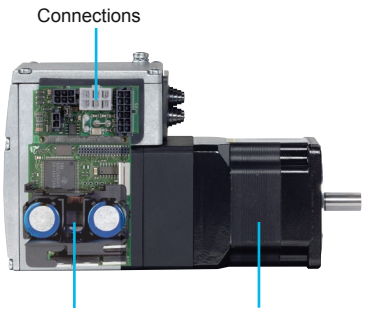
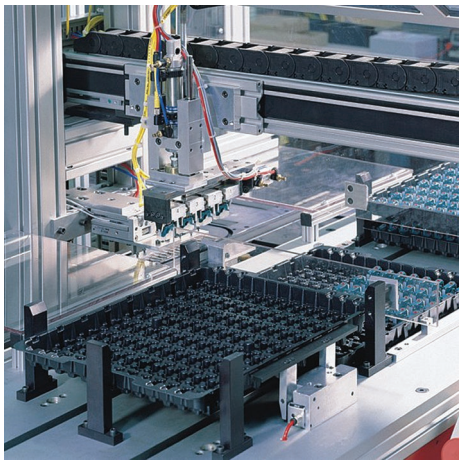
Lexium™ Integrated Drives
Motion control



Lexium drive incorporating control electronics, motor and connectors



Material handling application

Labelling application

Overview

Lexium™ Integrated Drives are used to create decentralized motion control solutions in very compact units.

These drives consist of a motor and control electronics. They are controlled via a communication bus, a pulse/direction (P/D) interface or an I/O interface (for the “Motion sequence” operating mode).

Lexium Integrated Drives are used as decentralized drives in machine building. When combined with a Schneider Electric Lexium Controller or a PLC, they can be used to create complex control system architectures simply and at minimum cost. Ready-to-use function blocks are available for programming movements with Schneider Electric or third-party motion controllers.

Compact design

Lexium motor and control electronics form a compact unit. This decentralized unit does not require any space in the enclosure for the control electronics, thus reducing the size of the machine.

Simple to install and commission

Integration of the motor and the control electronics reduces installation costs and simplifies incorporation of electromagnetic compatibility. In addition, Lexium CT PC software enables rapid commissioning.

Optimum flexibility to adapt to your application

Lexium Integrated Drives can be equipped with an AC synchronous servo motor, a DC brushless motor or a stepper motor, providing multiple options for use in a wide variety of applications.
Depending on the technology used, these drives can meet requirements for dynamic performance, flexibility or precision in motion control applications.

Open communication with control system architectures

Depending on the model, Lexium Integrated Drives incorporate as standard the main communication protocols used in industry for increased performance of your applications:
- CANopen, PROFIBUS DP, DeviceNet, EtherCAT, EtherNet/IP, Ethernet POWERLINK™ and Modbus TCP communication buses and networks
- RS 485 serial link

Lexium Integrated Drives with stepper motor are also available with a pulse/direction (P/D) interface or an I/O interface for the motion sequence.

This open communication concept enables integration in numerous control system architectures.

Integrated safety

The integrated 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 without external power protection devices.
The integrated drive does not have to be switched off, which reduces the system costs and restart times. This drive complies with the requirements of the following standards: IEC/EN 61508 SIL2, ISO 13849-1 performance level “d” (PL d) and IEC/EN 61800-5-2 (STO).

Applications

Lexium Integrated Drives are suitable for the most common applications, including:
- Packaging
- Material handling, labelling
- Textiles
- Printing
- Electronic components
- Medical technology

Lexium™ Integrated Drives
Motion control
Lexium CT commissioning software

Overview (continued)

Commissioning time for Lexium Integrated Drives is reduced considerably using the Lexium CT (Lexium Commissioning Tool) PC software.

This software is used for commissioning, parameter setting, simulation and diagnostics.

Functions

Lexium CT PC software includes the following functions:
- Entry and display of parameters
- Archiving and duplication of parameters
- Display of status information
- Positioning of the motor via the PC
- Initiation of homing movements
- Access to all documented parameters
- Fault diagnostics
- Controller optimization (for ILA integrated drive)

Required configuration

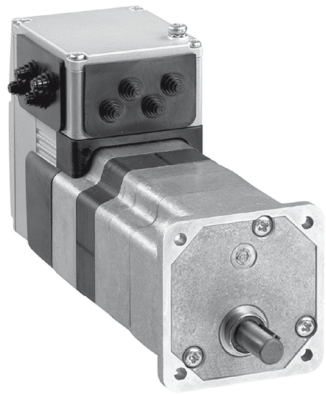
Lexium CT software runs on a PC with the Microsoft Windows® 2000/XP/Vista operating systems. The integrated drive is commissioned via the communication interface.

Download

Lexium CT software can be downloaded from our website: www.schneider-electric.com.

Lexium™ Integrated Drives
Motion control
IL●1 for CANopen, PROFIBUS DP, RS 485

ILA1 with AC synchronous servo motor



ILE1 with brushless servo motor

ILS1 with stepper motor

Introduction

Lexium IL●1 Integrated Drives include a motor, control electronics and a communication interface for:
- CANopen DS301 machine bus (IL●1F)
- PROFIBUS DP V0 fieldbus (IL●1B)
- RS 485 serial link (IL●1R)

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●1 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.
These drivers also have a 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●1 Integrated Drives can operate on a 24 V to 36 V ⎓ supply.

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

Adaptability assured by three motor technologies

The Lexium IL●1 Integrated Drive range offers three motor technologies to meet the requirements for dynamic performance, flexibility or precision in a wide variety of applications:

ILA1: the integrated drive for dynamic processes

The ILA1 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: bottling
Bottles are transported on a conveyor up to the filling point, where their presence is detected by a sensor.
The Lexium ILA1 drive activates a pump to start filling the bottle then ensures accurate filling and instant stop to avoid overflowing by means of its closed loop function.

ILE1: the integrated drive for automatic format adjustment

The ILE1 Integrated Drive is equipped with a DC brushless motor.
This motor has a high automatic holding torque, which makes the use of a holding brake unnecessary in the majority of applications.
The control electronics incorporated in the ILE1 drive provide absolute encoder functionality.

Application example: ground-mounted solar power plants
The latest solar power plants are equipped with biaxial tracking systems (azimuth/zenith).
Each axis is controlled by two Lexium ILE1 Integrated Drives.
The Lexium ILE1 drive was chosen for its high holding torque and because it totally eliminates the need for electrical cabinets.

ILS1: the integrated drive for short range positioning

With its 3-phase stepper motor, the ILS1 Integrated Drive offers high torque values at low rotation speeds.
In rotation speed mode, it has excellent stability characteristics and also enables high resolution positioning tasks.
Commissioning an ILS1 Integrated Drive with stepper motor is simplified, as it does not require any configuration of the control loop.

Application example: labelling machine
The Lexium ILS Integrated Drive's high torque is used to control the unrolling speed of the label roll.

Lexium™ Integrated Drives Motion control

IL●1 for CANopen, PROFIBUS DP, RS 485

Interfaces

Communication bus interface

Depending on the IL drive model, the following communication buses can be connected:

- CANopen machine bus (protocol DS301)
- PROFIBUS DP V0 fieldbus (data format according to Profidrive V2.0 PPO type 2)
- RS 485 serial link

The communication bus interface is used for setting parameters and controlling the integrated drive.
This bus is also used as an option for connecting the terminal, when commissioning the integrated drive using Lexium CT PC software (see page 7). A suitable communication bus converter is then required, for example CAN/USB, PROFIBUS DP/USB or RS 485/USB.

RS 485 serial link interface

The Lexium IL●1 Integrated Drive is commissioned by default via the RS 485 serial link interface.
This interface also accesses the drive's integrated control/monitoring function.
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 for predefined functions such as limit switches or reference sensors, and can be used by the master controller.

The 24 V power for the outputs is provided internally via the integrated drive's p ower 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 IEC/EN 60204-1 and/or prevents unintended motor operation in accordance with IEC/EN 61508 level SIL2, ISO 13849-1 performance level “d” (PL d) and IEC/EN 61800-5-2 (STO).
No additional power protection 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).

Special technical features

ILA1 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

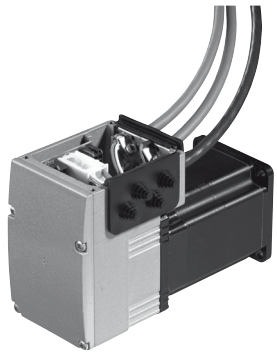
ILE1 with DC brushless motor

- 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

ILS1 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 ILS1●85 Integrated Drive
- Planetary gearbox available as an option

Lexium™ Integrated Drives
Motion control
IL●1 for CANopen, PROFIBUS DP, RS 485



Integrated drive with printed circuit board connectors

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 Lexium IL●1 Integrated Drive is connected by means of 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 the 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).

Compliance with international standards and certifications

The Lexium Integrated Drives product offer has been developed in accordance with strict international standards and 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 design of the Lexium Integrated Drive product 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 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))

Lexium™ Integrated Drives Motion control

IL●1 for CANopen, PROFIBUS DP, RS 485

Main functions

Lexium IL●1 Integrated Drives include the main functions required for motion control, including:

Configuration by means of parameter switches

The following settings can be performed using the parameter switches in the integrated drive:

- CANopen DS301 and RS 485 serial link:
  - setting of the communication bus address
  - setting of the transmission rate
  - end of line termination activation
  - setting of the pulse/direction (P/D) signals or encoder (A/B) signals to "electronic gearbox" mode for integrated drive ILA1●57 equipped with a single turn encoder
- PROFIBUS DP V0:
  - setting of the fieldbus address
  - end-of-line termination activation

Operating modes

The following operating modes can be set via the communication bus:

- electronic gearbox (for drive ILA1●57 with single turn encoder)
- speed profile
- manual (JOG)
- point-to-point
- homing

Other operating modes can be activated via the communication bus or with Lexium CT PC software:

- activation of the motor brake
- reversal of 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 drive internal units to user units
- control/monitoring functions

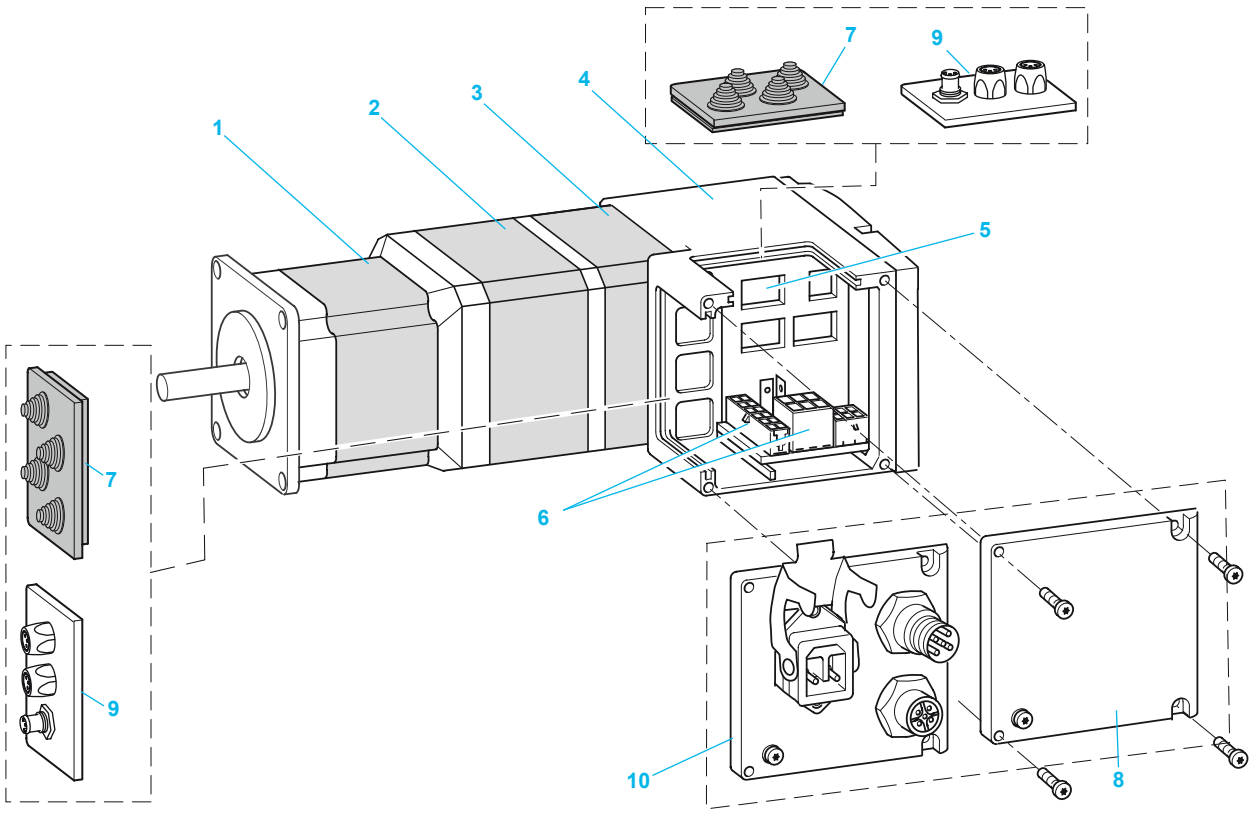
Note: *For details of available functions, please visit our website www.schneider-electric.com.*

Lexium™ Integrated Drives
Motion control

IL●1 for CANopen, PROFIBUS DP, RS 485
ILA1 with AC synchronous servo motor

Description

ILA1 Integrated Drives consist of control electronics with an interface for CANopen DS301, PROFIBUS DP or RS 485 communication bus and an AC synchronous servo motor.
They can be equipped with a single turn or multiturn encoder as required.
For ILA1 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 (optional)
3 Single turn or multiturn encoder
4 Electronic unit
5 Parameter switch
6 Connection terminals
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 24/36 V ⎓ power supply and the communication bus (see accessories page 40)

Note: *I/O connection plate equipped with industrial connectors for RS 485 serial link, CANopen machine bus and PROFIBUS DP communication bus: 2 round connectors (1 round connector for each signal, IN and OUT).*

Lexium™ Integrated Drives
Motion control

IL●1 for CANopen, PROFIBUS DP, RS 485
ILA1 with AC synchronous servo motor

ILA1 Integrated Drive with AC synchronous servo motor

References

Example:	I	L	A	1	B	5	7	1	P	B	1	A	0
Motor type **A** = AC synchronous servo motor	I	L	**A**	1	B	5	7	1	P	B	1	A	0
Supply voltage **1** = 24…36 V	I	L	A	**1**	B	5	7	1	P	B	1	A	0
Communication interface **B** = PROFIBUS DP **F** = CANopen DS301 **R** = RS 485	I	L	A	1	**B**	5	7	1	P	B	1	A	0
Flange size **57** = 57 mm	I	L	A	1	B	**5**	**7**	1	P	B	1	A	0
Drive type *(1)* **1** = ILA1●571 **2** = ILA1●572	I	L	A	1	B	5	7	**1**	P	B	1	A	0
Winding type *(1)* **P** = medium rotation speed **T** = high rotation speed	I	L	A	1	B	5	7	1	**P**	B	1	A	0
Connection **B** = printed circuit board connector **C** = industrial connector	I	L	A	1	B	5	7	1	P	**B**	1	A	0
Encoder type **1** = single turn encoder (16,384 points/turn) **2** = multiturn encoder (16,384 points/turn x 4096 turns) *(2)*	I	L	A	1	B	5	7	1	P	B	**1**	A	0
Holding brake **A** = without holding brake **F** = with holding brake *(2)*	I	L	A	1	B	5	7	1	P	B	1	**A**	0
Gearbox **0** = without gearbox	I	L	A	1	B	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			**ILA1●571**				**ILA1●572**			
Winding type			T		P		T		P	
Nominal supply voltage		**V ⎓**	24	36	24	36	24	36	24	36
Nominal speed of rotation		**rpm**	5100	7500	3200	5500	3100	5000	2600	4300
Peak stall torque		**Nm**	0.43		0.6		0.61		0.72	
Continuous stall torque		**Nm**	0.26				0.41		0.45	
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.*