

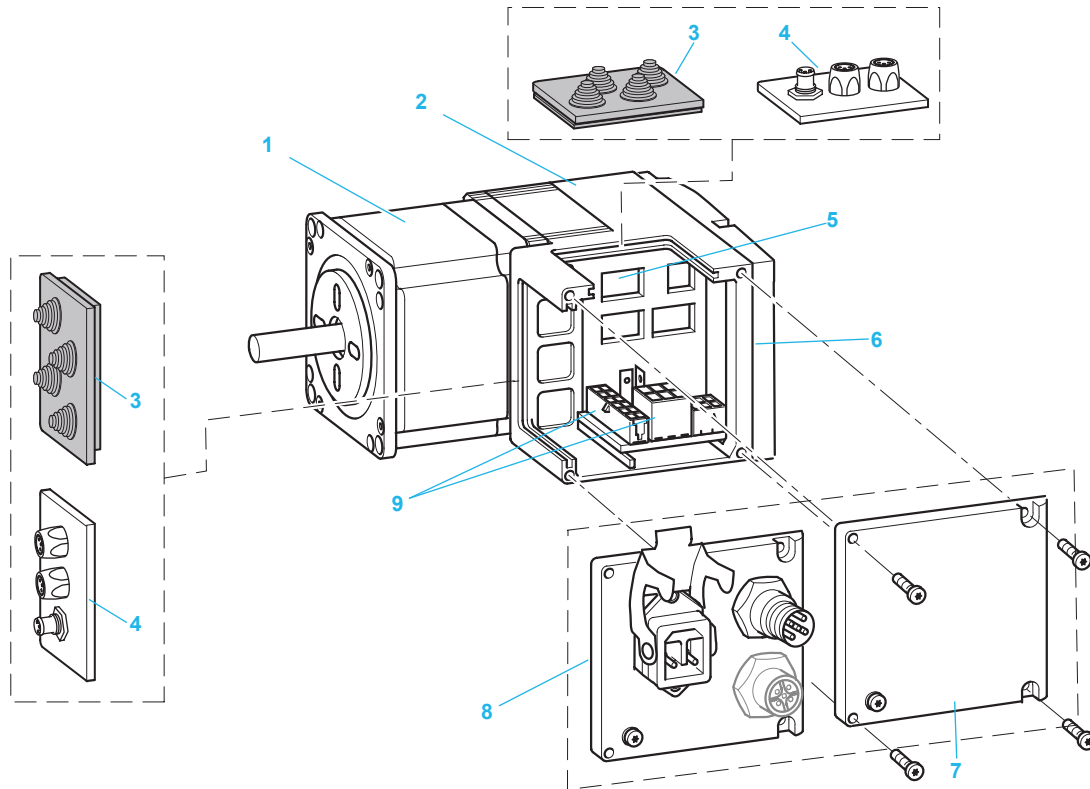
Lexium integrated drives

IL●2 for DeviceNet, EtherCAT, Modbus TCP, Ethernet Powerlink

ILS2 with 3-phase stepper motor

Description

ILS2 comprise control electronics with a fieldbus interface for DeviceNet, EtherCAT, Modbus TCP or Ethernet Powerlink and a 3-phase stepper motor. ILS2 is optionally available with printed circuit board connectors or industrial connectors. A holding brake is optionally available for ILS2●85.



- 1 3-phase stepper motor
- 2 Electronics housing
- 3 Insert cable entry (accessory)
- 4 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

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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 ... 55; power reduction by 2%/°C at 40 ... 55
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		
Supply voltage (CN1)		Corresponds to PELV according to DIN 19240, protected against reverse polarity
Supply voltage range (absolute limit values)	--- V	18 ... 55
Nominal supply voltage	--- V	24 / 48
Ripple at nominal voltage	V _{PP}	≤ 3.6
Max. current consumption	ILS2●57	A 3.5
	ILS2●851, ILS2●852	A 5
	ILS2●853:	
	■ Winding type P	A 5
	■ Winding type T	A 6
External fuse	A	16
Fieldbus interface (CN2)		
DeviceNet	Signal inputs/outputs	According to ODVA, galvanic isolation
	Transmission rate	kBaud 125 / 250 / 500
	Transmission protocol	DeviceNet Position Controller Profile
EtherCAT	Signal inputs/outputs	According to IEEE 802.3 standard, galvanic isolation
	Transmission rate	MBit 100
	Transmission protocol	EtherCAT
Modbus TCP	Signal inputs/outputs	According to IEEE 802.3 standard, galvanic isolation
	Transmission rate	MBit 10 / 100
	Transmission protocol	Modbus TCP
Ethernet Powerlink	Signal inputs/outputs	According to IEEE 802.3 standard, galvanic isolation
	Transmission rate	MBit 100
	Transmission protocol	Ethernet Powerlink

(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			
RS 485 commissioning interface (CN3)			
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		Modbus TCP
24 V signal interface (CN4)			4 signals, can each be used as input or output
24 V signal inputs			Galvanically connected to 0VDC, 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 ... IO3	ms	1.25 ... 1.5
	IO0 and IO1 (1)	ms	0.01
Jitter	IO0 and IO1 (1)	µs	< 2
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
Voltage drop at 50 mA load		V	≤ 1
			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)		mA	10
Debounce time		ms	1
Response time (until shutdown of power amplifier)		ms	< 50
Max. Time offset until detection of signal differences between STO_A and 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

(1) When the "Fast position capture" function is used

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Mechanical data ILS2●57					
Type of integrated drive		ILS2●571	ILS2●572	ILS2●573	
Winding type		P	P	P	
Max. torque		Nm	0.45	0.9	1.5
Holding torque		Nm	0.45	0.9	1.5
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 ILS2●85					
Type of integrated drive		ILS2●851	ILS2●852	ILS2●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

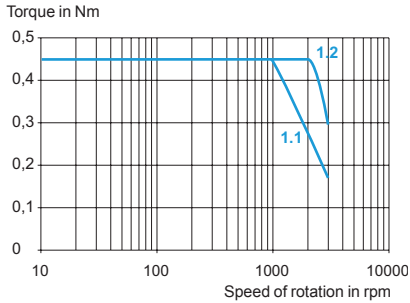
(2) Conditions for shaft load: speed of rotation 60 rpm, 100% duty cycle at continuous torque, ambient temperature 40 °C

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

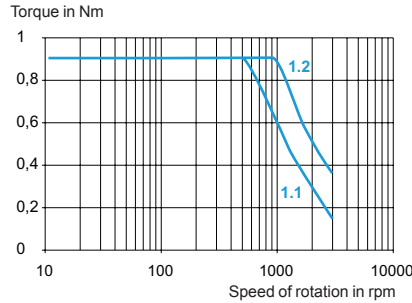
(4) Operating hours at a probability of failure of 10%

Torque characteristics ILS2●57

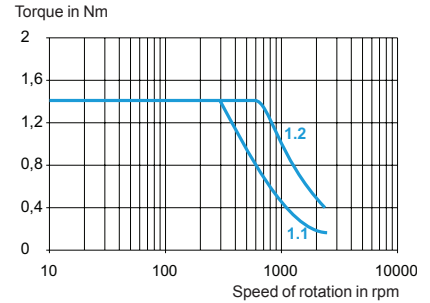
ILS2●571P (winding type P)



ILS2●572P (winding type P)

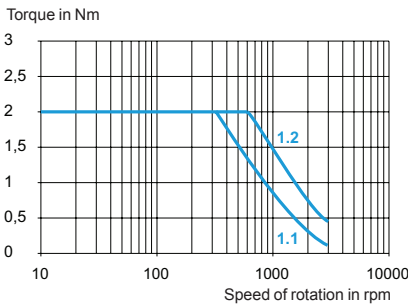


ILS2●573P (winding type P)

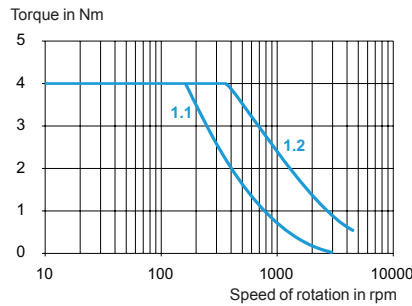


Torque characteristics ILS2●58

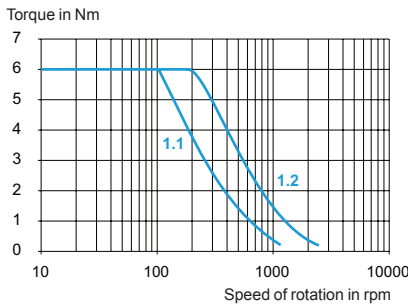
ILS2●851P (winding type P)



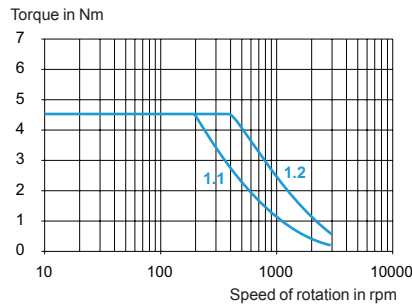
ILS2●852P (winding type P)



ILS2●853P (winding type P)



ILS2●853T (winding type T)



1.1 Max. torque at 24 V
 1.2 Max. torque at 48 V

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Ethernet Powerlink
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References

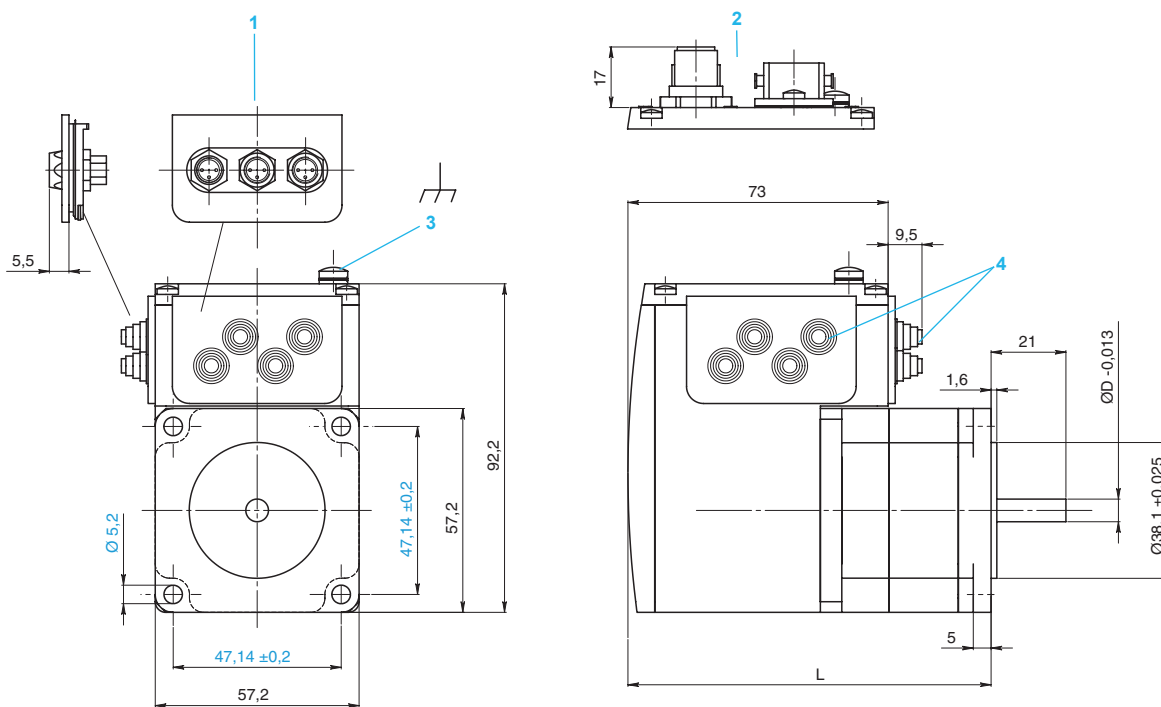
Example:	I	L	S	2	D	5	7	1	P	B	1	A
Motor type S = 3-phase stepper motor	I	L	S	2	D	5	7	1	P	B	1	A
Supply voltage 2 = 24 ... 48 V	I	L	S	2	D	5	7	1	P	B	1	A
Communication interface D = DeviceNet E = EtherCAT P = Ethernet Powerlink T = Modbus TCP	I	L	S	2	D	5	7	1	P	B	1	A
Flange size 57 = 57 mm 85 = 85 mm	I	L	S	2	D	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	2	D	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	2	D	5	7	1	P	B	1	A
Connection technology B = printed circuit board connector C = industrial connector	I	L	S	2	D	5	7	1	P	B	1	A
Measurement system 1 = index pulse	I	L	S	2	D	5	7	1	P	B	1	A
Holding brake A = no holding brake F = with holding brake	I	L	S	2	D	5	7	1	P	B	1	A

(1) The motor length "L" depends on the mechanical characteristics, see pages 4/65, 4/68 and 4/69.

(2) Winding type T only with ILS2●853.

(3) Holding brake only with ILS2●85.

ILS2●57 integrated drives

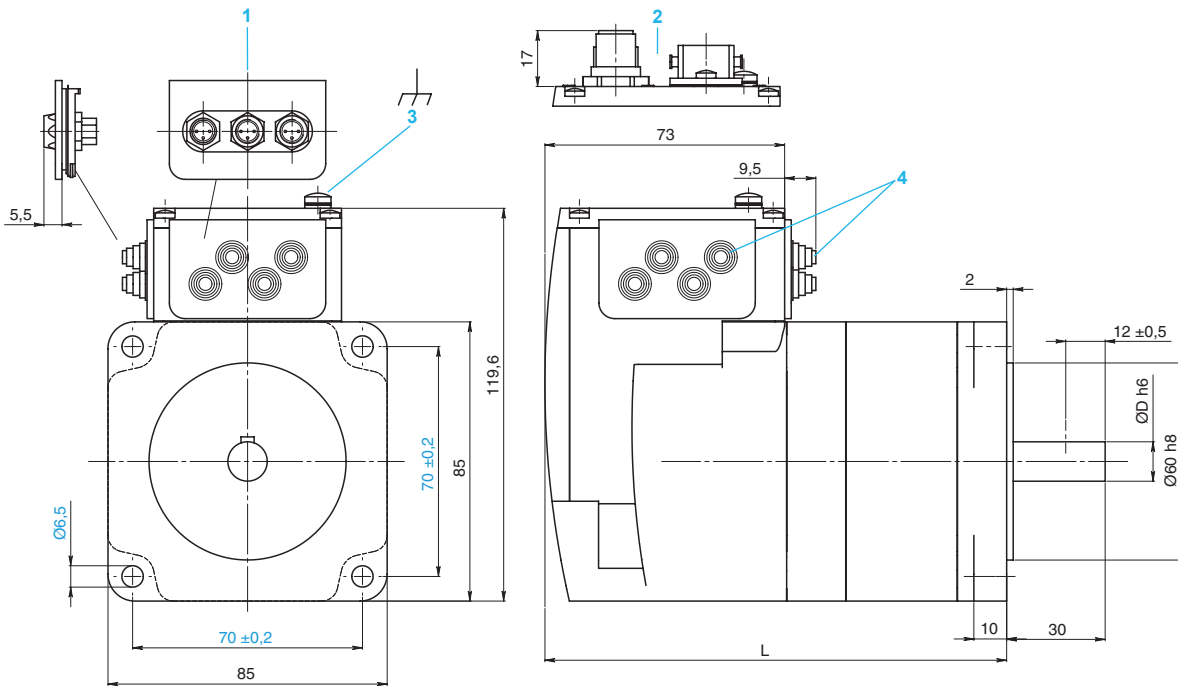


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	L	D
ILS2●571	101.9	6.35
ILS2●572	115.9	6.35
ILS2●573	138.9	8.00

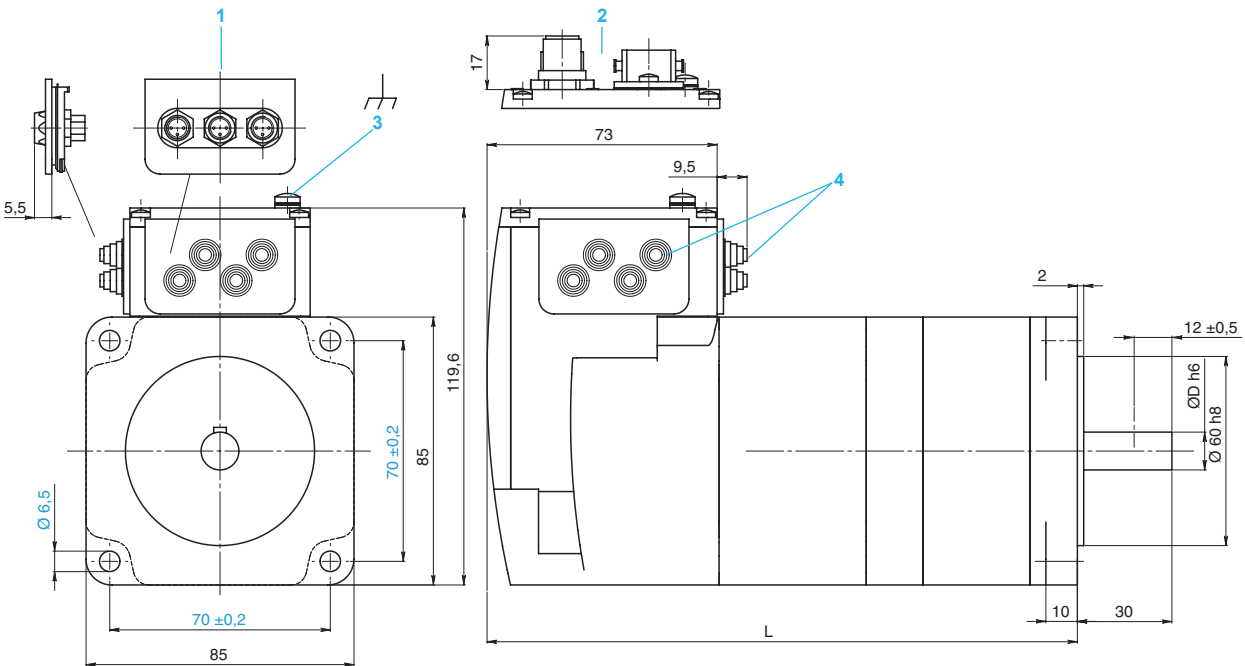
- 1 Accessories: I/O signal insert with industrial connectors
- 2 Option: industrial connectors
- 3 Earth (ground) terminal
- 4 Accessories: cable entries Ø = 3 ... 9 mm

ILS2●85 integrated drives without holding brake



	L	D
ILS2●851	140.6	12
ILS2●852	170.6	12
ILS2●853	200.6	14

ILS2●85 integrated drives with holding brake



	L	D
ILS2●851	187.3	12
ILS2●852	217.3	12
ILS2●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