Driver Manual
(Supplement to the FieldServer Instruction Manual)

FS-8700-113

PROFIBUS DP Slave

APPLICABILITY & EFFECTIVITY
Effective for all systems manufactured after June 2013

Driver Version:	1.01
Document Revision:	4

TABLE OF CONTENTS

1	**PROFIBUS DP SLAVE DESCRIPTION**

The FieldServer PROFIBUS DP Slave driver can be used to emulate a single Slave station on a PROFIBUS network. DP Masters can open a connection of up to 244 Bytes of Input and 244 Bytes of Output data, but not exceeding a combined total of 416 Bytes to the FieldServer. The FieldServer can be added to the PROFIBUS network with the use of the supplied GSD file for the ANYBUS™ card. Connection to the PROFIBUS network is via a DB9 port on the ANYBUS™ card.

1.1   Max Nodes Supported

FieldServer Mode	Nodes	Comments
Server	1	The FieldServer can only emulate one PROFIBUS DP Slave station

2	**DRIVER SCOPE OF SUPPLY**

2.1   Supplied by FieldServer Technologies for this driver

FieldServer Technologies PART #	Description
52201	PROFIBUS Connector
FS-8915-32	Adapter Card, Anybus-S PROFIBUS DP

2.2   Additional files required for the Driver

Filename	Comments
Config.csv[1]	Template loaded if no custom configuration ordered, otherwise Custom configuration loaded.
"Anybus gsd file"[2]	The Anybus template gsd file is supplied with the FieldServer and needs to be built up for the particular application by the Master configuration software

2.3   Provided by the Supplier of 3rd Party Equipment

2.3.1   Required 3rd Party Software

PROFIBUS Network Configuration Tool

2.3.2   Required 3rd Party Configuration

Connection to a properly terminated PROFIBUS network.

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[1] Always Loaded By FieldServer Technologies
[2] External Application

3   HARDWARE CONNECTIONS

The FieldServer is connected to the PROFIBUS network and NetTool as shown in the connection drawing below.
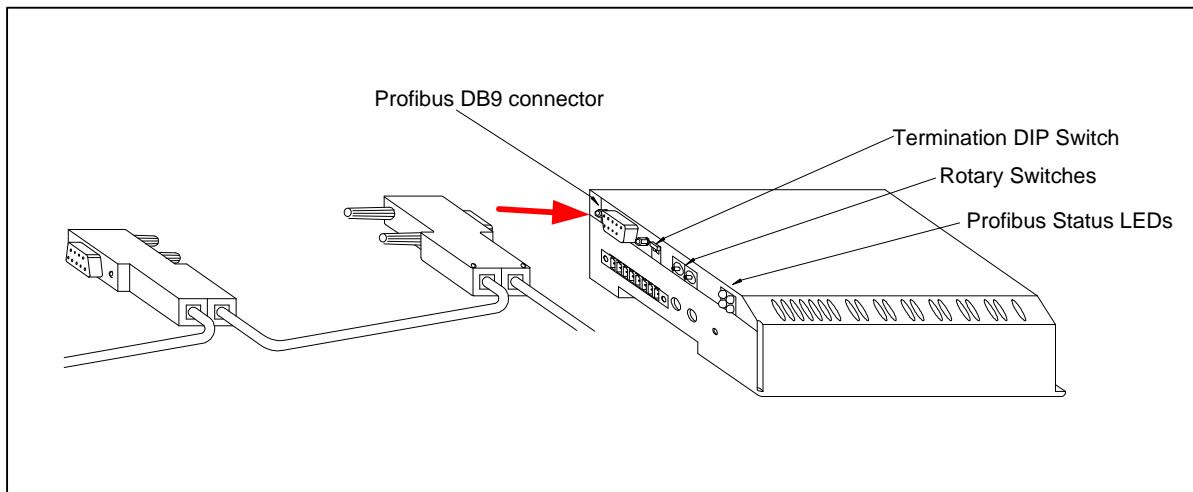
PROFIBUS DB9 Connector Pinouts

Pin	Name	Description
Housing	Shield	Connected to PE
1	Not connected	-
2	Not connected	-
3	B-Line	Positive RxD/TxD according to RS-485 specification
4	RTS[3]	Request to Send
5	GND BUS[4]	Isolated GND from RS-485 side
6	+5V BUS4	Isolated +5V from RS-485 side
7	Not connected	-
8	A-Line	Negative RxD/TxD according to RS-485 specification
9	Not connected	-

Only A-line, B-line and Shield are used for most applications.

PROFIBUS NetTool connector Pinouts

PC Side DB9 Female	FieldServer Side DB9 Female
2	3
3	2
5	5

3.1   Hardware Connection Tips / Hints

Use the recommended network cable and terminators as specified by the PROFIBUS network organization and/or the manufacturer of your network equipment.

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[3] Used in some equipment to determine the direction of transmission.
[4] Used for bus termination. Some devices, e.g. optical transceivers (RS-485 to fiber optics) require an external power supply from these pins.

4   DATA ARRAY PARAMETERS

Data Arrays are "protocol neutral" data buffers for storage of data to be passed between protocols. It is necessary to declare the data format of each of the Data Arrays to facilitate correct storage of the relevant data.

Section Title		
Data_Arrays		
Column Title	Function	Legal Values
Data_Array_Name	Provide name for Data Array	Up to 15 alphanumeric characters
Data_Array_Format	Provide data format. Each Data Array can only take on one format.	FLOAT, BIT, UInt16, SInt16, Packed_Bit, Byte, Packed_Byte, Swapped_Byte
Data_Array_Length	Number of Data Objects. Must be larger than the data storage area required by the Map Descriptors for the data being placed in this array.	1-10, 000

Example

```
//   Data Arrays
Data_Arrays
Data_Array_Name    , Data_Array_Format   , Data_Array_Length
DA_AI_01           , UInt16,             , 200
DA_AO_01           , UInt16              , 200
DA_DI_01           , Bit                 , 200
DA_DO_01           , Bit                 , 200
```

5   CONFIGURING THE FIELDSERVER AS A PROFIBUS DP SERVER

For a detailed discussion on FieldServer configuration, please refer to the FieldServer Configuration Manual. The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer (See ".csv" files provided with the FieldServer).

This section documents and describes the parameters necessary for configuring the FieldServer to communicate with a PROFIBUS DP Master.

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for PROFIBUS communications, the driver independent FieldServer buffers need to be declared in the "Data Arrays" section, the FieldServer virtual Node(s) needs to be declared in the "Server Side Nodes" section, and the data to be provided to the Clients needs to be mapped in the "Server Side Map Descriptors" section. Details on how to do this can be found below.

Note that in the tables, * indicates an optional parameter, with the bold legal value being the default.

5.1   PROFIBUS Settings

Section Title		
Bridge		
Column Title	**Function**	**Legal Values**
System_Station_Address*	PROFIBUS Station Address of the FieldServer	1-125

Example

```
// Bridge

Bridge
Title              , System_Station_Address
PROFIBUS DP    , 5
```

The PROFIBUS Station Address can also be set via the two rotary switches on the side of the FieldServer in which case the System_Station_Address setting must be omitted from the configuration file. The settings specified in the configuration file will override the settings on these switches.

5.2   Server Side Connection Parameters[5]

Section Title		
Connections		
Column Title	**Function**	**Legal Values**
Adapter	Adapter Name	Prof_DP_MS

Example

```
//   Server Side Connections

Connections
Adapter
Prof_DP_MS
```

5.3   Server Side Node Parameters

Section Title		
Nodes		
Column Title	**Function**	**Legal Values**
Node_Name	Provide name for Node	Up to 32 alphanumeric characters
Protocol	Specify protocol used	Anybus_Prof_DP_S

Example

```
//   Server Side Nodes

Nodes
Node_Name    , Protocol
Prof_5          , Anybus_Prof_DP_S
```

Only one Server Node may be defined for each connection. Please contact the sales department for information on support for multiple virtual Server Nodes on a single connection.

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[5] The X30 PROFIBUS card auto-senses the Baud rate

5.4   Server Side Map Descriptor Parameters

5.4.1   FieldServer Specific Map Descriptor Parameters

Column Title	Function	Legal Values
Map_Descriptor_Name	Name of this Map Descriptor	Up to 32 alphanumeric characters
Data_Array_Name	Name of Data Array where data is to be stored in the FieldServer	One of the Data Array names from Section 4.
Data_Array_Offset	Starting location in Data Array	0 to (Data_Array_Length -1) as specified in Section 4.
Function	Function of Server Map Descriptor	Rdbc, Wrbc

5.4.2   Driver Specific Map Descriptor Parameters

Column Title	Function	Legal Values
Node_Name	Name of Node	One of the Node names specified in Section 5.3
PROFIBUS_Data_Type	Data Type of local buffer	Byte, Word, Float, Bool
Address	Byte offset into local buffer	Rdbc: 0 – 243 Wrbc: 0 – 243
Length	Number of PROFIBUS_Data_Type items in local buffer	Byte: 1 – 244 Word: 1 – 122 Float: 1 – 61 Bool: 1 – 1952

Important Note:

The combined total length of all Map Descriptors may not exceed 416 bytes.

5.4.3   Map Descriptor Example.

```
//  Server side Map Descriptor

Map Descriptor
Map_Descriptor_Name          , Data_Array_Name        , Data_Array_Offset      , Function      , Node_Name        , PROFIBUS_Data_Type      , Address       , Length
Get_Data                     , Input_Data             , 0                      , Rdbc         , Prof_5           , Word                    , 0            , 100
Put_Data                     , Output_Data            , 0.                     , Wrbc         , Prof_5           , Word                    , 0            , 100
```

Read function Map Descriptor gets data from the PROFIBUS network and stores it in the Input_Data Data Array.

Write function Map Descriptor puts data from the Output_Data Data Array onto the PROFIBUS network.

Each address refers to an individual local input and output buffer. Each buffer can contain up to 244 bytes, although the combined total is limited to 416 bytes.

Appendix A. USEFUL FEATURES

Appendix A.1. PROFIBUS LED indicators
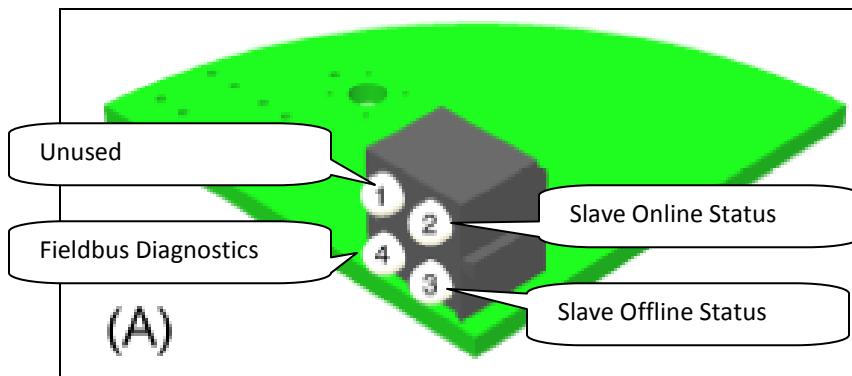
LED	Color	Frequency	Description
Slave Online Status (2)	Green	-	Slave is online on the PROFIBUS network
	Off	-	Slave is not online on the PROFIBUS network
Slave Offline Status (3)	Red	-	Slave is offline on the PROFIBUS network
	Off	-	Slave is not offline on the PROFIBUS network
Fieldbus Diagnostics (4)	Red	1 Hz	Error in configuration: IN and/or OUT length set during initialization of the Slave is not equal to the length set during configuration of the network.
	Red	2 Hz	Error in User Parameter data: The length/contents of the User Parameter data set during initialization of the Slave is not equal to the length/contents set during configuration of the network.
	Red	4 Hz	Error in initialization of the PROFIBUS communication ASIC.
	Off	-	No diagnostics present.

Appendix A.2. Setting the FieldServer's PROFIBUS Station Address

The Station Address can be set in the FieldServer's CSV file using the System_Station_Address, (refer to Section 5.1), or it can be set with the two rotary switches as indicated on the connection diagram. The left switch selects the left decimal digit and the right switch the right decimal digit of the Station Address.

Note that the software setting with the System_Station_Address overrides the hardware setting with the rotary switches.

Appendix A.3. Understanding Driver Communication Statistics

When connecting with Ruinet to the FieldServer, there are communication statistics displayed on the Connection, Node and Map descriptor screens for the PROFIBUS DP driver.

The Transmit (Tx) message count indicates the number of times the driver wrote output data into the PROFIBUS hardware card's output buffers for transmission on the PROFIBUS network. It does not indicate the actual number of transmissions on the PROFIBUS network.

The Receive (Rx) message count indicates the number of times the driver read input data from the PROFIBUS hardware card's input buffers. It does not indicate the number of actual messages received on the PROFIBUS network.

Appendix B. TROUBLESHOOTING

Appendix B.1. Communication Problems

If no communication is being experienced between a PROFIBUS Master and a FieldServer PROFIBUS Slave, check for the following most common issues:

> The Node_ID must match the System_Station_Address in the configuration. Having these two parameters match in the configuration tells the FieldServer that the buffer referenced in the Node_ID refers to the buffers in the PROFIBUS card attached to the FieldServer.

> The gsd file must match the FieldServer hardware being used
>> FieldServer offers several hardware platforms that support PROFIBUS. Each hardware platform requires its own gsd file. Ensure that the gsd file being used is the correct file for the hardware platform in use.
>> The gsd file can be opened with a text editor. The Vendor and model name can be checked in this file. For the FieldServer PROFIBUS Slave, the Vendor is "HMS Industrial Networks AB", and the Model Name is "ANYBUS-S PDP". The current revision is 1.5, which uses Hardware revision 1.6 and software release 1.2.

> The byte count for the gsd profile must match the byte count configured in the FieldServer
>> The gse being used is either going to allow the Client (via the network configuration tool) to select the bytes to be used, or the byte make-up will be fixed and specified in the gse. Either way, the largest byte offset used by the Client must match the largest byte offset configured in the FieldServer.
>> When selecting byte count with a network configuration tool, the total amount of bytes/words/bits setup per Input/Output buffer in the FieldServer configuration Map Descriptors must match those selected in the network configuration tool otherwise a connection length mismatch will occur and the connection will not be established. The FieldServer shows the connection size it expects on the F

(driver message) screen in the RUI utility in order that this value may be checked against the network configuration tool.

The direction of the communications (Input/Output Buffer) may be incorrectly configured.

Buffer names can be confusing, especially when looking at the Slave. The buffers are named according to their direction of communication in the Master. Hence, an Input buffer in the Slave will write data to the Master, and data will be received from the Master in the output buffer.

Remember that as a Slave, the FieldServer will have to write data into the input buffer (function=Wrbc), and read data from the output buffer (function=Rdbc).

The Data Type/Offset/Length combination may be incorrectly set up

In the FieldServer configuration, the Offset Parameter refers to the buffer offset in bytes (starting at 0), regardless of data type. The Length parameter always refers to length in items, which means Float data will be the number of float values, Word data will be the number of words, etc

The PROFIBUS card may be faulty.

If this is the case, then there will be an error message in the FieldServer RUI error screen indicating that the card could not be reached. Check for this message. If it is there, try opening up the FieldServer and re-seating the card. If this does not help, contact FieldServer Technical support for jumper settings on the card, and further possible troubleshooting or return authorization.
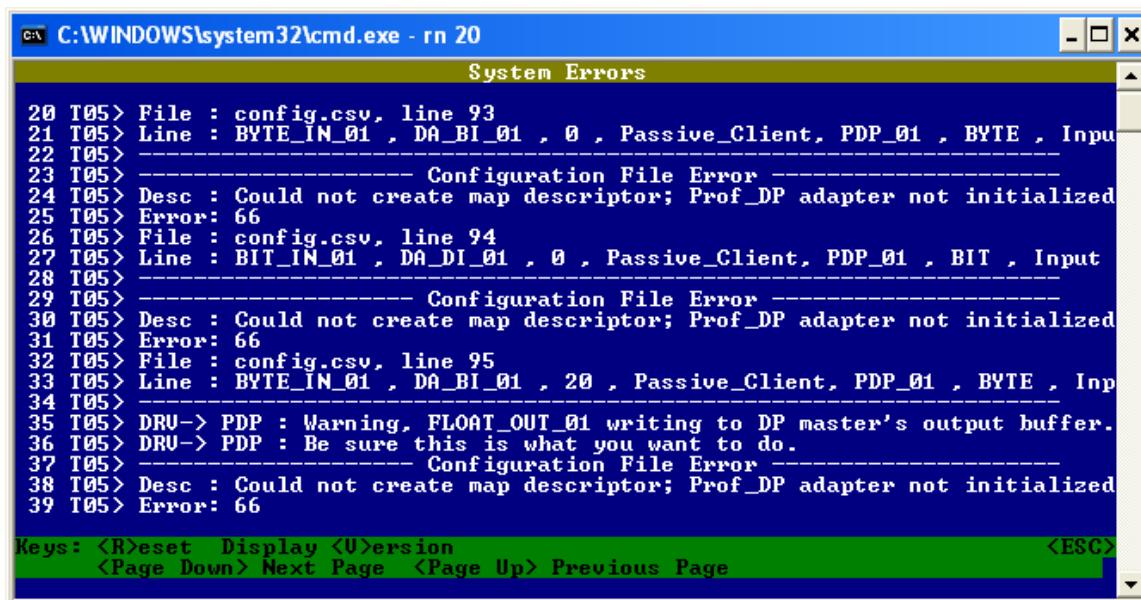
```
C:\WINDOWS\system32\cmd.exe - rn 20                            _ □ ×
                              System Errors                          ▲
20 T05> File : config.csv, line 93
21 T05> Line : BYTE_IN_01 , DA_BI_01 , 0 , Passive_Client, PDP_01 , BYTE , Inpu
22 T05> ----------------------------------------------------------------------
23 T05> ------------------- Configuration File Error --------------------
24 T05> Desc : Could not create map descriptor; Prof_DP adapter not initialized
25 T05> Error: 66
26 T05> File : config.csv, line 94
27 T05> Line : BIT_IN_01 , DA_DI_01 , 0 , Passive_Client, PDP_01 , BIT , Input
28 T05> ----------------------------------------------------------------------
29 T05> ------------------- Configuration File Error --------------------
30 T05> Desc : Could not create map descriptor; Prof_DP adapter not initialized
31 T05> Error: 66
32 T05> File : config.csv, line 95
33 T05> Line : BYTE_IN_01 , DA_BI_01 , 20 , Passive_Client, PDP_01 , BYTE , Inp
34 T05> ----------------------------------------------------------------------
35 T05> DRV-> PDP : Warning, FLOAT_OUT_01 writing to DP master's output buffer.
36 T05> DRV-> PDP : Be sure this is what you want to do.
37 T05> ------------------- Configuration File Error --------------------
38 T05> Desc : Could not create map descriptor; Prof_DP adapter not initialized
39 T05> Error: 66
Keys: <R>eset  Display <V>ersion                              <ESC>
      <Page Down> Next Page  <Page Up> Previous Page                 ▼
```

Appendix C. VENDOR INFORMATION

Appendix C.1. Using the Siemens PLC with the Anybus Card

The following HMS APP note provides useful information.

http://www.anybus.com/support/support.asp?PID=70&ProductType=Anybus-S

Please note that this link and document is provided for information only and is not maintained by FieldServer.