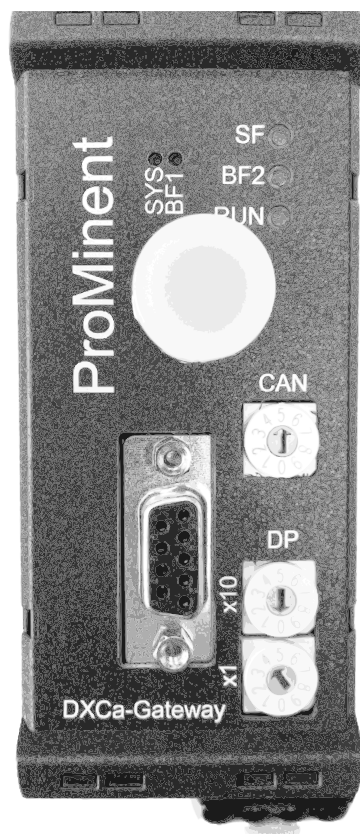


Installation and configuration manual

DXCa Modbus RTU – CAN Gateway

V1.2



A1241

These operating instructions are only valid in conjunction with the complete operating instructions DULCOMARIN® II

Please carefully read these operating instructions before use! · Do not discard!
The operator shall be liable for any damage caused by installation or operating errors!
Technical changes reserved.

General non-discriminatory approach

In order to make it easier to read, this document uses the male form in grammatical structures but with an implied neutral sense. It is aimed equally at both men and women. We kindly ask female readers for their understanding in this simplification of the text.

Supplementary information

Please read the supplementary information in its entirety.

The following are highlighted separately in the document:

- Enumerated lists
- Instructions
 - ⇒ Outcome of the instructions

Information



This provides important information relating to the correct operation of the device or is intended to make your work easier.

Safety information

The safety information includes detailed descriptions of the hazardous situation.

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1 Introduction



The document is aimed at programmers and personnel who are involved with planning and commissioning.

This document contains a description of the DXCa-Modbus RTU-CAN gateway for communication with the DULCOMARIN® II. The document should also assist in commissioning the DXCa-Modbus RTU-CAN gateway. Alongside the description of the hardware and software components, this document also contains a typical project created using the development environment [Step 7] from Siemens. The document is aimed at programmers and personnel who are involved with planning and commissioning.

This software manual is only valid in combination with the DXCa gateway described in this document. The DXCa-Gateway may only be used with DULCOMARIN® II. The content of this document has been checked for agreement with the described hardware and software. Nevertheless deviations cannot be excluded. Complete agreement can therefore not be guaranteed.

Revision history

Revision	Date	Name	Chapter	Revision
1	22/04/2013	FR	All	Document created.
1.1	21/06/2013	FR	5	Tables updated with register addresses and remarks.
1.2	07/02/2014	FR	5.2.4 5.2.5 5.2.6	Table title repeated on following pages. Column "Address (hex.);" inserted.
	07/02/2014	FF	4.38.1	Miscellaneous images updated.

Reference to hardware, software and firmware

Hardware

Device	Revision
DXCa-Modbus RTU-CAN-Gateway	2.3
DULCOMARIN® II	001

Software

Software	Version
HERMES flasher	1

Firmware

Firmware	Firmware version	For the hardware
Gateway firmware	1	DXCa-Modbus-Gateway
Firmware DULCOMARIN® II	From 3022	DULCOMARIN® II

1.1 Technical data

Properties Modbus-RS485 interface

Description	Parameter
Baud rate	2400 Baud 9600 Baud 19200 Baud 57600 Baud 115200 Baud
Interface type	Potential-free RS-485 interface
Connector	D-sub port, 9 pin
Function codes	FC3, FC6, FC8 (only sub-function code 0)

Characteristic data DXCa gateway

Description	Parameter
Power supply	24V DC
Typical power consumption	approx. 500 mA
Max. number of measured values	116
Weight	250 grams
Dimensions (L x W x H)	117.2 x 45 x 113.5 (mm)
ROHS	yes
CE mark	yes
IP rating	IP20

2 Safety



This document plus all accompanying texts were written for use by briefed and trained specialist personnel. When using this product, all safety instructions plus the applicable regulations must be observed. The user must ensure adherence to the legal conditions.

Intended use

The DXCa-Gateway described in this document represents a MODBUS based interface to the DULCOMARIN® II made by ProMinent®. The DXCa-Gateway may only be operated in conjunction with the named device and as described in this document. The DXCa gateway was designed solely to create a connection between the MODBUS master and the DULCOMARIN® II.

Incorrect use

It is strictly forbidden to use the DXCa gateway in the following areas:

- for military purposes or in weapons systems
- for the design, construction, maintenance or operation of nuclear plants
- in flight safety systems, air traffic or flight communications systems
- in life support systems
- in systems in which incorrect functioning of the gateway could result in physical injuries or fatal injuries.

You are advised that the DXCa gateway was not created for use in dangerous environments, that require fail-safe control mechanisms. The use of the DXCa gateway in such an environment is at your own risk, any liability for damage or losses arising from impermissible use is excluded.

2.1 Duty to read the user manual

Before the installation and use of the DXCa gateway described in this document, you must read and understand all instructions to avoid damage.

2.2 Exclusion of plausibility checking of the setpoints

At this point it is expressly pointed out that the DXCa MODBUS CAN gateway does not carry out any plausibility testing of the fed-through parameters and setpoints.

Checking, alarming or correction of these setpoints does not take place and is also technically not provided for. In systems, in which incorrect operation or incorrect setpoint specifications may under certain circumstances cause damage, the responsibility is that of the operator, this applies particularly where there is a risk of impairment to health.

The user/operator must therefore ensure that they personally are adhering to critical parameters by carrying out regular, manual control measurements.

2.3 Explanation of the safety information

Introduction

These operating instructions provide information on the technical data and functions of the product. These operating instructions provide detailed safety information and are provided as clear step-by-step instructions.

The safety information and notes are categorised according to the following scheme. A number of different symbols are used to denote different situations. The symbols shown here serve only as examples.



DANGER!

Nature and source of the danger

Consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger

Danger!

- Denotes an immediate threatening danger. If this is disregarded, it will result in fatal or very serious injuries.



WARNING!

Nature and source of the danger

Possible consequence: Fatal or very serious injuries.

Measure to be taken to avoid this danger

Warning!

- Denotes a possibly hazardous situation. If this is disregarded, it could result in fatal or very serious injuries.



CAUTION!

Nature and source of the danger

Possible consequence: Slight or minor injuries, material damage.

Measure to be taken to avoid this danger

Caution!

- Denotes a possibly hazardous situation. If this is disregarded, it could result in slight or minor injuries. May also be used as a warning about material damage.



NOTICE!

Nature and source of the danger

Damage to the product or its surroundings

Measure to be taken to avoid this danger

Note!

- Denotes a possibly damaging situation. If this is disregarded, the product or an object in its vicinity could be damaged.



Type of information

Hints on use and additional information

Source of the information, additional measures

Information!

- *Denotes hints on use and other useful information. It does not indicate a hazardous or damaging situation.*

2.4 Users' Qualifications



WARNING!

Danger of injury with inadequately qualified personnel

If inadequately qualified personnel work on the unit or loiter in the hazard zone of the unit, this could result in dangers that could cause serious injuries and material damage.

- All work on the unit should therefore only be conducted by qualified personnel.
- Unqualified personnel should be kept away from the hazard zone.

Training	Definition
instructed personnel	An instructed person is deemed to be a person who has been instructed and, if required, trained in the tasks assigned to him/her and possible dangers that could result from improper behaviour, as well as having been instructed in the required protective equipment and protective measures.
Trained user	A trained user is a person who fulfills the requirements made of an instructed person and who has also received additional training specific to the system from ProMinent or another authorised distribution partner.
Technical experts	A technical expert is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her technical training and experience, as well as knowledge of pertinent regulations.

Training	Definition
Trained qualified personnel	A qualified employee is deemed to be a person who is able to assess the tasks assigned to him and recognize possible hazards based on his/her training, knowledge and experience, as well as knowledge of pertinent regulations. The assessment of a person's technical training can also be based on several years of work in the relevant field.
Electrician	<p>Electricians are deemed to be people, who are able to complete work on electrical systems and recognize and avoid possible hazards independently based on their technical training and experience, as well as knowledge of pertinent standards and regulations.</p> <p>Electricians should be specifically trained for the working environment in which they are employed and know the relevant standards and regulations.</p> <p>Electricians must comply with the provisions of the applicable statutory directives on accident prevention.</p>
Customer service department	Customer Service department refers to service technicians, who have received proven training and have been authorised by ProMinent to work on the system.

i ***Note for the system operator***
The pertinent accident prevention regulations, as well as all other generally acknowledged safety regulations, must be adhered to!

3 Commissioning

During commissioning of the DXCa gateway, please proceed as follows:

1. ➤ Fit the DXCa gateway on a standard top hat rail
2. ➤ Provide the 24V DC power supply
3. ➤ Connect the DXCa gateway to the DULCOMARIN® II using a CAN M12 connection cable.
4. ➤ Connect the DXCa gateway to the PLC
5. ➤ Set the desired addresses for the CAN bus and MODBUS.
6. ➤ Create a configuration and load the programme in the PLC memory.

3.1 Connectors/fitting

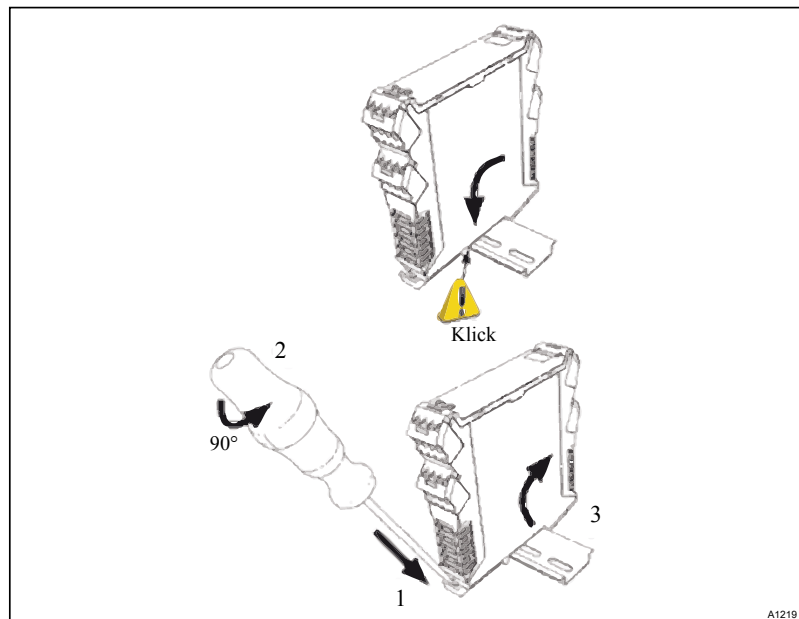
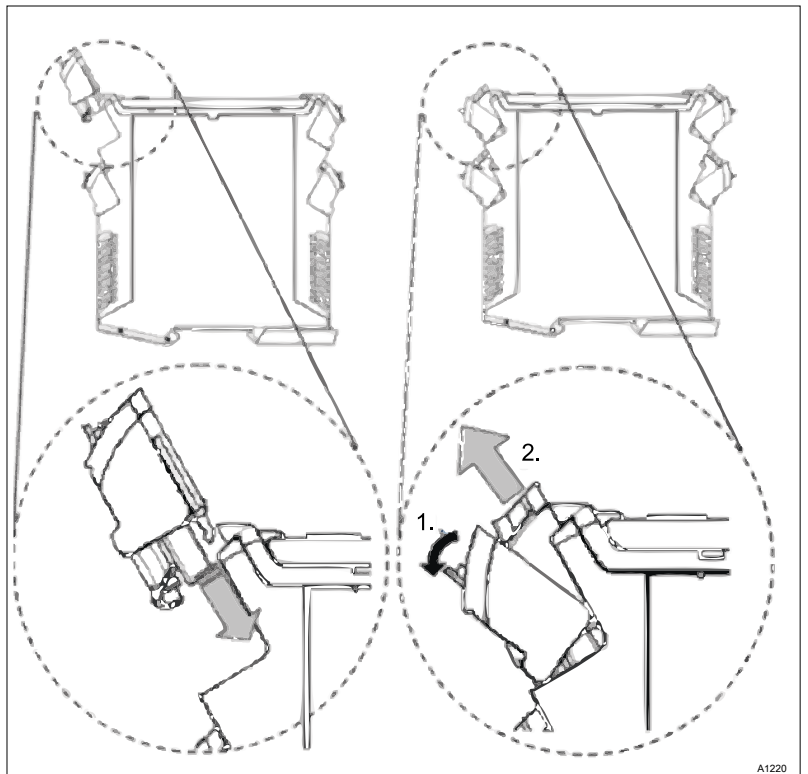


Fig. 1: The DXCa gateway is designed for assembly on standard top hat rail configurations (e.g. DIN EN 60715, steel, 2000 mm, galvanized)



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Fig. 2: Fitting / removal of the connector plug (detailed view)

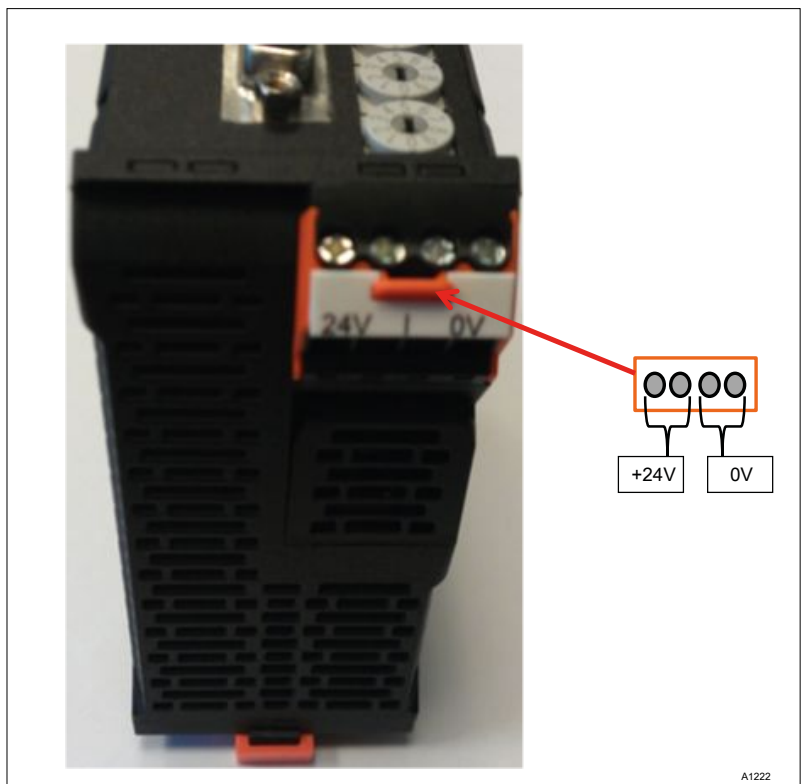


A1220

Fig. 3: Fitting / removal of the connector plug

Power supply

The DXCa gateway has two connection terminals for +24 V and 0 V (jumpered on the circuit board).



A1222

Fig. 4: Front view of DXCa gateway (power supply)

3.2 Installation, electrical

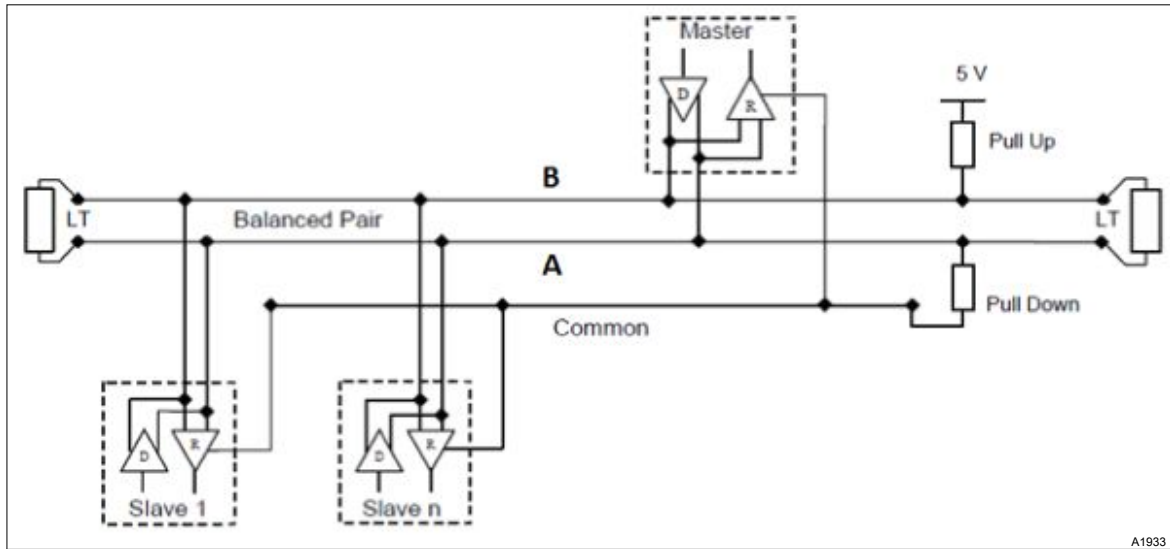


Fig. 5: Cabling of the electrical components

The figure shows the cabling of the DXCa Modbus RTU gateway with a master (e.g. PLC). When connecting a master ensure that you insert a terminating resistance on each of the end devices in the bus segment. The DXCa gateway has a switch via which you can switch the terminating resistance on and off.

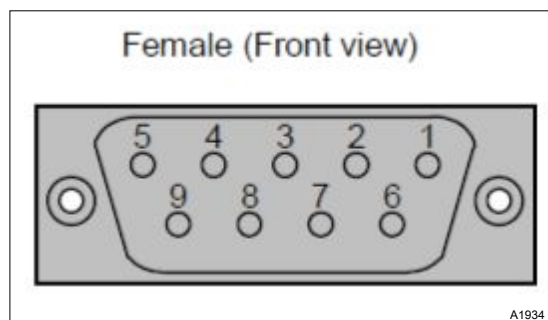


Fig. 6: Plug pin assignments (source: Modbus.org)

Plug pin assignments (source: Modbus.org)

Pin	Name	Description
5	B	Transceiver terminal 1
9	A	Transceiver terminal 0
1	Common	Signal and power supply common (earth)

4 Modbus RTU data model

4.1 Function codes

The DXCa Modbus RTU gateway supports the following function codes:

Function code	Name	Description
3	<i>[Read holding register]</i>	Up to 125 registers can be read with this function code.
6	<i>[Write single register]</i>	A maximum of one register can be written using this function code.
8	<i>[Diagnostic (return query data)]</i>	This function code only supports the sub-function code 0. With function code 8 and sub-function code 0, the received frame is checked for CRC errors and then returned to the sender.

4.1.1 Function code 3 – *[Read Holding Register]*

Up to 125 registers can be read with this function code.

FC 3 - request

Slave address	1 byte	1 – 99
Function code	1 byte	0x03
Start address	2 byte	0x0000 – 0xFFFF
Number of registers	2 byte	1 – 125 (7D)
CRC sum	2 byte	0x0000 – 0xFFFF

FC 3 - response

Slave address	1 byte	1 – 99
Function code	1 byte	0x03
Number of bytes	1 byte	2 x N*
Register values	N* x 2 byte	
CRC sum	2 byte	0x0000 – 0xFFFF
*N = number of registers		

FC 3 - error

Slave address	1 byte	1 – 99
Function code	1 byte	0x83
Exception code	1 byte	01, 02, 03 or 04
CRC sum	2 byte	0x0000 – 0xFFFF

Example: read 4 registers (2000 to 2003) from the slave with address 1. The register values and the CRC sum serve purely as an example for depiction of the frame and may deviate.

FC 3 - example

Request		Response	
Name	Value (hex)	Name	Value (hex)
Slave address	0x01	Slave address	0x01
Function code	0x03	Function code	0x03
Start address (high)	0x07	Number of bytes	0x08
Start address (low)	0xd0	Register value 1 (high) - register 0x2000	0x00
Number of registers (high)	0x00	Register value 1 (low) - register 0x2000	0x00
Number of registers (low)	0x04	Register value 2 (high) - register 0x2001	0x00
CRC (high)	0x44	Register value 2 (low) - register 0x2001	0x00
CRC (low)	0x84	Register value 3 (high) - register 0x2002	0x00
		Register value 3 (low) - register 0x2002	0x00
		Register value 4 (high) - register 0x2003	0x00
		Register value 4 (low) - register 0x2003	0x00
		CRC (high)	0x95
		CRC (low)	0xd7

4.1.2 Function code 6 – Write Single Register

You can write a maximum of one register using this function code.

FC 6 - request

Slave address	1 byte	1 – 99
Function code	1 byte	0x06
Register address	2 byte	0x0000 – 0xFFFF
Register value	2 byte	0x0000 – 0xFFFF
CRC sum	2 byte	0x0000 – 0xFFFF

FC 6 - response

Slave address	1 byte	1 – 99
Function code	1 byte	0x06
Register address	2 byte	0x0000 – 0xFFFF
Register value	2 byte	0x0000 – 0xFFFF
CRC sum	2 byte	0x0000 – 0xFFFF

FC 6 - error

Slave address	1 byte	1 – 99
Function code	1 byte	0x86
Exception code	1 byte	01, 02, 03 or 04
CRC sum	2 byte	0x0000 – 0xFFFF

Example: write 1 register (3004) to the slave with address 1. The register values and the CRC sum serve purely as an example for depiction of the frame and may deviate.

FC 6 - example

Request		Response	
Name	Value (hex)	Name	Value (hex)
Slave address	0x01	Slave address	0x01
Function code	0x06	Function code	0x06
Register address (high)	0x0B	Register address (high)	0x0B
Register address (low)	0xBC	Register address (low)	0xBC
Register value (high)	0x00	Register value 1 (low) - register 0x3004	0x00
Register value (low)	0x70	Register value 2 (high) - register 0x3004	0x70
CRC (high)	0x4B	CRC (high)	0x4B
CRC (low)	0xEE	CRC (low)	0xEE

4.1.3 Function code 8 - diagnostics

This function code only supports the sub-function code 0. With function code 8 and sub-function code 0, the received frame is checked for CRC errors and then returned to the sender.

FC 8 – request

Slave address	1 byte	1 – 99
Function code	1 byte	0x08
Sub-function code	2 byte	0x00
Data	N* x 2 byte	0x0000 – 0xFFFF
CRC sum	2 byte	0x0000 – 0xFFFF

*N = number of data

FC 8 – response

Slave address	1 byte	1 – 99
Function code	1 byte	0x08
Sub-function code	2 byte	0x00

Data	N* x 2 byte	0x0000 – 0xFFFF
CRC sum	2 byte	0x0000 – 0xFFFF

FC 8 – error

Slave address	1 byte	1 – 99
Function code	1 byte	0x88
Exception code	1 byte	01, 03 or 04
CRC sum	2 byte	0x0000 – 0xFFFF

Example: The register values and the CRC sum serve purely as an example for depiction of the frame and may deviate.

FC 6 - example

Request		Response	
Name	Value (hex)	Name	Value (hex)
Slave address	0x01	Slave address	0x01
Function code	0x08	Function code	0x08
Sub-function code (high)	0x00	Sub-function code (high)	0x00
Sub-function code (low)	0x00	Sub-function code (low)	0x00
Data 1	0x01	Data 1	0x01
Data 2	0x02	Data 2	0x02
CRC (high)	0x60	CRC (high)	0x60
CRC (low)	0x5a	CRC (low)	0x5a

4.1.4 [Modbus exception responses - exception codes]

The [exception codes] listed in the previous chapters are interpreted as follows:

Code	Name	Meaning
1	Incorrect function code	The received frame contains a function code that is not supported by the DXCa Modbus gateway.
2	Incorrect register address	The register address in the received frame is invalid.
3	Incorrect register value (data)	The user data transmitted in the frame are invalid for the register to be described.
4	Service device error	A non-correctable error has occurred during processing of the query.

4.2 The register range (system image)

The register range of the DXCa Modbus gateway is the central range through which the interfaces are connected with each other. The register range has a defined structure and is sub-divided into various data ranges.

		Register range		
CAN-Dulcomarin II	0	System information (read only)	MODBUS RTU MASTER	
	99			
	100	System configuration (write only)		
	199			
	200			
	999	free		
	1000	Input data (from Modbus RTU to the gateway). Not allocated (reserve) (write only)		
	1999			
	2000			Output data (from the gateway to the Modbus RTU master) (read only)
	2999			
	3000			
	3999			
	4000	Acyclic output data (read only) This range can only be read every 4 seconds. If a faster cycle is used, an error telegram with exception code 4 is sent.		

		Register range	
	4999		

The Modbus RTU master can read and write to the various registers via the Modbus RTU functions.

4.2.1 The system information block

The DXCa Modbus RTU gateway makes various system information available and this is displayed in the following table.

System information block

Address	Register	Description	Data type	Access	Explanation
0	1	Software version	UINT16	RO	Version of the loaded microcontroller firmware.
1	2	Hardware version	UINT16	RO	Hardware revision of the gateway
2	3	Continuous counter	UINT16	RO	Counts from 0 - 65536, used to detect whether the gateway is still working.
3	4	CAN-ID	UINT16	RO	Indicates the CAN BUS ID of the gateway.
4	5	Error code	UINT16	RO	Display of various errors. 0 = no error 4 = CAN is stopped 5 = CAN is operational 127 = CAN is pre-operational
5	6	Number of pools	UINT16	RO	The number of pools
6...	7...	Reserve			
...99	...100	Reserve			

4.2.2 The system configuration block

The system configuration block is not currently used and serves as a reserve.

System configuration block

Address	Register	Description	Data type	Access	Explanation
100...	101...	Reserve			
...199	...200	Reserve			

4.2.3 Input data block – register 1000

The input data block is not currently used and serves as a reserve.

Input data block

Address	Register	Description	Data type	Access	Explanation
1000...	1001...	Reserve			
...1999	...2000	Reserve			

4.2.4 Output data block – register 2000

The output data block contains the data for the actual and control values as well as for the error messages of the individual pools. These data can be read using Modbus function 3 'Read holding register'.

**Note:**

Please note that the various programmes for reading the measured values differentiate between the Modbus address and Modbus register. Modbus register 2001 is located at Modbus address 2000.

Output data

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2000	7D0	2001	pH actual value pool	1	INT16	RO
2001	7D1	2002	pH control value pool	1	INT16	RO
2002	7D2	2003	ORP actual value pool	1	INT16	RO
2003	7D3	2004	ORP control value pool	1	INT16	RO
2004	7D4	2005	Temperature actual value pool	1	INT16	RO
2005	7D5	2006	Temperature control value pool	1	INT16	RO
2006	7D6	2007	Channel 4 actual value pool	1	INT16	RO
2007	7D7	2008	Channel 4 control value pool	1	INT16	RO
2008	7D8	2009	Channel 5 actual value pool	1	INT16	RO
2009	7D9	2010	Channel 5 control value pool	1	INT16	RO
2010	7DA	2011	Channel 6 actual value pool	1	INT16	RO
2011	7DB	2012	Channel 6 control value pool	1	INT16	RO
2012	7DC	2013	Channel 7 actual value pool	1	INT16	RO
2013	7DD	2014	Channel 7 control value pool	1	INT16	RO
2014	7DE	2015	Channel 8 actual value pool	1	INT16	RO
2015	7DF	2016	Channel 8 control value pool	1	INT16	RO
2016	7E0	2017	Channel 9 actual value pool	1	INT16	RO
2017	7E1	2018	Channel 9 control value pool	1	INT16	RO
2018	7E2	2019	Channel 10 actual value pool	1	INT16	RO
2019	7E3	2020	Channel 10 control value pool	1	INT16	RO

Modbus RTU data model

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2020	7E4	2021	Channel 11 actual value pool	1	INT16	RO
2021	7E5	2022	Channel 11 control value pool	1	INT16	RO
2022	7E6	2023	Error pool	1	INT32	RO
2023	7E7	2024				
2024	7E8	2025	pH actual value pool	2	INT16	RO
2025	7E9	2026	pH control value pool	2	INT16	RO
2026	7EA	2027	ORP actual value pool	2	INT16	RO
2027	7EB	2028	ORP control value pool	2	INT16	RO
2028	7EC	2029	Temperature actual value pool	2	INT16	RO
2029	7ED	2030	Temperature control value pool	2	INT16	RO
2030	7EE	2031	Channel 4 actual value pool	2	INT16	RO
2031	7EF	2032	Channel 4 control value pool	2	INT16	RO
2032	7F0	2033	Channel 5 actual value pool	2	INT16	RO
2033	7F1	2034	Channel 5 control value pool	2	INT16	RO
2034	7F2	2035	Channel 6 actual value pool	2	INT16	RO
2035	7F3	2036	Channel 6 control value pool	2	INT16	RO
2036	7F4	2037	Channel 7 actual value pool	2	INT16	RO
2037	7F5	2038	Channel 7 control value pool	2	INT16	RO
2038	7F6	2039	Channel 8 actual value pool	2	INT16	RO
2039	7F7	2040	Channel 8 control value pool	2	INT16	RO
2040	7F8	2041	Channel 9 actual value pool	2	INT16	RO
2041	7F9	2042	Channel 9 control value pool	2	INT16	RO
2042	7FA	2043	Channel 10 actual value pool	2	INT16	RO
2043	7FB	2044	Channel 10 control value pool	2	INT16	RO
2044	7FC	2045	Channel 11 actual value pool	2	INT16	RO
2045	7FD	2046	Channel 11 control value pool	2	INT16	RO
2046	7FE	2047	Error pool	2	INT32	RO
2047	7FF	2048				
2048	800	2049	pH actual value pool	3	INT16	RO
2049	801	2050	pH control value pool	3	INT16	RO
2050	802	2051	ORP actual value pool	3	INT16	RO
2051	803	2052	ORP control value pool	3	INT16	RO
2052	804	2053	Temperature actual value pool	3	INT16	RO
2053	805	2054	Temperature control value pool	3	INT16	RO
2054	806	2055	Channel 4 actual value pool	3	INT16	RO
2055	807	2056	Channel 4 control value pool	3	INT16	RO
2056	808	2057	Channel 5 actual value pool	3	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2057	809	2058	Channel 5 control value pool	3	INT16	RO
2058	80A	2059	Channel 6 actual value pool	3	INT16	RO
2059	80B	2060	Channel 6 control value pool	3	INT16	RO
2060	80C	2061	Channel 7 actual value pool	3	INT16	RO
2061	80D	2062	Channel 7 control value pool	3	INT16	RO
2062	80E	2063	Channel 8 actual value pool	3	INT16	RO
2063	80F	2064	Channel 8 control value pool	3	INT16	RO
2064	810	2065	Channel 9 actual value pool	3	INT16	RO
2065	811	2066	Channel 9 control value pool	3	INT16	RO
2066	812	2067	Channel 10 actual value pool	3	INT16	RO
2067	813	2068	Channel 10 control value pool	3	INT16	RO
2068	814	2069	Channel 11 actual value pool	3	INT16	RO
2069	815	2070	Channel 11 control value pool	3	INT16	RO
2070	816	2071	Error pool	3	INT32	RO
2071	817	2072				
2072	818	2073	pH actual value pool	4	INT16	RO
2073	819	2074	pH control value pool	4	INT16	RO
2074	81A	2075	ORP actual value pool	4	INT16	RO
2075	81B	2076	ORP control value pool	4	INT16	RO
2076	81C	2077	Temperature actual value pool	4	INT16	RO
2077	81D	2078	Temperature control value pool	4	INT16	RO
2078	81E	2079	Channel 4 actual value pool	4	INT16	RO
2079	81F	2080	Channel 4 control value pool	4	INT16	RO
2080	820	2081	Channel 5 actual value pool	4	INT16	RO
2081	821	2082	Channel 5 control value pool	4	INT16	RO
2082	822	2083	Channel 6 actual value pool	4	INT16	RO
2083	823	2084	Channel 6 control value pool	4	INT16	RO
2084	824	2085	Channel 7 actual value pool	4	INT16	RO
2085	825	2086	Channel 7 control value pool	4	INT16	RO
2086	826	2087	Channel 8 actual value pool	4	INT16	RO
2087	827	2088	Channel 8 control value pool	4	INT16	RO
2088	828	2089	Channel 9 actual value pool	4	INT16	RO
2089	829	2090	Channel 9 control value pool	4	INT16	RO
2090	82A	2091	Channel 10 actual value pool	4	INT16	RO
2091	82B	2092	Channel 10 control value pool	4	INT16	RO
2092	82C	2093	Channel 11 actual value pool	4	INT16	RO
2093	82D	2094	Channel 11 control value pool	4	INT16	RO

Modbus RTU data model

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2094	82E	2095	Error pool	4	INT32	RO
2095	82F	2096				
2096	830	2097	pH actual value pool	5	INT16	RO
2097	831	2098	pH control value pool	5	INT16	RO
2098	832	2099	ORP actual value pool	5	INT16	RO
2099	833	2100	ORP control value pool	5	INT16	RO
2100	834	2101	Temperature actual value pool	5	INT16	RO
2101	835	2102	Temperature control value pool	5	INT16	RO
2102	836	2103	Channel 4 actual value pool	5	INT16	RO
2103	837	2104	Channel 4 control value pool	5	INT16	RO
2104	838	2105	Channel 5 actual value pool	5	INT16	RO
2105	839	2106	Channel 5 control value pool	5	INT16	RO
2106	83A	2107	Channel 6 actual value pool	5	INT16	RO
2107	83B	2108	Channel 6 control value pool	5	INT16	RO
2108	83C	2109	Channel 7 actual value pool	5	INT16	RO
2109	83D	2110	Channel 7 control value pool	5	INT16	RO
2110	83E	2111	Channel 8 actual value pool	5	INT16	RO
2111	83F	2112	Channel 8 control value pool	5	INT16	RO
2112	840	2113	Channel 9 actual value pool	5	INT16	RO
2113	841	2114	Channel 9 control value pool	5	INT16	RO
2114	842	2115	Channel 10 actual value pool	5	INT16	RO
2115	843	2116	Channel 10 control value pool	5	INT16	RO
2116	844	2117	Channel 11 actual value pool	5	INT16	RO
2117	845	2118	Channel 11 control value pool	5	INT16	RO
2118	846	2119	Error pool	5	INT32	RO
2119	847	2120				
2120	848	2121	pH actual value pool	6	INT16	RO
2121	849	2122	pH control value pool	6	INT16	RO
2122	84A	2123	ORP actual value pool	6	INT16	RO
2123	84B	2124	ORP control value pool	6	INT16	RO
2124	84C	2125	Temperature actual value pool	6	INT16	RO
2125	84D	2126	Temperature control value pool	6	INT16	RO
2126	84E	2127	Channel 4 actual value pool	6	INT16	RO
2127	84F	2128	Channel 4 control value pool	6	INT16	RO
2128	850	2129	Channel 5 actual value pool	6	INT16	RO
2129	851	2130	Channel 5 control value pool	6	INT16	RO
2130	852	2131	Channel 6 actual value pool	6	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2131	853	2132	Channel 6 control value pool	6	INT16	RO
2132	854	2133	Channel 7 actual value pool	6	INT16	RO
2133	855	2134	Channel 7 control value pool	6	INT16	RO
2134	856	2135	Channel 8 actual value pool	6	INT16	RO
2135	857	2136	Channel 8 control value pool	6	INT16	RO
2136	858	2137	Channel 9 actual value pool	6	INT16	RO
2137	859	2138	Channel 9 control value pool	6	INT16	RO
2138	85A	2139	Channel 10 actual value pool	6	INT16	RO
2139	85B	2140	Channel 10 control value pool	6	INT16	RO
2140	85C	2141	Channel 11 actual value pool	6	INT16	RO
2141	85D	2142	Channel 11 control value pool	6	INT16	RO
2142	85E	2143	Error pool	6	INT32	RO
2143	85F	2144				
2144	860	2145	pH actual value pool	7	INT16	RO
2145	861	2146	pH control value pool	7	INT16	RO
2146	862	2147	ORP actual value pool	7	INT16	RO
2147	863	2148	ORP control value pool	7	INT16	RO
2148	864	2149	Temperature actual value pool	7	INT16	RO
2149	865	2150	Temperature control value pool	7	INT16	RO
2150	866	2151	Channel 4 actual value pool	7	INT16	RO
2151	867	2152	Channel 4 control value pool	7	INT16	RO
2152	868	2153	Channel 5 actual value pool	7	INT16	RO
2153	869	2154	Channel 5 control value pool	7	INT16	RO
2154	86A	2155	Channel 6 actual value pool	7	INT16	RO
2155	86B	2156	Channel 6 control value pool	7	INT16	RO
2156	86C	2157	Channel 7 actual value pool	7	INT16	RO
2157	86D	2158	Channel 7 control value pool	7	INT16	RO
2158	86E	2159	Channel 8 actual value pool	7	INT16	RO
2159	86F	2160	Channel 8 control value pool	7	INT16	RO
2160	870	2161	Channel 9 actual value pool	7	INT16	RO
2161	871	2162	Channel 9 control value pool	7	INT16	RO
2162	872	2163	Channel 10 actual value pool	7	INT16	RO
2163	873	2164	Channel 10 control value pool	7	INT16	RO
2164	874	2165	Channel 11 actual value pool	7	INT16	RO
2165	875	2166	Channel 11 control value pool	7	INT16	RO
2166	876	2167	Error pool	7	INT32	RO
2167	877	2168				

Modbus RTU data model

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2168	878	2169	pH actual value pool	8	INT16	RO
2169	879	2170	pH control value pool	8	INT16	RO
2170	87A	2171	ORP actual value pool	8	INT16	RO
2171	87B	2172	ORP control value pool	8	INT16	RO
2172	87C	2173	Temperature actual value pool	8	INT16	RO
2173	87D	2174	Temperature control value pool	8	INT16	RO
2174	87E	2175	Channel 4 actual value pool	8	INT16	RO
2175	87F	2176	Channel 4 control value pool	8	INT16	RO
2176	880	2177	Channel 5 actual value pool	8	INT16	RO
2177	881	2178	Channel 5 control value pool	8	INT16	RO
2178	882	2179	Channel 6 actual value pool	8	INT16	RO
2179	883	2180	Channel 6 control value pool	8	INT16	RO
2180	884	2181	Channel 7 actual value pool	8	INT16	RO
2181	885	2182	Channel 7 control value pool	8	INT16	RO
2182	886	2183	Channel 8 actual value pool	8	INT16	RO
2183	887	2184	Channel 8 control value pool	8	INT16	RO
2184	888	2185	Channel 9 actual value pool	8	INT16	RO
2185	889	2186	Channel 9 control value pool	8	INT16	RO
2186	88A	2187	Channel 10 actual value pool	8	INT16	RO
2187	88B	2188	Channel 10 control value pool	8	INT16	RO
2188	88C	2189	Channel 11 actual value pool	8	INT16	RO
2189	88D	2190	Channel 11 control value pool	8	INT16	RO
2190	88E	2191	Error pool	8	INT32	RO
2191	88F	2192				
2192	890	2193	pH actual value pool	9	INT16	RO
2193	891	2194	pH control value pool	9	INT16	RO
2194	892	2195	ORP actual value pool	9	INT16	RO
2195	893	2196	ORP control value pool	9	INT16	RO
2196	894	2197	Temperature actual value pool	9	INT16	RO
2197	895	2198	Temperature control value pool	9	INT16	RO
2198	896	2199	Channel 4 actual value pool	9	INT16	RO
2199	897	2200	Channel 4 control value pool	9	INT16	RO
2200	898	2201	Channel 5 actual value pool	9	INT16	RO
2201	899	2202	Channel 5 control value pool	9	INT16	RO
2202	89A	2203	Channel 6 actual value pool	9	INT16	RO
2203	89B	2204	Channel 6 control value pool	9	INT16	RO
2204	89C	2205	Channel 7 actual value pool	9	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2205	89D	2206	Channel 7 control value pool	9	INT16	RO
2206	89E	2207	Channel 8 actual value pool	9	INT16	RO
2207	89F	2208	Channel 8 control value pool	9	INT16	RO
2208	8A0	2209	Channel 9 actual value pool	9	INT16	RO
2209	8A1	2210	Channel 9 control value pool	9	INT16	RO
2210	8A2	2211	Channel 10 actual value pool	9	INT16	RO
2211	8A3	2212	Channel 10 control value pool	9	INT16	RO
2212	8A4	2213	Channel 11 actual value pool	9	INT16	RO
2213	8A5	2214	Channel 11 control value pool	9	INT16	RO
2214	8A6	2215	Error pool	9	INT32	RO
2215	8A7	2216				
2216	8A8	2217	pH actual value pool	10	INT16	RO
2217	8A9	2218	pH control value pool	10	INT16	RO
2218	8AA	2219	ORP actual value pool	10	INT16	RO
2219	8AB	2220	ORP control value pool	10	INT16	RO
2220	8AC	2221	Temperature actual value pool	10	INT16	RO
2221	8AD	2222	Temperature control value pool	10	INT16	RO
2222	8AE	2223	Channel 4 actual value pool	10	INT16	RO
2223	8AF	2224	Channel 4 control value pool	10	INT16	RO
2224	8B0	2225	Channel 5 actual value pool	10	INT16	RO
2225	8B1	2226	Channel 5 control value pool	10	INT16	RO
2226	8B2	2227	Channel 6 actual value pool	10	INT16	RO
2227	8B3	2228	Channel 6 control value pool	10	INT16	RO
2228	8B4	2229	Channel 7 actual value pool	10	INT16	RO
2229	8B5	2230	Channel 7 control value pool	10	INT16	RO
2230	8B6	2231	Channel 8 actual value pool	10	INT16	RO
2231	8B7	2232	Channel 8 control value pool	10	INT16	RO
2232	8B8	2233	Channel 9 actual value pool	10	INT16	RO
2233	8B9	2234	Channel 9 control value pool	10	INT16	RO
2234	8BA	2235	Channel 10 actual value pool	10	INT16	RO
2235	8BB	2236	Channel 10 control value pool	10	INT16	RO
2236	8BC	2237	Channel 11 actual value pool	10	INT16	RO
2237	8BD	2238	Channel 11 control value pool	10	INT16	RO
2238	8BE	2239	Error pool		INT32	RO
2239	8BF	2240				
2240	8C0	2241	pH actual value pool	11	INT16	RO
2241	8C1	2242	pH control value pool	11	INT16	RO

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Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2242	8C2	2243	ORP actual value pool	11	INT16	RO
2243	8C3	2244	ORP control value pool	11	INT16	RO
2244	8C4	2245	Temperature actual value pool	11	INT16	RO
2245	8C5	2246	Temperature control value pool	11	INT16	RO
2246	8C6	2247	Channel 4 actual value pool	11	INT16	RO
2247	8C7	2248	Channel 4 control value pool	11	INT16	RO
2248	8C8	2249	Channel 5 actual value pool	11	INT16	RO
2249	8C9	2250	Channel 5 control value pool	11	INT16	RO
2250	8CA	2251	Channel 6 actual value pool	11	INT16	RO
2251	8CB	2252	Channel 6 control value pool	11	INT16	RO
2252	8CC	2253	Channel 7 actual value pool	11	INT16	RO
2253	8CD	2254	Channel 7 control value pool	11	INT16	RO
2254	8CE	2255	Channel 8 actual value pool	11	INT16	RO
2255	8CF	2256	Channel 8 control value pool	11	INT16	RO
2256	8D0	2257	Channel 9 actual value pool	11	INT16	RO
2257	8D1	2258	Channel 9 control value pool	11	INT16	RO
2258	8D2	2259	Channel 10 actual value pool	11	INT16	RO
2259	8D3	2260	Channel 10 control value pool	11	INT16	RO
2260	8D4	2261	Channel 11 actual value pool	11	INT16	RO
2261	8D5	2262	Channel 11 control value pool	11	INT16	RO
2262	8D6	2263	Error pool	11	INT32	RO
2263	8D7	2264				
2264	8D8	2265	pH actual value pool	12	INT16	RO
2265	8D9	2266	pH control value pool	12	INT16	RO
2266	8DA	2267	ORP actual value pool	12	INT16	RO
2267	8DB	2268	ORP control value pool	12	INT16	RO
2268	8DC	2269	Temperature actual value pool	12	INT16	RO
2269	8DD	2270	Temperature control value pool	12	INT16	RO
2270	8DE	2271	Channel 4 actual value pool	12	INT16	RO
2271	8DF	2272	Channel 4 control value pool	12	INT16	RO
2272	8E0	2273	Channel 5 actual value pool	12	INT16	RO
2273	8E1	2274	Channel 5 control value pool	12	INT16	RO
2274	8E2	2275	Channel 6 actual value pool	12	INT16	RO
2275	8E3	2276	Channel 6 control value pool	12	INT16	RO
2276	8E4	2277	Channel 7 actual value pool	12	INT16	RO
2277	8E5	2278	Channel 7 control value pool	12	INT16	RO
2278	8E6	2279	Channel 8 actual value pool	12	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2279	8E7	2280	Channel 8 control value pool	12	INT16	RO
2280	8E8	2281	Channel 9 actual value pool	12	INT16	RO
2281	8E9	2282	Channel 9 control value pool	12	INT16	RO
2282	8EA	2283	Channel 10 actual value pool	12	INT16	RO
2283	8EB	2284	Channel 10 control value pool	12	INT16	RO
2284	8EC	2285	Channel 11 actual value pool	12	INT16	RO
2285	8ED	2286	Channel 11 control value pool	12	INT16	RO
2286	8EE	2287	Error pool	12	INT32	RO
2287	8EF	2288				
2288	8F0	2289	pH actual value pool	13	INT16	RO
2289	8F1	2290	pH control value pool	13	INT16	RO
2290	8F2	2291	ORP actual value pool	13	INT16	RO
2291	8F3	2292	ORP control value pool	13	INT16	RO
2292	8F4	2293	Temperature actual value pool	13	INT16	RO
2293	8F5	2294	Temperature control value pool	13	INT16	RO
2294	8F6	2295	Channel 4 actual value pool	13	INT16	RO
2295	8F7	2296	Channel 4 control value pool	13	INT16	RO
2296	8F8	2297	Channel 5 actual value pool	13	INT16	RO
2297	8F9	2298	Channel 5 control value pool	13	INT16	RO
2298	8FA	2299	Channel 6 actual value pool	13	INT16	RO
2299	8FB	2300	Channel 6 control value pool	13	INT16	RO
2300	8FC	2301	Channel 7 actual value pool	13	INT16	RO
2301	8FD	2302	Channel 7 control value pool	13	INT16	RO
2302	8FE	2303	Channel 8 actual value pool	13	INT16	RO
2303	8FF	2304	Channel 8 control value pool	13	INT16	RO
2304	900	2305	Channel 9 actual value pool	13	INT16	RO
2305	901	2306	Channel 9 control value pool	13	INT16	RO
2306	902	2307	Channel 10 actual value pool	13	INT16	RO
2307	903	2308	Channel 10 control value pool	13	INT16	RO
2308	904	2309	Channel 11 actual value pool	13	INT16	RO
2309	905	2310	Channel 11 control value pool	13	INT16	RO
2310	906	2311	Error pool	13	INT32	RO
2311	907	2312				
2312	908	2313	pH actual value pool	14	INT16	RO
2313	909	2314	pH control value pool	14	INT16	RO
2314	90A	2315	ORP actual value pool	14	INT16	RO
2315	90B	2316	ORP control value pool	14	INT16	RO

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Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2316	90C	2317	Temperature actual value pool	14	INT16	RO
2317	90D	2318	Temperature control value pool	14	INT16	RO
2318	90E	2319	Channel 4 actual value pool	14	INT16	RO
2319	90F	2320	Channel 4 control value pool	14	INT16	RO
2320	910	2321	Channel 5 actual value pool	14	INT16	RO
2321	911	2322	Channel 5 control value pool	14	INT16	RO
2322	912	2323	Channel 6 actual value pool	14	INT16	RO
2323	913	2324	Channel 6 control value pool	14	INT16	RO
2324	914	2325	Channel 7 actual value pool	14	INT16	RO
2325	915	2326	Channel 7 control value pool	14	INT16	RO
2326	916	2327	Channel 8 actual value pool	14	INT16	RO
2327	917	2328	Channel 8 control value pool	14	INT16	RO
2328	918	2329	Channel 9 actual value pool	14	INT16	RO
2329	919	2330	Channel 9 control value pool	14	INT16	RO
2330	91A	2331	Channel 10 actual value pool	14	INT16	RO
2331	91B	2332	Channel 10 control value pool	14	INT16	RO
2332	91C	2333	Channel 11 actual value pool	14	INT16	RO
2333	91D	2334	Channel 11 control value pool	14	INT16	RO
2334	91E	2335	Error pool	14	INT32	RO
2335	91F	2336				
2336	920	2337	pH actual value pool	15	INT16	RO
2337	921	2338	pH control value pool	15	INT16	RO
2338	922	2339	ORP actual value pool	15	INT16	RO
2339	923	2340	ORP control value pool	15	INT16	RO
2340	924	2341	Temperature actual value pool	15	INT16	RO
2341	925	2342	Temperature control value pool	15	INT16	RO
2342	926	2343	Channel 4 actual value pool	15	INT16	RO
2343	927	2344	Channel 4 control value pool	15	INT16	RO
2344	928	2345	Channel 5 actual value pool	15	INT16	RO
2345	929	2346	Channel 5 control value pool	15	INT16	RO
2346	92A	2347	Channel 6 actual value pool	15	INT16	RO
2347	92B	2348	Channel 6 control value pool	15	INT16	RO
2348	92C	2349	Channel 7 actual value pool	15	INT16	RO
2349	92D	2350	Channel 7 control value pool	15	INT16	RO
2350	92E	2351	Channel 8 actual value pool	15	INT16	RO
2351	92F	2352	Channel 8 control value pool	15	INT16	RO
2352	930	2353	Channel 9 actual value pool	15	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
2353	931	2354	Channel 9 control value pool	15	INT16	RO
2354	932	2355	Channel 10 actual value pool	15	INT16	RO
2355	933	2356	Channel 10 control value pool	15	INT16	RO
2356	934	2357	Channel 11 actual value pool	15	INT16	RO
2357	935	2358	Channel 11 control value pool	15	INT16	RO
2358	936	2359	Error pool	15	INT32	RO
2359	937	2360				
2360	938	2361	pH actual value pool	16	INT16	RO
2361	939	2362	pH control value pool	16	INT16	RO
2362	93A	2363	ORP actual value pool	16	INT16	RO
2363	93B	2364	ORP control value pool	16	INT16	RO
2364	93C	2365	Temperature actual value pool	16	INT16	RO
2365	93D	2366	Temperature control value pool	16	INT16	RO
2366	93E	2367	Channel 4 actual value pool	16	INT16	RO
2367	93F	2368	Channel 4 control value pool	16	INT16	RO
2368	940	2369	Channel 5 actual value pool	16	INT16	RO
2369	941	2370	Channel 5 control value pool	16	INT16	RO
2370	942	2371	Channel 6 actual value pool	16	INT16	RO
2371	943	2372	Channel 6 control value pool	16	INT16	RO
2372	944	2373	Channel 7 actual value pool	16	INT16	RO
2373	945	2374	Channel 7 control value pool	16	INT16	RO
2374	946	2375	Channel 8 actual value pool	16	INT16	RO
2375	947	2376	Channel 8 control value pool	16	INT16	RO
2376	948	2377	Channel 9 actual value pool	16	INT16	RO
2377	949	2378	Channel 9 control value pool	16	INT16	RO
2378	94A	2379	Channel 10 actual value pool	16	INT16	RO
2379	94B	2380	Channel 10 control value pool	16	INT16	RO
2380	94C	2381	Channel 11 actual value pool	16	INT16	RO
2381	94D	2382	Channel 11 control value pool	16	INT16	RO
2382	94E	2383	Error pool	16	INT32	RO
2383	94F	2384	ECO status pool 1 to 16	-	INT16	RO
2384	950	2385	Pause status pool 1 to 16	-	INT16	RO
...2999	...BB7	...3000	Reserve			

4.2.5 Acyclic input data block – register 3000

The acyclic range of the data model includes the setpoints for the individual pools as well as the values for 'ECO' and 'Pause active'. Write access can be made to these values using Modbus function code 6.



Write access can only be made to this register once every 4 seconds, because all values must first be written via the CAN bus to the Dulcomarin II. If this condition is not observed, the DXCa Modbus gateway answers with an error telegram and exception code 4.



NOTICE!

The time until receipt of the Modbus confirmation (value has been written) can be up to one second.

Moreover for these registers, only one register can be queried per telegram. If this condition is not observed, the DXCa gateway answers with an error telegram and exception code 2.



Note:

Please note that the various programmes for reading the measured values differentiate between the Modbus address and Modbus register. Modbus register 2001 is located at Modbus address 2000.

Acyclic input data block

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3000	BB8	3001	pH setpoint pool	1	INT16	WO
3001	BB9	3002	pH setpoint pool	2	INT16	WO
3002	BBA	3003	pH setpoint pool	3	INT16	WO
3003	BBB	3004	pH setpoint pool	4	INT16	WO
3004	BBC	3005	pH setpoint pool	5	INT16	WO
3005	BBD	3006	pH setpoint pool	6	INT16	WO
3006	BBE	3007	pH setpoint pool	7	INT16	WO
3007	BBF	3008	pH setpoint pool	8	INT16	WO
3008	BC0	3009	pH setpoint pool	9	INT16	WO
3009	BC1	3010	pH setpoint pool	10	INT16	WO
3010	BC2	3011	pH setpoint pool	11	INT16	WO
3011	BC3	3012	pH setpoint pool	12	INT16	WO
3012	BC4	3013	pH setpoint pool	13	INT16	WO
3013	BC5	3014	pH setpoint pool	14	INT16	WO
3014	BC6	3015	pH setpoint pool	15	INT16	WO
3015	BC7	3016	pH setpoint pool	16	INT16	WO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3016	BC8	3017	ORP setpoint pool	1	INT16	WO
3017	BC9	3018	ORP setpoint pool	2	INT16	WO
3018	BCA	3019	ORP setpoint pool	3	INT16	WO
3019	BCB	3020	ORP setpoint pool	4	INT16	WO
3020	BCC	3021	ORP setpoint pool	5	INT16	WO
3021	BCD	3022	ORP setpoint pool	6	INT16	WO
3022	BCE	3023	ORP setpoint pool	7	INT16	WO
3023	BCF	3024	ORP setpoint pool	8	INT16	WO
3024	BD0	3025	ORP setpoint pool	9	INT16	WO
3025	BD1	3026	ORP setpoint pool	10	INT16	WO
3026	BD2	3027	ORP setpoint pool	11	INT16	WO
3027	BD3	3028	ORP setpoint pool	12	INT16	WO
3028	BD4	3029	ORP setpoint pool	13	INT16	WO
3029	BD5	3030	ORP setpoint pool	14	INT16	WO
3030	BD6	3031	ORP setpoint pool	15	INT16	WO
3031	BD7	3032	ORP setpoint pool	16	INT16	WO
3032	BD8	3033	Temperature setpoint pool	1	INT16	WO
3033	BD9	3034	Temperature setpoint pool	2	INT16	WO
3034	BDA	3035	Temperature setpoint pool	3	INT16	WO
3035	BDB	3036	Temperature setpoint pool	4	INT16	WO
3036	BDC	3037	Temperature setpoint pool	5	INT16	WO
3037	BDD	3038	Temperature setpoint pool	6	INT16	WO
3038	BDE	3039	Temperature setpoint pool	7	INT16	WO
3039	BDF	3040	Temperature setpoint pool	8	INT16	WO
3040	BE0	3041	Temperature setpoint pool	9	INT16	WO
3041	BE1	3042	Temperature setpoint pool	10	INT16	WO
3042	BE2	3043	Temperature setpoint pool	11	INT16	WO
3043	BE3	3044	Temperature setpoint pool	12	INT16	WO
3044	BE4	3045	Temperature setpoint pool	13	INT16	WO
3045	BE5	3046	Temperature setpoint pool	14	INT16	WO
3046	BE6	3047	Temperature setpoint pool	15	INT16	WO
3047	BE7	3048	Temperature setpoint pool	16	INT16	WO
3048	BE8	3049	Channel 4 setpoint pool	1	INT16	WO
3049	BE9	3050	Channel 4 setpoint pool	2	INT16	WO
3050	BEA	3051	Channel 4 setpoint pool	3	INT16	WO
3051	BEB	3052	Channel 4 setpoint pool	4	INT16	WO
3052	BEC	3053	Channel 4 setpoint pool	5	INT16	WO

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Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3053	BED	3054	Channel 4 setpoint pool	6	INT16	WO
3054	BEE	3055	Channel 4 setpoint pool	7	INT16	WO
3055	BEF	3056	Channel 4 setpoint pool	8	INT16	WO
3056	BF0	3057	Channel 4 setpoint pool	9	INT16	WO
3057	BF1	3058	Channel 4 setpoint pool	10	INT16	WO
3058	BF2	3059	Channel 4 setpoint pool	11	INT16	WO
3059	BF3	3060	Channel 4 setpoint pool	12	INT16	WO
3060	BF4	3061	Channel 4 setpoint pool	13	INT16	WO
3061	BF5	3062	Channel 4 setpoint pool	14	INT16	WO
3062	BF6	3063	Channel 4 setpoint pool	15	INT16	WO
3063	BF7	3064	Channel 4 setpoint pool	16	INT16	WO
3064	BF8	3065	Channel 5 setpoint pool	1	INT16	WO
3065	BF9	3066	Channel 5 setpoint pool	2	INT16	WO
3066	BFA	3067	Channel 5 setpoint pool	3	INT16	WO
3067	BFB	3068	Channel 5 setpoint pool	4	INT16	WO
3068	BFC	3069	Channel 5 setpoint pool	5	INT16	WO
3069	BFD	3070	Channel 5 setpoint pool	6	INT16	WO
3070	BFE	3071	Channel 5 setpoint pool	7	INT16	WO
3071	BFF	3072	Channel 5 setpoint pool	8	INT16	WO
3072	C00	3073	Channel 5 setpoint pool	9	INT16	WO
3073	C01	3074	Channel 5 setpoint pool	10	INT16	WO
3074	C02	3075	Channel 5 setpoint pool	11	INT16	WO
3075	C03	3076	Channel 5 setpoint pool	12	INT16	WO
3076	C04	3077	Channel 5 setpoint pool	13	INT16	WO
3077	C05	3078	Channel 5 setpoint pool	14	INT16	WO
3078	C06	3079	Channel 5 setpoint pool	15	INT16	WO
3079	C07	3080	Channel 5 setpoint pool	16	INT16	WO
3080	C08	3081	Channel 6 setpoint pool	1	INT16	WO
3081	C09	3082	Channel 6 setpoint pool	2	INT16	WO
3082	C0A	3083	Channel 6 setpoint pool	3	INT16	WO
3083	C0B	3084	Channel 6 setpoint pool	4	INT16	WO
3084	C0C	3085	Channel 6 setpoint pool	5	INT16	WO
3085	C0D	3086	Channel 6 setpoint pool	6	INT16	WO
3086	C0E	3087	Channel 6 setpoint pool	7	INT16	WO
3087	C0F	3088	Channel 6 setpoint pool	8	INT16	WO
3088	C10	3089	Channel 6 setpoint pool	9	INT16	WO
3089	C11	3090	Channel 6 setpoint pool	10	INT16	WO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3090	C12	3091	Channel 6 setpoint pool	11	INT16	WO
3091	C13	3092	Channel 6 setpoint pool	12	INT16	WO
3092	C14	3093	Channel 6 setpoint pool	13	INT16	WO
3093	C15	3094	Channel 6 setpoint pool	14	INT16	WO
3094	C16	3095	Channel 6 setpoint pool	15	INT16	WO
3095	C17	3096	Channel 6 setpoint pool	16	INT16	WO
3096	C18	3097	Channel 7 setpoint pool	1	INT16	WO
3097	C19	3098	Channel 7 setpoint pool	2	INT16	WO
3098	C1A	3099	Channel 7 setpoint pool	3	INT16	WO
3099	C1B	3100	Channel 7 setpoint pool	4	INT16	WO
3100	C1C	3101	Channel 7 setpoint pool	5	INT16	WO
3101	C1D	3102	Channel 7 setpoint pool	6	INT16	WO
3102	C1E	3103	Channel 7 setpoint pool	7	INT16	WO
3103	C1F	3104	Channel 7 setpoint pool	8	INT16	WO
3104	C20	3105	Channel 7 setpoint pool	9	INT16	WO
3105	C21	3106	Channel 7 setpoint pool	10	INT16	WO
3106	C22	3107	Channel 7 setpoint pool	11	INT16	WO
3107	C23	3108	Channel 7 setpoint pool	12	INT16	WO
3108	C24	3109	Channel 7 setpoint pool	13	INT16	WO
3109	C25	3110	Channel 7 setpoint pool	14	INT16	WO
3110	C26	3111	Channel 7 setpoint pool	15	INT16	WO
3111	C27	3112	Channel 7 setpoint pool	16	INT16	WO
3112	C28	3113	Channel 8 setpoint pool	1	INT16	WO
3113	C29	3114	Channel 8 setpoint pool	2	INT16	WO
3114	C2A	3115	Channel 8 setpoint pool	3	INT16	WO
3115	C2B	3116	Channel 8 setpoint pool	4	INT16	WO
3116	C2C	3117	Channel 8 setpoint pool	5	INT16	WO
3117	C2D	3118	Channel 8 setpoint pool	6	INT16	WO
3118	C2E	3119	Channel 8 setpoint pool	7	INT16	WO
3119	C2F	3120	Channel 8 setpoint pool	8	INT16	WO
3120	C30	3121	Channel 8 setpoint pool	9	INT16	WO
3121	C31	3122	Channel 8 setpoint pool	10	INT16	WO
3122	C32	3123	Channel 8 setpoint pool	11	INT16	WO
3123	C33	3124	Channel 8 setpoint pool	12	INT16	WO
3124	C34	3125	Channel 8 setpoint pool	13	INT16	WO
3125	C35	3126	Channel 8 setpoint pool	14	INT16	WO
3126	C36	3127	Channel 8 setpoint pool	15	INT16	WO

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Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3127	C37	3128	Channel 8 setpoint pool	16	INT16	WO
3128	C38	3129	Channel 9 setpoint pool	1	INT16	WO
3129	C39	3130	Channel 9 setpoint pool	2	INT16	WO
3130	C3A	3131	Channel 9 setpoint pool	3	INT16	WO
3131	C3B	3132	Channel 9 setpoint pool	4	INT16	WO
3132	C3C	3133	Channel 9 setpoint pool	5	INT16	WO
3133	C3D	3134	Channel 9 setpoint pool	6	INT16	WO
3134	C3E	3135	Channel 9 setpoint pool	7	INT16	WO
3135	C3F	3136	Channel 9 setpoint pool	8	INT16	WO
3136	C40	3137	Channel 9 setpoint pool	9	INT16	WO
3137	C41	3138	Channel 9 setpoint pool	10	INT16	WO
3138	C42	3139	Channel 9 setpoint pool	11	INT16	WO
3139	C43	3140	Channel 9 setpoint pool	12	INT16	WO
3140	C44	3141	Channel 9 setpoint pool	13	INT16	WO
3141	C45	3142	Channel 9 setpoint pool	14	INT16	WO
3142	C46	3143	Channel 9 setpoint pool	15	INT16	WO
3143	C47	3144	Channel 9 setpoint pool	16	INT16	WO
3144	C48	3145	Channel 10 setpoint pool	1	INT16	WO
3145	C49	3146	Channel 10 setpoint pool	2	INT16	WO
3146	C4A	3147	Channel 10 setpoint pool	3	INT16	WO
3147	C4B	3148	Channel 10 setpoint pool	4	INT16	WO
3148	C4C	3149	Channel 10 setpoint pool	5	INT16	WO
3149	C4D	3150	Channel 10 setpoint pool	6	INT16	WO
3150	C4E	3151	Channel 10 setpoint pool	7	INT16	WO
3151	C4F	3152	Channel 10 setpoint pool	8	INT16	WO
3152	C50	3153	Channel 10 setpoint pool	9	INT16	WO
3153	C51	3154	Channel 10 setpoint pool	10	INT16	WO
3154	C52	3155	Channel 10 setpoint pool	11	INT16	WO
3155	C53	3156	Channel 10 setpoint pool	12	INT16	WO
3156	C54	3157	Channel 10 setpoint pool	13	INT16	WO
3157	C55	3158	Channel 10 setpoint pool	14	INT16	WO
3158	C56	3159	Channel 10 setpoint pool	15	INT16	WO
3159	C57	3160	Channel 10 setpoint pool	16	INT16	WO
3160	C58	3161	Channel 11 setpoint pool	1	INT16	WO
3161	C59	3162	Channel 11 setpoint pool	2	INT16	WO
3162	C5A	3163	Channel 11 setpoint pool	3	INT16	WO
3163	C5B	3164	Channel 11 setpoint pool	4	INT16	WO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3164	C5C	3165	Channel 11 setpoint pool	5	INT16	WO
3165	C5D	3166	Channel 11 setpoint pool	6	INT16	WO
3166	C5E	3167	Channel 11 setpoint pool	7	INT16	WO
3167	C5F	3168	Channel 11 setpoint pool	8	INT16	WO
3168	C60	3169	Channel 11 setpoint pool	9	INT16	WO
3169	C61	3170	Channel 11 setpoint pool	10	INT16	WO
3170	C62	3171	Channel 11 setpoint pool	11	INT16	WO
3171	C63	3172	Channel 11 setpoint pool	12	INT16	WO
3172	C64	3173	Channel 11 setpoint pool	13	INT16	WO
3173	C65	3174	Channel 11 setpoint pool	14	INT16	WO
3174	C66	3175	Channel 11 setpoint pool	15	INT16	WO
3175	C67	3176	Channel 11 setpoint pool	16	INT16	WO
3176	C68	3177	ECO active pool	1	INT16	WO
3177	C69	3178	ECO active pool	2	INT16	WO
3178	C6A	3179	ECO active pool	3	INT16	WO
3179	C6B	3180	ECO active pool	4	INT16	WO
3180	C6C	3181	ECO active pool	5	INT16	WO
3181	C6D	3182	ECO active pool	6	INT16	WO
3182	C6E	3183	ECO active pool	7	INT16	WO
3183	C6F	3184	ECO active pool	8	INT16	WO
3184	C70	3185	ECO active pool	9	INT16	WO
3185	C71	3186	ECO active pool	10	INT16	WO
3186	C72	3187	ECO active pool	11	INT16	WO
3187	C73	3188	ECO active pool	12	INT16	WO
3188	C74	3189	ECO active pool	13	INT16	WO
3189	C75	3190	ECO active pool	14	INT16	WO
3190	C76	3191	ECO active pool	15	INT16	WO
3191	C77	3192	ECO active pool	16	INT16	WO
3192	C78	3193	Pause active pool	1	INT16	WO
3193	C79	3194	Pause active pool	2	INT16	WO
3194	C7A	3195	Pause active pool	3	INT16	WO
3195	C7B	3196	Pause active pool	4	INT16	WO
3196	C7C	3197	Pause active pool	5	INT16	WO
3197	C7D	3198	Pause active pool	6	INT16	WO
3198	C7E	3199	Pause active pool	7	INT16	WO
3199	C7F	3200	Pause active pool	8	INT16	WO
3200	C80	3201	Pause active pool	9	INT16	WO

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Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3201	C81	3202	Pause active pool	10	INT16	WO
3202	C82	3203	Pause active pool	11	INT16	WO
3203	C83	3204	Pause active pool	12	INT16	WO
3204	C84	3205	Pause active pool	13	INT16	WO
3205	C85	3206	Pause active pool	14	INT16	WO
3206	C86	3207	Pause active pool	15	INT16	WO
3207	C87	3208	Pause active pool	16	INT16	WO
3208	C88	3209	INPUT 1 product identifier	1	INT16	WO
3209	C89	3210	INPUT 2	2	INT16	WO
3210	C8A	3211	INPUT 3	3	INT16	WO
3211	C8B	3212	INPUT 4	4	INT16	WO
3212	C8C	3213	INPUT 5	5	INT16	WO
3213	C8D	3214	INPUT 6	6	INT16	WO
3214	C8E	3215	INPUT 7	7	INT16	WO
3215	C8F	3216	INPUT 8	8	INT16	WO
3216	C90	3217	INPUT 9	9	INT16	WO
3217	C91	3218	INPUT 10	10	INT16	WO
3218	C92	3219	INPUT 11	11	INT16	WO
3219	C93	3220	INPUT 12	12	INT16	WO
3220	C94	3221	INPUT 13	13	INT16	WO
3221	C95	3222	INPUT 14	14	INT16	WO
3222	C96	3223	INPUT 15	15	INT16	WO
3223	C97	3224	INPUT 16	16	INT16	WO
3224	C98	3225	INPUT 17	17	INT16	WO
3225	C99	3226	INPUT 18	18	INT16	WO
3226	C9A	3227	INPUT 19	19	INT16	WO
3227	C9B	3228	INPUT 20	20	INT16	WO
3228	C9C	3229	INPUT 21	21	INT16	WO
3229	C9D	3230	INPUT 22	22	INT16	WO
3230	C9E	3231	INPUT 23	23	INT16	WO
3231	C9F	3232	INPUT 24	24	INT16	WO
3232	CA0	3233	INPUT 25	25	INT16	WO
3233	CA1	3234	INPUT 26	26	INT16	WO
3234	CA2	3235	INPUT 27	27	INT16	WO
3235	CA3	3236	INPUT 28	28	INT16	WO
3236	CA4	3237	INPUT 29	29	INT16	WO
3237	CA5	3238	INPUT 30	30	INT16	WO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
3238	CA6	3239	INPUT 31	31	INT16	WO
3239	CA7	3240	INPUT 32	32	INT16	WO
...3999	...F9F	3241	Reserve			

4.2.6 Acyclic output data block – register 4000

The acyclic range of the data model includes the setpoints for the individual pools as well as the values for 'ECO' and 'Pause active'. Write access can be made to these values using Modbus function code 3.



Write access can only be made to this register once every 4 seconds, because all values must first be written via the CAN bus to the Dulcomarin II. If this condition is not observed, the DXCa Modbus gateway answers with an error telegram and exception code 4.



NOTICE!

The time until receipt of the Modbus telegram (return of the value to be written) can be up to one second.

Moreover for these registers, only one register can be queried per telegram. If this condition is not observed, the DXCa gateway answers with an error telegram and exception code 2.



Note:

Please note that the various programmes for reading the measured values differentiate between the Modbus address and Modbus register. Modbus register 2001 is located at Modbus address 2000.

Acyclic output data block

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
4000	FA0	4001	pH setpoint pool	1	INT16	RO
4001	FA1	4002	pH setpoint pool	2	INT16	RO
4002	FA2	4003	pH setpoint pool	3	INT16	RO
4003	FA3	4004	pH setpoint pool	4	INT16	RO
4004	FA4	4005	pH setpoint pool	5	INT16	RO
4005	FA5	4006	pH setpoint pool	6	INT16	RO
4006	FA6	4007	pH setpoint pool	7	INT16	RO
4007	FA7	4008	pH setpoint pool	8	INT16	RO
4008	FA8	4009	pH setpoint pool	9	INT16	RO

Modbus RTU data model

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
4009	FA9	4010	pH setpoint pool	10	INT16	RO
4010	FAA	4011	pH setpoint pool	11	INT16	RO
4011	FAB	4012	pH setpoint pool	12	INT16	RO
4012	FAC	4013	pH setpoint pool	13	INT16	RO
4013	FAD	4014	pH setpoint pool	14	INT16	RO
4014	FAE	4015	pH setpoint pool	15	INT16	RO
4015	FAF	4016	pH setpoint pool	16	INT16	RO
4016	FB0	4017	ORP setpoint pool	1	INT16	RO
4017	FB1	4018	ORP setpoint pool	2	INT16	RO
4018	FB2	4019	ORP setpoint pool	3	INT16	RO
4019	FB3	4020	ORP setpoint pool	4	INT16	RO
4020	FB4	4021	ORP setpoint pool	5	INT16	RO
4021	FB5	4022	ORP setpoint pool	6	INT16	RO
4022	FB6	4023	ORP setpoint pool	7	INT16	RO
4023	FB7	4024	ORP setpoint pool	8	INT16	RO
4024	FB8	4025	ORP setpoint pool	9	INT16	RO
4025	FB9	4026	ORP setpoint pool	10	INT16	RO
4026	FBA	4027	ORP setpoint pool	11	INT16	RO
4027	FBB	4028	ORP setpoint pool	12	INT16	RO
4028	FBC	4029	ORP setpoint pool	13	INT16	RO
4029	FBD	4030	ORP setpoint pool	14	INT16	RO
4030	FBE	4031	ORP setpoint pool	15	INT16	RO
4031	FBF	4032	ORP setpoint pool	16	INT16	RO
4032	FC0	4033	Temperature setpoint pool	1	INT16	RO
4033	FC1	4034	Temperature setpoint pool	2	INT16	RO
4034	FC2	4035	Temperature setpoint pool	3	INT16	RO
4035	FC3	4036	Temperature setpoint pool	4	INT16	RO
4036	FC4	4037	Temperature setpoint pool	5	INT16	RO
4037	FC5	4038	Temperature setpoint pool	6	INT16	RO
4038	FC6	4039	Temperature setpoint pool	7	INT16	RO
4039	FC7	4040	Temperature setpoint pool	8	INT16	RO
4040	FC8	4041	Temperature setpoint pool	9	INT16	RO
4041	FC9	4042	Temperature setpoint pool	10	INT16	RO
4042	FCA	4043	Temperature setpoint pool	11	INT16	RO
4043	FCB	4044	Temperature setpoint pool	12	INT16	RO
4044	FCC	4045	Temperature setpoint pool	13	INT16	RO
4045	FCD	4046	Temperature setpoint pool	14	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
4046	FCE	4047	Temperature setpoint pool	15	INT16	RO
4047	FCF	4048	Temperature setpoint pool	16	INT16	RO
4048	FD0	4049	Channel 4 setpoint pool	1	INT16	RO
4049	FD1	4050	Channel 4 setpoint pool	2	INT16	RO
4050	FD2	4051	Channel 4 setpoint pool	3	INT16	RO
4051	FD3	4052	Channel 4 setpoint pool	4	INT16	RO
4052	FD4	4053	Channel 4 setpoint pool	5	INT16	RO
4053	FD5	4054	Channel 4 setpoint pool	6	INT16	RO
4054	FD6	4055	Channel 4 setpoint pool	7	INT16	RO
4055	FD7	4056	Channel 4 setpoint pool	8	INT16	RO
4056	FD8	4057	Channel 4 setpoint pool	9	INT16	RO
4057	FD9	4058	Channel 4 setpoint pool	10	INT16	RO
4058	FDA	4059	Channel 4 setpoint pool	11	INT16	RO
4059	FDB	4060	Channel 4 setpoint pool	12	INT16	RO
4060	FDC	4061	Channel 4 setpoint pool	13	INT16	RO
4061	FDD	4062	Channel 4 setpoint pool	14	INT16	RO
4062	FDE	4063	Channel 4 setpoint pool	15	INT16	RO
4063	FDF	4064	Channel 4 setpoint pool	16	INT16	RO
4064	FE0	4065	Channel 5 setpoint pool	1	INT16	RO
4065	FE1	4066	Channel 5 setpoint pool	2	INT16	RO
4066	FE2	4067	Channel 5 setpoint pool	3	INT16	RO
4067	FE3	4068	Channel 5 setpoint pool	4	INT16	RO
4068	FE4	4069	Channel 5 setpoint pool	5	INT16	RO
4069	FE5	4070	Channel 5 setpoint pool	6	INT16	RO
4070	FE6	4071	Channel 5 setpoint pool	7	INT16	RO
4071	FE7	4072	Channel 5 setpoint pool	8	INT16	RO
4072	FE8	4073	Channel 5 setpoint pool	9	INT16	RO
4073	FE9	4074	Channel 5 setpoint pool	10	INT16	RO
4074	FEA	4075	Channel 5 setpoint pool	11	INT16	RO
4075	FEB	4076	Channel 5 setpoint pool	12	INT16	RO
4076	FEC	4077	Channel 5 setpoint pool	13	INT16	RO
4077	FED	4078	Channel 5 setpoint pool	14	INT16	RO
4078	FEE	4079	Channel 5 setpoint pool	15	INT16	RO
4079	FEF	4080	Channel 5 setpoint pool	16	INT16	RO
4080	FF0	4081	Channel 6 setpoint pool	1	INT16	RO
4081	FF1	4082	Channel 6 setpoint pool	2	INT16	RO
4082	FF2	4083	Channel 6 setpoint pool	3	INT16	RO

Modbus RTU data model

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
4083	FF3	4084	Channel 6 setpoint pool	4	INT16	RO
4084	FF4	4085	Channel 6 setpoint pool	5	INT16	RO
4085	FF5	4086	Channel 6 setpoint pool	6	INT16	RO
4086	FF6	4087	Channel 6 setpoint pool	7	INT16	RO
4087	FF7	4088	Channel 6 setpoint pool	8	INT16	RO
4088	FF8	4089	Channel 6 setpoint pool	9	INT16	RO
4089	FF9	4090	Channel 6 setpoint pool	10	INT16	RO
4090	FFA	4091	Channel 6 setpoint pool	11	INT16	RO
4091	FFB	4092	Channel 6 setpoint pool	12	INT16	RO
4092	FFC	4093	Channel 6 setpoint pool	13	INT16	RO
4093	FFD	4094	Channel 6 setpoint pool	14	INT16	RO
4094	FFE	4095	Channel 6 setpoint pool	15	INT16	RO
4095	FFF	4096	Channel 6 setpoint pool	16	INT16	RO
4096	1000	4097	Channel 7 setpoint pool	1	INT16	RO
4097	1001	4098	Channel 7 setpoint pool	2	INT16	RO
4098	1002	4099	Channel 7 setpoint pool	3	INT16	RO
4099	1003	4100	Channel 7 setpoint pool	4	INT16	RO
4100	1004	4101	Channel 7 setpoint pool	5	INT16	RO
4101	1005	4102	Channel 7 setpoint pool	6	INT16	RO
4102	1006	4103	Channel 7 setpoint pool	7	INT16	RO
4103	1007	4104	Channel 7 setpoint pool	8	INT16	RO
4104	1008	4105	Channel 7 setpoint pool	9	INT16	RO
4105	1009	4106	Channel 7 setpoint pool	10	INT16	RO
4106	100A	4107	Channel 7 setpoint pool	11	INT16	RO
4107	100B	4108	Channel 7 setpoint pool	12	INT16	RO
4108	100C	4109	Channel 7 setpoint pool	13	INT16	RO
4109	100D	4110	Channel 7 setpoint pool	14	INT16	RO
4110	100E	4111	Channel 7 setpoint pool	15	INT16	RO
4111	100F	4112	Channel 7 setpoint pool	16	INT16	RO
4112	1010	4113	Channel 8 setpoint pool	1	INT16	RO
4113	1011	4114	Channel 8 setpoint pool	2	INT16	RO
4114	1012	4115	Channel 8 setpoint pool	3	INT16	RO
4115	1013	4116	Channel 8 setpoint pool	4	INT16	RO
4116	1014	4117	Channel 8 setpoint pool	5	INT16	RO
4117	1015	4118	Channel 8 setpoint pool	6	INT16	RO
4118	1016	4119	Channel 8 setpoint pool	7	INT16	RO
4119	1017	4120	Channel 8 setpoint pool	8	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
4120	1018	4121	Channel 8 setpoint pool	9	INT16	RO
4121	1019	4122	Channel 8 setpoint pool	10	INT16	RO
4122	101A	4123	Channel 8 setpoint pool	11	INT16	RO
4123	101B	4124	Channel 8 setpoint pool	12	INT16	RO
4124	101C	4125	Channel 8 setpoint pool	13	INT16	RO
4125	101D	4126	Channel 8 setpoint pool	14	INT16	RO
4126	101E	4127	Channel 8 setpoint pool	15	INT16	RO
4127	101F	4128	Channel 8 setpoint pool	16	INT16	RO
4128	1020	4129	Channel 9 setpoint pool	1	INT16	RO
4129	1021	4130	Channel 9 setpoint pool	2	INT16	RO
4130	1022	4131	Channel 9 setpoint pool	3	INT16	RO
4131	1023	4132	Channel 9 setpoint pool	4	INT16	RO
4132	1024	4133	Channel 9 setpoint pool	5	INT16	RO
4133	1025	4134	Channel 9 setpoint pool	6	INT16	RO
4134	1026	4135	Channel 9 setpoint pool	7	INT16	RO
4135	1027	4136	Channel 9 setpoint pool	8	INT16	RO
4136	1028	4137	Channel 9 setpoint pool	9	INT16	RO
4137	1029	4138	Channel 9 setpoint pool	10	INT16	RO
4138	102A	4139	Channel 9 setpoint pool	11	INT16	RO
4139	102B	4140	Channel 9 setpoint pool	12	INT16	RO
4140	102C	4141	Channel 9 setpoint pool	13	INT16	RO
4141	102D	4142	Channel 9 setpoint pool	14	INT16	RO
4142	102E	4143	Channel 9 setpoint pool	15	INT16	RO
4143	102F	4144	Channel 9 setpoint pool	16	INT16	RO
4144	1030	4145	Channel 10 setpoint pool	1	INT16	RO
4145	1031	4146	Channel 10 setpoint pool	2	INT16	RO
4146	1032	4147	Channel 10 setpoint pool	3	INT16	RO
4147	1033	4148	Channel 10 setpoint pool	4	INT16	RO
4148	1034	4149	Channel 10 setpoint pool	5	INT16	RO
4149	1035	4150	Channel 10 setpoint pool	6	INT16	RO
4150	1036	4151	Channel 10 setpoint pool	7	INT16	RO
4151	1037	4152	Channel 10 setpoint pool	8	INT16	RO
4152	1038	4153	Channel 10 setpoint pool	9	INT16	RO
4153	1039	4154	Channel 10 setpoint pool	10	INT16	RO
4154	103A	4155	Channel 10 setpoint pool	11	INT16	RO
4155	103B	4156	Channel 10 setpoint pool	12	INT16	RO
4156	103C	4157	Channel 10 setpoint pool	13	INT16	RO

Modbus RTU data model

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
4157	103D	4158	Channel 10 setpoint pool	14	INT16	RO
4158	103E	4159	Channel 10 setpoint pool	15	INT16	RO
4159	103F	4160	Channel 10 setpoint pool	16	INT16	RO
4160	1040	4161	Channel 11 setpoint pool	1	INT16	RO
4161	1041	4162	Channel 11 setpoint pool	2	INT16	RO
4162	1042	4163	Channel 11 setpoint pool	3	INT16	RO
4163	1043	4164	Channel 11 setpoint pool	4	INT16	RO
4164	1044	4165	Channel 11 setpoint pool	5	INT16	RO
4165	1045	4166	Channel 11 setpoint pool	6	INT16	RO
4166	1046	4167	Channel 11 setpoint pool	7	INT16	RO
4167	1047	4168	Channel 11 setpoint pool	8	INT16	RO
4168	1048	4169	Channel 11 setpoint pool	9	INT16	RO
4169	1049	4170	Channel 11 setpoint pool	10	INT16	RO
4170	104A	4171	Channel 11 setpoint pool	11	INT16	RO
4171	104B	4172	Channel 11 setpoint pool	12	INT16	RO
4172	104C	4173	Channel 11 setpoint pool	13	INT16	RO
4173	104D	4174	Channel 11 setpoint pool	14	INT16	RO
4174	104E	4175	Channel 11 setpoint pool	15	INT16	RO
4175	104F	4176	Channel 11 setpoint pool	16	INT16	RO
4176	1050	4177	ECO active pool	1	INT16	RO
4177	1051	4178	ECO active pool	2	INT16	RO
4178	1052	4179	ECO active pool	3	INT16	RO
4179	1053	4180	ECO active pool	4	INT16	RO
4180	1054	4181	ECO active pool	5	INT16	RO
4181	1055	4182	ECO active pool	6	INT16	RO
4182	1056	4183	ECO active pool	7	INT16	RO
4183	1057	4184	ECO active pool	8	INT16	RO
4184	1058	4185	ECO active pool	9	INT16	RO
4185	1059	4186	ECO active pool	10	INT16	RO
4186	105A	4187	ECO active pool	11	INT16	RO
4187	105B	4188	ECO active pool	12	INT16	RO
4188	105C	4189	ECO active pool	13	INT16	RO
4189	105D	4190	ECO active pool	14	INT16	RO
4190	105E	4191	ECO active pool	15	INT16	RO
4191	105F	4192	ECO active pool	16	INT16	RO
4192	1060	4193	Pause active pool	1	INT16	RO
4193	1061	4194	Pause active pool	2	INT16	RO

Address (dec.)	Address (hex.)	Register no.	Description	Pool	Data type	Access
4194	1062	4195	Pause active pool	3	INT16	RO
4195	1063	4196	Pause active pool	4	INT16	RO
4196	1064	4197	Pause active pool	5	INT16	RO
4197	1065	4198	Pause active pool	6	INT16	RO
4198	1066	4199	Pause active pool	7	INT16	RO
4199	1067	4200	Pause active pool	8	INT16	RO
4200	1068	4201	Pause active pool	9	INT16	RO
4201	1069	4202	Pause active pool	10	INT16	RO
4202	106A	4203	Pause active pool	11	INT16	RO
4203	106B	4204	Pause active pool	12	INT16	RO
4204	106C	4205	Pause active pool	13	INT16	RO
4205	106D	4206	Pause active pool	14	INT16	RO
4206	106E	4207	Pause active pool	15	INT16	RO
4207	106F	4208	Pause active pool	16	INT16	RO
...4999	...1387	...5000				

5 Description of the data objects

5.1 Actual values



After starting DULCOMARIN II all actual values are only available on the Modbus after 130 seconds. Measured values that are not available or are incorrect are displayed as 0x7FFF = 32767.

The updating rate of the parameters is 4 seconds per configured pool. This means that with 10 configured pools, all measured values are updated every 40 seconds.

[pH measured variable pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[pH measured variable pool 1 ... 16] (pH actual value)	0 ... 1400	Range: 0 ... 14.00 Example: 720 = 7.20 pH	---

[ORP measured variable pool 1 - 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[ORP measured variable pool 1 ... 16] (ORP actual value)	-1200 ... +1200	-1200 ... 1200 mV	mV

[Temp. Measured pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[Temp. measured variable pool 1 ... 16] (Temperature actual value)	0 ... 1200	Range: 0 ... 120 °C Example: 130 = 13.0 °C	°C

The interpretation of the data changes dependent on the identity code. The following data are consecutively numbered starting with number 4 and thus do not have the actual names of their user data.

[Ch. 4 measured variable pool 1 ... 16]

Measured value	Sensor type	DXCa identity code	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 4 measured variable pool 1 ... 16]</i> (Channel 4 actual value)					
Cl	CLE 3	S, C, D	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
			0 ... 20000	Range 0 ... 200 ppm Example: 10000 = 100 ppm	ppm
	CGE	S, D	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
	CLE 3.1		0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
Cl free			0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
Br			0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
ClO2	CDR	S, D	0 ... 200	Range 0 ... 2.00 ppm Example: 50 = 0.50 ppm	ppm

[Ch. 5 measured variable pool 1 ... 16]

Measured value	Sensor type	DXCa identity code 'Use'	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 5 measured variable pool 1 ... 16]</i> (Channel 5 actual value)					
Cl	CLE 3	C	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm

Description of the data objects

Measured value	Sensor type	DXCa identity code 'Use'	Modbus input value (range)	Converted measured value	Unit
			0 ... 20000	Range 0 ... 200 ppm Example: 10000 = 100 ppm	ppm
Cl total	CTE	D	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
Cl bound	CTE	S	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
CIO2-	CLT	S, D	0 ... 200	Range 0 ... 2.00 ppm Example: 50 = 0.50 ppm	ppm

[Ch. 6 measured variable pool 1 ... 16]

Measured value	Sensor type	DXCa identity code 'Use'	Modbus input value (range)	Converted measured value	Unit
[Ch. 6 measured variable pool 1 ... 16] (Channel 6 actual value)					
Cl total	CTE	S	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm
Cl bound	CTE	D	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	ppm

[Ch. 7 measured variable pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[Ch. 7 measured variable pool 1 ... 16] (Channel 7 actual value)			
Ht. above sea level			

[Ch. 8 measured variable pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 8 measured variable pool 1 ... 16]</i> (Channel 8 actual value)			
CANopen turbidity sensor			

[Ch. 9 measured variable pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 9 measured variable pool 1 ... 16]</i> (Channel 9 actual value)			
I1 (edit mode)	0 ... 9999	Dependent on the edited value in the I module	
Q	0 ... 9999	see device formatting	m ³ /h, l/h

[Ch. 10 measured variable pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 10 measured variable pool 1 ... 16]</i> (Channel 10 actual value)			
I2 (edit mode)	0 ... 9999		mA
Ammonia (NH ₃)	0 ... 9999		ppm, mg/l
Hydrogen peroxide (H ₂ O ₂)	0 ... 9999		ppm, mg/l
Peracetic acid (PES)	0 ... 9999		ppm, mg/l
Conductive conductivity	0 ... 9999		µS/cm, mS/cm, S/cm
ClO ₂	0 ... 9999		ppm, mg/l
DO	0 ... 9999		ppm, mg/l

[Ch. 11 measured variable pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 11 measured variable pool 1 ... 16]</i> (Channel 11 actual value)			
I3 (edit mode)			mA
PES	0 ... 9999		ppm/mg/l
Temperature	0 ... 9999		°C
ClO ₂ -	0 ... 9999		ppm/mg/l
UV intensity (UV)	0 ... 9999		W/m ² , mW/cm ²
Turbidity	0 ... 9999		FNU, NTU, FTU, FAU, EBC

5.2 Control values



After starting DULCOMARIN II all actual values are only available on the Modbus after 130 seconds. Measured values that are not available or are incorrect are displayed as 0x7FFF = 32767.

The updating rate of the parameters is 4 seconds per configured pool. This means that with 10 configured pools, all measured values are updated every 40 seconds.

[pH control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[pH control output pool 1 ... 16] (pH control value)	-1000 ... 0 ... 1000	Range: 0 ... 14.00 Example: 720 = 7.20 pH	%

[ORP control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[ORP control output pool 1 ... 16] (ORP control value)	-1000 ... 0 ... 1000	-1200 ... 1200 mV	%

[Tem. Control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[Temp. control output pool 1 ... 16] (Temperature control value)	0 ... 1000	Range: 0 ... 120 °C Example: 130 = 13.0 °C	°C



Interpretation of the data

Dependent upon whether the DULCOMARIN II is equipped with the various modules, the interpretation of the data changes. The following data are consecutively numbered starting with number 4 and thus do not have the actual names of their user data.

[Ch. 4 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[Ch. 4 control output pool 1... 16] (Channel 4 control value)			
Cl, Br, ClO ₂ ,...	0 ... 1000		%

[Ch. 5 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[Ch. 5 control output pool 1 ... 16] (Channel 5 control value)			
Cl bound	-1000 ... 0		%
ClO ₂ -	-1000 ... 0		%

[Ch. 6 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[Ch. 6 control output pool 1 ... 16] (Channel 6 control value)			
Ht. above sea level	0 ... 1000		%

[Ch. 7 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
[Ch. 7 control output pool 1 ... 16] (Channel 7 control value)			
FLOCK	0 ... 1000		%

[Ch. 8 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 8 control output pool 1 ... 16]</i> (Channel 8 control value)			
Ht. above sea level	0 ... 1000		%

[Ch. 9 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 9 control output pool 1 ... 16]</i> (Channel 8 control value)			
Ht. above sea level			%

[Ch. 10 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 10 control output pool 1 ... 16]</i> (Channel 10 control value)			
I2 (edit mode)	0 ... 1000		%
Ammonia (NH3)	0 ... 1000		%
Hydrogen peroxide (H2O2)	0 ... 1000		%
Peracetic acid (PES)	0 ... 1000		%
Conductive conductivity	0 ... 1000		%
ClO2	0 ... 1000		%
DO	0 ... 1000		%

[Ch. 11 control output pool 1 ... 16]

Measured value	Modbus input value (range)	Converted measured value	Unit
<i>[Ch. 11 control output pool 1 ... 16]</i> (Channel 11 control value)			
Ht. above sea level			%

5.3 Error messages

Error messages are coded as a bit field.

Error messages

No.	Description
1	Error pool 1 (32 Bit)
...	
16	Error pool 16 (32 Bit)

Decoding of the error messages

Number	Description
pH actual value channel 1 bit: 0	= 0x00000001 pH measured value invalid
pH actual value channel 1 bit: 1	= 0x00000002 pH measured value min.
pH actual value channel 1 bit: 2	= 0x00000004 pH measured value max.
Channel 2 bit: 3	= 0x00000008 measured value invalid
Channel 2 bit: 4	= 0x00000010 measured value min.
Channel 2 bit: 5	= 0x00000020 measured value max.
Channel 3 bit: 6	= 0x00000040 measured value invalid
Channel 3 bit: 7	= 0x00000080 measured value min.
Channel 3 bit: 8	= 0x00000100 measured value max.
Channel 4 bit: 9	= 0x00000200 measured value invalid
Channel 4 bit: 10	= 0x00000400 measured value min.
Channel 4 bit: 11	= 0x00000800 measured value max.
Channel 5 bit: 12	= 0x00001000 measured value invalid
Channel 5 bit: 13	= 0x00002000 measured value min.
Channel 5 bit: 14	= 0x00004000 measured value max.
Channel 10 bit: 15	= 0x00008000 measured value invalid
Channel 10 bit: 16	= 0x00010000 measured value min.
Channel 10 bit: 17	= 0x00020000 measured value max.
Channel 11 bit: 18	= 0x00040000 measured value invalid
Channel 11 bit: 19	= 0x00080000 measured value min.
Channel 11 bit: 20	= 0x00100000 measured value max.
Bit 21	= 0x00200000 sample water error
Free bit: 22	= 0x00400000
Free bit: 23	= 0x00800000
Free bit: 24	= 0x01000000
Free bit: 25	= 0x02000000
DXMaA bit: 26	= 0x04000000 error

Number	Description
DXMaR bit: 27	= 0x08000000 control valve not ready
DP1 bit: 28	= 0x10000000 metering pump error active
DP2 bit: 29	= 0x20000000 metering pump error active
DP3 bit: 30	= 0x40000000 metering pump error active
DP4 bit: 31	= 0x80000000 metering pump error active
No error	= 0x00000000

6 Acyclic data (3000 and 4000)

The following setpoints are only available via acyclic Modbus RTU traffic and start at Register 0x3000 (acyclic input data) and 0x4000 (acyclic output data).

6.1 Setpoints

pH setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
pH setpoint pool 1 ... 16	0 ... 1400	Range: 0 ... 14.00 Example: 720 = 7.20 pH	---	Read/write

ORP setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
ORP setpoint pool 1 ... 16	-1200 ... +1200	-1200 ... 1200 mV	mV	Read/write

Temperature setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
Temperature setpoint pool 1 ... 16	0 ... 1200	Range: 0 ... 120 °C Example: 130 = 13.0 °C	°C	Read/write

**Interpretation of the data**

Dependent upon whether the DULCOMARIN II is equipped with the various modules, the interpretation of the data changes. The following data are consecutively numbered starting with number 4 and thus do not have the actual names of their user data.

Channel 4 setpoint pool 1 ... 16

Measured value	Sensor type	DXCa identity code	Modbus input value (range)	Converted measured value	Access
Channel 4 setpoint pool 1 ... 16					Read/write
Cl	CLE 3	S, C, D	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
			0 ... 20000	Range 0 .. 200 ppm Example: 10000 = 100 ppm	
	CGE	S, D	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
	CLE 3.1		0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
Cl free			0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
Br			0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
ClO ₂	CDR	S, D	0 ... 200	Range 0 ... 2.00 ppm Example: 50 = 0.50 ppm	

Channel 5 setpoint pool 1 ... 16

Measured value	Sensor type	DXCa identity code "Use"	Modbus input value (range)	Converted measured value	Access
Channel 5 setpoint pool 1 ... 16					Read/write
Cl	CLE 3	C	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
			0 ... 20000	Range 0 ... 200 ppm Example: 10000 = 100 ppm	
Cl total	CTE	D	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
Cl bound	CTE	S	0 ... 1000	Range 0 ... 10.00 ppm Example: 200 = 2.00 ppm	
CIO2-	CLT	S, D	0 ... 200	Range 0 ... 2.00 ppm Example: 50 = 0.50 ppm	

Channel 6 setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
Channel 6 setpoint pool 1 ... 16				Read/write
Ht. above sea level				

Channel 7 setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
Channel 7 setpoint pool 1 ... 16				Read/write
Ht. above sea level				

Channel 8 setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
Channel 8 setpoint pool 1 ... 16				Read/write
Ht. above sea level				

Channel 9 setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
Channel 9 setpoint pool 1 ... 16				Read/write
Ht. above sea level				

Channel 10 setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Access
Channel 10 setpoint pool 1 ... 16			Read/write
I2 (edit mode)	0 ... 9999		
Ammonia (NH3)	0 ... 9999		
Hydrogen peroxide (H2O2)	0 ... 9999		
Peracetic acid (PES)	0 ... 9999		
Conductive conductivity	0 ... 9999		
ClO2	0 ... 9999		
DO	0 ... 9999		

Channel 11 setpoint pool 1 ... 16

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
Channel 11 setpoint pool 1 ... 16				Read/write
Ht. above sea level				

6.2 Pause active

Pause active

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
Pause pool 1 ... 16				Read/write
Pause active = 1 Pause inactive = 0				

Under pause inactive, the corresponding field contains a 0.

6.3 ECO active

Pause active

Measured value	Modbus input value (range)	Converted measured value	Unit	Access
ECO! mode pool 1 ... 16				Read/write
ECO! mode active = 1 inactive = 0				

Under ECO inactive, the corresponding field contains a 0.



After starting DULCOMARIN II all setpoints are only available on the Modbus after 130 seconds.

7 LEDs and addressing

The chapter describes the meaning of the LEDs and the settings for the rotary coding switches.

7.1 Rotary coding switches (addressing)

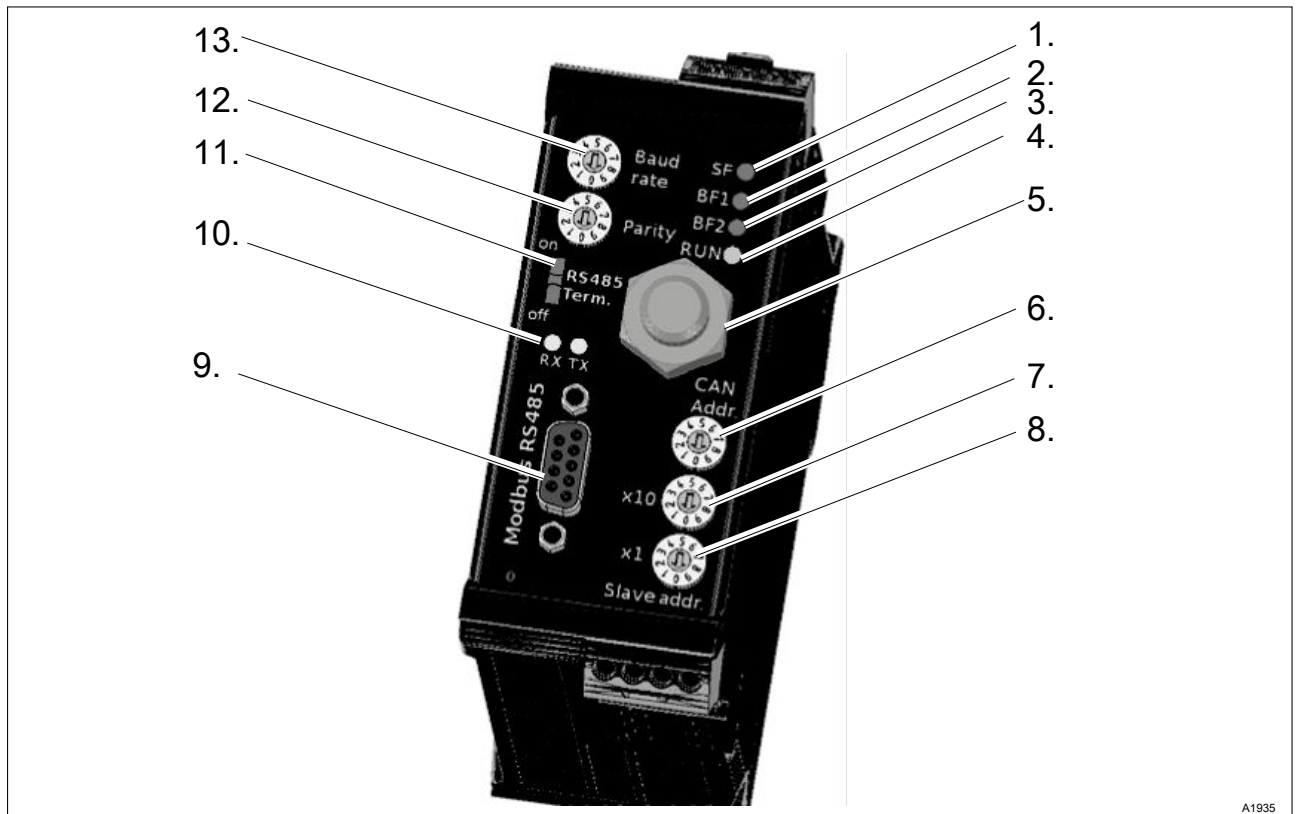


Fig. 7: Rotary coding switches (addressing) / device view

- | | |
|-------------------------------|------------------------------|
| 1. SF LED | 8. [Modbus slave address x1] |
| 2. BF1-LED | 9. DSub Modbus RS485 |
| 3. BF2-LED | 10. RX-TX LED |
| 4. RUN-LED | 11. Modbus bus connector |
| 5. M12 CAN bus connector | 12. Parity |
| 6. CAN bus address | 13. Baud rate |
| 7. [Modbus slave address x10] | |

7.1.1 Setting the baud rate

The baud rate for the serial Modbus connection can be set as follows:

Setting the baud rate

Number	Baud rate in baud
1	2400
2	9600
3	19200
4	57600
5	115200
0, 6, 7, 8, 9	115200

7.1.2 Setting the parity

The parity for the serial Modbus connection can be set as follows:

Setting the parity

Number	Parity
0	No parity
1	No parity
2	Even parity
3	Odd parity
4, 5, 6, 7, 8, 9	No parity

7.1.3 Setting the CAN address

The CAN address can be set as follows:

Setting the CAN address

Number	Address
0	0
1, 2, 3, 4	5
5	5
6	6
7, 8, 9	5

7.1.4 Setting the Modbus slave address

The Modbus slave address can be set from 1 ... 99.

Setting the Modbus slave address

Number	Address
0	Not specified
1 ... 99	According to the rotary coding switch

7.2 LEDs

7.2.1 BF1-LED

Communication LED (bus error 1). This LED describes the condition of the primary communication protocol.

BF1-LED

LED	Colour	Status	Meaning
BF1	LED (red)		
	Red	Cyclical flashing	STOP, error in communication
	-	OFF	OK

7.2.2 SF LED

Collective error LED This LED describes gateway errors

SF1-LED

LED	Colour	Status	Meaning
SF1	LED (red)		
	Red	ON	General error: Error of the primary or secondary communications system.
	-	OFF	OK

7.2.3 BF2-LED

Communication LED (bus error 2). This LED describes the condition of the secondary (CAN) communication protocol.

BF2-LED

LED	Colour	Status	Meaning
BF2	LED (red)		
	Red	Cyclical flashing	Error CAN bus. No DUL-COMARIN II connected or connection faulty.
	-	OFF	OK

7.2.4 RUN-LED

The RUN-LED informs about the error-free state of the gateway.

RUN-LED

LED	Colour	Status	Meaning
BF2	LED (green)		
	green	ON	OK
	-	OFF	Error. See error LEDs SF, BF1 or BF2.

8 Troubleshooting

Signalisation	Possible errors	Remedy
None of the LEDs illuminates or flashes.	No 24V voltage supply. Device defective.	Ensure that the gateway has a 24V supply. Check the polarity of the input voltage.
BF1 illuminates.	Faulty connection to the Modbus master.	Check the bus cable for short circuits or breaks. Check whether the terminating resistances are switched on at the first and last bus members. Check and change the transmission rate (e.g. in the Step 7)
BF2 illuminate or flashes. (CAN bus error).	No or faulty physical connection to the DULCO-MARIN II.	Check the CAN bus cable for short circuits and breaks. Check whether the terminating resistances are set at the first and last CAN members.
SF illuminates.	Faulty Modbus connection or no CAN bus connection. Internal error.	Check the CAN bus cable for short circuits and breaks. Check whether the terminating resistances are set at the first and last CAN members.
One or more measured values indicate the value "0x7FFF or 32767".	This value means that the measured value does not exist. You have selected a measured value that is not available in the DULCO-MARIN II.	Adjust your configuration (e.g. in the Step 7).
The DXCa Modbus gateway is not responding to a telegram	Incorrect Modbus address set. Incorrect CRC sum.	Check the address at the gateway and in your master application. Check the calculation of the CRC sum.



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