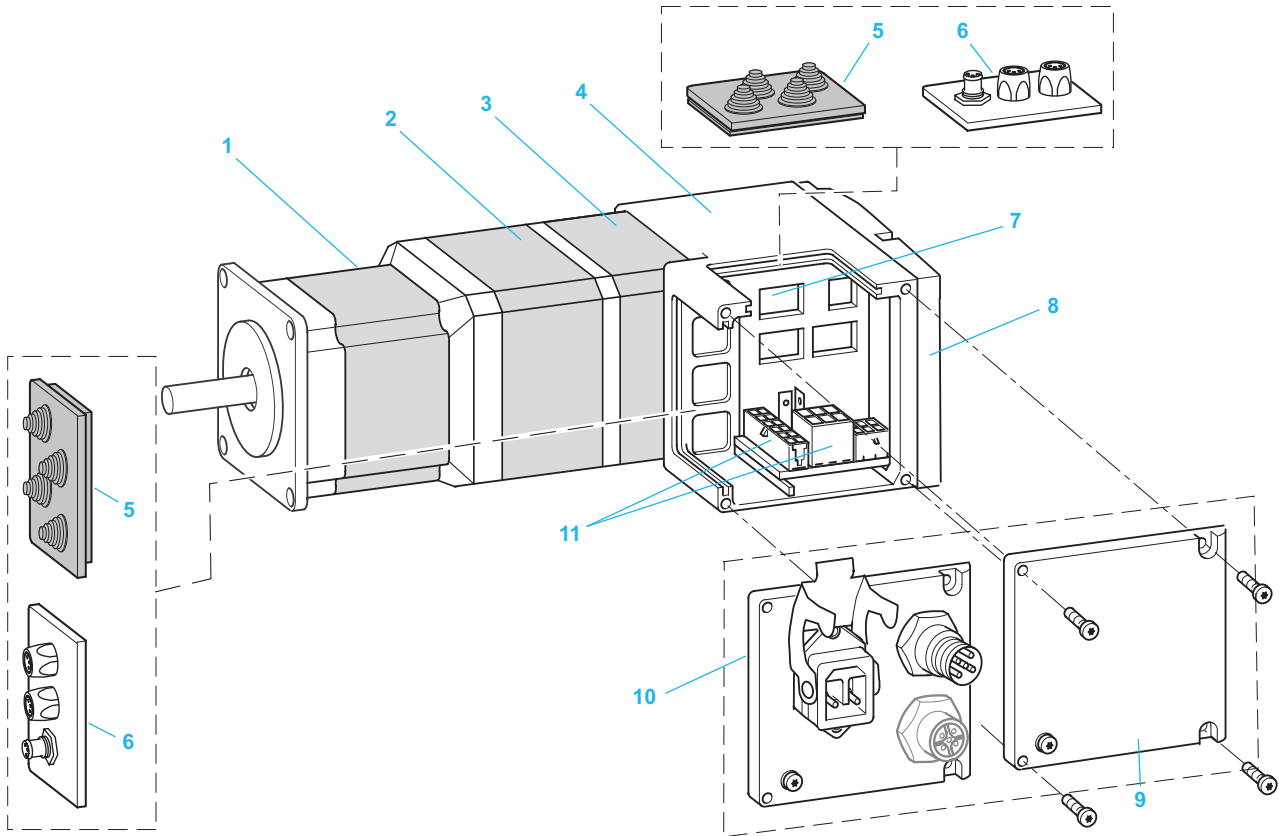


Lexium integrated drives

IL●2 for DeviceNet, EtherCAT, Modbus TCP, Ethernet Powerlink
 ILA2 with AC synchronous servo motor

Description

ILA2 comprise control electronics with a fieldbus interface for DeviceNet, EtherCAT, Modbus TCP or Ethernet Powerlink and an AC synchronous servo motor. ILA2 is optionally available with printed circuit board connectors or industrial connectors. A multiturn encoder is optionally available for ILA2. A holding brake is optionally available for the ILA2 with a singleturn encoder.



- 1 Synchronous AC servo motor
- 2 Holding brake (optional)
- 3 Singleturn or multiturn encoder (optional)
- 4 Electronics housing
- 5 Insert cable entry (accessory)
- 6 I/O insert with industrial connectors (accessory)
- 7 Settings via parameter switches
- 8 Cover for electronics housing
- 9 Cover for Lexium integrated drives with option "PCB connector"
- 10 Cover for supply voltage $\bar{\sim}$ V and fieldbus connection for Lexium integrated drives with option "industrial connector"
- 11 Electrical interfaces

Note:

- DeviceNet and Modbus TCP: 1 circular connector for IN and OUT signals
- EtherCAT and Ethernet Powerlink: 2 circular connectors (1 circular connector each for IN and OUT signals)

4

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 <ul style="list-style-type: none"> ■ Power supplies without external mains filter: <ul style="list-style-type: none"> □ C3 up to 10 m supply cable length ■ Power supplies with external mains filter: <ul style="list-style-type: none"> □ C2 up to 20 m supply cable length □ 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: <ul style="list-style-type: none"> ■ 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 ... 55.2
Nominal supply voltage	--- V	24 / 48
Ripple at nominal voltage	V _{pp}	≤ 3.6
Max. continuous current consumption	■ Winding type T	ILA2●571 7.5 ILA2●572 7.5
	■ Winding type P	A 5 7
Peak current consumption	■ Winding type T	A 11 9
	■ Winding type P	A 7 8.5
Inrush current		Inrush current time-dependent by current incline function and depending on device capacitance C = 1500 µF and resistance of connectivity
External fuse	A	16
Fieldbus interface (CN2)		
DeviceNet	Signal inputs/outputs	According to OVDA, galvanic isolation
	Transmission rate	kBaud 125 / 250 / 500
	Transmission protocol	DeviceNet Position Controller Profile
EtherCAT	Signal inputs/outputs	According to IEEE 802.3 standard, no galvanic isolation
	Transmission rate	MBit 100
	Transmission protocol	EtherCAT
Modbus TCP	Signal inputs/outputs	According to IEEE 802.3 standard, no galvanic isolation
	Transmission rate	MBit 10 / 100
	Transmission protocol	Modbus TCP
Ethernet Powerlink	Signal inputs/outputs	According to IEEE 802.3 standard, no 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

4

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	LIO1 ... LIO4	ms	1.25 ... 1.5

24 V signal outputs

Switching to plus, short-circuit protected, suitable for inductive load (1000 mH / 100 mA)			
Nominal voltage	--- V		24
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 ... 5
Response time (until shutdown of power amplifier)		ms	< 50
Max. time offset until detection of signal differences between STO_A and STO_B (1)		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) Switching process must be simultaneous for both signal inputs (time offset < 1 s).

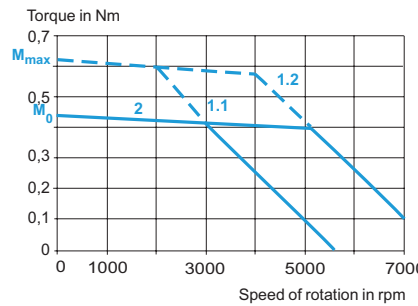
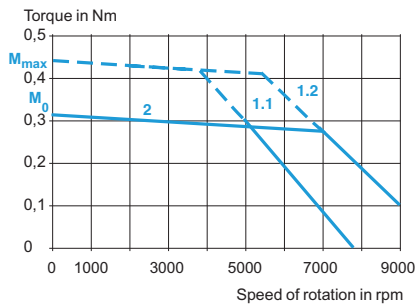
Mechanical data					
Type of integrated drive		ILA2●571		ILA2●572	
Winding type		T		P	
Nominal supply voltage		--- V		24 48	
Nominal speed of rotation		rpm		5000 7000	
Max. torque (1)		M_{max} Nm		0.45 0.62	
Continuous torque (2)		M_0 Nm		0.31 0.44	
Positioning resolution per revolution		Inc.		16384	
Accuracy of positioning sensor		°		±0.05	
Rotor inertia		kg·cm ²		0.095	
Mass		kg		1.4	
Shaft load		N		89	
Max. radial force (3)		N		104	
Max. axial tensile force		N		104	
Max. axial force pressure		h		20000	
Nominal bearing service life (4)		h		20000	
Holding brake (optional) (5)					
Holding torque		Nm		1.2	
Electrical pull-in power		W		10	
Brake release time		ms		14	
Brake application time		ms		13	
Moment of inertia		kg·cm ²		0.07	
Multiturn encoder (optional) (5)					
Measuring range absolute		rpm		4096	
Positioning resolution per revolution		Inc.		16384	
Accuracy of positioning sensor		°		±0.05	

- (1) Max. 2.5 s
- (2) At 20 rpm; at 0 rpm the continuous torque is reduced to 89% of the specified value
- (3) Point of application of radial force: 10 mm distance to flange
- (4) Operating hours at a probability of failure of 10%; conditions for shaft load: speed 4000 rpm, 100% duty cycle at continuous torque, ambient temperature 40 °C
- (5) Holding brake and multiturn encoder cannot be used in combination.

Torque characteristics

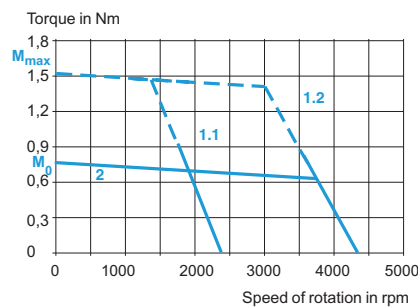
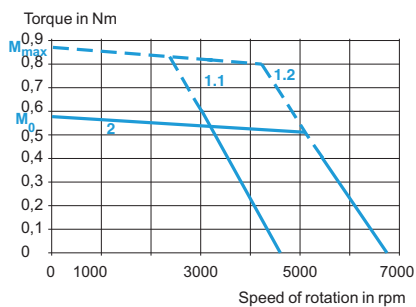
ILA2●571T (winding type T)

ILA2●571P (winding type P)



ILA2●572T (winding type T)

ILA2●572P (winding type P)



- 1.1 Max. torque at 24 V
- 1.2 Max. torque at 48 V
- 2 Continuous torque

Lexium integrated drives

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References												
Example:	I	L	A	2	D	5	7	1	P	B	1	A
Motor type A = AC synchronous servo motor	I	L	A	2	D	5	7	1	P	B	1	A
Supply voltage 2 = 24 ... 48 V	I	L	A	2	D	5	7	1	P	B	1	A
Communication interface D = DeviceNet E = EtherCAT P = Ethernet Powerlink T = Modbus TCP	I	L	A	2	D	5	7	1	P	B	1	A
Flange size 57 = 57 mm	I	L	A	2	D	5	7	1	P	B	1	A
Motor length ("L") (1) 1 = motor length ("L") 2 = motor length ("L")	I	L	A	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	I	L	A	2	D	5	7	1	P	B	1	A
Connection technology B = printed circuit board connector C = industrial connector	I	L	A	2	D	5	7	1	P	B	1	A
Measurement system 1 = singleturn encoder 2 = multiturn encoder (2)	I	L	A	2	D	5	7	1	P	B	1	A
Holding brake A = no holding brake F = with holding brake (2)	I	L	A	2	D	5	7	1	P	B	1	A

(1) The motor length "L" depends on the mechanical characteristics, see pages 4/51 and 4/53.
(2) Holding brake and multiturn encoder cannot be used in combination.