 05 ●D14N4	LXM 05 ●D10F1	LXM 05 CU70M2	LXM 05 ●D10M2	LXM 05 ●D10M3X
Line supply voltage			V	230 single-phase	400/480 3-phase	115 single-phase	230 single-phase		230 3-phase
Switching frequency			kHz	8					
Torque	Continuous stall	M ₀	Nm	0.46					
	Peak stall	M _{max}	Nm	1.26	1.39	1.15	0.88	1.15	
Nominal operating point	Nominal torque		Nm	0.43	0.41	0.43	0.41		
	Nominal speed		rpm	3000	6000	3000	6000		
	Nominal servo motor output power		W	135	260	135	260		
Maximum current			A rms	4.3	5.4	6	4.3	6	

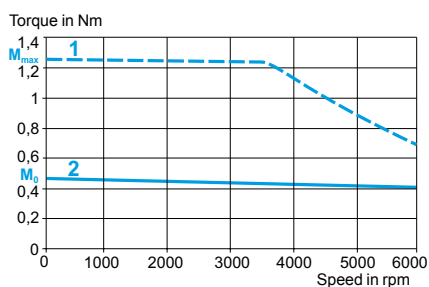
Servo motor characteristics

Maximum mechanical speed				rpm	8000	
Constants (at 120°C)	Torque			Nm/A rms	0.34	0.21
	Back emf			V rms/ krpm	20.9	13.1
Rotor	Number of poles				10	
	Inertia	Without brake	J _m	kgcm ²	0.18	
		With brake	J _m	kgcm ²	0.18	
Stator (at 20°C)	Resistance (phase/phase)			Ω	12.7	5
	Inductance (phase/phase)			mH	24.1	9.5
	Electrical time constant			ms	1.9	
Holding brake (depending on model)					See page 2/102	

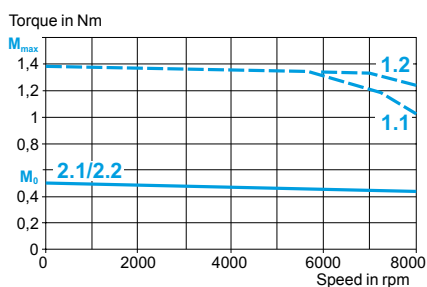
Torque/speed curves

BRH 0571P servo motor

With LXM 05CU70M2 servo drive
230 V single-phase

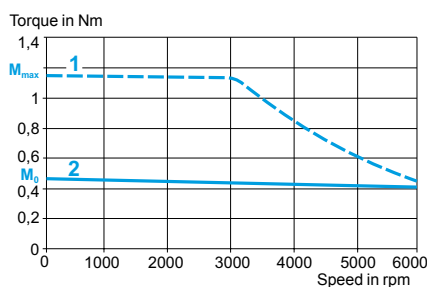


With LXM 05●D14N4 servo drive
400/480 V 3-phase



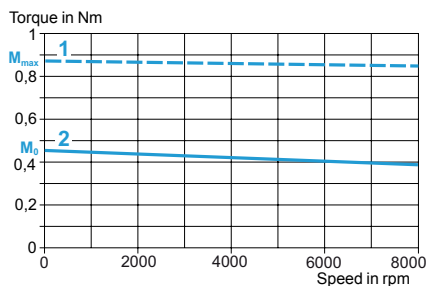
BRH 0571T servo motor

With LXM 05●D10F1 servo drive
115 V single-phase

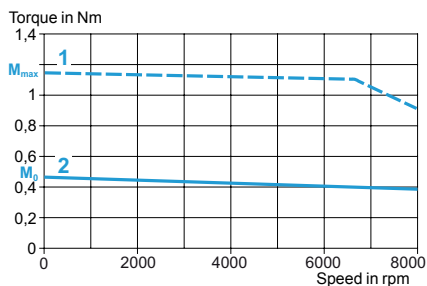


BRH 0571T servo motor (continued)

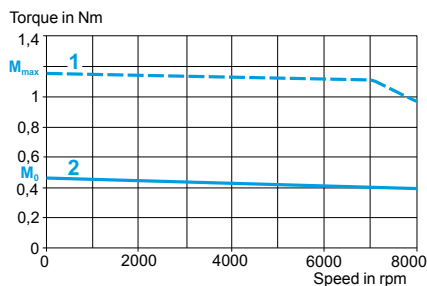
With LXM 05CU70M2 servo drive
230 V single-phase



With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

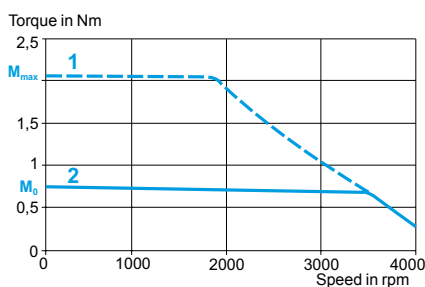
Characteristics of BRH 0572P servo motors

Type of servo motor			BRH 0572P				
Associated with Lexium 05 servo drive			LXM 05 ●D10F1	LXM 05 CU70M2	LXM 05 ●D10M2	LXM 05 ●D10M3X	LXM 05 ●D14N4
Line supply voltage		V	115 single-phase	230 single-phase		230 3-phase	400/480 3-phase
Switching frequency		kHz	8				
Torque	Continuous stall	M_0	Nm	0.76			
	Peak stall	M_{max}	Nm	2.07	1.55	2.07	2.46
Nominal operating point	Nominal torque		Nm	0.73	0.7		0.64
	Nominal speed		rpm	1500	3000		6000
	Nominal servo motor output power		W	120	220		400
Maximum current		A rms	6	4.3	6		7.5
Servo motor characteristics							
Maximum mechanical speed			rpm	8000			
Constants (at 120°C)	Torque		Nm/A rms	0.38			
	Back emf		V rms/ krpm	24.3			
Rotor	Number of poles			10			
	Inertia	Without brake	J_m	kgcm ²	0.26		
		With brake	J_m	kgcm ²	0.26		
Stator (at 20°C)	Resistance (phase/phase)		Ω	6.7			
	Inductance (phase/phase)		mH	13.6			
	Electrical time constant		ms	2			
Holding brake (depending on model)				See page 2/102			

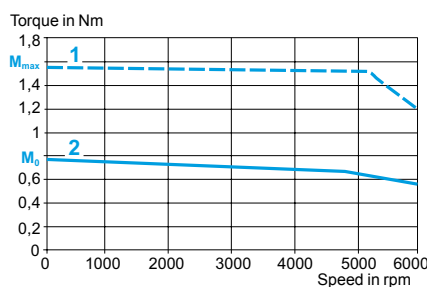
Torque/speed curves

BRH 0572P servo motor

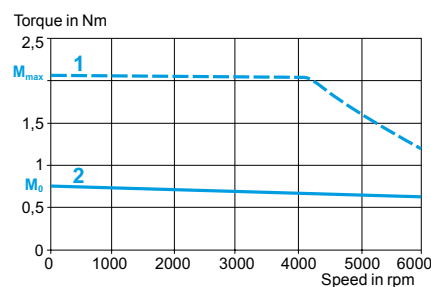
With LXM 05●D10F1 servo drive
115 V single-phase



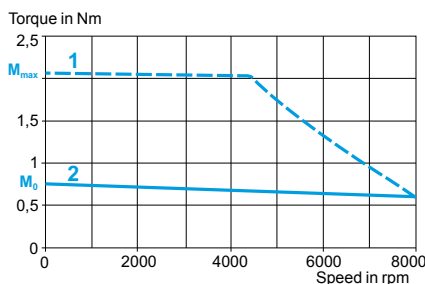
With LXM 05CU70M2 servo drive
230 V single-phase



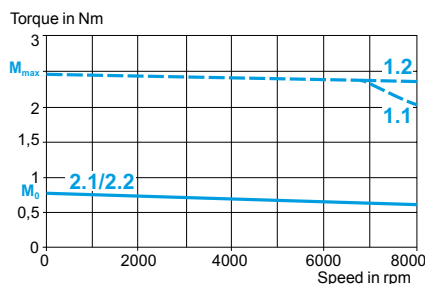
With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



With LXM 05●D14N4 servo drive
400/480 V 3-phase



1 Peak torque
2 Continuous torque

1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BRH 0573P servo motors

Type of servo motor		BRH 0573P			
Associated with Lexium 05 servo drive		LXM 05 ●D17F1	LXM 05 ●D10M2	LXM 05 ●D10M3X	LXM 05 ●D14N4
Line supply voltage	V	115 single-phase	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	8			
Torque	Continuous stall	M_0	Nm	1.05	
	Peak stall	M_{max}	Nm	3.9	2.43
Nominal operating point	Nominal torque	Nm	1	0.91	3
	Nominal speed	rpm	1500	4500	0.87
	Nominal servo motor output power	W	160	430	6000
Maximum current	A rms	10	7		550

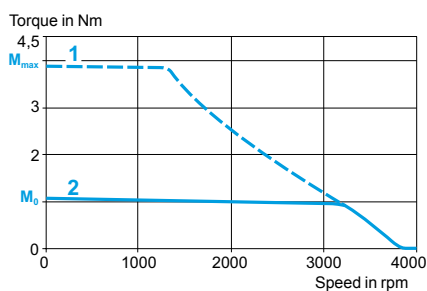
Servo motor characteristics

Maximum mechanical speed	rpm	8000
Constants (at 120°C)	Torque	Nm/A rms
	Back emf	V rms/krpm
Rotor	Number of poles	10
	Inertia Without brake	J_m
	Inertia With brake	J_m
Stator (at 20°C)	Resistance (phase/phase)	Ω
	Inductance (phase/phase)	mH
	Electrical time constant	ms
Holding brake (depending on model)		See page 2/102

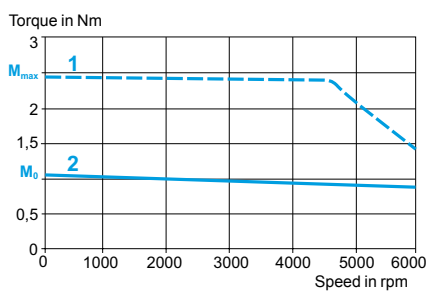
Torque/speed curves

BRH 0573P servo motor

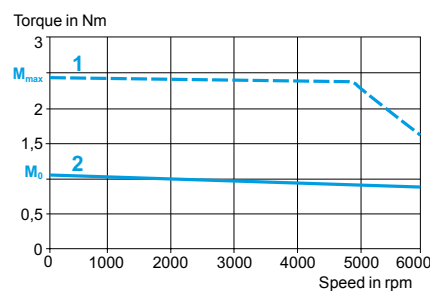
With LXM 05●D17F1 servo drive
115 V single-phase



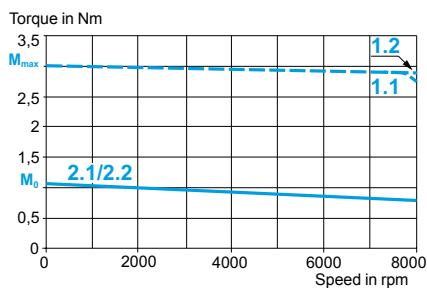
With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



With LXM 05●D14N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

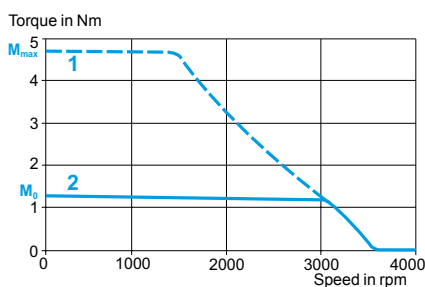
Characteristics of BRH 0574P servo motors

Type of servo motor				BRH 0574P			
Associated with Lexium 05 servo drive				LXM 05 ●D17F1	LXM 05 ●D17M2	LXM 05 ●D17M3X	LXM 05 ●D22N4
Line supply voltage			V	115 single-phase	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency			kHz	8			
Torque	Continuous stall	M_o	Nm	1.3			
	Peak stall	M_{max}	Nm	4.73			
Nominal operating point	Nominal torque		Nm	1.22	1.08	1	
	Nominal speed		rpm	1500	4500	6000	
	Nominal servo motor output power		W	190	510	630	
Maximum current			A rms	11			
Servo motor characteristics							
Maximum mechanical speed			rpm	8000			
Constants (at 120°C)	Torque		Nm/A rms	0.46			
	Back emf		V rms/ krpm	29.3			
Rotor	Number of poles			10			
	Inertia	Without brake	J_m	kgcm²	0.42		
		With brake	J_m	kgcm²	0.42		
Stator (at 20°C)	Resistance (phase/phase)		Ω	4.3			
	Inductance (phase/phase)		mH	9			
	Electrical time constant		ms	2.1			
Holding brake (depending on model)				See page 2/102			

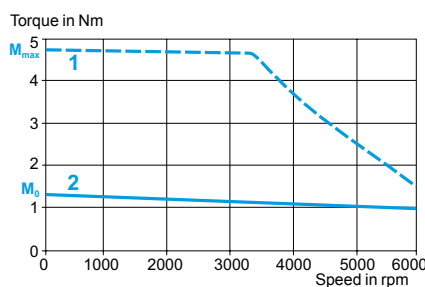
Torque/speed curves

BRH 0574P servo motor

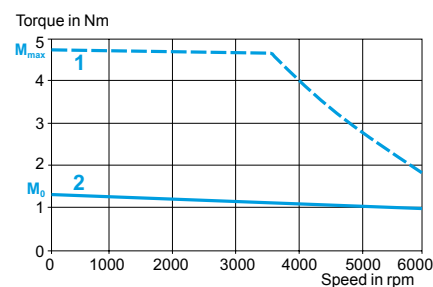
With LXM 05●D17F1 servo drive
115 V single-phase



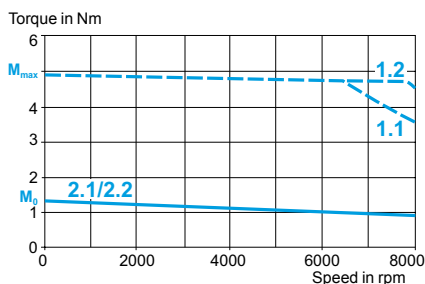
With LXM 05●D17M2 servo drive
230 V single-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D22N4 servo drive
400/480 V 3-phase



1 Peak torque
2 Continuous torque

1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BRH 0851M servo motors

Type of servo motor		BRH 0851M		
Associated with Lexium 05 servo drive		LXM 05 ●D10M2	LXM 05 ●D17M3X	LXM 05 ●D14N4
Line supply voltage	V	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	8		
Torque	Continuous stall	M_0	Nm	1.86
	Peak stall	M_{max}	Nm	3.4
Nominal operating point	Nominal torque	Nm	1.66	5.27
	Nominal speed	rpm	3000	4.05
	Nominal servo motor output power	W	520	1.45
Maximum current	A rms	6	11	7.5

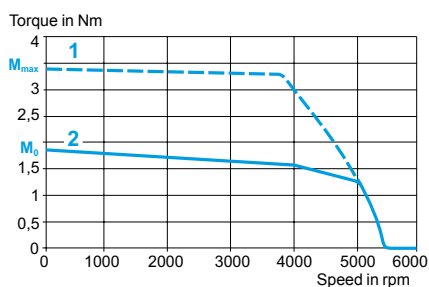
Servo motor characteristics

Maximum mechanical speed	rpm	6000
Constants (at 120°C)	Torque	Nm/A rms
	Back emf	V rms/krpm
Rotor	Number of poles	10
	Inertia Without brake	J_m
	Inertia With brake	J_m
Stator (at 20°C)	Resistance (phase/phase)	Ω
	Inductance (phase/phase)	mH
	Electrical time constant	ms
Holding brake (depending on model)		See page 2/102

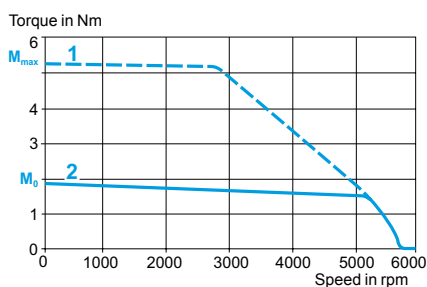
Torque/speed curves

BRH 0851M servo motor

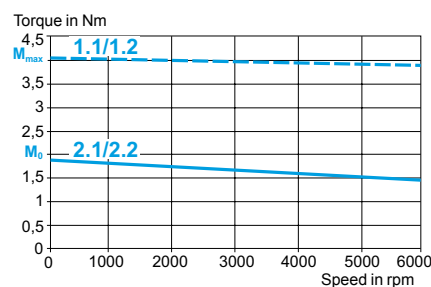
With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D14N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BRH 0851P servo motors

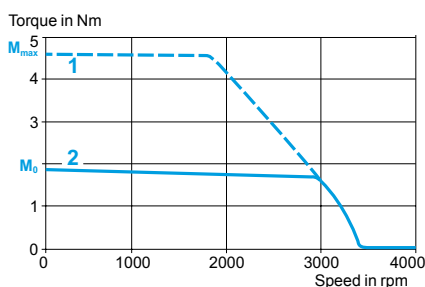
Type of servo motor		BRH 0851P			
Associated with Lexium 05 servo drive		LXM 05 ●D17F1	LXM 05 ●D17M2	LXM 05 ●D17M3X	LXM 05 ●D22N4
Line supply voltage	V	115 single-phase	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	8			
Torque	Continuous stall M_0	Nm	1.86		
	Peak stall M_{max}	Nm	4.61		5.34
Nominal operating point	Nominal torque	Nm	1.76	1.55	1.45
	Nominal speed	rpm	1500	4500	6000
	Nominal servo motor output power	W	280	730	910
Maximum current	A rms	11			14

Servo motor characteristics			
Maximum mechanical speed	rpm	6000	
Constants (at 120°C)	Torque	Nm/A rms	0.48
	Back emf	V rms/krpm	30.5
Rotor	Number of poles		10
	Inertia Without brake J_m	kgcm ²	1.06
	With brake J_m	kgcm ²	1.59
Stator (at 20°C)	Resistance (phase/phase)	Ω	2.1
	Inductance (phase/phase)	mH	8
	Electrical time constant	ms	3.8
Holding brake (depending on model)		See page 2/102	

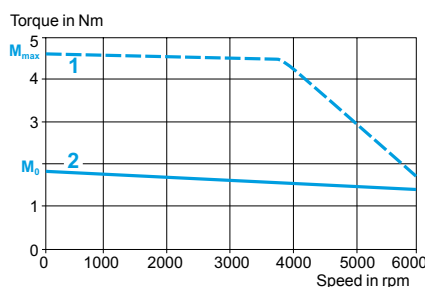
Torque/speed curves

BRH 0851P servo motor

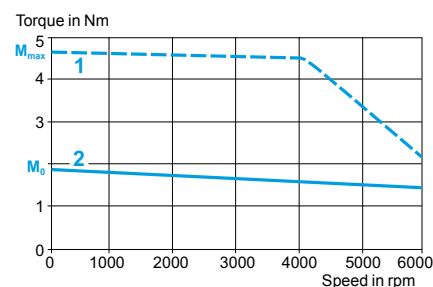
With LXM 05●D17F1 servo drive
115 V single-phase



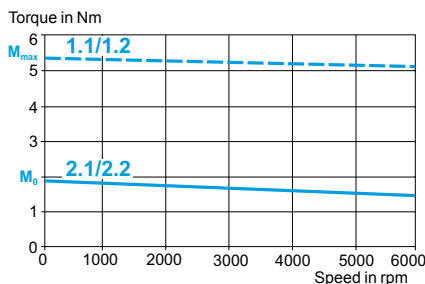
With LXM 05●D17M2 servo drive
230 V single-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D22N4 servo drive
400/480 V 3-phase



1 Peak torque
2 Continuous torque

1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BRH 0852M servo motors

Type of servo motor		BRH 0852M		
Associated with Lexium 05 servo drive		LXM 05 ●D17M2	LXM 05 ●D17M3X	LXM 05 ●D22N4
Line supply voltage	V	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	8		
Torque	Continuous stall	M_0	Nm	3.1
	Peak stall	M_{max}	Nm	7.81
Nominal operating point	Nominal torque	Nm	2.45	9.51
	Nominal speed	rpm	3000	1.8
	Nominal servo motor output power	W	770	6000
Maximum current	A rms	11	14	

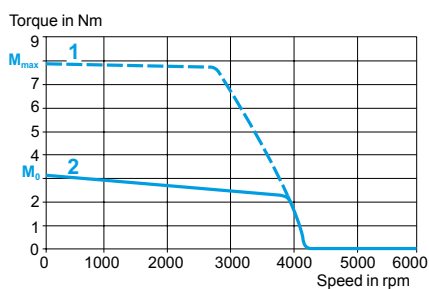
Servo motor characteristics

Maximum mechanical speed				rpm	6000
Constants (at 120°C)	Torque			Nm/A rms	0.75
	Back emf			V rms/ krpm	49.2
Rotor	Number of poles				10
	Inertia	Without brake	J _m	kgcm²	2
		With brake	J _m	kgcm²	2.53
Stator (at 20°C)	Resistance (phase/phase)			Ω	2.5
	Inductance (phase/phase)			mH	9.5
	Electrical time constant			ms	3.8
Holding brake (depending on model)					See page 2/102

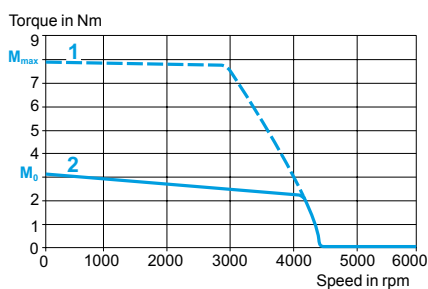
Torque/speed curves

BRH 0852M servo motor

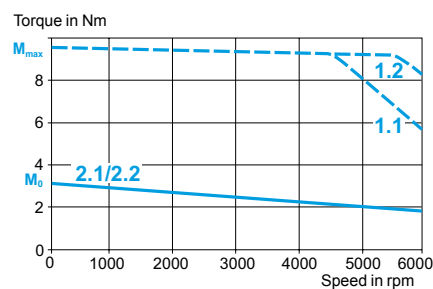
With LXM 05●D17M2 servo drive
230 V single-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D22N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

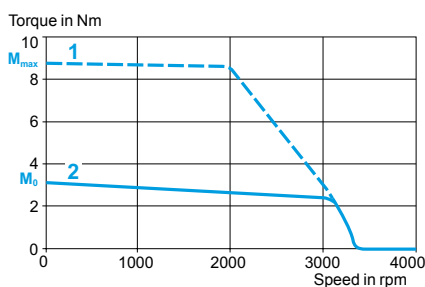
Characteristics of BRH 0852P servo motors

Type of servo motor			BRH 0852P			
Associated with Lexium 05 servo drive			LXM 05 ●D28F1	LXM 05 ●D28M2	LXM 05 ●D42M3X	LXM 05 ●D34N4
Line supply voltage		V	115 single-phase	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency		kHz	8			
Torque	Continuous stall	M_0	Nm	3.1		
	Peak stall	M_{max}	Nm	8.7	10.8	7.95
Nominal operating point	Nominal torque		Nm	2.78	2.13	1.8
	Nominal speed		rpm	1500	4500	6000
	Nominal servo motor output power		W	440	1000	1150
Maximum current		A rms	20		26.4	18
Servo motor characteristics						
Maximum mechanical speed		rpm	6000			
Constants (at 120°C)	Torque		Nm/A rms	0.47		
	Back emf		V rms/ krpm	30.7		
Rotor	Number of poles			10		
	Inertia	Without brake	J_m	kgcm²	2	
		With brake	J_m	kgcm²	2.53	
Stator (at 20°C)	Resistance (phase/phase)		Ω	1		
	Inductance (phase/phase)		mH	3.7		
	Electrical time constant		ms	3.7		
Holding brake (depending on model)			See page 2/102			

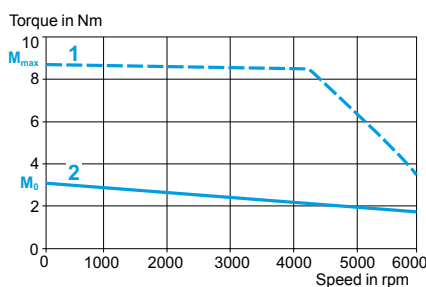
Torque/speed curves

BRH 0852P servo motor

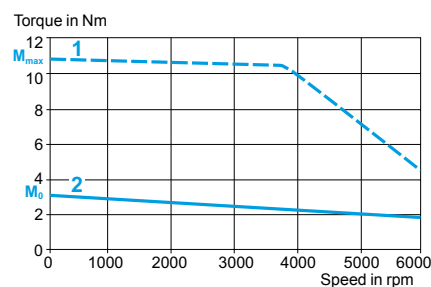
With LXM 05●D28F1 servo drive
115 V single-phase



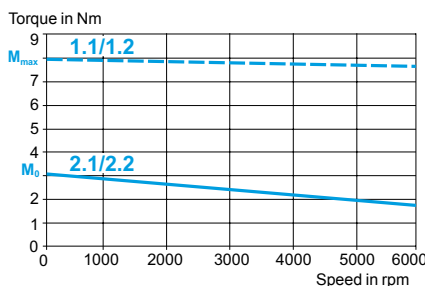
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



With LXM 05●D34N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BRH 0853M servo motors

Type of servo motor		BRH 0853M		
Associated with Lexium 05 servo drive		LXM 05 ●D28M2	LXM 05 ●D17M3X	LXM 05 ●D34N4
Line supply voltage	V	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	8		
Torque	Continuous stall	M_0	Nm	4.2
	Peak stall	M_{max}	Nm	13
Nominal operating point	Nominal torque	Nm	3.1	7.73
	Nominal speed	rpm	3000	12
	Nominal servo motor output power	W	970	2
Maximum current	A rms	20	11	18

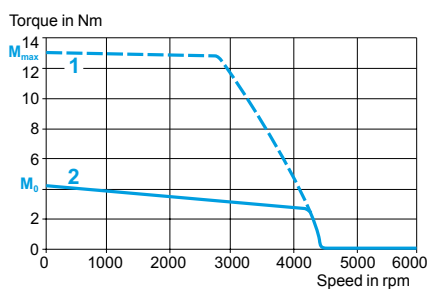
Servo motor characteristics

Maximum mechanical speed		rpm	6000
Constants (at 120°C)	Torque	Nm/A rms	0.72
	Back emf	V rms/krpm	46.8
Rotor	Number of poles		10
	Inertia Without brake	J_m	kgcm ²
	Inertia With brake	J_m	kgcm ²
Stator (at 20°C)	Resistance (phase/phase)	Ω	1.4
	Inductance (phase/phase)	mH	5.5
	Electrical time constant	ms	4.1
Holding brake (depending on model)			See page 2/102

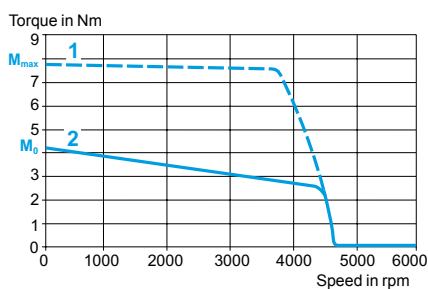
Torque/speed curves

BRH 0853M servo motor

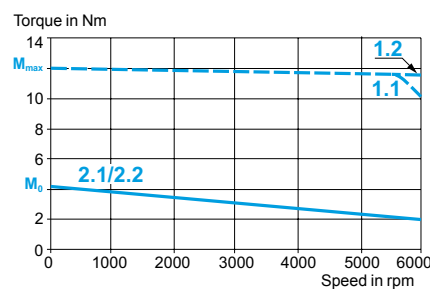
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D34N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BRH 0853P servo motors

Type of servo motor		BRH 0853P		
Associated with Lexium 05 servo drive		LXM 05 ●D28F1	LXM 05 ●D28M2	LXM 05 ●D42M3X
Line supply voltage	V	115 single-phase	230 single-phase	230 3-phase
Switching frequency	kHz	8		
Torque	Continuous stall M_0	Nm	4.2	
	Peak stall M_{max}	Nm	9.7	13.6
Nominal operating point	Nominal torque	Nm	3.65	2.55
	Nominal speed	rpm	1500	4500
	Nominal servo motor output power	W	570	1200
Maximum current	A rms	20		
				30

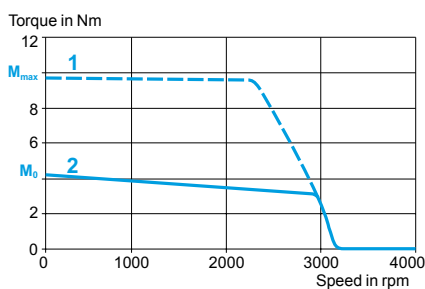
Servo motor characteristics

Maximum mechanical speed		rpm	6000
Constants (at 120°C)	Torque	Nm/A rms	0.51
	Back emf	V rms/krpm	33
Rotor	Number of poles		10
	Inertia Without brake J_m	kgcm ²	2.96
	With brake J_m	kgcm ²	3.49
Stator (at 20°C)	Resistance (phase/phase)	Ω	0.7
	Inductance (phase/phase)	mH	2.7
	Electrical time constant	ms	4
Holding brake (depending on model)			See page 2/102

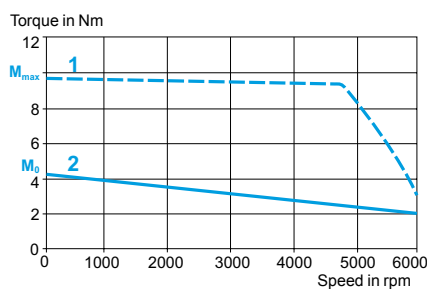
Torque/speed curves

BRH 0853P servo motor

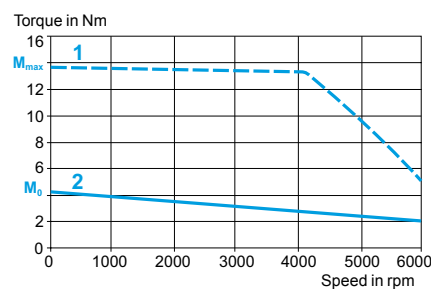
With LXM 05●D28F1 servo drive
115 V single-phase



With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



- 1 Peak torque
- 2 Continuous torque

Characteristics of BRH 0854M servo motors

Type of servo motor		BRH 0854M		
Associated with Lexium 05 servo drive		LXM 05 ●D28M2	LXM 05 ●D17M3X	LXM 05 ●D34N4
Line supply voltage	V	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	8		
Torque	Continuous stall	M_0	Nm	5.3
	Peak stall	M_{max}	Nm	15.8
Nominal operating point	Nominal torque		9.2	14.5
	Nominal speed		3000	6000
	Nominal servo motor output power		1250	1400
Maximum current	A rms	20	11	18

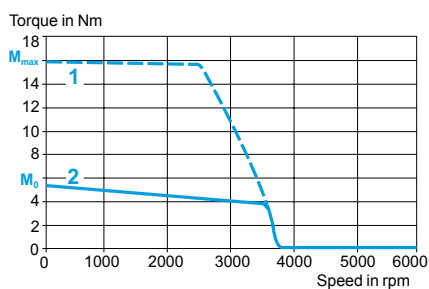
Servo motor characteristics

Maximum mechanical speed				rpm	6000
Constants (at 120°C)	Torque			Nm/A rms	0.86
	Back emf			V rms/ krpm	55.3
Rotor	Number of poles				10
	Inertia	Without brake	J _m	kgcm²	3.9
		With brake	J _m	kgcm²	4.44
Stator (at 20°C)	Resistance (phase/phase)			Ω	1.4
	Inductance (phase/phase)			mH	5.7
	Electrical time constant			ms	4.2
Holding brake (depending on model)					See page 2/102

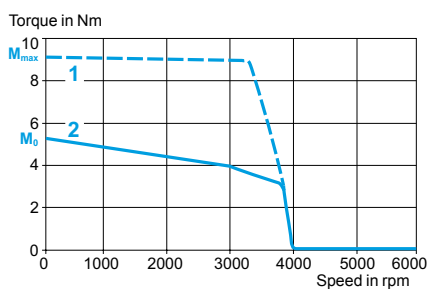
Torque/speed curves

BRH 0854M servo motor

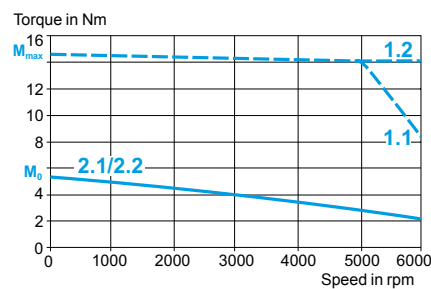
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D34N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

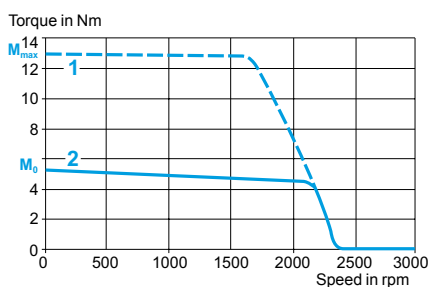
Characteristics of BRH 0854P servo motors

Type of servo motor			BRH 0854P			
Associated with Lexium 05 servo drive			LXM 05 ●D28F1	LXM 05 ●D28M2	LXM 05 ●D42M3X	LXM 05 ●D22N4
Line supply voltage		V	115 single-phase	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency		kHz	8			
Torque	Continuous stall	M_0	Nm	5.3		4.8
	Peak stall	M_{max}	Nm	13		18.3
Nominal operating point	Nominal torque		Nm	4.71	4	2.2
	Nominal speed		rpm	1500	3000	6000
	Nominal servo motor output power		W	740	1250	1400
Maximum current		A rms	20		30	14
Servo motor characteristics						
Maximum mechanical speed			rpm	6000		
Constants (at 120°C)	Torque		Nm/A rms	0.68		
	Back emf		V rms/ krpm	44		
Rotor	Number of poles			10		
	Inertia	Without brake	J_m	kgcm²	3.9	
		With brake	J_m	kgcm²	4.44	
Stator (at 20°C)	Resistance (phase/phase)		Ω	0.9		
	Inductance (phase/phase)		mH	3.6		
	Electrical time constant		ms	4.2		
Holding brake (depending on model)			See page 2/102			

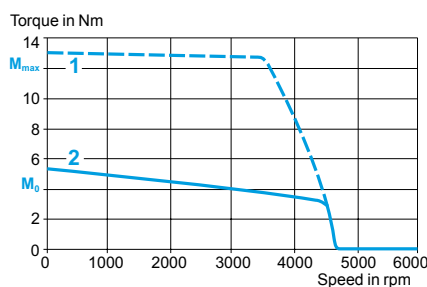
Torque/speed curves

BRH 0854P servo motor

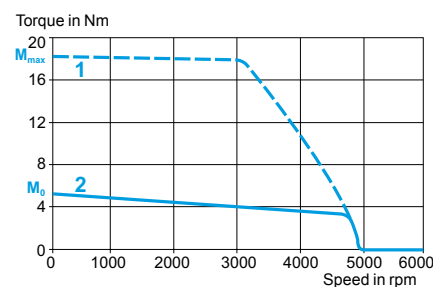
With LXM 05●D28F1 servo drive
115 V single-phase



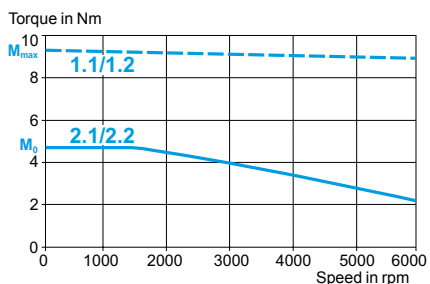
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



With LXM 05●D22N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BRH 1101P servo motors

Type of servo motor		BRH 1101P		
Associated with Lexium 05 servo drive		LXM 05 ●D28M2	LXM 05 ●D42M3X	LXM 05 ●D34N4
Line supply voltage	V	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	8		
Torque	Continuous stall	M_0	Nm	5.2
	Peak stall	M_{max}	Nm	14
Nominal operating point	Nominal torque		Nm	4.5
	Nominal speed		rpm	3000
	Nominal servo motor output power		W	1400
Maximum current	A rms	20	30	18

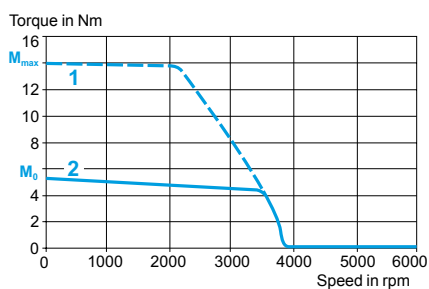
Servo motor characteristics

Maximum mechanical speed		rpm	6000
Constants (at 120°C)	Torque	Nm/A rms	0.83
	Back emf	V rms/krpm	54.2
Rotor	Number of poles		10
	Inertia Without brake	J_m	kgcm ²
	With brake	J_m	kgcm ²
Stator (at 20°C)	Resistance (phase/phase)	Ω	1.2
	Inductance (phase/phase)	mH	8.1
	Electrical time constant	ms	6.5
Holding brake (depending on model)			See page 2/102

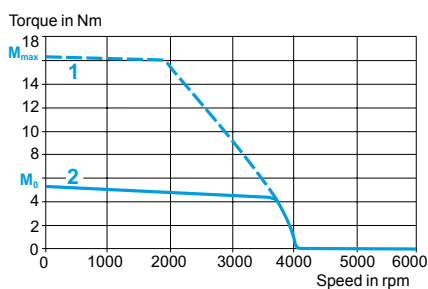
Torque/speed curves

BRH 1101P servo motor

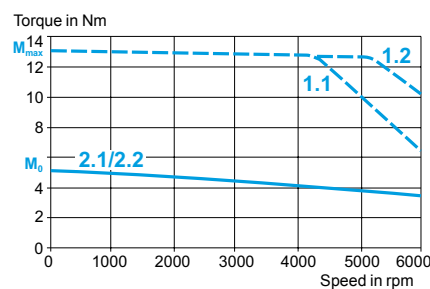
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



With LXM 05●D34N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

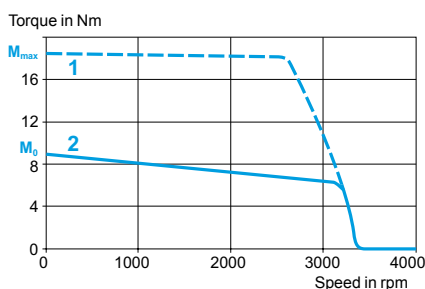
Characteristics of BRH 1102P servo motors

Type of servo motor				BRH 1102P			
Associated with Lexium 05 servo drive				LXM 05 ●D28M2		LXM 05 ●D42M3X	LXM 05 ●D34N4
Line supply voltage				V	230 single-phase	230 3-phase	400/480 3-phase
Switching frequency				kHz	8		
Torque	Continuous stall		M_o	Nm	9		
	Peak stall		M_{max}	Nm	18.4	26	16.7
Nominal operating point	Nominal torque			Nm	7.83		4.58
	Nominal speed			rpm	1500		4500
	Nominal servo motor output power			W	1250		2150
Maximum current				A rms	20	30	18
Servo motor characteristics							
Maximum mechanical speed				rpm	6000		
Constants (at 120°C)	Torque			Nm/A rms	0.96		
	Back emf			V rms/ krpm	62.1		
Rotor	Number of poles				10		
	Inertia	Without brake	J_m	kgcm²	8.8		
		With brake	J_m	kgcm²	10.1		
Stator (at 20°C)	Resistance (phase/phase)			Ω	0.7		
	Inductance (phase/phase)			mH	4.9		
	Electrical time constant			ms	7.1		
Holding brake (depending on model)					See page 2/102		

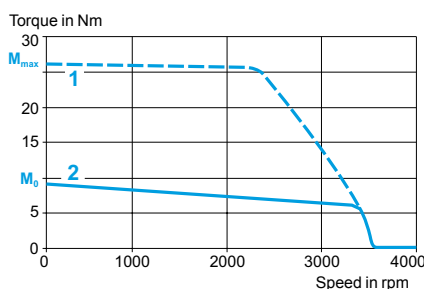
Torque/speed curves

BRH 1102P servo motor

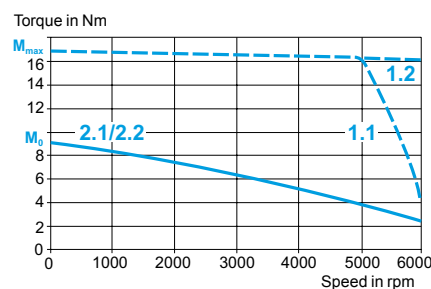
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



With LXM 05●D34N4 servo drive
400/480 V 3-phase



- 1 Peak torque
- 2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
- 2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
- 2.2 Continuous torque at 480 V, 3-phase

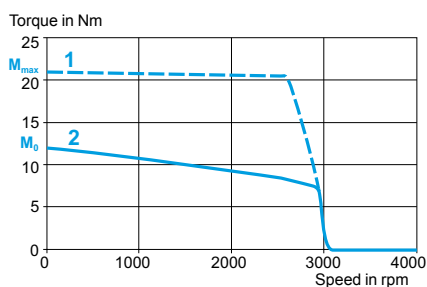
Characteristics of BRH 1103P servo motors

Type of servo motor		BRH 1103P			
Associated with Lexium 05 servo drive		LXM 05 ●D28M2	LXM 05 ●D42M3X	LXM 05 ●D34N4	LXM 05 ●D57N4
Line supply voltage	V	230 single-phase	230 3-phase	400/480 3-phase	
Switching frequency	kHz	8			
Torque	Continuous stall	M_0	Nm	12	
	Peak stall	M_{max}	Nm	21	30.3
Nominal operating point	Nominal torque	Nm	10	7.5	30.3
	Nominal speed	rpm	1500	3000	
	Nominal servo motor output power	W	1550	2360	
Maximum current	A rms	20	30	18	30
Servo motor characteristics					
Maximum mechanical speed	rpm	4500			
Constants (at 120°C)	Torque	Nm/A rms	1.06		
	Back emf	V rms/krpm	68.5		
Rotor	Number of poles		10		
	Inertia Without brake	J_m	kgcm ²	13.1	
	With brake	J_m	kgcm ²	14.4	
Stator (at 20°C)	Resistance (phase/phase)	Ω	0.5		
	Inductance (phase/phase)	mH	3.9		
	Electrical time constant	ms	7.2		
Holding brake (depending on model)			See page 2/102		

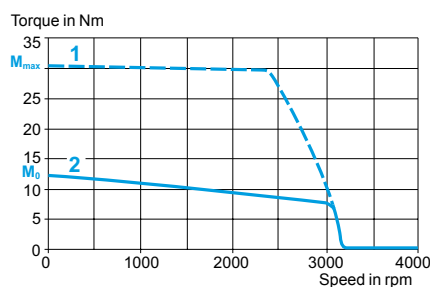
Torque/speed curves

BRH 1103P servo motor

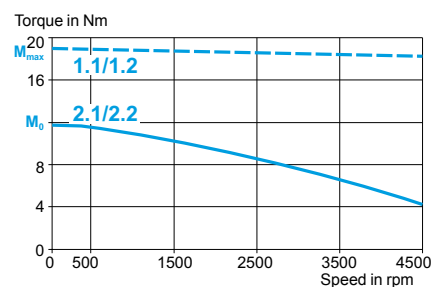
With LXM 05●D28M2 servo drive
230 V single-phase



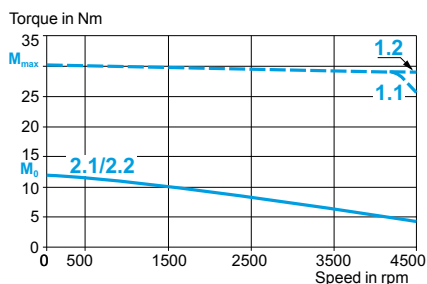
With LXM 05●D42M3X servo drive
230 V 3-phase



With LXM 05●D34N4 servo drive
400/480 V 3-phase



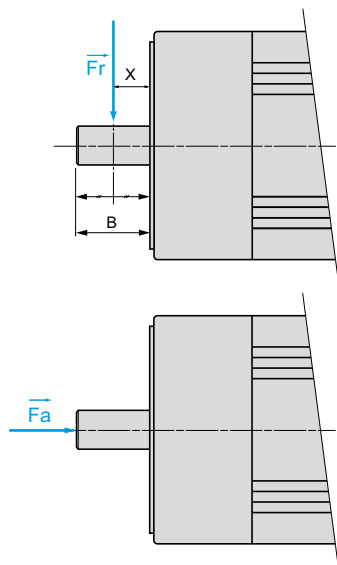
With LXM 05●D57N4 servo drive
400/480 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase



Radial and axial forces permitted on the motor shaft

Even when the servo motors are used under optimum conditions, their service life is limited by that of the bearings.

Conditions

Nominal service life of bearings (1)	$L_{10h} = 20,000$ hours
Ambient temperature (bearing temperature $\sim 100^{\circ}\text{C}$)	40°C
Force application point	F_r applied at the middle of the shaft end $X = B/2$ (dimension B, see page 2/100)

(1) Hours of use with a failure probability of 10%



The following conditions must be adhered to:

- Radial and axial forces must not be applied simultaneously
- Shaft end with IP 41 or IP 56 degree of protection
- The bearings cannot be changed by the user as the built-in position sensor must be realigned if the unit is dismantled.

Mechanical speed		rpm	Maximum radial force F_r					
			1000	2000	3000	4000	5000	6000
Servo motor	BRH 0571	N	109	81	76	74	73	72
	BRH 0572	N	130	96	91	89	87	86
	BRH 0573	N	143	106	100	98	96	94
	BRH 0574	N	152	112	106	103	101	100
	BRH 0851	N	226	193	187	181	176	173
	BRH 0852	N	265	226	219	213	207	203
	BRH 0853	N	287	244	237	230	223	220
	BRH 0854	N	300	256	248	241	234	230
	BRH 1101	N	729	709	697	688	655	629
	BRH 1102	N	848	824	811	800	762	731
	BRH 1103	N	908	883	869	857	–	–
Maximum axial force: $F_a = 0.2 \times F_r$								

Characteristics of servo motor/servo drive power connection cables

Cables fitted with a connector on servo motor side

Type of cable		VW3 M5 101 R●●●
Outer cover, insulation		PUR (RAL 2003 orange), TPM or PP/PE
Capacity	pF/m	< 70 (conductors/shielding)
Number of conductors (shielded)		[(4 x 1.5 mm ²) + (2 x 1 mm ²)]
Connector type		1 M23 industrial connector (servo motor side) and 1 free wire end (servo drive side)
External diameter	mm	12 ± 0.2
Curvature radius	mm	90, suitable for daisy-chain, cable-carrier chain
Operating voltage	V	600
Maximum length	m	75 (1)
Operating temperature	°C	- 40...+ 90 (fixed), - 20...+ 80 (mobile)
Certifications		UL, CSA, VDE, CE, DESINA

Cables without connectors

Cable type		VW3 M5 301 R●●●●
Outer cover, insulation		PUR (RAL 2003 orange), TPM or PP/PE
Capacity	pF/m	< 70 (conductors/shielding)
Number of conductors (shielded)		[(4 x 1.5 mm ²) + (2 x 1 mm ²)]
Connector type		None, see page 2/99
External diameter	mm	12 ± 0.2
Curvature radius	mm	90, suitable for daisy-chain, cable-carrier chain
Operating voltage	V	600
Maximum length	m	100
Operating temperature	°C	- 40...+ 90 (fixed), - 20...+ 80 (mobile)
Certifications		UL, CSA, VDE, CE, DESINA

(1) For cables longer than 75 m, please consult your Regional Sales Office.

Characteristics of the servo motor/servo drive control connection cables		
Cables fitted with a connector at both ends (servo motor and servo drive)		
Type of cable		VW3 M8 101 R●●●
Type of encoder		SinCos encoder
Outer cover, insulation		PUR (RAL 6018 green), polyester
Number of conductors (shielded)		[5 x (2 x 0.25 mm ²) + (2 x 0.5 mm ²)]
External diameter	mm	8.8 ± 0.2
Connector type		1 M23 industrial connector (servo motor side) and one 12-way female Molex connector (servo drive side)
Min. curvature radius	mm	68, suitable for daisy-chain, cable-carrier chain
Operating voltage	V	350 (0.25 mm ²), 500 (0.5 mm ²)
Maximum length	m	75 (1)
Operating temperature	°C	- 50... + 90 (fixed), - 40... + 80 (mobile)
Certifications		UL, CSA, VDE, CE, DESINA
Cables without connectors		
Cable type		VW3 M8 221 R●●●●
Type of encoder		SinCos encoder
Outer cover, insulation		PUR (RAL 6018 green), polyester
Number of conductors (shielded)		[5 x (2 x 0.25 mm ²) + (2 x 0.5 mm ²)]
External diameter	mm	8.8 ± 0.2
Connector type		None, see page 2/99
Min. curvature radius	mm	68, suitable for daisy-chain, cable-carrier chain
Operating voltage	V	350 (0.25 mm ²), 500 (0.5 mm ²)
Maximum length	m	100
Operating temperature	°C	- 50... + 90 (fixed), - 40... + 80 (mobile)
Certifications		UL, CSA, VDE, CE, DESINA

(1) For cables longer than 75 m, please consult your Regional Sales Office.

108025



BRH 057... A1A

108024



BRH 057... A2A

108108



BRH 085... A2A

BRH servo motors

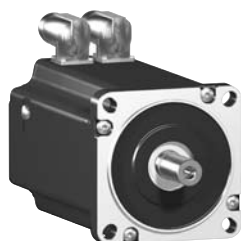
The BRH servo motors shown below are supplied without a gearbox.
For GBX gearboxes see page 2/107.

Continuous stall torque	Peak stall torque	Nominal servo motor output power	Nominal speed	Maximum mechanical speed	Associated LXM 05 servo drive	Reference ⁽¹⁾	Weight ⁽²⁾		
Nm	Nm	W	rpm	rpm			kg		
0.46	0.88	260	6000	8000	CU70M2	BRH 0571T ●●●●A	1.100		
	1.15	135	3000	8000	●D10F1				
		260	6000	8000	●D10M2				
		260	6000	8000	●D10M3X				
	1.26	135	3000	8000	CU70M2	BRH 0571P ●●●●A	1.100		
	1.39	260	6000	8000	●D14N4				
0.76	1.55	220	3000	8000	CU70M2	BRH 0572P ●●●●A	1.400		
	2.07	120	1500	8000	●D10F1				
		220	3000	8000	●D10M2				
		400	6000	8000	●D10M3X				
	2.46	400	6000	8000	●D14N4				
1.05	2.43	430	4500	8000	●D10M2	BRH 0573P ●●●●A	1.700		
		430	4500	8000	●D10M3X				
	3	550	6000	8000	●D14N4				
	3.9	160	1500	8000	●D17F1				
1.3	4.73	190	1500	8000	●D17F1	BRH 0574P ●●●●A	2.000		
		510	4500	8000	●D17M2				
		510	4500	8000	●D17M3X				
	4.9	630	6000	8000	●D22N4				
1.86	3.4	520	3000	6000	●D10M2	BRH 0851M ●●●●A	2.200		
	4.05	910	6000	6000	●D14N4				
	4.61	280	1500	6000	●D17F1	BRH 0851P ●●●●A	2.200		
		730	4500	6000	●D17M2				
		730	4500	6000	●D17M3X				
	5.27	520	3000	6000	●D17M3X	BRH 0851M ●●●●A	2.200		
5.34	910	6000	6000	●D22N4	BRH 0851P ●●●●A	2.200			
3.1	7.81	770	3000	6000	●D17M2	BRH 0852M ●●●●A	3.300		
		770	3000	6000	●D17M3X				
	7.95	1150	6000	6000	●D34N4	BRH 0852P ●●●●A	3.300		
	8.7	440	1500	6000	●D28F1				
		1000	4500	6000	●D28M2				
	9.51	1150	6000	6000	●D22N4	BRH 0852M ●●●●A	3.300		
	10.8	1000	4500	6000	●D42M3X	BRH 0852P ●●●●A	3.300		
4.2	7.73	970	3000	6000	●D17M3X	BRH 0853M ●●●●A	4.400		
	9.7	570	1500	6000	●D28F1	BRH 0853P ●●●●A	4.400		
		1200	4500	6000	●D28M2				
	12	1250	6000	6000	●D34N4	BRH 0853M ●●●●A	4.400		
	13	970	3000	6000	●D28M2				
	13.6	1250	6000	6000	●D42M3X			BRH 0853P ●●●●A	4.400
4.8	9.3	1400	6000	6000	●D22N4	BRH 0854P ●●●●A	6.100		
5.2	13	1900	4500	6000	●D34N4	BRH 1101P ●●●●A	4.900		
	14	1400	3000	6000	●D28M2				
	16.2	1400	3000	6000	●D42M3X				
5.3	9.2	1250	3000	6000	●D17M3X	BRH 0854M ●●●●A	6.100		
	13	740	1500	6000	●D28F1	BRH 0854P ●●●●A	6.100		
		1250	3000	6000	●D28M2				
	14.5	1400	6000	6000	●D34N4	BRH 0854M ●●●●A	6.100		
	15.8	1250	3000	6000	●D28M2				
	18.3	1450	4000	6000	●D42M3X			BRH 0854P ●●●●A	6.100

(1) To complete each reference see the table on page 2/97.

(2) Weight of servo motor without brake, no packaging. To obtain the weight of the servo motor with holding brake, see page 2/102.

BRH servo motors (continued)



BRH 110●● ●●A2A

Continuous stall torque	Peak stall torque	Nominal servo motor output power	Nominal speed	Maximum mechanical speed	Associated LXM 05 servo drive	Reference (1)	Weight (2)
Nm	Nm	W	rpm	rpm			kg
9	16.7	2150	4500	6000	●D34N4	BRH 1102P ●●●●A	7.700
	18.4	1250	1500	6000	●D28M2		
	26	1250	1500	6000	●D42M3X		
12	18.9	2360	3000	4500	●D34N4	BRH 1103P ●●●●A	10.500
	21	1550	1500	4500	●D28M2		
	30.3	1550	1500	4500	●D42M3X		
		2360	3000	4500	●D57N4		

To order a BRH servo motor, complete each reference above with:

BRH 0571P			●	●	●	●	A
Shaft end	IP 41	Untapped	0				
		Keyed	1				
	IP 56	Untapped	2				
		Keyed	3				
Integrated sensor	Single turn, SinCos Hiperface® 16,384 points/turn (3)			0			
	Single turn, SinCos Hiperface® 131,072 points/turn (3)			1			
	Multiturn, SinCos Hiperface® 131,072 points/turn x 4096 turns (3)			2			
Holding brake	Without				A		
	With				F		
Connections	Straight connectors					1	
	Rotatable right-angled connectors					2	
Flange	International standard						A

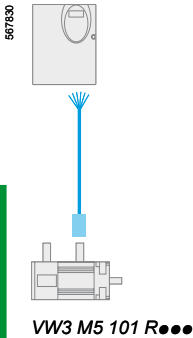
Note: The example above is for a **BRH 0571P** servo motor. Replace **BRH 0571P** by the relevant reference for other servo motors.

(1) To complete each reference see the table above.

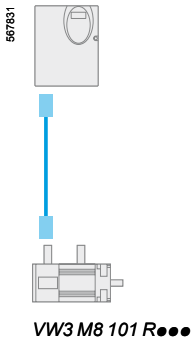
(2) Weight of servo motor without brake, no packaging. To obtain the weight of the servo motor with holding brake, see page 2/102.

(3) Sensor resolution given for use with a Lexium 05 servo drive.

2

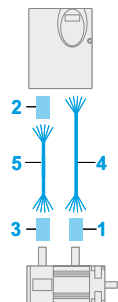


Connection elements						
Power cordsets						
Description	From servo motor	To servo drive	Composition	Length	Reference	Weight
				m		kg
Cables equipped with one M23 industrial connector (servo motor side)	BRH ●●●●●	LXM 05●●●●●●●●, depending on combinations, see pages 2/78 to 2/92	[(4 x 1.5 mm²) + (2 x 1 mm²)]	3	VW3 M5 101 R30	0.810
				5	VW3 M5 101 R50	1.210
				10	VW3 M5 101 R100	2.290
				15	VW3 M5 101 R150	3.400
				20	VW3 M5 101 R200	4.510
				25	VW3 M5 101 R250	6.200
				50	VW3 M5 101 R500	12.325
				75	VW3 M5 101 R750	18.450



Control cordsets						
Description	From servo motor	To servo drive	Composition	Length	Reference	Weight
				m		kg
SinCos Hiperface® encoder cables equipped with one M23 industrial connector (servo motor side) and one 12-way female Molex connector (servo drive side)	BRH ●●●●●	LXM 05●●●●●●●●	[5 x (2 x 0.25 mm²) + (2 x 0.5 mm²)]	3	VW3 M8 101 R30	0.800
				5	VW3 M8 101 R50	1.200
				10	VW3 M8 101 R100	2.250
				15	VW3 M8 101 R150	3.450
				20	VW3 M8 101 R200	4.350
				25	VW3 M8 101 R250	4.950
				50	VW3 M8 101 R500	13.300
				75	VW3 M8 101 R750	17.650

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Connection elements (continued)

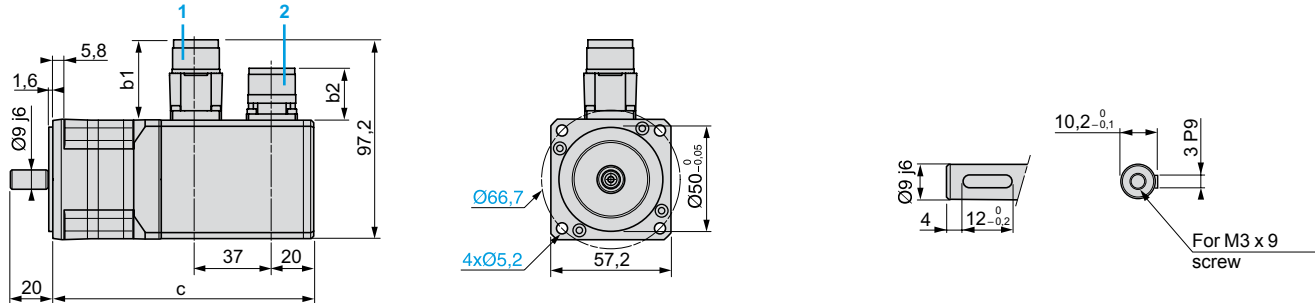
Connection accessories for creating power and control cordsets

Description	Used for	Ref.	For cable of cross-section	Reference	Weight
			mm ²		kg
M23 industrial connector for creating power cordsets (sold in lots of 5)	BRH servo motors ●●●●●	1	1.5	VW3 M8 215	0.350
12-way female Molex connector for creating control cordsets (sold in lots of 5)	LXM 05 servo drives ●●●●●●● (CN2 connector)	2	—	VW3 M8 213	—
M23 industrial connector for creating control cordsets (sold in lots of 5)	BRH servo motors ●●●●●	3	—	VW3 M8 214	—

Description	From servo motor	To servo drive	Composition	Ref.	Length	Reference	Weight
					m		kg
Cables for creating power cordsets	BRH ●●●●●	LXM 05●●●●●●●, depending on combinations, see pages 2/78 to 2/92	[(4 x 1.5 mm ²) + (2 x 1 mm ²)]	4	25	VW3 M5 301 R250	5.550
					50	VW3 M5 301 R500	11.100
					100	VW3 M5 301 R1000	22.200
Cables for creating control cordsets for SinCos Hiperface® encoders	BRH ●●●●●	LXM 05●●●●●●●	[5 x (2 x 0.25 mm ²) + (2 x 0.5 mm ²)]	5	25	VW3 M8 221 R250	5.250
					50	VW3 M8 221 R500	10.500
					100	VW3 M8 221 R1000	21.000

BRH 057 (example with straight connectors: servo motor/brake power supply 1 and encoder 2)

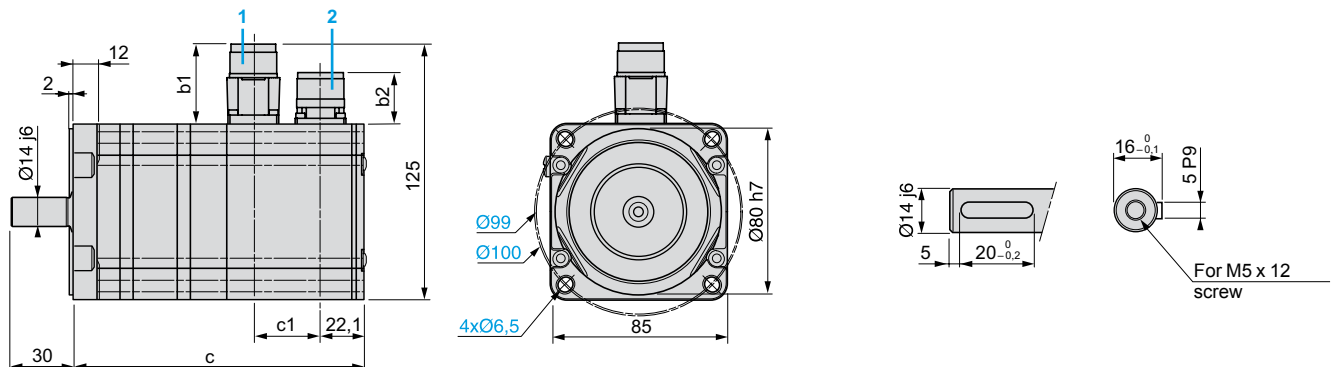
Keyed shaft end (optional)



	Straight connectors		Angled connectors		c (without brake)	c (with brake)
	b1	b2	b1	b2		
BRH 0571	39.4	22.3	39.4	39.4	124.6	124.6
BRH 0572	39.4	22.3	39.4	39.4	143.1	143.1
BRH 0573	39.4	22.3	39.4	39.4	161.6	161.6
BRH 0574	39.4	22.3	39.4	39.4	180.1	180.1

BRH 085 (example with straight connectors: servo motor/brake power supply 1 and encoder 2)

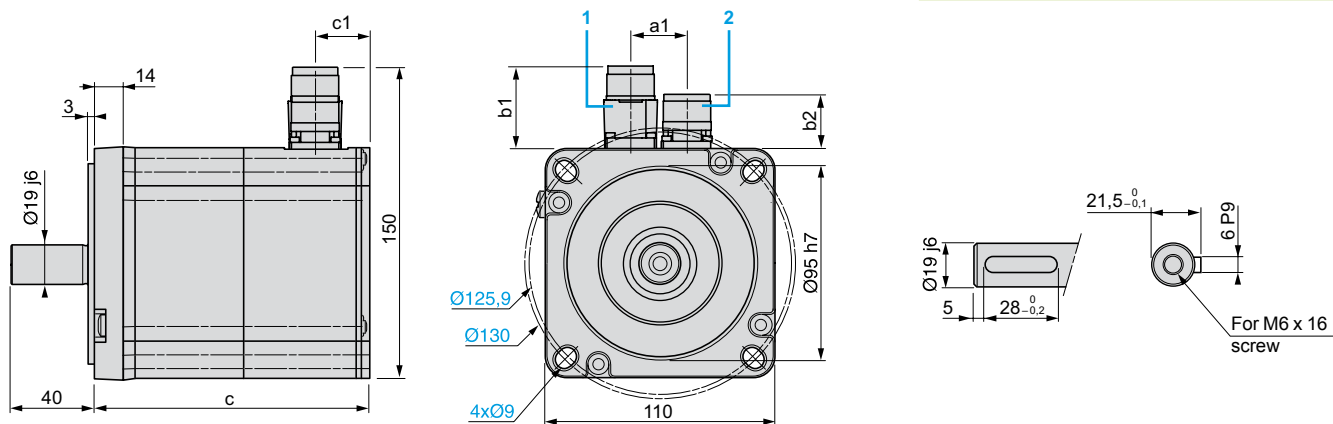
Keyed shaft end (optional)



	Straight connectors		Angled connectors		c (without brake)	c (with brake)	c1 (without brake)	c1 (with brake)
	b1	b2	b1	b2				
BRH 0851	38.9	21.8	38.9	38.9	140.4	162.1	30	31
BRH 0852	38.9	21.8	38.9	38.9	170.4	192.1	30	31
BRH 0853	38.9	21.8	38.9	38.9	200.4	222.1	30	31
BRH 0854	38.9	21.8	38.9	38.9	230.4	252.1	30	31

BRH 110 (example with straight connectors: servo motor/brake power supply 1 and encoder 2)

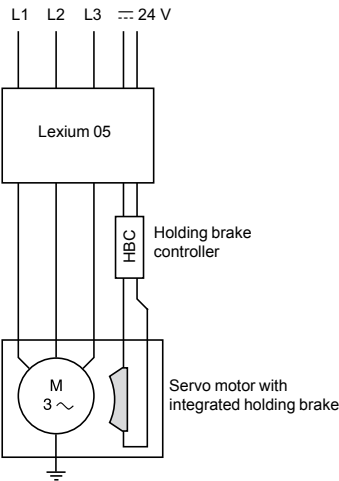
Keyed shaft end (optional)



			Straight connectors		Angled connectors					
	a1 (without brake)	a1 (with brake)	b1	b2	b1	b2	c (without brake)	c (with brake)	c1 (without brake)	c1 (with brake)
BRH 1101	31	30.5	38.9	21.8	38.9	38.9	132.1	198.1	25.6	28.6
BRH 1102	31	30.5	38.9	21.8	38.9	38.9	180.1	246.1	25.6	28.6
BRH 1103	31	30.5	38.9	21.8	38.9	38.9	228.1	294.1	25.6	28.6

Holding brake

Presentation



The holding brake integrated in the BRH servo motor is an electromagnetic pressure spring brake that blocks the servo motor axis once the output current has been switched off.
In the event of an emergency, such as a power outage or an emergency stop, the drive is immobilized, thus significantly increasing safety.
Blocking the servo motor axis is also necessary in cases of torque overload, such as in the event of vertical axis movement.

The holding brake is activated using the holding brake controller (HBC) **VW3 M3 103** (see page 2/43).

The HBC is an external device. It also ensures electrical isolation.

Characteristics

Type of servo motor	BRH	0571, 0572, 0573, 0574	0851, 0852, 0853, 0854	1101, 1102, 1103
Holding torque M_{Br}	Nm	2.2	8	15
Moment of inertia of rotor (brake only) J_{Br}	kgcm ²	0.09	0.53	1.3
Electrical clamping power P_{Br}	W	9	15	18
Nominal current	A	0.375	0.625	0.75
Supply voltage	V	24 +10/-10%		
Opening time	ms	30	50	80
Closing time	ms	15	25	
Weight (to be added to the weight of the servo motor without brake, see page 2/96)	kg	0.200	0.600	1.100

References

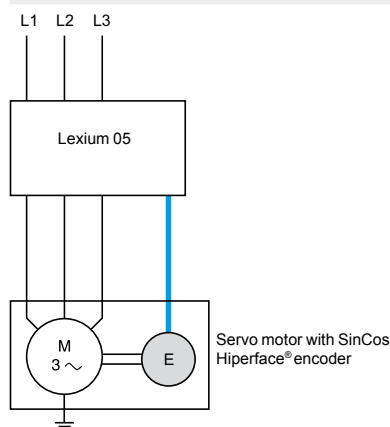


BRH servo motor

For selection of BRH servo motor with or without holding brake, see references on page 2/97.

Encoder integrated in BRH servo motor

Presentation



The standard measurement device is the SinCos Hiperface® single turn or multiturn encoder integrated in BRH servo motors. This measurement device is perfectly suited to the Lexium 05 range of servo drives.

Use of this interface enables:

- Automatic identification of BRH servo motor data by the servo drive
- Automatic initialization of the servo drive's control loops, thus simplifying installation of the motion control device

Characteristics

Type of encoder		Single turn SinCos		Multiturn SinCos
Sine periods per turn		16	128	
Number of points (1)		16,384	131,072	131,072 x 4096 turns
Encoder precision	arc min	± 4.8	± 1.3	
Measurement method		Optical, high resolution		
Interface		Hiperface®		
Operating temperature	°C	-5...+110		

(1) Encoder resolution given for use with a Lexium 05 servo drive.

References



BRH servo motor

For selection of the SinCos Hiperface® single turn or multiturn encoder integrated in the BRH servo motor, see references on page 2/97.

Presentation



GBX planetary gearbox

In many cases, motion control requires the use of planetary gearboxes to adapt speeds and torques, while continuing to provide the precision demanded by the application.

Schneider Electric has chosen to use GBX gearboxes (made by Neugart) with the BRH range of servo motors. These gearboxes are lubricated for life and are designed for applications which are not susceptible to mechanical backlash. The fact that their use in combination with BRH servo motors has been fully verified and that they are easily assembled, ensures simple, risk-free operation.

Available in 5 sizes (GBX 40...GBX 160), the planetary gearboxes are offered in 15 reduction ratios (3:1...100:1), see table below.

The continuous and peak standstill torques available at the gearbox output are obtained by multiplying the characteristic values of the servo motor by the reduction ratio and efficiency of the gearbox (0.96, 0.94 or 0.9 depending on the reduction ratio).

The table below shows the most suitable servo motor/gearbox combinations. For other combinations, refer to the servo motor data sheets.

BRH servo motor/GBX gearbox combinations

Reduction ratios from 3:1 to 16:1

Type of servo motor	Reduction ratio							
	3:1	4:1	5:1	8:1	9:1	12:1	15:1	16:1
BRH 0571	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40
BRH 0572	GBX 40	GBX 40	GBX 40	GBX 60	GBX 40	GBX 40	GBX 40	GBX 40
BRH 0573	GBX 40	GBX 40	GBX 40	GBX 60	GBX 40	GBX 40	GBX 60	GBX 60
BRH 0574	GBX 40	GBX 40	GBX 60	GBX 60	GBX 60	GBX 60	GBX 60	GBX 60
BRH 0851	GBX 60	GBX 60	GBX 60	GBX 80	GBX 60	GBX 60	GBX 60	GBX 60
BRH 0852	GBX 60	GBX 60	GBX 60	GBX 80	GBX 60	GBX 60	GBX 80	GBX 80
BRH 0853	GBX 60	GBX 60	GBX 80	GBX 80	GBX 60	GBX 80	GBX 80	GBX 80
BRH 0854	GBX 60	GBX 60	GBX 80	GBX 80	GBX 80	GBX 80	GBX 80	GBX 80
BRH 1101	GBX 80	GBX 80	GBX 80	GBX 120	GBX 80	GBX 80	GBX 80	GBX 80
BRH 1102	GBX 80	GBX 80	GBX 80	GBX 120	GBX 80	GBX 80	GBX 120	GBX 120
BRH 1103	GBX 80	GBX 80	GBX 80	GBX 120	GBX 80	GBX 80	GBX 120	GBX 120

Reduction ratios from 20:1 to 100:1

Type of servo motor	Reduction ratio						
	20:1	25:1	32:1	40:1	60:1	80:1	100:1
BRH 0571	GBX 40	GBX 40	GBX 60	GBX 60	GBX 60	(1)	(1)
BRH 0572	GBX 40	GBX 60	GBX 60	(1)	(1)	(1)	(1)
BRH 0573	GBX 60	GBX 60	GBX 60	(1)	(1)	(1)	(1)
BRH 0574	GBX 60	(1)	(1)	(1)	(1)	(1)	(1)
BRH 0851	GBX 60	GBX 80	GBX 80	GBX 80	GBX 120	GBX 120	GBX 120
BRH 0852	GBX 80	GBX 80	GBX 80	GBX 120	GBX 120	GBX 120	GBX 120
BRH 0853	GBX 80	GBX 80	GBX 120	GBX 120	GBX 120	—	—
BRH 0854	GBX 80	GBX 120	GBX 120	GBX 120	GBX 120	—	—
BRH 1101	GBX 80	GBX 120	GBX 120	GBX 160	GBX 120	—	—
BRH 1102	GBX 120	GBX 120	GBX 120	GBX 160	—	—	—
BRH 1103	GBX 120	GBX 160	GBX 120	GBX 160	—	—	—

(1) For this combination, please consult your Regional Sales Office.

GBX 60

For these combinations, you must check that the application will not exceed the maximum output torque of the gearbox (see the values given on page 2/106).

Characteristics of GBX gearboxes							
Type of gearbox			GBX 40	GBX 60	GBX 80	GBX 120	GBX 160
Type of gearbox			Planetary gearbox with straight teeth				
Backlash	3:1... 8:1	arc min	< 24	< 16	< 9	< 8	< 6
	9:1... 40:1		< 28	< 20	< 14	< 12	< 10
	60:1... 100:1		< 30	< 22	< 16	< 14	–
Torsion rigidity	3:1... 8:1	Nm/arc min	1	2.3	6	12	38
	9:1... 40:1		1.1	2.5	6.5	13	41
	60:1... 100:1		1	2.5	6.3	12	–
Noise level (1)		dB (A)	55	58	60	65	70
Casing			Black anodized aluminium				
Shaft material			C 45				
Shaft output dust and damp protection			IP 54				
Lubrication			Lubricated for life				
Average service life (2)			h				
Mounting position			Any position				
Operating temperature			°C				
Efficiency	3:1...8:1		0.96				
	9:1...40:1		0.94				
	60:1...100:1		0.9				
Maximum permitted radial force (2) (3)	L _{10h} = 10,000 hours	N	200	500	950	2000	6000
	L _{10h} = 30,000 hours	N	160	340	650	1500	4200
Maximum permitted axial force (2)	L _{10h} = 10,000 hours	N	200	600	1200	2800	8000
	L _{10h} = 30,000 hours	N	160	450	900	2100	6000
Moment of inertia of gearbox	3:1	kgcm ²	0.031	0.135	0.77	2.63	12.14
	4:1	kgcm ²	0.022	0.093	0.52	1.79	7.78
	5:1	kgcm ²	0.019	0.078	0.45	1.53	6.07
	8:1	kgcm ²	0.017	0.065	0.39	1.32	4.63
	9:1	kgcm ²	0.03	0.131	0.74	2.62	–
	12:1	kgcm ²	0.029	0.127	0.72	2.56	12.37
	15:1	kgcm ²	0.023	0.077	0.71	2.53	12.35
	16:1	kgcm ²	0.022	0.088	0.5	1.75	7.47
	20:1	kgcm ²	0.019	0.075	0.44	1.5	6.65
	25:1	kgcm ²	0.019	0.075	0.44	1.49	5.81
	32:1	kgcm ²	0.017	0.064	0.39	1.3	6.36
	40:1	kgcm ²	0.016	0.064	0.39	1.3	5.28
	60:1	kgcm ²	0.029	0.076	0.51	2.57	–
	80:1	kgcm ²	0.019	0.075	0.5	1.5	–
	100:1	kgcm ²	0.019	0.075	0.44	1.49	–

(1) Value measured at a distance of 1 m, at no-load for a servo motor speed of 3000 rpm and a reduction ratio of 5:1.

(2) Values given for an output shaft speed of 100 rpm in S1 mode (cyclic ratio = 1) on electrical machines for an ambient temperature of 30°C.

(3) Force applied at mid-distance from the output shaft.

Characteristics of GBX gearboxes (continued)							
Type of gearbox			GBX 40	GBX 60	GBX 80	GBX 120	GBX 160
Continuous output torque M_{2N} (1)	3:1	Nm	11	28	85	115	400
	4:1	Nm	15	38	115	155	450
	5:1	Nm	14	40	110	195	450
	8:1	Nm	6	18	50	120	450
	9:1	Nm	16.5	44	130	210	—
	12:1	Nm	20	44	120	260	800
	15:1	Nm	18	44	110	230	700
	16:1	Nm	20	44	120	260	800
	20:1	Nm	20	44	120	260	800
	25:1	Nm	18	40	110	230	700
	32:1	Nm	20	44	120	260	800
	40:1	Nm	18	40	110	230	700
	60:1	Nm	20	44	110	260	—
	80:1	Nm	20	44	120	260	—
	100:1	Nm	20	44	120	260	—
Maximum output torque (1)	3:1	Nm	17.6	45	136	184	640
	4:1	Nm	24	61	184	248	720
	5:1	Nm	22	64	176	312	720
	8:1	Nm	10	29	80	192	720
	9:1	Nm	26	70	208	336	—
	12:1	Nm	32	70	192	416	1280
	15:1	Nm	29	70	176	368	1120
	16:1	Nm	32	70	192	416	1280
	20:1	Nm	32	70	192	416	1280
	25:1	Nm	29	64	176	368	1120
	32:1	Nm	32	70	192	416	1280
	40:1	Nm	29	64	176	368	1120
	60:1	Nm	32	70	176	416	—
	80:1	Nm	32	70	192	416	—
	100:1	Nm	32	70	192	416	—

(1) Values given for an output shaft speed of 100 rpm in S1 mode (cyclic ratio = 1) on electrical machines for an ambient temperature of 30°C.

References



GBX ●●●

Size	Reduction ratio	Reference	Weight kg
GBX 40	3:1, 4:1, 5:1 and 8:1	GBX 040●●● ●●● ●G	0.350
	9:1, 12:1, 15:1, 16:1, 20:1 and 25:1	GBX 040●●● ●●● ●G	0.450
GBX 60	3:1, 4:1, 5:1 and 8:1	GBX 060●●● ●●● ●G	0.900
	9:1, 12:1, 15:1, 16:1, 20:1, 25:1, 32:1 and 40:1	GBX 060●●● ●●● ●G	1.100
	60:1	GBX 060●●● ●●● ●G	1.300
GBX 80	3:1, 4:1, 5:1 and 8:1	GBX 080●●● ●●● ●G	2.100
	9:1, 12:1, 15:1, 16:1, 20:1, 25:1, 32:1 and 40:1	GBX 080●●● ●●● ●G	2.600
	60:1, 80:1 and 100:1	GBX 080●●● ●●● ●G (1)	3.100
GBX 120	8:1	GBX 120●●● ●●● ●G	6.000
	15:1, 16:1, 20:1, 25:1, 32:1 and 40:1	GBX 120●●● ●●● ●G	8.000
	60:1, 80:1 and 100:1	GBX 120●●● ●●● ●G	10.000
GBX 160	25:1 and 40:1	GBX 160●●● ●●● ●G	22.000

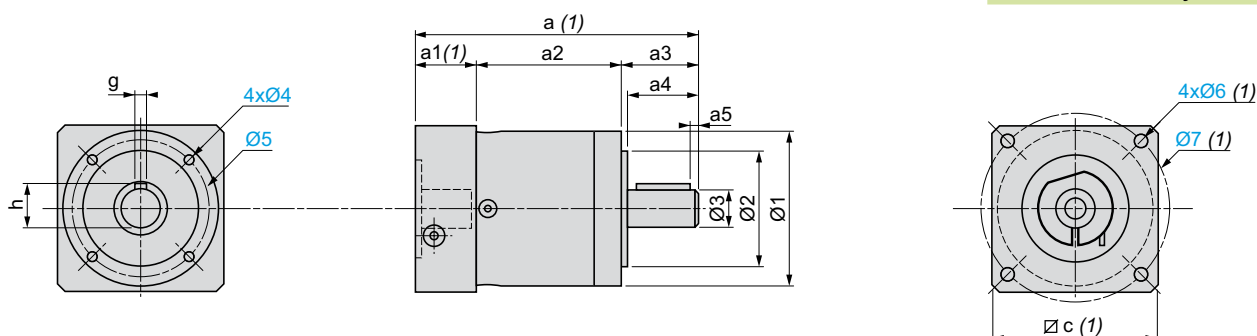
To order a GBX planetary gearbox, complete each reference above with:

			GBX	●●●	●●●	●●●	●	G
Size	Diameter of the casing (see table of combinations with BRH servo motor on page 2/104)	40 mm	040					
		60 mm	060					
		80 mm	080					
		120 mm	120					
		160 mm	160					
Reduction ratio		3:1		003				
		4:1		004				
		5:1		005				
		8:1		008				
		9:1		009				
		12:1		012				
		15:1		015				
		16:1		016				
		20:1		020				
		25:1		025				
		32:1		032				
		40:1		040				
		60:1		060				
		80:1		080				
		100:1		100				
Associated BRH servo motor	Type	BRH 057			057			
		BRH 085			085			
		BRH 110			110			
	Model	BRH ●●●1					1	
		BRH ●●●2					2	
		BRH ●●●3					3	
		BRH ●●●4					4	
BRH servo motor adaptation								G

(1) For a GBX 080 gearbox/BRH 057● servo motor combination, please consult your Regional Sales Office.

Dimensions

Servo motor assembly



GBX	a2	a3	a4	a5	h	g	Ø1	Ø2	Ø3	Ø4	Ø5
040 003...008	39	26	23	2,5	11.2	3	40	26 h7	10 h7	M4 x 6	34
040 009...025	52	26	23	2,5	11.2	3	40	26 h7	10 h7		34
060 003...008	47	35	30	2,5	16	5	60	40 h7	14 h7	M5 x 8	52
060 009...040	59.5	35	30	2,5	16	5	60	40 h7	14 h7	M5 x 8	52
060 060	72	35	30	2,5	16	5	60	40 h7	14 h7	M5 x 8	52
080 003...008	60.5	40	36	4	22.5	6	80	60 h7	20 h7	M6 x 10	70
080 009...040	77.5	40	36	4	22.5	6	80	60 h7	20 h7	M6 x 10	70
080 060...100	95	40	36	4	22.5	6	80	60 h7	20 h7	M6 x 10	70
120 008	74	55	50	5	28	8	115	80 h7	25 h7	M10 x 16	100
120 015...040	101	55	50	5	28	8	115	80 h7	25 h7	M10 x 16	100
120 060...100	128	55	50	5	28	8	115	80 h7	25 h7	M10 x 16	100
160 025, 040	153.5	87	80	8	43	12	160	130 h7	40 h7	M12 x 20	145

(1) Dimensions a, a1, Øc, Ø6 and Ø7 depend on the planetary gearbox/BRH servo motor combination:

Combinations		Reduction ratios						
Gearbox	Servo motor	3:1 to 8:1	9:1 to 40:1	60:1 to 100:1	3:1 to 100:1	3:1 to 100:1	3:1 to 100:1	3:1 to 100:1
		a	a	a	a1	Øc	Ø6	Ø7
GBX 040	BRH 057●	89.5	102.5	–	24.5	60	M5	66.7
GBX 060	BRH 057●	106	118.5	131.5	24.5	60	M5	66.7
GBX 060	BRH 085●	113	125.5	138.5	31.5	90	M6	100
GBX 080 (2)	BRH 057● (2)	–	151	168.5	33.5	80	M5	66.7
GBX 080	BRH 085●	133.5	151	168.5	33.5	90	M6	100
GBX 080	BRH 110●	143.5	161	178.5	43.5	115	M8	130
GBX 120	BRH 085●	–	203.5	231	47.5	115	M6	100
GBX 120	BRH 110●	176.5	203.5	231	47.5	115	M8	130
GBX 160	BRH 110●	–	305	–	64.5	140	M8	130

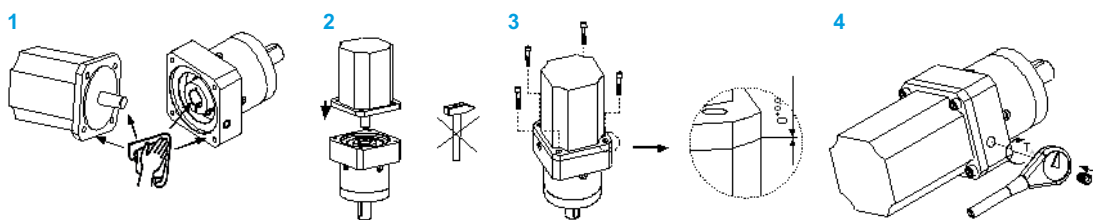
(2) For this combination, please consult your Regional Sales Office.

Mounting

No special tool is required for mounting the GBX planetary gearbox on the BRH servo motor. The usual rules for mechanical mounting must be followed:

- 1 Clean the bearing surfaces and seals.
- 2 Align the shafts that are to be coupled and assemble in vertical position.
- 3 Uniform adhesive force of the servo motor flange on the gearbox flange, with tightening of the Phillips screws.
- 4 Correct tightening torque of the TA ring using a torque wrench (2...40 Nm depending on the gearbox model).

For more information, refer to the instruction sheets supplied with the products.

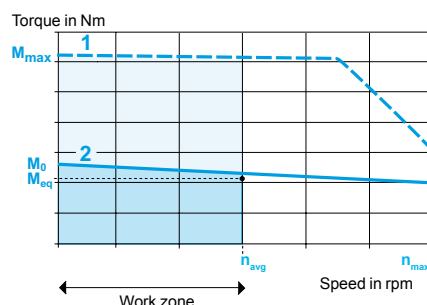




BSH servo motor with straight connectors



BSH servo motor with rotatable angled connectors



Presentation

BSH servo motors are the ideal choice to meet the requirements of dynamics and precision. With five flange sizes and a variety of lengths, there is a suitable solution for most applications, covering a continuous stall torque range from 0.5 to 34.4 Nm for a maximum speed of 8000 rpm.

Thanks to their new winding technology based on salient poles, BSH servo motors are far more compact and offer a higher power density than conventional servo motors.

BSH servo motors are available in five flange sizes: 55, 70, 100, 140 and 205 mm. Thermal protection is provided by a temperature probe integrated into the servo motors. They are certified as "Recognized" by the Underwriters Laboratories and conform to UL 1004 standards as well as to European directives (CE marking).

BSH servo motors are available with the following variants:

- IP 50 or IP 65 degree of protection
- With or without holding brake
- Straight or angled connectors
- Single turn or multiturn SinCos encoder
- Untapped or keyed shaft end

Torque/speed characteristics

BSH servo motors provide torque/speed curve profiles similar to the example shown on the left with:

- 1 Peak torque, depending on the servo drive model
- 2 Continuous torque, depending on the servo drive model

where:

- n_{max} (in rpm) corresponds to the maximum speed of the servo motor
- M_{max} (in Nm) represents the peak stall torque value
- M_0 (in Nm) represents the continuous stall torque value

Principle for determining servo motor size according to the application

The torque/speed curves can be used to determine the correct servo motor size.

- 1 Locate the work zone of the application in terms of speed.
- 2 Verify, using the servo motor cycle timing diagram, that the torques required by the application during the various phases of the cycle are located within the area bounded by curve 1 in the work zone.
- 3 Calculate the average speed n_{avg} and the equivalent thermal torque M_{eq} (see page 6/2).
- 4 The point defined by n_{avg} and M_{eq} must be located below curve 2 in the work zone.

Note: For sizing of servo motors, see page 6/2.

Functions

General functions

BSH servo motors have been developed to meet the following requirements:

- Functional characteristics, ruggedness, safety, etc. in accordance with IEC/EN 60034-1
- Ambient operating temperature:
 - - 20...40°C according to DIN 50019R14.
 - Maximum 55°C with derating from 40°C by 1% of the nominal output power per additional °C
- Relative humidity: IEC 60721-3-3 category 3K4
- Maximum operating altitude: 1000 m without derating, 2000 m with $k = 0.86$, 3000 m with $k = 0.8$ (1)
- Storage and transport temperature: - 25...70°C
- Winding insulation class: F (threshold temperature for windings 155°C) in accordance with DIN VDE 0530
- Power and encoder connection via straight or angled connectors
- Thermal protection by built-in PTC thermistor probe, controlled by the Lexium 05 servo drive
- Out-of-round, concentricity and perpendicularity between flange and shaft in accordance with DIN 42955, class N
- Permitted mounting positions: no mounting restrictions for IMB5 - IMV1 and IMV3 in accordance with DIN 42950
- Polyester resin-based paint: opaque black RAL 9005

(1) k : derating factor

Functions (continued)

General functions (continued)

- Degree of protection:
 - Casing: IP 65 in accordance with IEC/EN 60529
 - Shaft end: IP 50 (1) or IP 65 in accordance with IEC/EN 60529
- Integrated sensor: SinCos Hiperface® single turn or multiturn high-resolution encoder
- Untapped or keyed shaft end

Holding brake

BSH servo motors can be fitted with a failsafe electro-magnetic holding brake.



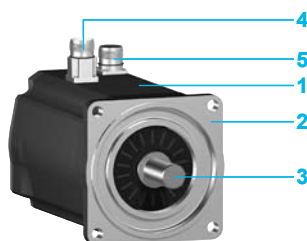
Do not use the holding brake as a dynamic brake for deceleration, as this will quickly damage the brake.

Integrated encoder

BSH servo motors are fitted with a SinCos Hiperface® high-resolution single turn (131,072 points/turn) (2) or multiturn (131,072 points/turn x 4096 turns) (2) encoder providing angular precision of the shaft position, accurate to less than ± 1.3 arc minutes.

This performs the following functions:

- Gives the angular position of the rotor so that flows can be synchronized
 - Measures the servo motor speed via the associated Lexium 05 servo drive.
- This information is used by the speed controller of the servo drive.
- Measures the position information for the servo drive position controller
 - Measures and transmits position information in incremental format for the position return of a motion control module (ESIM (Encoder Simulation) output of the RS 422 interface)



Description

BSH servo motors with a three-phase stator and a 6- to 10-pole rotor (depending on model) with Neodymium Iron Boron (NdFeB) magnets consist of:

- 1 A casing protected by RAL 9005 opaque black paint
- 2 A 4-point axial fixing flange
- 3 A keyed or untapped shaft end (depending on the model)
- 4 A threaded dust and damp proof male straight connector for connecting the power cable (3)
- 5 A threaded dust and damp proof male straight connector for connecting the control cable (encoder) (3)

Connectors to be ordered separately, for connection to Lexium 05 servo drives (see page 2/140).

Schneider Electric has taken particular care to ensure compatibility between BSH servo motors and Lexium 05 servo drives. This compatibility can only be assured by using cables and connectors sold by Schneider Electric (see page 2/140).

- (1) IP 50 mounted in position IMV3 (vertical mounting with shaft end at the top),
IP 54 mounted in position IMV1 (vertical mounting with shaft end at the bottom) or position IMB5 (horizontal mounting).
- (2) Encoder resolution given for use with a Lexium 05 servo drive.
- (3) Other model with rotatable angled connector

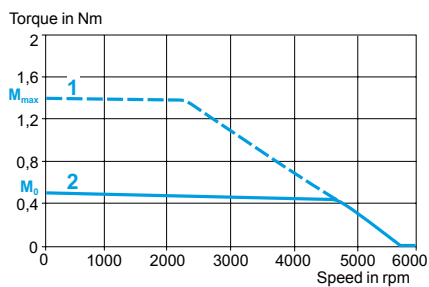
Characteristics of BSH 0551T servo motors

Type of servo motor				BSH 0551T			
Associated with Lexium 05 servo drive				LXM 05 ●D10F1	LXM 05 CU70M2	LXM 05 ●D10M2	LXM 05 ●D10M3X
Line supply voltage			V	115 single phase	230 single phase		230 3-phase
Switching frequency			kHz	8			
Torque	Continuous stall		M_0	Nm	0.5		
	Peak stall		M_{max}	Nm	1.4	1.08	1.4
Nominal operating point	Nominal torque		Nm	0.46			0.43
	Nominal speed		rpm	3000			6000
	Nominal servo motor output power		W	150			270
Maximum current			A rms	5.4			
Servo motor characteristics							
Maximum mechanical speed			rpm	9000			
Constants (at 120°C)	Torque		Nm/A rms	0.36			
	Back emf		V rms/ krpm	22			
Rotor	Number of poles			6			
	Inertia	Without brake	J_m	kgcm²	0.059		
		With brake	J_m	kgcm²	0.0803		
Stator (at 20°C)	Resistance (phase/phase)		Ω	12.2			
	Inductance (phase/phase)		mH	20.8			
	Electrical time constant		ms	1.7			
Holding brake (depending on model)				See page 2/144			

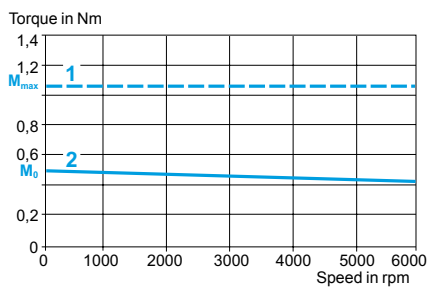
Torque/speed curves

BSH 0551T servo motor

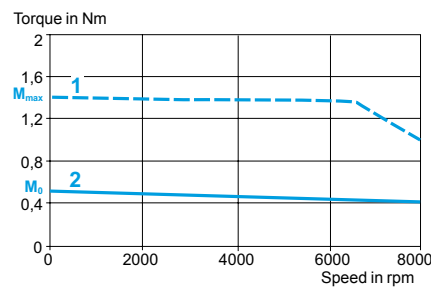
With LXM 05●D10F1 servo drive
115 V single-phase



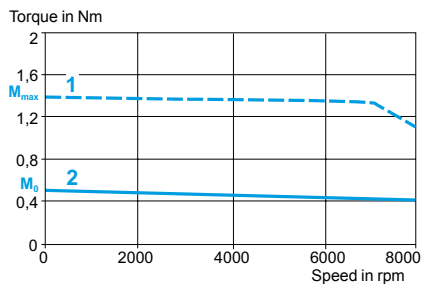
With LXM 05CU70M2 servo drive
230 V single-phase



With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



- 1 Peak torque
2 Continuous torque

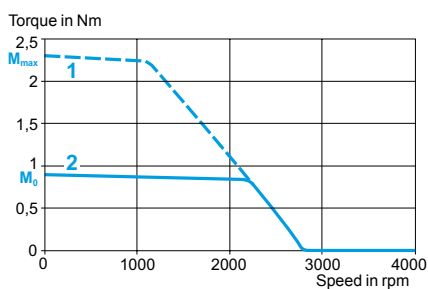
Characteristics of BSH 0552M servo motors

Type of servo motor				BSH 0552M			
Associated with Lexium 05 servo drive				LXM 05 CU70M2		LXM 05 ●D10M2	LXM 05 ●D10M3X
Line supply voltage			V	230 single phase			230 3-phase
Switching frequency			kHz	4			
Torque	Continuous stall		M_o	Nm	0.9		
	Peak stall		M_{max}	Nm	2.3		
Nominal operating point	Nominal torque			Nm	0.85		
	Nominal speed			rpm	1500		
	Nominal servo motor output power			W	130		
Maximum current			A rms	2.6			
Servo motor characteristics							
Maximum mechanical speed			rpm	9000			
Constants (at 120°C)	Torque			Nm/A rms	1.33		
	Back emf			V rms/krpm	74		
Rotor	Number of poles				6		
	Inertia	Without brake	J_m	kgcm²	0.096		
		With brake	J_m	kgcm²	0.1173		
Stator (at 20°C)	Resistance (phase/phase)			Ω	60.2		
	Inductance (phase/phase)			mH	122		
	Electrical time constant			ms	2.03		
Holding brake (depending on model)				See page 2/144			

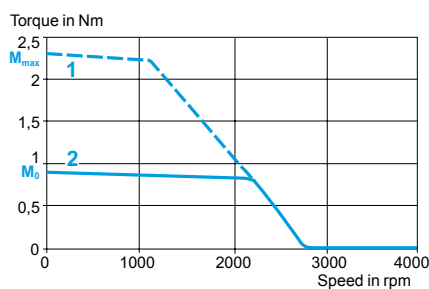
Torque/speed curves

BSH 0552M servo motor

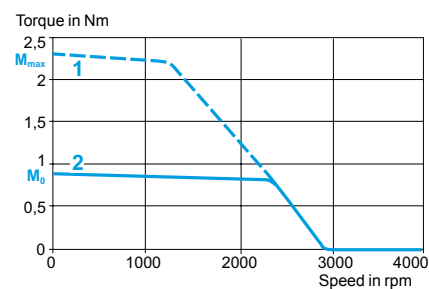
With LXM 05CU70M2 servo drive
230 V single-phase



With LXM 05D10M2 servo drive
230 V single-phase



With LXM 05D10M3X servo drive
230 V 3-phase



- 1 Peak torque
- 2 Continuous torque

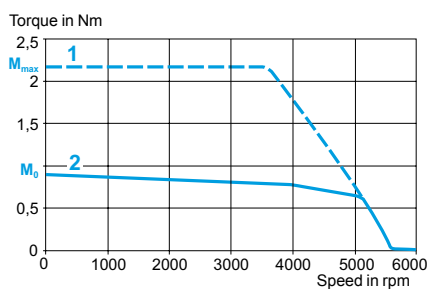
Characteristics of BSH 0552P servo motors

Type of servo motor				BSH 0552P			
Associated with Lexium 05 servo drive				LXM 05 CU70M2	LXM 05 ●D10M2	LXM 05 ●D10M3X	LXM 05 ●D14N4
Line supply voltage			V	230 single phase		230 3-phase	400/480 3-phase
Switching frequency			kHz	8			
Torque	Continuous stall		M_0	Nm	0.9		
	Peak stall		M_{max}	Nm	2.17	2.7	
Nominal operating point	Nominal torque		Nm	0.81			
	Nominal speed		rpm	3000			
	Nominal servo motor output power		W	250			
Maximum current			A rms	4.8			
Servo motor characteristics							
Maximum mechanical speed			rpm	9000			
Constants (at 120°C)	Torque		Nm/A rms	0.7			
	Back emf		V rms/ krpm	40			
Rotor	Number of poles			6			
	Inertia	Without brake	J_m	kgcm²	0.096		
		With brake	J_m	kgcm²	0.1173		
Stator (at 20°C)	Resistance (phase/phase)		Ω	17.4			
	Inductance (phase/phase)		mH	35.3			
	Electrical time constant		ms	2.03			
Holding brake (depending on model)				See page 2/144			

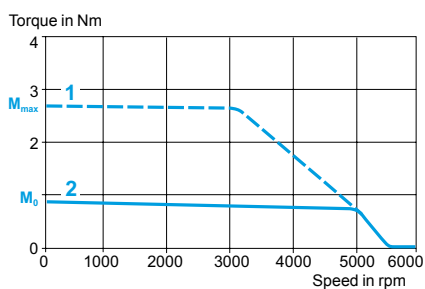
Torque/speed curves

BSH 0552P servo motor

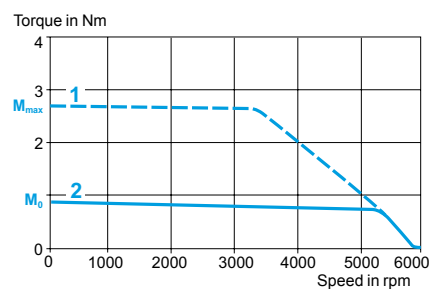
With LXM 05CU70M2 servo drive
230 V single-phase



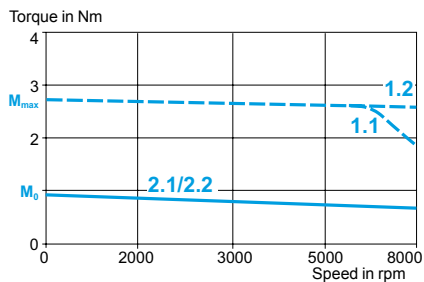
With LXM 05D10M2 servo drive
230 V single-phase



With LXM 05D10M3X servo drive
230 V 3-phase



With LXM 05D14N4 servo drive
400/480 V three-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

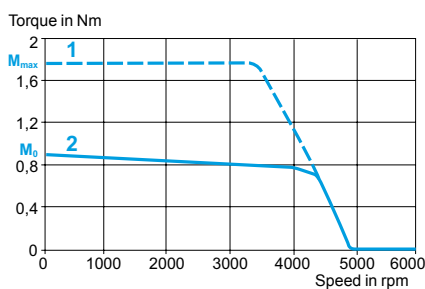
Characteristics of BSH 0552T servo motors

Type of servo motor			BSH 0552T				
Associated with Lexium 05 servo drive			LXM 05 ●D10F1	LXM 05 ●D17F1	LXM 05 CU70M2	LXM 05 ●D10M2	LXM 05 ●D10M3X
Line supply voltage		V	115 single phase		230 single phase		230 3-phase
Switching frequency		kHz	8				
Torque	Continuous stall	M_0	Nm	0.9		0.77	0.9
	Peak stall	M_{max}	Nm	1.77	2.7	1.31	1.77
Nominal operating point	Nominal torque		Nm	0.8		0.77	0.71
	Nominal speed		rpm	3000		6000	
	Nominal servo motor output power		W	250		240	450
Maximum current		A rms	8.8				
Servo motor characteristics							
Maximum mechanical speed		rpm	9000				
Constants (at 120°C)	Torque		Nm/A rms	0.36			
	Back emf		V rms/ krpm	22			
Rotor	Number of poles			6			
	Inertia	Without brake	J_m	kgcm ²	0.096		
		With brake	J_m	kgcm ²	0.1173		
Stator (at 20°C)	Resistance (phase/phase)		Ω	5.2			
	Inductance (phase/phase)		mH	10.6			
	Electrical time constant		ms	2.04			
Holding brake (depending on model)			See page 2/144				

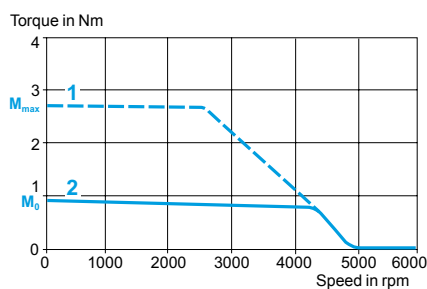
Torque/speed curves

BSH 0552T servo motor

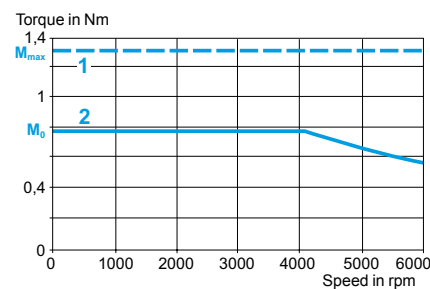
With LXM 05●D10F1 servo drive
115 V single-phase



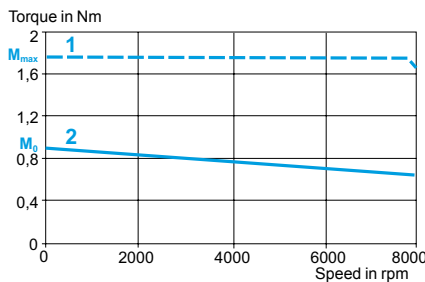
With LXM 05●D17F1 servo drive
115 V single-phase



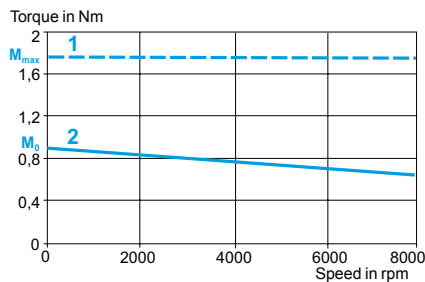
With LXM 05CU70M2 servo drive
230 V single-phase



With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



- 1 Peak torque
- 2 Continuous torque

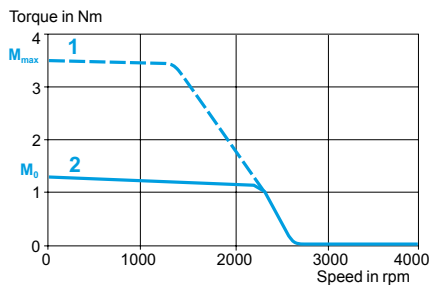
Characteristics of BSH 0553M servo motors

Type of servo motor				BSH 0553M	
Associated with Lexium 05 servo drive				LXM 05 ●D10M2	LXM 05 ●D10M3X
Line supply voltage			V	230 single phase	230 3-phase
Switching frequency			kHz	4	
Torque	Continuous stall		M_0	Nm	1.3
	Peak stall		M_{max}	Nm	3.5
Nominal operating point	Nominal torque			Nm	1.2
	Nominal speed			rpm	1500
	Nominal servo motor output power			W	190
Maximum current			A rms	3.4	
Servo motor characteristics					
Maximum mechanical speed			rpm	9000	
Constants (at 120°C)	Torque			Nm/A rms	1.33
	Back emf			V rms/krpm	79
Rotor	Number of poles			6	
	Inertia	Without brake	J_m	kgcm²	0.134
		With brake	J_m	kgcm²	0.1553
Stator (at 20°C)	Resistance (phase/phase)			Ω	38.4
	Inductance (phase/phase)			mH	92.2
	Electrical time constant			ms	2.4
Holding brake (depending on model)				See page 2/144	

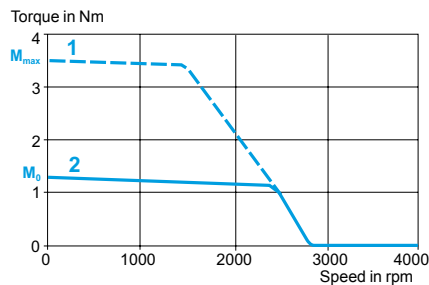
Torque/speed curves

BSH 0553M servo motor

With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



- 1 Peak torque
- 2 Continuous torque

Characteristics of BSH 0553P/0553T servo motors

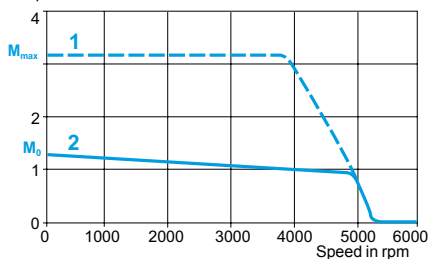
Type of servo motor		BSH 0553P			BSH 0553T		
Associated with Lexium 05 servo drive		LXM 05 ●D10M2	LXM 05 ●D10M3X	LXM 05 ●D14N4	LXM 05 ●D17F1	LXM 05 ●D17M2	LXM 05 ●D17M3X
Line supply voltage	V	230 single phase	230 3-phase	400/480 3-phase	115 single phase	230 single phase	230 3-phase
Switching frequency	kHz	8					
Torque	Continuous stall M_0	Nm	1.3				
	Peak stall M_{max}	Nm	3.18	3.87	3.31		
Nominal operating point	Nominal torque	Nm	1.1				
	Nominal speed	rpm	3000				
	Nominal servo motor output power	W	350				
Maximum current	A rms	6.5			11.9		
Servo motor characteristics							
Maximum mechanical speed	rpm	9000					
Constants (at 120°C)	Torque	Nm/A rms	0.7		0.39		
	Back emf	V rms/krpm	41		22		
Rotor	Number of poles		6				
	Inertia Without brake J_m	kgcm ²	0.134				
	With brake J_m	kgcm ²	0.1553				
Stator (at 20°C)	Resistance (phase/phase)	Ω	10.4		3.1		
	Inductance (phase/phase)	mH	25		7.4		
	Electrical time constant	ms	2.4		2.39		
Holding brake (depending on model)		See page 2/144					

Torque/speed curves

BSH 0553P servo motor

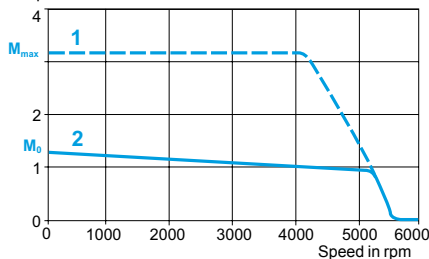
With LXM 05●D10M2 servo drive
230 V single-phase

Torque in Nm



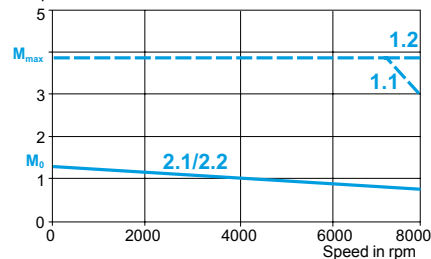
With LXM 05●D10M3X servo drive
230 V 3-phase

Torque in Nm



With LXM 05●D14N4 servo drive
400/480 V three-phase

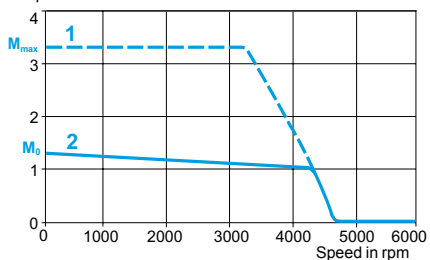
Torque in Nm



BSH 0553T servo motor

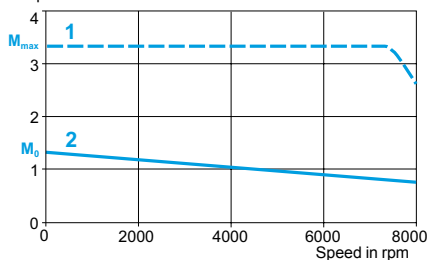
With LXM 05●D17F1 servo drive
115 V single-phase

Torque in Nm



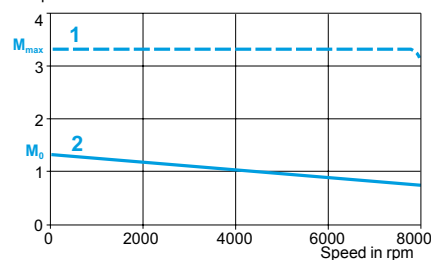
With LXM 05●D17M2 servo drive
230 V single-phase

Torque in Nm



With LXM 05●D17M3X servo drive
230 V 3-phase

Torque in Nm



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

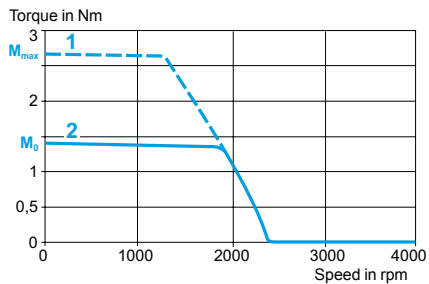
Characteristics of BSH 0701M/0701P servo motors

Type of servo motor		BSH 0701M	BSH 0701P	
Associated with Lexium 05 servo drive		LXM 05 ●D10M3X	LXM 05 ●D10M2	LXM 05 ●D10M3X
Line supply voltage	V	230 3-phase	230 single phase	230 3-phase
Switching frequency	kHz	4		
Torque	Continuous stall M_0	Nm	1.4	
	Peak stall M_{max}	Nm	2.66	
Nominal operating point	Nominal torque	Nm	1.36	1.3
	Nominal speed	rpm	1500	3000
	Nominal servo motor output power	W	210	400
Maximum current	A rms	3.1	5.7	
Servo motor characteristics				
Maximum mechanical speed	rpm	8000		
Constants (at 120°C)	Torque	Nm/A rms	1.4	0.8
	Back emf	V rms/krpm	85	46
Rotor	Number of poles		6	
	Inertia Without brake J_m	kgcm ²	0.25	
	With brake J_m	kgcm ²	0.322	
Stator (at 20°C)	Resistance (phase/phase)	Ω	35.4	10.4
	Inductance (phase/phase)	mH	131.9	38.8
	Electrical time constant	ms	3.73	3.73
Holding brake (depending on model)		See page 2/144		

Torque/speed curves

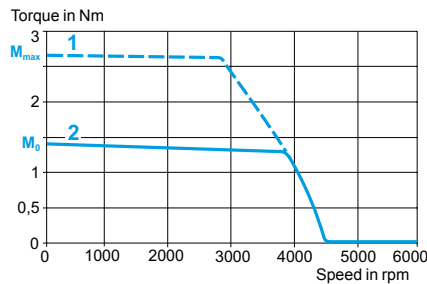
BSH 0701M servo motor

With LXM 05●D10M3X servo drive
230 V 3-phase

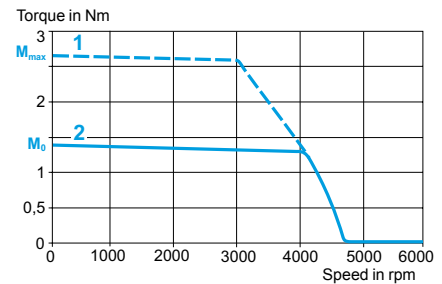


BSH 0701P servo motor

With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



- 1 Peak torque
2 Continuous torque

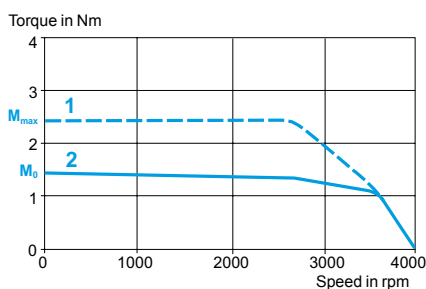
Characteristics of BSH 0701T servo motors

Type of servo motor			BSH 0701T			
Associated with Lexium 05 servo drive			LXM 05 ●D10F1	LXM 05 ●D17M2	LXM 05 ●D10M3X	LXM 05 ●D17M3X
Line supply voltage		V	115 single phase	230 single phase	230 3-phase	
Switching frequency		kHz	8			
Torque	Continuous stall	M_o	Nm	1.4		
	Peak stall	M_{max}	Nm	2.42	3.19	2.42 3.19
Nominal operating point	Nominal torque		Nm	1.2	1.3	
	Nominal speed		rpm	3000		
	Nominal servo motor output power		W	380	400	
Maximum current		A rms	10.1			
Servo motor characteristics						
Maximum mechanical speed		rpm	8000			
Constants (at 120°C)	Torque		Nm/A rms	0.44		
	Back emf		V rms/krpm	26		
Rotor	Number of poles			6		
	Inertia	Without brake	J_m	kgcm²	0.25	
		With brake	J_m	kgcm²	0.322	
Stator (at 20°C)	Resistance (phase/phase)		Ω	3.3		
	Inductance (phase/phase)		mH	12.3		
	Electrical time constant		ms	3.73		
Holding brake (depending on model)			See page 2/144			

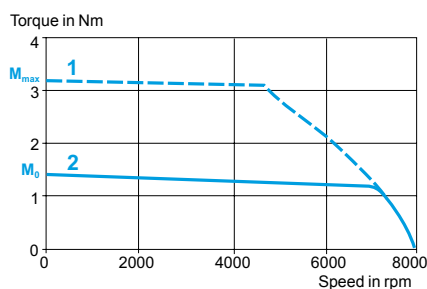
Torque/speed curves

BSH 0701T servo motor

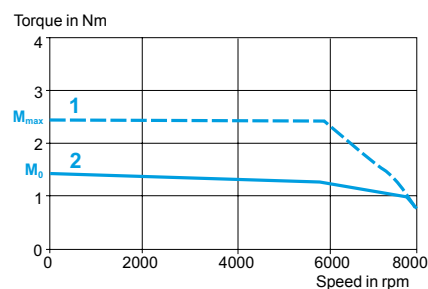
With LXM 05●D10F1 servo drive
115 V single-phase



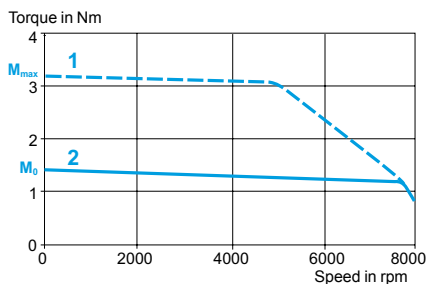
With LXM 05●D17M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



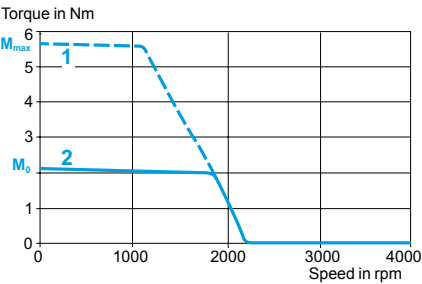
- 1 Peak torque
- 2 Continuous torque

Characteristics of BSH 0702M servo motors					
Type of servo motor			BSH 0702M		
Associated with Lexium 05 servo drive			LXM 05 ●D10M2	LXM 05 ●D10M3X	
Line supply voltage		V	230 single phase	230 3-phase	
Switching frequency		kHz	4		
Torque	Continuous stall	M ₀	Nm	2.12	
	Peak stall	M _{max}	Nm	5.63	
Nominal operating point	Nominal torque		Nm	2	
	Nominal speed		rpm	1500	
	Nominal servo motor output power		W	300	
Maximum current		A rms	6		
Servo motor characteristics					
Maximum mechanical speed		rpm	8000		
Constants (at 120°C)	Torque		Nm/A rms	1.47	
	Back emf		V rms/krpm	95	
Rotor	Number of poles			6	
	Inertia	Without brake	J _m	kgcm ²	0.41
		With brake	J _m	kgcm ²	0.482
Stator (at 20°C)	Resistance (phase/phase)		Ω	16.4	
	Inductance (phase/phase)		mH	74.1	
	Electrical time constant		ms	4.52	
Holding brake (depending on model)			See page 2/144		

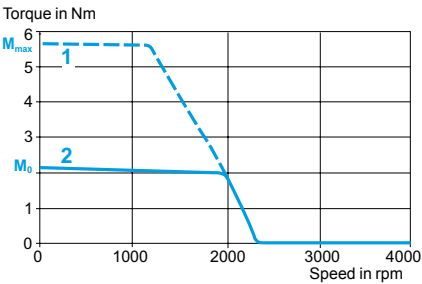
Torque/speed curves

BSH 0702M servo motor

With LXM 05●D10M2 servo drive
230 V single-phase



With LXM 05●D10M3X servo drive
230 V 3-phase



- 1 Peak torque
2 Continuous torque

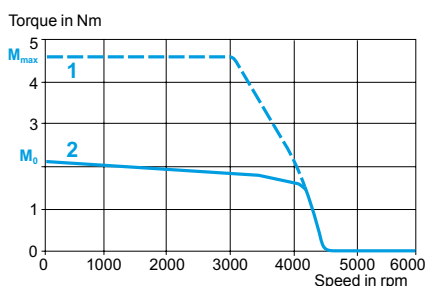
Characteristics of BSH 0702P servo motors

Type of servo motor				BSH 0702P				
Associated with Lexium 05 servo drive				LXM 05 ●D10M2	LXM 05 ●D17M2	LXM 05 ●D10M3X	LXM 05 ●D17M3X	LXM 05 ●D14N4
Line supply voltage			V	230 single phase		230 3-phase		400/480 3-phase
Switching frequency			kHz	4				
Torque	Continuous stall		M_o	Nm	2.12			
	Peak stall		M_{max}	Nm	4.57	5.63	4.57	5.63
Nominal operating point	Nominal torque			Nm	1.9			
	Nominal speed			rpm	3000			
	Nominal servo motor output power			W	600			
Maximum current			A rms	11.8				
Servo motor characteristics								
Maximum mechanical speed			rpm	8000				
Constants (at 120°C)	Torque			Nm/A rms	0.77			
	Back emf			V rms/ krpm	48			
Rotor	Number of poles			6				
	Inertia	Without brake	J_m	kgcm²	0.41			
		With brake	J_m	kgcm²	0.482			
Stator (at 20°C)	Resistance (phase/phase)			Ω	4.2			
	Inductance (phase/phase)			mH	19			
	Electrical time constant			ms	4.52			
Holding brake (depending on model)				See page 2/144				

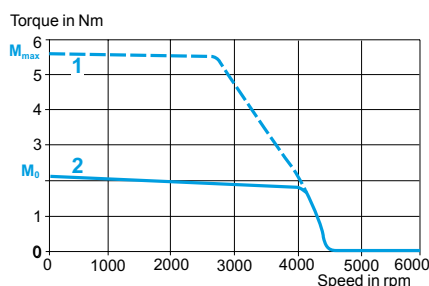
Torque/speed curves

BSH 0702P servo motor

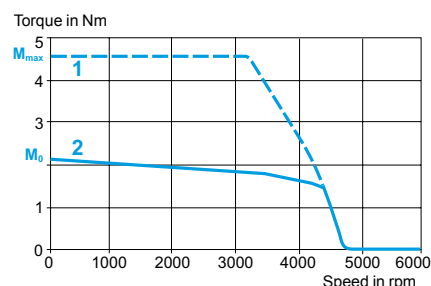
With LXM 05●D10M2 servo drive
230 V single-phase



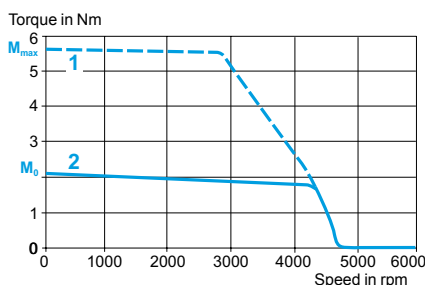
With LXM 05●D17M2 servo drive
230 V single-phase



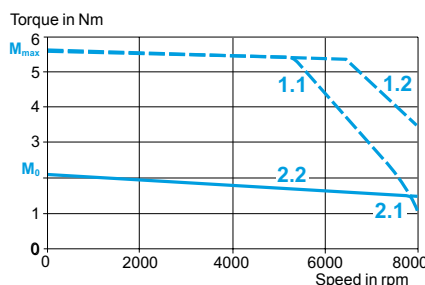
With LXM 05●D10M3X servo drive
230 V 3-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D14N4 servo drive
400/480 V three-phase



1 Peak torque
2 Continuous torque

1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

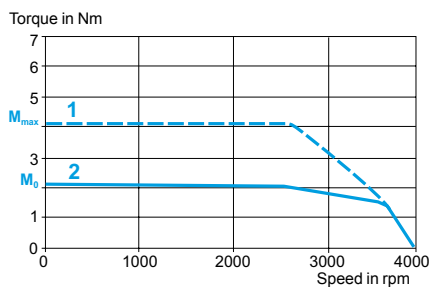
Characteristics of BSH 0702T servo motors

Type of servo motor				BSH 0702T			
Associated with Lexium 05 servo drive				LXM 05 ●D17F1	LXM 05 ●D17M2	LXM 05 ●D28M2	LXM 05 ●D42M3X
Line supply voltage			V	115 single phase	230 single phase	230 3-phase	
Switching frequency			kHz	8			
Torque	Continuous stall		M_o Nm	2.12			
	Peak stall		M_{max} Nm	4.14		6.8	
Nominal operating point	Nominal torque		Nm	1.83	1.9		
	Nominal speed		rpm	3000			
	Nominal servo motor output power		W	570	600		
Maximum current			A rms	19.9			
Servo motor characteristics							
Maximum mechanical speed			rpm	8000			
Constants (at 120°C)	Torque		Nm/A rms	0.45			
	Back emf		V rms/krpm	28			
Rotor	Number of poles			6			
	Inertia	Without brake	J_m kgcm²	0.41			
		With brake	J_m kgcm²	0.482			
Stator (at 20°C)	Resistance (phase/phase)		Ω	1.5			
	Inductance (phase/phase)		mH	6.7			
	Electrical time constant		ms	4.47			
Holding brake (depending on model)				See page 2/144			

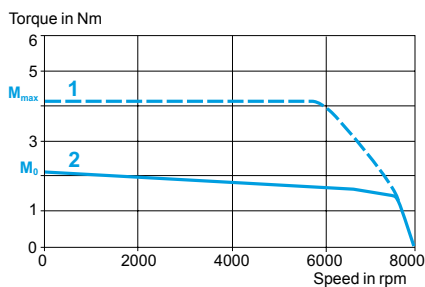
Torque/speed curves

BSH 0702T servo motor

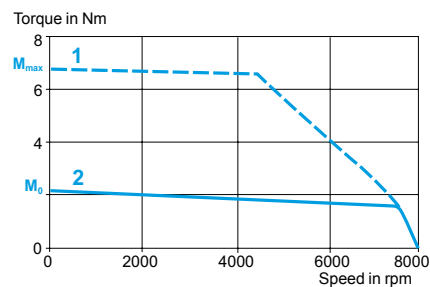
With LXM 05●D17F1 servo drive
115 V single-phase



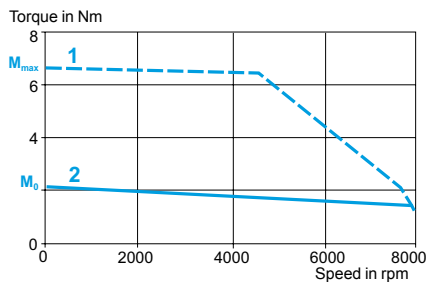
With LXM 05●D17M2 servo drive
230 V single-phase



With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



- 1 Peak torque
- 2 Continuous torque

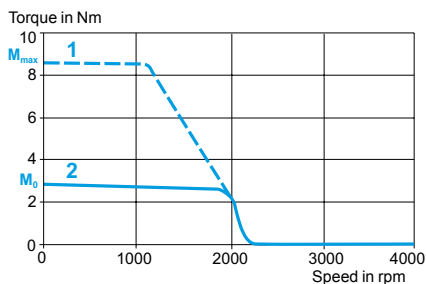
Characteristics of BSH 0703M servo motors

Type of servo motor				BSH 0703M		
Associated with Lexium 05 servo drive				LXM 05 ●D10M2	LXM 05 ●D10M3X	LXM 05 ●D14N4
Line supply voltage			V	230 3-phase	230 3-phase	400/480 3-phase
Switching frequency			kHz	4		
Torque	Continuous stall		M_o	Nm	2.8	
	Peak stall		M_{max}	Nm	8.6	
Nominal operating point	Nominal torque		Nm	2.63		2.4
	Nominal speed		rpm	1500		3000
	Nominal servo motor output power		W	400		750
Maximum current			A rms	8.7		
Servo motor characteristics						
Maximum mechanical speed			rpm	8000		
Constants (at 120°C)	Torque		Nm/A rms	1.48		
	Back emf		V rms/ krpm	95		
Rotor	Number of poles			6		
	Inertia	Without brake	J_m	kgcm ²	0.58	
		With brake	J_m	kgcm ²	0.81	
Stator (at 20°C)	Resistance (phase/phase)		Ω	10.2		
	Inductance (phase/phase)		mH	49.2		
	Electrical time constant		ms	4.82		
Holding brake (depending on model)				See page 2/144		

Torque/speed curves

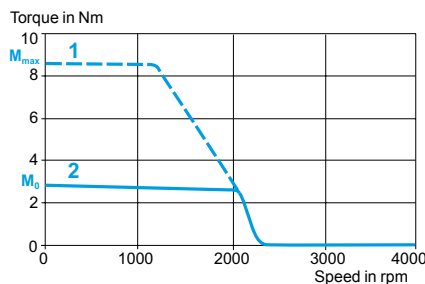
BSH 0703M servo motor

With LXM 05●D10M2 servo drive
230 V single-phase



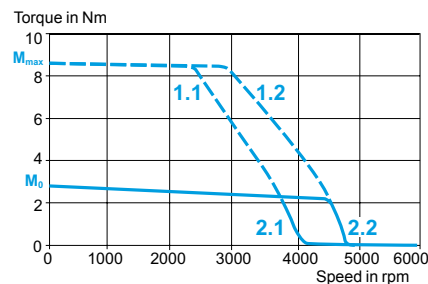
- 1 Peak torque
2 Continuous torque

With LXM 05●D10M3X servo drive
230 V 3-phase



- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

With LXM 05●D14N4 servo drive
400/480 V three-phase



- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

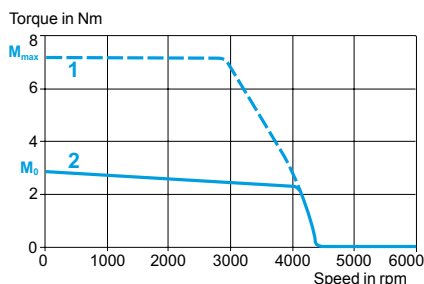
Characteristics of BSH 0703P servo motors

Type of servo motor				BSH 0703P			
Associated with Lexium 05 servo drive				LXM 05 ●D17M2	LXM 05 ●D28M2	LXM 05 ●D17M3X	LXM 05 ●D22N4
Line supply voltage			V	230 single phase		230 3-phase	400/480 3-phase
Switching frequency			kHz	8			
Torque	Continuous stall		M_o	Nm	2.8		
	Peak stall		M_{max}	Nm	7.16	10.3	7.16 8.75
Nominal operating point	Nominal torque			Nm	2.4		
	Nominal speed			rpm	3000		
	Nominal servo motor output power			W	750		
Maximum current			A rms	17			
Servo motor characteristics							
Maximum mechanical speed			rpm	8000			
Constants (at 120°C)	Torque			Nm/A rms	0.78		
	Back emf			V rms/krpm	49		
Rotor	Number of poles			6			
	Inertia	Without brake	J_m	kgcm²	0.58		
		With brake	J_m	kgcm²	0.81		
Stator (at 20°C)	Resistance (phase/phase)			Ω	2.7		
	Inductance (phase/phase)			mH	13		
	Electrical time constant			ms	4.81		
Holding brake (depending on model)				See page 2/144			

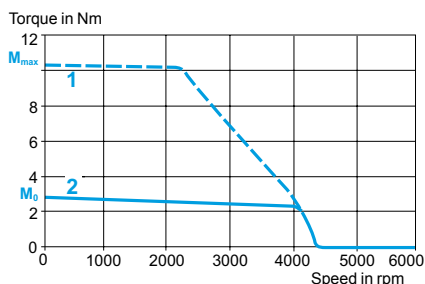
Torque/speed curves

BSH 0703P servo motor

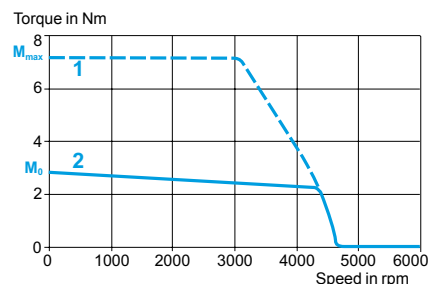
With LXM 05●D17M2 servo drive
230 V single-phase



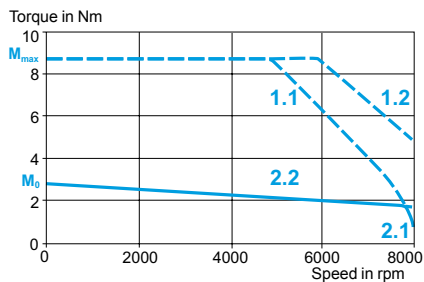
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D17M3X servo drive
230 V 3-phase



With LXM 05●D22N4 servo drive
400/480 V three-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

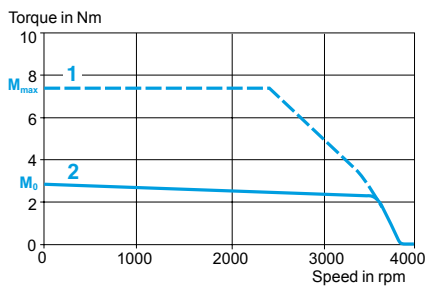
Characteristics of BSH 0703T servo motors

Type of servo motor				BSH 0703T						
Associated with Lexium 05 servo drive				LXM 05 ●D28F1		LXM 05 ●D28M2		LXM 05 ●D42M3X		
Line supply voltage				V	115 single phase		230 single phase		230 3-phase	
Switching frequency				kHz	8					
Torque	Continuous stall			M_o	Nm	2.8				
	Peak stall			M_{max}	Nm	7.38		10.25		
Nominal operating point	Nominal torque				Nm	2.4				
	Nominal speed				rpm	3000				
	Nominal servo motor output power				W	750				
Maximum current				A rms	29.2					
Servo motor characteristics										
Maximum mechanical speed				rpm	8000					
Constants (at 120°C)	Torque				Nm/A rms	0.44				
	Back emf				V rms/ krpm	29				
Rotor	Number of poles					6				
	Inertia	Without brake		J_m	kgcm²	0.58				
		With brake		J_m	kgcm²	0.81				
Stator (at 20°C)	Resistance (phase/phase)				Ω	0.91				
	Inductance (phase/phase)				mH	4.4				
	Electrical time constant				ms	4.84				
Holding brake (depending on model)						See page 2/144				

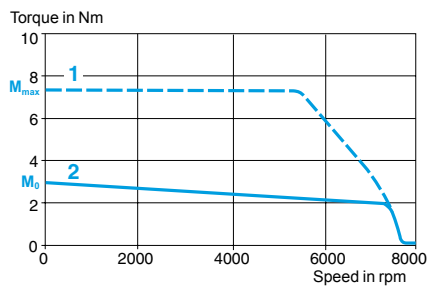
Torque/speed curves

BSH 0703T servo motor

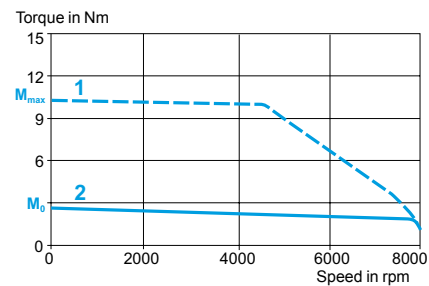
With LXM 05●D28F1 servo drive
115 V single-phase



With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



- 1 Peak torque
- 2 Continuous torque

Characteristics of BSH 1001M/1001P servo motors

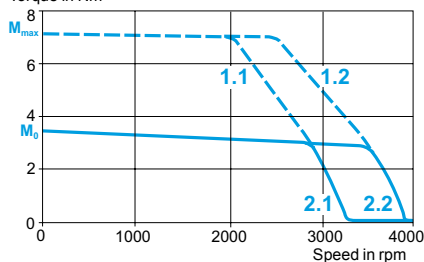
Type of servo motor		BSH 1001M	BSH 1001P	
Associated with Lexium 05 servo drive		LXM 05 ●D14N4	LXM 05 ●D17M3X	LXM 05 ●D22N4
Line supply voltage	V	400/480 3-phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	4		
Torque	Continuous stall	M_0	Nm	3.4
	Peak stall	M_{max}	Nm	7.1
Nominal operating point	Nominal torque	Nm	3.16	2.92
	Nominal speed	rpm	1500	3000
	Nominal servo motor output power	W	500	900
Maximum current	A rms	6.3	12	
Servo motor characteristics				
Maximum mechanical speed	rpm	6000		
Constants (at 120°C)	Torque	Nm/A rms	1.83	0.89
	Back emf	V rms/krpm	115	60
Rotor	Number of poles		8	
	Inertia Without brake	J_m	kgcm ²	1.4
	With brake	J_m	kgcm ²	2.018
Stator (at 20°C)	Resistance (phase/phase)	Ω	13.9	3.8
	Inductance (phase/phase)	mH	64.3	17.6
	Electrical time constant	ms	4.63	4.63
Holding brake (depending on model)		See page 2/144		

Torque/speed curves

BSH 1001M servo motor

With LXM 05●D14N4 servo drive
400/480 V three-phase

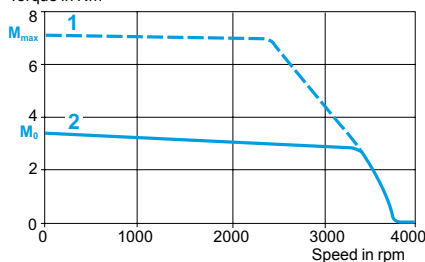
Torque in Nm



BSH 1001P servo motor

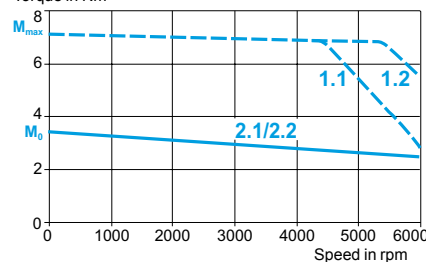
With LXM 05●D17M3X servo drive
230 V 3-phase

Torque in Nm



With LXM 05●D22N4 servo drive
400/480 V three-phase

Torque in Nm



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

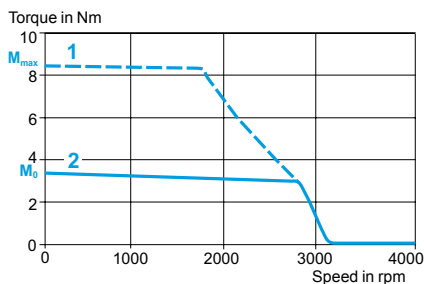
Characteristics of BSH 1001T servo motors

Type of servo motor				BSH 1001T						
Associated with Lexium 05 servo drive				LXM 05 ●D28F1		LXM 05 ●D28M2		LXM 05 ●D42M3X		
Line supply voltage				V	115 single phase		230 single phase		230 3-phase	
Switching frequency				kHz	8					
Torque	Continuous stall			M_o	Nm	3.4				
	Peak stall			M_{max}	Nm	8.5				
Nominal operating point	Nominal torque				Nm	3.16		2.9		
	Nominal speed				rpm	1500		3000		
	Nominal servo motor output power				W	500		900		
Maximum current				A rms	25.1					
Servo motor characteristics										
Maximum mechanical speed				rpm	6000					
Constants (at 120°C)	Torque				Nm/A rms	0.45				
	Back emf				V rms/ krpm	29				
Rotor	Number of poles					8				
	Inertia	Without brake		J_m	kgcm²	1.4				
		With brake		J_m	kgcm²	2.018				
Stator (at 20°C)	Resistance (phase/phase)				Ω	0.87				
	Inductance (phase/phase)				mH	4				
	Electrical time constant				ms	4.6				
Holding brake (depending on model)					See page 2/144					

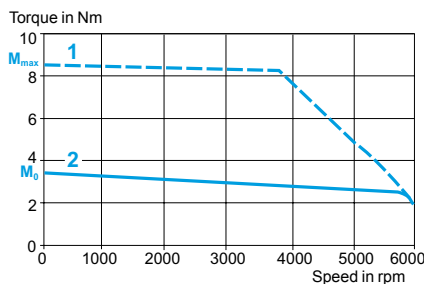
Torque/speed curves

BSH 1001T servo motor

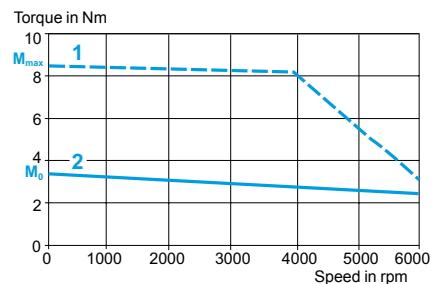
With LXM 05●D28F1 servo drive
115 V single-phase



With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



- 1 Peak torque
- 2 Continuous torque

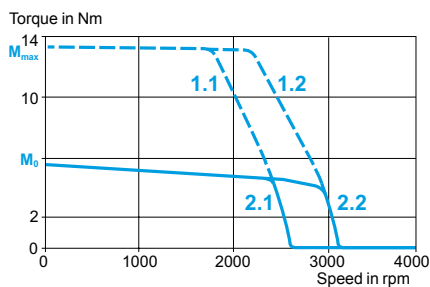
Characteristics of BSH 1002M/1002P/1002T servo motors

Type of servo motor				BSH 1002M		BSH 1002P		BSH 1002T		
Associated with Lexium 05 servo drive				LXM 05 ●D14N4	LXM 05 ●D28M2	LXM 05 ●D17M3X	LXM 05 ●D22N4	LXM 05 ●D42M3X		
Line supply voltage			V	400/480 3-phase	230 single phase	230 3-phase	400/480 3-phase	230 3-phase		
Switching frequency			kHz	4	8					
Torque	Continuous stall		M_o	Nm	5.5					
	Peak stall		M_{max}	Nm	13.3	16	11.23	13.92	16	
Nominal operating point	Nominal torque		Nm	4.96				4.4		
	Nominal speed		rpm	1500				3000		
	Nominal servo motor output power		W	780				1400		
Maximum current			A rms	9	17.1				35.4	
Servo motor characteristics										
Maximum mechanical speed			rpm	6000						
Constants (at 120°C)	Torque		Nm/A rms	2.32	1.21				0.59	
	Back emf		V rms/ krpm	146	77				37	
Rotor	Number of poles			8						
	Inertia	Without brake	J_m	kgcm²	2.31					
		With brake	J_m	kgcm²	2.928					
Stator (at 20°C)	Resistance (phase/phase)		Ω	8.6	2.4				0.56	
	Inductance (phase/phase)		mH	45.7	12.7				3	
	Electrical time constant		ms	5.31	5.29				5.36	
Holding brake (depending on model)				See page 2/144						

Torque/speed curves

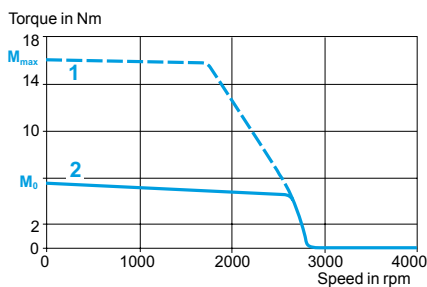
BSH 1002M servo motor

With LXM 05●D14N4 servo drive
400/480 V three-phase

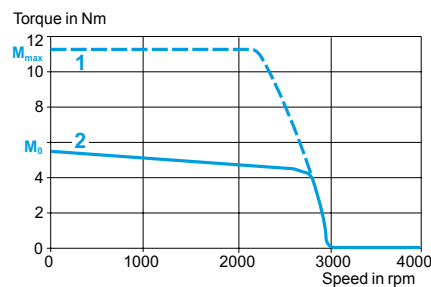


BSH 1002P servo motor

With LXM 05●D28M2 servo drive
230 V single-phase

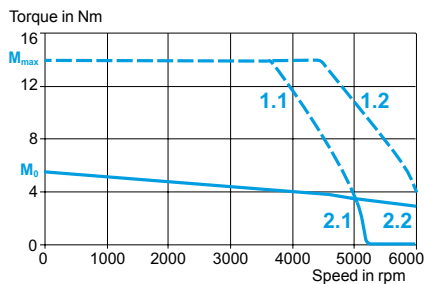


With LXM 05●D17M3X servo drive
230 V 3-phase



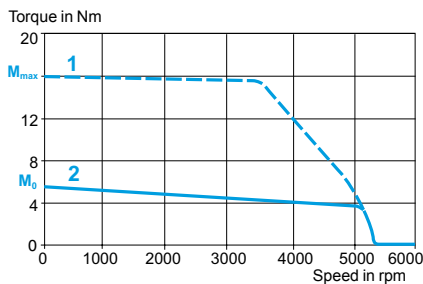
BSH 1002P servo motor(continued)

With LXM 05●D22N4 servo drive
400/480 V three-phase



BSH 1002T servo motor

With LXM 05●D42M3X servo drive
230 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

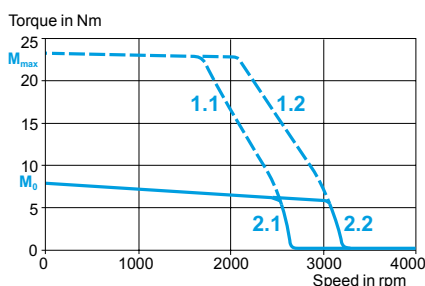
Characteristics of BSH 1003M/1003P servo motors

Type of servo motor		BSH 1003M	BSH 1003P		
Associated with Lexium 05 servo drive		LXM 05 ●D22N4	LXM 05 ●D28M2	LXM 05 ●D42M3X	LXM 05 ●D34N4
Line supply voltage	V	400/480 3-phase	230 single phase	230 3-phase	400/480 3-phase
Switching frequency	kHz	4			
Torque	Continuous stall M_0	Nm	7.8		
	Peak stall M_{max}	Nm	23.17	19.69	23.17
Nominal operating point	Nominal torque	Nm	6.73		5.7
	Nominal speed	rpm	1500		3000
	Nominal servo motor output power	W	1100		1800
Maximum current	A rms	14.7	28.3		
Servo motor characteristics					
Maximum mechanical speed	rpm	6000			
Constants (at 120°C)	Torque	Nm/A rms	2.35	1.22	
	Back emf	V rms/ krpm	148	77	
Rotor	Number of poles		8		
	Inertia Without brake J_m	kgcm ²	3.22		
	With brake J_m	kgcm ²	3.838		
Stator (at 20°C)	Resistance (phase/phase)	Ω	5.3	1.43	
	Inductance (phase/phase)	mH	32.5	8.8	
	Electrical time constant	ms	6.13	6.15	
Holding brake (depending on model)		See page 2/144			

Torque/speed curves

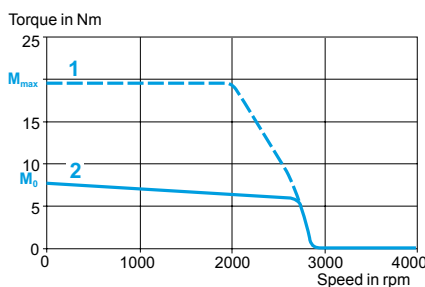
BSH 1003M servo motor

With LXM 05●D22N4 servo drive
400/480 V three-phase

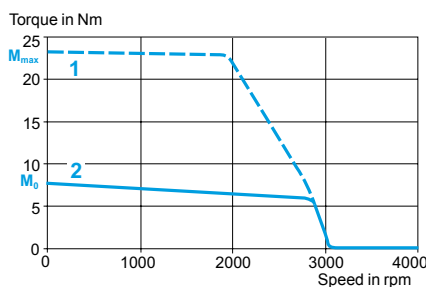


BSH 1003P servo motor

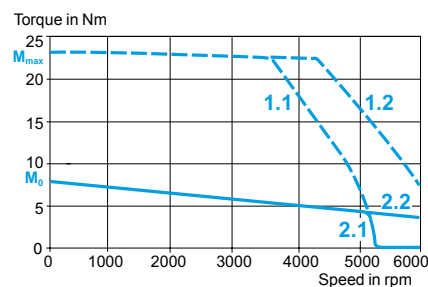
With LXM 05●D28M2 servo drive
230 V single-phase



With LXM 05●D42M3X servo drive
230 V 3-phase



With LXM 05●D34N4 servo drive
400/480 V three-phase



1 Peak torque
2 Continuous torque

1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

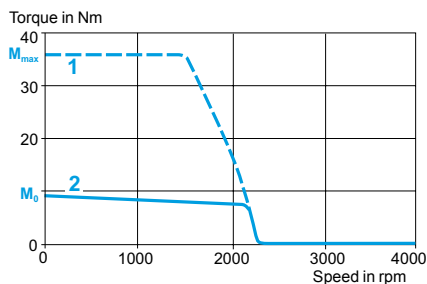
Characteristics of BSH 1004P servo motors

Type of servo motor				BSH 1004P		
Associated with Lexium 05 servo drive				LXM 05 ●D42M3X	LXM 05 ●D34N4	LXM 05 ●D57N4
Line supply voltage			V	230 3-phase	400/480 3-phase	400/480 3-phase
Switching frequency			kHz	8		
Torque	Continuous stall		M_o	Nm	9.31	
	Peak stall		M_{max}	Nm	35.7	23.47 35.7
Nominal operating point	Nominal torque		Nm	8.22	7.1	
	Nominal speed		rpm	1500	3000	
	Nominal servo motor output power		W	1300	2200	
Maximum current			A rms	32.3		
Servo motor characteristics						
Maximum mechanical speed			rpm	6000		
Constants (at 120°C)	Torque		Nm/A rms	1.62		
	Back emf		V rms/krpm	103		
Rotor	Number of poles			8		
	Inertia	Without brake	J_m	kgcm²	4.22	
		With brake	J_m	kgcm²	5.245	
Stator (at 20°C)	Resistance (phase/phase)		Ω	1.81		
	Inductance (phase/phase)		mH	11.8		
	Electrical time constant		ms	6.52		
Holding brake (depending on model)				See page 2/144		

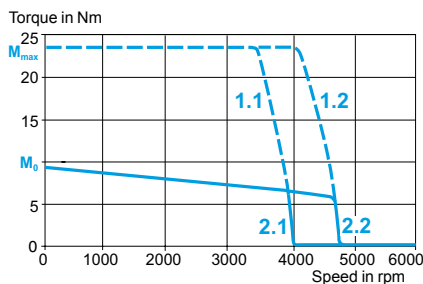
Torque/speed curves

BSH 1004P servo motor

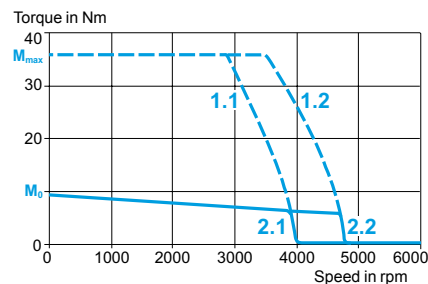
With LXM 05●D42M3X servo drive
115 V single-phase



With LXM 05●D34N4 servo drive
400/480 V three-phase



With LXM 05●D57N4 servo drive
400/480 V three-phase



1 Peak torque

2 Continuous torque

1.1 Peak torque at 400 V, 3-phase

2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase

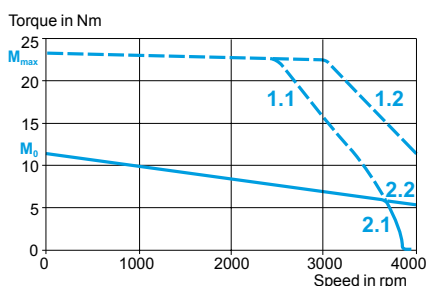
2.2 Continuous torque at 480 V, 3-phase

Characteristics of BSH 1401P/1401T servo motors					
Type of servo motor			BSH 1401P		BSH 1401T
Associated with Lexium 05 servo drive			LXM 05 ●D34N4		LXM 05 ●D42M3X
Line supply voltage		V	400/480 3-phase		230 3-phase
Switching frequency		kHz	4		
Torque	Continuous stall	M_0	Nm	11.4	
	Peak stall	M_{max}	Nm	23.33	
Nominal operating point	Nominal torque		Nm	6.9	
	Nominal speed		rpm	3000	
	Nominal servo motor output power		W	2200	
Maximum current		A rms	20.8		37.1
Servo motor characteristics					
Maximum mechanical speed		rpm	4000		
Constants (at 120°C)	Torque	Nm/A rms	1.43		0.8
	Back emf	V rms/krpm	100		56
Rotor	Number of poles		10		
	Inertia	Without brake J_m	kgcm²	7.41	
		With brake J_m	kgcm²	9.21	
Stator (at 20°C)	Resistance (phase/phase)		Ω	1.41	
	Inductance (phase/phase)		mH	15.6	
	Electrical time constant		ms	11.06	
Holding brake (depending on model)			See page 2/144		

Torque/speed curves

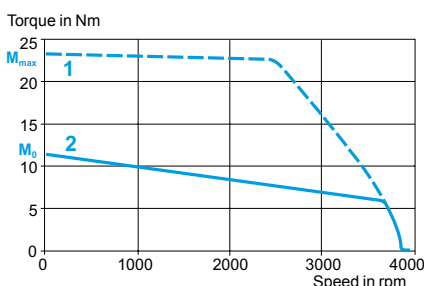
BSH 1401P servo motor

With LXM 05●D34N4 servo drive
400/480 V three-phase



BSH 1401T servo motor

With LXM 05●D42M3X servo drive
230 V 3-phase



1 Peak torque

2 Continuous torque

1.1 Peak torque at 400 V, 3-phase

2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase

2.2 Continuous torque at 480 V, 3-phase

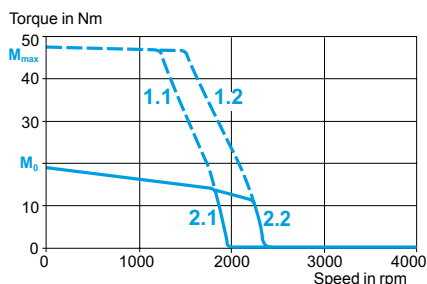
Characteristics of BSH 1402M/1402P/1402T servo motors

Type of servo motor		BSH 1402M	BSH 1402P		BSH 1402T
Associated with Lexium 05 servo drive		LXM 05 ●D34N4	LXM 05 ●D42M3X	LXM 05 ●D57N4	LXM 05 ●D42M3X
Line supply voltage	V	400/480 3-phase	230 3-phase	400/480 3-phase	230 3-phase
Switching frequency	kHz	4			
Torque	Continuous stall	M_0	Nm	19.2	14.4
	Peak stall	M_{max}	Nm	47.5	24.56
Nominal operating point	Nominal torque	Nm	15	10.8	9.2
	Nominal speed	rpm	1500	3000	
	Nominal servo motor output power	W	2350	3400	2900
Maximum current	A rms	22.4	44.1		75.2
Servo motor characteristics					
Maximum mechanical speed	rpm	4000			
Constants (at 120°C)	Torque	Nm/A rms	2.91	1.47	0.87
	Back emf	V rms/ krpm	199	101	59
Rotor	Number of poles		10		
	Inertia Without brake	J_m	kgcm ²	12.68	
	With brake	J_m	kgcm ²	14.48	
Stator (at 20°C)	Resistance (phase/phase)	Ω	2.32	0.6	0.21
	Inductance (phase/phase)	mH	28.6	7.4	2.54
	Electrical time constant	ms	12.33		12.1
Holding brake (depending on model)		See page 2/144			

Torque/speed curves

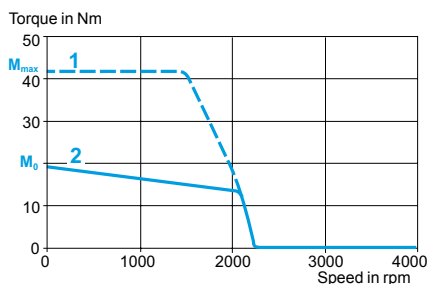
BSH 1402M servo motor

With LXM 05●D34N4 servo drive
400/480 V three-phase

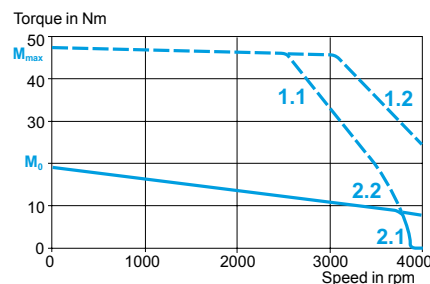


BSH 1402P servo motor

With LXM 05●D42M3X servo drive
230 V 3-phase

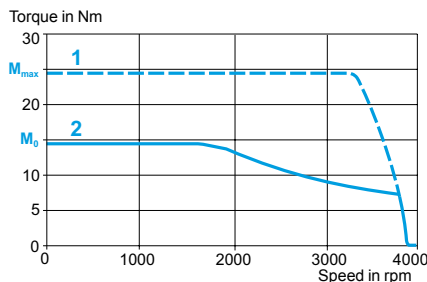


With LXM 05●D57N4 servo drive
230 V 3-phase



BSH 1402T servo motor

With LXM 05●D42M3X servo drive
230 V 3-phase



- 1 Peak torque
2 Continuous torque

- 1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

- 1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

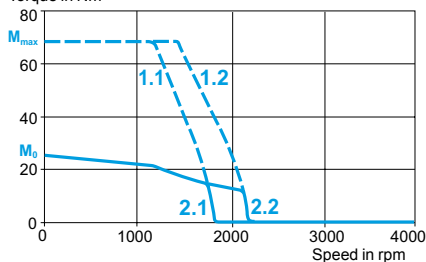
Characteristics of BSH 1403M/1403P servo motors					
Type of servo motor			BSH 1403M		BSH 1403P
Associated with Lexium 05 servo drive			LXM 05 ●D34N4	LXM 05 ●D57N4	LXM 05 ●D57N4
Line supply voltage		V	400/480 3-phase		
Switching frequency		kHz	4		
Torque	Continuous stall	M_0	Nm	25.4	
	Peak stall	M_{max}	Nm	68	71.7
Nominal operating point	Nominal torque		Nm	17.2	20.3
	Nominal speed		rpm	1500	
	Nominal servo motor output power		W	2700	3200
Maximum current		A rms	31.3		61
Servo motor characteristics					
Maximum mechanical speed		rpm	4000		
Constants (at 120°C)	Torque		Nm/A rms	3.09	1.58
	Back emf		V rms/ krpm	205	105
Rotor	Number of poles			10	
	Inertia	Without brake	J_m	kgcm²	17.94
		With brake	J_m	kgcm²	23.44
Stator (at 20°C)	Resistance (phase/phase)		Ω	1.52	0.4
	Inductance (phase/phase)		mH	19.4	5.1
	Electrical time constant		ms	12.76	12.75
Holding brake (depending on model)			See page 2/144		

Torque/speed curves

BSH 1403M servo motor

With LXM 05●D34N4 servo drive
400/480 V three-phase

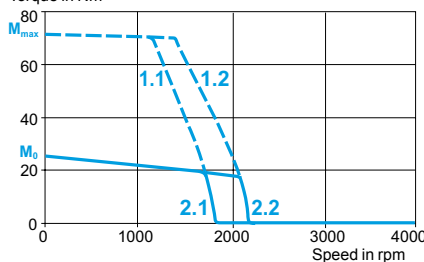
Torque in Nm



1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

With LXM 05●D57N4 servo drive
400/480 V three-phase

Torque in Nm

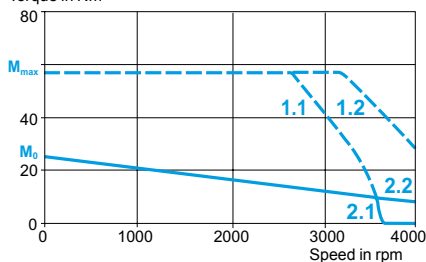


1.1 Peak torque at 480 V, 3-phase
2.1 Continuous torque at 480 V, 3-phase

BSH 1403P servo motor

With LXM 05●D57N4 servo drive
400/480 V three-phase

Torque in Nm



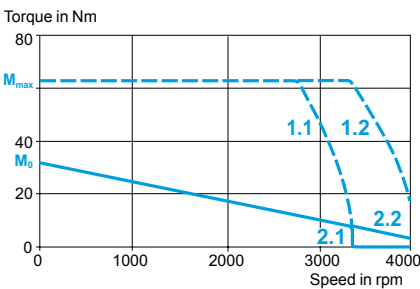
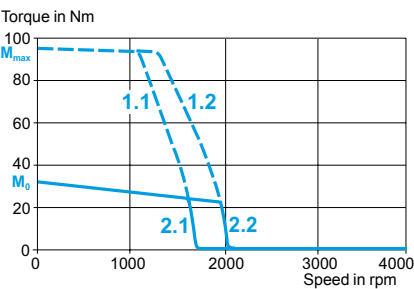
Characteristics of BSH 1404M/1404P servo motors				
Type of servo motor		BSH 1404M		BSH 1404P
Associated with Lexium 05 servo drive		LXM 05 ●D57N4		
Line supply voltage		V	400/480 3-phase	
Switching frequency		kHz	4	
Torque	Continuous stall	M_0	Nm	32.1
	Peak stall	M_{max}	Nm	95
Nominal operating point	Nominal torque		Nm	24.9
	Nominal speed		rpm	1500
	Nominal servo motor output power		W	3900
Maximum current		A rms	47.8	95.6
Servo motor characteristics				
Maximum mechanical speed		rpm	4000	
Constants (at 120°C)	Torque	Nm/A rms	3.12	1.57
	Back emf	V rms/ krpm	208	104
Rotor	Number of poles		10	
	Inertia Without brake	J_m	kgcm ²	23.7
	With brake	J_m	kgcm ²	29.2
Stator (at 20°C)	Resistance (phase/phase)	Ω	1.12	0.28
	Inductance (phase/phase)	mH	15.6	3.9
	Electrical time constant	ms	13.93	
Holding brake (depending on model)			See page 2/144	

Torque/speed curves

BSH 1404M servo motor	BSH 1404P servo motor
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With LXM 05●D57N4 servo drive
400/480 V three-phase

With LXM 05●D57N4 servo drive
400/480 V three-phase



1.1 Peak torque at 400 V, 3-phase
2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase
2.2 Continuous torque at 480 V, 3-phase

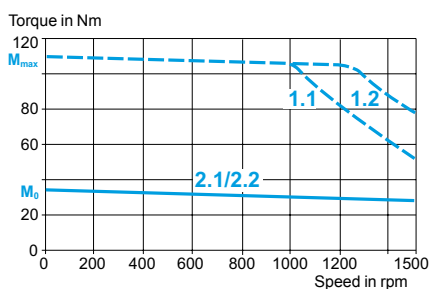
Characteristics of BSH 2051M servo motors

Type of servo motor			BSH 2051M		
Associated with Lexium 05 servo drive			LXM 05 ●D57N4		
Line supply voltage			V	400/480 3-phase	
Switching frequency			kHz	4	
Torque	Continuous stall	M_0	Nm	34.4	
	Peak stall	M_{max}	Nm	110	
Nominal operating point	Nominal torque		Nm	28.2	
	Nominal speed		rpm	1500	
	Nominal servo motor output power		W	4500	
Maximum current			A rms	40.4	
Servo motor characteristics					
Maximum mechanical speed			rpm	3800	
Constants (at 120°C)	Torque		Nm/A rms	3.1	
	Back emf		V rms/krpm	200	
Rotor	Number of poles			10	
	Inertia	Without brake	J_m	kgcm ²	71.4
		With brake	J_m	kgcm ²	87.4
Stator (at 20°C)	Resistance (phase/phase)		Ω	1.1	
	Inductance (phase/phase)		mH	21.3	
	Electrical time constant		ms	19.36	
Holding brake (depending on model)				See page 2/144	

Torque/speed curves

BSH 2051M servo motor

With LXM 05●D57N4 servo drive
400/480 V three-phase

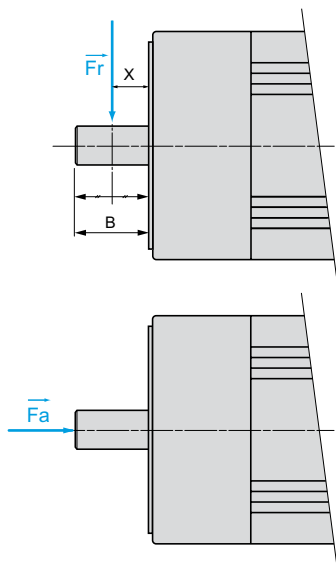


1.1 Peak torque at 400 V, 3-phase

2.1 Continuous torque at 400 V, 3-phase

1.2 Peak torque at 480 V, 3-phase

2.2 Continuous torque at 480 V, 3-phase



Radial and axial forces permitted on the motor shaft

Even when the servo motors are used under optimum conditions, their service life is limited by that of the bearings.

Conditions

Nominal service life of bearings (1)	$L_{10h} = 20,000$ hours
Ambient temperature (bearing temperature $\sim 100^{\circ}\text{C}$)	40°C
Force application point	F_r applied at the middle of the shaft end $X = B/2$ (dimension B, see page 2/142)

(1) Hours of use with a failure probability of 10%



The following conditions must be adhered to:

- Radial and axial forces must not be applied simultaneously
- Shaft end with IP 50 or IP 65 degree of protection
- The bearings cannot be changed by the user as the built-in position sensor must be realigned if the unit is dismantled.

Mechanical speed			Maximum radial force Fr							
		rpm	1000	2000	3000	4000	5000	6000	7000	8000
Servo motor	BSH 0551	N	340	270	240	220	200	190	180	170
	BSH 0552	N	370	290	260	230	220	200	190	190
	BSH 0553	N	390	310	270	240	230	210	200	190
	BSH 0701	N	660	520	460	410	380	360	–	–
	BSH 0702	N	710	560	490	450	410	390	–	–
	BSH 0703	N	730	580	510	460	430	400	–	–
	BSH 1001	N	900	720	630	570	530	–	–	–
	BSH 1002	N	990	790	690	620	–	–	–	–
	BSH 1003	N	1050	830	730	660	–	–	–	–
	BSH 1004	N	1070	850	740	–	–	–	–	–
	BSH 1401	N	2210	1760	1530	–	–	–	–	–
	BSH 1402	N	2430	1930	1680	–	–	–	–	–
	BSH 1403	N	2560	2030	1780	–	–	–	–	–
	BSH 1404	N	2660	2110	1840	–	–	–	–	–
	BSH 2051	N	3730	2960	2580	–	–	–	–	–

Maximum axial force: $F_a = 0.2 \times F_r$

Characteristics of servo motor/servo drive power connection cables

Preassembled cordsets with connector at servo motor end				
Type of cordset		VW3 M5 101 R●●●	VW3 M5 102 R●●●	VW3 M5 103 R●●●
External sleeve, insulation		PUR orange coloured RAL 2003, TPM or PP/PE		
Capacity	pF/m	< 70 (conductors/shielding)		
Number of conductors (shielded)		[(4 x 1.5 mm ²) + (2 x 1 mm ²)]	[(4 x 2.5 mm ²) + (2 x 1 mm ²)]	[(4 x 4 mm ²) + (2 x 1 mm ²)]
Connector type		1 M23 industrial connector (servo motor side) and 1 end with flying leads (servo drive side)		1 M40 industrial connector (servo motor side) and 1 end with flying leads (servo drive side)
External diameter	mm	12 ± 0.2	14.3 ± 0.3	16.3 ± 0.3
Curvature radius	mm	90, suitable for daisy-chaining, cable-carrier system	110, suitable for daisy-chaining, cable-carrier system	125, suitable for daisy-chaining, cable-carrier system
Working voltage	V	600		
Maximum length	m	75 (1)		
Operating temperature	°C	- 40...+ 90 (fixed), - 20...+ 80 (mobile)		
Certifications		UL, CSA, VDE, CE, DESINA		

Cables without connectors				
Cable type		VW3 M5 301 R●●●●	VW3 M5 302 R●●●●	VW3 M5 303 R●●●●
External sleeve, insulation		PUR orange coloured RAL 2003, TPM or PP/PE		
Capacity	pF/m	< 70 (conductors/shielding)		
Number of conductors (shielded)		[(4 x 1.5 mm ²) + (2 x 1 mm ²)]	[(4 x 2.5 mm ²) + (2 x 1 mm ²)]	[(4 x 4 mm ²) + (2 x 1 mm ²)]
Connector type		None, see page 2/141		
External diameter	mm	12 ± 0.2	14.3 ± 0.3	16.3 ± 0.3
Curvature radius	mm	90, suitable for daisy-chaining, cable-carrier system	110, suitable for daisy-chaining, cable-carrier system	125, suitable for daisy-chaining, cable-carrier system
Working voltage	V	600		
Maximum length	m	100		
Operating temperature	°C	- 40...+ 90 (fixed), - 20...+ 80 (mobile)		
Certifications		UL, CSA, VDE, CE, DESINA		

Characteristics of the servo motor/servo drive control connection cables

Preassembled cordsets with connector at both ends (servo motor and servo drive)				
Type of cordset		VW3 M8 101 R●●●		
Type of encoder		SinCos encoder		
External sleeve, insulation		PUR green coloured RAL 6018, polyester		
Number of conductors (shielded)		[5 x (2 x 0.25 mm ²) + (2 x 0.5 mm ²)]		
External diameter	mm	8.8 ± 0.2		
Connector type		1 M23 industrial connector (servo motor side) and 1 12-way female Molex connector (servo drive side)		
Min. curvature radius	mm	68, suitable for daisy-chaining, cable-carrier system		
Working voltage	V	350 (0.25 mm ²), 500 (0.5 mm ²)		
Maximum length	m	75 (1)		
Operating temperature	°C	- 50...+ 90 (fixed), - 40...+ 80 (mobile)		
Certifications		UL, CSA, VDE, CE, DESINA		

Cables without connectors				
Cable type		VW3 M8 221 R●●●●		
Type of encoder		SinCos encoder		
External sleeve, insulation		PUR green coloured RAL 6018, polyester		
Number of conductors (shielded)		[5 x (2 x 0.25 mm ²) + (2 x 0.5 mm ²)]		
External diameter	mm	8.8 ± 0.2		
Connector type		None, see page 2/141		
Min. curvature radius	mm	68, suitable for daisy-chaining, cable-carrier system		
Working voltage	V	350 (0.25 mm ²), 500 (0.5 mm ²)		
Maximum length	m	100		
Operating temperature	°C	- 50...+ 90 (fixed), - 40...+ 80 (mobile)		
Certifications		UL, CSA, VDE, CE, DESINA		

(1) For cables longer than 75 m, please consult your Regional Sales Office.

105990



BSH 055... 1A

105991



BSH 070... 1A

BSH servo motor

The BSH servo motors shown below are supplied without a gearbox.
For GBX gearboxes see page 2/149.

Continuous stall torque	Peak stall torque	Nominal servo motor output power	Nominal speed	Maximum mechanical speed	Associated LXM 05 servo drive	Reference (1)	Weight (2)
Nm	Nm	W	rpm	rpm			kg
0.5	1.08 1.4	150	3000	9000	CU70M2	BSH 0551TA	1.160
		150	3000	9000	●D10F1		
		270	6000	9000	●D10M2		
		270	6000	9000	●D10M3X		
0.77	1.31	240	3000	9000	CU70M2	BSH 0552TA	1.470
0.9	1.77	250	3000	9000	●D10F1	BSH 0552PA	1.470
		450	6000	9000	●D10M2		
		450	6000	9000	●D10M3X		
		250	3000	9000	CU70M2		
2.17	2.3	130	1500	9000	CU70M2	BSH 0552MA	1.470
		130	1500	9000	●D10M2		
		130	1500	9000	●D10M3X		
		250	3000	9000	CU70M2		
2.7	2.7	250	3000	9000	●D17F1	BSH 0552TA	1.470
		250	3000	9000	●D10M2		
		250	3000	9000	●D10M3X		
		250	3000	9000	●D14N4		
1.3	3.18	350	3000	9000	●D10M2	BSH 0553PA	1.760
		350	3000	9000	●D10M3X		
		350	3000	9000	●D17F1		
		350	3000	9000	●D17M2		
3.31	3.31	350	3000	9000	●D17M3X	BSH 0553TA	1.760
		350	3000	9000	●D17M2		
		350	3000	9000	●D17M3X		
		350	3000	9000	●D17M2		
3.5	3.5	190	1500	9000	●D10M2	BSH 0553MA	1.760
		190	1500	9000	●D10M3X		
		350	3000	9000	●D14N4		
		350	3000	9000	●D14N4		
1.4	2.42	380	3000	8000	●D10F1	BSH 0701TA	2.200
		400	3000	8000	●D10M3X		
		210	1500	8000	●D10M3X		
		400	3000	8000	●D10M2		
2.66	2.66	400	3000	8000	●D10M3X	BSH 0701MA	2.200
		400	3000	8000	●D10M2		
		400	3000	8000	●D10M3X		
		400	3000	8000	●D10M3X		
3.19	3.19	400	3000	8000	●D17M2	BSH 0701TA	2.200
		400	3000	8000	●D17M3X		
		400	3000	8000	●D17M3X		
		400	3000	8000	●D17M3X		
2.12	4.14	570	3000	8000	●D17F1	BSH 0702TA	2.890
		600	3000	8000	●D17M2		
		600	3000	8000	●D10M2		
		600	3000	8000	●D10M3X		
4.57	4.57	600	3000	8000	●D10M2	BSH 0702PA	2.890
		600	3000	8000	●D10M3X		
		600	3000	8000	●D10M3X		
		600	3000	8000	●D10M3X		
5.63	5.63	300	1500	8000	●D10M2	BSH 0702MA	2.890
		300	1500	8000	●D10M3X		
		600	3000	8000	●D17M2		
		600	3000	8000	●D17M3X		
6.8	6.8	600	3000	8000	●D14N4	BSH 0702PA	2.890
		600	3000	8000	●D14N4		
		600	3000	8000	●D28M2		
		600	3000	8000	●D42M3X		
2.8	7.16	750	3000	8000	●D17M2	BSH 0703PA	3.620
		750	3000	8000	●D17M3X		
		750	3000	8000	●D28F1		
		750	3000	8000	●D28M2		
7.38	7.38	400	1500	8000	●D10M2	BSH 0703TA	3.620
		400	1500	8000	●D10M3X		
		400	1500	8000	●D10M3X		
		400	1500	8000	●D10M3X		
8.6	8.6	750	3000	8000	●D14N4	BSH 0703MA	3.620
		750	3000	8000	●D14N4		
		750	3000	8000	●D22N4		
		750	3000	8000	●D22N4		
8.75	8.75	750	3000	8000	●D42M3X	BSH 0703PA	3.620
		750	3000	8000	●D42M3X		
		750	3000	8000	●D42M3X		
		750	3000	8000	●D42M3X		
10.25	10.25	750	3000	8000	●D28M2	BSH 0703TA	3.620
		750	3000	8000	●D28M2		
		750	3000	8000	●D28M2		
		750	3000	8000	●D28M2		
10.3	10.3	750	3000	8000	●D28M2	BSH 0703PA	3.620
		750	3000	8000	●D28M2		
		750	3000	8000	●D28M2		
		750	3000	8000	●D28M2		

(1) To complete each reference see the table on page 2/139.

(2) Weight of servo motor without brake, no packaging. To obtain the weight of the servo motor with holding brake, see page 2/144.

BSH servo motor (continued)

105992



BSH 100... 1A

105993



BSH 1401P... 1A

Continuous stall torque	Peak stall torque	Nominal servo motor output power	Nominal speed	Maximum mechanical speed	Associated LXM 05 servo drive	Reference (1)	Weight (2)
Nm	Nm	W	rpm	rpm			kg
3.4	7.1	500	1500	6000	●D14N4	BSH 1001M ●●●●A	4.200
		500	1500	6000	●D17M3X	BSH 1001P ●●●●A	4.200
		900	3000	6000	●D22N4		
	8.5	500	1500	6000	●D28F1	BSH 1001T ●●●●A	4.200
		900	3000	6000	●D28M2		
		900	3000	6000	●D42M3X		
5.5	11.23	780	1500	6000	●D17M3X	BSH 1002P ●●●●A	5.900
	13.3	780	1500	6000	●D14N4	BSH 1002M ●●●●A	5.900
	13.92	1400	3000	6000	●D22N4	BSH 1002P ●●●●A	5.900
	16	780	1500	6000	●D28M2		
		1400	3000	6000	●D42M3X	BSH 1002T ●●●●A	5.900
7.8	19.69	1100	1500	6000	●D28M2	BSH 1003P ●●●●A	7.400
	23.01	1800	3000	6000	●D34N4	BSH 1003P ●●●●A	7.400
	23.17	1100	1500	6000	●D22N4	BSH 1003M ●●●●A	7.400
		1100	1500	6000	●D42M3X	BSH 1003P ●●●●A	7.400
9.31	23.47	2200	3000	6000	●D34N4	BSH 1004P ●●●●A	9.500
	35.7	1300	1500	6000	●D42M3X		
		2200	3000	6000	●D57N4		
11.4	23.33	2200	3000	4000	●D34N4	BSH 1401P ●●●●A	11.200
		2200	3000	4000	●D42M3X	BSH 1401T ●●●●A	11.200
14.4	24.56	2900	3000	4000	●D42M3X	BSH 1402T ●●●●P	16.000
19.2	41.94	2350	1500	4000	●D42M3X	BSH 1402P ●●●●A	16.000
	47.5	2350	1500	4000	●D34N4	BSH 1402M ●●●●A	16.000
		3400	3000	4000	●D57N4	BSH 1402P ●●●●A	16.000
25.4	57.32	3900	3000	4000	●D57N4	BSH 1403P ●●●●A	21.200
	68	2700	1500	4000	●D34N4	BSH 1403M ●●●●A	21.200
		71.7	3200	1500	4000	●D57N4	
32.1	63.09	3400	3000	4000	●D57N4	BSH 1404P ●●●●P	26.500
	95	3900	1500	4000	●D57N4	BSH 1404M ●●●●A	26.500
34.4	110	4500	1500	3800	●D57N4	BSH 2051M ●●●●A	35.000

To order a BSH servo motor, complete each reference above with:

		BSH 1401P					A
Shaft end	IP 50	Untapped	0				
		Keyed	1				
	IP 65	Untapped	2				
		Keyed	3				
Integrated sensor	Single turn, SinCos Hiperface® 131,072 points/turn (3)			1			
	Multiturn, SinCos Hiperface® 131,072 points/turn x 4096 turns (3)			2			
Holding brake	Without				A		
	With				F		
Connections	Straight connectors					1	
	Rotatable right-angled connectors					2	
Flange	International standard						A or P (4)

Note: The example above is for a BSH 1401P servo motor. Replace BSH 1401P by the relevant reference for other servo motors.

(1) To complete each reference see the table above.

(2) Weight of servo motor without brake, no packaging. To obtain the weight of the servo motor with holding brake, see page 2/144.

(3) Sensor resolution given for use with a Lexium 05 servo drive.

(4) "A" or "P" depending on model, see table of references above.

2

524626



VW3 M5 10● R●●●

Connection elements

Power cordsets

Description	From servo motor	To servo drive	Composition	Length	Reference	Weight
				m		kg
Cables equipped with one M23 industrial connector (servo motor side)	BSH 055●●	LXM 05●●●●●●●●	[(4 x 1.5 mm ²) + (2 x 1 mm ²)]	3	VW3 M5 101 R30	0.810
	BSH 070●●	depending on		5	VW3 M5 101 R50	1.210
	BSH 100●●	combinations, see		10	VW3 M5 101 R100	2.290
	BSH 1401P	pages 2/112 to		15	VW3 M5 101 R150	3.400
	BSH 1402M	2/135		20	VW3 M5 101 R200	4.510
	BSH 1402P			25	VW3 M5 101 R250	6.200
	BSH 1403M			50	VW3 M5 101 R500	12.325
	BSH 1404M			75	VW3 M5 101 R750	18.450
	BSH 1401T	LXM 05●D42M3X	[(4 x 2.5 mm ²) + (2 x 1 mm ²)]	3	VW3 M5 102 R30	1.070
	BSH 1403P	LXM 05●D57N4		5	VW3 M5 102 R50	1.670
				10	VW3 M5 102 R100	3.210
				15	VW3 M5 102 R150	4.760
				20	VW3 M5 102 R200	6.300
				25	VW3 M5 102 R250	7.945
				50	VW3 M5 102 R500	16.170
				75	VW3 M5 102 R750	24.095
Cables equipped with one M40 industrial connector (servo motor side)	BSH 1402T	LXM 05●D42M3X	[(4 x 4 mm ²) + (2 x 1 mm ²)]	3	VW3 M5 103 R30	1.330
	BSH 1404P	LXM 05●D57N4		5	VW3 M5 103 R50	2.130
	BSH 2051M			10	VW3 M5 103 R100	4.130
				15	VW3 M5 103 R150	6.120
				20	VW3 M5 103 R200	8.090
				25	VW3 M5 103 R250	11.625
				50	VW3 M5 103 R500	23.175
				75	VW3 M5 103 R750	34.725

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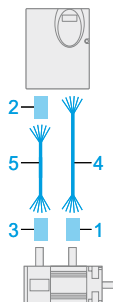


VW3 M8 101 R●●●

Control cordsets

Description	From servo motor	To servo drive	Composition	Length	Reference	Weight
				m		kg
SinCos Hiperface® encoder cables equipped with one M23 industrial connector (servo motor side) and one 12-way female Molex connector (servo drive side)	BSH ●●●●●	LXM 05●●●●●●●●	[5 x (2 x 0.25 mm ²) + (2 x 0.5 mm ²)]	3	VW3 M8 101 R30	0.800
				5	VW3 M8 101 R50	1.200
				10	VW3 M8 101 R100	2.250
				15	VW3 M8 101 R150	3.450
				20	VW3 M8 101 R200	4.350
				25	VW3 M8 101 R250	4.950
				50	VW3 M8 101 R500	13.300
				75	VW3 M8 101 R750	17.650

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Connection elements (continued)

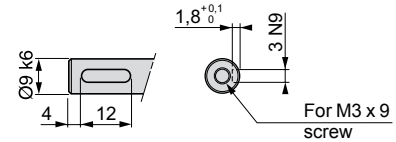
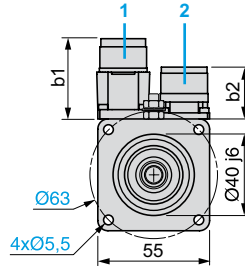
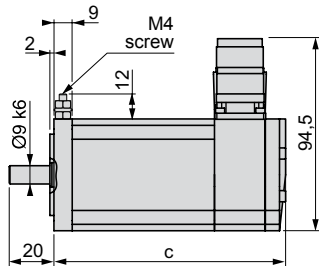
Connection accessories for creating power and control cordsets

Description	Used for	Ref.	For cable of cross-section	Reference	Weight
			mm ²		kg
M23 industrial connectors for creating power cordsets (sold in lots of 5)	BSH 055●●, BSH 070●●, BSH 100●●, BSH 1401P, BSH 1402M, BSH 1402P, BSH 1403M and BSH 1404M servo motors	1	1.5	VW3 M8 215	0.350
	BSH 1401T and BSH 1403P servo motors	1	2.5	VW3 M8 216	0.600
M40 industrial connector for creating power cordsets (sold in lots of 5)	BSH 1402T, BSH 1404P and BSH 2051M servo motors	1	4	VW3 M8 217	0.850
12-way female Molex connector for creating control cordsets (sold in lots of 5)	LXM 05 servo drives ●●●●●● (CN2 connector)	2	—	VW3 M8 213	—
M23 industrial connector for creating control cordsets (sold in lots of 5)	BSH servo motors ●●●●●	3	—	VW3 M8 214	—

Description	From servo motor	To servo drive	Composition	Ref.	Length	Reference	Weight
					m		kg
Cables for creating power cordsets	BSH 055●●	LXM 05●●●●●●●●	[(4 x 1.5 mm ²) + (2 x 1 mm ²)]	4	25	VW3 M5 301 R250	5.550
	BSH 070●●	depending on combinations, see pages 2/112 to 2/135			50	VW3 M5 301 R500	11.100
	BSH 100●●				100	VW3 M5 301 R1000	22.200
	BSH 1401P						
	BSH 1402M						
	BSH 1402P						
Cables for creating control cordsets for SinCos Hiperface® encoders	BSH 1403M						
	BSH 1404M						
	BSH 1401T	LXM 05●D42M3X	[(4 x 2.5 mm ²) + (2 x 1 mm ²)]	4	25	VW3 M5 302 R250	7.725
	BSH 1403P	LXM 05●D57N4			50	VW3 M5 302 R500	15.450
					100	VW3 M5 302 R1000	30.900
	BSH 1402T	LXM 05●D42M3X	[(4 x 4 mm ²) + (2 x 1 mm ²)]	4	25	VW3 M5 303 R250	9.900
	BSH 1404P	LXM 05●D57N4			50	VW3 M5 303 R500	19.800
	BSH 2051M				100	VW3 M5 303 R1000	39.600
	BSH ●●●●●	LXM 05●●●●●●●●	[5 x (2 x 0.25 mm ²) + (2 x 0.5 mm ²)]	5	25	VW3 M8 221 R250	5.250
					50	VW3 M8 221 R500	10.500
					100	VW3 M8 221 R1000	21.000

BSH 055 (example with straight connectors: servo motor/brake power supply 1 and encoder 2)

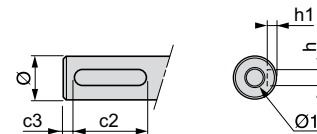
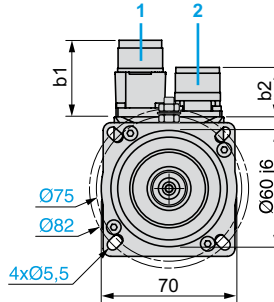
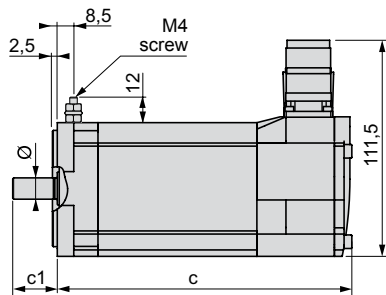
Shaft end, keyed slot (optional)



	Straight connectors		Rotatable angled connectors		c (without brake)	c (with brake)
	b1	b2	b1	b2		
BSH 0551●	39.5	25.5	39.5	39.5	132.5	159
BSH 0552●	39.5	25.5	39.5	39.5	154.5	181
BSH 0553●	39.5	25.5	39.5	39.5	176.5	203

BSH 070 (example with straight connectors: servo motor/brake power supply 1 and encoder 2)

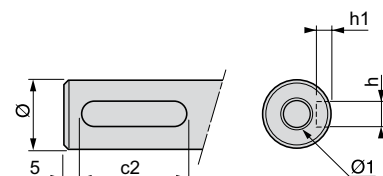
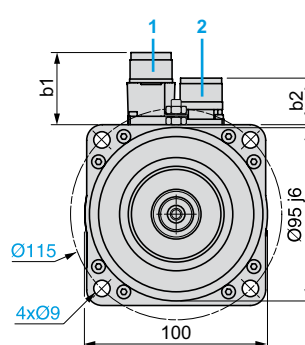
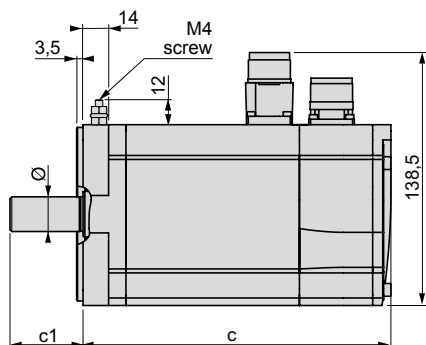
Shaft end, keyed slot (optional)



	Straight connectors		Rotatable angled connectors		c (without brake)	c (with brake)	c1	c2	c3	hrs	h1	Ø	Ø1 for screw
	b1	b2	b1	b2									
BSH 0701●	39.5	25.5	39.5	39.5	154	180	23	18	2.5	4 N9	2.5 ^{+0.1} ₀	11 k6	M4 x 10
BSH 0702●	39.5	25.5	39.5	39.5	187	213	23	18	2.5	4 N9	2.5 ^{+0.1} ₀	11 k6	M4 x 10
BSH 0703●	39.5	25.5	39.5	39.5	220	254	30	20	5	5 N9	3 ^{+0.1} ₀	14 k6	M5 x 12.5

BSH 100 (example with straight connectors: servo motor/brake power supply 1 and encoder 2)

Shaft end, keyed slot (optional)



	Straight connectors		Rotatable angled connectors		c (without brake)	c (with brake)	c1	c2	hrs	h1	Ø	Ø1 for screw
	b1	b2	b1	b2								
BSH 1001●	39.5	25.5	39.5	39.5	169	200	40	30	6 N9	3.5 ^{+0.1} ₀	19 k6	M6 x 16
BSH 1002●	39.5	25.5	39.5	39.5	205	236	40	30	6 N9	3.5 ^{+0.1} ₀	19 k6	M6 x 16
BSH 1003●	39.5	25.5	39.5	39.5	241	272	40	30	6 N9	3.5 ^{+0.1} ₀	19 k6	M6 x 16
BSH 1004●	39.5	25.5	39.5	39.5	277	308	50	40	8 N9	4 ^{+0.1} ₀	24 k6	M8 x 19

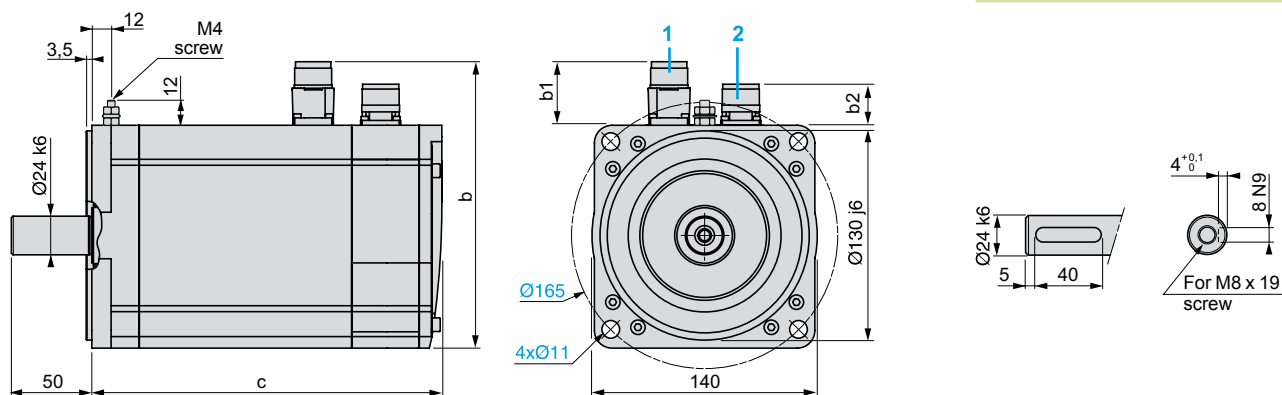
Presentation:
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Characteristics:
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BSH 140 (example with straight connectors: servo motor/brake power supply 1 and encoder 2)

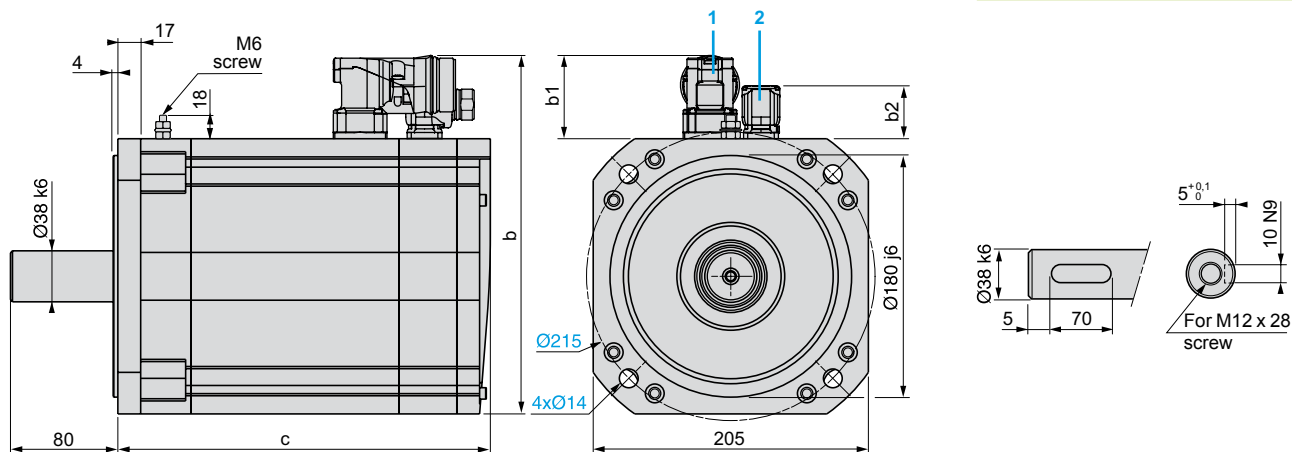
Shaft end, keyed slot (optional)



	Straight connectors			Angled connectors			c (without brake)	c (with brake)
	b	b1	b2	b	b1	b2		
BSH 1401 ●	178	39.5	25.5	178	39.5	39.5	218	256
BSH 1402M, 1402P	178	39.5	25.5	178	39.5	39.5	273	311
BSH 1402T	192.5	54	25.5	198.5	60	39.5	273	311
BSH 1403 ●	178	39.5	25.5	178	39.5	39.5	328	366
BSH 1404M	178	39.5	25.5	178	39.5	39.5	383	421
BSH 1404P	192.5	54	25.5	198.5	60	39.5	383	421

BSH 2051 (example with rotatable angled connectors: servo motor/brake power supply 1 and encoder 2)

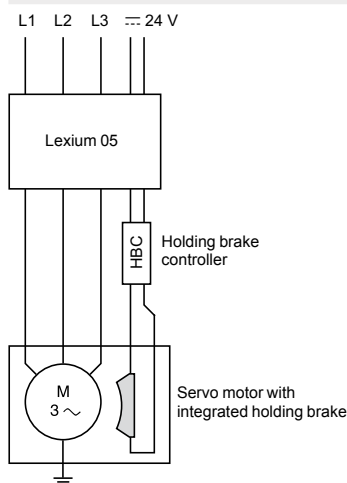
Shaft end, keyed slot (optional)



	Straight connectors			Angled connectors			c (without brake)	c (with brake)
	b	b1	b2	b	b1	b2		
BSH 2051M	259	54	25.5	265	60	39.5	321	370.5

Holding brake

Presentation



The holding brake integrated in the BSH servo motor is an electromagnetic pressure spring brake that blocks the servo motor axis once the output current has been switched off.

In the event of an emergency, such as a power outage or an emergency stop, the drive is immobilized, thus significantly increasing safety.

Blocking the servo motor axis is also necessary in cases of torque overload, such as in the event of vertical axis movement.

The holding brake is activated using the holding brake controller (HBC) **VW3 M3 103** (see page 2/43).

The HBC is an external device. It also ensures electrical isolation.

Characteristics

Type of servo motor	BSH	0551, 0552, 0553	0701, 0702	0703	1001, 1002, 1003	1004	1401, 1402	1403, 1404	2051
Holding torque M_{Br}	Nm	0.8	2	3	9	12	23	36	80
Moment of inertia of rotor(brake only) J_{Br}	kgcm ²	0.0213	0.072	0.23	0.618	1.025	1.8	5.5	16
Electrical clamping power P_{Br}	W	10	11	12	18	17	24	26	40
Nominal current	A	0.4167	0.458	0.5	0.75	0.71	1	1.083	1.667
Supply voltage	V	24 +6/-10%							
Opening time	ms	12	25	35	40	45	50	100	200
Closing time	ms	6	8	15	20	20	40	45	50
Weight (to be added to the weight of the servo motor without brake, see page 2/138)	kg	0.170	0.260	0.450	0.800	0.900	1.400	2.400	5.500

References

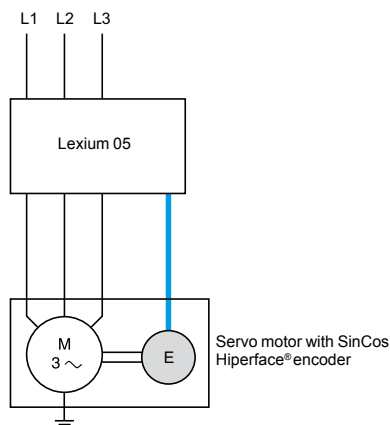


BSH servo motor

For selection of BSH servo motor with or without holding brake, see references on page 2/139.

Encoder integrated in BSH servo motor

Presentation



The standard measurement device is the SinCos Hiperface® single turn or multiturn encoder integrated in BSH servo motors. This measurement device is perfectly suited to the Lexium 05 range of servo drives.

Use of this interface enables:

- Automatic identification of BSH servo motor data by the servo drive
- Automatic initialization of the servo drive's control loops, thus simplifying installation of the motion control device

Characteristics

Type of encoder		Single turn SinCos	Multiturn SinCos
Sine periods per turn		128	
Number of points (1)		131,072	131,072 x 4096 turns
Encoder precision	arc min	± 1.3	
Measurement method		Optical, high resolution	
Interface		Hiperface®	
Operating temperature	°C	-5...+110	

(1) Encoder resolution given for use with a Lexium 05 servo drive.

References



BSH servo motor

For selection of the SinCos Hiperface® single turn or multiturn encoder integrated in the BSH servo motor, see references on page 2/139.

Presentation



GBX planetary gearbox

In many cases, motion control requires the use of planetary gearboxes to adapt speeds and torques, while ensuring the precision demanded by the application.

Schneider Electric has chosen to use GBX gearboxes (made by Neugart) with the BSH range of servo motors. These gearboxes are lubricated for life and are designed for applications which are not susceptible to mechanical backlash. The fact that their use in combination with BSH servo motors has been fully verified and that they are easily assembled, ensures simple, risk-free operation.

The planetary gearboxes are available in 5 sizes (GBX 40...GBX 160) and with 15 reduction ratios (3:1...100:1) (see the table below).

The continuous and peak standstill torques available at the gearbox output are obtained by multiplying the characteristic values of the servo motor by the reduction ratio and efficiency of the gearbox (0.96, 0.94 or 0.9 depending on the reduction ratio).

The table below shows the most suitable servo motor/gearbox combinations. For other combinations, refer to the servo motor data sheets.

BSH servo motor/GBX gearbox combinations

Reduction ratios from 3:1 to 16:1

Type of servo motor	Reduction ratio							
	3:1	4:1	5:1	8:1	9:1	12:1	15:1	16:1
BSH 0551	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40	GBX 40
BSH 0552	GBX 40	GBX 40	GBX 40	GBX 60	GBX 40	GBX 40	GBX 60	GBX 60
BSH 0553	GBX 40	GBX 40	GBX 40	GBX 60	GBX 40	GBX 40	GBX 60	GBX 60
BSH 0701	GBX 60	GBX 60	GBX 60	GBX 60	GBX 60	GBX 60	GBX 60	GBX 60
BSH 0702	GBX 60	GBX 60	GBX 60	GBX 80	GBX 60	GBX 60	GBX 80	GBX 80
BSH 0703	GBX 60	GBX 60	GBX 60	GBX 80	GBX 60	GBX 80	GBX 80	GBX 80
BSH 1001	GBX 80	GBX 80	GBX 80	GBX 80	GBX 80	GBX 80	GBX 80	GBX 80
BSH 1002	GBX 80	GBX 80	GBX 80	GBX 120	GBX 80	GBX 80	GBX 120	GBX 120
BSH 1003	GBX 80	GBX 80	GBX 80	GBX 120	GBX 80	GBX 120	GBX 120	GBX 120
BSH 1004	GBX 120	GBX 120	GBX 120	GBX 120	GBX 120	GBX 120	GBX 160	GBX 160
BSH 1401	GBX 120	GBX 120	GBX 120	GBX 120	GBX 120	GBX 120	GBX 160	GBX 160
BSH 1402	GBX 120	GBX 120	GBX 120	GBX 160	–	GBX 160	GBX 160	GBX 160
BSH 1403	GBX 120	GBX 120	GBX 120	GBX 160	–	GBX 160	GBX 160	GBX 160
BSH 1404	GBX 120	GBX 120	GBX 160	GBX 160	–	GBX 160	GBX 160	GBX 160
BSH 2051	(1)	(1)	(1)	(1)	–	–	–	–

Reduction ratios from 20:1 to 100:1

Type of servo motor	Reduction ratio						
	20:1	25:1	32:1	40:1	60:1	80:1	100:1
BSH 0551	GBX 40	GBX 60	GBX 60	GBX 60	GBX 60	(1)	(1)
BSH 0552	GBX 60	GBX 60	GBX 60	(1)	(1)	(1)	(1)
BSH 0553	GBX 60	(1)	(1)	(1)	(1)	(1)	(1)
BSH 0701	GBX 80	GBX 80	GBX 80	GBX 80	GBX 120	GBX 120	GBX 120
BSH 0702	GBX 80	GBX 80	GBX 120	GBX 120	GBX 120	GBX 120	GBX 120
BSH 0703	GBX 80	GBX 120	GBX 120	GBX 120	GBX 120	GBX 120	GBX 120
BSH 1001	GBX 80	GBX 120	GBX 120	GBX 120	–	–	–
BSH 1002	GBX 120	GBX 160	GBX 160	GBX 160	–	–	–
BSH 1003	GBX 120	GBX 160	GBX 160	GBX 160	–	–	–
BSH 1004	GBX 160	GBX 160	GBX 160	GBX 160	–	–	–
BSH 1401	GBX 160	GBX 160	GBX 160	GBX 160	–	–	–
BSH 1402	GBX 160	GBX 160	GBX 160	GBX 160	–	–	–
BSH 1403	GBX 160	GBX 160	GBX 160	GBX 160	–	–	–
BSH 1404	GBX 160	–	–	–	–	–	–
BSH 2051	–	–	–	–	–	–	–

(1) For this combination, please consult your Regional Sales Office.

GBX 60

For these combinations, you must check that the application will not exceed the maximum output torque of the gearbox (see the values given on page 2/148).

Characteristics of GBX gearboxes							
Type of gearbox			GBX 40	GBX 60	GBX 80	GBX 120	GBX 160
Type of gearbox			Planetary gearbox with straight teeth				
Backlash	3:1... 8:1	arc min	< 24	< 16	< 9	< 8	< 6
	9:1... 40:1		< 28	< 20	< 14	< 12	< 10
	60:1... 100:1		< 30	< 22	< 16	< 14	–
Torsion rigidity	3:1... 8:1	Nm/ arc min	1	2.3	6	12	38
	9:1... 40:1		1.1	2.5	6.5	13	41
	60:1... 100:1		1	2.5	6.3	12	–
Noise level (1)		dB (A)	55	58	60	65	70
Casing			Black anodized aluminum				
Shaft material			C 45				
Shaft output dust and damp protection			IP 54				
Lubrication			Lubricated for life				
Average service life (2)		hrs	30,000				
Mounting position			Any position				
Operating temperature			-25...+90				
Efficiency	3:1...8:1		0.96				
	9:1...40:1		0.94				
	60:1...100:1		0.9				
Maximum permitted radial force (2) (3)	L _{10h} = 10,000 hours	N	200	500	950	2000	6000
	L _{10h} = 30,000 hours	N	160	340	650	1500	4200
Maximum permitted axial force (2)	L _{10h} = 10,000 hours	N	200	600	1200	2800	8000
	L _{10h} = 30,000 hours	N	160	450	900	2100	6000
Moment of inertia of gearbox	3:1	kgcm ²	0.031	0.135	0.77	2.63	12.14
	4:1	kgcm ²	0.022	0.093	0.52	1.79	7.78
	5:1	kgcm ²	0.019	0.078	0.45	1.53	6.07
	8:1	kgcm ²	0.017	0.065	0.39	1.32	4.63
	9:1	kgcm ²	0.03	0.131	0.74	2.62	–
	12:1	kgcm ²	0.029	0.127	0.72	2.56	12.37
	15:1	kgcm ²	0.023	0.077	0.71	2.53	12.35
	16:1	kgcm ²	0.022	0.088	0.5	1.75	7.47
	20:1	kgcm ²	0.019	0.075	0.44	1.5	6.65
	25:1	kgcm ²	0.019	0.075	0.44	1.49	5.81
	32:1	kgcm ²	0.017	0.064	0.39	1.3	6.36
	40:1	kgcm ²	0.016	0.064	0.39	1.3	5.28
	60:1	kgcm ²	0.029	0.076	0.51	2.57	–
	80:1	kgcm ²	0.019	0.075	0.5	1.5	–
	100:1	kgcm ²	0.019	0.075	0.44	1.49	–

(1) Value measured at a distance of 1 m, at no-load for a servo motor speed of 3000 rpm and a reduction ratio of 5:1.

(2) Values given for an output shaft speed of 100 rpm in S1 mode (cyclic ratio = 1) on electrical machines for an ambient temperature of 30°C.

(3) Force applied at mid-point along the output shaft.

Characteristics of GBX gearboxes (continued)

Type of gearbox			GBX 40	GBX 60	GBX 80	GBX 120	GBX 160
Continuous output torque M_{2N} (1)	3:1	Nm	11	28	85	115	400
	4:1	Nm	15	38	115	155	450
	5:1	Nm	14	40	110	195	450
	8:1	Nm	6	18	50	120	450
	9:1	Nm	16.5	44	130	210	—
	12:1	Nm	20	44	120	260	800
	15:1	Nm	18	44	110	230	700
	16:1	Nm	20	44	120	260	800
	20:1	Nm	20	44	120	260	800
	25:1	Nm	18	40	110	230	700
	32:1	Nm	20	44	120	260	800
	40:1	Nm	18	40	110	230	700
	60:1	Nm	20	44	110	260	—
	80:1	Nm	20	44	120	260	—
	100:1	Nm	20	44	120	260	—
Maximum output torque (1)	3:1	Nm	17.6	45	136	184	640
	4:1	Nm	24	61	184	248	720
	5:1	Nm	22	64	176	312	720
	8:1	Nm	10	29	80	192	720
	9:1	Nm	26	70	208	336	—
	12:1	Nm	32	70	192	416	1280
	15:1	Nm	29	70	176	368	1120
	16:1	Nm	32	70	192	416	1280
	20:1	Nm	32	70	192	416	1280
	25:1	Nm	29	64	176	368	1120
	32:1	Nm	32	70	192	416	1280
	40:1	Nm	29	64	176	368	1120
	60:1	Nm	32	70	176	416	—
	80:1	Nm	32	70	192	416	—
	100:1	Nm	32	70	192	416	—

(1) Values given for an output shaft speed of 100 rpm in S1 mode (cyclic ratio = 1) on electrical machines for an ambient temperature of 30°C.

References



GBX ●●●

Size	Reduction ratio	Reference	Weight kg
GBX 40	3:1, 4:1, 5:1 and 8:1	GBX 040●●● ●●● ●F	0.350
	9:1, 12:1, 15:1, 16:1 and 20:1	GBX 040●●● ●●● ●F	0.450
GBX 60	3:1, 4:1, 5:1 and 8:1	GBX 060●●● ●●● ●F	0.900
	9:1, 12:1, 15:1, 16:1, 20:1, 25:1, 32:1 and 40:1	GBX 060●●● ●●● ●F	1.100
	60:1	GBX 060●●● ●●● ●F	1.300
GBX 80	3:1, 4:1, 5:1 and 8:1	GBX 080●●● ●●● ●F	2.100
	9:1, 12:1, 15:1, 16:1, 20:1, 25:1, 32:1 and 40:1	GBX 080●●● ●●● ●F	2.600
	60:1, 80:1 and 100:1	GBX 080●●● ●●● ●F (1)	3.100
GBX 120	3:1, 4:1, 5:1 and 8:1	GBX 120●●● ●●● ●F	6.000
	9:1, 12:1, 15:1, 16:1, 20:1, 25:1, 32:1 and 40:1	GBX 120●●● ●●● ●F	8.000
	60:1, 80:1 and 100:1	GBX 120●●● ●●● ●F	10.000
GBX 160	5:1 and 8:1	GBX 160●●● ●●● ●F	18.000
	12:1, 15:1, 16:1, 20:1, 25:1, 32:1 and 40:1	GBX 160●●● ●●● ●F	22.000

2

To order a GBX planetary gearbox, complete each reference above with:

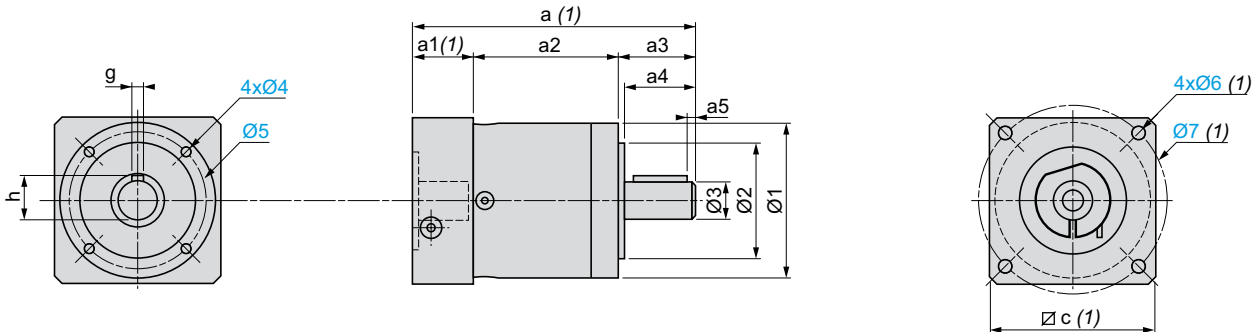
			GBX	●●●	●●●	●●●	●	F
Size	Diameter of the casing (see table of combinations with BSH servo motor on page 2/146)	40 mm	040					
		60 mm	060					
		80 mm	080					
		120 mm	120					
		160 mm	160					
Reduction ratio		3:1		003				
		4:1		004				
		5:1		005				
		8:1		008				
		9:1		009				
		12:1		012				
		15:1		015				
		16:1		016				
		20:1		020				
		25:1		025				
		32:1		032				
		40:1		040				
		60:1		060				
		80:1		080				
		100:1		100				
Associated BSH servo motor	Type	BSH 055			055			
		BSH 070			070			
		BSH 100			100			
		BSH 140			140			
		BSH 205			(2)			
	Model	BSH ●●●1					1	
		BSH ●●●2					2	
		BSH ●●●3					3	
		BSH ●●●4					4	
BSH servo motor adaptation							F	

(1) For a GBX 080 gearbox/BSH 055● servo motor combination, please consult your Regional Sales Office.

(2) For a combination with a BSH 2051 servo motor, please consult your Regional Sales Office.

Dimensions

Servo motor assembly



GBX	a2	a3	a4	a5	hrs	g	Ø1	Ø2	Ø3	Ø4	Ø5
040 003...008	39	26	23	2.5	11.2	3	40	26 h7	10 h7	M4 x 6	34
040 009...020	52	26	23	2.5	11.2	3	40	26 h7	10 h7	M4 x 6	34
060 003...008	47	35	30	2.5	16	5	60	40 h7	14 h7	M5 x 8	52
060 009...040	59.5	35	30	2.5	16	5	60	40 h7	14 h7	M5 x 8	52
060 060	72	35	30	2.5	16	5	60	40 h7	14 h7	M5 x 8	52
080 003...008	60.5	40	36	4	22.5	6	80	60 h7	20 h7	M6 x 10	70
080 009...040	77.5	40	36	4	22.5	6	80	60 h7	20 h7	M6 x 10	70
080 060...100	95	40	36	4	22.5	6	80	60 h7	20 h7	M6 x 10	70
120 003...008	74	55	50	5	28	8	115	80 h7	25 h7	M10 x 16	100
120 009...040	101	55	50	5	28	8	115	80 h7	25 h7	M10 x 16	100
120 060...100	128	55	50	5	28	8	115	80 h7	25 h7	M10 x 16	100
160 005, 008	104	87	80	8	43	12	160	130 h7	40 h7	M12 x 20	145
160 012...040	153.5	87	80	8	43	12	160	130 h7	40 h7	M12 x 20	145

(1) Dimensions a, a1, Øc, Ø6 and Ø7 depend on the planetary gearbox/BSH servo motor combination:

Combinations		Reduction ratios						
Gearbox	Servo motor	3:1 to 8:1	9:1 to 40:1	60:1 to 100:1	3:1 to 100:1	3:1 to 100:1	3:1 to 100:1	3:1 to 100:1
		a	a	a	a1	Ø c	Ø6	Ø7
GBX 040	BSH 055●	89.5	102.5	–	24.5	60	M4	63
GBX 060	BSH 055●	106	118.5	131.5	24	60	M4	63
GBX 060	BSH 0701, 0702	106	118.5	131.5	24	70	M5	75
GBX 060	BSH 0703	113	125.5	138.5	31	70	M5	75
GBX 080 (2)	BSH 055● (2)	–	151	168.5	33.5	80	M4	63
GBX 080	BSH 070●	133.5	151	168.5	33.5	80	M5	82
GBX 080	BSH 1001...1003	143.5	161	178.5	43.5	100	M8	115
GBX 120	BSH 070●	–	203.5	231	47.5	115	M5	75
GBX 120	BSH 1001...1003	176.5	203.5	231	47.5	115	M8	115
GBX 120	BSH 1004	186.5	213.5	241	57.5	115	M8	115
GBX 120	BSH 140●	186.5	213.5	–	57.5	140	M10	165
GBX 160	BSH 1002...1004	–	305	–	64.5	140	M8	115
GBX 160	BSH 140●	255.5	305	–	64.5	140	M10	165

(2) For this combination, please consult your Regional Sales Office.

Mounting

No special tool is required for mounting the GBX planetary gearbox on the BSH servo motor. The usual rules for mechanical mounting must be followed:

- 1 Clean the bearing surfaces and seals.
- 2 Align the shafts that are to be coupled and assemble in vertical position.
- 3 Uniform adhesive force of the servo motor flange on the gearbox flange, with tightening of the Phillips screws.
- 4 Correct tightening torque of the TA ring using a torque wrench (2...40 Nm depending on the gearbox model).

For more information, refer to the instruction sheets supplied with the products.

