

Fieldbus coupler and Gateways

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1 General

The Fieldbus connection differs between Fieldbus-modules and Fieldbus-gateways.

The Fieldbus-modules are integrated in the WatchDog pro system and work with the G4WDCU over the high-speed bus.

Gateways work without G4WDCU. These modules read in the raw values of the measured data and provide them on the particular Fieldbus. The superior process control level must convert the raw values into real values.

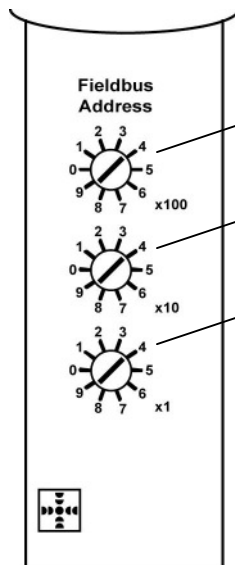
2 Fieldbus modules (G2FBC)

2.1 Generally valid facts

2.1.1 Functions

The module communicates over the high speed bus with the central unit and is a slave module on the local bus. With this module a WatchDog pro system could be connected to a PLC.

2.1.2 Address adjustment – Fieldbus and WatchDog pro



Potentiometer 1:
To adjust the HUNDREDS

Potentiometer 2:
To adjust the DECADES

Potentiometer 3:
To adjust the UNITS

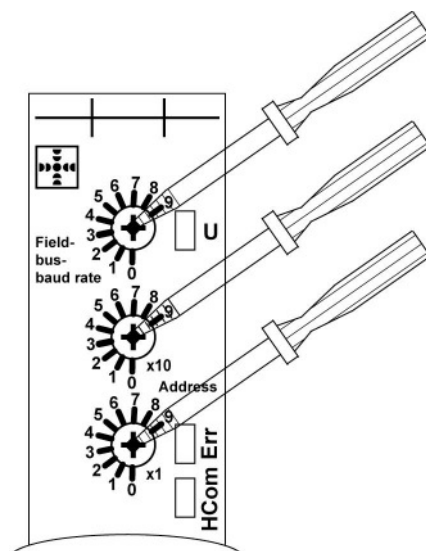
e.g.: the address 108 will be adjusted as follows:

Potentiometer 1 on position 1

Potentiometer 2 on position 0

Potentiometer 3 on position 8

Depending on the fieldbus these potentiometers can not be available.



Potentiometer:
To adjust the fieldbus communication settings

Potentiometer 1:
To adjust the DECADES

Potentiometer 2:
To adjust the UNITS

e.g.: the address 43 will be adjusted as follows:

Potentiometer 1 on position 4

Potentiometer 2 on position 3

Address range WDp: 1-99

Deactivation(Off): adresse 0

2.1.3 Indications

LED	Colour	Meaning
U	green	Module is connected to power supply
HCom	yellow	Data transfer over high- speed bus in progress
Err	red	illuminates: fatal error / flashes: error

2.1.4 Mechanical design

Self- extinguishing plastic housing, IP rating IP
 Mounted on DIN- rail TS 35 according to EN 60715
 Mounting position: any
 Shockproof terminal connection according to VBG 4 (PZ1 required), IP rating IP20
 Tightening torque: max. 1Nm
 Terminal capacity:
 1 x 0.5 to 2.5 mm² with/without multicore cable end
 1 x 4 mm² without multicore cable end
 2 x 0.5 to 1.5 mm² with/without multicore cable end
 2 x 2.5 mm² flexible without multicore cable end

2.1.5 Supply

Supply voltage: 24V DC over local interface
 Terminals: 
 Tolerance: ± 10%
 Duty cycle: 100%
 Supply current:

G2FBC	Rated consumption [VA]	Rated current [mA]	Max. supply current [mA]
MB-RTU	1,08	45	100
MB-TCP	1,32	55	120
PB-DPV1	1,20	50	100
CANOP	1,08	45	100

2.1.6 Businterface

Standardbus:
 Data link: RS485; yellow LED HCom ON
 Interface parameter: 460,8 kBd, 9 Bit data

2.1.7 Isolation

Functional isolation between fieldbus and local interface.
 Overvoltage protection between fieldbus shielding and functional earth.

2.1.8 Ambient conditions

Ambient temperature: -25 bis +55 °C (in accordance with IEC 60068-1)
 -25 bis +40 °C
 Storage temperature: -25 bis +70 °C
 Transport temperature: -25 bis +70 °C
 Relative humidity: 15% bis 85% (in accordance with IEC 60721-3-3 class 3K3)
 Absolute humidity: 1g bis 25g H₂O/m³ (in accordance with IEC 60721-3-3 class 3K3)
 Pollution degree: 2 (in accordance with IEC 60664-1)
 Vibration resistance: 10 bis 55Hz 0,35mm (in accordance with IEC 60068-2-6)
 Shock resistance: 15g 11ms (in accordance with IEC 60068-2-27)

2.1.9 Operator accessibility of clamps and connectors

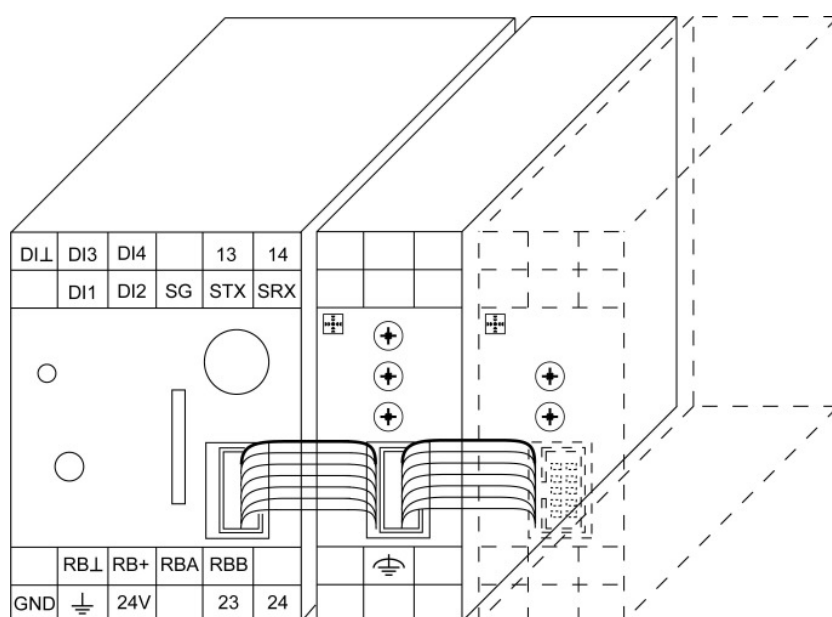
The table shows which terminals and connectors can be touched by the operator during normal operation.

Nr.	Typ	Anschluss	Berührbar
1	Al	Communication interface for local input-/output- extension device	YES
2	Ar	Communication interface for remote input-/output unit	YES
3	Be	Open communication interface, open to external devices as well	YES
4	Bi	Internal communication interface for peripheral modules	NO
5	C	Interface for digital and analog input signals	NO
6	D	Interface for digital and analog output signals	NO
7	E	Serial or parallel communication interface for data communication with external devices	YES
8	F	Terminal for line power supply	NO
9	H	Functional Earth terminal	YES
10	J	Input-/output interface for power supply of sensors and actuators	NO
11	K	Interface for auxiliary supply output and auxiliary supply input	NO

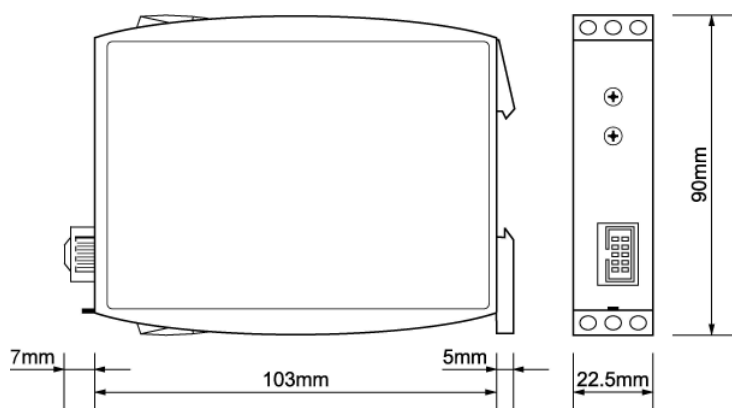
WatchDog pro modules

Name	Type	Nb.	Terminals related to the circuits
Supply	K	11	24V, GND
Functional earth	H	9	
Local interface	Al	1	LI Box header; LI plug connector with ribbon cable
Fieldbus interface	Be	3	Fieldbus connector

2.1.10 Connections



2.1.11 Dimensions



2.1.12 Fieldbus cable

The type of the fieldbus cable and the length of the cable has to match the fieldbus specification. The shield of the cable have to be connected to the fieldbus master unit.

2.1.13 Inputs and outputs

Maximum 55 inputs and 55 outputs are possible. Each value has a word size of 16 bit.

2.1.14 Reset and settings

Changes of the WatchDog pro address are valid after a reset on the central unit or after a power-up. Changes on the side of the Fieldbus are only taken over after a power-up.

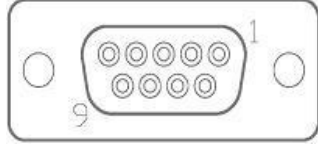
2.2 G2FBC MB-RTU (2500500)

2.2.1 Fieldbus

Modbus-RTU Slave

2.2.2 Fieldbus connector

9-pole SUB-D connector (female)

Pin	Signal	 module view
1	GND	Ground
2	5V	5V Output
3	PMC	Connect with Pin2 for RS232; don't connect for RS485
4	-	-
5	B	RS485 – B
6	-	-
7	Rx	RS232 – Data Receive
8	Tx	RS232 – Data Transmit
9	A	RS485 – A

2.2.3 Fieldbus address

Settings: 1-247 (0 → 1; >247 → 247)

2.2.4 Fieldbus communication

Settings: 0-9

Setting	Baud rate	Parity	Stop bit
0	2400	Even	1
1	4800	Even	1
2	9600	Even	1
3	19200	Even	1
4	38400	Even	1
5	2400	Odd	1
6	4800	Odd	1
7	9600	Odd	1
8	19200	Odd	1
9	38400	Odd	1

2.2.5 Fieldbus variables

The addresses of the WatchDog pro variables are shown directly in the WatchDog pro programming environment. The first input is Modbus register 528, the first output is Modbus register 583.

Notice: Only one Modbus register can be processed per Fieldbus access. This also applies to variables which reserve two registers (e.g. float).

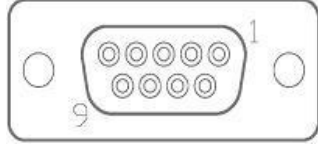
2.3 G2FBC PB-DPV1 (2500501)

2.3.1 Fieldbus

Profibus DPV1 Slave

2.3.2 Fieldbus connector

9-pole SUB-D connector (female)

Pin	Signal	 module view
1	-	-
2	-	-
3	B	Positive RxD/TxD, RS485 level
4	RTS	Request to send
5	GND	Ground
6	+5V	+5V termination power
7	-	-
8	A	Negative RxD/TxD, RS485 level
9	-	-

2.3.3 Fieldbus address

Settings: 0-126 (>126 → 126)

2.3.4 Fieldbus communication

No settings required because the module supports Auto Baud Rate Detection.

Supported Baud rates [Baud]	
9,6k	500k
19,2k	1,5M
45,45k	3M
93,75k	6M
187,5k	12M

2.3.5 Fieldbus variables

The addresses of the WatchDog pro variables are assigned as follows

Index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Slot															
1	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	14*	15*
2	16*	17*	18*	19*	20*	21*	22*	23*	24*	25*	26*	27*	28*	29*	30*
3	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
4	46	47	48	49	50	51	52	53	54	55	56*	57*	58*	59*	60*
5	61*	62*	63*	64*	65*	66*	67*	68*	69*	70*	71*	72*	73*	74*	75*
6	76*	77*	78*	79*	80*	81*	82*	83*	84*	85*	86	87	88	89	90
7	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
8	106	107	108	109	110										

	Legend
	Input
	Output
*	Cyclic data (also a acyclic access is possible)
	Acyclic data

Notice:

For linking the module to the process control level (e.g. Siemens S7) a GSD-file is available.

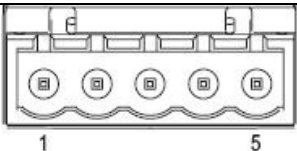
2.4 G2FBC DEVNET (2500502) preliminary

2.4.1 Fieldbus

DeviceNet Slave

2.4.2 Fieldbus connector

Screw type terminal respectively DeviceNet connector

Pin	Signal	 module view
1	V-	Negative bus supply
2	CAN_L	CAN-bus low line
3	Shield	Shield
4	CAN_H	CAN-bus high line
5	V+	Positive bus supply

2.4.3 Fieldbus address

Settings: 0-63 (>63 → 63)

2.4.4 Fieldbus communication

Settings: 0-3 (>3 → 3)

Sett.	Baudrate
0	125kbps
1	250kbps
2	500kbps
3	Auto baud

2.4.5 Fieldbus variables

Cyclic and acyclic data has to be defined.

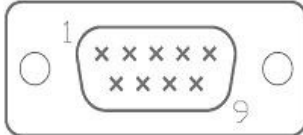
2.5 G2FBC CANOP (2500503)

2.5.1 Fieldbus

CANopen Slave

2.5.2 Fieldbus connector

9-pole SUB-D connector (male)

Pin	Signal	 module view
1	-	-
2	CAN_L	CAN-bus low line
3	CAN_GND	Ground
4	-	-
5	CAN_SHIELD	Shield
6	-	-
7	CAN_H	CAN-bus high line
8	-	-
9	-	-

2.5.3 Fieldbus address

Settings: 1-127; 255 (128-254 are invalid and are interpreted as 255)

2.5.4 Fieldbus communication

Settings: 0-9

Setting	Baud rate
0	10kbps
1	20kbps
2	50kbps
3	100kbps
4	125kbps
5	250kbps
6	500kbps
7	800kbps
8	1Mbps
9	Autobaud

2.5.5 Fieldbus variables

The WatchDog pro variables of the measurement modules are located in the “Manufacturer Specific Object” starting with address 0x2001 (8193 dec). These WDp data are not map able and can only be accessed via a SDO command. Parts of the system area of the Fieldbus module can be mapped in the PDO area. If no PDO mapping in the master configuration is specified, then a default mapping is used. Then there are 4 TPDOs which are mapped to the Error Register (0x1001) and 4 RPDOs which are mapped to dummy addresses.

The addresses of the WatchDog pro variables are shown directly in the WatchDog pro programming environment. The first input is CANopen register 8193, the first output is CANopen register 8248.

Notice:

For linking the module to the process control level a ESD-file is available.

2.6 G2FBC MB-TCP (2500510)

2.6.1 Fieldbus

Modbus-TCP Slave

2.6.2 Fieldbus connector

RJ45

2.6.3 Fieldbus address

IP address adjustable via a special software.

2.6.4 Fieldbus communication

10/100Mbit, full and half duplex

2.6.5 Fieldbus variables

The addresses of the WatchDog pro variables are shown directly in the WatchDog pro programming environment. The first input is Modbus register 528, the first output is Modbus register 583.

The module comes with an embedded webserver over them all the variables can also be displayed and modified. On the webserver the addresses starts with 1. Modbus register 528 is on the webserver variable 1, Modbus register 583 is variable 56.

2.7 G2FBC ENET/IP (2500511) preliminary

2.7.1 Fieldbus

EtherNet/IP Slave

2.7.2 Fieldbus connector

RJ45

2.7.3 Fieldbus address

IP address adjustable via a special software.

2.7.4 Fieldbus communication

10/100Mbit, full and half duplex

2.7.5 Fieldbus variables

The addresses of the WatchDog pro variables are shown directly in the WatchDog pro programming environment. The number of the variable is equivalent to the number of the CIP object.

The module comes with an embedded webserver over them all the variables can also be displayed and modified.

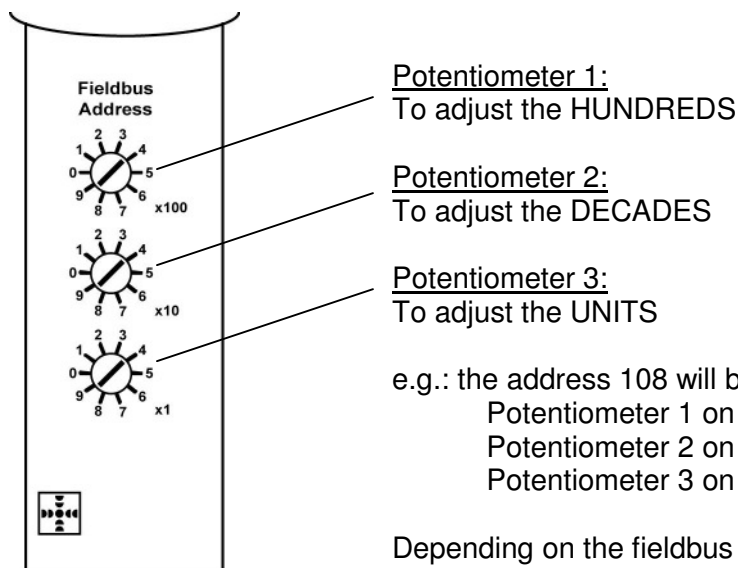
3 GATEWAYS (G2WDGW2)

3.1 Generally valid facts

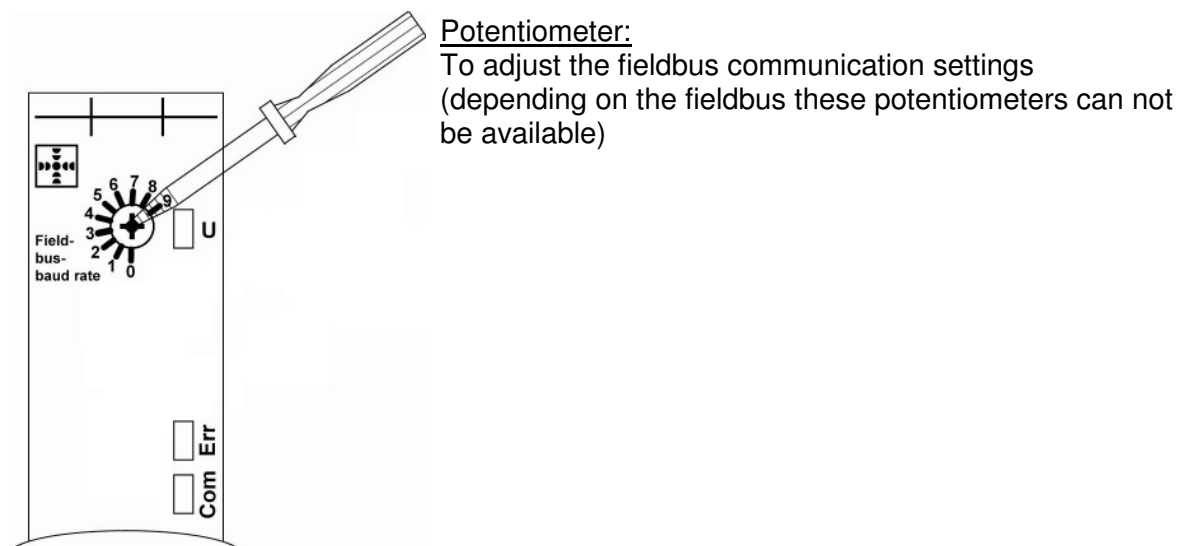
3.1.1 Functions

The WatchDog pro gateway works without a central unit (CU) and makes it possible to establish a communication between an PLC with fieldbus functionality and measurement modules. The measurement modules are connected via the gateway to the PLC.

3.1.2 Address adjustment – Fieldbus



Depending on the fieldbus these potentiometers can not be available.



3.1.3 Indications

LED	Colour	Meaning
U	green	Module is connected to power supply
Com	yellow	Data transfer over standard bus in progress
Err	red	illuminates: fatal error / flashes: error

3.1.4 Mechanical design

Self- extinguishing plastic housing, IP rating IP
 Mounted on DIN- rail TS 35 according to EN 60715
 Mounting position: any
 Shockproof terminal connection according to VBG 4 (PZ1 required), IP rating IP20
 Tightening torque: max. 1Nm
 Terminal capacity:
 1 x 0.5 to 2.5 mm² with/without multicore cable end
 1 x 4 mm² without multicore cable end
 2 x 0.5 to 1.5 mm² with/without multicore cable end
 2 x 2.5 mm² flexible without multicore cable end

3.1.5 Supply

Supply voltage: 24V DC over local interface
 Terminals: GND -  - 24V
 Tolerance: ± 10%
 Supply current:

G2WDGW2	Rated consumption [VA]	Rated current [mA]	Max. supply current [mA]
MB-RTU	1,08	45	100
MB-TCP	1,32	55	120
PB-DPV1	1,20	50	100
CANOP	1,08	45	100

Ripple and noise: < 150 mV_{PP}
 Duty cycle: 100%
 Start-up time: 2s typ.
 Cable length: < 10m (gateway to power supply)

3.1.6 Businterface

Standardbus:
 Data link: RS485; yellow LED Com ON
 Interface parameter: 115,2 kBd, 9 Bit Daten
 Number of extension modules: Local interface max. 12 modules

3.1.7 Isolation

Functional isolation between fieldbus and local interface.
 Overvoltage protection between fieldbus shielding and functional earth.

3.1.8 Ambient conditions

Ambient temperature: -25 bis +55 °C (in accordance with IEC 60068-1)
 -25 bis +40 °C
 Storage temperature: -25 bis +70 °C
 Transport temperature: -25 bis +70 °C
 Relative humidity: 15% bis 85% (in accordance with IEC 60721-3-3 class 3K3)
 Absolute humidity: 1g bis 25g H₂O/m³ (in accordance with IEC 60721-3-3 class 3K3)
 Pollution degree: 2 (in accordance with IEC 60664-1)
 Vibration resistance: 10 bis 55Hz 0,35mm (in accordance with IEC 60068-2-6)
 Shock resistance: 15g 11ms (in accordance with IEC 60068-2-27)

3.1.9 Operator accessibility of clamps and connectors

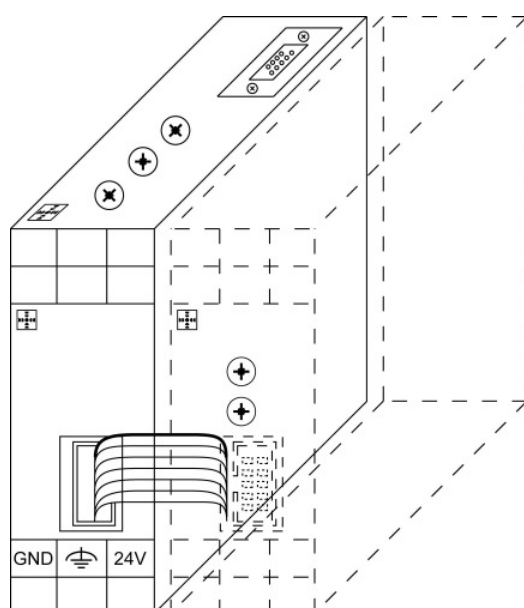
The table shows which terminals and connectors can be touched by the operator during normal operation.

Nr.	Typ	Anschluss	Berührbar
1	Al	Communication interface for local input-/output- extension device	YES
2	Ar	Communication interface for remote input-/output unit	YES
3	Be	Open communication interface, open to external devices as well	YES
4	Bi	Internal communication interface for peripheral modules	NO
5	C	Interface for digital and analog input signals	NO
6	D	Interface for digital and analog output signals	NO
7	E	Serial or parallel communication interface for data communication with external devices	YES
8	F	Terminal for line power supply	NO
9	H	Functional Earth terminal	YES
10	J	Input-/output interface for power supply of sensors and actuators	NO
11	K	Interface for auxiliary supply output and auxiliary supply input	NO

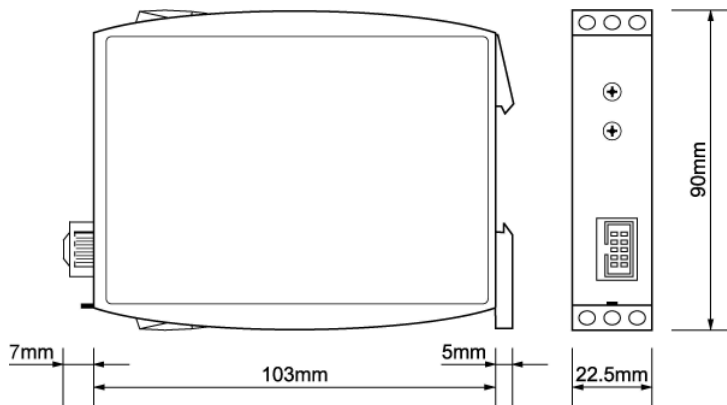
WatchDog pro gateways

Name	Type	Nb.	Terminals related to the circuits
Supply	K	11	24V, GND
Functional earth	H	9	
Local interface	Al	1	LI Box header; LI plug connector with ribbon cable
Fieldbus interface	Be	3	Fieldbus connector

3.1.10 Connections



3.1.11 Dimensions



3.1.12 Fieldbus cable

The type of the fieldbus cable and the length of the cable has to match the fieldbus specification. The shield of the cable have to be connected to the fieldbus master unit.

3.1.13 Inputs and outputs

The Fieldbus module reserves a defined memory area on the Fieldbus (maximal 1000 variables). Each existing measurement module reserves 15 variables of this memory area. The allocation between the measurement modules and the block of variables results from the WatchDog pro address adjusted on the different measurement modules. It must be pointed out, that only modules with an address less than 49 can be used and identified. The first 15 words in the memory area are reserved for the gateway itself.

3.1.14 Reset and settings

All changes and settings on the side of the Fieldbus or the WatchDog pro modules are not valid until power up.

3.1.15 Data of the gateway

All variables are designed for read and write accesses. When a write access is executed on a read only register, the write access is cancelled.

The assignment of the internal addresses in the gateway and the external Fieldbus addresses are dependent on which Fieldbus is used and is described in the particular chapters.

GATEWAY	
Int. Addr.	Meaning
0	Identifier
1	Version
2	Error bits
3	Number of detected modules
4	Error-ID
5	Reserved
6	Reserved
7	Reserved
8	Reserved
9	Reserved

10	Reserved
11	Reserved
12	Reserved
13	Reserved
14	Command word

Identifier:

The master identifier is 0xFF00.

Version:

Software version of the gateways

Error bits:

Bit	Error
15*	No WDp-module detected; connect modules and execute power-up
14*	Communication timeout with the measuring modules
13*	Reserved
12*	Reserved
11*	Reserved
10*	Reserved
9	Reserved
8	Reserved
7	Reserved
6	Reserved
5	Reserved
4	Reserved
3	Power supply to high
2	Power supply to low
1	DIP-Switches changed; execute power-up to adopt changes
0	reserved (slave module)

* Fatal error: LED illuminates; otherwise the LED flashes

Number of detected modules:

After each power up the internal bus scans for the number of modules that are connected. This word contains the number of identified modules.

Error-ID:

If the gateway cannot communicate with a connected module, the module address is copied to this word.

Command Word:

Write a defined value to achieve special instructions on the modules.

Command word	Meaning
0x0000 = 0	Normal operation
0x0005 = 5	Software reset
0x000A = 10	Safe state

Normal operation:

The measurement modules work normal, the measured values are read out and are available on the fieldbus.

Software reset:

With this command the measurement modules can be reset.

Safe State:

In this state all the measured values are frozen, the outputs are turned off and the communication to the modules is stopped. This state can only be cancelled when writing 0x0000 to the command word.

3.1.16 Measurement module data

Measurement module	
Int. address	Meaning
0 + Offs	Module identifier
1 + Offs	Module error
2 + Offs	Measured value 1
3 + Offs	Measured value 2
4 + Offs	Measured value 3
5 + Offs	Measured value 4
6 + Offs	Measured value 5
7 + Offs	Measured value 6
8 + Offs	Parameter 1
9 + Offs	Parameter 2
10 + Offs	Parameter 3
11 + Offs	Parameter 4
12 + Offs	Parameter 5
13 + Offs	Parameter 6
14 + Offs	Parameter 7

Offs Offset = WDP_Addr * 15

(WDP_Addr is the adjusted address of the measurement module on the front)

Module identifier:

In the upper Byte is the module group, in the lower byte is the adjusted module address.

Module error:

Bit	Error
15	Reserved
14	Reserved
13	Reserved
12	Reserved
11	Reserved
10	Reserved
9	Reserved
8	Reserved
7	Reserved
6	Reserved
5	Reserved
4	A module reset occurred
3	Internal fatal error
2	The address of the module has been changed
1	Power supply to low
0	Power supply to high

Measured values 1-6 and parameters 1-7:

The user data of the measurement modules are stored here.

If a module has more than 6 measured values, then the remaining values are added consecutively in the parameter area. The measured values are “raw values” in LSB and must be multiplied by their individual resolution.

3.1.17 Safety instructions

This installation instructions describe the WatchDog pro monitoring system’s devices.

These include:

- The gateway module,
- The expansion modules

The aspects relevant to assembly, cabling and operation are set out in this manual, which also contains additional explanations.

WatchDog pro may only be installed and operated by qualified engineers. Special training in electronics is required for installation and parameterizing. The local regulations, standards and work instructions must be observed. They are not, however, part of these installation instructions.

WatchDog pro may not be used to replace safety-relevant controls as demanded by IEC 61508, for instance, EMERGENCY-STOP crane or protective door controls.

WatchDog pro has been designed to be installed in a housing or a switch cabinet. Command and alarm lines must also be installed and enclosed when necessary in such a way so as to prevent users from coming into contact with them.

The following points must be observed before installation work may be commenced:

- Ensure that the system (including measuring and control circuits) is voltage-free
- Protect it from being switched back on again
- Confirm that the system is voltage-free
- Ensure that the system is earthed and short-circuited
- Neighbouring components that remain live must be covered or cordoned off.

The following assembly instructions must be observed for WatchDog pro:

Only staff qualified in accordance with EN 501101/2 (VDE 0105 Part 100) may intervene in this system.

Functional earthing (⚡) must be connected to the protective earth or potential equalization. This connection falls within the responsibility of the person setting the system up.

Connection and signal lines must installed in such a way that inductive and capacitive interspersions do not negatively affect the monitoring and control functions.

Automation engineering facilities and their control elements must be fitted in such a way that they may be protected against accidental operation.

In order to prevent cable or lead breakages on the signal side from causing undefined states in the WatchDog pro system, hardware and software precautions must be taken for the input / output wiring.

Ensure that the extra-low voltage output of the 24V power supply is safely electrically insulated. Only mains equipment that fulfils the requirements of IEC 60364-4-41 and VDE 0100 Part 410 (HD 384.4.41 S2) may be used.

The galvanic isolation between the interfaces and inputs and outputs may not be bridged. Fluctuations and differences in the mains voltage from the specified voltages may not exceed the

tolerance limits specified in the technical data. Otherwise, function failures and dangerous conditions cannot be excluded.

EMERGENCY-STOP facilities as required by IEC/EN 60204-1 must remain functional in all operating conditions. Releasing EMERGENCY-STOP systems may not restart the system.

Measures must be implemented to enable programs interrupted by voltage drops and power failures to restart properly. No dangerous conditions may occur during such events, even for short periods. EMERGENCY-STOPS should otherwise be forced.

External measures that ensure or enforce safe states during malfunctions or failures must be implemented in places where automation errors may result in injuries or damage (e.g. through independent limit switches, mechanical locks, etc.).

Expansion modules with damaged bus connection cables may not be taken into operation. The Central Unit's front panel or that of an expansion module may under no circumstances be removed. Terminals that are not used (no symbol on the front for the corresponding terminal) may not be wired up. The local interface's male header, the connector and the ribbon cable may never come into contact with electrically conducting components or liquids.

ASSEMBLY

WatchDog pro must be attached to a TS 35 profile rail in accordance with EN 60715 (DIN rail).

Always click the gateway module on the left while maintaining a distance (> 5 mm) to other modules. The expansion modules must be installed in rows on the right next to the gateway and connected via the bus connector to the gateway or the next module on the left. In the event that expansion modules possessing greater currents are used, a distance (> 5 mm) between the modules must be ensured (see corresponding module data sheet). Only connect or disconnect the modules when the power has been switched off (when the power supply and input / output circuits are voltage-free).

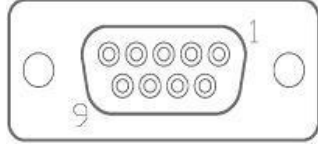
3.2 G2WDGW2 MB-RTU (2500550)

3.2.1 Fieldbus

Modbus-RTU Slave

3.2.2 Fieldbus connector

9-pole SUB-D connector (female)

Pin	Signal	 module view
1	GND	Ground
2	5V	5V output
3	PMC	Connect to Pin2 for RS232; don't connect for RS485
4	-	-
5	B	RS485 – B
6	-	-
7	Rx	RS232 – Data Receive
8	Tx	RS232 – Data Transmit
9	A	RS485 – A

3.2.3 Fieldbus address

Settings: 1-247 (0 => 1; >247 => 247)

3.2.4 Fieldbus communication

Settings: 0-9

Setting	Baud rate	Parity	Stop bit
0	2400	Even	1
1	4800	Even	1
2	9600	Even	1
3	19200	Even	1
4	38400	Even	1
5	2400	Odd	1
6	4800	Odd	1
7	9600	Odd	1
8	19200	Odd	1
9	38400	Odd	1

3.2.5 Fieldbus variables

The variables starts at address 528.

Modules →	GW	1	2	3	
Address #1	528	543	558	573	
Address #2	529	544	559	574	
Address #3	530	545	560	575	
Address #4	531	546	561	576	
Address #5	532	547	562	577	
Address #6	533	548	563	578	
Address #7	534	549	564	579	
Address #8	535	550	565	580	
Address #9	536	551	566	581	
Address #10	537	552	567	582	
Address #11	538	553	568	583	
Address #12	539	554	569	584	
Address #13	540	555	570	585	
Address #14	541	556	571	586	
Address #15	542	557	572	587	

Notice:

Only one Modbus register can be processed per Fieldbus access. This also applies to variables which reserve two registers (e.g. float).

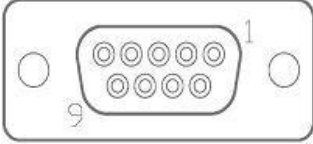
3.3 G2WDGW2 PB-DPV1 (2500551)

3.3.1 Fieldbus

Profibus DPV1 Slave

3.3.2 Fieldbus connector

9-pole SUB-D connector (female)

Pin	Signal	 module view
1	-	-
2	-	-
3	B	Positive RxD/TxD, RS485 level
4	RTS	Request to send
5	GND	Ground
6	+5V	+5V termination power
7	-	-
8	A	Negative RxD/TxD, RS485 level
9	-	-

3.3.3 Fieldbus address

Settings: 0-126 (>126 → 126)

3.3.4 Fieldbus communication

No settings required because the module supports Auto Baud Rate Detection.

Supported Baud rates [Baud]	
9,6k	500k
19,2k	1,5M
45,45k	3M
93,75k	6M
187,5k	12M

3.3.5 Fieldbus variables

All cyclic data can only be read cyclical. A write command is not possible. At all cyclic data a noncyclical access is possible too.

GATEWAY		PROFIBUS		
Int. address	Meaning	Slot	Index	Z / A*
0	Identifier	1	0	A
1	Version	1	1	A
2	Error bits	1	2	Z
3	Number of detected modules	1	3	Z
4	Error-ID	1	4	Z
5	Reserved	1	5	Z

6	Reserved	1	6	A
7	Reserved	1	7	A
8	Reserved	1	8	A
9	Reserved	1	9	A
10	Reserved	1	10	A
11	Reserved	1	11	A
12	Reserved	1	12	A
13	Reserved	1	13	A
14	Command word	1	14	A
Measurement module		PROFIBUS		
Int. address	Meaning	Slot	Index	Z / A*
0 + Offs	Module identifier	ID+1	0	A
1 + Offs	Module error	ID+1	1	A
2 + Offs	Measured value 1	ID+1	2	Z
3 + Offs	Measured value 2	ID+1	3	Z
4 + Offs	Measured value 3	ID+1	4	Z
5 + Offs	Measured value 4	ID+1	5	Z
6 + Offs	Measured value 5	ID+1	6	Z
7 + Offs	Measured value 6	ID+1	7	Z
8 + Offs	Parameter 1	ID+1	8	A
9 + Offs	Parameter 2	ID+1	9	A
10 + Offs	Parameter 3	ID+1	10	A
11 + Offs	Parameter 4	ID+1	11	A
12 + Offs	Parameter 5	ID+1	12	A
13 + Offs	Parameter 6	ID+1	13	A
14 + Offs	Parameter 7	ID+1	14	A

* Z ... cyclic (only readable); A ... acyclic

Offs Offset = WDP_Addr * 15

(WDP_Addr is the adjusted address of the measurement module on the front)

Measured value 1-6 und Parameter 1-7:

The user data of the measurement modules are stored here.

The measured values can be read cyclic. Since in cyclic mode only a read command is possible, write-commands have to be acyclic, but can then be read back cyclic again.

Notice:

For linking the module to the process control level (e.g. Siemens S7) a GSD-file is available.

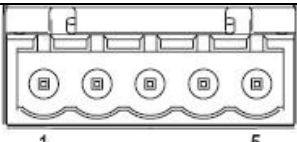
3.4 G2WDGW2 DEVNET (2500552) preliminary

3.4.1 Fieldbus

DeviceNet Slave

3.4.2 Fieldbus connector

Screw type terminal respectively DeviceNet connector

Pin	Signal	 module view
1	V-	Negative bus supply
2	CAN_L	CAN-bus low line
3	Shield	Shield
4	CAN_H	CAN-bus high line
5	V+	Positive bus supply

3.4.3 Fieldbus address

Settings: 0-63 (>63 → 63)

3.4.4 Fieldbus communication

Settings: 0-3 (>3 → 3)

Sett.	Baudrate
0	125kbps
1	250kbps
2	500kbps
3	Auto baud

3.4.5 Fieldbus variables

Cyclic and acyclic data has to be defined.

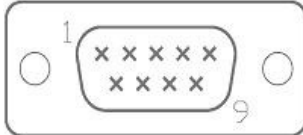
3.5 G2WDGW2 CANOP (2500553)

3.5.1 Fieldbus

CANopen Slave

3.5.2 Fieldbus connector

9-pole SUB-D connector (male)

Pin	Signal	 module view
1	-	-
2	CAN_L	CAN-bus low line
3	CAN_GND	Ground
4	-	-
5	CAN_SHIELD	Shield
6	-	-
7	CAN_H	CAN-bus high line
8	-	-
9	-	-

3.5.3 Fieldbus address

Settings: 1-127; 255 (128-254 are invalid and are interpreted as 255)

3.5.4 Fieldbus communication

Settings: 0-9

Setting	Baud rate
0	10kbps
1	20kbps
2	50kbps
3	100kbps
4	125kbps
5	250kbps
6	500kbps
7	800kbps
8	1Mbps
9	Autobaud

3.5.5 Fieldbus variables

The WatchDog pro variables of the measurement modules are located in the “Manufacturer Specific Object” starting with address 0x2001 (8193 dec). These WDp data are not map able and can only be accessed via a SDO command. Parts of the system area of the Fieldbus module can be mapped in the PDO area. If no PDO mapping in the master configuration is specified, then a default mapping is used. Then there are 4 TPDOs which are mapped to the Error Register (0x1001) and 4 RPDOs which are mapped to dummy addresses.

Modules →	GW	1	2	3	
Address #1	8193	8208	8223	8238	
Address #2	8194	8209	8224	8239	
Address #3	8195	8210	8225	8240	
Address #4	8196	8211	8226	8241	
Address #5	8197	8212	8227	8242	
Address #6	8198	8213	8228	8243	
Address #7	8199	8214	8229	8244	
Address #8	8200	8215	8230	8245	
Address #9	8201	8216	8231	8246	
Address #10	8202	8217	8232	8247	
Address #11	8203	8218	8233	8248	
Address #12	8204	8219	8234	8249	
Address #13	8205	8220	8235	8250	
Address #14	8206	8221	8236	8251	
Address #15	8207	8222	8237	8252	

Notice:

For linking the module to the process control level a ESD-file is available.

3.6 G2WDGW2 MB-TCP (2500560)

3.6.1 Fieldbus

Modbus-TCP Slave

3.6.2 Fieldbus connector

RJ45

3.6.3 Fieldbus address

IP address adjustable via a special software.

3.6.4 Fieldbus communication

10/100Mbit, full and half duplex

3.6.5 Fieldbus variables

See G2WDGW2 MB-RTU (2500550)

3.7 G2WDGW2 ENET/IP (2500561) preliminary

3.7.1 Fieldbus

EtherNet/IP Slave

3.7.2 Fieldbus connector

RJ45

3.7.3 Fieldbus address

IP address adjustable via a special software.

3.7.4 Fieldbus communication

10/100Mbit, full and half duplex

3.7.5 Fieldbus variables

The number of the variable is equivalent to the number of the CIP object.

The module comes with an embedded webserver over them all the variables can also be displayed and modified.

3.8 Module memory - overview

3.8.1 G2UI1 (1phase voltage)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	U1	Rd
3	U2	Rd
4	U3	Rd
5	reserved	-
6	reserved	-
7	reserved	-
8	reserved	-
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x0B, LOB = Addr.

Measurement range U _x	Raw data	Resolution
60 mV	0 – 200	0,3 mV
150 mV	0 – 200	0,75 mV
10 V	0 – 200	50 mV
30 V	0 – 200	150 mV
60 V	0 – 200	300 mV
300 V	0 – 200	1,5 V

3.8.2 G2PI1 400V (3phase voltage)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	Sequence Flag	Rd
3	U12	Rd
4	U23	Rd
5	U31	Rd
6	U1	Rd
7	U2	Rd
8	U3	Rd
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x09, LOB = Addr.

Measurement range	Raw data	Resolution
U1, U2, U3	0 - 185	1,25 V
U12,U23,U31	0 - 160	2,5 V

3.8.3 G2DI4 (Digital input)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	Inputs (Sync)	Rd
3	(Inputs hl)	-
4	(Inputs ll)	-
5	reserved	-
6	reserved	-
7	reserved	-
8	reserved	-
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x03, LOB = Addr.

Inputs	
Bit	Channel
0	DI1
1	DI2
2	DI3
3	DI4
4-15	reserved

3.8.4 G2DO4 (Digital output)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	Outputs	Wr
3	reserved	-
4	reserved	-
5	reserved	-
6	reserved	-
7	reserved	-
8	reserved	-
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x04, LOB = Addr.

Outputs	
Bit	Channel
0	DO1
1	DO2
2	DO3
3	DO4
4-15	reserved

3.8.5 G2II1 (1phase current)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	I1	Rd
3	I2	Rd
4	I3	Rd
5	reserved	-
6	reserved	-
7	reserved	-
8	reserved	-
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x0C, LOB = Addr.

Measurement range Ix	Raw value	Resolution
20 mA	0 – 200	0,1 mA
100 mA	0 – 200	0,5 mA
1 A	0 – 200	5 mA
5 A	0 – 200	25 mA
10 A	0 – 200	50 mA

3.8.6 G2JI1 5A (3phase current)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	I1	Rd
3	I2	Rd
4	I3	Rd
5	reserved	-
6	reserved	-
7	reserved	-
8	reserved	-
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x0A, LOB = Addr.

Measurement range	Raw value	Resolution
5 A	0 - 200	25 mA

3.8.7 G2BI1 (True power)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	True power P	Rd
3	Current (average) I	Rd
4	I=0 flag	Rd
5	Channel number	Wr
6	reserved	-
7	reserved	-
8	reserved	-
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x0E, LOB = Addr.

Measurement range	Raw values	Resolution
P: 0,6 kW	0 – 1000	0,6 W
P: 1,2 kW	0 – 1000	1,2 W
I: 6 A	0 – 200	30 mA
P: 2,4 kW	0 – 1000	2,4 W
P: 4,8 kW	0 – 1000	4,8 W
I: 12 A	0 – 200	60 mA

Channel number	Measurement range
0 (Write)	0,6 kW (6A)
1 (Write)	1,2 kW (6A)
2 (Write)	2,4 kW (12A)
3 (Write)	4,8 kW (12A)

3.8.8 G2TI1 (Temperature)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	Flag temp. invalid	Rd
3	Temperature T	Rd
4	reserved	-
5	reserved	-
6	reserved	-
7	reserved	-
8	reserved	-
9	reserved	-
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-

* HOB = 0x08, LOB = ID

Measurement range T	Raw value	Resolution
-50...+200 °C	0 – 250	1 °C

3.8.9 G2AM4 (Analog input/output)

Measurement range	Raw value	Resolution
U: 30 V	0 - 30000	1 mV
I: 30 mA	0 - 30000	1 uA

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Modul error	Rd
2	Flags	Rd
3	Output U	Rd
4	Output I	Rd
5	Input1 U	Rd
6	Input1 I	Rd
7	Input2 U	Rd
8	Input2 I	Rd
9	Configuration	Wr
10	Desired value Output U	Wr
11	Desired value Output I	Wr
12	reserved	-
13	reserved	-
14	reserviert	-

Bit	Flags
0-7	reserved
8	Output error
9	Initialisation error
10-15	reserved

Bit	Configuration
0	Input1 digital
1	Input1 mode
2-3	reserved
4	Input2 digital
5	Input2 mode
6-7	reserved
8	Output power supply
9	Output mode
10-14	reserved
15	Save state

In Mode	In Digital	Input description
0	0	Analog input 10V (max. 12V)
0	1	Digital input PNP, pull-down active (max. up to 30V)
1	0	Analog input 24V
1	1	Digital input NPN, pull-up active

Out Mode	Out Supply	Output description	Error	Reason
0	0	Analog output voltage (max. 10V / 22mA)	1	Short-circuit
0	1	Power supply fixed to 12V (max. 30mA)	1	Output current to high
1	0	Analog output current (max. 22mA / 10V)	1	Open loop
1	1	Power supply fixed to 24V (max 30mA)	1	Output current to high

3.8.10 G2CI1 (Cos Phi)

Addr	Meaning	Rd/Wr
0	Module identifier *	Rd
1	Module error	Rd
2	True power P	Rd
3	Apparent power S	Rd
4	Cos Phi	Rd
5	Current (true rms) I	Rd
6	Voltage (true rms) U	Rd
7	Flags	Rd
8	Reactive power Q	Rd
9	Channel number	Wr
10	reserved	-
11	reserved	-
12	reserved	-
13	reserved	-
14	reserved	-
14	reserved	-

* HOB = 0x06, LOB = Addr.

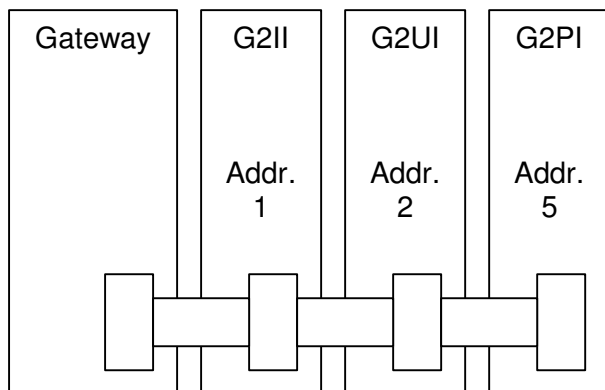
Measurement range	Raw value	Resolution
P: 1,2 kW	-2000..+2000	1,2 W
S: 1,2 kW	0..+2000	1,2 W
Q: 1,2 kW	-2000..+2000	1,2 W
I: 6 A	0 – 1000	6 mA
P: 4,8 kW	-2000..+2000	4,8 W
S: 4,8 kW	0..+2000	4,8 W
Q: 4,8kW	-2000..+2000	4,8 W
I: 12 A	0 – 1000	12 mA
Cos phi	-1000..+1000	0,001
U: 250V	0 – 2000	125 mV

Channel number	Measurement range
0 (Write)	1,2 kW (6A)
1 (Write)	4,8 kW (12A)

Bit	Flags
0	inductive / capacitive
1	Current-0 detection

3.9 Example for a gateway system

3.9.1 Equipment



Modbus RTU slave

3.9.2 Data of the measurement modules

The memory map of the measurement modules to the internal memory of the gateway can be found in Module memory - overview.

	G2WDGW2	G2II1	G2UI1	G2PI1
Internal	Meaning	Meaning	Meaning	Meaning
0	Identifier	Module identifier	Module identifier	Module identifier
1	Version	Module error	Module error	Module error
2	Error bits	I1	U1	Phase sequence flag
3	Number of det. modules	I2	U2	U12
4	Error-ID	I3	U3	U23
5	Reserved	Reserved	Reserved	U31
6	Reserved	Reserved	Reserved	U1
7	Reserved	Reserved	Reserved	U2
8	Reserved	Reserved	Reserved	U3
9	Reserved	Reserved	Reserved	Reserved
10	Reserved	Reserved	Reserved	Reserved
11	Reserved	Reserved	Reserved	Reserved
12	Reserved	Reserved	Reserved	Reserved
13	Reserved	Reserved	Reserved	Reserved
14	Command word	Reserved	Reserved	Reserved

3.9.3 Fieldbus variables

Module / Addr.	Meaning	Int. Addr.	MB-RTU Register	PB-DPV1		
				Slot	Ind	a/c*
G2WDGW / 0	Identifier	0	528	1	0	a
	Version	1	529	1	1	a
	Error bits	2	530	1	2	c
	Number of det. modules	3	531	1	3	c
	Error-ID	4	532	1	4	c
	Reserved	5	533	1	5	c
						
	Reserved	13	541	1	13	a
	Command word	14	542	1	14	a
G2II / 1	Module identifier	15	543	2	0	a
	Module error	16	544	2	1	a
	I1	17	545	2	2	c
	I2	18	546	2	3	c
	I3	19	547	2	4	c
	Reserved	20	548	2	5	c
						
	Reserved	29	557	2	14	a
G2UI / 2	Module identifier	30	558	3	0	a
	Module error	31	559	3	1	a
	U1	32	560	3	2	c
	U2	33	561	3	3	c
	U3	34	562	3	4	c
	Reserved	35	563	3	5	c
						
	Reserved	44	572	3	14	a
Addr. 3 not assigned	xxx	45	573	4	0	a
						
	xxx	59	587	4	14	a
Addr. 4 not assigned	xxx	60	588	5	0	a
						
	xxx	74	602	5	14	a
G2PI / 5	Module identifier	75	603	6	0	a
	Module error	76	604	6	1	a
	Phase sequence flag	77	605	6	2	c
	U12	78	606	6	3	c
	U23	79	607	6	4	c
	U31	80	608	6	5	c
	U1	81	609	6	6	c
	U2	82	610	6	7	c
	U3	83	611	6	8	a
	Reserved	84	612	6	9	a
	Reserved	85	613	6	10	a
	Reserved	86	614	6	11	a
	Reserved	87	615	6	12	a
	Reserved	88	616	6	13	a
	Reserved	89	617	6	14	a
Addr. 6 not assigned	xxx	90	618	7	0	a
						
	xxx	104	632	7	14	a

* a = acyclic, c = cyclic reading

4 History

15.05.2007	Creation
28.05.2009	Major updates; added electrical characteristics
28.02.2009	Changes in the module memory