

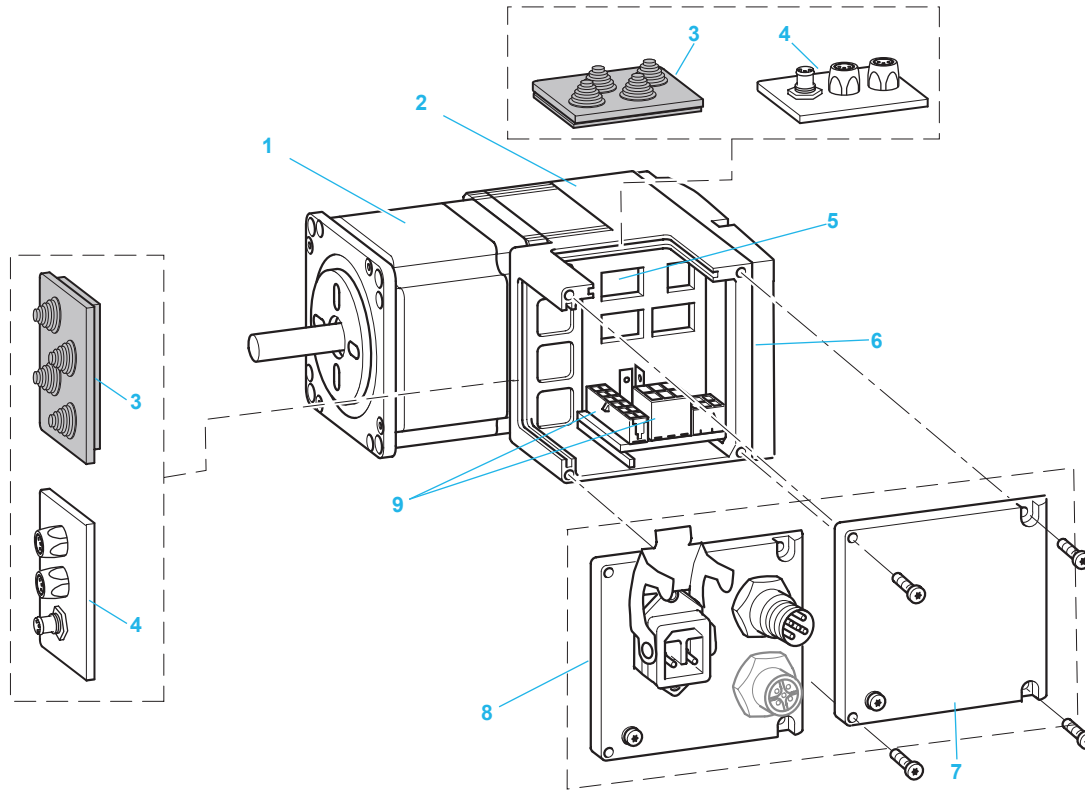
Lexium integrated drives

IL●1 for CANopen, PROFIBUS DP, RS 485

ILS1 with 3-phase stepper motor

Description

ILS1 comprise control electronics with a fieldbus interface for CANopen DS301, PROFIBUS DP or RS 485 and a 3-phase stepper motor. ILS1 is optionally available with printed circuit board connectors or industrial connectors. A holding brake is optionally available for ILS1●85.



- 1 3-phase stepper motor
- 2 Electronics housing
- 3 Insert cable entry (accessory)
- 4 I/O insert with industrial connectors (accessory)
- 5 Settings via parameter switches
- 6 Cover for electronics housing
- 7 Cover for Lexium integrated drives with option "PCB connector"
- 8 Cover for supply voltage --- V and fieldbus connection for Lexium integrated drives with option "industrial connector"
- 9 Electrical interfaces

Certifications		
Conformity to standards		Lexium integrated drives have been developed to comply with the stringent international standards and with the recommendations for adjustable speed power drive systems, specifically: IEC/EN 61800-3 (noise immunity to conducted and radiated high-frequency signals) and IEC/EN 50178 (resistance of devices to vibration).
	EMC immunity	EN 61800-3:2001, second environment
	Conducted and radiated EMC emissions	EN 61800-3:2001-02; IEC 61800-3, Ed.2 ■ Power supplies without external mains filter: <input type="checkbox"/> C3 up to 10 m supply cable length ■ Power supplies with external mains filter: <input type="checkbox"/> C2 up to 20 m supply cable length <input type="checkbox"/> C3 up to 50 m supply cable length
CE marking		The Lexium integrated drives are CE marked in accordance with the European Machinery Directive (98/37/EEC) and the European EMC Directive (2004/108/EEC).
Product certifications		UL (USA), cUL (Canada)
		TÜV certification: Lexium integrated drives are TÜV-certified for device safety and medical devices. The certification includes: ■ Functional safety of electrical/electronic/programmable safety-related electronic systems (IEC 61508:2000; SIL 2) ■ Safety of machinery – functional safety of safety-related electrical and electronic and programmable electronic control systems (IEC 62061:2005; SILcl2) ■ Safety of machinery – safety-related parts of control systems – Part 1: General principles for design (ISO 13849-1:2006; PL d (Category 3))

Ambient conditions		
Ambient temperature (1)	°C	0 ... 65; power reduction by 2%/°C at 50 ... 65
Max. permissible temperature of the power amplifier	°C	105
Max. permissible temperature of the motor (2)	°C	110
Transport and storage temperature	°C	-25 ... +70
Installation height without power reduction	m	< 1000 m above mean sea level
Relative humidity	%	15 ... 85 (not condensing)
Vibration load during operation as per DIN EN 60068-2-6	Number of cycles	10
	Acceleration amplitude:	m/s ² 20
	Frequency range	Hz 10 ... 500
Continuous shocks as per DIN EN 60068-2-29	Number of shocks	1000
	Peak acceleration	m/s ² 150
Shaft wobble and perpendicularity		According to EN 50347 (IEC 60072-1)
Degree of protection as per DIN EN 60034-5		Total except shaft bushing IP54, shaft bushing IP41

Electrical data		
Power supply connection (CN1)		Corresponds to PELV according to DIN 19240, not protected against reverse polarity
Supply voltage range (absolute limit values)	--- V	18 ... 40
Nominal supply voltage	--- V	24 ... 36
Ripple at nominal voltage	V _{pp}	≤ 3.6
Max. current consumption	ILS1●57	A 3.5
	ILS1●851, ILS1●852	A 5
	ILS1●853:	
	■ Winding type P	A 5
■ Winding type T	A 6	
Inrush current		Charging current for capacitor C=1500 µF
External fuse	A	10
Fieldbus interfaces (CN2 and CN3)		
CANopen	Signal inputs/outputs	According to ISO 11898 standard, no galvanic isolation
	Transmission rate	kBaud 50 / 100 / 125 / 250 / 500 / 800 / 1000
	Transmission protocol	CANopen as per DS301
PROFIBUS DP	Signal inputs/outputs	According to RS 485, galvanic isolation, 2-wire
	Transmission rate	kBaud 9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 / 1500 / 3000 / 6000 / 12000
	Transmission protocol	PROFIBUS DP-V0 (data format as per Profidrive V2.0 PPO Type 2)
RS 485	Signal inputs/outputs	According to RS 485, no galvanic isolation, 2-wire
	Transmission rate	kBaud 9.6 / 19.2 / 38.4
	Transmission protocol	Manufacturer-specific

(1) Limit values with flanged motor mounted on a steel plate 300 x 300 x 10 mm

(2) Measured at the surface

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Electrical data			
24 V signal interface (CN4)		4 signals, can each be used as input or output	
24 V signal inputs		Galvanically connected to 0VDC, not protected against reverse polarity	
Logic 0 (U_{low})	V	-3 ... +4.5	
Logic 1 (U_{high})	V	+15 ... +30	
Input current (typical at 24 V)	mA	2	
Debounce time	IO0 and IO1	ms	0.1
	IO2 and IO3	ms	0.01
24 V signal outputs		Switching to plus, short-circuit protected, suitable for inductive load (1000 mH / 100 mA)	
Supply voltage range	V	23 ... 25	
Max. switching current (total)	mA	200	
Max. switching current per output	mA	100	
		The internal power supply unit is protected against: ■ Short circuit of the output voltage ■ Overload of output voltage (limited to 6 W output power)	
Interface for safety function "Safe Torque Off" ("Power Removal") (CN5)		No galvanic isolation; corresponds to RS 485 standard	
Logic 0 (U_{low})	V	-3 ... +4.5	
Logic 1 (U_{high})	V	+15 ... +30	
Input current (typical at 24 V)	$\overline{STO_A}$	mA	≤ 10
	$\overline{STO_B}$	mA	≤ 3
Debounce time	ms	1	
Response time (until shutdown of power amplifier)	ms	< 50	
Max. time offset until detection of signal differences between $\overline{STO_A}$ and $\overline{STO_B}$	S	< 1	
Safety function "Safe Torque Off" ("Power Removal")			
Protection	Of machine	"Safe Torque Off" safety function which forces stopping and/or prevents unintended restarting of the motor, conforming to standard ISO 13849-1, performance level "d" (PL d), and standard IEC/EN 61800-5-2	
	Of the system process	"Safe Torque Off" safety function which forces stopping and/or prevents unintended restarting of the motor, conforming to standard IEC/EN 61508 level SIL2 and standard IEC/EN 61800-5-2	

Mechanical data ILS1●57					
Type of integrated drive		ILS1●571	ILS1●572	ILS1●573	
Winding type		P	P	P	
Max. torque		Nm	0.45	0.9	1.5
Holding torque		Nm	0.51	1.02	1.70
Moment of inertia		kg·cm ²	0.1	0.22	0.38
Positioning resolution per revolution		Inc.	20000		
Systematic angle tolerance per step (1)		arcmin	±6		
Mass		kg	1.3	1.6	2.0
Shaft load (2)	Max. radial force (3)	N	24	24	50
	Max. axial tensile force	N	100		
	Max. axial force pressure	N	8.4		
	Nominal bearing service life (4)	h	20000		

Mechanical data ILS1●85					
Type of integrated drive		ILS1●851	ILS1●852	ILS1●853	
Winding type		P	P	P	T
Max. torque		Nm	2.0	4.0	6.0
Holding torque		Nm	2.0	4.0	6.0
Moment of inertia		kg·cm ²	1.1	2.2	3.3
Positioning resolution		Inc.	20000		
Systematic angle tolerance per step (1)		arcmin	±6		
Mass		kg	2.6	3.6	4.7
Shaft load (2)	Max. radial force (3)	N	100	100	110
	Max. axial tensile force	N	170		
	Max. axial force pressure	N	30		
	Nominal bearing service life (4)	h	20000		
Holding brake					
Holding torque		Nm	6		
Electrical pull-in power		W	22		
Brake release time		ms	40		
Brake application time		ms	20		
Moment of inertia		kg·cm ²	0.2		
Mass		kg	1.8		

(1) Measured at 1000 steps/revolution

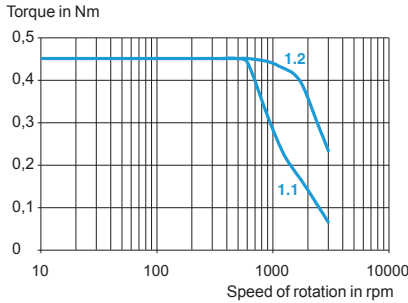
(2) Conditions for shaft load: speed of rotation 60 rpm, 100% duty cycle at continuous torque, ambient temperature 40 °C

(3) Point of application of radial force: 10.5 mm distance to flange

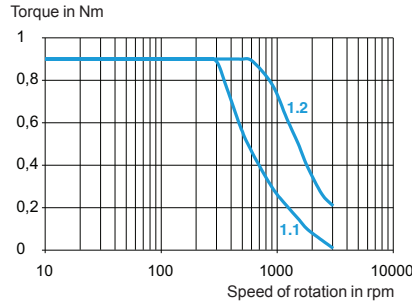
(4) Operating hours at a probability of failure of 10%

Torque characteristics ILS1●57

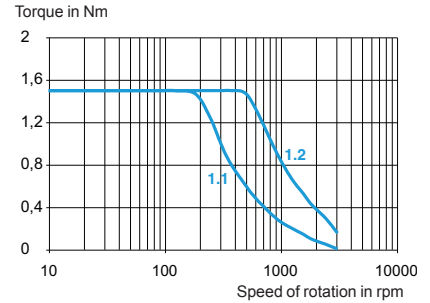
ILS1●571P (winding type P)



ILS1●572P (winding type P)

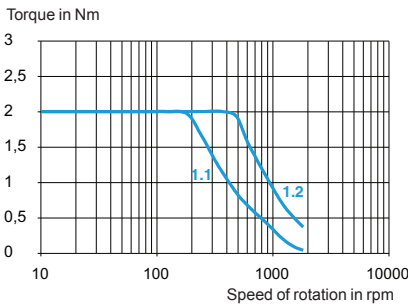


ILS1●573P (winding type P)

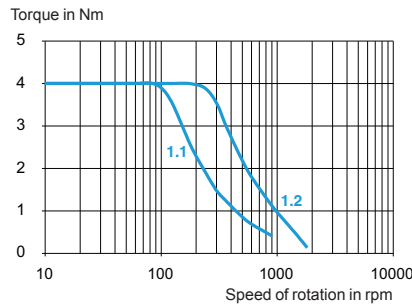


Torque characteristics ILS1●85

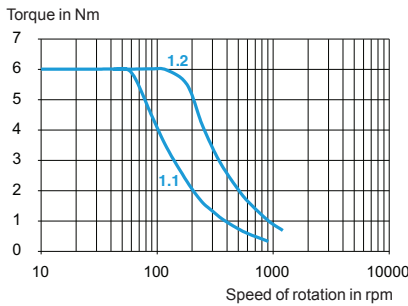
ILS1●851P (winding type P)



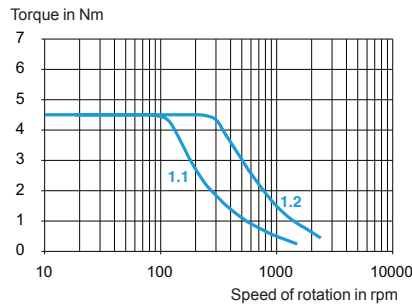
ILS1●852P (winding type P)



ILS1●853P (winding type P)



ILS1●853T (winding type T)



1.1 Max. torque at 24 V
 1.2 Max. torque at 36 V

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Lexium integrated drives

IL●1 for CANopen, PROFIBUS DP, RS 485
 ILS1 with 3-phase stepper motor

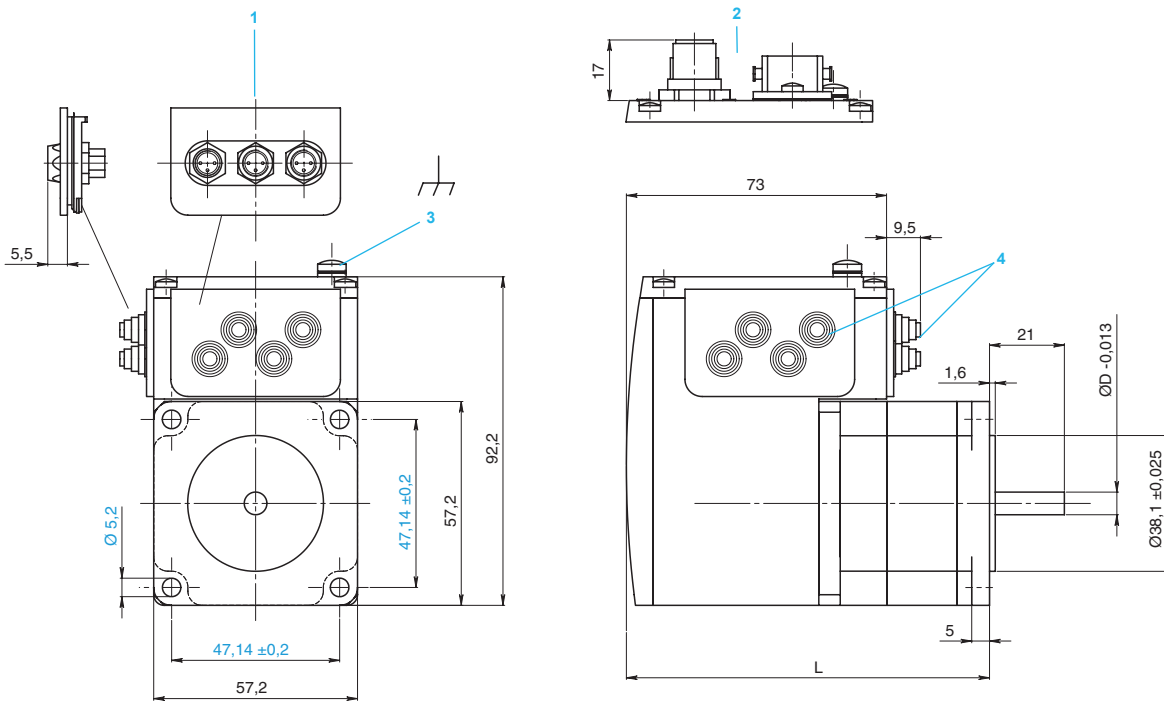
References												
Example:	I	L	S	1	B	5	7	1	P	B	1	A
Motor type S = 3-phase stepper motor	I	L	S	1	B	5	7	1	P	B	1	A
Supply voltage 1 = 24 ... 36 V	I	L	S	1	B	5	7	1	P	B	1	A
Communication interface B = PROFIBUS DP F = CANopen DS301 R = RS 485	I	L	S	1	B	5	7	1	P	B	1	A
Flange size 57 = 57 mm 85 = 85 mm	I	L	S	1	B	5	7	1	P	B	1	A
Motor length ("L") (1) 1 = motor length ("L") 2 = motor length ("L") 3 = motor length ("L")	I	L	S	1	B	5	7	1	P	B	1	A
Winding type P = medium speed of rotation, medium torque T = high speed of rotation, medium torque (2)	I	L	S	1	B	5	7	1	P	B	1	A
Connection technology B = printed circuit board connector C = industrial connector	I	L	S	1	B	5	7	1	P	B	1	A
Measurement system 1 = index pulse	I	L	S	1	B	5	7	1	P	B	1	A
Holding brake A = no holding brake F = with holding brake (3)	I	L	S	1	B	5	7	1	P	B	1	A

(1) The motor length "L" depends on the mechanical characteristics, see pages 4/33, 4/36 and 4/37.

(2) Winding type T only with ILS1●853.

(3) Holding brake only with ILS1●85.

ILS1●57 integrated drives

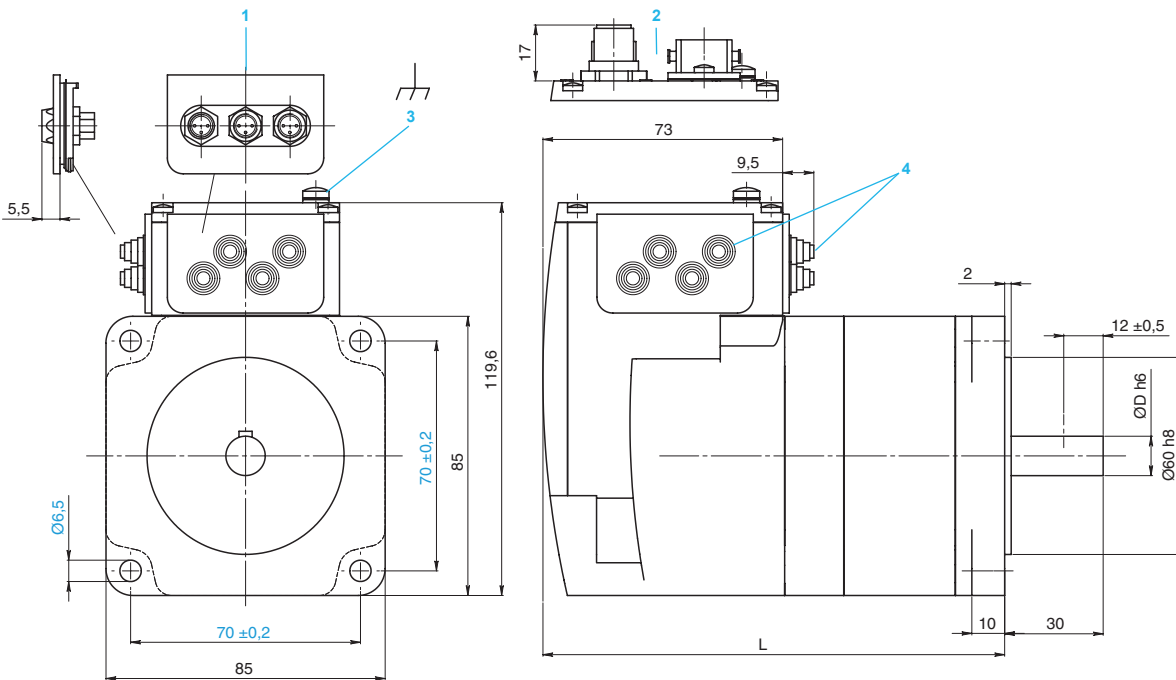


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	L	D
ILS1●571	101.9	6.35
ILS1●572	115.9	6.35
ILS1●573	138.9	8.00

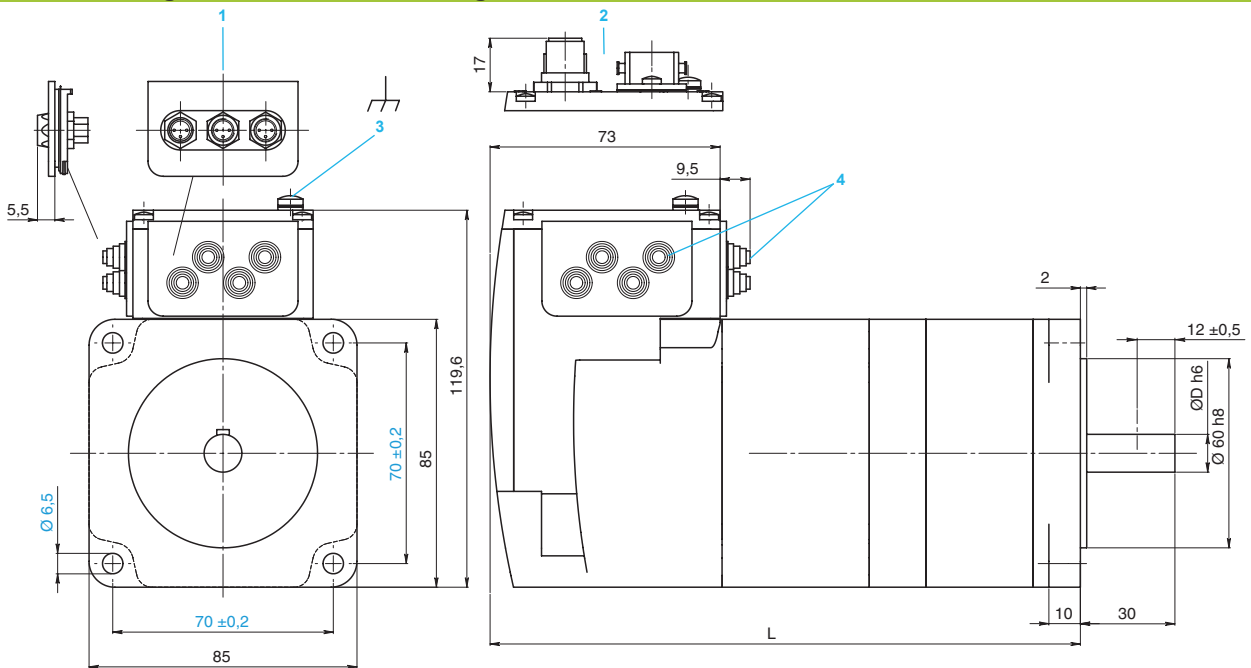
- 1 Accessories: I/O signal insert with industrial connectors
- 2 Option: industrial connectors
- 3 Earth (ground) terminal

ILS1●85 integrated drives without holding brake



	L	D
ILS1●851	140.6	12
ILS1●852	170.6	12
ILS1●853	200.6	14

ILS1●85 integrated drives with holding brake



	L	D
ILS1●851	187.3	12
ILS1●852	217.3	12
ILS1●853	247.3	14

- 1 Accessories: I/O signal insert with industrial connectors
- 2 Option: industrial connectors
- 3 Earth (ground) terminal
- 4 Accessories: cable entries $\varnothing = 3 \dots 9$ mm