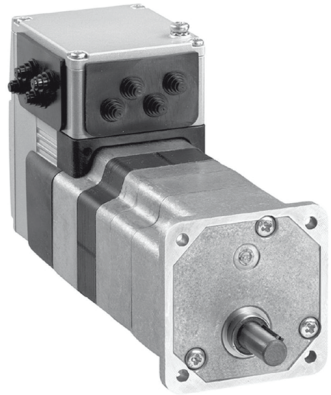
Lexium™ Integrated Drives Motion control

IL●2 for DeviceNet, EtherCAT, EtherNet/IP, Modbus TCP, Ethernet POWERLINK

ILA2 with AC synchronous servo motor



ILE2 with brushless servo motor

ILS2 with stepper motor

Introduction

Lexium IL●2 Integrated Drives include a motor, control electronics and a communication interface for:

- DeviceNet (IL●2D)
- EtherCAT (IL●2E)
- EtherNet/IP (IL●2K)
- Modbus TCP (IL●2T)
- Ethernet POWERLINK (IL●2P)

The communication bus interface is used for setting parameters and controlling the integrated drives, as well as for commissioning using Lexium CT software.

Lexium IL●2 Integrated Drives also have an RS 485 serial link interface and an interface for four 24 V signals, which can be configured as either inputs or outputs to suit application requirements.
They also include the Safe Torque Off (Power Removal) safety function as standard, which prevents unintended motor operation.

The control section is comprised of control electronics and a power stage which share a common power supply.
Lexium IL● 2 Integrated Drives can operate on a 24 V to 48 V ⎓ supply.

Three motor technologies are offered to cover a wide range of applications.

Adaptability assured by three motor technologies

The Lexium IL● 2 Integrated Drive product range offers three motor technologies to meet requirements for dynamic performance, flexibility or precision in a wide variety of applications:

ILA2: the integrated drive for dynamic processes

The ILA2 Integrated Drive is equipped with an AC synchronous servo motor.
This motor features high dynamic performance, as it can be temporarily boosted when accelerating.

Application example: manufacture of CDs/DVDs
From the pressing of the CD or DVD right through to the end of manufacturing, the process is totally automated using Lexium ILA2 Integrated Drives, which increase productivity and reduce floor space by approximately 10%.

ILE2: the integrated drive for automatic format adjustment

The ILE2 Integrated Drive is equipped with a DC brushless motor.
This motor has a high automatic holding torque. This makes the use of a holding brake unnecessary in the majority of applications.
The control electronics incorporated in the ILE2 drive provide absolute encoder functionality.

Application example: manufacture of solar cells
Electrical circuits are printed using a silkscreening process. Lexium ILE2 Integrated Drives are used for conveying.
Dynamic performance is significantly improved and the wiring time is reduced.
Other integrated drives, such as Lexium ILS2, are also used for precise positioning, or Lexium ILA2 for the printing process.

ILS2: the integrated drive for short range positioning

With its 3-phase stepper motor, the ILS2 Integrated Drive offers high torque values at low rotation speeds. It is mainly used in rotation speed mode with excellent stability characteristics and also for high resolution positioning.
The commissioning of ILS2 drives with stepper motor is simple, as it does not require any configuration of the control loop.

Application example: lumber processing
In applications using multi-blade circular saws, the planks are measured using lasers. They are positioned using linear axes equipped with a Lexium ILS2 Integrated Drive. Because of the harsh environmental conditions, the control cabinets are located some distance from the machinery. This concept of decentralization considerably reduces the wiring.

Interfaces

Communication bus interface

Depending on the model, the following communication buses can be connected:
- DeviceNet
- EtherCAT (according to IEEE 802.3)
- EtherNet/IP (according to IEEE 802.3)
- Modbus TCP (according to IEEE 802.3)
- Ethernet POWERLINK (according to IEEE 802.3)

The communication bus interface is used for setting parameters and controlling the integrated drive.
It is also used as an option for connecting the terminal when commissioning the integrated drive using Lexium CT PC software (see page 7).

Connection to the DeviceNet fieldbus, available depending on the model, provides access to the ADR (Auto Device Replacement) function. If maintenance is required, this function enables drives to be replaced without having to redefine the parameters.

The communication bus and RS 485 serial link can be connected simultaneously.

RS 485 serial link interface

The Lexium IL●2 Integrated Drive is commissioned by default via the RS 485 serial link interface.

This interface also accesses the control/monitoring function included in the drive. This function can also be accessed via the Lexium CT PC software.

The communication bus and RS 485 serial link can be connected simultaneously.

Interface for 24 V signals

Four 24 V signals are available, configurable as inputs or outputs.
They can also be used to set the parameters of predefined functions such as limit switch detection.

These signals can be used by the master controller.

The 24 V power for the outputs is provided internally via the integrated drive's power supply.

Interface for integrated Safe Torque Off function

The Safe Torque Off (Power Removal) safety function enables a category 0 or 1 stop to be performed in accordance with standard IEC/EN 60204-1 and/or prevents unintended motor operation in accordance with standard IEC/EN 61508 level SIL2, ISO 13849-1 performance level "d" (PL d) and IEC/EN 61800-5-2 (STO).

No additional power protection option is necessary. The Lexium IL●1 Integrated Drive can remain powered up, which reduces system costs and restart time.

The Safe Torque Off function is activated via two redundant 24 V input signals (active in OFF state).

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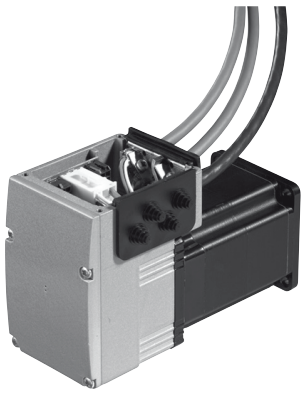


Integrated drive with printed circuit board connectors

Special technical features

ILA2 with AC synchronous servo motor

- High dynamic performance and high peak torque
- Choice of:
  - Single turn high resolution encoder, 16,384 points/turn (0.02°)
  - Multiturn high resolution encoder, 16,384 points/turn (0.02°) for 4096 turns
- Integrated holding brake available as an option
- Planetary gearbox available as an option

ILE2 with DC brushless motor

- High automatic holding torque
- Absolute encoder: no homing required after switching off/on
- Can be equipped with integral straight-tooth gearbox or tapered worm gearbox
- Planetary gearbox available as an option

ILS2 with 3-phase stepper motor

- High continuous stall torque
- Good speed stability characteristics
- High encoder accuracy (0.018°)
- Holding brake available as an option for ILS2●85 Integrated Drive
- Planetary gearbox available as an option

Integrated drive with industrial connectors

Connections

Two types of connectors are available, depending on the types of machine to be equipped. They are used to connect the communication buses, the RS 485 serial link, the interfaces for 24 V signals, and the Safe Torque Off function…as well as the power supply.

Printed circuit board connectors

Printed circuit board connectors are preferably used for wiring standard machines with cable harnesses.

The integrated drive is connected via two cable entry plates, to be ordered separately (see accessories page 38).

Industrial connectors

Integrated drives with industrial connectors are preferably used for special machines and small series production machines.

The communication buses and power supply are connected by means of the industrial connectors located on the top of the drive.

The RS 485 serial link, the 24 V signals and the Safe Torque Off function are connected via two plates fitted with industrial connectors, to be ordered separately (see accessories pages 38 and 40).

Lexium™ Integrated Drives Motion control

IL●2 for DeviceNet, EtherCAT, EtherNet/IP, Modbus TCP, Ethernet POWERLINK

Compliance with international standards and certifications

The Lexium Integrated Drive product range has been developed in accordance with strict international standards and with the recommendations for variable speed electrical power drive products, in particular IEC/EN 61800-3 (immunity to disturbance related to high frequency signals connected by cables and transmitted) and IEC/EN 50178 (vibration resistance).

Compliance with electromagnetic compatibility requirements has been incorporated in the integrated drive range. The entire product range conforms to international standard IEC/EN 61800-3:2001, environment 2.

Lexium Integrated Drives carry the CE marking in accordance with the European machinery directive (98/37/EEC) and the European EMC directive (2004/108/EEC).

The entire range is c UL us certified (United States and Canada).
It is also TÜV certified in accordance with the safety standards for medical devices and equipment. This certification covers:
- Functional safety of electrical/electronic/programmable electronic safety-related systems (IEC 61508: 2000; SIL 2)
- Safety of machinery – functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061: 2005; SILcl2)
- Safety of machinery – safety-related parts of electronic control systems – part 1: General principles for design (ISO 13849-1: 2006; PL d (category 3))

Main functions

Lexium IL●2 Integrated Drives include the main functions required for motion control, in particular:

Configuration by parameter switch

Depending on the communication bus, the following settings can be performed using the parameter switches in the integrated drive:
- DeviceNet:
setting of the communication bus address
- EtherCAT, Ethernet/IP, Modbus TCP and Ethernet POWERLINK:
setting of the IP address

Operating modes

The following operating modes can be set via the communication bus:
- Electronic gearbox (for ILA2 Integrated Drive with single turn encoder)
- Speed profile
- Manual (JOG)
- Point-to-point
- Homing

Other operating modes can be activated via the communication bus or the Lexium CT PC software:
- Activation of the motor brake
- Reversal of the direction of rotation of the motor
- Setting of the motion profile via the profile generator
- Setting of the motor phase current
- Triggering of the Quick Stop function
- Fast position capture via an input signal
- Configuration of I/O signals
- Scaling of units within the drive to user units
- Control/monitoring functions

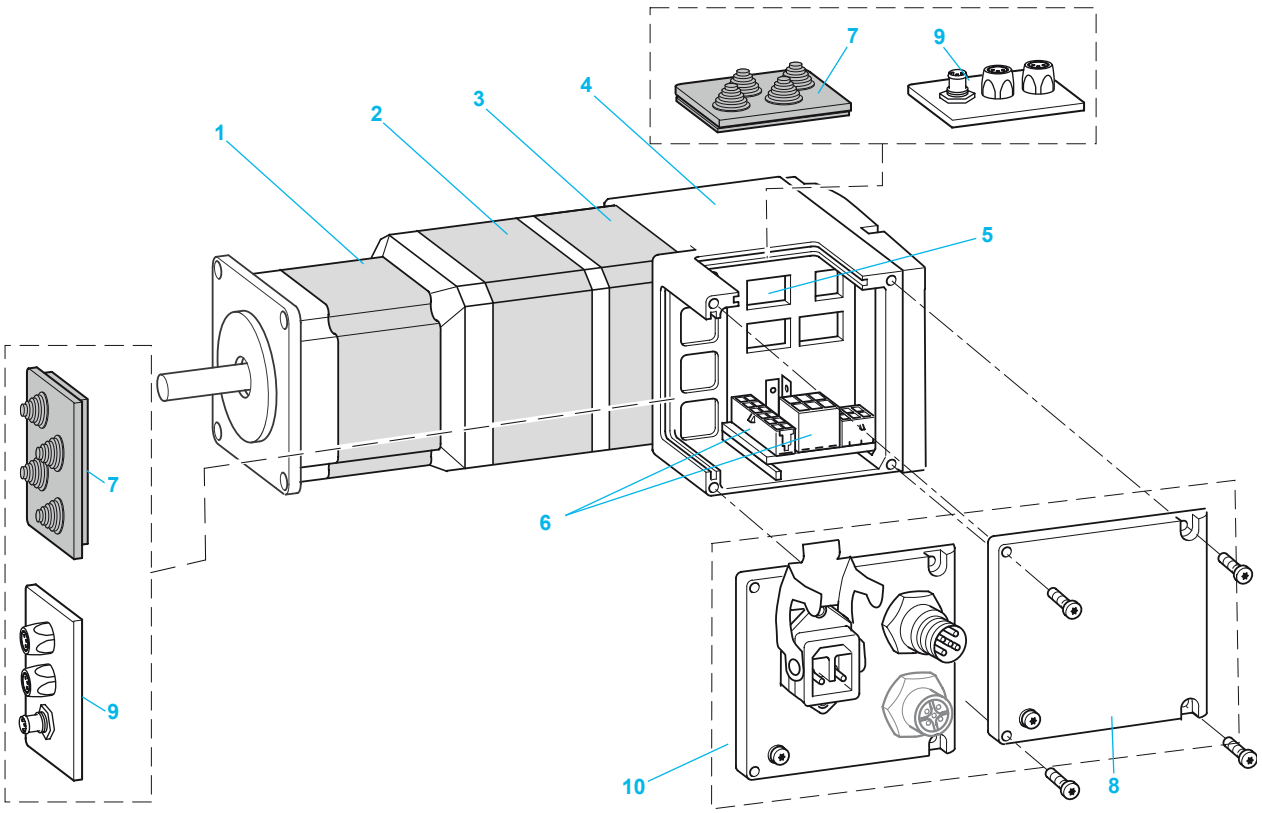
***Note**: For details of available functions, please visit our website www.schneider-electric.com.*

Lexium™ Integrated Drives
Motion control

IL●2 for DeviceNet, EtherCAT, EtherNet/IP, Modbus TCP, Ethernet POWERLINK
ILA2 with AC synchronous servo motor

Description

ILA2 Integrated Drives consist of control electronics with an interface for DeviceNet, EtherCAT, EtherNet/IP, Modbus TCP or Ethernet POWERLINK communication bus and an AC synchronous servo motor.
They can be equipped with a single turn or multiturn encoder as required.
For ILA2 Integrated Drives equipped with a single turn encoder, an integrated holding brake is also available as an option.
Two types of connection are possible:
- Printed circuit board connectors
- Industrial connectors



1 AC synchronous servo motor
2 Integrated holding brake (option)
3 Single turn or multiturn encoder
4 Electronic unit
5 Parameter switch
6 Connection units
For drive with printed circuit board connector:
7 Cable entry plate (see accessories page 38)
8 Cover
For drive with industrial connector:
9 Plate for connecting I/O and the Safe Torque Off function (see accessories page 40)
10 Cover for connecting the 24/48 V ⎓ power supply and the communication bus (see accessories page 40)

Note: *I/O connection plate equipped with industrial connectors for:*
DeviceNet and Modbus TCP communication bus: 1 round connector for IN and OUT signals
EtherCAT, EtherNet/IP and Ethernet POWERLINK communication bus: 2 round connectors (1 round connector for each signal, IN and OUT).

Lexium™ Integrated Drives
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IL●2 for DeviceNet, EtherCAT, EtherNet/IP, Modbus TCP, Ethernet POWERLINK
ILA2 with AC synchronous servo motor

ILA2 Integrated Drive with AC synchronous servo motor

References

Example:	I	L	A	2	D	5	7	1	P	B	1	A	0
Motor type **A** = AC synchronous servo motor	I	L	**A**	2	D	5	7	1	P	B	1	A	0
Supply voltage **2** = 24... 48 V	I	L	A	**2**	D	5	7	1	P	B	1	A	0
Communication interface **D** = DeviceNet **E** = EtherCAT **K** = EtherNet/IP **P** = Ethernet POWERLINK **T** = Modbus TCP	I	L	A	2	**D**	5	7	1	P	B	1	A	0
Flange size **57** = 57 mm	I	L	A	2	D	**5**	**7**	1	P	B	1	A	0
Drive type *(1)* **1** = ILA2●571 **2** = ILA2●572	I	L	A	2	D	5	7	**1**	P	B	1	A	0
Winding type *(1)* **P** = medium rotation speed **T** = high rotation speed	I	L	A	2	D	5	7	1	**P**	B	1	A	0
Connection **B** = printed circuit board connector **C** = industrial connector	I	L	A	2	D	5	7	1	P	**B**	1	A	0
Encoder type **1** = single turn encoder (16,384 points/turn) **2** = multiturn encoder *(2)* (16,384 points/turn x 4096 turns)	I	L	A	2	D	5	7	1	P	B	**1**	A	0
Holding brake **A** = without holding brake **F** = with holding brake *(2)*	I	L	A	2	D	5	7	1	P	B	1	**A**	0
Without gearbox **0** = without gearbox	I	L	A	2	D	5	7	1	P	B	1	A	**0**

(1) See the main specifications and dimensions according to the type of drive in the table below:

Drive			**ILA2●571**				**ILA2●572**			
Winding type			T		P		T		P	
Nominal supply voltage		**V ⎓**	24	48	24	48	24	48	24	48
Nominal speed of rotation		**rpm**	5000	7000	3200	5100	3000	5100	1600	3400
Peak stall torque		**Nm**	0.45		0.62		0.85		1.62	
Continuous stall torque		**Nm**	0.31		0.44		0.57		0.78	
Dimensions (overall in mm)	With single turn encoder	**W x H x D**	57.2 x 92.2 x 145.3				57.2 x 92.2 x 163.8			
	With multiturn encoder	**W x H x D**	57.2 x 92.2 x 189.3				57.2 x 92.2 x 207.8			
	With holding brake	**W x H x D**	57.2 x 92.2 x 190.8				57.2 x 92.2 x 209.3			

(2) The holding brake and the multiturn encoder cannot be used together.

***Note**: See all the data (specifications, dimensions) on our website www.schneider-electric.com.*