Dupline® Profibus-DP Gateway Passive with safety mapping Type GS 3891 0125

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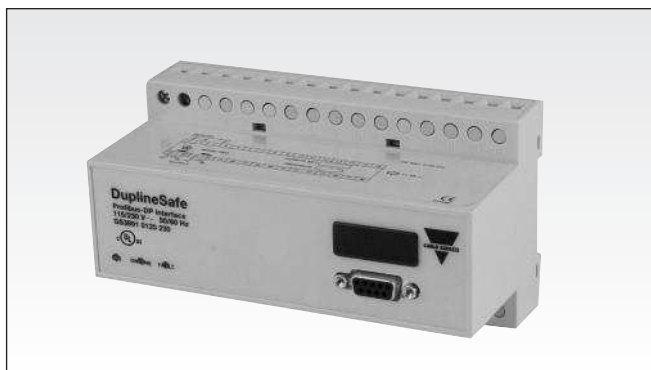
- Passive gateway without channel generator
- PROFIBUS-DP slave according to EN 50 170
- Certified by the PNO
- Can be connected at any point in a Dupline® network
- Several gateways can be connected to the same Dupline® network
- cULus approved
- PROFIBUS-DP communication speed of up to 12 MBaud
- Read/control 128 standard inputs/outputs through PROFIBUS-DP
- 63 DuplineSafe signals can be read via the PROFIBUS-DP network
- For mounting on DIN-rail (EN 50 022)
- LED indicators for supply, Dupline® carrier and fault
- AC power supply

Product Description

Dupline® Gateway with the function of a PROFIBUS-DP slave. This means that the Dupline® I/O's (incl. Dupline® Safe signals) can be read/controlled by PROFI-BUS-DP masters (PLC's, PC interface cards, etc. from various suppliers). Several Dupline® gateways can be connected to the same Dupline® network. The unit is certified by PNO (Profibus Nutzer Organisation) which ensures compatibility and interoperability with other PNO-certified products.

Ordering Key

GS 3891 0125 230

Duplinesafe
Type no.
Supply

Type Selection

Supply	Ordering no.
115/230 VAC	**GS 3891 0125 230**

Input/Output Specifications

PROFIBUS-DP		RS 485 9-pole female SUB-D
Pin assignment	A	Pin 8
	B	Pin 3
	RTS	Pin 4
	+5V	Pin 6
	GND	Pin 5
Baudrate		Auto detection
Cable length		100 m @ 12 MBaud 200 m @ 1.5 MBaud 1200 m @ 93.75 kBaud
Up-date time (128 digital I/O)		Typ. 200 µs at 12 MBaud Typ. 1.6 ms at 1.5 MBaud
Dielectric voltage		
PROFIBUS-DP Dupline®		≥ 4 kVAC (rms)
PROFIBUS-DP ID-no.		6590
GSD-file		GS38_125.gsd

Adjustments	
2 x 10 pos. rotary switch	PROFIBUS Slave Address Range 02 to 99
1 x 16 pos. rotary switch	Not used
DIP-switch 1	Not used
DIP-switch 2	Not used
DIP-switch 3	Not used
DIP-switch 4	Off in normal mode

Approvals	
PROFIBUS operability	PNO (Profibus Nutzer Organisation)

Conformity	
CE	EMC Industrial Environment

General Specifications

Power ON delay	< 2.5 s
Indication for	
Supply ON	LED, green
Dupline® carrier	LED, yellow
Fault	LED, red
Environment	
Degree of protection	IP 20
Pollution degree	3 (IEC 60664)
Operating temperature	0° to +50°C (+32° to +122°F)
Storage temperature	-20° to +85°C (-4° to +185°F)
Humidity (non-condensing)	20 to 80% RH
Mechanical resistance	
Shock	15 G (11 ms)
Vibration	2 G (6 to 55 Hz)
Dimensions	144 x 77 x 70 mm
Material	H8-housing
Weight	540 g
Approvals	IEC/EN 61508-SIL3 EN954 cat 4 TÜV Rheinland Group cULus

Specifications are subject to change without notice (25.11.2010)
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1

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Supply Specifications

Power supply	Overvoltage cat. III (IEC 60664)
Rated operational voltage through term. 21, 22, 23 & 24	See wiring diagram
230	230 VAC ± 15% (IEC 60038)
115	115 VAC ± 15% (IEC 60038)
Frequency	45 to 65 Hz
Rated operational power	11 VA
Rated impulse withstand voltage 230	4 kV
115	2.5 kV
Dielectric voltage	
Supply - Dupline®	≥ 4 kVAC (rms)
Supply - RS 485	≥ 4 kVAC (rms)

Wiring Diagrams
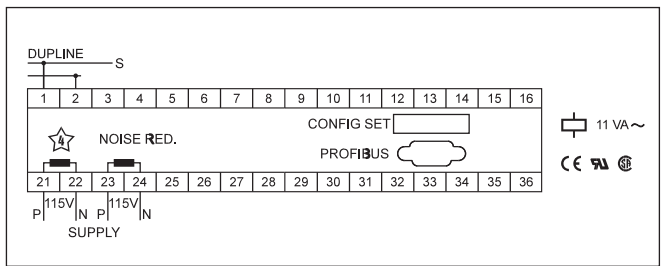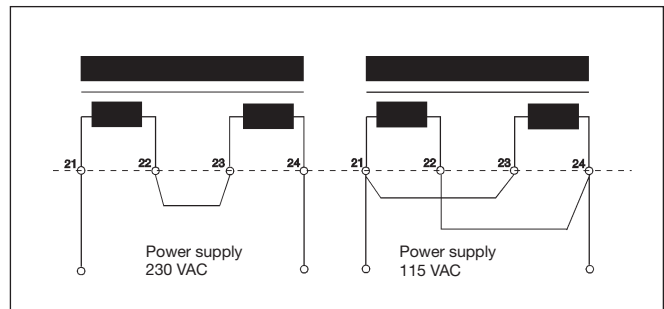
Mode of Operation

The Dupline PROFIBUS-DP Gateway operates as a PROFIBUS-DP slave according to EN 50 170. This means that the 128 Dupline® I/O's can be read/controlled by PROFIBUS-DP masters like PLC's and PC interface-cards from many different suppliers. Since the GS38910125 is a passive gateway without channel generator function, it is possible to connect several units to the same Dupline® network.

Configuration switches
The unit is equipped with the following switches:
1 x 16-position rotary switch- not used in the GS38910125.
2 x 10-position rotary switch for selection of the **PROFIBUS-DP Slave Address** in the range 02..99. (00..01 are reserved). Each module connected to PROFIBUS-DP must have a unique slave address which enables the PROFIBUS-DP Master to access the modules individually.

4 x DIPswitches - not used in the GS38910125.

Note: Dipswitch 4 must be off in operationel mode.

Dupline® Input Data
To ease up the **Profibus Master configuration**, the **GS38_125.gsd** file is to be used. This file describes to the Master which I/O data the gateway supports.
All I/O data are selectable through so-called modules, each described with its particular function.
Digital Input, Digital output, Safety input etc. Through this, the individual configuration of the Gateway is quite simplified, as the user only has to select which I/O modules to use. The supported modules may be selected in any order and any combination.

The GS38910125 passive gateway supports Digital input module, and Digital output module, corresponding to the 128 channels of input and output data. Furthermore, the GS38910125 supports reading of Dupline - safe signals. This requires 2 bits of information per safety-signal. Thus, the information must be read like this:

00: Safe valid - Closed
10: Unsafe Valid - Open
* 11: Unsafe - Invalid condition

* 11 - is a situation where the system is in "Unsafe" mode, but either loses sync signal, bus signal disconnect or short-circuit, etc.

All modules consist of 16 bytes of data, and the tables below describe the content and the relations to the Dupline data.

Safe Principles:
Each safety module is using 2 channel adresses to send its signal. The possible selections are in the range A3/A4... P7/P8.
Which channel adress to be monitored by the safety module, must be defined. (Please note that the channel adress A1/A2 is not allowed in the system. A1 is always used for safe synchronization between all safe modules).

It has the state of "0" when A1 is OK, and the state of "1" when A1 is faulty. A2 is surveillance of the Dupline Bus. By the state "0", the Dupline Bus is OK and by the state "1" the Dupline Bus is faulty.

If all configured safety modules send a valid "safe-state" signal, every relay contact on the output-modules will be closed. In any other case - Non-safe signals received from one or several safety modules or failure in the Dupline bus, the relays will stay open and keep the system in "safe-state".

When starting up a safe-system, all contacts remain open until a valid "safe-state" signal is received from alle safety modules.

If the Dupline® signal is missing or faulty, the gateway will set the input status of all channels to OFF.

Reaction time

The reaction time for the total Dupline® safety-loop depends of the number of Dupline® channels, and the responsetime from the gateway = max. 136 mSec. The response time, of the channels, can be calculated as:

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Mode of Operation (cont.)

Reaction time on relay release (worst-case): 2 x Number of Dupline® channels + 40 [ms]

Note: Reaction time is for the total Dupline® safety-loop; from a safety input goes to non-safe state until the output relay is released.

Reaction time on relay activate (worst-case): 4 x Number of Dupline® channels + 80 [ms].

Note: Reaction time is for the total Dupline® safety-loop; from a safety input goes to safe state until the output relay is activated.

Byte 0.. 0Fh Safety input module

Byte addres	Dupline Channel	Safe Bits
00	x	7.6
	A3-4	5.4
	A5-6	3.2
	A7-8	1.0
01	B1-2	
	B3-4	
	B5-6	
	B7-8	
	-	
	-	
0F	P1-2	7.6
	P3-4	5.4
	P5-6	3.2
	P7-8	1.0

Each safe input consists of 2 Safe Bits.
The 2 bits are to be interpreted like this:

00: Safe valid - Closed
10: Unsafe Valid - Open
11: Unsafe - Invalid condition

The 2 safe bits can be read as follows:
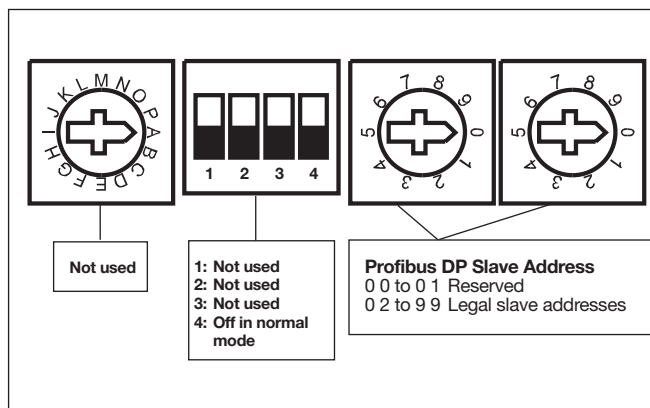Example:
Safe bits: 7.6.5.4.3.2.<u>1.0</u>
Bit example: 0 0 1 1 0 1 <u>1 0</u>

Read "Byte adress" "<u>01</u>" and Dupline channel <u>B7-8</u>
Now read Safe bits on place <u>1.0</u> to bit example <u>1 0</u>
This means that the Dupline channel is : SAFE OFF
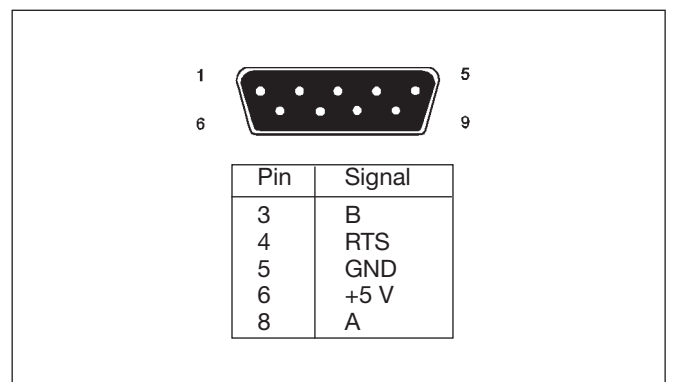
Byte 0.. 0F$_h$ *Digital input module*

Byte adress	Dupline Group	Bit	Channel Number
0	A	7	A1
0	A	6	A2
0	A	5	A3
0	-	-	-
0	A	0	A8
1	B	7	B1
2	C	6	C2
-	-	-	-
E	O	1	O7
F	P	0	P8

Byte 0.. 0F$_h$ *Digital output module*

Byte adress	Dupline Group	Bit	Channel Number
0	A	7	A1
0	A	6	A2
0	A	5	A3
0	-	-	-
0	A	0	A8
1	B	7	B1
2	C	6	C2
-	-	-	-
E	O	1	O7
F	P	0	P8

Pin Assignment

Pin	Signal
3	B
4	RTS
5	GND
6	+5 V
8	A

Switch Settings

Not used

1: Not used
2: Not used
3: Not used
4: Off in normal mode

Profibus DP Slave Address
0 0 to 0 1 Reserved
0 2 to 9 9 Legal slave addresses

Dimensions (mm)

H8-housing