Lexium 15 using EcoStruxure™ Control Expert

Communication by Fipio Setup Manual

(Original Document)

12/2018

35008159.09

www.schneider-electric.com

Schneider Electric

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

You agree not to reproduce, other than for your own personal, noncommercial use, all or part of this document on any medium whatsoever without permission of Schneider Electric, given in writing. You also agree not to establish any hypertext links to this document or its content. Schneider Electric does not grant any right or license for the personal and noncommercial use of the document or its content, except for a non-exclusive license to consult it on an "as is" basis, at your own risk. All other rights are reserved.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

© 2018 Schneider Electric. All rights reserved.

Table of Contents

	Safety Information	7
	About the Book	9
Chapter 1	**Fipio on LEXIUM 15**	11
	Implementation: overview	12
	Methodology	14
Chapter 2	**Hardware implementation**	15
	Installation: overview	16
	Assembly precautions	19
	References of Fipio accessories	20
	Connecting to Fipio Bus	21
	Preparation of cables	23
	Connection using the TSX FP ACC12 connector	24
	Connection of TSX FP ACC 2 connectors	27
	Connection to TSX FP ACC 4 junction box	30
Chapter 3	**Software implementation**	33
	Overview	34
	Operation of servodrive on the bus	35
Chapter 4	**Premium Command Station**	37
	Command Station	38
	Addressing of Remote Module Language Objects on a FIPIO Bus	39
	Configuration	42
	Use of messaging	43
Chapter 5	**Lexium 15 configuration: parameters**	45
	Configuration parameters	45
Chapter 6	**Debugging and diagnostics**	49
	Diagnostics of FIPIO option card	50
	Lexium 15 Parameters in Unilink Software	51
	Diagnostics by READ_STS Instruction	52
	Debugging Screen for Lexium 15 on Fipio	53
	Shared Debug Screen for Lexium 15	55
	Speed settings screen	57
	Analog Speed Screen	58
	Torque Setpoint Screen	59

Analog Torque Screen 60
Position on External Encoder Screen 61
Position setpoint screen 62
Motion control screens 63
Chapter 7 Replacement of the servodrive 67
General Introduction 68
LXM_SAVE Function 69
LXM_RESTORE Function 71
Implementation 73
Chapter 8 Introduction to Lexium 15 servo language objects 75
8.1 Lexium 15 Drive Language Objects and IODDTs 76
Presentation of Language Objects of Lexium 15 Servodrives on Fipio Bus 77
Implicit Exchange Language Objects Associated with the Application-Specific Function 78
Explicit Exchange Language Objects Associated with the Application-Specific Function 79
Management of Exchanges and Reports with Explicit Objects 81
8.2 Lexium servo drives IODDT 15 85
Details of Implicit Exchange Objects of the T_LEXIUM_FIPIO IODDT: %I, %IW and %ID 86
Details of Implicit Exchange Objects of the T_LEXIUM_FIPIO IODDT: %QW and %QD 91
Details of Explicit Exchange Objects of the T_LEXIUM_FIPIO IODDT: 94
8.3 Lexium 15 Servodrive Language Objects 96
Implicit Exchange Language Objects 97
Explicit Exchange Language Objects 99
Chapter 9 Servodrive operating modes 103
Operating Modes of Servodrive 104
Status Diagram 105
Unilink-forced offline mode 107
Downgraded Operating Modes 108
Chapter 10 Theoretical performance 109
Theoretical Performance 109

Chapter 11 List of Lexium 15 variables 111
Lexium 15 Variables: overview 112
General read/write variables 113
Read/Write semi-logical variables 117
General read only variables 118
Read-only logic and register status variables 119
Read/Write Status Registers 120
Index 123

Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

At a Glance

Document Scope

This manual describes how to install hardware and software for Lexium 15 drives on a Fipio bus.

Validity Note

This documentation is valid for EcoStruxure™ Control Expert 14.0 or later.

The technical characteristics of the devices described in the present document also appear online. To access the information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the reference or product range. ● To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual	35008155 (English), 35008156 (French), 35008157 (German), 35013953 (Italian), 35008158 (Spanish), 35013954 (Chinese)

You can download these technical publications and other technical information from our website at https://www.schneider-electric.com/en/download

Product Related Information

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter, and apply this product.

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Chapter 1
Fipio on LEXIUM 15

Subject of this Chapter

This chapter details the implementation of Fipio on LEXIUM 15

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Implementation: overview	12
Methodology	14

Implementation: overview

Introduction

The Fipio communication option card enables you to connect a Lexium 15 drive on a Fipio bus.

The Fipio option card package consists of:

- An option card, reference AM0 FIP 001 V000,

The Fipio accessories and cables comply with the standards referred to in the Schneider Automation product catalog. References for the necessary elements are detailed in the Hardware implementation *(see page 15)* chapter.

Compatibility

This card may be used with Lexium 15 servodrives.

Reference	Permanent output current
LXM15LD13M3	3 A clr
LXM15LD21M3	6A clr
LXM15LD28M3	10 A clr
LXM15LU60N4	1.5 A clr
LXM15LD10N4	3 A clr
LXM15LD17N4	6 A clr
LXM15MD28N4	10 A clr
LXM15MD40N4	14 A clr
LXM15MD56N4	20 A clr
LXM15HC11N4X	40 A clr
LXM15HC20N4X	70 A clr

NOTE: Lexium 15 LP compatibility rules :

- The software version of the drive must be higher than version V1.4,
- Control Expert version V2.3 software can accept a Lexium 15 drive using a specific profile with extended services.
- The Unilink version must be higher than V1.5.

Lexium 15 MP/HP compatibility rules :

- The software version of the drive must be higher than version V7.0,
- Control Expert version V2.3 software can accept a Lexium 15 MP/HP servodrive using a specific profile with extended services,
- The Unilink version must be higher than V3.5.

Compatibility with Option Card Standards

- EN61131-2
- IEC 1000-4-2
- IEC 1000-4-3
- IEC 1000-4-5
- IEC 1000-4-6
- EN55022/55011
- UL508
- CSA 22-2

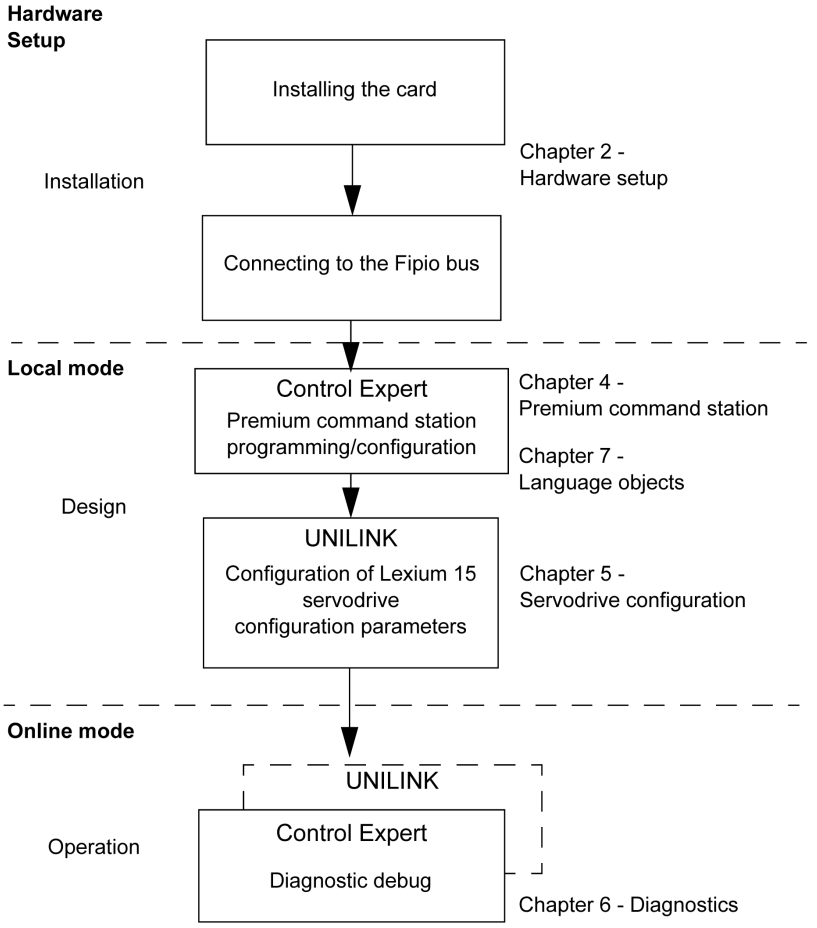
Operating temperature

- In operation: 0 °C to 60 °C.
- En Stockage : -25 °C to 70 °C.

Methodology

Introductory flow chart

The following flow chart summarizes the various phases for implementing a Lexium 15 drive equipped with a Fipio option card in a Fipio network architecture.



Chapter 2
Hardware implementation

Purpose of this chapter

This chapter deals with the material setting of the Fipio option card on the Lexium 15 servodrive

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Installation: overview	16
Assembly precautions	19
References of Fipio accessories	20
Connecting to Fipio Bus	21
Preparation of cables	23
Connection using the TSX FP ACC12 connector	24
Connection of TSX FP ACC 2 connectors	27
Connection to TSX FP ACC 4 junction box	30

Installation: overview

Introduction

Fipio is a field bus which allows the decentralization of the inputs/outputs of a PLC station and its industrial peripheral devices nearest to the operational part.

From a PLC station whose processor has a built-in Fipio link, the Fipio bus is used to connect 1 to 127 devices.

The Fipio field bus can be used in a single architecture (mono-station) or in a more complex architecture (multi-station) where several Fipio segments can be brought together by a local network at a higher level such as Fipway or Ethernet TCP/IP, for example.

Main features (reminder)

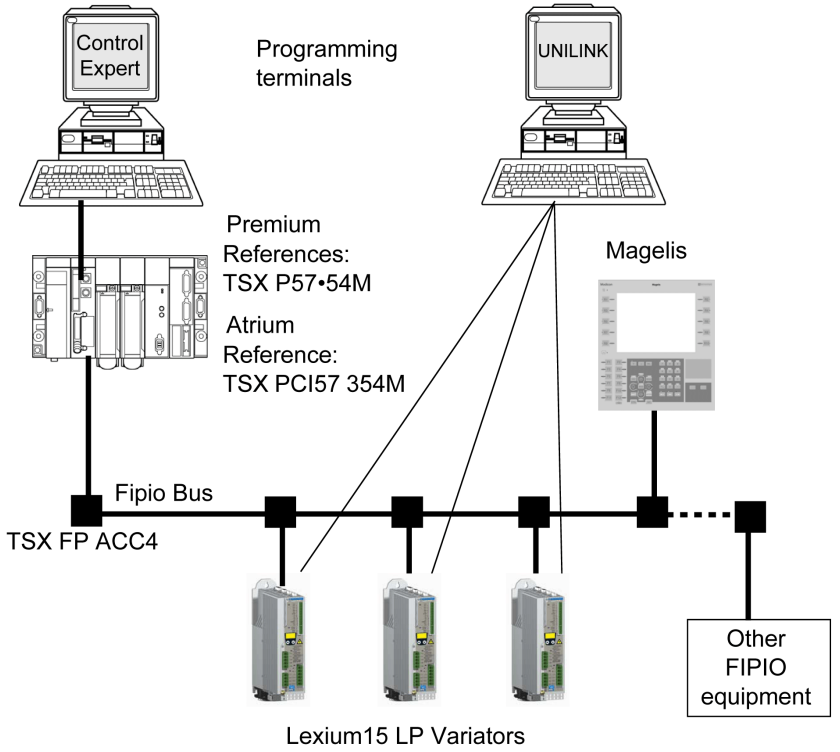
Structure	
Nature	Open field bus, conforming to World FIP standards.
Topology	Devices linked by chaining or branching.
Access method	Managed by a bus arbiter.
Communication	By exchange of variables which can be accessed by the user in the form of language objects and X-Way datagrams.
Privileged exchanges	Cyclical exchange of status variables and remote input/output commands.

Transmission	
Mode	Physical layer in baseband on shielded twisted pair in accordance with IEC 1158-2.
Bit rate	1 Mb/s.
Medium	Shielded twisted pair (150 Ohms of characteristic impedance).

Configuration	
Number of connection points	128 logic connection points for the entire architecture.
Number of segments	Unlimited.
PLC	One PLC (connection point with address 0).
Programming terminal	One programming terminal (must be connected to connection point 63).
Length	The length of a segment depends on its type of branches: ● 1000 meters maximum without repeater, ● 1500 meters maximum between the devices which are the furthest apart.

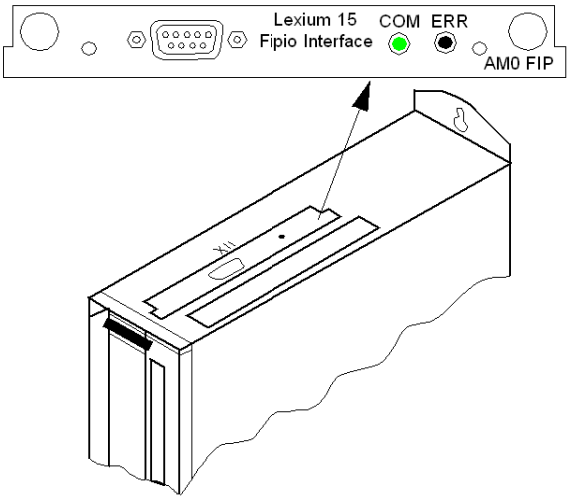
Typical architecture

Illustration:



Installation

The Fipio option card is not mounted on the servodrive when it is supplied. The card slot for this card (reference X11 on the servodrive) is protected by a cover.



The Fipio option card has a Sub-D 9 male connector and 2 diagnostics LEDs.

The power for this card is supplied by the servodrive.

Assembly precautions

Procedure to be followed

Before starting, make sure that the servo drive is switched OFF.

Stage	Action
1	Detach the cover from the port intended for the option cards.
2	Take care to ensure that nothing falls into the open slot.
3	Carefully place the card into the slot, following the guide rail.
4	Press down firmly on the card until the card's contact is in contact with the edge of the servo drive. This enables you to make sure that the card is well connected to the servo drive.
5	Fix the card in place with the 2 knurled screws provided.

References of Fipio accessories

Table of References

References for the main accessories

Designation	Product Reference
Polycarbonate female connector (SUB-D 9 pin)	TSX FP ACC 12
Zamac female connector (SUB-D 9 pin)	TSX FP ACC 2
IP20-rated isolation box for connection to bus (branching)	TSX FP ACC 14
IP20-rated isolation box for connection to bus (branching)	TSX FP ACC 3
IP65-rated dust and damp proof junction box for connection to bus (branching)	TSX FP ACC 4
IP65-rated dust and damp proof junction box for connection to bus (branching)	TBX FP ACC 10
Electrical repeater	TSX FP ACC 6
Electric/fiber optic repeater	TSX FP ACC 8M
Line terminator:	TSX FP ACC 7
Trunk cable (standard environment)	TSX FP CA •00
Trunk cable (harsh environment)	TSX FP CR •00
Branch cables	TSX FP CC •00
Fipio PCMCIA card for Micro/Premium	TSX FPP 10
Cable for TSX FPP 10/20 PCMCIA card	TSX FP CG 0•0
Cable for PC card	TSX FP CE 030

NOTE: For more extensive details, please consult the Schneider catalogues.

Connecting to Fipio Bus

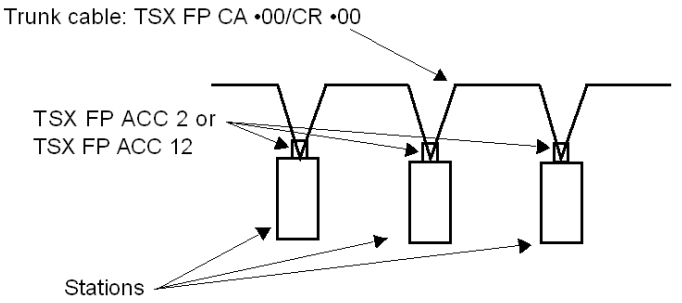
Introduction

The bus consists of a shielded twisted pair cable.

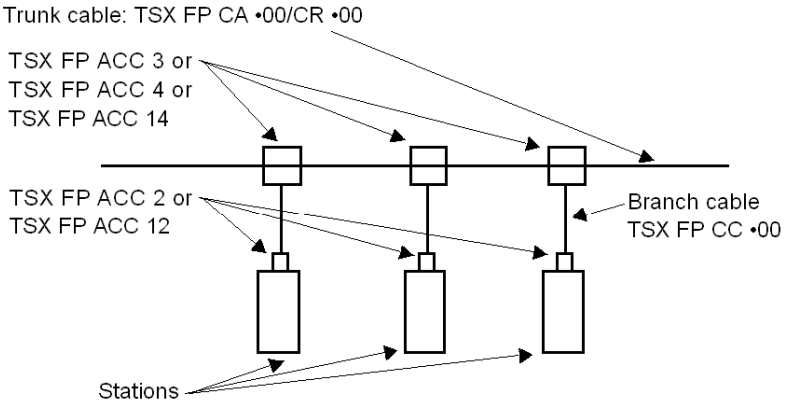
Connections can be made to the bus either by chaining or branching.

Diagram Showing Station Connections

Wiring by Chaining:



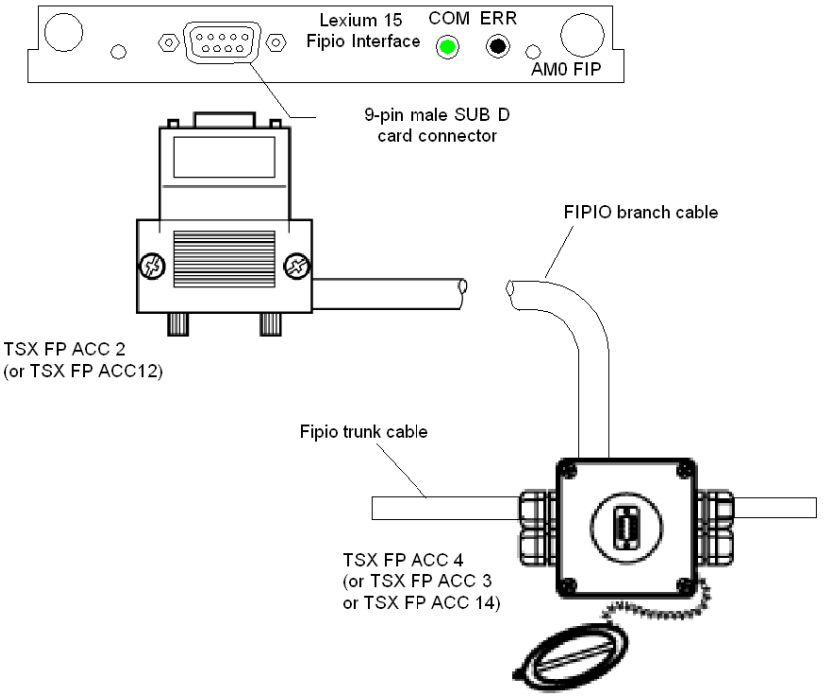
Wiring by Branching:



Connection of the Option Card to the Branch Cable

The connection in chaining or branching mode on the **AM0 FIP 001 V000** Fipio option card is made using **TSX FP ACC12** or **TSX FP ACC2** connectors.

Example of connection of the Fipio card by branching.

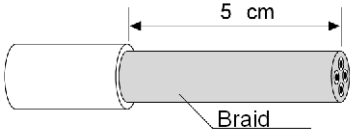
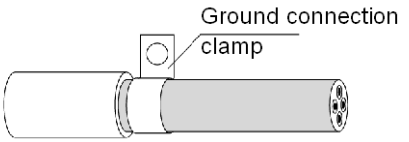
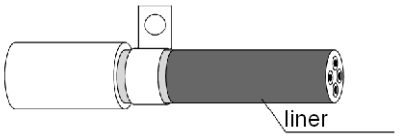
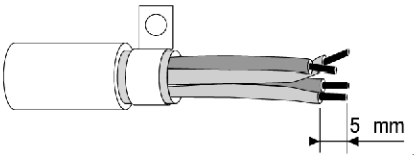


NOTE: The connection or disconnection of the connectors between the TSX FP ACC12 and the Fipio bus may be altered while the module is powered up. When making any alterations that involve connecting or disconnecting the branching devices, you must make sure that power is switched off.

Preparation of cables

Procedure to be followed

Before connecting the auxiliaries, you are advised to prepare the cables by following the steps below:

1	Strip a 5 cm length of sleeve from the cable,	
2	cut the braid in line with the ground connection,	
3	fit the ground connection clamp (the position of the clamp on the cable must take account of the fact that it must be fastened to the connector, to the right or the left of the cable),	
4	split apart the liner and the transparent cable strands to free the wires,	
5	strip 5 cm from the end of each of these wires and fit them with the end-pieces supplied.	

Connection using the TSX FP ACC12 connector

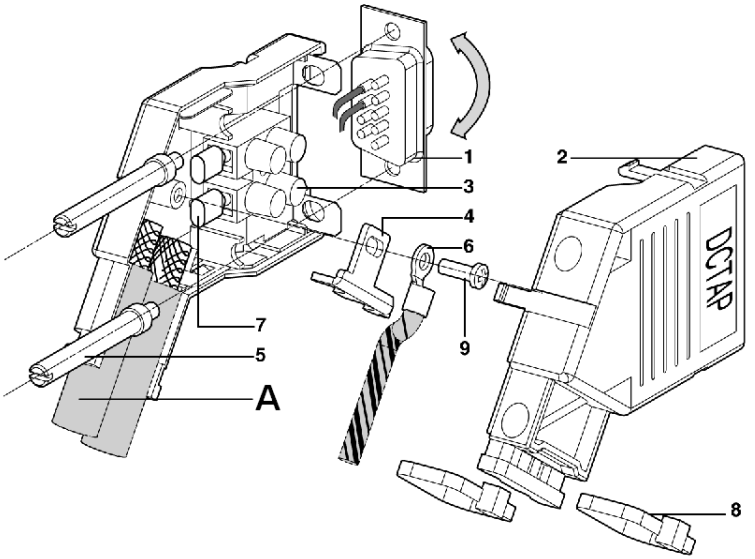
General

This connector is used for connections to the FIPIO option card by chaining or branching.

It is important to check for proper electrical continuity when wiring the connector.

Illustration

Illustration of TSX FP ACC 12 connector:



Description of TSX FP ACC 12 connector:

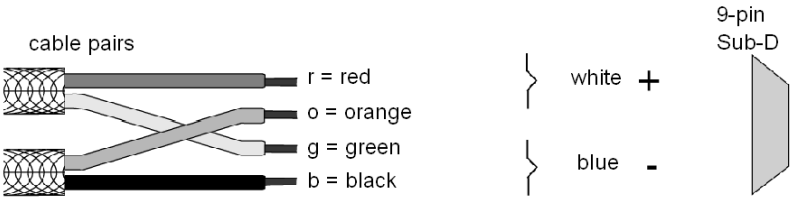
Number	Description
1	SUB-D 9 pin connector with directionable upward or downward cable outlet
2	Cover
3	Connection block
4	Cable shield holding clamp
5	Fastening screw for TSX FP ACC 12
6	Ground connection lug
7	Double wiring ends
8	Cable cleat
9	Fastening screw for clamp

When the connector is located at the end of the bus, the cable **A** is replaced by a standardized TSX FP ACC 7 line terminator resistor.

For further information, refer to the information sheet supplied with all TSX FP ACC 12 products.

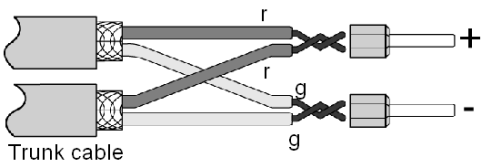
Connections

Identification of signal wire colors:



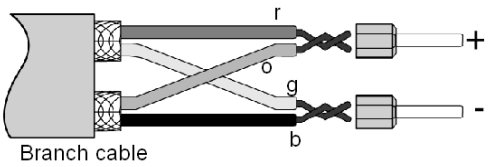
Reminder: the trunk cable contains a shielded pair: red and green wires, the branch cable contains two shielded pairs: red and green wires for one pair and orange and black wires for the second pair.

Connection by chaining:



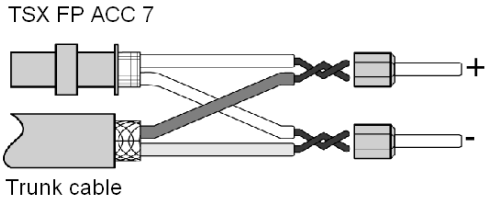
Ensure that the stripped sections of wire are well twisted before inserting them into the double wiring end-piece.
This means that the link will not be broken if the terminal block is only partially tightened.

Connection by branching:



The branch cable is to be positioned at the DCTAP outlet in position (A). The other end of the cable is connected to the trunk cable using a branch box.

Line terminator:



To ensure that the network functions correctly, a line terminator must be connected at both ends of each segment. To comply with the IEC 1158-2 standard, you must use a standardized terminator:
TSX FP ACC 7 (not supplied).
This line terminator must then be placed in position (A).

⚠ DANGER

ELECTRICK SHOCK

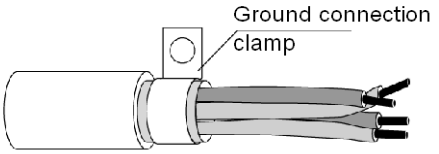
Before disconnecting the TSX FP ACC 12 from a device, ensure that is is grounded to the local ground or take appropriate electrical insulation measures.

Failure to follow these instructions will result in death or serious injury.

Connection of TSX FP ACC 2 connectors

Installation

The different cables are connected using a screw terminal block. The procedure for installation is as follows:

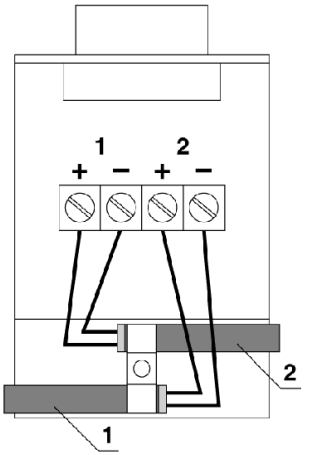
Stage	Action	
1	Open the connector	
2	Prepare the cables *(see page 23)*, then tighten the connection for each wire on the screw terminal block, observing the requirements for the pairing and polarity of wires: Red (+) / Green (-) and Orange (+) / Black (-). The wiring diagrams below show the two types of connection possible: by chaining or branching.	
3	Fasten the ground connection clamp(s) to the connector taking care not to pinch the wires.	
4	Remove the blank(s) on the cover to allow the cables to be passed through.	
5	Replace the cover and fasten it in place.	

Connection by chaining

If the device to which the connector is fitted is positioned at the start or the end of the FIPIO segment, only cable **1** is connected to the junction box. If this is the case, cable **2** must be replaced by a TSX FP ACC 7 non-polarized line terminator.

The fastening system for the ground connection clamps prevents cables arriving opposite each other. They must either arrive from the same direction (left or right), or be offset.

Illustration of connection by chaining:

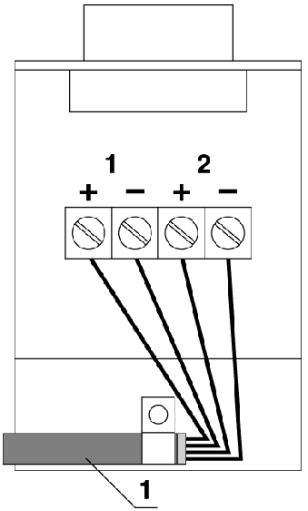


Connection by branching

In the drawing below, cable **1** is a branch cable of type TSX FP CC•••. If the branch is made using 2 TSX FP CA/CR••• type cables, the connection is made in the same way as for chaining.

In this type of configuration, the cable can either arrive from the left or the right, or from above or below.

Illustration of connection by branching:



Connection to TSX FP ACC 4 junction box

Implementation

The different cables are connected using screw terminal blocks, with one terminal block per twisted pair. The installation procedure is as follows:

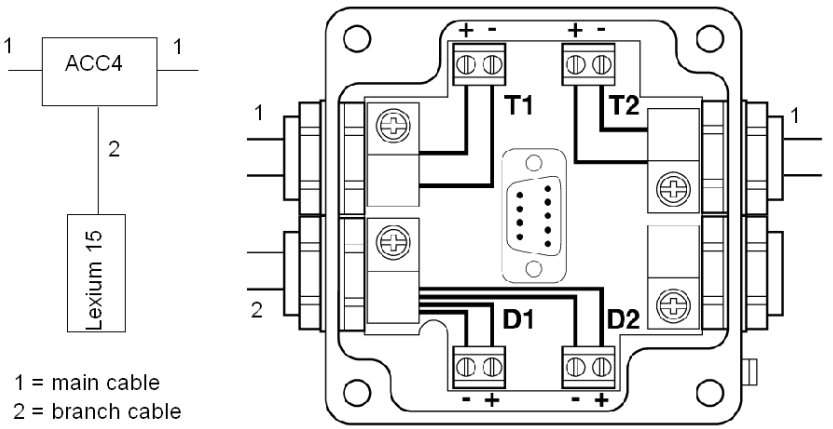
Step	Action
1	Open the junction box
2	Prepare the cables *(see page 23)*, then pass them through the stuffing box
3	Fit a ground connection clamp to each cable. The position of the clamp on each cable must take into account its attachment to the junction box (to the right or the left of the cable)
4	Tighten the connection for each wire on the screw terminal block observing the requirements for the pairing and polarity of wires: Red (D+) / Green (D-) or Orange (D+) / Black (D-)
5	Fasten the ground connection clamps, then tighten the stuffing box through which a cable or line terminator has been threaded
6	Replace the cover and fasten it into place.

Possible connections

The TSX FP ACC 4 junction box also has a 9-pin female connector which can be used to connect a type 3 PCMCIA device: TSX FPP 10, TSX FPP 20.

Two types of connection are possible: branching and chaining.

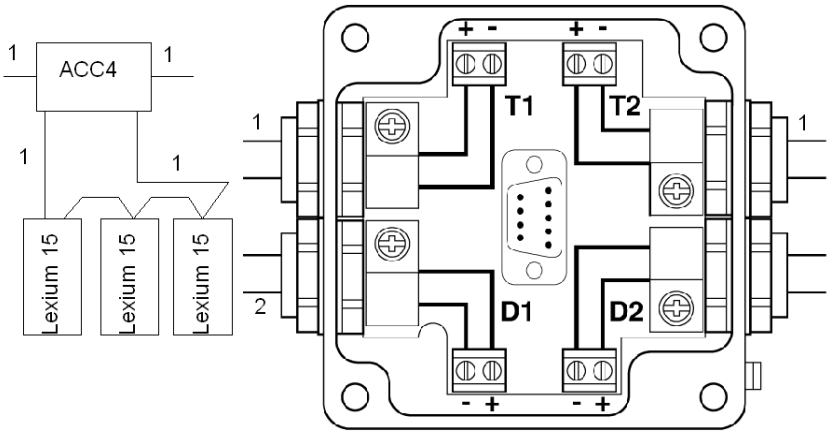
Branching with TSX FP CC •00 branch cable



In this case, the branch must be connected as shown above. The user may also connect a programming terminal to the SUB-D connector after having loosened the plug by a quarter turn.

In this example, the branch cable exits through the left stuffing box. It is also possible to allow it to exit from the right side.

Chaining carried out with the TSX FP CA •00/CR•00 trunk cable



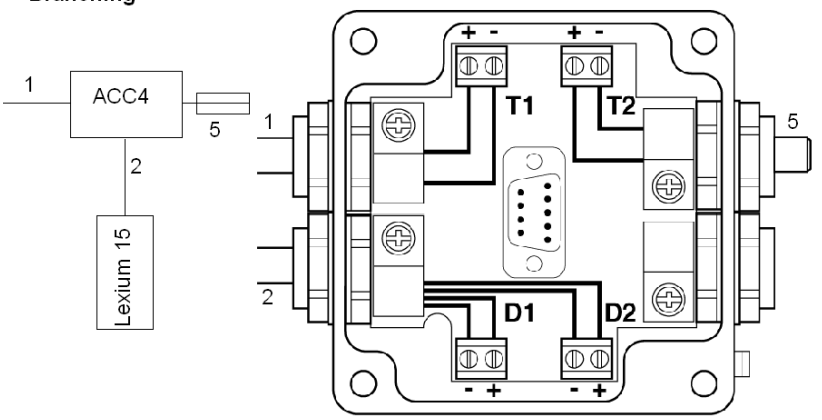
In this case, the branches must be connected as shown above. The user may also connect a programming terminal to the SUB-D connector after having loosened the plug by a quarter turn.

Connection of a terminator

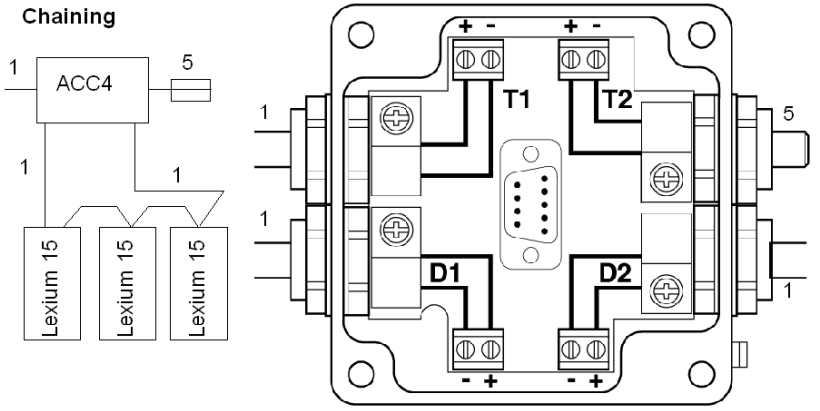
If the box is positioned at the start or end of the segment, only T1 cable is connected and a TSX FP ACC 7 terminator (non-polarized) is connected instead of the second cable segment.

The connection is made as shown below:

Branching



Chaining



1 TSX FP CA •00/CR •00 trunk cable
2 TSX FP CC •00 branch cable
5 TSX FP ACC 7 line terminator
(+) Corresponds to red or orange wire
(-) Corresponds to green or black wire

NOTE: For connection of TSX FP ACC 3 and TSX FP ACC 14 boxes, refer to the general Fipio documentation.

Chapter 3
Software implementation

Subject of this Chapter

This chapter describes the general communication function on Fipio.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Overview	34
Operation of servodrive on the bus	35

Overview

Introduction

A device on the Fipio field bus is identified by its connection point.

The number of the connection point represents the physical address of the equipment on the bus and takes a value between 0 and 127. For the Lexium 15 servodrive, this value is limited to 62.

Address 0 is exclusively reserved for the bus manager PLC.

Address 63 is reserved for the programming terminal. This specific address allows the terminal to access any network architecture without the need for prior configuration.

All other addresses can be used by any devices that can be connected to the FIPIO bus, but must have been configured in advance using the programming software

Bus arbiter

On a FIPIO bus, a single manager PLC authorizes data exchanges. This PLC is the active bus arbiter, and is responsible for managing access to the medium.

The task of the bus arbiter is to scroll through the list of messages to be sent and to allocate the word for the aperiodic exchanges of variables and messages requested.

The list of cyclic exchanges followed by the windows allocated for the aperiodic traffic form a macrocycle. The active bus arbiter scans this macrocycle, and repeats this task to infinity.

On a FIPIO bus, the macrocycle is linked to the exchange requirements of the application program. In particular, this makes it possible to:

- scan the status and command variables of the devices while meeting requirements to update PLC tasks,
- allocate an aperiodic exchange window to variables for the configuration, management and diagnostics of remote devices,
- allocate an aperiodic exchange window to messages to be shared between all devices using a messaging service (this window allows 20 messages of 128 bytes to be exchanged per second, with this rate rising to 50 messages per second for messages of 32 bytes).

All these functions are automatically supported by the system when the bus is configured.

Operation of servodrive on the bus

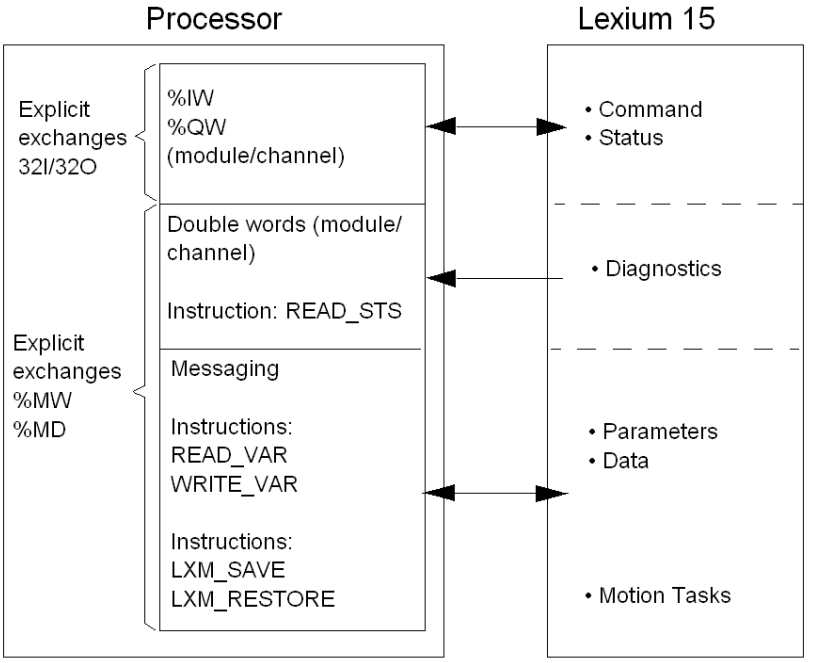
Introduction

The Lexium 15 servodrive appears on the Fipio bus as a slave station.

The Lexium 15 servodrive can exchange information over Fipio either by aperiodic exchange or by cyclic exchange. These exchanges *(see page 75)* make it possible to access the following information:

- Reading and writing of configuration parameters,
- command and status,
- debug,
- diagnostics.

Overview of exchanges possible between the processor and Lexium 15 :



Replacement of Defective Servodrive

This service allows you to save and restore all parameters of the servodrive and the programmed **Motion tasks** using two instructions.

This function allows you to replace a defective servodrive *(see page 67)* without having to use Unilink software.

Chapter 4
Premium Command Station

Purpose of this chapter

This chapter shows how to position the various communication modes allowing access to the servodrive.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Command Station	38
Addressing of Remote Module Language Objects on a FIPIO Bus	39
Configuration	42
Use of messaging	43

Command Station

Overview

An application is installed on a Premium or Atrium PLC by means of the Control Expert software workshop.

Depending on the version of Control Expert software, the services available will differ:

- Software version V1.1: configuration of drives with customized services and profile.

The installation is carried out in two parts:

- Station configuration,
- Writing PLC tasks (using messaging).

Addressing of Remote Module Language Objects on a FIPIO Bus

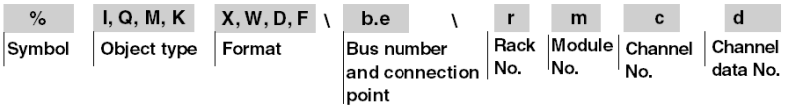
At a Glance

The addressing of the main bit and word objects of remote modules on the Fipio bus is performed on a geographical basis. That means that it depends on:

- The connection point,
- The type of module (base or extended),
- The channel number.

Illustration

Addressing is defined in the following way:



Syntax

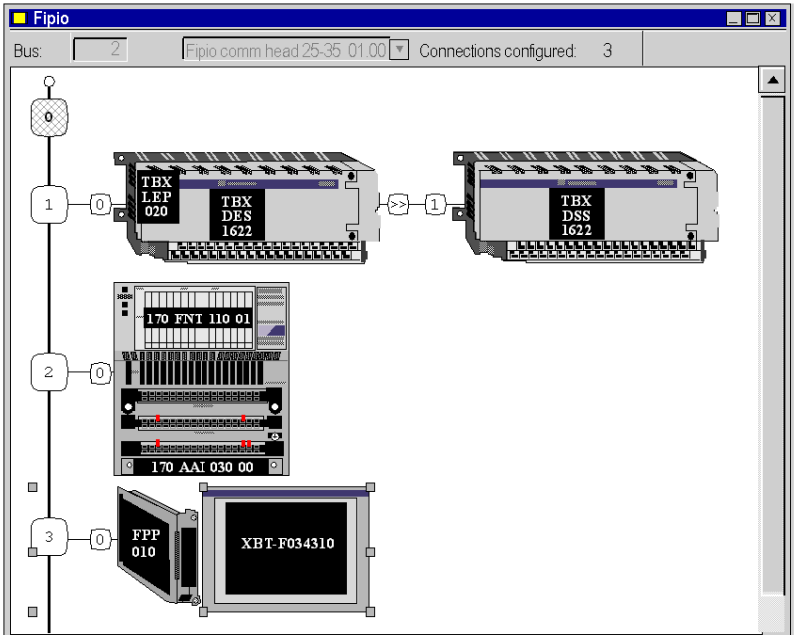
The table below describes the different elements that make up addressing.

Family	Element	Values	Meaning
Symbol	%	-	-
Object type	I Q	- -	Image of the physical input of the module. Image of the physical output of the module. This information is exchanged automatically for each cycle of the task to which they are attached.
	M	-	Internal variable This read or write information is exchanged at the request of the project.
	K	-	Internal constant This configuration information is available as read only.
Format (size)	X	-	Boolean For Boolean objects the X can be omitted.
	W	16 Bit	Single length.
	D	32 Bit	Double length.
	F	32 Bit	Floating point. The floating point format used is the IEEE Std 754-1985 standard (equivalent to IEC 559).
Module/channel address and connection point	b	2	Bus number.
	e	1 to 127	Connection point number.
Rack No.	r	0	Virtual rack number:
Module No.	m	0 or 1	0: base module, 1: extension module.
Channel No.	c	0 to 999 or MOD	MOD: channel reserved for managing the module and parameters common to all the channels.
Channel data No.	d	0 to 999 or ERR	ERR: Used to read a module or channel fault.

Examples

The table below shows some examples of addressing objects.

Object	Meaning
%MW\2.1\0.0.5.2	Status word at rank 2 of the image bit of input 5 of the remote input base module situated at connection point 1 on the Fipio bus.
%I\2.1\0.0.7	Image bit of input 7 of remote input base module situated at connection point 1 on the Fipio bus.
%Q\2.1\0.1.2	Image bit of output 2 of the remote output extension module situated at connection point 1 on the Fipio bus.
%I\2.2\0.0.MOD.ERR	Fault information for Momentum module situated at connection point 2 on the Fipio bus.
%I\2.3\0.0.0.ERR	Fault information for channel 0 of Magelis module situated at connection point 3 on the Fipio bus.



Configuration

Introduction

A Lexium 15 servodrive configured and implemented using Control Expert software will benefit from the following specific services:

- A customized debugging screen,
- A customized interface language,
- Pre-symbolization,
- Specific services (e.g.: replacement of defective servodrive)

Configuration

The following table describes the procedure to be followed to configure a Lexium 15 drive on a Fipio bus.

Step	Action
1	Access *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)* the Fipio bus configuration screen *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)*.
2	Add *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)* a Lexium 15 servodrive on the bus. **Note:** Select the desired device in the **Lexium** model family under **Lexium drop**. **Note:** Lexium 15 servodrives cannot be connected to connection points higher than 64.

Use of messaging

Introduction

The servodrive is seen as a module without parameters.

To access all the servodrive parameters (position loops, speed loops, current loops, motor parameters, monitoring parameters) and to load the **Motion tasks**, use the services for reading/writing messaging variables.

Two examples of application for a Lexium 15 drive are given in the paragraphs below.

Read Command

The **READ_VAR** function enables a read request to be performed using messaging over Fipio.

The example below shows the use of the **READ_VAR** function in the Premium environment.

```
IF %M206 THEN
    READ_VAR (ADDR('\2.1\SYS'),'%MD',2,1,%MW100:4,%MW0:2);
    RESET %M206;
END_IF;
```

The following table explains the parameters:

`(ADDR('\2.1\SYS')`	Fipio address of servodrive: ● 2 = Fipio channel address, ● 1 = servodrive connection point on Fipio bus.
`'%MD'`	Type of object to be exchanged (for Lexium 15: always `%MW` or `%MD`).
`2` (ACCR)	Coding of object to be read: for the servodrive, this code will be the identifier of the corresponding ASCII command *(see page 111)* (the full list of Lexium 15 variables is available on the CD-ROM provided with every Lexium 15 servodrive).
`1`	Number of objects to be read
`%MW100:4`	Address of communication report (4 words).
`%MW0:2`	Read 2 words starting from `%MW0`.

Important

Certain parametrs are coded into two 16-bit registers (these are DW double words). To perform a read of contiguous registers, first make sure that the registers are of the same type (single word: W or double word: DW).

Note : Double words cannot be truncated.

Write Command

The **WRITE_VAR** function enables a write request to be performed using messaging over Fipio.

The examples below show the use of the **WRITE_VAR** function:

```
IF %M209 THEN
    WRITE_VAR (ADDR('\2.1\SYS'),'%MW',11,1,%MW0:2,%MW100:4);
    RESET %M209;
END_IF;
```

Example of how to write an ASCII command in double word format:

```
IF %M209 THEN
    WRITE_VAR (ADDR('\2.1\SYS'),'%MD',3,1,%MW0:2,%MW100:4);
    RESET %M209;
END_IF;
```

The following table explains the parameters:

`(ADDR('\2.1\SYS')`	Fipio address of servodrive: • 2 = Fipio channel address, • 1 = servodrive connection point on Fipio bus.
`'%MW'` or `'%MD'`	Type of object to be exchanged (for Lexium 15: always `%MW` or `%MD`).
`11` or `3` (ANOFF1)	Coding of object to be read: for the servodrive, this code will be the identifier of the corresponding ASCII command *(see page 111)* (the full list of Lexium 15 variables is also available on the CD-ROM provided with every Lexium 15 servodrive).
`1`	Number of objects to be written.
`%MW0:2`	Read 2 words starting from `%MW0`.
`%MW100:4`	Address of communication report (4 words).

Reading Status

The status of the Lexium 15 servodrive can be read using the **READ_STS** *(see EcoStruxure™ Control Expert, I/O Management, Block Library)* instruction.

Other Instructions

The **LXM_SAVE** and **LXM_RESTORE** instructions are used for the Defective Lexium *(see page 67)* module replacement service.

Chapter 5
Lexium 15 configuration: parameters

Configuration parameters

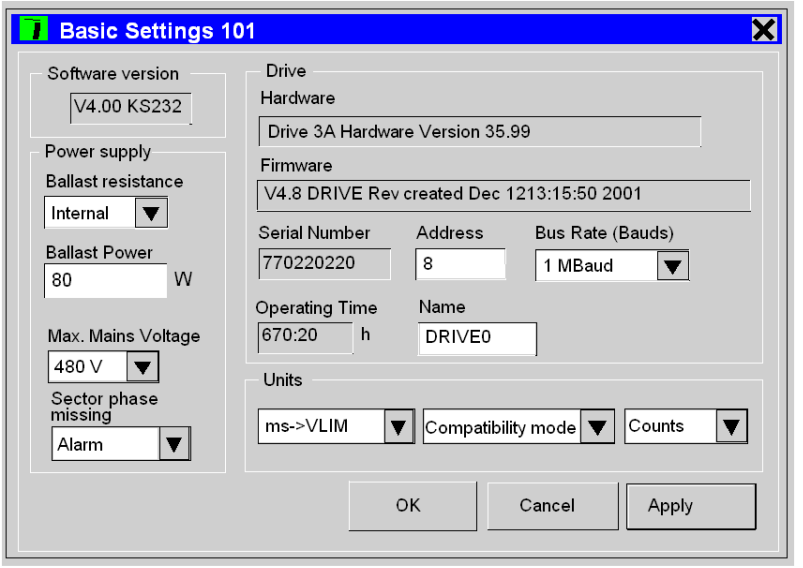
Introduction

The Lexium 15 drives control their own operating mode. They configure themselves automatically on power-up by retrieving the information held in their own internal Flash memory. The parameters are entered in the following screens.

FIPIO address

The address of the servodrive on the FIPIO bus is created from the base adjustment screen of the Unilink software. Possible address values are: 1 to 62.

View of the window used to configure the FIPIO address:

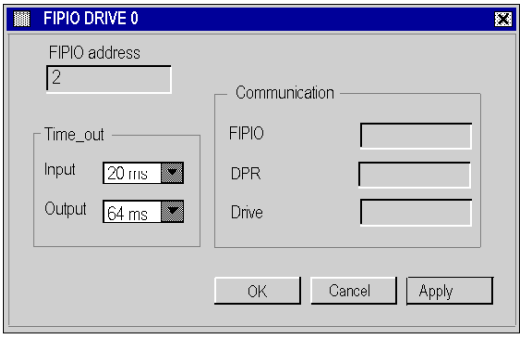


NOTE: The baud rate does not need to be entered. It is calculated automatically.

Additional parameters

The servodrive communication parameters must be inserted in the Unilink software's FIBIO screen (except the FIPIO address). This screen is accessible as soon as Unilink is connected to a servodrive that includes the FIPIO card option.

The Unilink software FIPIO screen :



The following table describes the different parameters of the "FIPIO" screen.

Parameter	ASCII command		Identifier	Range of Values	Error	Access	Note
	Lexium 15 LP	Lexium 15 MP/HP					
FIPIO Address (1)	ADDR	ADDR	-	1-62	1	Read	Node address
Input TimeOut (2)	BUSP4	TO_IN	413	20 ms, 32 ms, 64 ms, 256 ms, 1 s, 4 s	20 ms	Read/ Write	-
Output TimeOut (3)	BUSP5	TO_OUT	414	32 ms, 64 ms, 256 ms, 1 s, 4 s	256 ms	Read/ Write	-
FIPIO	BUSP9 (4)	MBPSTATE (4)	-	-	0	Read	16 bit length
DPR	DPRSTATE (5)	DPRSTATE (5)	-	-	-	Read	16 bit length
Drive	MBPDRVSTAT (6)	MBPDRVSTAT (6)	-	1-100	0	Read	16 bit length

(1) The address on the FIPIO bus is configured in the "Basic Settings" screen of Unilink. Possible address values range from 1 to 62.

The FIPIO address may also be configured using the dialogue (display and BP) in front, before the servodrive.

(2) **Input TimeOut**: maximum response time of the servodrive

(3) **Output TimeOut**: maximum update time for %QW words

(4) **MBPSTATE:**

State read by Unilink, updated by the FIPIO card, which allows the servodrive to know the state of the FIPIO card.

Description of the different states of MBPSTATE/BUSP9:

0	Card not configured
1	Card in Run
2	Card not communicating (STOP)
3	Network communication fault
4	DPRAM communication fault

(5) **DPRSTATE:**

0	Initialization of FIPIO card
80	Nominal phase no message
81	Receiving message
82	Sending response

(6) **MBPDRVSTAT:**

State read by Unilink, updated by the servodrive, which allows the FIPIO card to know the state of the servodrive. Write-accessible through the ASCII MBPDRVSTAT command.

Description of the different MBPDRVSTAT statuses:

1H	servodrive ready
2H	Network communication fault
4H	DPRAM communication fault
8H MBPNTO (*)	Communication fault: network unknown

(*) MBPNTO = 0 communication defect reported to the servodrive.

MBPNTO = 1 communication fault unknown to servodrive, write-accessible

via the ASCII MBPDRVSTAT command.

Either MBPDRVSTAT = 16#08 for MBPNTO = 1

or MBPDRVSTAT = 16#00 for MBPNTO = 0

Chapter 6
Debugging and diagnostics

Purpose of this chapter

This chapter discusses the adjustments and diagnostics of the Lexium 15 servodrives on a FIPIO bus.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Diagnostics of FIPIO option card	50
Lexium 15 Parameters in Unilink Software	51
Diagnostics by READ_STS Instruction	52
Debugging Screen for Lexium 15 on Fipio	53
Shared Debug Screen for Lexium 15	55
Speed settings screen	57
Analog Speed Screen	58
Torque Setpoint Screen	59
Analog Torque Screen	60
Position on External Encoder Screen	61
Position setpoint screen	62
Motion control screens	63

Diagnostics of FIPIO option card

Diagnostics

The FIPIO option card has two indicator LEDs to facilitate diagnostics. Their meanings are stated below.

COM LED

Status	Meaning
Off	No communication
Flashing	Communication established.

ERR LED

Status	Meaning
Off	Normal operation
Flashing	Card not configured or communication error
Fixed on	Faulty module

NOTE: During the initialization phase on power up, the ERR LED and COM LED flash.

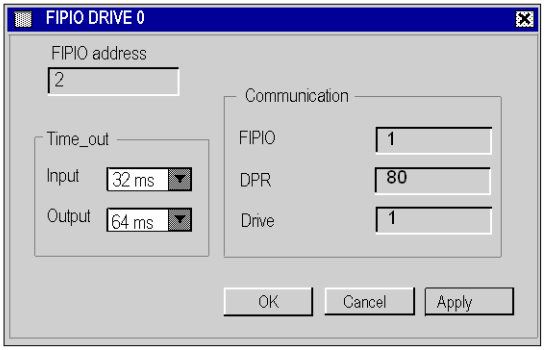
Lexium 15 Parameters in Unilink Software

Servodrive status

The Lexium 15 servodrive uses three parameters, which allow the drive and Fipio option card status to be seen.

These parameters can be accessed :

- Via the Unilink software terminal or any terminal. The ACII commands associated with these parameters are described in the table *(see page 46)*.
- Via the Unilink software screens (Fipio card parameters *(see page 45)* window) :



Diagnostics by READ_STS Instruction

Introduction

It is possible to read the status of the drive from the Control Expert software by using the **READ_STS** instruction.

Syntax

The syntax of the READ_STS instruction is as follows :

```
READ_STS(%CH\2.e\r.m.c)
```

Description

The following table describes the different elements that are part of the instruction.

Element	Description
READ_STS	Name of the instruction.
%CH	Channel-type object.
2.e	Module/channel address and connection point (2.e for Lexium 15).
r	Virtual rack number (0 for Lexium 15).
m	Module number (0 for Lexium 15).
c	Channel number (0 for Lexium 15) or MOD.

Examples

The following table shows the two examples applied to Lexium 15.

Object	Description
READ_STS %CH\2.1\0.0.MOD	Read servodrive module status.
READ_STS %CH\2.1\0.0.0	Read servodrive channel status.

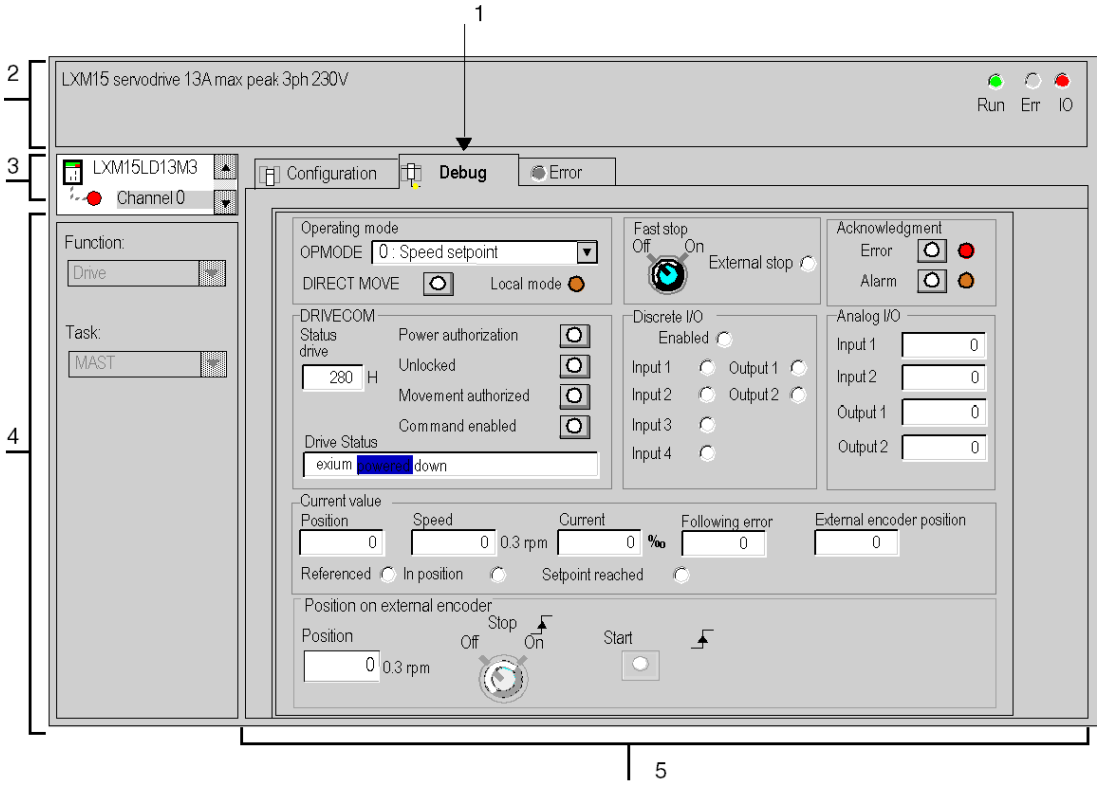
Debugging Screen for Lexium 15 on Fipio

Overview

This screen *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)*, featuring several zones, is used to access the debugging function for Lexium 15 servodrives on a Fipio bus.

Illustration

The following figure shows the debugging screen for a Lexium 15 servodrive on a Fipio bus.



Description

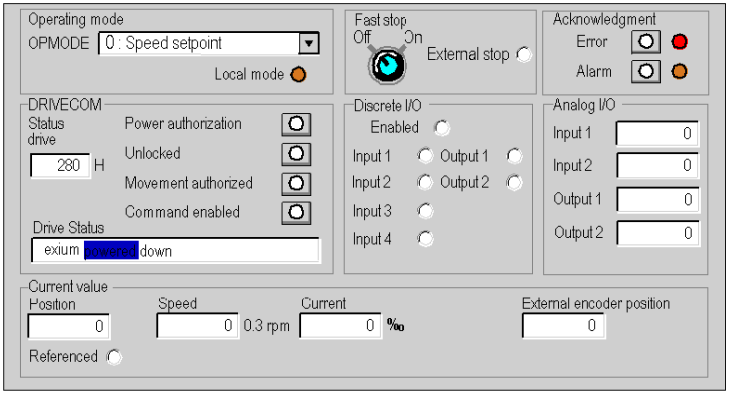
The following table shows the different elements of the debug screen and their functions.

Reference	Element	Function
1	Tabs	The tab in the foreground indicates the current mode (**Debug** in this example). Every mode can be selected using the respective tab. The available modes are : ● **Configuration**, ● **Debug**, accessible only in Online mode, ● **Fault** (channel level) accessible only in online mode.
2	**Module** zone	Gives a reminder of the device's shortened name. In online mode, this zone also includes the three LEDs **Run**, **Err**, **IO**.
3	**Channel** zone	Allows you : ● By clicking on the device reference number, to display the tabs : ❍ **Description** which gives the characteristics of the device, ❍ **I/O Objects** *(see EcoStruxure™ Control Expert, Operating Modes)* which is used to presymbolize the input/output objects, ❍ **Fault** which shows the device faults (only accessible in online mode). ● To display the **Symbol**, which is the name of the channel defined by the user (using the variable editor).
4	**General parameters** zone	These parameters are accessible in **Configuration** mode. In **Debug mode** they are grayed out.
5	**Current parameters** zone	This zone depends on the operating mode selected from the **OPMODE** drop-down list. It is broken down into two sections : ● A shared screen *(see page 55)*, ● A panel specific to the operating mode. The available operating modes are given below : ● 0 : Speed setpoint *(see page 57)*, ● 1 : Analog speed *(see page 58)*, ● 2 : Torque setpoint *(see page 59)*, ● 3 : Analog torque *(see page 60)*, ● 4 : Position on external encoder *(see page 61)*, ● 5 : Position setpoint *(see page 62)*, ● 8 : Motion control *(see page 63)* : ❍ With **DIRECT MOVE** inactive, ❍ With **DIRECT MOVE** active.

Shared Debug Screen for Lexium 15

Introduction

The following figure shows the shared zone of the screen for debugging the Lexium 15 drive on a Fipio bus.



Description

The following table shows the different elements of the shared zone of the debug screen and their functions.

Zone	Description
Operating mode	This zone consists of : ● An **OPMODE** drop-down list to select the operating mode, ● An LED which is orange when the Lexium 15 is in Offline (local) mode.
Fast stop	This zone consists of : ● A switch which can be positioned to : ❍ **OFF** to deactivate stop, ❍ **ON** to activate stop, ● An **External stop** check box, which indicates acknowledgement by Lexium 15 : ❍ Check box not checked = not active, ❍ Check box checked = active.
Acknowledgment	This zone is used to view and acknowledge faults and alarms. It consists of : ● An LED which turns orange to indicate a fault, ● An LED which turns orange to indicate an alarm, ● Two acknowledgment buttons with the following meaning : ❍ Button not pressed = not acknowledged, ❍ Button pressed = acknowledged.
DRIVECOM	This zone consists of : ● The **Drive status** field, which displays the current status of the Lexium 15 (in hex), ● The 4 buttons **Power authorized**, **Unlocked**, **Movement authorized** and **Control enabled** which can be used to change the drive status with the following significance : ❍ Button not pressed = not active, ❍ Button pressed = active. ● The **Drive status** field, which displays the current status of the servodrive.
Discrete I/O	Zone which uses a series of check boxes to display the state of the discrete I/Os of the Lexium 15 and which has the following significance: ● Check box not checked = 0, ● Check box checked = 1.
Analog I/O	Zone which displays the values of the 2 analog inputs and the 2 analog outputs (in signed decimal) of the Lexium 15.
Current value	Zone which displays the **Position**, **Speed** and **Current** values of the Lexium 15, as well as the value of the **External coder position** (where used). These values are expressed in signed decimal (the unit is indicated to the right of the value).

Speed settings screen

Introduction

A specific panel appears at the bottom of the debug window when the operating mode **Speed setpoint** is selected. This mode allows to finish a velocity and to launch the servodrive from this velocity.

The panel looks like this:



Description

This window consists of:

- an entry field for entering the speed setpoint in signed decimal
- a servodrive stop operation switch
- a start button of the servodrive at the defined velocity

Analog Speed Screen

Introduction

A specific panel appears at the bottom of the debug window when the **Analog speed** operating mode is selected. This mode is used to start the servodrive at a speed set as +/- 10V via the analog inputs of the servodrive.

The panel looks like this:



Torque Setpoint Screen

Introduction

A specific panel appears at the bottom of the debug window when the **Torque setpoint** operating mode is selected. This mode is used to set a torque and start the servodrive at this torque.

The panel looks like this:



Description

This window consists of:

- An entry field for entering the current setpoint in signed decimal,
- A button to start the servodrive with the set torque.

Analog Torque Screen

Introduction

A specific panel appears at the bottom of the debug window when the **Analog torque** operating mode is selected. This mode is used to start the servodrive with torque set as a current loop via the analog inputs of the servodrive.

The panel looks like this:

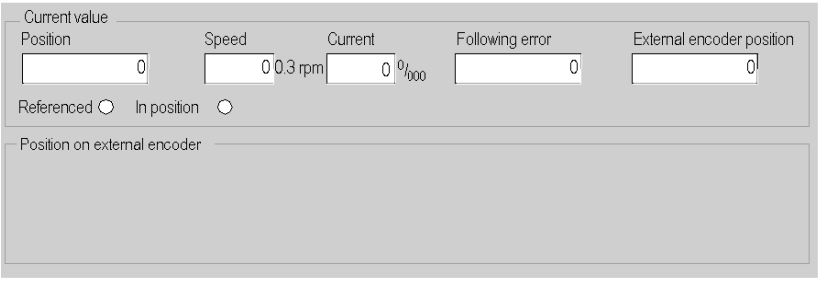


Position on External Encoder Screen

Introduction

A specific panel appears at the bottom of the debug window when the **Position on external encoder** operating mode is selected. The following error is also displayed in the **Current value** zone of the shared window. This mode is used with the **Electrical shaft** function (see the Unilink and Unilink MH programming guides).

The panel looks like this:



Description

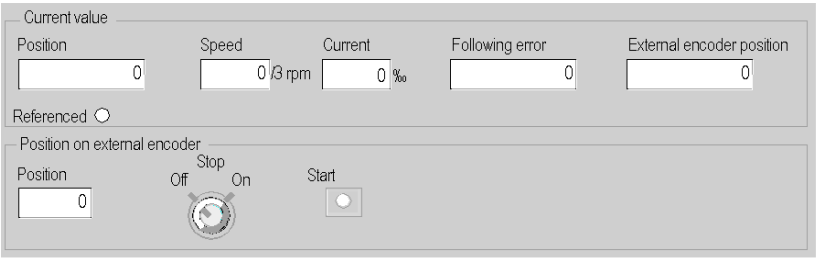
This operating mode displays the following error in the **Current value** field of the main window.

Position setpoint screen

Introduction

A specific panel appears at the bottom of the debug window when the **Position setpoint** operating mode is selected. The following error is also displayed in the **Current value** zone of the shared window. This mode is used for setting the servodrive to a defined value.

The panel looks like this:



Description

This window consists of:

- The position to be reached
- a servodrive stop operation switch (without effect)
- a servodrive start switch (without effect)
- in addition, the following error value is displayed in the **Current value** zone of the main window

Motion control screens

Introduction

This mode has two sub-modes:

- without DIRECT MOVE
- with DIRECT MOVE

DIRECT MOVE is enabled using the button which appears in the **Operate mode** zone when: **Motion control** is selected.

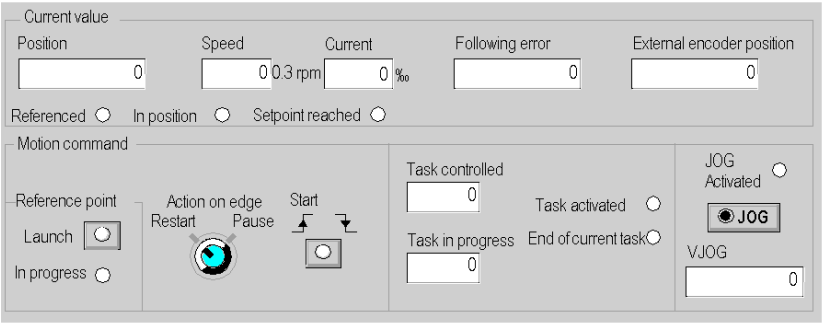
Illustration with DIRECT MOVE activated :



Without DIRECT MOVE

A specific panel appears at the bottom of the debug window when the DIRECT MOVE operational sub-mode is not active. The following error is also displayed in the **Current value** zone of the shared window. This mode is used to send a task to be carried out by Lexium 15. It also allows setting of references and launching of a **JOG** to a given speed.

The panel looks like this:



This window consists of:

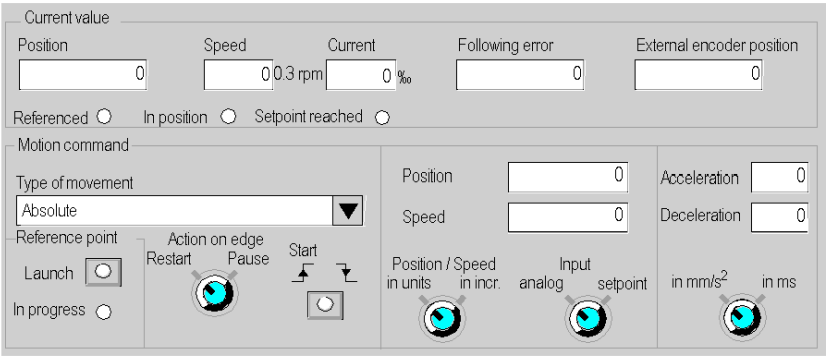
- a **Reference point** zone: click on the button to launch the process to set a reference point. An indicator shows the status of the reference setting.
- a control zone used to launch a task
- an on/off switch to stop the motion in progress: Pause
- a start button to launch a task

- a zone relating to the task to be launched consisting of:
  - a task data entry zone for the task to be launched:
  - a zone displaying the task in progress
  - two task progress indicators
- a zone relating to the **JOG** consisting of:
  - an entry field for entering the JOG speed (VJOG) in signed decimal
  - a button to start the JOG
  - a JOG progress indicator
- in addition, the following error value is displayed in the **Current value** zone of the main window

With DIRECT MOVE

A specific panel appears at the bottom of the debug window when the DIRECT MOVE operational sub-mode is active. The following error is also displayed in the **Current value** zone of the shared window. This mode is used for sending different types of movements to be executed by the Lexium 15. It also allows reference setting and various detailed adjustemts as described below.

The panel looks like this:



This window consists of:

- a **Reference point** zone: click on the button to launch the process to set a reference point. An indicator shows the status of the reference setting.
- a pick list for the following types of movement:
  - Absolute
  - Relative to last setpoint
  - Relative to current position
  - Relative to position captured on falling edge
  - Relative to position captured on rising edge
  - Relative to IN_POSITION
- an on/off switch

- a start button to launch the movement
- a zone relating to position and speed consisting of:
  - an entry field for entering the position in signed decimal
  - an entry field for entering the speed in signed decimal
  - a switch to select display of speed and position in units or in increments
  - a switch to choose the type of input: analog or setpoint
- a zone relating to acceleration and deceleration consisting of:
  - an entry field for entering the acceleration in signed decimal
  - an entry field for entering the deceleration in signed decimal
  - a switch to display acceleration and deceleration in mm/s^2 or in ms
- in addition, the following error value is displayed in the **Current value** zone of the main window

Chapter 7
Replacement of the servodrive

Purpose of this chapter

This chapter deals with the operations to be performed to replace a Lexium 15 drive, if, for example, the drive is defective.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
General Introduction	68
LXM_SAVE Function	69
LXM_RESTORE Function	71
Implementation	73

General Introduction

Overview

Servodrive replacement allows you to save and restore the parameters of the servodrives on the Fipio bus.

When a servodrive is defective it can be replaced without having to use Unilink software.

Principle

To perform this operation, two functions are available : these are the functions LXM_SAVE and LXM_RESTORE which enable you to save and restore the parameters and tasks of the Lexium 15.

These functions are available in the Control Expert library, in the Lexium 15 family.

LXM_SAVE Function

Introduction

This function is used to save the parameters or tasks of the Lexium 15.

Syntax

The syntax of this function is as follows:

- To save the parameters of the LexiumLexium 15:
  `LXM_SAVE (ADDR('\2.e\SYS', 'P', %MWg:h, %MWx:y)`
- To save the Lexium 15 tasks:
  `LXM_SAVE (ADDR('\2.e\SYS', 'MT', %MWg:h, %MWx:y)`

The following table describes the function's different parameters.

Parameter	Description
`ADDR('\b.e\SYS'`	Address of the connection point of Fipio card number e.
`'P'` or `'MT'`	Type of object to be saved : • `'P'` = parameters, • `'MT'` = tasks (Motion tasks).
`%MWx:y`	Word zone where data will be saved.
`%MWg:h`	Word zone to which exchange management information will be written (minimum of 14 words).

The following table describes the management information.

Word number	Most Significant Byte	Least Significant Byte
`%MWg`	Exchange number.	-
`%MWg+1`	Operation report.	Communication report.
`%MWg+2`	Timeout.	Timeout.
`%MWg+3`	Length.	Length.
`%MWg+4`	-	Activity bit.
The words `%MWg+5` to `%MWg+13` are reserved.		

Description of Reports

The following table shows the main report descriptions depending on the values returned.

Description	Operation report value	Communication report value
The address format is incorrect.	16#00	16#03
The type of object is different from `'P'` or `'MT'`.	16#00	16#06
The management parameters are less than 14 words long.	16#00	16#05
The frame received from the Fipio card does not contain any data.	16#03	16#00
The frame received from the Fipio card is of an incorrect length.		
The frame received from the Fipio card contains the response code `FD`. (1)	16#01	16#00
The length of the word zone is insufficient to save data. (2)	16#00	16#09
Incorrect response from Lexium.	16#32	16#00
Memory capacity of Fipio card on Lexium 15 exceeded.	16#33	16#00
Key:		
(1)	For example, when another request is being processed.	
(2)	In this case, the minimum number of bytes required to save the data is specified in the word `%MWg+3`.	

LXM_RESTORE Function

Introduction

This function is used to restore the parameters or tasks of the Lexium 15.

Syntax

The syntax of this function is as follows :

- To restore the parameters of the Lexium 15 :
  `LXM_RESTORE (ADDR('\2.e\SYS'), 'P', %MWx:y, %MWg:h)`
- To restore the tasks of the Lexium 15 :
  `LXM_RESTORE (ADDR('\2.e\SYS'), 'MT', %MWx:y, %MWg:h)`

The following table describes the function's different parameters.

Parameter	Description
`(ADDR('\2.e\SYS')`	Address of the connection point of Fipio card number e.
`'P'` or `'MT'`	Type of object to be restored : ● `'P'` = parameters, ● `'MT'` = tasks (Motion tasks).
`%MWx:y`	Word zone where the data is stored and from which it will be restored.
`%MWg:h`	Word zone to which exchange management information will be written (minimum of 14 words).

The following table describes the management information.

Word number	Most Significant Byte	Least Significant Byte
`%MWg`	Exchange number.	-
`%MWg+1`	Operation report.	Communication report.
`%MWg+2`	Timeout.	Timeout.
`%MWg+3`	Length.	Length.
`%MWg+4`	-	Activity bit.
The words `%MWg+5` to `%MWg+13` are reserved.		

Description of Reports

The following table shows the main report descriptions depending on the values returned.

Description	Operation report value	Communication report value
The address format is incorrect.	16#00	16#03
The type of object is different to 'P' or 'MT'.	16#00	16#06
The management parameters are less than 14 words long.	16#00	16#05
The frame received from the Fipio card does not contain any data.	16#03	16#00
The frame received from the Fipio card is of an incorrect length.		
The frame received from the Fipio card contains the response code FD. (1)	16#01	16#00
The length of the word zone where the data is stored is insufficient. (2)	16#00	16#0A
The checksum of the word zone where the data is stored is incorrect.	16#30	16#00
The type of Lexium 15 on the Fipio bus is different from the one whose parameters have been saved.	16#31	16#00
Incorrect response from Lexium 15.	16#32	16#00
Memory capacity of Fipio card on Lexium 15 exceeded.	16#33	16#00
Incorrect type of memory zone.	16#34	16#00
Key :		
(1)	For example, when another request is being processed.	
(2)	In this case, the minimum number of bytes required to restore the data is specified in the word %MWg+3.	

Implementation

Procedure

The following table describes the procedure to be followed to implement the defective drive replacement function.

Step	Action
1	Save Lexium 15 parameters and tasks in the PLC application.
2	Run servodrive hardware fault detection.
3	Replacement of defective servodrive.
4	Adjust servodrive address on front panel.
5	Restore parameters and tasks of servodrive from PLC application.

Example:

Example of how to program the function:

```
! (* SAVE PARAMETERS *)
          IF %M0 THEN
     LXM_SAVE(ADDR('\2.1\SYS'),'P',%MW100:14,%MW500:780);
     RESET %M0;
  END_IF;
! (* RESTORE PARAMETERS *)
  IF %M1 THEN
     LXM_RESTORE(ADDR('\2.1\SYS'),'P',%MW500:780,%MW100:14);
     RESET %M1;
  END_IF;
! (* SAVE TASK *)
  IF %M2 THEN
     LXM_SAVE(ADDR('\2.1\SYS'),'MT',%MW100:14,%MW500:120);
     RESET %M2;
  END_IF;
! (* RESTORE TASK *)
  IF %M3 THEN
     LXM_RESTORE(ADDR('\2.1\SYS'),'MT',%MW500:120,%MW100:14);
     RESET %M3;
  END_IF;
```

Chapter 8
Introduction to Lexium 15 servo language objects

Purpose of this chapter

This chapter describes the language objects associated with Lexium 15 servo drives on a Fipio bus.

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
8.1	Lexium 15 Drive Language Objects and IODDTs	76
8.2	Lexium servo drives IODDT 15	85
8.3	Lexium 15 Servodrive Language Objects	96

Section 8.1
Lexium 15 Drive Language Objects and IODDTs

Purpose of this Section

This section presents general information about language objects and IODDTs of Lexium 15 drives on a Fipio bus.

What Is in This Section?

This section contains the following topics:

Topic	Page
Presentation of Language Objects of Lexium 15 Servodrives on Fipio Bus	77
Implicit Exchange Language Objects Associated with the Application-Specific Function	78
Explicit Exchange Language Objects Associated with the Application-Specific Function	79
Management of Exchanges and Reports with Explicit Objects	81

Presentation of Language Objects of Lexium 15 Servodrives on Fipio Bus

Overview

Lexium 15 servodrives on a Fipio bus have an associated IODDT:

- `T_LEXIUM_FIPIO`.

The IODDTs are predefined by the manufacturer. They contain input/output language objects belonging to a channel of an application-specific module.

NOTE: The language objects that are not detailed in the Lexium 15 IODDT are described in a specific chapter *(see page 96)*.

NOTE: IODDT variables can be created in two different ways:
- Tab **I/O objects** *(see EcoStruxure™ Control Expert, Operating Modes)*,
- Data Editor.

Language Object Types

Each IODDT contains a set of language objects allowing its operation to be controlled and checked.

There are two types of language objects:

- **Implicit exchange objects**, which are automatically exchanged on each cycle of the task associated with the module,
- **Explicit exchange objects**, which are exchanged when requested to do so by the project, using explicit exchange instructions.

Implicit exchanges are related to the module inputs/outputs: process value results, information and commands.

Explicit exchanges allow module parametering and diagnostics.

Implicit Exchange Language Objects Associated with the Application-Specific Function

At a Glance

An integrated application-specific interface or the addition of a module automatically enhances the language objects application used to program this interface or module.

These objects correspond to the input/output images and software data of the module or integrated application-specific interface.

Reminders

The module inputs (`%I` and `%IW`) are updated in the PLC memory at the start of the task, the PLC being in RUN or STOP mode.

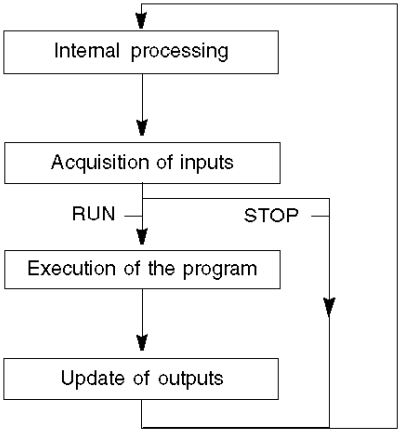
The outputs (`%Q` and `%QW`) are updated at the end of the task, only when the PLC is in RUN mode.

NOTE: When the task occurs in STOP mode, either of the following are possible, depending on the configuration selected:

- outputs are set to fallback position (fallback mode)
- outputs are maintained at their last value (maintain mode)

Figure

The following diagram shows the operating cycle of a PLC task (cyclical execution).



Explicit Exchange Language Objects Associated with the Application-Specific Function

At a Glance

Explicit exchanges are exchanges performed at the user program's request, and using instructions:

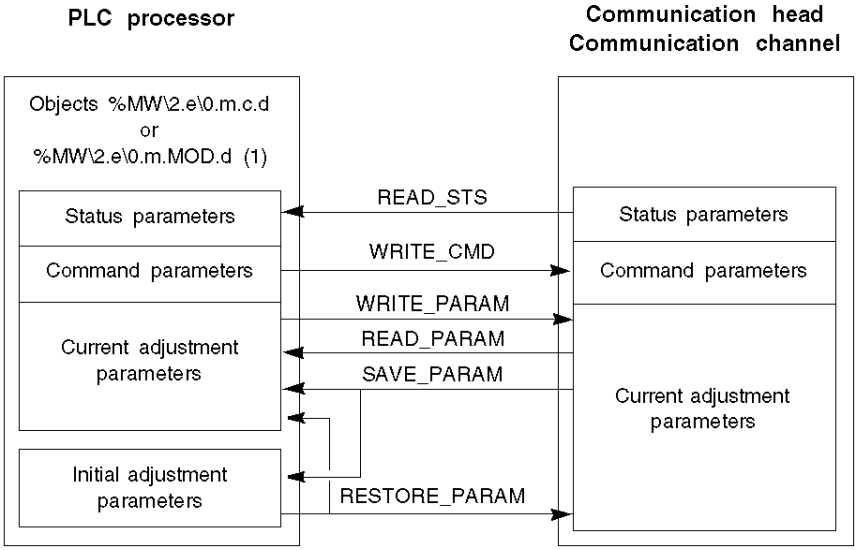
- READ_STS *(see EcoStruxure™ Control Expert, I/O Management, Block Library)* (read status words)
- WRITE_CMD *(see EcoStruxure™ Control Expert, I/O Management, Block Library)* (write command words)
- WRITE_PARAM *(see EcoStruxure™ Control Expert, I/O Management, Block Library)* (write adjustment parameters)
- READ_PARAM *(see EcoStruxure™ Control Expert, I/O Management, Block Library)* (read adjustment parameters)
- SAVE_PARAM *(see EcoStruxure™ Control Expert, I/O Management, Block Library)* (save adjustment parameters)
- RESTORE_PARAM *(see EcoStruxure™ Control Expert, I/O Management, Block Library)* (restore adjustment parameters)

These exchanges apply to a set of %MW objects of the same type (status, commands or parameters) that belong to a channel.

NOTE: These objects provide information about the module (e.g., type of channel fault, etc.), and are used to control the modules and to define their operating modes (saving and restoring currently applied adjustment parameters).

General Principle For Using Explicit Instructions

The diagram below shows the different types of explicit exchanges that can be made between the processor and module.



(1) Only with the instructions READ_STS and WRITE_CMD.

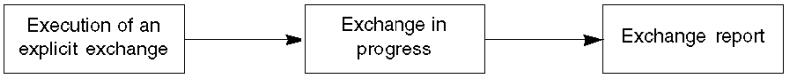
Managing exchanges

During an explicit exchange, it is necessary to check its performance in order that data is only taken into account when the exchange has been correctly executed.

To do this, two types of information are available:

- information concerning the exchange in progress *(see page 84)*
- the exchange report *(see page 84)*

The following diagram describes the management principle for an exchange:



NOTE: In order to avoid several simultaneous explicit exchanges for the same channel, it is necessary to test the value of the word EXCH_STS (`%MWr.m.c.0`) of the IODDT associated to the channel before to call any EF using this channel.

Management of Exchanges and Reports with Explicit Objects

At a Glance

When data is exchanged between the PCL memory and the module, the module may require several task cycles to acknowledge this information. All IODDTs use two words to manage exchanges:

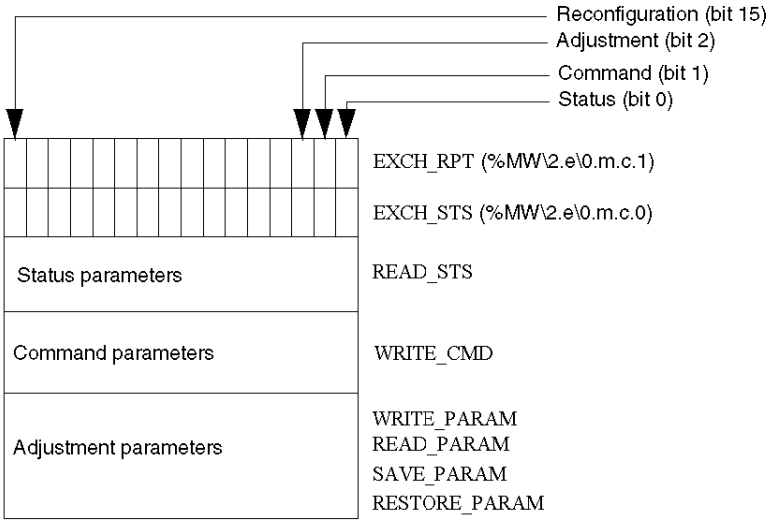
- `EXCH_STS` (%MW\2.e\0.m.c.0): exchange in progress
- `EXCH_RPT` (%MW\2.e\0.m.c.1): report

NOTE: Depending on the localization of the module, the management of the explicit exchanges `(%MW0.0.MOD.0.0 for example)will not be detected by the application:`

- For in-rack modules, explicit exchanges are done immediately on the local PLC Bus and are finished before the end of the execution task. So, the `READ_STS`, for example, is always finished when the `%MW0.0.MOD.0.0` bit is checked by the application.
- For remote bus (Fipio for example), explicit exchanges are not synchronous with the execution task. So, the detection is possible by the application.

Illustration

The illustration below shows the different significant bits for managing exchanges:



Description of the Significant Bits

Each bit of the words EXCH_STS (%MW\2.e\0.m.c.0) and EXCH_RPT (%MW\2.e\0.m.c.1) is associated with a type of parameter:

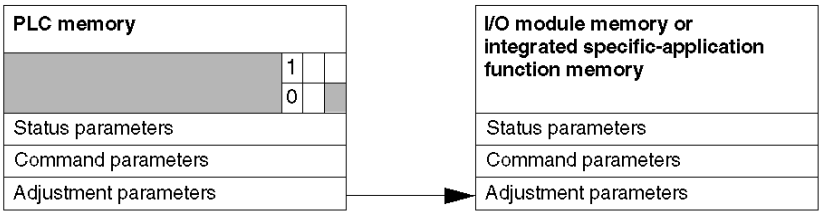
- Rank 0 bits are associated with the status parameters:
  - The STS_IN_PROGR bit (%MW\2.e\0.m.c.0.0) indicates whether a read request for the status words is in progress.
  - The STS_ERR bit (%MW\2.e\0.m.c.1.0) specifies whether a read request for the status words is refused by the module channel.
- Rank 1 bits are associated with the command parameters:
  - The CMD_IN_PROGR bit (%MW\2.e\0.m.c.0.1) indicates whether command parameters are being sent to the module channel.
  - The CMD_ERR bit (%MW\2.e\0.m.c.1.1) specifies whether the command parameters are refused by the module channel.
- Rank 2 bits are associated with the adjustment parameters:
  - The ADJ_IN_PROGR bit (%MW\2.e\0.m.c.0.2) indicates whether the adjustment parameters are being exchanged with the module channel (via WRITE_PARAM, READ_PARAM, SAVE_PARAM, RESTORE_PARAM).
  - The ADJ_ERR bit (%MW\2.e\0.m.c.1.2) specifies whether the adjustment parameters are refused by the module.
    If the exchange is correctly executed, the bit is set to 0.
- Rank 15 bits indicate a reconfiguration on channel c of the module from the console (modification of the configuration parameters + cold start-up of the channel).

NOTE: m stands for the position of the module; **c** stands for the channel number in the module.

NOTE: Exchange and report words also exist at module level EXCH_STS (%MW\2.e\0.m.MOD) and EXCH_RPT (%MW\2.e\0.m.MOD.1) in the IODDT type T_GEN_MOD.

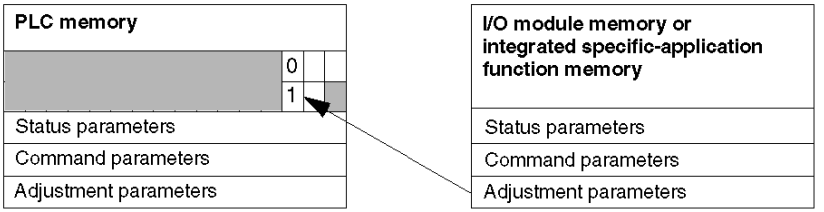
Example

Phase 1: Sending data by using the `WRITE_PARAM` instruction.



When the instruction is scanned by the PLC processor, the **Exchange in progress** bit is set to 1 in %MW\2.e\0.m.c.

Phase 2: Analysis of the data by the I/O module and report



When the data is exchanged between the PLC memory and the module, processing by the module is managed by the `ADJ_ERR` bit (%MW\2.e\0.m.c.1.2): Report (0 = correct exchange, 1 = faulty exchange).

NOTE: There is no adjustment parameter at module level.

Execution Indicators for an Explicit Exchange: EXCH_STS

The table below shows the control bits of the explicit exchanges: EXCH_STS (%MW\2.e\0.m.c.0).

Standard symbol	Type	Access	Meaning	Address
STS_IN_PROGR	BOOL	R	Reading of channel status words in progress	%MW\2.e\0m.c.0.0
CMD_IN_PROGR	BOOL	R	Command parameters exchange in progress	%MW\2.e\0m.c.0.1
ADJ_IN_PROGR	BOOL	R	Adjust parameters exchange in progress	%MW\2.e\0m.c.0.2
RECONF_IN_PROGR	BOOL	R	Reconfiguration of the module in progress	%MW\2.e\0.m.c.0.15

NOTE: If the module is not present or is disconnected, explicit exchange objects (Read_Sts for example) are not sent to the module (STS_IN_PROG (%MWr.m.c.0.0) = 0), but the words are refreshed.

Explicit Exchange Report: EXCH_RPT

The table below shows the report bits: EXCH_RPT (%MW\2.e\0.m.c.1).

Standard symbol	Type	Access	Meaning	Address
STS_ERR	BOOL	R	Error in reading status words of the channel (1 = failure)	%MW\2.e\0.m.c.1.0
CMD_ERR	BOOL	R	Error when exchanging command parameters (1 = failure)	%MW\2.e\0.m.c.1.1
ADJ_ERR	BOOL	R	Error when exchanging adjustment parameters (1 = failure)	%MW\2.e\0.m.c.1.2
RECONF_ERR	BOOL	R	Fault when reconfiguring the channel (1 = failure)	%MW\2.e\0.m.c.1.15

Section 8.2
Lexium servo drives IODDT 15

Subject of this Section

This section describes the different IODDTs and language objects associated with Lexium servo drives 15 on a Fipio bus.

What Is in This Section?

This section contains the following topics:

Topic	Page
Details of Implicit Exchange Objects of the T_LEXIUM_FIPIO IODDT: %I, %IW and %ID	86
Details of Implicit Exchange Objects of the T_LEXIUM_FIPIO IODDT: %QW and %QD	91
Details of Explicit Exchange Objects of the T_LEXIUM_FIPIO IODDT:	94

Details of Implicit Exchange Objects of the T_LEXIUM_FIPIO IODDT: %I, %IW and %ID

Introduction

This page describes the implicit exchange objects (%I, %IW and %ID) of the T_LEXIUM_FIPIO IODDT that apply to Lexium 15 drives.

Error Bit

The following table presents the meaning of the error bit CH_ERROR (`%I\2.e\0.m.c.ERR`).

Standard symbol	Type	Access	Meaning	Reference
`CH_ERROR`	BOOL	R	Indicates that input channel c is faulty.	`%I\2.e\0.m.c.ERR`

Servodrive Status: ZSW

The following table presents the meanings of the ZSW drive status word bits (`%IW\2.e\0.m.c.0`).

Standard symbol	Type	Access	Meaning	Reference
`RDY_START`	BOOL	R	Ready for start-up.	`%IW\2.e\0.m.c.0.0`
`DRV_RDY`	BOOL	R	Servodrive ready.	`%IW\2.e\0.m.c.0.1`
`DRV_RUN`	BOOL	R	Servodrive running.	`%IW\2.e\0.m.c.0.2`
`FAULT`	BOOL	R	Fault present.	`%IW\2.e\0.m.c.0.3`
`UNDER_POWER`	BOOL	R	Power under voltage.	`%IW\2.e\0.m.c.0.4`
`EMCY_STOP_IN_PROG`	BOOL	R	Emergency stop in progress. (1)	`%IW\2.e\0.m.c.0.5`
`DRV_LOCK`	BOOL	R	Servodrive locked.	`%IW\2.e\0.m.c.0.6`
`ALRM_IN_PROG`	BOOL	R	Alarm in progress.	`%IW\2.e\0.m.c.0.7`
`FOLL_ERR`	BOOL	R	Following error in external position command. (2)	`%IW\2.e\0.m.c.0.8`
-	-	-	Reserved.	`%IW\2.e\0.m.c.0.9`
`SETPOINT_REACHED`	BOOL	R	Setpoint reached. (3)	`%IW\2.e\0.m.c.0.10`
`THR_REACHED`	BOOL	R	Threshold reached (not supported).	`%IW\2.e\0.m.c.0.11`
-	-	-	Reserved.	`%IW\2.e\0.m.c.0.12`
-	-	-	Reserved.	`%IW\2.e\0.m.c.0.13`
`OFFLINE_MODE`	BOOL	R	Offline mode.	`%IW\2.e\0.m.c.0.14`
-	-	-	Reserved.	`%IW\2.e\0.m.c.0.15`

Standard symbol	Type	Access	Meaning	Reference
Key :				
(1)	Only in operating modes 0, 2 and 8.			
(2)	Only in operating mode 5.			
(3)	Only in operating modes 4 and 8.			

NOTE: Certain statuses are only valid on bit combinations *(see page 105)*.

Alarm: STATCODE_1 and STATCODE_2

The following table presents the meanings of the alarm words STATCODE_1 (`%IW\2.e\0.m.c.1`) and STATCODE_2 (`%IW\2.e\0.m.c.2`).

Standard symbol	Type	Access	Meaning	Reference
`STATCODE_1`	INT	R	Alarm 1 *(see page 99)*.	`%IW\2.e\0.m.c.1`
`STATCODE_2`	INT	R	Alarm 2 *(see page 100)*.	`%IW\2.e\0.m.c.2`

Error: ERRCODE_1 and ERRCODE_2

The following table presents the meanings of the error words ERRCODE_1 (`%IW\2.e\0.m.c.5`) and ERRCODE_2 (`%IW\2.e\0.m.c.6`).

Standard symbol	Type	Access	Meaning	Reference
`ERRCODE_1`	INT	R	Error 1 *(see page 100)*.	`%IW\2.e\0.m.c.3`
`ERRCODE_2`	INT	R	Error 2 *(see page 101)*.	`%IW\2.e\0.m.c.4`

Status: TRJSTAT_1

The following table presents the meanings of the TRJSTAT_1 status word bits (`%IW\2.e\0.m.c.5`).

Standard symbol	Type	Access	Meaning	Reference
`IMPOS2_OUT`	BOOL	R	INPOS2 output updated.	`%IW\2.e\0.m.c.5.0`
`END_MOT_TASK`	BOOL	R	End of current motion task.	`%IW\2.e\0.m.c.5.1`
`MOT_TASK_COMPLETE`	BOOL	R	Motion task completed (Toggle).	`%IW\2.e\0.m.c.5.2`
-	-	-	Reserved.	`%IW\2.e\0.m.c.5.3` to `%IW\2.e\0.m.c.5.15`

Status: TRJSTAT_2

The following table presents the meanings of the TRJSTAT_2 status word bits (%IW\2.e\0.m.c.6).

Standard symbol	Type	Access	Meaning	Reference
MOT_TASK_ACT	BOOL	R	Motion task active.	%IW\2.e\0.m.c.6.0
REF_OK	BOOL	R	Reference point reached.	%IW\2.e\0.m.c.6.1
HOMED	BOOL	R	Position = home.	%IW\2.e\0.m.c.6.2
IN_POSITION	BOOL	R	In position.	%IW\2.e\0.m.c.6.3
RE_IN2	BOOL	R	Rising edge detection on input latch 2.	%IW\2.e\0.m.c.6.4
REF_ACT	BOOL	R	Reference point active.	%IW\2.e\0.m.c.6.5
JOG_ACT	BOOL	R	JOG move active.	%IW\2.e\0.m.c.6.6
FE_IN2	BOOL	R	Falling edge detection on input latch 2.	%IW\2.e\0.m.c.6.7
EMCY_ACT	BOOL	R	Emergency stop active.	%IW\2.e\0.m.c.6.8
-	-	-	Reserved.	%IW\2.e\0.m.c.6.9 to %IW\2.e\0.m.c.6.15

Position: PFB

The following table presents the meaning of the position word PFB (%ID\2.e\0.m.c.7).

Standard symbol	Type	Access	Meaning	Reference
PFB	DINT	R	Position (in increments).	%ID\2.e\0.m.c.7

Speed: V

The following table presents the meaning of the speed word V (%IW\2.e\0.m.c.9).

Standard symbol	Type	Access	Meaning	Reference
V	INT	R	Speed (0.3 rpm).	%IW\2.e\0.m.c.9

Effective current: I

The following table presents the meaning of the effective current word I (%IW\2.e\0.m.c.10).

Standard symbol	Type	Access	Meaning	Reference
I	INT	R	Effective current (1/10000 x DIPEAK (A)).	%IW\2.e\0.m.c.10
Key :				
DIPEAK (A)	2 x exit current permanent *(see page 12)*.			

MONITOR1 and MONITOR2

The following table presents the meanings of the words MONITOR1 (%IW\2.e\0.m.c.11) and MONITOR2 (%IW\2.e\0.m.c.12).

Standard symbol	Type	Access	Meaning	Reference
MONITOR1	INT	R	ANAOUT1 value (in mV).	%IW\2.e\0.m.c.11
MONITOR2	INT	R	ANAOUT2 value (in mV).	%IW\2.e\0.m.c.12

NOTE: These values are not accessible for a Lexium 15 LP

Analog Inputs: ANIN1 and ANIN2

The following table presents the meanings of the analog input words ANIN1 (%IW\2.e\0.m.c.13) and ANIN2 (%IW\2.e\0.m.c.14).

Standard symbol	Type	Access	Meaning	Reference
ANIN1	INT	R	Analog Input 1.	%IW\2.e\0.m.c.13
ANIN2	INT	R	Analog Input 2.	%IW\2.e\0.m.c.14

STAT_IO

The following table presents the meaning of the word STAT_IO (%IW\2.e\0.m.c.15).

Standard symbol	Type	Access	Meaning	Reference
STAT_IO	INT	R	Digital I/O Drive Status.	%IW\2.e\0.m.c.15

Following error: PE

The following table presents the meaning of the following error word PE (%ID\2.e\0.m.c.16).

Standard symbol	Type	Access	Meaning	Reference
PE	DINT	R	Following error (in increments).	%ID\2.e\0.m.c.16

Task number in progress: TASK_NUMBER

The following table presents the meaning of the word TASK_NUMBER (%IW\2.e\0.m.c.18).

Standard symbol	Type	Access	Meaning	Reference
TASK_NUMBER	INT	R	Current task (Motion Task) number.	%IW\2.e\0.m.c.18

External encoder position: PFB0

The following table presents the meaning of the external coder position word PFB0 (%ID\2.e\0.m.c.19).

Standard symbol	Type	Access	Meaning	Reference
PFB0	DINT	R	External coder position (if EXPOS = 2, with EXTMUL, EXTCIN, GEARO, GEARI).	%ID\2.e\0.m.c.19
-	-	-	Reserved.	%IW\2.e\0.m.c.21 to %IW\2.e\0.m.c.31

Details of Implicit Exchange Objects of the T_LEXIUM_FIPIO IODDT: %QW and %QD

Introduction

This page describes the (%QW and %QD) implicit exchange objects of IODDT T_LEXIUM_FIPIO which apply to Lexium 15 servodrives.

Command Register : DRIVECOM

The following table presents the meaning of the (`%QW\2.e\0.m.c.0`) DRIVECOM command register word.

Standard symbol	Type	Access	Meaning	Reference
`DRIVECOM`	INT	R/W	Command Register.	`%QW\2.e\0.m.c.0`

NOTE: The bits of the DRIVECOM word are described in a specific chapter *(see page 97)*.

Operating mode : OPMODE

The following table presents the meaning of the (`%QW\2.e\0.m.c.1`) OPMODE operating mode word.

Standard symbol	Type	Access	Meaning	Reference
`OPMODE`	INT	R/W	Operating mode of drive.	`%QW\2.e\0.m.c.1`

The following table presents the possible values of the `%QW\2.e\0.m.c.1` OPCODE word.

Value	Operating mode
16#00	Speed setpoint (**OPMODE 0**).
16#01	Analog speed (**OPMODE 1**).
16#02	Torque setpoint (**OPMODE 2**).
16#03	Analog torque (**OPMODE 3**).
16#04	Position on external encoder (**OPMODE 4**).
16#05	Position setpoint (**OPMODE 5**).
16#08	Motion control (**OPMODE 8**).

Commands : CMD_POS, CMD_VEL, CMD_CUR and VJOG

The following table presents the meaning of the command words CMD_POS (%QD\2.e\0.m.c.2), CMD_VEL (%QW\2.e\0.m.c.4), CMD_CUR (%QW\2.e\0.m.c.5) and VJOG (%QD\2.e\0.m.c.6).

Standard symbol	Type	Access	Meaning	Reference
CMD_POS	DINT	R/W	Absolute command position (in increments) (*).	%QD\2.e\0.m.c.2
CMD_VEL	INT	R/W	Digital speed command (0.3 rpm).	%QW\2.e\0.m.c.4
CMD_CUR	INT	R/W	Digital current command (1/1000 x DIPEAK (A)).	%QW\2.e\0.m.c.5
VJOG	DINT	R/W	JOG speed command (0.3 rpm).	%QD\2.e\0.m.c.6
Key :				
DIPEAK (A)	2 x exit current permanent *(see page 12)*.			

(*) This trajectory mode is made up of 2 parameters :

- PTBASE (address: 213) : time base expressed in N*250 s Example : N=4 implies an interpolation time of 1 ms
- PRBASE (address: 209) : defines the number of increments per rotation Example : N=20, or in other words 220=1048576 increments/rotation

⚠ CAUTION

RISK OF MECHANICAL DAMAGE

Make sure that the chosen parameters are compatible with the kinetics of your machine

Failure to follow these instructions can result in injury or equipment damage.

Motion tasks : MTMUX, MOVE, O_C, O_P, O_V, O_ACC1 and O_DEC1

The following table presents the meaning of the words MTMUX (%QW\2.e\0.m.c8), MOVE (%QW\2.e\0.m.c.9), O_C (%QW\2.e\0.m.c.10), O_P (%QD\2.e\0.m.c.11), O_V (%QD\2.e\0.m.c.13), O_ACC1 (%QW\2.e\0.m.c.15) and O_DEC1 (%QW\2.e\0.m.c.16).

Standard symbol	Type	Access	Meaning	Reference
MTMUX	INT	R/W	Preselected motion task (must be = 0 in **DIRECT MOVE**) mode.	%QW\2.e\0.m.c.8
MOVE	INT	R/W	Motion task number.	%QW\2.e\0.m.c.9
O_C	INT	R/W	Type of movement and unit.	%QW\2.e\0.m.c.10
O_P	DINT	R/W	Target position of motion task (in increments).	%QD\2.e\0.m.c.11
O_V	DINT	R/W	Target speed of motion task.	%QD\2.e\0.m.c.13
O_ACC1	INT	R/W	Acceleration of motion task. (1)	%QW\2.e\0.m.c.15
O_DEC1	INT	R/W	Deceleration of the motion task. (1)	%QW\2.e\0.m.c.16
-	-	-	Reserved.	%QW\2.e\0.m.c.17 to %QW\2.e\0.m.c.31
Key :				
(1)	If O_ACC1 or O_DE1 = 0, then the maximum value is applied.			

Details of Explicit Exchange Objects of the T_LEXIUM_FIPIO IODDT:

Introduction

This page describes the explicit exchange objects of the T_LEXIUM_FIPIO IODDT that apply to Lexium 15 drives.

Exchange management: EXCH_STS

The following table presents the meanings of the EXCH_STS exchange management word bits (%MW\2.e\0.m.c.0).

Standard symbol	Type	Access	Meaning	Reference
STS_IN_PROG	BOOL	R	Parameter status reading in progress.	%MW\2.e\0.m.c.0.0
CMD_IN_PROG	BOOL	R	Command parameters write in progress.	%MW\2.e\0.m.c.0.1
ADJ_IN_PROG	BOOL	R	Parameter exchange adjustment in progress.	%MW\2.e\0.m.c.0.2

Exchange report: EXCH_RPT

The following table presents the meanings of the EXCH_RPT exchange report word bits (%MW\2.e\0.m.c.1).

Standard symbol	Type	Access	Meaning	Reference
STS_ERR	BOOL	R	Error reading channel status.	%MW\2.e\0.m.c.1.0
CMD_ERR	BOOL	R	Error sending a command to the channel.	%MW\2.e\0.m.c.1.1
ADJ_ERR	BOOL	R	Error adjusting the channel.	%MW\2.e\0.m.c.1.2

Channel error: CH_FLT

The following table presents the meanings of the CH_FLT channel error word bits (%MW\2.e\0.m.c.2).

Standard symbol	Type	Access	Meaning	Reference
INTERNAL_FLT	BOOL	R	Internal channel fault.	%MW\2.e\0.m.c.2.4
CONF_FLT	BOOL	R	Hardware or software configuration error.	%MW\2.e\0.m.c.2.5
COM_FLT	BOOL	R	Error communicating with the bus.	%MW\2.e\0.m.c.2.6
APPLI_FLT	BOOL	R	Application fault.	%MW\2.e\0.m.c.2.7

Communication error: FIP_ERROR

The following table presents the meaning of the communication error word FIP_ERROR (%MW\2.e\0.m.c.7).

Standard symbol	Type	Access	Meaning	Reference
PFB	INT	R	Communication error.	%MW\2.e\0.m.c.7

NOTE: The FIP_ERROR word bits are described in a specific chapter *(see page 102)*.

Section 8.3
Lexium 15 Servodrive Language Objects

Purpose of this Section

This section describes the language objects associated with Lexium 15 servo drives on a Fipio bus.

What Is in This Section?

This section contains the following topics:

Topic	Page
Implicit Exchange Language Objects	97
Explicit Exchange Language Objects	99

Implicit Exchange Language Objects

Introduction

This page describes the implicit exchange language objects of a Lexium 15 servodrive on a Fipio bus.

Command Register : DRIVECOM

The following table presents the meanings of the DRIVECOM command register word bits (%QW\2.e\0.m.c.0).

Object	Meaning
%QW\2.e\0.m.c.0.0	Transition to **Ready** status.
%QW\2.e\0.m.c.0.1	Switched on.
%QW\2.e\0.m.c.0.2	0 : emergency stop.
%QW\2.e\0.m.c.0.3	Run.
%QW\2.e\0.m.c.0.4	Ramp stop.
%QW\2.e\0.m.c.0.5	Depends on operating mode *(see page 98)*.
%QW\2.e\0.m.c.0.6	Depends on operating mode *(see page 98)*.
%QW\2.e\0.m.c.0.7	Fault acknowledgment.
%QW\2.e\0.m.c.0.8	Depends on operating mode *(see page 98)*.
%QW\2.e\0.m.c.0.9	Direct Move.
%QW\2.e\0.m.c.0.10	Reserved.
%QW\2.e\0.m.c.0.11	Depends on operating mode *(see page 98)*.
%QW\2.e\0.m.c.0.12	Re-initialization of position (manufacturer-specific function).
%QW\2.e\0.m.c.0.13	Alarm acknowledgment (manufacturer-specific function).
%QW\2.e\0.m.c.0.14	Reserved.
%QW\2.e\0.m.c.0.15	Reserved.

NOTE: Certain statuses are only valid on bit combinations *(see page 105)*.

DRIVECOM word bits

The following table presents the meanings of the DRIVECOM command register word bits (`%QW\2.e\0.m.c.0`) that are dependent on the operating mode.

	OPMODE 0	OPMODE 2	OPMODE 1 OPMODE 3 OPMODE 4	OPMODE 5	OPMODE 8	
					Without Direct Move (bit 9 = 0)	With Direct Move (bit 9 = 1)
`%QW\2.e\0.m.c.0.5`	Ramp stop.	Reserved.	Reserved.	Reserved.	Pause / Restart.	
`%QW\2.e\0.m.c.0.6`	VCMD authorized setpoint.	ICMD authorized setpoint.	Reserved.	Start S_SETH.	Start motion task.	Start movement.
`%QW\2.e\0.m.c.0.8`	Reserved.	Reserved.	Reserved.	-	Start JOG.	-
`%QW\2.e\0.m.c.0.11`	Reserved.	Reserved.	Reserved.	-	Start reference point.	-

NOTE: The movement command **Direct Move** is launched, either on the rising or falling edge of bit 6, or on a change of status of the motion control parameters.
The motion task start command is launched, either on the rising or falling edge of bit 6.
On change of status in bit 9, there is no stop.

⚠ WARNING

RISK OF UNATTENDED MOVEMENTS

Use of Direct Move mode can cause the axis to begin movement immediately. Make sure that safety devices are in place to protect the hardware and persons nearby.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Explicit Exchange Language Objects

Introduction

This page describes the explicit exchange language objects of a Lexium 15 servodrive on a Fipio bus.

Alarm and Error Words

The following table presents the meaning of the Lexium 15 servodrive bits.

Object	Meaning
%MW\2.e\0.m.c.3	STATCODE_1 alarm *(see page 99)*.
%MW\2.e\0.m.c.4	STATCODE_2 alarm *(see page 100)*.
%MW\2.e\0.m.c.5	ERRCODE_1 drive error *(see page 100)*.
%MW\2.e\0.m.c.6	ERRCODE_2 drive error *(see page 101)*.
%MW\2.e\0.m.c.8	Reserved.
%MW\2.e\0.m.c.9	Reserved.

Bit Table

The following table presents the meaning of the word bits %MW\2.e\0.m.c.3.

Object	Meaning	Servodrive warning code (1)
%MW\2.e\0.m.c.3.0	I^2T warning.	n01
%MW\2.e\0.m.c.3.1	Ballast power.	n02
%MW\2.e\0.m.c.3.2	Following error.	n03
%MW\2.e\0.m.c.3.3	Response check.	n04
%MW\2.e\0.m.c.3.4	Mains phase.	n05
%MW\2.e\0.m.c.3.5	Limit switch 1.	n06
%MW\2.e\0.m.c.3.6	Limit switch 2.	n07
%MW\2.e\0.m.c.3.7	Motion task error.	n08
%MW\2.e\0.m.c.3.8	No "reference" point value.	n09
%MW\2.e\0.m.c.3.9	Positive limit.	n10
%MW\2.e\0.m.c.3.10	Negative limit.	n11
%MW\2.e\0.m.c.3.11	Default values.	n12
%MW\2.e\0.m.c.3.12	The Fipio interface is not functioning correctly.	n13
%MW\2.e\0.m.c.3.13	HIPERFACE reference mode.	n14

Object	Meaning	Servodrive warning code (1)
%MW\2.e\0.m.c.3.14	Table error.	n15
%MW\2.e\0.m.c.3.15	Reserved.	n16
Key :		
(1)	For additional information, see the installation guides for the Lexium 15 LP/MP/HP servodrives.	

Bit Table

The following table presents the meaning of the word bits %MW\2.e\0.m.c.4.

Object	Meaning	Servodrive warning code (1)
%MW\2.e\0.m.c.4.0 à %MW\2.e\0.m.c.4.14	Reserved.	n17... n31
%MW\2.e\0.m.c.4.15	Beta Version of firmware.	n32
Key :		
(1)	For additional information, see the installation guides for the Lexium 15 LP/MP/HP servodrives.	

Bit Table

The following table presents the meaning of the word bits %MW\2.e\0.m.c.5.

Object	Meaning	Servodrive warning code (1)
%MW\2.e\0.m.c.5.0	Servodrive heatsink overheating.	F01
%MW\2.e\0.m.c.5.1	Voltage limit on DC link exceeded.	F02
%MW\2.e\0.m.c.5.2	Following error limit exceeded.	F03
%MW\2.e\0.m.c.5.3	Return signals missing or inadequate.	F04
%MW\2.e\0.m.c.5.4	DC link voltage lower than factory settings (100 V).	F05
%MW\2.e\0.m.c.5.5	Motor overheating.	F06
%MW\2.e\0.m.c.5.6	Internal 24 Vdc fault.	F07
%MW\2.e\0.m.c.5.7	Speed limit exceeded.	F08
%MW\2.e\0.m.c.5.8	EEPROM checksum error.	F09
%MW\2.e\0.m.c.5.9	Flash EPROM checksum error.	F10
%MW\2.e\0.m.c.5.10	Motor brake faulty.	F11

Object	Meaning	Servodrive warning code (1)
%MW\2.e\0.m.c.5.11	Motor phase missing.	F12
%MW\2.e\0.m.c.5.12	Ambient temperature.	F13
%MW\2.e\0.m.c.5.13	Fault at servodrive output stage.	F14
%MW\2.e\0.m.c.5.14	Maximum I^2T value exceeded.	F15
%MW\2.e\0.m.c.5.15	2 or 3 phases missing from power supply.	F16
Key :		
(1)	For additional information, see the installation guides for the Lexium 15 LP/MP/HP servodrives.	

Bit Table

The following table presents the meaning of the word bits %MW\2.e\0.m.c.6.

Object	Meaning	Servodrive warning code (1)
%MW\2.e\0.m.c.6.0	Analog/digital converter error.	F17
%MW\2.e\0.m.c.6.1	Regen circuit faulty or incorrectly adjusted.	F18
%MW\2.e\0.m.c.6.2	One phase missing from network power supply.	F19
%MW\2.e\0.m.c.6.3	Location fault.	F20
%MW\2.e\0.m.c.6.4	Processing fault.	F21
%MW\2.e\0.m.c.6.5	Short-circuit to ground.	F22
%MW\2.e\0.m.c.6.6	Reserved.	F23
%MW\2.e\0.m.c.6.7	Alarm set to error by WMASK.	F24
%MW\2.e\0.m.c.6.8	Exchange error.	F25
%MW\2.e\0.m.c.6.9	Hard limit error.	F26
%MW\2.e\0.m.c.6.10	External trajectory error.	F27
%MW\2.e\0.m.c.6.11	Reserved.	F28
%MW\2.e\0.m.c.6.12	Network error / Enable input = 0.	F29
%MW\2.e\0.m.c.6.13	Reserved.	F30
%MW\2.e\0.m.c.6.14	Reserved.	F31
%MW\2.e\0.m.c.6.15	System error.	F32
Key :		
(1)	For additional information, see the installation guides for the Lexium 15 LP/MP/HP servodrives.	

Communication error: FIP_ERROR

The following table presents the meaning of the FIP_ERROR communication error bits (%MW\2.e\0.m.c.7).

Object	Meaning
%MW\2.e\0.m.c.7.0	Shared memory error.
%MW\2.e\0.m.c.7.1	Fipio network error.
%MW\2.e\0.m.c.7.2 to %MW\2.e\0.m.c.7.15	Reserved.

Chapter 9
Servodrive operating modes

Purpose of this chapter

This chapter explains the different operating modes of the Lexium 15 servodrive on FIPIO.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Operating Modes of Servodrive	104
Status Diagram	105
Unilink-forced offline mode	107
Downgraded Operating Modes	108

Operating Modes of Servodrive

Introduction

The Lexium 15 servodrive on a Fipio bus has the following 7 operating modes :

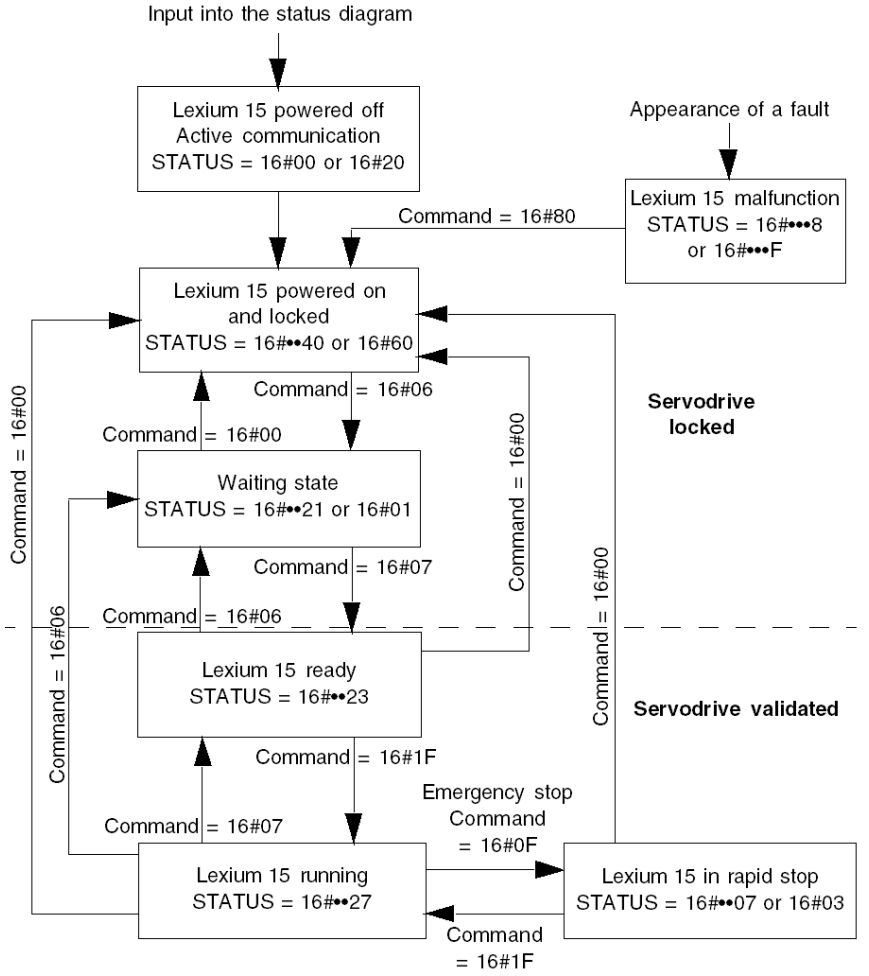
- 0 : Speed setpoint,
- 1 : Analog speed,
- 2 : Torque setpoint,
- 3 : Analog torque,
- 4 : Position on external encoder,
- 5 : Position setpoint,
- 8 : Motion control :
  - With DIRECT MOVE inactive,
  - With DIRECT MOVE active.

Status Diagram

Status Diagram for the DriveCom Standard

The Lexium 15 servodrive can be driven via Fipio in accordance with the following status diagram

The diagram below has been adapted to the properties of the Lexium 15 in order to facilitate programming. Each status represents an internal servodrive behavior. It is possible to change from one status to another by using the command word `%QW\2.c\0.0.0` (STW). The status of the drive can be viewed using the status word `%IW\2.c\0.0.0` (ZSW).



STATUS ZSW AND 16#006F

The following table shows the combinations of bits accepted by the command word (STW).

Command	Bit 13	Bit 7	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Stop	-	-	-	-	1	1	0
Run	-	-	-	-	1	1	1
Inhibit voltage	-	-	-	-	-	0	-
Fast stop (deactivate)	-	-	-	-	0	1	-
Fast stop (authorize)	-	-	0	1	1	1	1
Inhibit operation	-	-	-	0	1	1	1
Authorize operation	-	-	1	1	1	1	1
Clear Error	-	1	-	-	-	-	-
Acknowledge Warnings	1	-	-	-	-	-	-
Key :							
-	Not significant.						

The following table shows the combinations of bits accepted by the status word (ZSW).

Command	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Not ready to run	0	-	-	0	0	0	0
Prevent run	1	-	-	0	0	0	0
Ready to run	0	1	-	0	0	0	1
Ready for operation	0	1	-	0	0	1	1
Operation authorized	0	1	-	0	1	1	1
Operation inhibited	0	-	-	1	0	0	0
Error	0	-	-	1	0	0	0
Error response	0	-	-	1	0	0	0
Fast stop active	0	0	-	0	0	1	1
Key :							
-	Not significant.						

Unilink-forced offline mode

Unilink-forced offline mode

Unilink-forced offline mode

When the axis is debugged, it is possible to switch to forced offline mode in Unilink.

The switch to offline mode is achieved by using the servodrive "Validation" command through Unilink. In this case the exchange of Fipio command words is halted, and the entire Unilink command set is accessible as if in independent operating mode.

The exchange of Fipio command words is reactivated with the servodrive "Devalidation" commando through Unilink.

Downgraded Operating Modes

Operating Modes

The behavior of Fipio on Lexium 15 when operating in downgraded mode is specified below :

Operating mode	Performance
Stop PLC	The outputs %QW are maintained except %QW\2.e\0.0.0.d.0 to %QW\2.e\0.0.0.d.3 set to 0.
Network fault	
Fipio network configuration refused	

Chapter 10
Theoretical performance

Theoretical Performance

Preface

The following provides a review of the cycle times *(see Premium and Atrium Using EcoStruxure™ Control Expert, Fipio Bus, Setup Manual)* of the Fipio bus applied to Lexium 15 servodrive.

Network Cycle Time

The network cycle time for a **mono task** application is calculated for the following configuration:

- The bus length is 1 Km,
- The values corresponding to silence time, slot time and bandwidth are the default values (automatic mode).

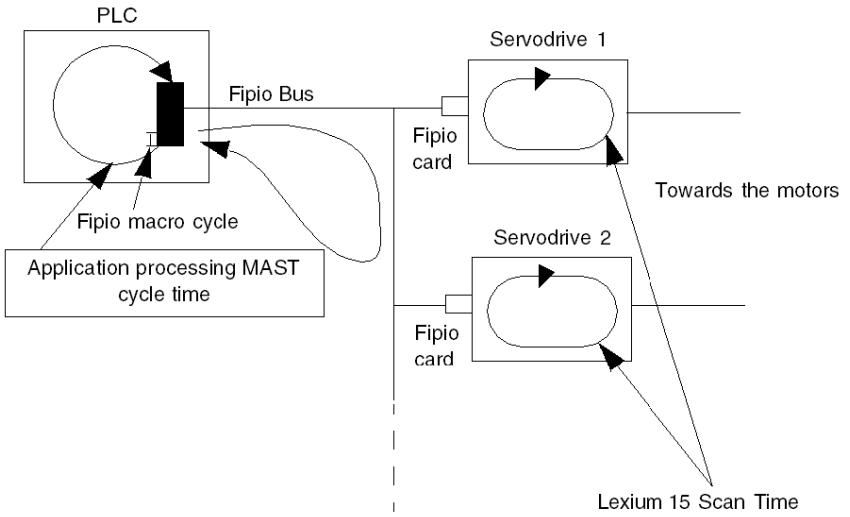
For an application where all devices are configured in the same task, the value of the network cycle time of the task, in milliseconds, is obtained using the following formula:

$$TCR_TASK = 1{,}45 + \Sigma(K \text{ x nombre équipements de la même famille})$$

Value of coefficient K for all types of Lexium 15 : **1,5**

Example:

Example of calculation for 2 Lexium 15's configured in the Mast task :



Fip network cycle time:
TCR_TSK = 1.45 + (1.5 x 2) = 4.45 ms
Or approx. 4.5 ms

Lexium 15 Scan Time (typical values):
- Cyclic I/O = 5 ms
- Messaging = 10 ms

Chapter 11
List of Lexium 15 variables

Purpose of this chapter

This chapter contains one part of the Lexium 15 variable tables, accessible by the user through messaging.

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Lexium 15 Variables: overview	112
General read/write variables	113
Read/Write semi-logical variables	117
General read only variables	118
Read-only logic and register status variables	119
Read/Write Status Registers	120

Lexium 15 Variables: overview

Overview

The following tables show the variables which can be accessed by the user via messaging.

The list is not exhaustive. To obtain the complete list, see the ASCII Command List that is available on the CD-Rom provided with every Lexium 15 servodrive.

Formats:

- W: Word (16 bit words)
- DW: Double Word (32 bits, least significant first)
- F: Floating point (32 bits with the value * 1000)
  Example: ASCII GP=0.15, the returned value read will be 150.

The ASCII variables specific to the Fipio ard are described in the chapter *(see page 45)* that describes the LexiumLexium 15 servodrive configuration parameters.

General read/write variables

Table of Variables

The general variables which can be read/write-accessed by the user are shown below:

Identifier	ASCII command		Description	Format
	Lexium 15 LP	Lexium 15 MP/HP		
001	ACC	ACC	Acceleration rate	DW
002	ACCR	ACCR	Acceleration ramp (reference point, Jog)	DW
008	ANDB	ANDB	Analog input signal dead band	DW (F)
017	AVZ1	AVZ1	Input 1 filter time constant	DW (F)
034	DEC	DEC	Deceleration rate	DW
035	DECDIS	DECDIS	Deceleration in case of power outage	DW
036	DECR	DECR	Deceleration ramp (reference point, Jog)	DW
037	DECSTOP	DECSTOP	Fast stop ramp	DW
050	ENCIN	ENCIN	Encoder input resolution	DW
055	ENCZERO	ENCZERO	Top zero offset	W
056	EXTMUL	EXTMUL	External incremental return scale factor	W
062	GEARI	GEARI	Number of teeth on gearing input	W
064	GEARO	GEARO	Number of teeth on gearing output	W
066	GP	GP	Position loop: Proportional gain	DW (F)
068	GPFFT	GPFFT	Position loop: Feed Forward current	DW (F)
069	GPFFV	GPFFV	Position loop: Feed Forward speed	DW (F)
070	–	GPTN	Position loop: Integration action time	DW (F)
072	GV	GV	Speed loop: Proportional gain	DW (F)
073	–	GVFBT	Speed loop: First return filter rate time constant	DW (F)
074	–	GVFILT	Speed loop: proportion of filtering in [%] for GVT2	W
075	GVFR	GVFR	Speed loop: PI-Plus term	DW (F)
077	GVTN	GVTN	Speed loop: I-integration time	DW (F)
090	I2TLIM	I2TLIM	I2T message	W

Identifier	ASCII command		Description	Format
	Lexium 15 LP	Lexium 15 MP/HP		
092	–	ICONT	Nominal current	DW (F)
099	IN1TRIG	IN1TRIG	Auxiliary trigger variable for IN1MODE	DW
102	IN2TRIG	IN2TRIG	Auxiliary trigger variable for IN2MODE	DW
105	IN3TRIG	IN3TRIG	Auxiliary trigger variable for IN3MODE	DW
108	IN4TRIG	IN4TRIG	Auxiliary trigger variable for In4MODE	DW
110	IPEAK	IPEAK	Max application current	DW (F)
111	IPEAKN	IPEAKN	Max application current negative direction	DW (F)
113	ISCALE1	ISCALE1	Scale factor for analog current command 1	DW (F)
114	ISCALE2	ISCALE2	Scale factor for analog current command 2	DW (F)
303	KTN	KTN	Entire action time for the current regulator	DW (F)
132	MAXTEMPE	MAXTEMPE	Max. internal temperature of servodrive	W
133	MAXTEMPH	MAXTEMPH	Radiator temperature cut-off value	W
134	MAXTEMPM	MAXTEMPM	Max. temperature Motor	DW (F)
142	MICONT	MICONT	Nominal direct current	DW (F)
143	MIPEAK	MIPEAK	Peak current limited motor	DW (F)
149	MLGC	MLGC	Adaptive gain of the current regulator (direct current)	DW (F)
150	MLGD	MLGD	D axis current regulator gain for the motor current	DW (F)
151	MLGP	MLGP	Peak motor current adaptive gain	DW (F)
152	MLGQ	MLGQ	Q axis current regulator gain for the motor current	DW (F)
156	MPHASE	MPHASE	Motor phase, Electrical offset (resolver adjustment)	W
160	MRESBW	MRESBW	Resolver bandwidth	W
163	MSPEED	MSPEED	Max. speed limited motor	DW (F)
165	MTANGLP	MTANGLP	Current advance	W

Identifier	ASCII command		Description	Format
	Lexium 15 LP	Lexium 15 MP/HP		
347	MTMUX	MTMUX	OPMode <> 8 Parameter-based MT selection	W
167	MVANGLB	MVANGLB	Advance depending on the rotation speed (initial Phi)	DW
168	MVANGLF	MVANGLF	Advance depending on rotation speed (final Phi)	W
146	MVANGLP	MVANGLP	Velocity-Related Commutation Angle	W
183	O_ACC	O_ACC1	Acceleration time 1 for MT <>0	W
184	O_TAB	O_ACC2	Acceleration time 2 for MT <>0	W
185	O_C	O_C	Command variable for MT <> 0	DW (for Lexium 15 LP) W (for Lexium 15 MP/HP)
186	O_DEC	O_DEC1	Deceleration time 1 for MT <> 0	W
187	O_TAB	O_DEC2	Deceleration time 2 for MT <> 0	W
188	O_FN	O_FN	Next order number for MT <> 0	W
189	O_FT	O_FT	Next order delay time for MT <> 0	W
190	O_P	O_P	Target position for MT <> 0	DW
191	O_V	O_V	Target speed for MT <> 0	DW
176	O1TRIG	O1TRIG	Auxiliary variable for O1MODE trigger	DW
179	O2TRIG	O2TRIG	Auxiliary variable for O2MODE trigger	DW
193	PBALMAX	PBALMAX	Maximum ballast power	DW
198	PEINPOS	PEINPOS	Position error threshold for the in-position band (INPOS)	DW
199	PEMAX	PEMAX	Max tracking error	DW
202	PGEARI	PGEARI	Numerator for the Motion Task resolution factor	DW
203	PGEARO	PGEARO	Denominator for the Motion Task resolution factor	DW
213	PTBASE	PTBASE	External trajectory time basis	W
214	PTMIN	PTMIN	Minimum MT acceleration time	DW
216	PVMAX	PVMAX	Max. MT speed	DW
217	PVMAXN	PVMAX	Max. MT speed (negative direction)	DW
218	OCOPY	OCOPY	MT backup copy	W

Identifier	ASCII command		Description	Format
	Lexium 15 LP	Lexium 15 MP/HP		
226	REFIP	REFIP	Application current at reference point on mechanical stop	DW (F)
231	ROFFS	ROFFS	Source offset	DW
260	SWE1	SWE1	Position value for Pos.Reg.1	DW
262	SWE2	SWE2	Position value for Pos.Reg.2	DW
264	–	SWE3	Position value for Pos.Reg.3	DW
266	–	SWE4	Position value for Pos.Reg.4	DW
284	VBUSMAX	VBUSMAX	Max. bus voltage	DW
285	VBUSMIN	VBUSMIN	Min. bus voltage	W
289	VJOG	VJOG	Speed in Jog	DW
290	VLIM	VLIM	System speed limit	DW (F)
291	VLIMN	VLIMN	System speed limit (negative direction)	DW (F)
295	VOSPD	VOSPD	Speed overshoot	DW (F)
296	VREF	VREF	Homing speed	DW
297	VSCALE1	VSCALE1	Scale factor on speed 1 input	W
298	VSCALE 2	VSCALE 2	Scale factor on speed 2 input	W

Read/Write semi-logical variables

Table of variables

The table of read/write-accessible semi-logical variables is shown below:

Identifier	ASCII command		Description	Range	Value	Format
	Lexium 15 LP	Lexium 15 MP/HP		Error		
003	ACTFAULT	ACTFAULT	Active fault mode	0=var. cut 1=deceleration	0	W
162	MSG	MSG	Message acceptance/refusal	0=refusal 1=acceptance of messages	0	W
180	OPMODE	OPMODE	Operation mode	0-5, 8	1	W
209	PRBASE	PRBASE	Bits by rev	16, 20	20	W
211	PROMPT	PROMPT	RS232 protocol pre-selection	0=prompt step 1= active prompt 2= char. echo and active prompt 3=prompt and check sum activated	1	–
255	STOPMODE	STOPMODE	Dynamic brake management mode	0=braking step 1=braking on fault and/or var. cut	0	W

General read only variables

Table of variables

The list of general read-only accessible variables is provided below:

Identifier	ASCII command		Description	Format
	Lexium 15 LP	Lexium 15 MP/HP		
009	ANIN1	ANIN1	Analog Input 1	DW
010	ANIN2	ANIN2	Analog Input 2	DW
039	DICONT	DICONT	Nominal current of the servodrive	DW (F)
041	DIPEAK	DIPEAK	Servodrive peak current	DW (F)
088	I	I	Real value of the current	DW (F)
089	DI2T	I2T	RMS average current	DW
093	ID	ID	D component of the real current value	DW (F)
091	–	ICMD	Current setpoint value	DW (F)
095	ICMD	IMAX	Current limit for the servodrive/motor combination	DW (F)
112	–	IQ	Q component of the real current value	DW (F)
136	IQ	MDBCNT	Number of motor data sets	W
154	–	MONITOR 1	Analog 1 output voltage	W
155	–	MONITOR 2	Analog 2 output voltage	W
192	PBAL	PBAL	Real ballast power value	DW
197	PE	PE	Slave position error	DW
200	PFB	PFB	Current position control	DW
210	PRD	PRD	Measured position hardware counter	DW
215	PV	PV	Instantaneous speed of the position regulator	DW
272	TEMPE	TEMPE	Internal Temperature	DW
273	TEMPH	TEMPH	Real radiator temperature value	DW
274	TEMPM	TEMPM	Motor temperature	DW
280	V	V	Measured speed (rpm)	DW
282	VBUS	VBUS	Bus voltage	DW
286	VCMD	VCMD	Speed setpoint	DW (F)
292	–	VMAX	Maximum system load	DW (F)

Read-only logic and register status variables

Table of logic variables

The following is a list of read-only logic variables :

Identifier	ASCII command		Description	Range	Value	Format
	Lexium 15 LP	Lexium 15 MP/HP				
004	ACTIVE	ACTIVE	Power level on / off	0=off 1=on	–	W
006	AENA	AENA	Initialization status of the software validation	0,1	1	W
221	READY	READY	Software validation status		–	W

Table of Status registers

The following is a list of read-only status registers :

Identifier	ASCII command		Description	Range	Value	Format
	Lexium 15 LP	Lexium 15 MP/HP				
097	IN1	IN1	Status of hardware logic input 1	0=inactive 1=active	–	W
100	IN2	IN2	Status of hardware logic input 2	0=inactive 1=active	–	W
103	IN3	IN3	Status of hardware logic input 3	0=inactive 1=active	–	W
106	IN4	IN4	Status of hardware logic input 4	0=inactive 1=active	–	W
109	INPOS	INPOS	Motion task completed in PEINPOS-configured window	0=not in pos 1=in pos	–	W
174	O1	O1	Status of hardware logic output 1	0=inactive 1=active	–	W
177	O2	O2	Status of hardware logic output 2	0=inactive 1=active	–	W
181	OPTION	OPTION	Option ID card	Entire (=word)	–	W
251	STAT	STAT	Servodrive status word	Entire (=word)	–	W

Read/Write Status Registers

Table of Status Registers

The read/write accessible status registers are listed in the table below:

Identifier	ASCII command		Description	Format
	Lexium 15 LP	Lexium 15 MP/HP		
015	ANZERO1	ANZERO1	Analog input zero 1 (ANOFF1)	W
016	ANZERO2	ANZERO2	Analog input zero 2 (ANOFF2)	W
024	CLRFAULT	CLRFAULT	Clear/acknowledge servodrive error	W
306	COLDSTART	COLDSTART	Reset servodrive	W
029	CONTINUE	CONTINUE	Continue the previous position control order	W
043	DIS	DIS	Software deactivation	W
048	EN	EN	Software activation	W
115	K	K	Stop (= deactivate)	W
131	LOAD	LOAD	Data loading from EPROM to RAM	W
141	MH	MH	Start reference point	W
145	MJOG	MJOG	Start Jog	W
233	RSTVAR	RSTVAR	Factory adjustment of variables	W
234	S	S	Movement stop and drive deactivation	W
235	SAVE	SAVE	Saves variables in EPROM from RAM	W
240	SETREF	SETREF	Configure a reference point	W
241	–	SETROFFS	ROFFS automatic configuration	W
254	STOP	STOP	Stop motion task	W
322	MOVE	MOVE	Start the indicated motion task Start movement command bit in the DRIVECOM word	W

Request equipment identification

A Lexium 15 identification request can be made using the SEND_REQ instruction in Control Expert.

Code : 16#0F.

Example of syntax :

```
SEND_REQ(ADDR('\2.1\SYS'),16#000F,%MW200:1,%MW300:200, %MW100:4);
```

The response for a Lexium 15 on Fipio is as follows (in the form of %MB) :

Byte	Value	Description
%MBn	16#FF	Type of identification. Always FF.
%MBn+1	16#80	The product range : 80 for Fipio.
%MBn+2	16#49	Commercial version of servodrive. In this case V4.9.
%MBn+3	16#20	Servodrive ASCII string length. Always = 20.
%MBn+4 to %MBn+24	String	ASCII string giving the product reference of the drive in 20 characters. The 21st character is equal to 0 (end of string).
%MBn+25	16#08	Number of PLC description bits. Always = 8.
%MBn+26	16#03	Device ready. Always = 3.
%MBn+27	16#00	Status of servodrive LEDs. Always = 0 (no LED).
%MBn+28	16#F1	Application type. F1 = FED profile.
%MBn+29	16#11	Product type. 11 = modular product.
%MBn+30	16#06	Catalog reference of servodrive. In this case, 06 for **LXMLU60N4**.
%MBn+31	16#00	Base module fault. In this case 0 = no fault.
%MBn+32	16#01	Number of sub-modules. In this case 1 = 1 Fipio card.
%MBn+33	16#00	Sub-module address. Always = 0 for the Fipio card.
%MBn+34	16#10	Firmware Version of Fipio card. In this case V1.0.
%MBn+35	16#14	Fipio card ASCII string length. Always = 20.
%MBn+36 to %MBn+56	String	ASCII string giving the product reference of the Fipio card in 20 characters. The 21st character is equal to 0 (end of string).
%MBn+57	16#08	Number of Fipio card status description bits. Always = 8.
%MBn+58	Fipio card status:	
	16#00	0 = Card not configured.
	16#01	1 = Card in RUN.
	16#02	2 = Card in STOP.
	16#03	3 = Communication fault.
	16#04	4 = DPRAM fault.

Byte	Value	Description
%MBn+59	Status of COM (most significant) and ERR (least significant) LEDs. Example: : 16#40 = COM flashing and ERR off.	
	16#x0	0 = Off.
	16#x4	4 = Flashing.
	16#x8	8 = Fixed.
%MBn+60	16#2F	Application type of Fipio card.
%MBn+61	16#01	Product type of Fipio card.
%MBn+62	16#05	Catalog reference of Fipio card. In this case 5 for **AM0 FIP**.
%MBn+63	Fipio card faults:	
	16#00	0 = No fault.
	16#01	1 = DPRAM fault.
	16#02	2 = FIP communication fault.

Index

C

channel data structure for lexium devices
    T_LEXIUM_FIPIO, *85*
compliance, *12*
configuring
    steps, *14*
connecting
    TSXFPACC12, *15*
    TSXFPACC2, *15*

D

debugging, *49*
diagnosing, *50*

L

LXM_RESTORE, *71*
LXM_SAVE, *69*

O

operating modes, *103*

P

parameter settings, *75*
    Lexium, *111*

R

READ_VAR, *43*
replacing a servo drive, *67*

T

T_LEXIUM_FIPIO, *85*
TSXPFACC4, *15*

U

Using
    Lexium 15 messaging on the Fipio bus, *43*

W

WRITE_VAR, *43*