

# Lexium Controller motion controllers

## Communication buses and networks

### Modbus serial link

#### Presentation

The Modbus protocol is of master/slave type, consisting of a master station and slave stations. Lexium Controller LMC 10, LMC 20 and LMC 20A130 motion controllers have the Modbus protocol integrated as standard: These are slave stations.

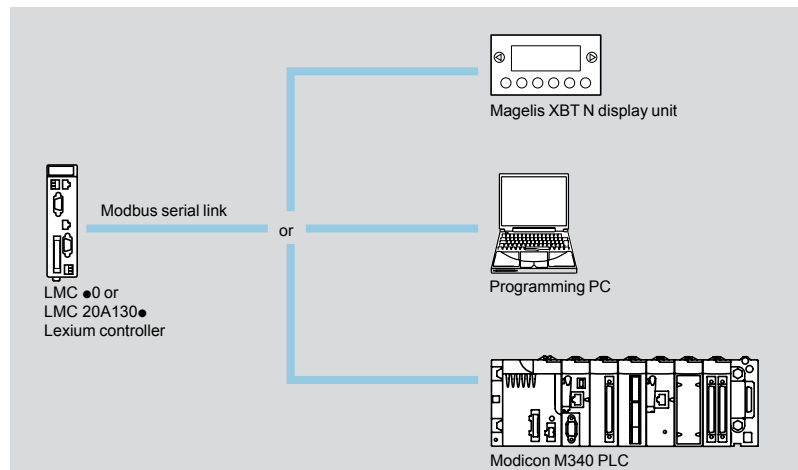
Two exchange mechanisms are possible:

- Request/response: The request from the master is addressed to a given slave. The master then waits for the response from the slave which has been interrogated.
- Broadcasting: The master broadcasts a request to all the slave stations on the bus, which execute the command without transmitting a response.

The Modbus protocol allows:

- Programming and configuration of the Lexium Controller motion controller with Easy Motion and Motion Pro software or with the remote graphic terminal
- Connection of an HMI terminal (Magelis XBT GT graphic terminal, Magelis XBT N alphanumeric display or Magelis XBT R alphanumeric terminal)
- An economical connection point for sharing application data with a PLC or any other type of client.

#### Architecture



Example of architecture with Modbus serial link

### CANopen machine bus and CANoption Motionbus

#### Presentation

The CANopen machine bus complies with standard ISO 11898. Thanks to its standard communication profiles, it can be used to ensure openness and interoperability with various devices (drives, motor starters, smart sensors, etc.).

The CANopen bus is a multi-master bus based on the master/slave principle, which guarantees secure access to realtime automation device data. The CSMA/CA type protocol is based on broadcast exchanges, transmitted cyclically or on event, which guarantee optimum use of the bandwidth. A messaging channel is also used to parameterize the slave devices.

A staged CANopen connectivity solution reduces costs and optimizes the realization of your architecture, thanks to:

- Reduced cabling time
- Greater reliability of the cabling
- Flexibility should you need to add or remove equipment.

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## Communication buses and networks

### Architecture

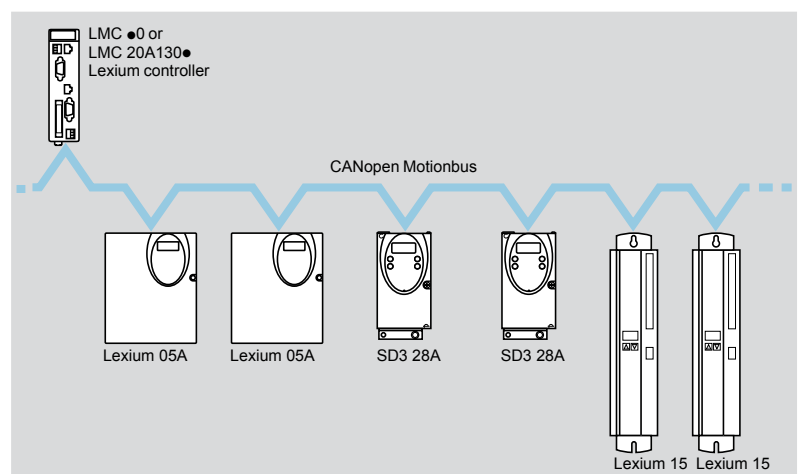
#### CANopen Motionbus

The CANopen connection dedicated to the Motion bus allows the possibility of connecting and controlling up to 8 Lexium 05A, Lexium 15 servo drives or SD3 28A steppers.

The network cycle ensures updating of the position setpoints so as to guarantee synchronization of axes.

Lexium Controller LMC 10, LMC 20 and LMC 20A130 motion controllers have the CANopen Motionbus integrated as standard.

To guarantee the performance of the CANopen Motionbus, it is advisable to create a bus in a daisy-chain formation, without tap junctions; our range of connection accessories has been extended with this in mind.



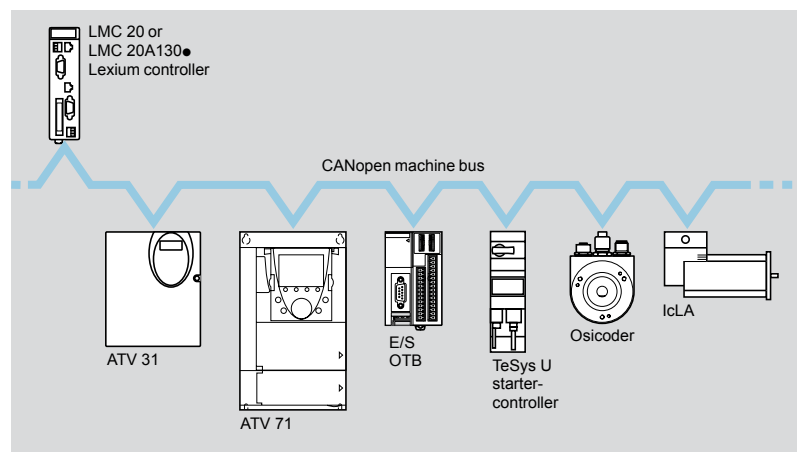
Example of architecture with CANopen Motionbus

#### CANopen machine bus

Thanks to their CANopen connection, Lexium Controller LMC 20 and LMC 20A130 motion controllers extend their capabilities to include applications requiring the control of a greater number of I/O, control devices or motor starters.

Schneider Electric products which can be connected to the CANopen machine bus are:

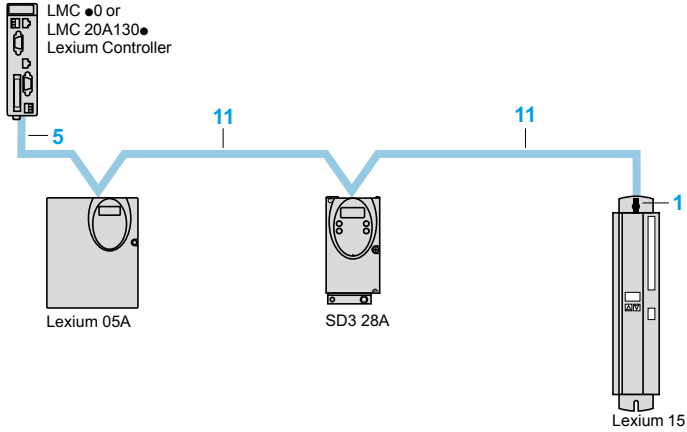
- TeSys U controller-starters
- Advantys OTB and STB distributed I/O
- Advantys FTB and FTM I/O splitter boxes
- Altivar 31, Altivar 61 and Altivar 71 variable speed drives
- XCC incremental or absolute rotary encoders
- Intelligent compact drives



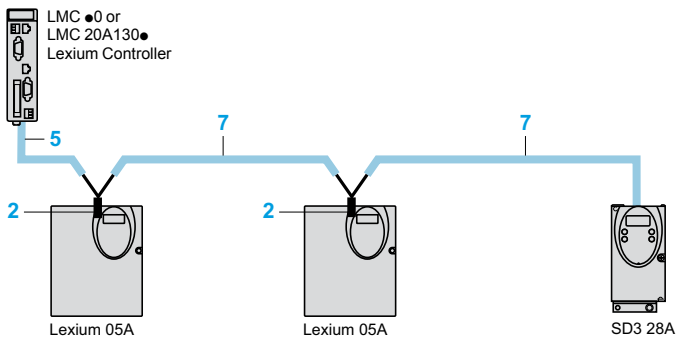
Example of architecture with CANopen machine bus

**Examples of connection to CANopen Motionbus**

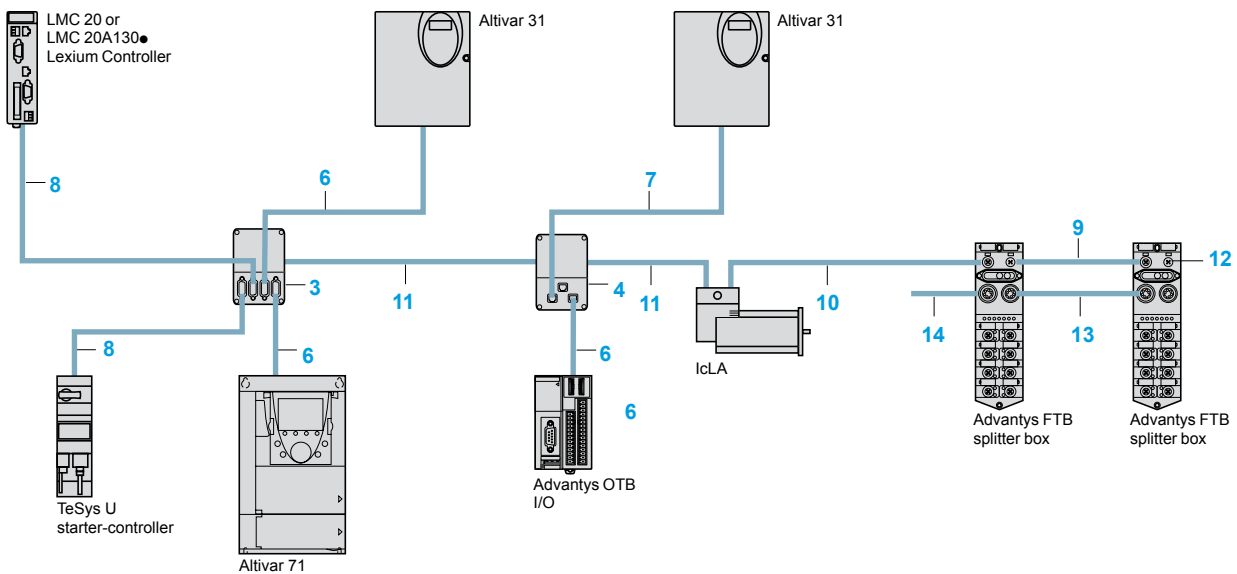
For Lexium 05A and Lexium 15 servo drives or SD3 28A stepper, for customer assembly



**For Lexium 05A servo drive or SD3 28A stepper, prewired**



**Example of connection to CANopen machine bus**



Connection accessories						
Connection accessories						
Description	Use	No.	Reference	Weight	kg	
<b>Connector</b> 9-way female SUB-D with screw terminals and line terminator	Connection of Lexium 15 servo drive	1	VW3 M3 802	–	–	
<b>Daisy chain tap</b> with 3 RJ45 connectors and a 0.3 m cable	Daisy-chain connection of Lexium 05 servo drive or SD3 28A stepper	2	TCS CTN023F13M03	–	–	
<b>CANopen IP 20 tap junctions</b>						
With 4 SUB-D ports. Screw terminals for connection of trunk cables. Line terminator	Tapping of trunk cable for SUB-D cabling	3	TSX CAN TDM4	0.196	–	
With 2 RJ45 ports	Tapping of trunk cable for RJ45 cabling	4	VW3 CAN TAP2	–	–	
Description	Use	No.	Length.	Reference	Weight	kg
From	To		m			
<b>Connection cables with connectors</b>						
<b>CANopen cable</b> with one 9-way female SUB-D connector with integrated line terminator and one RJ45 connector	LMC Lexium controller	Lexium 05A servo drive, SD3 28A stepper, TCS CTN023F13M03 daisy chain tap	5	1	VW3 M3 805R010	–
<b>CANopen cables</b> with one 9-way female SUB-D connector and one RJ45 connector	TSX CAN TDM4 junction box	ATV 31 drive, ATV 71 drive	6	0.5	TCS CCN4F3M05T	–
	TSX CAN TAP2 junction box	Advantys OTB I/O	3	1	TCS CCN4F3M1T	–
				3	TCS CCN4F3M3T	–
<b>CANopen cables (1)</b> with 1 RJ45 connector at each end	TCS CTN023F13M03 daisy chain tap	TCS CTN023F13M03 daisy chain tap	7	0.3	VW3 CAN CARR 03	–
	VW3 CAN TAP2 junction box	ATV 31 drive	1	1	VW3 CAN CARR 1	–
<b>CANopen IP 20 cables (1)</b> with one 9-way female SUB-D connector at each end Standard cable, C€ marking Low smoke emission, halogen-free Flame retardant (IEC 60332-1)	LMC Lexium controller	TSX CAN TDM4 junction box	8	0.3	VW3 CAN CADD 03	0.091
				1	VW3 CAN CADD 1	0.143
	TSX CAN TDM4 junction box	TeSys U starter-controller	3	3	VW3 CAN CADD 3	0.295
			5	5	VW3 CAN CADD 5	0,440
<b>CANopen IP 67 cables (1)</b> with 2 x 5-way angled M12 connectors, A coding (1 female connector and 1 male connector)	Advantys FTB splitter box	Advantys FTB splitter box	9	0.3	FTX CN 3203	0.040
				0.6	FTX CN 3206	0.070
				1	FTX CN 3210	0.100
				2	FTX CN 3220	0.160
				3	FTX CN 3230	0.220
				5	FTX CN 3250	0.430
<b>CANopen IP 67 cables (1)</b> with one 5-way female M12 connector, A coding, and one stripped end	IcLA compact drive	Advantys FTB splitter box	10	3	FTX CN 3130	–
				5	FTX CN 3150	–
<b>Connection cables</b>						
<b>CANopen IP 20 cables (1)</b>						
Standard cables, C€ marking Low smoke emission, halogen-free Flame retardant (IEC 60332-1)			11	50	TSX CAN CA 50	4.930
				100	TSX CAN CA 100	8.800
				300	TSX CAN CA 300	24.560
UL certification, C€ marking Flame retardant (IEC 60332-2)				50	TSX CAN CB 50	3.580
				100	TSX CAN CB 5100	7.840
				300	TSX CAN CB 300	21.870
Cable for harsh environments (2) or mobile installation, C€ marking Low smoke emission, halogen-free Flame retardant (IEC 60332-1)				50	TSX CAN CD 50	3.510
				100	TSX CAN CD 100	7.770
				300	TSX CAN CD 300	21.700
<b>Connection accessories</b>						
<b>IP 67 line terminator</b> with one M12 connector (for end of bus)	–	–	12		FTX CNTL12	0.010
<b>Power supply cables</b> 24 V $\overline{\text{DC}}$ with two 5-way 7/8 connectors	Advantys FTB splitter box	Advantys FTB splitter box	13	0.6	FTX DP2206	0.150
				1	FTX DP2210	0.190
				2	FTX DP2220	0.310
				5	FTX DP2250	0.750
<b>Power supply cables</b> 24 V $\overline{\text{DC}}$ with one 5-way 7/8 connector and one stripped end	Phaseo ABL 7 power supply	Advantys FTB splitter box	14	1.5	FTX DP2115	0.240
				3	FTX DP2130	0.430
				5	FTX DP2150	0.700

(1) Please refer to the "Machines and installations with CANopen" catalogue.

(2) Harsh environments:

- resistance to hydrocarbons, industrial oils, detergents, solder splashes
- relative humidity up to 100 %,
- saline atmosphere,
- significant temperature variations,
- operating temperature between - 10°C and + 70°C.

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## Communication buses and networks

### PROFIBUS DP and DeviceNet fieldbuses

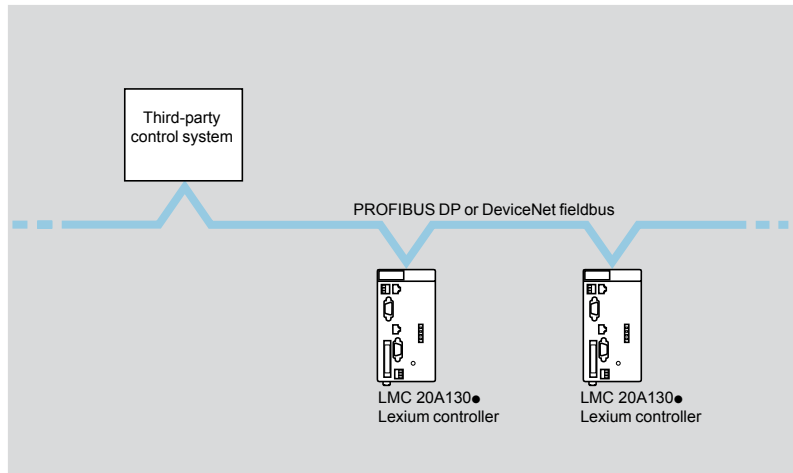
#### Presentation

The PROFIBUS DP bus is a fieldbus that meets industrial communication requirements. It has linear bus topology with a master/slave-type centralized access procedure. The physical link is made by a single shielded twisted pair, although optical interfaces are available for establishing tree, star or ring structures.

The DeviceNet fieldbus is an open low-end type bus system, used in various industrial applications. It is based on CAN technology (layers OSI 1 and 2). The DeviceNet fieldbus is based on the master/slave principle. The physical link is composed of 2 shielded twisted pairs to which it is possible to connect up to 63 slaves. Each end must have a line terminator.

The connection to the PROFIBUS DP and DeviceNet fieldbuses allows the LMC 20A1307 and LMC 20A1309 motion controllers to standardize the motion control solutions, while remaining independent of the system controlling the automation of the machine.

#### Architecture



Example of architecture with PROFIBUS DP or DeviceNet fieldbus

#### Connection type

For	Description
<b>PROFIBUS DP fieldbus</b>	9-way male SUB-D connector 490 NAD 911 for LMC 20A1307 Lexium Controller
<b>DeviceNet fieldbus</b>	Removable 5-way screw terminal for LMC 20A1309 Lexium Controller

# Lexium Controller motion controllers

## Communication buses and networks

### Modbus TCP network

#### Presentation

Introduced by Schneider Electric, the Transparent Ready concept enables transparent communication between control system devices, production and management. Network technologies and the associated new services are used to share and distribute data between sensors, PLCs, workstations and third-party devices in an increasingly efficient manner.

This concept is based on the Modbus TCP industrial standard which proposes a single network that meets most communication requirements from sensors/actuators through to production management systems. Where a variety of communication systems are usually required, Transparent Ready standard technologies can result in significant cost savings in the areas of definition, installation, maintenance or training.

Transparent Ready is based on:

- Modbus TCP-based services meeting control system requirements in terms of functions, performance and quality of services
- Products including motion controllers, several ranges of PLC, distributed I/O, industrial terminals, variable speed drives, gateways and an increasing number of partner products
- The ConneXium range of cabling accessories: hubs, switches, cables adapted to the environment and to the requirements of industrial conditions.

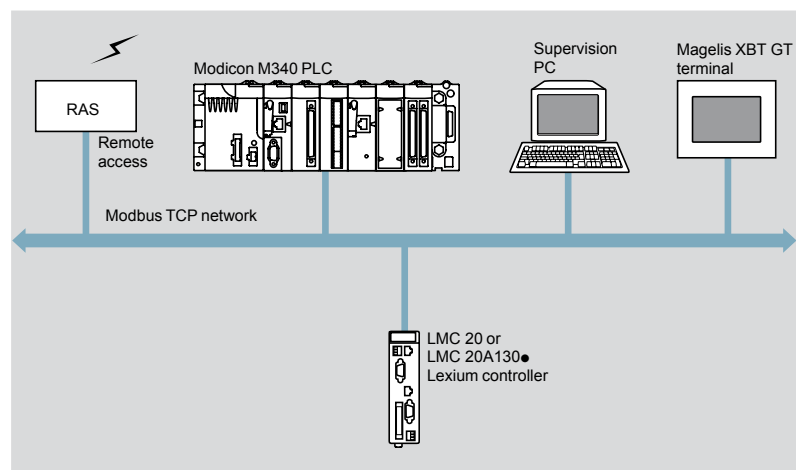
Lexium Controller LMC 20 and LMC 20A130● motion controllers are connected to the Modbus TCP network via an RJ45 connector.

They are supplied with an integrated Web server which users can adapt according to the application. This can be used to:

- Access configuration data transparently
- Perform remote diagnostics or maintenance
- Incorporate simple human/machine interface functions.

The Modbus TCP link thus provides a convenient connection for the programming, configuration and debugging of your Lexium PAC: Lexium Controller LMC 20 and LMC 20A130● motion controllers, Lexium 05A and Lexium 15 servo drives, and BSH and BDH servo motors.

#### Architecture



Example of architecture with Modbus TCP network