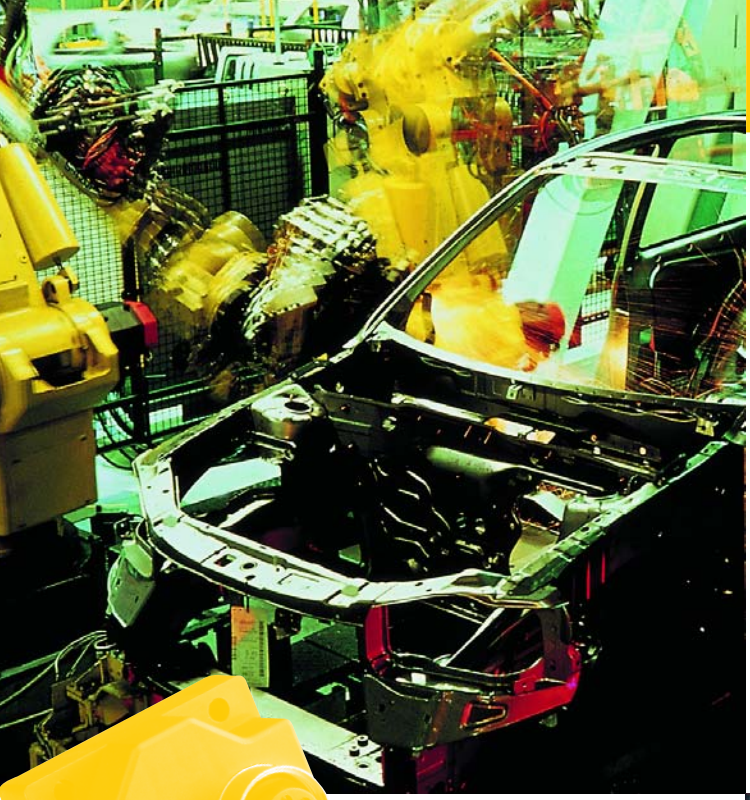
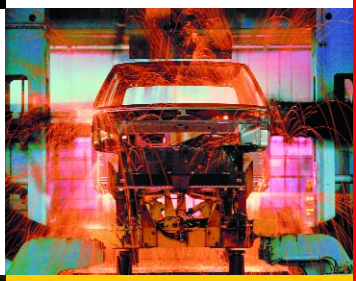


TURCK

Industrial
Automation

FXDP –
USER MANUAL



3rd, revised edition, 09/05

Warning!
Dangerous electrical voltage!

Before commencing the installation

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighboring units that are live.
- Follow the engineering instructions of the device concerned.
- Only suitably qualified personnel in accordance with EN 50 110-1/-2 (VDE 0 105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalization. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference do not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60 364-4-41 (VDE 0 100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60 204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.

- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).
- The electrical installation must be carried out in accordance with the relevant regulations (e. g. with regard to cable cross sections, fuses, PE).
- All work relating to transport, installation, commissioning and maintenance must only be carried out by qualified personnel. (IEC 60 364 and HD 384 and national work safety regulations).
- All shrouds and doors must be kept closed during operation.

Table of Contents

9 Index

About this manual

Documentation concept

This manual contains all information about the TURCK product family FXDP in protection class IP67.

The following chapters contain exact information about the general technical data and properties of each single module in the product family, a description of the coupling to PROFIBUS-DP as well as information about diagnosis and data mapping.

General Information.

Attention

Please read this section carefully. Safety aspects cannot be left to chance when dealing with electrical equipment.

Prescribed Use

Warning

The devices described in this manual must be used only in applications prescribed in this manual or in the respective technical descriptions, and only with certified components and devices from third party manufacturers.

Appropriate transport, storage, deployment and mounting as well as careful operating and thorough maintenance guarantee the trouble-free and safe operation of these devices.

Notes Concerning Planning /Installation of this Product

Warning

All respective safety measures and accident protection guidelines must be considered carefully and without exception.

Description of Symbols Used

Warning

This sign can be found next to all notes that indicate a source of hazards. This can refer to danger to personnel or damage to the system (hardware and software) and to the facility.

This sign means for the operator: work with extreme caution.

Attention

This sign can be found next to all notes that indicate a potential hazard.

This can refer to possible danger to personnel and damages to the system (hardware and software) and to the facility.

Note

This sign can be found next to all general notes that supply important information about one or more operating steps. These specific notes are intended to make operation easier and avoid unnecessary work due to incorrect operation.

List of Revisions

In comparison to the previous manual edition, the following changes/ revisions have been made

Table 1: List of revisions

Chapter	Subject/ Description	new	changed
Chap. 5	– Example for wire break detection	X	

1 The FXDP product family

This chapter contains all information about the construction and the general technical data of the FXDP modules as well as about the their method of functioning.

Note

Please find all module-specific information in the module descriptions contained in the respective module chapters of the manual.

General information

The new FXDP product family shows the following proven module properties:

- rugged PROFIBUS-DP module
- glass-fibre reinforced plastic housing
- fully encapsulated electronics
- degree of protection IP67
- galvanic channel isolation to the PROFIBUS-DP
- short-circuit protected channels

Figure 1:
FXDP module

Note

All modules of the product family FXDP are approved for use in Zone 2.

Product overview

Table 2: Product overview of the FXDP family

User data section	FXDP-IM8-0001	FXDP-IM16-0001	FXDP-OM8-0001	FXDP-OM16-0001	FXDP-IOM88-0001	FXDP-CSG88-0001	FXDP-XSG16-0001	Comment
8 Bit IN	x						x	I per connector
16 Bit IN		x					x	I/I per connector
8 Bit OUT			x				x	O per connector
16 Bit OUT				x			x	O/O per connector
8 Bit IN, 8 Bit OUT					x		x	I/I or O/O per connector
8 Bit IN, 8 Bit OUT						x	x	I/O per connector
8 Bit IN, 8 Bit DIAG							x	I/DIAG per connector
8 Bit OUT, 8 Bit DIAG							x	O/DIAG per connector
12 Bit IN, 4 Bit OUT							x	I/I or O/O per connector
n Bit IN, 16-n Bit OUT (AUTO Mode)							x	outputs are read back
n Bit IN, 16-n Bit OUT (PROG Mode)							x	channel as IN, inverted IN, DIAG IN or OUT
AddOn: Diag mapped	x	x	x	x	x	x	x	diagnostics mapped to user data section

The service module

Besides the typical FXDP properties like the extended diagnosis, the possibility of diagnosis-data mapping into the user data as well as the comfortable M12-I/O-connection technology, the service module FXDP-XSG16-0001 provides the following additional features:

- Each single channel can be configured according to the application via configuration software tools (e.g. SIMATIC Manager, etc.). The required combination of in- and outputs can be exactly planned to suit the customer's needs. This thus ensures a 100% technology utilization and a cost minimization.
- Operating FXDP-modules can directly be replaced by the XSG-module. Without any additional configuration, it can take-over the function of the module that has to be replaced. The customer only has to change the hardware, to set the previously configured PROFIBUS-DP address at the XSG-module and to execute a voltage reset at the module.

Based on this fact, the module is universally applicable and can be used to reduce inventory costs and system down-times - two factors that are constantly gaining in importance in face of ever more complex technical processes.

Connection to PROFIBUS-DP

Addressing on PROFIBUS-DP

The PROFIBUS-DP address (1 to 126) is set via three decimal rotary coding switches located under a transparent protective cover.

Figure 2: Setting the PROFIBUS-DP address

Transmission rates

The module supports transmission rates of up to 12 Mbps and adjusts automatically to the transmission speed determined by the master.

Bus termination

The bus termination is realized via an external terminating resistor at Bus-OUT.

Configuration files

The configuration files for the software link are available via the internet under **www.turck.com** for download purposes.

The following table shows the corresponding configuration files for each single module:

Table 3: Configuration files

Module	Configuration file
FXDP-IM8-0001	TU0_ff1f.gsd
FXDP-IM16-0001	TU1_ff1f.gsd
FXDP-OM8-0001	TU2_ff1f.gsd
FXDP-OM16-0001	TU3_ff1f.gsd
FXDP-IOM88-0001	TU4_ff1f.gsd
FXDP-CSG88-0001	TU5_ff1f.gsd
FXDP-XSG16-0001	TU6_ff1f.gsd

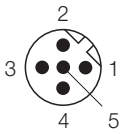
Connection possibilities

PROFIBUS-DP

Module connection to the PROFIBUS-DP is established via two reverse-keyed M12 connectors.

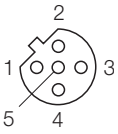
Figure 3: M12x1-connector for connection to PROFIBUS-DP

Male (IN)



1 =N.N.
2 = A line
3 = GND
4 = B line
5 = Shield

Female (OUT)



1 = 5 VDC
2 = A line
3 = GND
4 = B line
5 = Shield

Operating- / load voltage

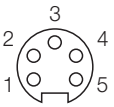
The module is powered via a 7/8” connector. The power is fed through via a second 7/8” connector.

Figure 4: 7/8” connector for supplying and feeding through of supply voltage

Male (U_i)

1 = GND
2 = GND
3 = PE
4 = U_B
5 = U_L

Female (U_o)



Note

The operational voltage is monitored internally. Supply failures of less than 2.5 ms are compensated and thus do not lead to module malfunction. It is also ensured that a voltage reset cannot lead to generation of faulty signals.

In-/ and outputs

The module is equipped throughout with 5-pole metal M12-connectors for connection of the sensor/actuator level.

Note

For the pin assignment, please refer to the wiring diagrams in the module-specific chapters of the manual.

General technical data

Table 4: General technical data of FXDP modules

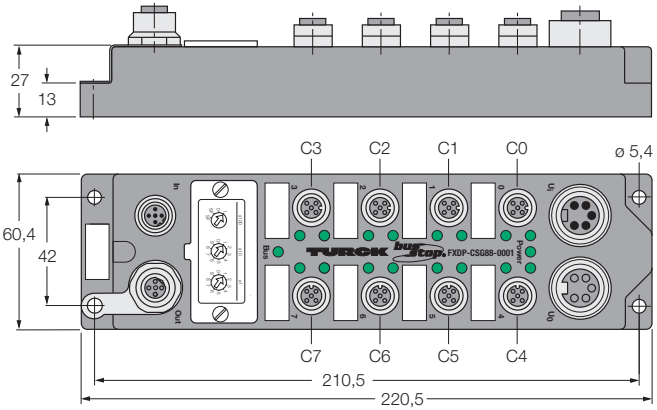
Technical data	
Power supply	
Operational voltage U_B	24 VDC (18 ... 30 VDC)
Load voltage U_L	24 VDC (18 ... 30 VDC)
Internal current consumption (via U_B)	< 70 mA
Connections	nickel-plated brass connectors
PROFIBUS-DP	1 x male M12 connector (IN), 1 x female M12 connector (OUT), 5-pole, reverse-keyed
Power supply	1 x 7/8" male connector (U_i), 1 x 7/8" female connector (U_o), 5-pole
Inputs/outputs	female M12-connectors, 5-pole
Housing	PA6-GF30
Dimensions	220,5 x 60,4 x 27 mm (H x B x T)
Mounting	via 4 through-holes Ø 5.4 mm
Mounting distance module/module	min. ≥ 50 mm **A** Valid for operation in the ambient temperatures mentioned below, with sufficient ventilation as well as maximum load (horizontal mounting).
Degree of protection (IEC 60529/EN 60529)	IP67
Vibration resistance test	according to EN 60068-2-6, IEC 68-2-47

A *In case of low simultaneity factors and low ambient temperatures, mounting distances of < 50mm may be possible.*

Shock resistance test	according to EN 60068-2-27
EMC	according to EN 61000-6-2, EN 61000-6-4
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / Ⓔx II 3 G EEx nA IIC T4 X
Temperature range	
– Operating temperature	0 °C to +55 °C (+32 °F to +131 °F)
– Storage and transport	-25 °C to +70 °C (-13 °F to +158 °F)

Dimension drawings

Figure 5: FXDP module-dimensions



LED indications

Table 5: FXDP LED indications

LED	Color	Meaning
Bus	green	communication with PROFIBUS-DP running
	red	no communication to PROFIBUS-DP
Power	off	U_B < 18 VDC
	green	U_B and U_L, within the operating range
	red	U_L < 18 VDC
In-/ outputs	off	not actuated, inactive
	green	actuated, active
	red	channel overload

Diagnosis

These modules combine the advantages of channel diagnostics - as known from the PDP series - with the favorable compact housing dimensions of the FLDP series.

Output diagnostics are effective for each channel, whereas the sensor supply is monitored separately for each connector.

Diagnostic data are also transferred to the PROFIBUS-DP and the respective status is indicated via LEDs on the module individually for each channel.

Diagnostic data can also be reproduced and transferred within the user data area.

Note

Please read the corresponding sections in the module-specific chapters for any information about the diagnosis mapping in the process data image.

Channel-related diagnostics help increase system availability, because the type of error and its location can be determined in detail. According to PROFIBUS specifications, all diagnostic data are transferred to the higher level control system via the PROFIBUS-DP where these information can be evaluated by higher level masters.

Chapter 6 of this manual „Connection to a Siemens PLC S7” contains an example for plain-text diagnosis evaluation.

2 Digital Input Modules

Digital input module, 8-channel

FXDP-IM8-0001

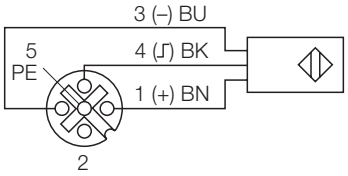
The busstop® input station FXDP-IM8-0001 is a modular PROFIBUS-DP slave in a compact housing design.

The module is suited for connection of up to eight 2/3 wire pnp sensors or mechanical contacts.

Figure 6:
FXDP-IM8-0001

Wiring diagram

Figure 7:
Wiring diagram



Technical data

Table 6:
Technical data
FXDP-IM8-0001

Type	FXDP-IM8-0001
Configuration file	TU0_ff1f.gsd
Inputs	(8) 2/3 wire pnp sensors
Supply (via UB)	24 VDC (18 ... 30 VDC)
Supply current	< 120 mA per connector, short-circuit protected
Switching threshold OFF/ON	2 mA/4 mA
Switching current limitation	6 mA
Switch-on delay	2,5 ms
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Housing	
EMC	to EN 61000-6-2, EN 61000-6-4; EN 61326/1999; A1/1999
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / ⟨Ex⟩ II 3 G EEx nA IIC T4 X

Parameterization

Table 7: parameter data assignment

Param.-Byte	Parameter	Meaning
0 to 6	Standard DP parameters	according to PROFIBUS-DP standard
7 to 9	Standard DPV1 parameters	according to PROFIBUS-DP standard
10 to 13	defined: 1 input per connector	not parameterizable
14 to 16	reserved	-

Diagnosis

- diagnostic messages in the diagnosis telegram:

Table 8: Diagnostic messages

Diagnostic message	Meaning
Short circuit	Channel wise diagnosis for short circuits at the connected sensor
Undervoltage	Operating voltage U_B < 18 VDC.

- diagnosis in process data image

Table 9: process data

Input	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4
Diagn. A	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						U_B	U_L	SC
Byte1	SC 7	SC 6	SC 5	SC 4	SC 3	SC 2	SC 1	SC 0
Byte2	SC 15	SC 14	SC 13	SC 12	SC 11	SC 10	SC 9	SC 8
Byte3	Con 7	Con 6	Con 5	Con 4	Con 3	Con 2	Con 1	Con 0

A *Depending on the configuration, the manufacturer specific diagnosis data can be mapped into the user data area.*

CxPy	Status: connector x, pin y
SC	Common short-circuit indication
SCx	Short-circuit indication channel x
Conx	Overload sensor voltage: connector x
U_B	U_B < 18 VDC
U_L	U_L <18 VDC
	Bit is not used

Digital input module, 16-channel

FXDP-IM16-0001

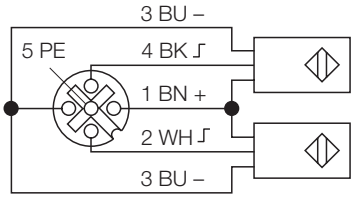
The busstop® input station FXDP-IM16-0001 is a modular PROFIBUS-DP slave in a compact housing design.

The module is suited for connection of up to sixteen 2/3 wire pnp sensors or mechanical contacts.

Figure 8:
FXDP-IM16-0001

Wiring diagram

Figure 9:
Wiring diagram



Technical Data

Table 10:
technical Data
FXDP-IM16-0001

Type	FXDP-IM16-0001
Configuration file	TU1_ff1f.gsd
Inputs	(16) 2/3 wire pnp sensors
Supply (via UB)	24 VDC (18 ... 30 VDC)
Supply current	< 120 mA per connector, short-circuit protected
Switching threshold OFF/ON	2 mA/4 mA
Switching current limitation	6 mA
Switch-on delay	2,5 ms
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Housing	
EMC	to EN 61000-6-2, EN 61000-6-4; EN 61326/1999; A1/1999
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / Ex II 3 G EEx nA IIC T4 X

Parameterization

Table 11: parameter data assignment

Param.-Byte	Parameter	Meaning
0 to 6	Standard DP parameters	according to PROFIBUS-DP standard
7 to 9	Standard DPV1 parameters	according to PROFIBUS-DP standard
10 to 13	defined: 2 inputs per connector	not parameterizable
14 to 16	reserved	-

Diagnosis

- diagnostic messages in diagnosis telegram:

Table 12: Diagnostic messages

Diagnostic message	Meaning
Short circuit	Channel wise diagnosis for short circuits at the connected sensor
Undervoltage	Operating voltage U_B < 18 V.

- diagnosis in process data image

Table 13: process data

Input	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4
Diagn. A	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						U_B	U_L	SC
Byte1	SC 7	SC 6	SC 5	SC 4	SC 3	SC 2	SC 1	SC 0
Byte2	SC 15	SC 14	SC 13	SC 12	SC 11	SC 10	SC 9	SC 8
Byte3	Con 7	Con 6	Con 5	Con 4	Con 3	Con 2	Con 1	Con 0

A *Depending on the configuration, the manufacturer specific diagnosis data can be mapped into the user data area.*

CxPy	Status: connector x, pin y
SC	Common short-circuit indication
SCx	Short-circuit indication channel x
Conx	Overload sensor voltage: connector x
U_B	U_B < 18 VDC
U_L	U_L < 18 VDC
	Bit is not used

3 Digital Output Modules

Digital output module, 8-channel

FXDP-OM8-0001

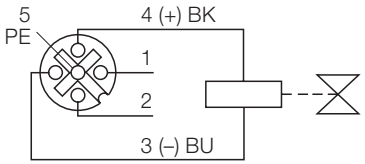
The busstop® output station FXDP-OM8-0001 is a modular PROFIBUS-DP slave in a compact housing design.

Up to eight DC actuators with a maximum output current of 1.4 A per output can be connected.

Figure 10:
FXDP-OM8-0001

Wiring diagram

Figure 11:
Wiring diagram



Technical data

Table 14:
Technical data
FXDP-OM8-0001

Type	FXDP-OM8-0001
Configuration file	TU2_ff1f.gsd
Outputs	(8) DC-actuators
Load supply (via U_L)	24 VDC (18 ... 30 VDC)
Output current	1,4 A, short-circuit protected (ON period = 50 %)
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Housing	
EMC	to EN 61000-6-2, EN 61000-6-4; EN 61326/1999; A1/1999
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / Ⓔx II 3 G EEx nA IIC T4 X

Parameterization

Table 15: Parameter data assignment

Param.-Byte	Parameter	Meaning
0 to 6	Standard DP parameters	according to PROFIBUS-DP standard
7 to 9	Standard DPV1 parameters	according to PROFIBUS-DP standard
10 to 13	defined: 1 output per connector	not parameterizable
14 and 15	reserved	-
16	U_L diagnosis 00 = diagnosis is not transferred via the bus **01** = diagnosis is transferred via the bus	Activation of U_L diagnosis

Diagnosis

- diagnostic messages in diagnosis telegram:

Table 16: Diagnostic messages

Diagnostic message	Meaning
Short circuit	Channel wise diagnosis for short circuits at the connected actuator.
Undervoltage	Operation voltage U_B missing or < 18 VDC
Load voltage missing	Load voltage U_L missing or < 18 VCD

- diagnosis in process data image

Table 17: process data

Output	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4
Diagn. A	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						U_B	U_L	SC
Byte1	SC 7	SC 6	SC 5	SC 4	SC 3	SC 2	SC 1	SC 0
Byte2	SC 15	SC 14	SC 13	SC 12	SC 11	SC 10	SC 9	SC 8
Byte3	Con 7	Con 6	Con 5	Con 4	Con 3	Con 2	Con 1	Con 0

A *Depending on the configuration, the manufacturer specific diagnosis data can be mapped into the user data area.*

CxPy	Status: connector x, pin y
SC	Common short-circuit indication
SCx	Short-circuit indication channel x
Conx	Overload sensor voltage: connector x
U_B	U_B < 18 VDC
U_L	U_L <18 VDC
	Bit is not used

Digital output module, 16-channel

FXDP-OM16-0001

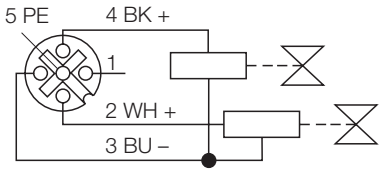
The busstop® output station FXDP-OM16-0001 is a modular PROFIBUS-DP slave in a compact housing design.

Up to sixteen DC actuators with a maximum output current of 1.4 A per output can be connected.

Figure 12:
FXDP-OM16-0001

Wiring diagram

Figure 13:
Wiring diagram



Technical data

Table 18:
Technical data
FXDP-OM16-0001

Type	FXDP-OM16-0001
Configuration file	TU3_ff1f.gsd
Outputs	(16) DC-actuators
Load supply (via U_L)	24 VDC (18 ... 30 VDC)
Output current	1,4 A, short-circuit protected (ON period = 50 %)
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Housing	
EMC	to EN 61000-6-2, EN 61000-6-4; EN 61326/1999; A1/1999
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / ⟨Ex⟩ II 3 G EEx nA IIC T4 X

Parameterization

Table 19: Parameter data assignment

Param.-Byte	Parameter	Meaning
0 to 6	Standard DP parameters	according to PROFIBUS-DP standard
7 to 9	Standard DPV1 parameters	according to PROFIBUS-DP standard
10 to 13	defined: 2 Outputs per connector	not parameterizable
14 and 15	reserved	-
16	U_L diagnosis 00 = diagnosis is not transferred via the bus **01** = diagnosis is transferred via the bus	Activation of U_L diagnosis

Diagnosis

- diagnostic messages in the diagnosis telegram

Table 20: Diagnostic messages

Diagnostic message	Meaning
Short circuit	Channel wise diagnosis for short circuits at the connected actuator.
Undervoltage	Operation voltage U_B missing or < 18 VDC
Load voltage missing	Load voltage U_L missing or < 18 VDC

- diagnosis in process data image

Table 21: process data

Output	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
Byte 1	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4
Diagn. A	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						U_B	U_L	SC
Byte1	SC 7	SC 6	SC 5	SC 4	SC 3	SC 2	SC 1	SC 0
Byte2	SC 15	SC 14	SC 13	SC 12	SC 11	SC 10	SC 9	SC 8
Byte3	Con 7	Con 6	Con 5	Con 4	Con 3	Con 2	Con 1	Con 0

A *Depending on the configuration, the manufacturer specific diagnosis data can be mapped into the user data area.*

CxPy	Status: connector x, pin y
SC	Common short-circuit indication
SCx	Short-circuit indication channel x
Conx	Overload sensor voltage: connector x
U_B	U_B < 18 VDC
U_L	U_L <18 VDC
	Bit is not used

4 Digital Hybrid Modules

Digital hybrid module, 2 x 8-channel, I/I or O/O per connector

FXDP-IOM88-0001

The busstop® input/output station FXDP-IOM88-0001 is a modular PROFIBUS-DP slave in a compact housing design.

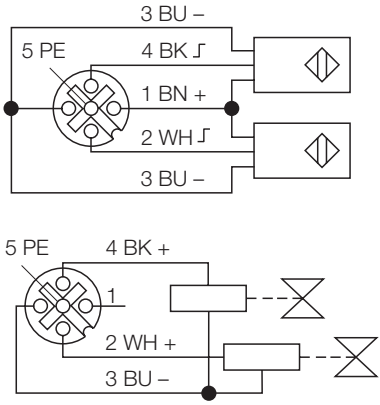
Up to eight 2/3 wire pnp sensors and eight DC actuators with a maximum output current of 1.4 A per output can be connected.

The inputs and outputs are provided equidirectionally via four connectors.

Figure 14:
FXDP-IOM88-0001

Wiring diagrams

Figure 15:
Wiring diagrams



Technical data

Table 22: Technical data FXDP-IOM88-0001

Type	FXDP-IOM88-0001
Configuration file	TU4_ff1f.gsd
Inputs	(8) 2/3 wire pnp sensors
Supply (via U_B)	24 VDC (18 ... 30 VDC)
Supply current	< 120 mA per connector, short-circuit protected
Switching threshold OFF/ON	2 mA/4 mA
Switching current limitation	6 mA
Switch-on delay	2,5 ms
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Outputs	(8) DC-actuators
Load supply (via U_L)	24 VDC (18 ... 30 VDC)
Output current	1.4 A, short-circuit protected (ON period = 50 %)
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Housing	
EMC	to EN 61000-6-2, EN 61000-6-4; EN 61326/1999; A1/1999
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / ⟨Ex⟩ II 3 G EEx nA IIC T4 X

Parameterization

Table 23: Parameter data assignment

Param.-Byte	Parameter	Meaning
0 to 6	Standard DP parameters	according to PROFIBUS-DP standard
7 to 9	Standard DPV1 parameters	according to PROFIBUS-DP standard
10 and 11	00, 00 not parameterizable	The connectors 0-3 are defined as inputs, the connectors 4-7 are defined as outputs.
12 and 13	AA, AA not parameterizable	
14 and 15	reserved	-
16	U_L diagnosis 00 = diagnosis is not transferred via the bus **01** = diagnosis is transferred via the bus	Activation of U_L diagnosis

Diagnosis

- diagnostic messages in the diagnosis telegram:

Table 24: Diagnostic messages

Diagnostic message	Meaning
Short circuit	Channel wise diagnosis for short circuits at the connected sensor/ actuator.
Undervoltage	Operation voltage U_B missing or < 18 VDC
Load voltage missing	Load voltage U_L missing or < 18 VDC

- diagnosis in process data image

Table 25: process data

Input	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
Output	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4
Diagn. A	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						U_B	U_L	SC
Byte1	SC 7	SC 6	SC 5	SC 4	SC 3	SC 2	SC 1	SC 0
Byte2	SC 15	SC 14	SC 13	SC 12	SC 11	SC 10	SC 9	SC 8
Byte3	Con 7	Con 6	Con 5	Con 4	Con 3	Con 2	Con 1	Con 0

A *Depending on the configuration, the manufacturer specific diagnosis data can be mapped into the user data area.*

CxPy	Status: connector x, pin y
SC	Common short-circuit indication
SCx	Short-circuit indication channel x
Conx	Overload sensor voltage: connector x
U_B	U_B < 18 VDC
U_L	U_L <18 VDC
	Bit is not used

Digital combined module, 2 x 8-channel, I/O per connector

FXDP-CSG88-0001

The busstop® input/output station FXDP-CSG88-0001 is a modular PROFIBUS-DP slave in a compact housing design.

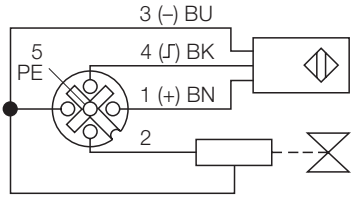
Up to eight 2/3 wire pnp sensors and eight DC actuators with a maximum output current of 1.4 A per output can be connected.

The inputs and outputs are provided in combination by eight connectors.

Figure 16:
FXDP-CSG88-0001

Wiring diagram

Figure 17:
Wiring diagram



Technical data

Table 26: Technical data FXDP-CSG88-0001

Type	FXDP-CSG88-0001
Configuration file	TU5_ff1f.gsd
Inputs	(8) 2/3 wire pnp sensors
Supply (via U_B)	24 VDC (18 ... 30 VDC)
Supply current	< 120 mA per connector, short-circuit protected
Switching threshold OFF/ON	2 mA/4 mA
Switching current limitation	6 mA
Switch-on delay	2,5 ms
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Outputs	(8) DC-actuators
Load supply (via U_L)	24 VDC (18 ... 30 VDC)
Output current	1.4 A, short-circuit protected (ON period = 50 %)
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Housing	
EMC	to EN 61000-6-2, EN 61000-6-4; EN 61326/1999; A1/1999
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / Ex II 3 G EEx nA IIC T4 X

Parameterization

Table 27: Parameter data assignment

Param.-Byte	Parameter	Meaning
0 to 6	Standard DP parameters	according to PROFIBUS-DP standard
7 to 9	Standard DPV1 parameters	according to PROFIBUS-DP standard
10 and 11	88, 88 not parameterizable	Pin 2 of the connectors is defined a output, pin 4 as input.
12 and 13	88, 88 not parameterizable	
14 and 15	reserved	-
16	U_L diagnosis 00 = diagnosis is not transferred via the bus **01** = diagnosis is transferred via the bus	Activation of U_L diagnosis

Diagnosis

- diagnostic messages in the diagnosis telegram:

Table 28: Diagnostic messages

Diagnostic message	Meaning
Short circuit	Channel wise diagnosis for short circuits at the connected sensor/ actuator.
Undervoltage	Operation voltage U_B missing or < 18 VDC
Load voltage missing	Load voltage U_L missing or < 18 VDC

- diagnosis in process data image

Table 29: process data

Input	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4
Output	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	C7P2	C6P2	C5P2	C4P2	C3P2	C2P2	C1P2	C0P2
Diagn. A	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						U_B	U_L	SC
Byte1	SC 7	SC 6	SC 5	SC 4	SC 3	SC 2	SC 1	SC 0
Byte2	SC 15	SC 14	SC 13	SC 12	SC 11	SC 10	SC 9	SC 8
Byte3	Con 7	Con 6	Con 5	Con 4	Con 3	Con 2	Con 1	Con 0

A *Depending on the configuration, the manufacturer specific diagnosis data can be mapped into the user data area.*

CxPy	Status: connector x, pin y
SC	Common short-circuit indication
SCx	Short-circuit indication channel x
Conx	Overload sensor voltage: connector x
U_B	U_B < 18 VDC
U_L	U_L <18 VDC
	Bit is not used

5 Universal Service Module

FXDP-XSG16-0001

The busstop® input/output station FXDP-XSG16-0001 is a modular PROFIBUS-DP slave in a compact housing design. The module is equipped with sixteen channels, which can be configured differently depending on the specific application requirements. Up to sixteen 2/3 wire pnp sensors or sixteen DC actuators with a maximum output current of 1.4 A per output can be connected.

The service module

Besides the typical FXDP properties like the extended diagnosis, the possibility of diagnosis-data mapping into the user data as well as the FIXCON® I/O-connection technology, the service module FXDP-XSG16-0001 provides the following additional features:

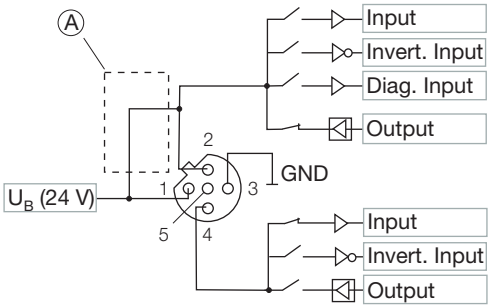
- Each single channel can be configured according to the application via configuration software tools (e.g. SIMATIC Manager, etc.). The required combination of in- and outputs can be exactly planned to suit the customer's needs. The device's configuration options enable the user to operate the module in the "AUTO mode" or to use the individual channels as an input, as an inverted input, as a diagnostic input or as an output. This thus ensures a 100% technology utilization and a cost minimization.
- Operating FXDP-modules can directly be replaced by the XSG-module. Without any additional configuration, it can take-over the function of the module that has to be replaced. The customer only has to change the hardware, to set the previously configured PROFIBUS-DP address at the XSG-module and to execute a voltage reset at the module.

Based on this fact, the module is universally applicable and can be used to reduce inventory costs and system down-times - two factors that are constantly gaining in importance in face of ever more complex technical processes.

Figure 18:
FXDP-XSG16-0001

Block diagram

Figure 19: Block diagram FXDP-XSG16-0001

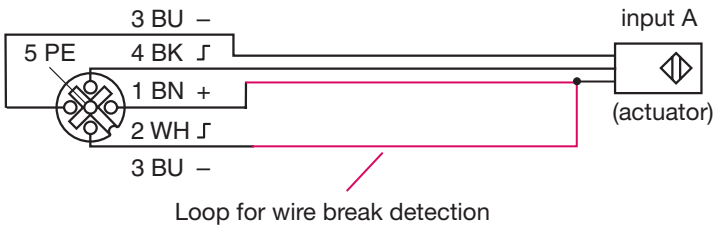


Ⓐ Wire-break detection via external bridge between PIN 2 and U_B. Only realizable with the parameterization of PIN 2 as “Diag. Input”.

Pin 2 = channel 1, 3, 5,... (all impair channel numbers)
Pin 4 = channel 0, 2, 4 ...(all pair channel numbers)*Figure*

Example for wire break detection:

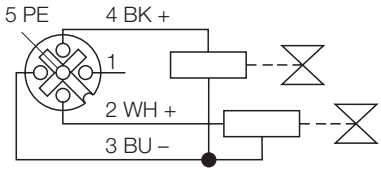
Figure 20: Setting the loop for wire break detection



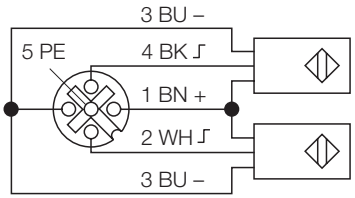
Wiring diagrams

Figure 21: Wiring diagrams

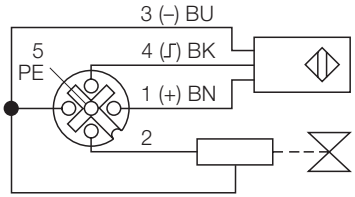
Connection of 2 actuators:

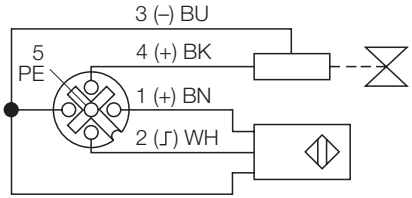


Connection of 2 sensors:



Combinations of sensor and actuator:





Technical data

Table 30: Technical data FXDP-XSG16-0001

Type	FXDP-XSG16-0001
Configuration file	TU6_ff1f.gsd
Inputs (configurable)	((n) 2/3 wire pnp sensors (n = 0...16)
Supply (via U_B)	24 VDC (18 ... 30 VDC)
Supply current	< 120 mA per connector, short-circuit protected
Switching threshold OFF/ON	2 mA/4 mA
Switching current limitation	6 mA
Switch-on delay	2,5 ms
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Outputs (configurable)	(16-n) DC actuators (n = 0...16)
Load supply (via U_L)	24 VDC (18 ... 30 VDC)
Output current	1.4 A, short-circuit protected (ON period = 35 %)
Switching frequency	< 250 Hz
Galvanic isolation	galvanic isolation to PROFIBUS-DP
Housing	
EMC	to EN 61000-6-2, EN 61000-6-4; EN 61326/1999; A1/1999
Approval for use in Zone 2	to EN 50014/2000, EN 50021/2000 / ⟨Ex⟩ II 3 G EEx nA IIC T4 X

Configuration options

Table 31: Configuration options for the universal service module

User data area	FXDP-IM8-0001	FXDP-IM16-0001	FXDP-OM8-0001	FXDP-OM16-0001	FXDP-IOM88-0001	FXDP-CSG88-0001	**FXDP-XSG16-0001**	Comment
8 Bit IN	x						x	I per connector
16 Bit IN		x					x	I/I per connector
8 Bit OUT			x				x	O per connector
16 Bit OUT				x			x	O/O per connector
8 Bit IN, 8 Bit OUT					x		x	I/I bzw. O/O per connector
8 Bit IN, 8 Bit OUT						x	x	I/O per connector
8 Bit IN, 8 Bit DIAG							x	I/DIAG per connector
8 Bit OUT, 8 Bit DIAG							x	O/DIAG per connector
12 Bit IN, 4 Bit OUT							x	I/I bzw. O/O per connector
n Bit IN, 16-n Bit OUT (AUTO Mode)							x	outputs are read back
n Bit IN, 16-n Bit OUT (PROG Mode)							x	channel config-urable as IN, inverted IN, DIAG IN or OUT
AddOn: Diag mapped	x	x	x	x	x	x	x	diagnostics mapped to user data area

Parameterization

Table 32: Parameter data assignment

A *The parameterization of the input as diagnostic input can only be realized if the input is connected to Pin 2*

Param.-Byte	Parameter	Meaning
0 to 6	Standard DP parameters	according to PROFIBUS-DP standard
7 to 9	Standard DPV1 parameters	according to PROFIBUS-DP standard
10	Channel-parameter [0] **00** = input 01 = inverted Input 10 = output 11 = diagnostic input **A**	Channel-function (Channel 0-3) 2 Bit define the function of the respective channel.
11	Channel-parameter [1] **00** = input 01 = inverted Input 10 = output 11 = diagnostic input **A**	Channel-function (Channel 4-7) 2 Bit define the function of the respective channel.
12	Channel-parameter [2] **00** = input 01 = inverted Input 10 = output 11 = diagnostic input **A**	Channel-function (Channel 8-11) 2 Bit define the function of the respective channel.
13	Channel-parameter [3] **00** = input 01 = inverted Input 10 = output 11 = diagnostic input **A**	Channel-function (Channel 12-15) 2 Bit define the function of the respective channel.
14	reserved	-
15	reserved	-
16	U_L diagnosis 00 = diagnosis is not transferred via the bus **01** = diagnosis is transferred via the bus	Activation of U_L diagnosis

Diagnosis

Diagnostic messages in the diagnosis telegram

Table 33: diagnostic messages

Diagnostic message	Meaning
Short circuit	Channel wise diagnosis for short circuits at the connected sensor/ actuator.
Wire-break	Indication of a wire-break in the sensor- / or actuator line (please read the following „Note“). The wire-break indication is inverted: diagnostic bit = 0 → no diagnosis diagnostic bit = 1 → wire-break at Diag.IN
Undervoltage	Operation voltage U_B missing or < 18 VDC
Load voltage missing	Load voltage U_L missing or < 18 VDC

Note

The Pin 2-diagnosis „wire-break“ can only be realized with the module FXDP-XSG-0001 configured as „IM8D8“, „OM8D8“ or „XSG16: 16 IN/ 16 OUT (Prog. Mode)“ (see „Configuration options”, Page 5-7).

Note

A wire-break can only be detected if Pin 1 (U_B - supply) and Pin 2 are bridged at the sensor or at the actuator.

Diagnosis in the process data image

Table 34: process data

Input	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
Byte 1	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4
Output	**Bit 7**	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Byte 0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
Byte 1	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4
Diagn. A	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						U_B	U_L	SC
Byte1	SC 7	SC 6	SC 5	SC 4	SC 3	SC 2	SC 1	SC 0
Byte2	SC 15	SC 14	SC 13	SC 12	SC 11	SC 10	SC 9	SC 8
Byte3	Con 7	Con 6	Con 5	Con 4	Con 3	Con 2	Con 1	Con 0

A *Depending on the configuration, the manufacturer specific diagnosis data can be mapped into the user data area.*

CxPy	Status: connector x, pin y
SC	Common short-circuit indication
SCx	Short-circuit indication channel x
Conx	Overload sensor voltage: connector x
U_B	U_B < 18 VDC
U_L	U_L <18 VDC

6 Connection to a Siemens PLC S7

General

The software „SIMATIC Manager“ V 5.1 with Service Pack 6 from Siemens is used to configure the connection of FXDP modules with the Siemens S7 PLC.

The CPU used in the S7 in the following example was a CPU 315-2AF02-0AB0 with firmware version 3.

Reading- in the GSD File

The GSD files for FXDP must be read into the software before you can begin with the initial configuration. There are two procedures possible for reading-in the files:

Reading-in the GSD files before starting the software

- Copy the GSD files „TUx_ff1f.gsd“ for the FXDP into the „Step7\S7data\GSD“ directory.
- Copy the icon files (*.bmp) into the „Step7\S7data“ directory.
- Start the „SIMATIC Manager“ software.
- The FXDP modules will automatically be entered into the hardware overview following correct installation of the files. The hardware overview can be accessed using the <Insert → Hardware Catalog> command.

Reading-in the GSD files after starting the software

Proceed as follows to read-in the above GSD files, if you have already started the software.

- Create a new or open an existing project.
- Open the hardware configuration software.
- Copy the required GSD file using the <Options → Install New *.GSD...> command.

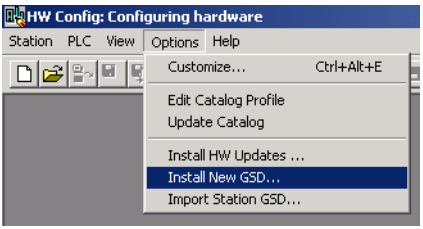
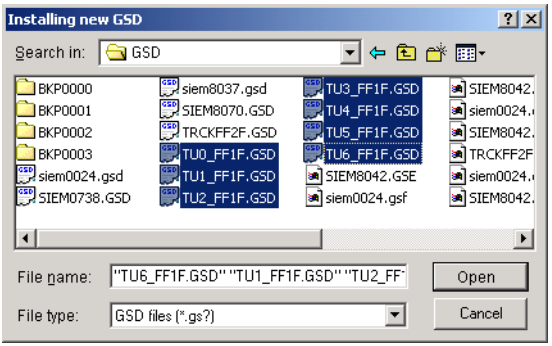


*Figure 21: Reading-in the GSD files using „Install New *.GSD...“*

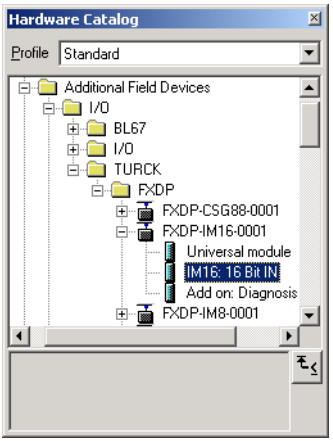
- Select the GSD file from the corresponding source directory.

Figure 22: Selection of the GSD files from the corresponding source directory



- The GSD files are listed as separate entries in the hardware catalog following correct installation.

Figure 23: FXDP modules in the hardware catalog



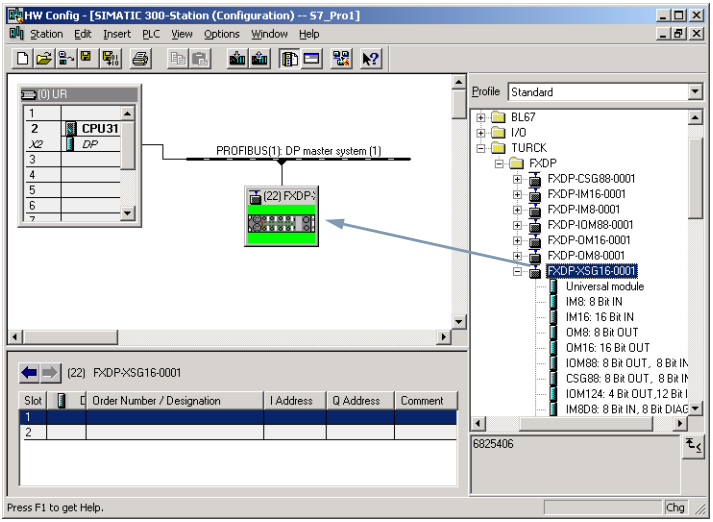
Note

The exact configuration procedure can be found in the operators manual, which is supplied with the software.

Selecting the FXDP Modules as Slaves

To insert a FXDP module as a slave, select the required entry from the hardware catalog.

Figure 24: Inserting a FXDP module as a slave



Configuring the FXDP modules

After the selection of a module as modular slave, the function of the module has to be defined.

Please choose one of the module's configuration options from the hardware catalog.

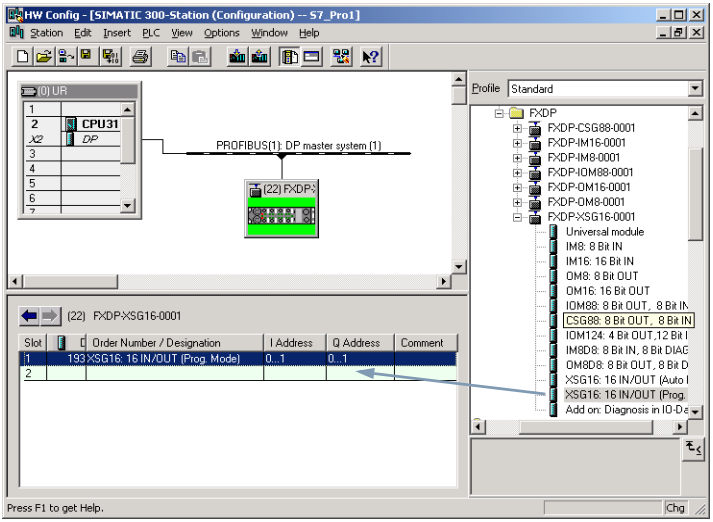


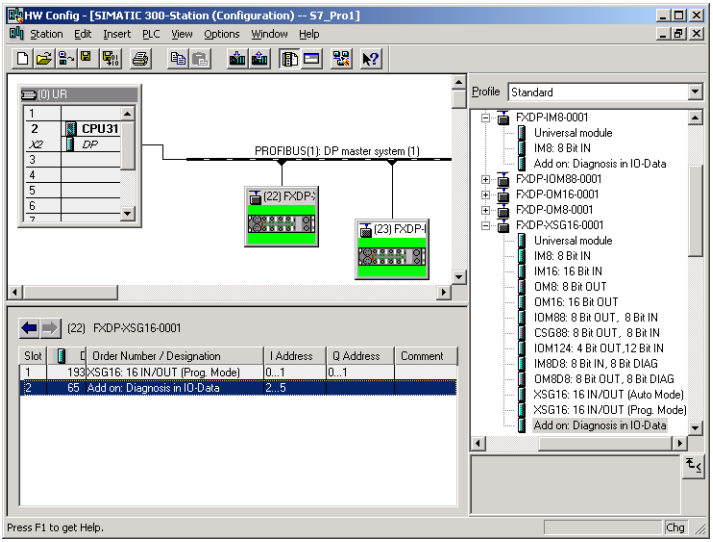
Figure 25: Configuration of the slave

Diagnostic messages in the process image

The FXDP modules offer the possibility to map the diagnosis data into the process image.

This can be achieved by adding the function „Add On: Diagnosis in I/O-Data“ to the module’s configuration.

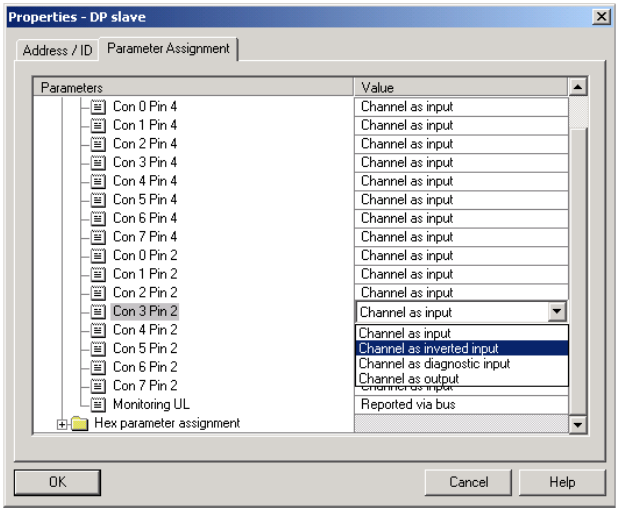
Figure 26: Add on: Diagnosis in I/O-Data



Parameterization of the FXDP modules

If parameterizable modules have been chosen, the slave properties can be opened with a double click on the respective module.

Figure 27: Parameterizing a FXDP module



Diagnosis evaluation on a S7-PLC

In the following example, a S7 PLC with the CPU 315-2AF02-0AB0, firmware version 3, is used for diagnosis evaluation.

Note

A correct diagnosis-data evaluation cannot be guaranteed if S7 PLCs with older hard- or firmware-version are used.

The diagnosis evaluation of the FXDP modules can be done either via the online diagnosis in the hardware configurator of the SIMATIC software or via the Siemens function block FB125. This function block enables the visualization of plain text diagnosis on systems of different manufacturers.

Online diagnosis with die SIMATIC Manager

For the online diagnosis you have to go online with the configured FXDP station in the hardware catalog.

A pending diagnosis is shown in the software with a red symbol at the module image . A double click on the module opens the window „Object
properties...“.

The register „DP Slave Diagnostics...“ shows the plain text diagnostic message, the slot number which accords to the connector’s number on the FXDP modules and the channel number.

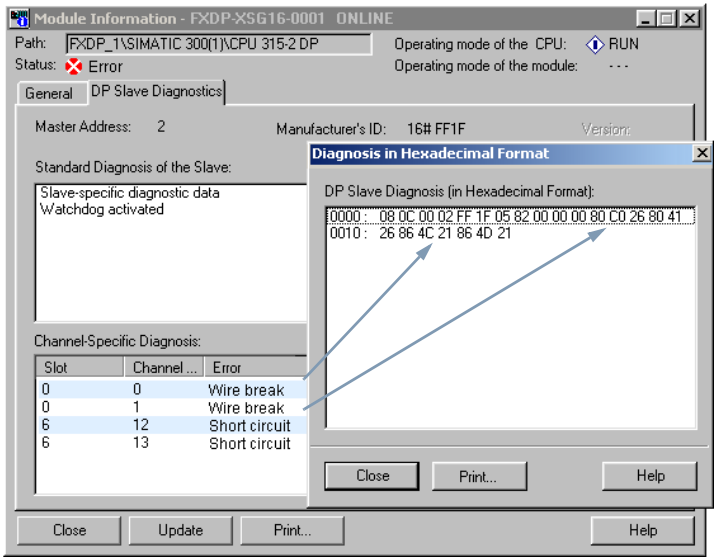
Note

The plain text diagnosis is an evaluation of standardized error codes, which are sent by the FXDP modules.

According to the PROFIBUS-DP standard, the meanings of the error codes 1-11 are defined (i.e. 1 = „Short circuit“, 6 = „Wire break“). All other error codes may differ in their interpretation, always depending on the programming software that is used.

The button „Hex Format...“ opens the window „Diagnosis in Hexadecimal Format“ which shows the module’s entire diagnosis telegram.

Figure 28: Module information

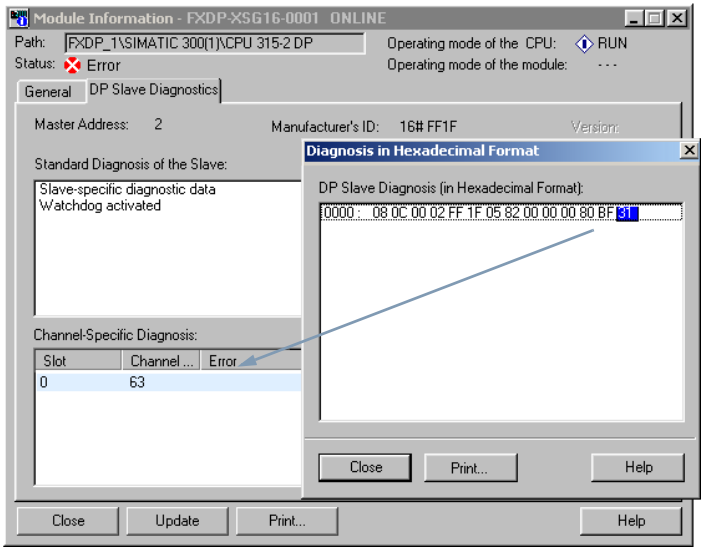


Note

The software „SIMATIC Manager“ only interprets the standardized error codes in the online diagnosis.

The following example shows a simulated failure in the load voltage supply (U_L). The software can not interpret the diagnostic message „No encoder voltage or load voltage“ (error code 17), because it is not standardized.

Figure 29: Error code 17 (not standardized)



Diagnosis via function block FB125

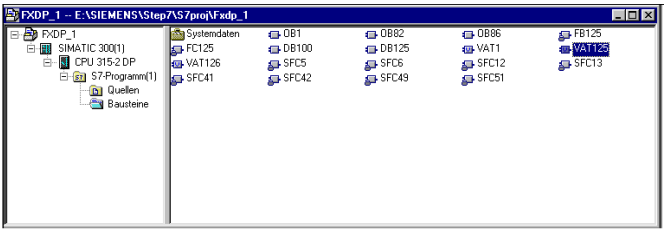
The following description shows the diagnosis with function block 125 version V4.5. You can download the actual version of the function block directly from the Siemens homepage.

Note

Please read the function block's description from Siemens for all information about structure and handling of FB 125.

In order to use the FB125, all „software blocks“ and „symbols“ of the function block have to be copied into the project.

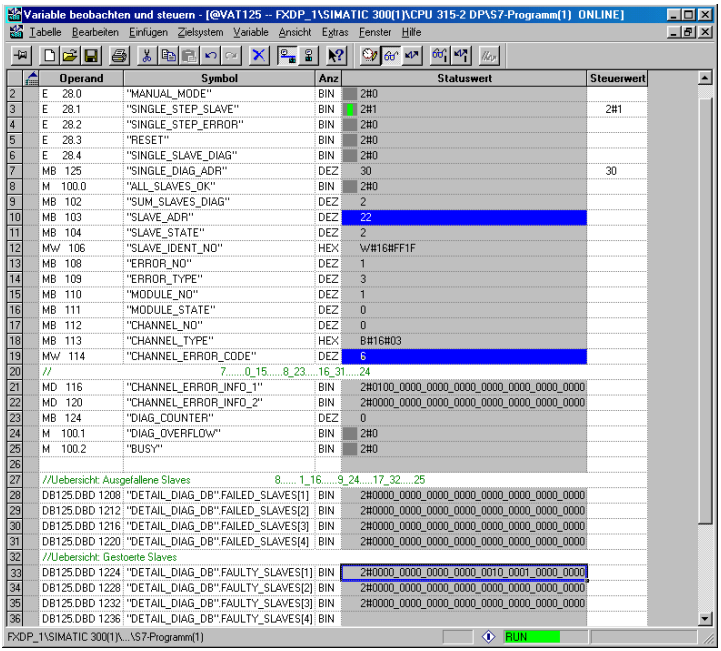
Figure 30: Project with FB125



Online-access to the modules' diagnostic messages is possible via the variable table VAT125 or the data block DB125.

The following example shows a diagnostic message with error code 6 („Wire break“) at station 22, channel 0.

Figure 31: VAT125 with diagnostic message



The function block FB125 transmits the diagnostic messages to higher-level operating panels which interpret the error codes and display them as plain text diagnosis.

7 Appendix

Declaration of conformity

Figure 32: Declaration of conformity

Konformitätserklärung **Nr. 3147 M**
Declaration of Conformity

TURCK Industrielle Automation

Diese Konformitätserklärung entspricht der Europäischen Norm EN 45014 "Allgemeine Kriterien für Konformitätserklärungen von Anbietern". Die Grundlage der Kriterien sind internationale Dokumente, insbesondere ISO/IEC Leitfaden 22, 1982: "Information on manufacturer's declaration of conformity with standards or other technical specifications".

This "Declaration of Conformity" complies with the European Standard EN 45014 "General criteria for a supplier's declaration of conformity". These criteria are based on the relevant international documentation, particularly the ISO/IEC Guide 22, 1982: "Information on the manufacturer's declaration of conformity with standards or other technical specifications".

Wir/ We HANS TURCK GMBH & CO KG
WITZLEBENSTR. 7, D - 45472 MÜLHEIM A.D. RUHR

erklären in alleiniger Verantwortung, dass die Produkte
declare under our sole responsibility that the products

Feldbusmodul Typenreihe FXDP...

auf die sich die Erklärung bezieht, mit den folgenden Normen übereinstimmen
to which this declaration relates are in conformity with the following standards

EN 61326 / 1998; A1 / 1999

und wo anwendbar
and where applicable

EN 50014 /2000 EN 50021 / 2000

Gemäß den Bestimmungen der Richtlinie (falls zutreffend)
Following the provisions of Directive (if applicable)

EMV - Richtlinie	/ EMC Directive	89 / 336 / EWG	3. Mai 1989
Richtlinie ATEX 100a	/ Directive ATEX 100a	94 / 9 / EG	23. März 1994

Weitere Normen
additional standards

Das Feldbusmodul ist unter Berücksichtigung der elektrischen Daten zum Einsatz in Zone 2 geeignet.
Die Ergebnisse der Prüfungen sind in dem Prüfprotokoll 04001H-... festgelegt.
U = 18...30 VDC; I <= 200 mA
Der zulässige Umgebungstemperaturbereich ist 0°C ... +55°C.

Besondere Bedingungen:
- Das Feldbusmodul ist vor vor jeglicher mechanischer Beschädigung und statischer Aufladung zu schützen. Die Module sind aus Netzteilen mit mit sicherer Trennung (IEC60364/UL508) zu versorgen. Die Bemessungsspannung von 30VDc darf auf keinen Fall um mehr als 40% überschritten werden.
- Steckverbinder dürfen nicht unter Spannung getrennt werden. Unbenutzte Steckvorrichtungen sind mit einer Schutzkappe zu verschließen.

Das Betriebsmittel erhält folgende Kennzeichnung: Ex II 3 G EEx nA IIC T4 X

Mülheim, den 06.05.04

i.V. W. Stoll

(i.V. W. Stoll)

Ort und Datum der Austellung / Place and date of issue

Name und Unterschrift des Befugten / Name and signature of authorized person

7_3f12a.doc Stand: 001 vom 26.05.03

8 Glossary

A

Acknowledge

Acknowledgment of a signal received.

Active metal component

Conductor or conducting component that is electrically live during operation.

Address

Identification number of, e.g. a memory position, a system or a module within a network.

Addressing

Allocation or setting of an address, e. g. for a module in a network.

Analog

Infinitely variable value, e. g. voltage. The value of an analog signal can take on any value, within certain limits.

Automation device

A device connected to a technical process with inputs and outputs for control. Programmable logic controllers (PLC) are a special group of automation devices.

B

Baud

Baud is a measure for the transmission speed of data. 1 Baud corresponds to the transmission of one bit per second (Bit/s).

Baud rate

Unit of measurement for measuring data transmission speeds in Bit/s.

Bidirectional

Working in both directions.

Bus

Bus system for data exchange, e. g. between CPU, memory and I/O levels. A bus can consist of several parallel cables for data transmission, addressing, control and power supply.

Bus cycle time

Time required for a master to serve all slaves or stations in a bus system, i. e. reading inputs and writing outputs.

Bus line

Smallest unit connected to a bus, consisting of a PLC, a coupling element for modules on the bus and a module.

Bus system

All units which communicate with one another via a bus.

C

Capacitive coupling

Electrical capacitive couplings occur between cables with different potentials. Typical sources of interference are, for example, parallel-routed signal cables, contactors and electrostatic discharges.

Coding elements

Two-piece element for the unambiguous assignment of electronic and base modules.

Configuration

Systematic arrangement of the I/O modules of a station.

CPU

Central Processing Unit. Central unit for electronic data processing, the processing core of the PC.

D

Digital

A value (e. g. a voltage) which can adopt only certain statuses within a finite set, mostly defined as 0 and 1.

DIN

German acronym for German Industrial Standard.

E

EIA

Electronic Industries Association – association of electrical companies in the United States.

Electrical components

All objects that produce, convert, transmit, distribute or utilize electrical power (e. g. conductors, cable, machines, control devices).

EMC

Electromagnetic compatibility – the ability of an electrical part to operate in a specific environment without fault and without exerting a negative influence on its environment.

EN

German acronym for European Standard.

ESD

Electrostatic Discharge.

F

Field power supply

Voltage supply for devices in the field as well as the signal voltage.

Fieldbus

Data network on sensor/actuator level. A fieldbus connects the equipment on the field level. Characteristics of a fieldbus are a high transmission security and real-time behavior.

G

GND

Abbreviation of ground (potential „0“).

Ground

Expression used in electrical engineering to describe an area whose electrical potential is equal to zero at any given point. In neutral grounding devices, the potential is not necessarily zero, and one speaks of the ground reference.

Ground connection

One or more components that have a good and direct contact to earth.

Ground reference

Potential of ground in a neutral grounding device. Unlike earth whose potential is always zero, it may have a potential other than zero.

GSD

Acronym for Electronic Device Data Sheet which contains standardized PROFIBUS DP station descriptions. They simplify the planning of the DP master and slaves. Default language is English.

H

Hexadecimal

System of representing numbers in base 16 with the digits 0 ... 9, and further with the letters A, B, C, D, E and F.

Hysteresis

A sensor can get caught up at a certain point, and then “waver“ at this position. This condition results in the counter content fluctuating around a given value. Should a reference value be within this fluctuating range, then the relevant output would be turned on and off in rhythm with the fluctuating signal.

I

I/O

Input/output.

Impedance

Total effective resistance that a component or circuit has for an alternating current at a specific frequency.

Inactive metal components

Conductive components that cannot be touched and are electrically isolated from active metal components by insulation, but can adopt voltage in the event of a fault.

Inductive coupling

Magnetic inductive couplings occur between two cables through which an electrical current is flowing. The magnetic effect caused by the electrical currents induces an interference voltage. Typical sources of interference are for example, transformers, motors, parallel-routed network and HF signal cables.

Intelligent modules

Intelligent modules are modules with an internal memory, able to transmit certain commands (e. g. substitute values and others).

L

Load value

Predefined value for the counter module with which the count process begins.

Lightning protection

All measures taken to protect a system from damage due to overvoltages caused by lightning strike.

Low impedance connection

Connection with a low AC impedance.

8

LSB

Least Significant Bit

M

Mass

All interconnected inactive components that do not take on a dangerous touch potential in the case of a fault.

Master

Station in a bus system that controls the communication between the other stations.

Master/slave mode

Mode of operation in which a station acting as a master controls the communication between other stations in a bus system.

Module bus

The module bus is the internal bus in a BL20 station. The BL20 modules communicate with the gateway via the module bus which is independent of the fieldbus.

MSB

Most Significant Bit

Multi-master mode

Operating mode in which all stations in a system communicate with equal rights via the bus.

N

NAMUR

German acronym for an association concerned with standardizing measurement and control engineering. NAMUR initiators are special versions of the two-wire initiators. NAMUr initiators are characterized by their high immunity to interference and operating reliability, due to their special construction (low internal resistance, few components and compact design).

O

Overhead

System administration time required by the system for each transmission cycle.

P

PLC

Programmable Logic Controller.

Potential compensation

The alignment of electrical levels of electrical components and external conductive components by means of an electrical connection.

Potential free

Galvanic isolation of the reference potentials in I/O modules of the control and load circuits.

Potential linked

Electrical connection of the reference potentials in I/O modules of the control and load circuits.

PROFIBUS-DP

PROFIBUS bus system with DP protocol. DP stands for decentralized periphery. PROFIBUS-DP is based on DIN 19245 Parts 1 + 3 and has been integrated into the European fieldbus standard EN 50170.
It ensures a fast cyclic data exchange between the central DP master and the decentralized periphery devices (slaves). Its universal use is realized by the multi master concept.

PROFIBUS-DP address

Each PROFIBUS-DP module is assigned an explicit PROFIBUS-DP address, with which it can be queried by the master.

PROFIBUS-DP master

The PROFIBUS-DP master is the central station on the bus and controls access of all stations to PROFIBUS.

PROFIBUS-DP slave

PROFIBUS-DP slaves are queried by the PROFIBUS-DP master and exchange data with the master on request.

Protective earth

Electrical conductor for protection against dangerous shock currents. Generally represented by PE (protective earth).

R

Radiation coupling

A radiation coupling appears when an electromagnetic wave hits a conductive structure. Voltages and currents are induced by the collision. Typical sources of interference are for example, sparking gaps (spark plugs, commutators from electric motors) and transmitters (e. g. radio), that are operated near to conducting structures.

Reaction time

The time required in a bus system between a reading operation being sent and the receipt of an answer. It is the time required by an input module to change a signal at its input until the signal is sent to the bus system.

Reference potential

Potential from which all voltages of connected circuits are viewed and/or measured.

Repeater

The phase and the amplitude of the electric data signals are regenerated during the transmission process by the repeater.
Further, it is possible to change the topology of the PROFIBUS network. It can be extended considerably by means of the repeater.

Root-connecting

Creating a new potential group using a power distribution module. This allows sensors and loads to be supplied individually.

RS 485

Serial interface in accordance with EIA standards, for fast data transmission via multiple transmitters.

S

Serial

Type of information transmission, by which data is transmitted bit by bit via a cable.

Setting parameters

Setting parameters of individual stations on the bus and their modules in the configuration software of the master.

Shield

Conductive screen of cables, enclosures and cabinets.

Shielding

Description of all measures and devices used to join installation components to the shield.

Short-circuit proof

Characteristic of electrical components. A short-circuit proof part withstands thermal and dynamic loads which can occur at its place of installation due to a short circuit.

Station

A functional unit or I/O components consisting of a number of elements.

SUB-D connector

9-pin connector for connecting the fieldbus to the I/O-stations.

T

Terminating resistance

Resistor on both ends of a bus cable used to prevent interfering signal reflections and which provides bus cable matching. Terminating resistors must always be the last component at the end of a bus segment.

To ground

Connection of a conductive component with the grounding connection via a grounding installation.

Topology

Geometrical structure of a network or the circuitry arrangement.

U

UART

Universal Asynchronous Receiver/Transmitter. UART is a logic circuit which is used to convert an asynchronous serial data sequence to a parallel bit sequence or vice versa.

Unidirectional

Working in one direction.

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TURCK

Industrial
Automation

TURCK WORLD-WIDE HEADQUARTERS

GERMANY
Hans Turck GmbH & Co. KG
Witzlebenstraße 7
D-45472 Mülheim an der Ruhr
P. O. Box 45466 Mülheim an der Ruhr
Phone (+49) (208) 4952-0
Fax (+49) (208) 4952-2 64
E-Mail turckmh@turck.com

www.turck.com

D300720 0905