

# Fieldbus

## Profibus Driver

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# Table of Contents



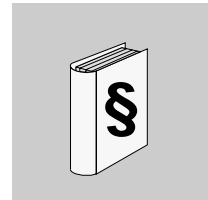
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	<b>Safety Information</b> .....	<b>5</b>
	<b>About the Book</b> .....	<b>7</b>
<b>Chapter 1</b>	<b>Profibus Driver</b> .....	<b>9</b>
	System Structure .....	10
	Cable Diagrams .....	12
	Cable Diagrams .....	12
	Supported Device Addresses .....	13
	Consecutive Equipment Addresses .....	15
	Environment Setup .....	16
	I/O Manager Configuration .....	17
	Driver Configuration .....	18
	Device Address Configuration .....	21
	Device Address Configuration .....	21



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# Safety Information



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## Important Information

### NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, 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 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 an imminently hazardous situation which, if not avoided, **will result in death or serious injury.**

### **WARNING**

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

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 **CAUTION**

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

***NOTICE***

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

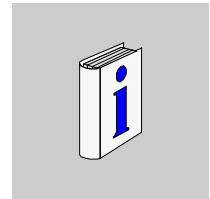
**PLEASE NOTE**

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.

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## About the Book



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### At a Glance

#### Document Scope

This manual describes the device driver communication settings in the Vijeo Designer screen editing software. Vijeo Designer enables you to design Magelis target machines that communicate with PLCs, drives, field devices, and other equipment.

For more information about Vijeo Designer and Magelis target machines, please refer to Vijeo Designer user documentation.

#### Validity Note

The data and illustrations found in this book are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Schneider Electric.

#### Documentation Conventions

**Target Machine:** Human-Machine Interface (HMI) that runs user applications designed in Vijeo Designer screen editing software. A target machine is also known as a terminal.

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## Product Related Information

### **WARNING**

#### **LOSS OF CONTROL**

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.\*
- Each implementation of a Magelis XBTGT, HMISTO, HMISTU, HMIGTO, XBTGH, XBTGK, XBTGC, iPC, and XBTGTW must be individually and thoroughly tested for proper operation before being placed into service.

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

\* For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control."

## User Comments

We welcome your comments about this document. You can reach us by e-mail at [techcomm@schneider-electric.com](mailto:techcomm@schneider-electric.com).



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# Profibus Driver

# 1

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## Subject of this Chapter

This chapter explains the Profibus Driver.

## What's in this Chapter?

This chapter contains the following topics:

Topic	Page
System Structure	10
Target Machine Serial Interface	11
Cable Diagrams	12
Supported Device Addresses	13
Consecutive Equipment Addresses	15
Environment Setup	16
I/O Manager Configuration	17
Driver Configuration	18
Device Address Configuration	21

## System Structure

### Overview

The following table describes the basic system setup for connecting a Siemens Series PLC to a Profibus network.

To view a cable connection diagram for a particular communication format, see *Cable Diagrams*.

### Connection

Series	Link I/F	Communication Format	Diagram
Any Profibus Master	Profibus DP Slave Unit	Profibus	Cable Diagram 1

#### Note:

- To enable communication between the target machine and Profibus master PLC, please copy the GSD files from the Vijeo-Designer installer (disk 2: \\Tools\Fieldbus) to your PLC configuration software. For details on how to install the GSD files into the configuration software, please refer to the Readme file located in the same folder as the GSD files, and also refer to the configuration software user documentation.

## Target Machine Serial Interface

Use the following serial interface diagrams in combination with the cable diagrams in Section 3 to wire connections between the target machine and external equipment.

## Cable Diagrams

Schneider Electric recommends using the following diagrammed connections

**Note:**

- Ensure that the equipment is properly grounded as indicated in the user manual and follows all applicable country standards.
- Recommended PLC connector: standard Profibus/MPI connector such as Siemens 6ES7 972-0BA11-0XA0.
- Recommended cable: Profibus cable such as Siemens 6XV1 830-0EH10.
- For multi-drop connections, refer to Profibus network documents.

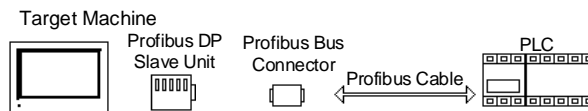
### Diagram 1 - Profibus

To connect the target machine and the PLC, use the recommended cables and accessories.

Target Machine	Cable / Adapter	Comments
XBTGK Series (Profibus DP Slave Unit), or XBTGT2000 Series or higher (Profibus DP Slave Unit)	Profibus Bus Connector and Profibus Cable	

**Note:**

- The first and last stations on the network should be terminated. For example, using the built-in termination switches in the Siemens Profibus bus connector (6ES7 972-0BA11-0XA0).



## Supported Device Addresses

### Overview

### WARNING

#### UNINTENDED EQUIPMENT OPERATION

Design your system to avoid conflicting write processes between the target machine and PLC program. Make sure that:

- The target machine and PLC program do not simultaneously write to the same register.
- PLC programs or other devices do not write 16-bit word values to registers being accessed in a bitwise manner.

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

The following tables list the device address ranges you can enter from the Device Address keypad.

For actual device address ranges supported by the PLC, refer to the corresponding PLC manual.

#### Note:

- Output is read-only for Direct I/O; Input is read-only for Packet Transfer. In other words, the viewpoint for Direct I/O is from slave to master, and for Packet Transfer is from master to slave.

### Direct I/O

Direct I/O is process data that is exchanged between the Profibus stack, the Profibus DP Slave Unit (target machine), and the Profibus master. This data is continuously updated and always available to the application.

Device	Bit Address <sup>1</sup>	Word Address	16 bit	32 bit
Input	PI0.0 - PI223.7	PIW0 - PIW222 <sup>2</sup>	H/L <sup>7</sup>	H/L <sup>7</sup>
Output	PQ0.0 - PQ223.7 <sup>3</sup>	PQW0 - PQW222 <sup>2*3</sup>		

## Packet Transfer

Packet transfer is communication by a target machine to request specific data from a PLC, or write to specific words on the PLC.

Use the following addressing format when Packet Transfer is selected in the Driver Configuration menu.

Device	Bit Address <sup>*1</sup>	Word Address	16 bit	32 bit
Input	%I0:X0 - %I65535:X7 <sup>*3</sup>	%IW0 - %IW65534 <sup>*2*3*4</sup>	H/L <sup>*7</sup>	H/L <sup>*7</sup>
	%E0:X0 - %E65535:X7 <sup>*3</sup>	%EW0 - %EW65534 <sup>*2*3*5</sup>		
Output	%Q0:X0 - %Q65535:X7	%QW0 - %QW65534 <sup>*2*4</sup>		
	%A0:X0 - %A65535:X7	%AW0 - %AW65534 <sup>*2*5</sup>		
Memory	%M0:X0 - %M65535:X7	%MW0 - %MW65534 <sup>*2*6</sup>		
Data Block	%DB1.DBW0:X0 - %DB255.DBW65535:X7	%DB1.DBW0 - %DB255.DBW65534 <sup>*2*6</sup>		

- \*1 Read-modify-write. When you write to one of these bit addresses, the target machine reads the entire word address, sets the defined bit, then returns the new value to the PLC. If the ladder program writes data to this word address during the bit read/write process, the resulting data may be incorrect.
- \*2 Word addresses must be even-numbered.
- \*3 Read-only.
- \*4 English device name.
- \*5 German device name.
- \*6 Device name applies to both English and German.
- \*7 16-bit and 32-bit data, High and Low, refer to data as defined in the following examples.

Byte	16 bit			Word	32 bit				
0	7	...	0	L (Low)	0	15	...	0	L (Low)
1	15	...	8	H (High)	1	31	...	16	H (High)

## Consecutive Equipment Addresses

### Overview

The following table lists the maximum number of consecutive addresses that can be read by each PLC. Refer to this table when using block transfers.

**Note:**

- Consecutive addresses and gap span are applicable when Packet Transfer is selected in the Driver Configuration dialog box. When using Direct I/O, the Profibus DP Slave interface module transfers all the data back and forth and stores it in memory.
- To speed up data communication, use consecutive variable addresses on the same panel screen.
- The following situations increase the number of times that the equipment is read, which reduces the data communication speed between the target machine and the equipment:
  - when the number of consecutive addresses exceeds the maximum
  - when different register/device types are used.

Device	Max. Consecutive Addresses	Gap Span
Input (I)	6 words	4 words
Output (Q)		
Internal Bit (M)		
Data Block (DB)		

## Environment Setup

### Overview

## ⚠ WARNING

### UNINTENDED EQUIPMENT OPERATION

Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the PLC and the target machine.

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

The following table lists the communication settings, recommended by Schneider Electric, for the target machine and Profibus PLC equipment.

For details, see *Driver Configuration*.

Target Machine Settings		PLC Settings	
Driver	Slave Address	User-defined	Master Address   1
	Profibus Port	Auto	—
	Direct I/O Input Size	8 words	—
	Direct I/O Output Size	8 words	—
	Packet Transfer	User-defined	If selected, requires a special interpreter program.
	Timeout	3 sec	—
	Retry Count	0	—



## I/O Manager Configuration

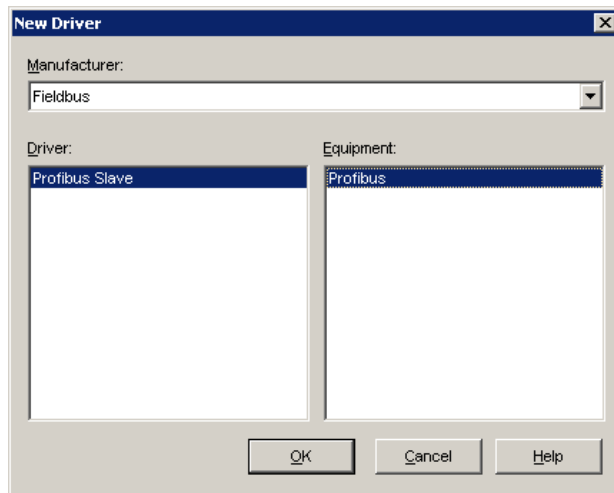
### Overview

Select the following driver and equipment to enable communication with the target machine.

**Note:**

- For information on how to display the [New Driver] dialog box, see the Vijeo Designer help.

### Screen example of I/O Manager Configuration



## Driver Configuration

### Overview

### **WARNING**

#### **UNINTENDED EQUIPMENT OPERATION**

Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the PLC and the target machine.

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

To configure the communication settings of the driver in the target machine, use the Driver Configuration dialog box. Make sure the settings match those of the PLC.

You can add up to two Profibus DP Slave Unit device drivers to an user application: one for the internal Profibus DP Slave Unit and one for an external Profibus DP Slave Unit.

For an overview of the driver and device settings, see *Environment Setup*.

#### **Note:**

- For information on how to display the [Driver Configuration] dialog box, see the Vijeo Designer help.

## Screen example of Driver Configuration

The screenshot shows a 'Driver Configuration' dialog box with the following settings:

- Manufacturer: Fieldbus
- Driver: Profibus Slave
- Slave Address: 3
- Profibus Port: Auto
- Direct I/O:
  - Input Size: 8 (Words)
  - Output Size: 8 (Words)
- Packet Transfer: 
  - Timeout: 3 (Sec)
  - Retry Count: 0
- Total I/O:
  - Input Size: 16 (Words)
  - Output Size: 16 (Words)

Buttons: OK, Cancel, Help

## Screen Description

Area	Description
Manufacturer	Displays the name of the equipment manufacturer.
Driver	Displays the type of serial connection used to connect the target machine to the PLC.
Slave Address	Defines the address of the target machine's Profibus DP Slave interface module.
Profibus Port	Select Internal, External, or Auto. You can mount the Profibus DP Slave Unit internally inside the target machine, or externally. Auto will find the location of the card for you. For details about the supported connections, see <i>Cable Diagrams</i> .
Input Size	Defines the number of words input to the Profibus master.
Output Size	Defines the number of words output from the Profibus master.
Packet Transfer	Select this checkbox to use Packet Transfer, which does not interfere with Direct I/O communication.

<b>Area</b>	<b>Description</b>
Timeout	Defines the length of time the target machine waits for a response before it outputs a timeout error or sends another communication.
Retry Count	Defines the number of times the driver tries to send or receive data when an error has been detected.
Total I/O	These properties display the total I/O (Direct I/O + Packet Transfer) occupied on the Profibus GMU interface module. When Packet Transfer is selected, it adds 8 words to the input and output size.

## Device Address Configuration

### Overview

### WARNING

#### UNINTENDED EQUIPMENT OPERATION

Read and understand the instructions in this section to ensure data is properly transferred. If you do not follow these instructions, incorrect data could be written to the PLC and the target machine.

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

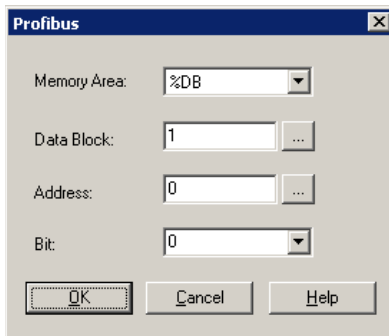
To set up a PLC variable in the Variable List, use the Device Address Keypad from the variable properties.

See *Supported Device Addresses*.

#### Note:

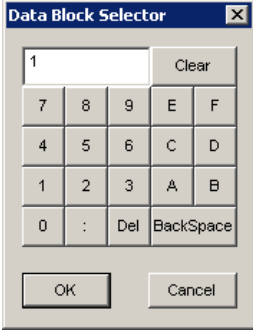
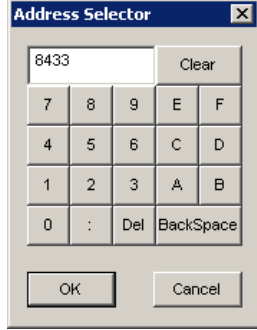
- For information on how to display the Device Address Keypad, see the Vijeo Designer help.

### Screen example of Device Address Configuration



The screenshot shows a dialog box titled "Profibus" with a close button (X) in the top right corner. The dialog contains four input fields and three buttons at the bottom. The "Memory Area" field is a dropdown menu with "%DB" selected. The "Data Block" field is a text box containing "1" and a "..." button to its right. The "Address" field is a text box containing "0" and a "..." button to its right. The "Bit" field is a dropdown menu with "0" selected. At the bottom, there are three buttons: "OK", "Cancel", and "Help".

## Screen Description

Area	Description
Memory Area	Lists the PLC devices.
Data Block	<p>Available when the Memory Area is %DB (Data Block). Click the ellipsis [...] to display the [Data Block Selector] keypad, which assists you in entering a valid data block number.</p> 
Address	<p>Enter the device address number here.</p> <p>When mapping an integer, float, or string variable to a PLC device, you can enter only even addresses.</p> <p>When mapping a discrete variable to a PLC device, you can enter both odd or even addresses.</p> <p>In the Address field, click the ellipsis [...] to display the [Address Selector] keypad, which assists you in entering a valid device address.</p> 
Bit	Available when mapping discrete variables to a PLC device. Lists the available bits (0-7).