

Neon® Multi
Krypton® Multi



Short manual modbus RTU

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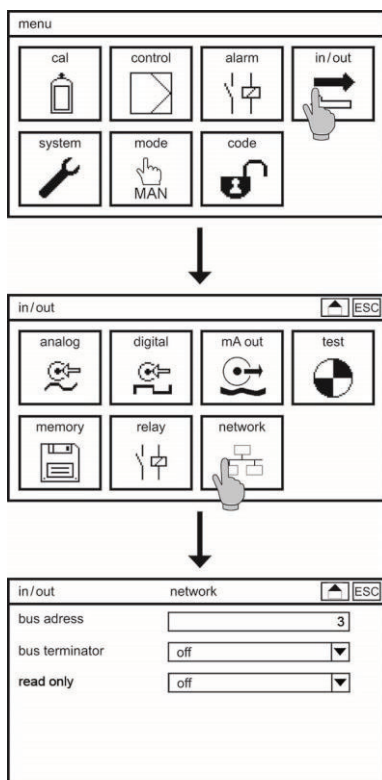
2 Neon Multi: Add on Modbus RTU

The instruments are optionally available with a serial interface RS 485 Modbus RTU. To use this function you have to install the RS 485 circuit-board, observing the ESD-directive, and activate the software with the appropriate add-on code obtained from Kuntze Instruments.

When setting up a bus with several instruments, mind that the instruments are connected in line, not radially. Both ends of a long bus connection should be terminated with termination resistors of 120 Ohm. You can activate the termination via menu.

NOTE

Activate the bus termination only at the ends of the line. If you activate terminations somewhere in-between, this might cause malfunction in the bus communication.



Select the symbol IN/OUT in the main menu and in the submenu, select the symbol NETWORK. Here you can set the following parameters:

Bus address

Assign a different number to each instrument in your bus system. With this number, you can address the instrument from the master instrument to read out data.

Bus termination

If you select ON from the drop-down list, the termination is activated for this instrument.

2.1 How to read out data

Request a variable

Function code	1 Byte	0x03
Start register	2 Bytes	0x0000 to 0xFFFF
Number of registers	2 Bytes	1 bis 125 (0x7D)

Answer of the device

Function code	1 Byte	0x03
Bytes	1 Byte	2 x N*
Register value	N* x 2 Bytes	

*N = number of registers

Write single register

Function code	1 Byte	0x06
Register	2 Bytes	0x0000 bis 0xFFFF

Write multiple registers

Function code	1 Byte	0x10
Start register	2 Bytes	0x0000 to 0xFFFF
Number of registers	2 Bytes	1 bis 125 (0x7D)

2.2 Communication Parameter

Baudrate: 19200 bps
 Data bits: 8
 Stop bits: 1
 Parity: even
 MODBUS address: selectable between 1-31, factory setting: 1

2.3 Registers

The NEON Multi provides the following variables:

- Measured values: pH, temperature, DIS 1, opt. Rx and EC or DIS 2 and their respective raw values
- Controller outputs: S1 and S2 for controllers and volume-based dosing
- Status of digital inputs and outputs: digital inputs 1-6, relays 1-8
- Event messages
- Calibration results as in the Cal/Info menu
- Instrument data incl. activated add-ons

All parameter settings can be read and most parameters can be set via the interface.

All test functions can be activated via the interface.

2.3.1 How to read variables

Each variable has at least three registers. The first register contains the value, the second in the lower 8 bit the number of decimal places and in Bit 8 the percentage flag, which is set if a value is expressed as percentage of a given range. In that case, the value of the first register lies within 0 (0%) and 10000 (100%). The third register contains a code indicating a unit or text – refer to table “units and texts”.

Numerical values with a limited range have two additional registers specifying the minimum and maximum value of the range.

Example for a numerical value without percentage flag:

The temperature is listed as follows:

1. register: 4160, number of registers: 5

If you read these five registers, the response is as follows:

Reg. 1 (4160)	Reg. 2 (4161)	Reg. 3 (4162)	Reg. 4 (4163)	Reg. 5 (4164)
250d	1d	1001d	0d	500d
Value	Number of decimal places	Code of unit (°C)	Minimum of range	Maximum of range

The 1 in the second register means:

- Value and range limits have to be divided by 10 to achieve one decimal place.
- The percentage flag is not set. Otherwise the number in the second register would be 257 (=256+1; expressed as hexadecimal value 0101h). The value is not a percentage of the range but already the true measured value.

The first register gives the value 250. This represents a temperature of 25.0 and from the third register the unit °C.

Registers four and five show the range of the temperature measurement, which is 0.0 50.0°C.

Example for a numerical value with percentage flag:

The lower limit is listed as follows:

1.register: 11512, number of registers: 5

If you read these five registers, the response is as follows:

Reg. 1 (11512)	Reg. 2 (11513)	Reg. 3 (11514)	Reg. 4 (11515)	Reg. 5 (11516)
0d (0457h)	258d (0102h)	1422d (058h)	0d (FF38h)	1400d (0640h)
Value	Number of decimal places	Code of unit (°C)	Minimum of range	Maximum of range

The 258 in the second register means:

- Percentage flag is set, the value is increased by 256 (expressed as hexadecimal value 0102h). The value is a percentage of the range. The true value has to be calculated from the range.
- After deducting the 256, in the second register remains a 2. Measured value and range limits have to be divided by 100 to achieve two decimal places.

Registers 4 and 5 show the range of the lower limit, which is 0.00...14.00 and the third register shows the unit pH. The value of the first register is 0. Calculate $0 \cdot (14) / 100$ and you will find that the value is 0 above the minimum of the range = pH 0.

NOTE

Text variables have 25 registers, each containing one character expressed in Ascii code. Text variables have no registers for decimal place, unit, or range.

2.3.2 Measured Values, controller outputs and digital in-/outputs

In addition to the measured values, the RAW-values of the sensors can be read-out.

These RAW-values are not influence by calibration or compensations and can be useful for troubleshooting the device.

Name	1. register	Number of registers	Type	Bytes
Measured pH value	4136	5	i_16	2
Measured temperature value	4160	5	i_16	2
Measured DIS 1 value	4680	5	i_16	2
Measured DIS 2 value	6000	5	i_16	2
Measured Redox value	4688	3	i_16	2
Measured EC value	4728	5	i_16	2
Measured OCI value	5832	3	i_16	2
RAW Value pH	4440	3	i_16	2
RAW Value temperature	4448	3	i_16	2
RAW Value DIS 1	4656	3	i_16	2
RAW Value Redox	4664	3	i_16	2
RAW Value EC	4736	3	i_16	2
Controller S1 pH	7608	5	i_16	2
Controller S2 pH	7616	5	i_16	2
Controller S1 DIS 1	7624	5	i_16	2
Controller S2 DIS 1	7632	5	i_16	2
Controller S1 Redox	7640	5	i_16	2
Controller S2 Redox	7648	5	i_16	2
Controller S1 EC	7656	5	i_16	2
Status digital input 1	6152	3	u_8	1
Status digital input 2	6184	3	u_8	1
Status digital input 3	7536	3	u_8	1
Status digital input 4	7544	3	u_8	1

Status digital input 5	7552	3	u_8	1
Status digital input 6	7560	3	u_8	1
Status Relay 1	6544	3	u_16	2
Status Relay 2	6568	3	u_16	2
Status Relay 3	6592	3	u_16	2
Status Relay 4	7568	3	u_16	2
Status Relay 5	7576	3	u_16	2
Status Relay 6	7584	3	u_16	2
Status Relay 7	7592	3	u_16	2
Status Relay 8	7600	3	u_16	2

2.3.3 Event messages and calibration results

Up to 100 event messages (current and logged) as well as the up to 10 logged calibration results of the Cal/Info menu are available via interface.

The index (registers 200 and 100) shows which entry is the first.

The time has three registers: Day+month contains the day in the upper 8 bits and the month in the lower 8 bits. Year+hour contains the year in the upper 8 bits and the hour in the lower 8 bits. Minute+second contains the minutes in the upper 8 bits and the seconds in the lower 8 bits.

For event messages, a code indicates the nature of the event – refer to table „event codes“.

Name	Register	Type	Bytes
Event log, index first entry	200	u_8	1
first entry day+month	201	u_16	2
first entry year+hour	202	u_16	2
first entry minute+second	203	u_16	2
first entry code (refer to the following table)	204	u_16	2
second entry day+month	205	u_16	2
...			
100. entry code	600	u_16	2
Calibration log, index first entry	100	u_8	1
first entry day+month	101	u_16	2
first entry year+hour	102	u_16	2
first entry minute+second	103	u_16	2
First entry slope	104	u_16	2
First entry zero-point	105	u_16	2

second entry day+month	106	u_16	2
...			
Tenth entry zero-point	150	u_16	2

Table event-codes

Code	Event
3	Start
4-12, 32	Internal error
14	Check pH input
15	Check temperature input
16	Check DIS 1 input
17	Check Rx input
18	Check DIS 2 input
19	Check EC input
20	Below measurement range pH
21	Above measurement range pH
22	Below measurement range Temp
23	Above measurement range Temp
24	Below measurement range DIS 1
25	Above measurement range DIS 1
26	Below measurement range Rx
27	Above measurement range Rx
28	Below measurement range DIS 2
29	Above measurement range DIS 2
30	Below measurement range EC
31	Above measurement range EC
33	Zero-point pH
34	Zero-point Rx
35	Zero-point DIS 1
36	Zero-point EC
38	Zero-point DIS 2
39	Slope pH
40	Slope DIS 1
41	Slope Rx
42	Slope EC
44	Slope DIS 2
45	Calibration pH

46	Calibration DIS 1
47	Calibration Rx
48	Calibration Temperature
49	Calibration EC
51	Calibration DIS 2
52	Clean filter
53	Clean armature
54	Clean sensors
55	Clean seals
56	Check safety functions
57	Change sensor pH
58	Change sensor DIS 1
59	Change sensor Rx
62	Change sensor DIS 2
65	SD card: logging stop
66	No SD card for saving
67	No SD card
68	SD card: invalid format
69	SD card: full
70	SD card: load error
71	SD card: saving error
72	SD card: write error
73	SD card: read error
75	No communication with the measurement module
76	Unknown measurement module
77	No program file
78	Unknown program file
80	Lower limit pH
81	Upper limit pH
82	Lower limit DIS 1
83	Upper limit DIS 1
84	Lower limit Rx
85	Upper limit Rx
86	Lower limit Temp
87	Upper limit Temp
88	Lower limit EC
89	Upper limit EC
92	Lower limit DIS 2

93	Upper limit DIS 2
94	Digital input 1 „no water“
95	Digital input 2 „External Stopp“
96	Digital input 3 „level“
97	Digital input 4 „level“
98	Digital input 5 „eco-Mode“
99	Digital input 6 „leakage“
100	Dosage surveillance
101	Relay 3 (alarm relay)
102	Error RS485
103	Delay-time controller
104	Delay-time controller pH
105	Delay-time controller DIS 1
106	Delay-time controller Rx
107	Delay-time controller EC
109	Delay-time controller DIS 2
110	mA 1 out of range
111	mA 2 out of range
112	mA 3 out of range
113	mA 4 out of range
114	mA 5 out of range
115	Load impedance mA 1 too high
116	Load impedance mA 2 too high
117	Load impedance mA 3 too high
118	Load impedance mA 4 too high
119	Load impedance mA 5 too high
120	Calibration
122	Delay time cleaning
123	Cleaning
124	Cleaning – base load dosing

NOTE

For events listed as „going“ in the eventlog, the numerical value is increased by 126

2.3.4 Instrument data

Via the interface, all information on the instrument is available, including which add-ons are activated (read-only). Information on the measurement module and the add-ons are coded as 32-bit, refer to table "Add-ons".

Name	Register	Number of registers	Typ	Bytes
ID	2056	4	u_32	4
Serial number	1024	12	string	24
Hardware version	2464	4	u_32	4
Production date	2448	4	u_32	4
Activated add-ons	2128	4	u_32	4
Software version	1056	10	string	20
Operating hours	2080	4	u_32	4

Table of activated add-ons (register 2128)

The add-ons are coded as 32-Bit value as follows:

Bitnumber	Option
9	pH (always available & activated. Value=0 by default!)
10	Rx
11	DIS 1
12	EC
14	DIS 2
19	Add-on analog outputs
20	Add-on controller
22	Add-on Modbus RTU
24	Add-on Data log
25	Add-on ASR

Table Coding Alarm relay (register 2128)

The alarm parameters are coded in the lower four bits of the active relay.

Bitnumber	Option
0	Relay 5
1	Relay 6
2	Relay 7
3	Relay 8

2.3.5 How to read and write parameter settings

Parameter registers are similar to the registers described above, but here you can change the settings via the interface. Mind the ranges and the percentage-flag – if a variable is expressed as percentage of a range, a new value must also be expressed that way. Besides the percentage calculation, the range indicates what values are possible for a variable. Since the ranges can change according to settings or selections, the range has to be read prior to writing and thereby determining the range, the percentage-flag setting, and the number of decimal places.

Text variables contain one character per register in ASCII code. Mind the maximum text length.

NOTE

The parameters are listed in the order of their description in this manual, i. e. Code, Mode, IN/OUT, System, Alarm, and Add-ons. Mind that not all parameters listed are available in your instrument, according to settings and activated add-ons.

Name	1. register	Number of registers	Type	Bytes	Read/write	Range
Code	2096	8	u_32	4	no	yes
Operation mode	2240	3	u_8	1	yes	no
Setting for the measurement:						
Parameter: pR						
Buffer 1	4400	5	i_16	2	yes	yes
Buffer 2	4408	5	i_16	2	yes	yes
Average	5664	3	u_8	1	yes	no
Temp.compensation	10248	3	u_8	1	yes	no
Parameter: Temperature						
Unit	10280	3	u_8	1	yes	no
Correction value	4384	5	i_16	2	yes	yes
Manual value	4392	5	i_16	2	yes	yes
Parameter: DIS 1						
Measurement	4464	3	u_8	1	yes	no
Unit	4616	3	u_8	1	yes	no
Measurement range	4536	3	u_8	1	yes	no
Average	5648	3	u_8	1	yes	no
Cleaning	4624	5	u_8	1	yes	yes
Start time	4632	4	u_32	4	yes	no
Start date	4648	4	u_32	4	yes	no
Base load	4640	3	u_8	1	yes	no

Temp.compensation.	5648	3	u_8	1	yes	no
Temp.coeff.	10264	5	i_16	2	yes	yes
Parameter: DIS 2						
Average	5656	3	u_8	1	yes	no
Temp.compensation.	5752	3	u_8	1	yes	no
Temp.coeff..	10320	5	i_16	2	yes	yes
Org. Chlorine	10336	3	u_8	1	yes	no
Parameter: Conductivity						
Cell constant	10288	5	u_16	2	yes	yes
Average	5688	3	u_8	1	yes	no
Digital Inputs						
Digital input 1 contact	10416	3	u_8	1	yes	no
Digital input 2 contact	10424	3	u_8	1	yes	no
Digital input 3 contact	10432	3	u_8	1	yes	no
Digital input 4 contact	10440	3	u_8	1	yes	no
Digital input 5 contact	10448	3	u_8	1	yes	no
Digital input 6 contact	10456	3	u_8	1	yes	no
Digital input 6 assignment	10792	3	u_8	1	yes	no
Digital input 6 dose rate	10320	5	i_16	2	yes	yes
System						
Language	2200	3	u_8	1	yes	no
Time	0	2	u_32	4	yes	no
Display contrast	2208	3	u_8	1	yes	no
Desktop design	2216	3	u_8	1	yes	no
Autolock design	2224	5	u_8	1	yes	yes
Screen saver time	2232	5	u_8	1	yes	yes
Text	1216	10	string	20	yes	no
Company	1120	25	string	50	yes	no
Name	1152	21	string	42	yes	no
Phone	1184	21	string	42	yes	no
Alarm						
Lower limit pH	11512	5	i_16	2	yes	yes
Upper limit pH	11520	5	i_16	2	yes	yes
Lower limit DIS 1	11528	5	i_16	2	yes	yes
Upper limit DIS 1	11536	5	i_16	2	yes	yes
Lower limit Rx	11544	5	i_16	2	yes	yes
Upper limit Rx	11552	5	i_16	2	yes	yes

Lower limit T	11560	5	i_16	2	yes	yes
Upper limit T	11568	5	i_16	2	yes	yes
Lower limit EC	11576	5	i_16	2	yes	yes
Upper limit EC	11584	5	i_16	2	yes	yes
Lower limit DIS 2	11608	5	i_16	2	yes	yes
Upper limit DIS 2	11616	5	i_16	2	yes	yes
Alarm delay	6328	5	u_16	2	yes	yes
Alarm actions						
Zeropoints	11624	3	u_8	1	yes	yes
Slope	11632	3	u_8	1	yes	yes
Measuring range pH	11640	3	u_8	1	yes	yes
Measuring range DIS 1	11648	3	u_8	1	yes	yes
Measuring range Rx	11656	3	u_8	1	yes	yes
Measuring range Temp	11664	3	u_8	1	yes	yes
Measuring range EC	11672	3	u_8	1	yes	yes
Measuring range DIS 2	11688	3	u_8	1	yes	yes
Limits pH	11696	3	u_8	1	yes	yes
Limits DIS 1	11704	3	u_8	1	yes	yes
Limits Rx	11712	3	u_8	1	yes	yes
Limits Temp	11720	3	u_8	1	yes	yes
Limits EC	11728	3	u_8	1	yes	yes
Limits DIS 2	11744	3	u_8	1	yes	yes
DI 1 – no water	11752	3	u_8	1	yes	yes
DI 2 – ext. Contr.-stop	11760	3	u_8	1	yes	yes
DI 3 – level	11768	3	u_8	1	yes	yes
DI 4 – level	11776	3	u_8	1	yes	yes
SD-card error	11784	3	u_8	1	yes	yes
Load impedance mA	11792	3	u_8	1	yes	yes
Relays						
Rel.6 assignment	10792	3	u_8	1	yes	no
Rel.6 dose rate	10800	5	i_16	2	yes	yes
Rel.6 lower limit	10808	5	i_16	2	yes	no
Rel.6 upper limit	10816	5	i_16	2	yes	no
Rel.6 circulation	10824	5	i_16	2	yes	no
Rel.6 pump power	10832	5	i_16	2	yes	yes
Rel.6 dosage	10840	5	i_16	2	yes	no
Rel.6 min. pulse	10848	5	i_16	2	yes	no
Rel.6 pulse-pause	10856	5	i_16	2	yes	no

Rel.7 assignment	11816	3	u_8	1	yes	no
Rel.8 assignment	11824	3	u_8	1	yes	no

Controllers

Depending on the purchased Add-ons, the following parameters are available for read-out and partially changeable via the interface.

Controller pH						
pH standart (Std) controller type	8304	3	u_8	1	yes	no
pH Std Direction	8320	3	u_8	1	yes	no
pH Std Setpoint	8312	5	i_16	2	yes	yes
pH Std Hysteresis	8376	5	i_16	2	yes	yes
pH Std p-range	8328	5	i_16	2	yes	yes
pH Std Integral time	8336	5	i_16	2	yes	yes
pH Std differential time	8344	5	i_16	2	yes	yes
pH Std Puls-Frequenz	8368	5	u_16	2	yes	yes
pH Std Puls-Pause	8360	5	u_16	2	yes	yes
pH Std min. pulse	8352	5	u_16	2	yes	yes
pH Std motor run time	8384	5	u_16	2	yes	yes
pH eco Controller type	8392	3	u_8	1	yes	no
pH eco Direction	8408	3	u_8	1	yes	no
pH eco Setpoint	8400	5	i_16	2	yes	yes
pH eco Hysteresis	8464	5	i_16	2	yes	yes
pH eco p-range	8416	5	i_16	2	yes	yes
pH eco integral time	8424	5	i_16	2	yes	yes
pH eco differential time	8432	5	i_16	2	yes	yes
pH eco Pulse frequency	8456	5	u_16	2	yes	yes
pH eco Pulse pause	8448	5	u_16	2	yes	yes
pH eco Min. pulse	8440	5	u_16	2	yes	yes
pH eco Motor run time	8472	5	u_16	2	yes	yes
pH 3rd Set of param. Controller type	8480	3	u_8	1	yes	no
pH 3rd PS Direction	8496	3	u_8	1	yes	no
pH 3rd PS Setpoint	8488	5	i_16	2	yes	yes
pH 3rd PS Hysteresis	8552	5	i_16	2	yes	yes
pH 3rd PS p-range	8504	5	i_16	2	yes	yes
pH 3rd PS Integral time	8512	5	i_16	2	yes	yes

pH 3rd PS differential time	8520	5	i_16	2	yes	yes
pH 3rd PS Pulse frequency	8544	5	u_16	2	yes	yes
pH 3rd PS Pulse pause	8536	5	u_16	2	yes	yes
pH 3rd PS Min. pulse	8528	5	u_16	2	yes	yes
pH 3rd PS Motor run time	8560	5	u_16	2	yes	yes
Controller DIS 1						
DIS 1 Std Controller type	8568	3	u_8	1	yes	no
DIS 1 Std Direction	8584	3	u_8	1	yes	no
DIS 1 Std Priority pH	8656	3	u_8	1	yes	no
DIS 1 Std Setpoint	8576	5	i_16	2	yes	yes
DIS 1 Std Hysteresis	8640	5	i_16	2	yes	yes
DIS 1 Std p-range	8592	5	i_16	2	yes	yes
DIS 1 Std Integral time	8600	5	i_16	2	yes	yes
DIS 1 Std Differential time	8608	5	i_16	2	yes	yes
DIS 1 Std Pulse frequency	8632	5	u_16	2	yes	yes
DIS 1 Std Pulse pause	8624	5	u_16	2	yes	yes
DIS 1 Std Min. pulse	8616	5	u_16	2	yes	yes
DIS 1 Std Motor run time	8648	5	u_16	2	yes	yes
DIS 1 eco Controller type	8664	3	u_8	1	yes	no
DIS 1 eco Direction	8680	3	u_8	1	yes	no
DIS 1 eco Priority pH	8752	3	u_8	1	yes	no
DIS 1 eco Setpoint	8672	5	i_16	2	yes	yes
DIS 1 eco Hysteresis	8736	5	i_16	2	yes	yes
DIS 1 eco p-range	8688	5	i_16	2	yes	yes
DIS 1 eco Integral time	8696	5	i_16	2	yes	yes
DIS 1 eco Differential time	8704	5	i_16	2	yes	yes
DIS 1 eco Pulse frequency	8728	5	u_16	2	yes	yes
DIS 1 eco Pulse pause	8720	5	u_16	2	yes	yes
DIS 1 eco Min. pulse	8712	5	u_16	2	yes	yes
DIS 1 eco Motor run time	8744	5	u_16	2	yes	yes

DIS 1 3rd Set of param. Contr. type	8760	3	u_8	1	yes	no
DIS 1 3rd PS Direction	8776	3	u_8	1	yes	no
DIS 1 3rd PS Priority pH	8848	3	u_8	1	yes	no
DIS 1 3rd PS Setpoint	8768	5	i_16	2	yes	yes
DIS 1 3rd PS Hysteresis	8832	5	i_16	2	yes	yes
DIS 1 3rd PS p-range	8784	5	i_16	2	yes	yes
DIS 1 3rd PS Integral time	8792	5	i_16	2	yes	yes
DIS 1 3rd PS Differential time	8800	5	i_16	2	yes	yes
DIS 1 3rd PS Pulse frequency	8824	5	u_16	2	yes	yes
DIS 1 3rd PS Pulse pause	8816	5	u_16	2	yes	yes
DIS 1 3rd PS Min. pulse	8808	5	u_16	2	yes	yes
DIS 1 3rd PS Motor run time	8840	5	u_16	2	yes	yes
Controller Rx (Add-on)						
Rx Standard Controller type	8856	3	u_8	1	yes	no
Rx Std Direction	8872	3	u_8	1	yes	no
Rx Std Setpoint	8864	5	i_16	2	yes	yes
Rx Std Hysteresis	8928	5	i_16	2	yes	yes
Rx Std p-range	8880	5	i_16	2	yes	yes
Rx Std Integral time	8888	5	i_16	2	yes	yes
Rx Std Differential time	8896	5	i_16	2	yes	yes
Rx Std Pulse frequency	8920	5	u_16	2	yes	yes
Rx Std Pulse pause	8912	5	u_16	2	yes	yes
Rx Std Min. pulse	8904	5	u_16	2	yes	yes
Rx Std Motor run time	8936	5	u_16	2	yes	yes
Rx eco Controller type	8944	3	u_8	1	yes	no
Rx eco Direction	8960	3	u_8	1	yes	no
Rx eco Setpoint	8952	5	i_16	2	yes	yes
Rx eco Hysteresis	9016	5	i_16	2	yes	yes
Rx eco p-range	8968	5	i_16	2	yes	yes
Rx eco Integral time	8976	5	i_16	2	yes	yes
Rx eco Differential time	8984	5	i_16	2	yes	yes
Rx eco Pulse frequency	9008	5	u_16	2	yes	yes
Rx eco Pulse pause	9000	5	u_16	2	yes	yes

pH eco Min. pulse	8992	5	u_16	2	yes	yes
Rx eco Motor run time	9024	5	u_16	2	yes	yes
Rx 3rd Set of param. Controller type	9032	3	u_8	1	yes	no
Rx 3rd PS Direction	9048	3	u_8	1	yes	no
Rx 3rd PS Setpoint	9040	5	i_16	2	yes	yes
Rx 3rd PS Hysteresis	9104	5	i_16	2	yes	yes
Rx 3rd PS p-range	9056	5	i_16	2	yes	yes
Rx 3rd PS Integral time	9064	5	i_16	2	yes	yes
Rx 3rd PS Differential time	9072	5	i_16	2	yes	yes
Rx 3rd PS Pulse frequency	9096	5	u_16	2	yes	yes
Rx 3rd PS Pulse pause	9088	5	u_16	2	yes	yes
Rx 3rd PS Min. pulse	9080	5	u_16	2	yes	yes
Rx 3rd PS Motor run time	9112	5	u_16	2	yes	yes
Controller EC (Add-on)						
EC Standard Controller type	9120	3	u_8	1	yes	no
EC Std Direction	9136	3	u_8	1	yes	no
EC Std Setpoint	9128	5	i_16	2	yes	yes
EC Std Hysteresis	9192	5	i_16	2	yes	yes
EC Std p-range	9144	5	i_16	2	yes	yes
EC Std Integral time	9152	5	i_16	2	yes	yes
EC Std Differential time	9160	5	i_16	2	yes	yes
EC Std Pulse frequency	9184	5	u_16	2	yes	yes
EC Std Pulse pause	9176	5	u_16	2	yes	yes
EC Std Min. pulse	9168	5	u_16	2	yes	yes
EC eco Controller type	9200	3	u_8	1	yes	no
EC eco Direction	9216	3	u_8	1	yes	no
EC eco Setpoint	9208	5	i_16	2	yes	yes
EC eco Hysteresis	9272	5	i_16	2	yes	yes
EC eco p-range	9224	5	i_16	2	yes	yes
EC eco Integral time	9232	5	i_16	2	yes	yes
EC eco Differential time	9240	5	i_16	2	yes	yes
EC eco Pulse frequency	9264	5	u_16	2	yes	yes
EC eco Pulse pause	9256	5	u_16	2	yes	yes
EC eco Min. pulse	9248	5	u_16	2	yes	yes

EC 3rd Set of param. Controller type	9280	3	u_8	1	yes	no
EC 3rd PS Direction	9296	3	u_8	1	yes	no
EC 3rd PS Setpoint	9288	5	i_16	2	yes	yes
EC 3rd PS Hysteresis	9352	5	i_16	2	yes	yes
EC 3rd PS p-range	9304	5	i_16	2	yes	yes
EC 3rd PS Integral time	9312	5	i_16	2	yes	yes
EC 3rd PS Differential time	9320	5	i_16	2	yes	yes
EC 3rd PS Pulse frequency	9344	5	u_16	2	yes	yes
EC3rd PS Pulse pause	9336	5	u_16	2	yes	yes
EC 3rd PS Min. pulse	9328	5	u_16	2	yes	yes
Controller DIS 2 (Add-on)						
DIS 2 Standard Controller type	9624	3	u_8	1	yes	no
DIS 2 Std Direction	9640	3	u_8	1	yes	no
DIS 2 Std Setpoint	9632	5	i_16	2	yes	yes
DIS 2 Std pH Priority	9704	3	u_8	1	yes	no
DIS 2 Std Hysteresis	9432	5	i_16	2	yes	yes
DIS 2 Std p-range	9648	5	i_16	2	yes	yes
DIS 2 Std Integral time	9656	5	i_16	2	yes	yes
DIS 2 Std Differential time	9664	5	i_16	2	yes	yes
DIS 2 Std Pulse frequency	9672	5	u_16	2	yes	yes
DIS 2 Std Pulse pause	9680	5	u_16	2	yes	yes
DIS 2 Std Min. pulse	9688	5	u_16	2	yes	yes
DIS 2 eco Controller type	9712	3	u_8	1	yes	no
DIS 2 eco Direction	9728	3	u_8	1	yes	no
DIS 2 eco Setpoint	9720	5	i_16	2	yes	yes
DIS 2 eco pH Priority	9792	3	u_8	1	yes	no
DIS 2 eco Hysteresis	9528	5	i_16	2	yes	yes
DIS 2 eco p-range	9736	5	i_16	2	yes	yes
DIS 2 eco Integral time	9744	5	i_16	2	yes	yes
DIS 2 eco Differential time	9752	5	i_16	2	yes	yes
DIS 2 eco Pulse frequency	9776	5	u_16	2	yes	yes
DIS 2 eco Pulse pause	9768	5	u_16	2	yes	yes

DIS 2 eco Min. pulse	9760	5	u_16	2	yes	yes
DIS 2 3rd Set of param. Contr. type	9800	3	u_8	1	yes	no
DIS 2 3rd PS Direction	9816	3	u_8	1	yes	no
DIS 2 3rd PS Setpoint	9808	5	i_16	2	yes	yes
DIS 2 3rd PS pH Priority	9880	3	u_8	1	yes	no
DIS 2 3rd PS Hysteresis	9608	5	i_16	2	yes	yes
DIS 2 3rd PS p-range	9824	5	i_16	2	yes	yes
DIS 2 3rd PS Integral time	9832	5	i_16	2	yes	yes
DIS 2 3rd PS Differential time	9840	5	i_16	2	yes	yes
DIS 2 3rd PS Pulse frequency	9864	5	u_16	2	yes	yes
DIS 23rd PS Pulse pause	9856	5	u_16	2	yes	yes
DIS 2 3rd PS Min. pulse	9848	5	u_16	2	yes	yes
Delay time	6680	5	u_16	2	yes	yes

Activated add-ons

Register 2128 indicates which add-ons are activated, as recently described. Dependent on that, some or all of the following parameters are available:

Name	1. Reg.	Number of registers	Type	Bytes	Write ?	Range
Add-on: Data log						
Intervall	10720	3	u_8	1	yes	yes
Trend pH	10728	3	u_8	1	yes	yes
Trend DIS 1	10736	3	u_8	1	yes	yes
Trend Rx	10744	3	u_8	1	yes	yes
Trend Temp	10752	3	u_8	1	yes	yes
Trend EC	10760	3	u_8	1	yes	yes
Trend OCI	10776	3	u_8	1	yes	yes
Trend DIS 2	10784	3	u_8	1	yes	yes
Intervall	6488	8	u_32	4	yes	yes
Mode	6496	3	u_8	1	yes	no
Logstatus pH	6504	3	u_8	1	yes	no
Logstatus DIS 1	7456	3	u_8	1	yes	no
Logstatus Temp	6512	3	u_8	1	yes	no

Logstatus Rx	10664	3	u_8	1	yes	no
Logstatus EC	10672	3	u_8	1	yes	no
Logstatus OCI	10688	3	u_8	1	yes	no
Logstatus DIS 2	10696	3	u_8	1	yes	no
Logstatus Raw Values	10712	3	u_8	1	yes	no
Logstatus Controller	7464	3	u_8	1	yes	no
Add-on: Analog-Outputs						
mA1 22mA alarm	6368	3	u_8	1	yes	no
mA1 range	6376	3	u_8	1	yes	no
mA1 assignment	6384	3	u_8	1	yes	no
mA1 range min.	6392	5	i_16	2	yes	yes
mA1 range max.	6400	5	i_16	2	yes	yes
mA2 22mA alarm	6432	3	u_8	1	yes	no
mA2 range	6440	3	u_8	1	yes	no
mA2 assignment	6448	3	u_8	1	yes	no
mA2 range min.	6456	5	i_16	2	yes	yes
mA2 range max.	6464	5	i_16	2	yes	yes
mA3 22mA alarm	10472	3	u_8	1	yes	no
mA3 range	10480	3	u_8	1	yes	no
mA3 assignment	10488	3	u_8	1	yes	no
mA3 range min.	10496	5	i_16	2	yes	yes
mA3 range max.	10504	5	i_16	2	yes	yes
mA4 22mA alarm	10512	3	u_8	1	yes	no
mA4 range	10520	3	u_8	1	yes	no
mA4 assignment	10528	3	u_8	1	yes	no
mA4 range min.	10536	5	i_16	2	yes	yes
mA4 range max.	10544	5	i_16	2	yes	yes
mA5 22mA alarm	10552	3	u_8	1	yes	no
mA5 range	10560	3	u_8	1	yes	no
mA5 assignment	10568	3	u_8	1	yes	no
mA5 range min.	10576	5	i_16	2	yes	yes
mA5 range max.	10584	5	i_16	2	yes	yes
Option: Modbus RTU						
Bus adress	6608	5	u_16	2	no	yes
Bus termination	6640	3	u_8	1	yes	no

Expert Menu

In Expert menus, the following parameters are readable and partially changeable via the interface:

Name	1. Reg.	Number of registers	Type	Bytes	Write?	Range
Maintenance cal.pH	10864	5	i_16	2	yes	yes
Maintenance cal.DIS 1	10872	5	i_16	2	yes	yes
Maintenance cal.Rx	10880	5	i_16	2	yes	yes
Maintenance cal.Temp.	10888	5	i_16	2	yes	yes
Maintenance cal.EC	10896	5	i_16	2	yes	yes
Maintenance cal.DIS 2	10912	5	i_16	2	yes	yes
Maintenance clean filter	10920	5	i_16	2	yes	yes
Maintenance clean armature	10928	5	i_16	2	yes	yes
Maintenance clean sensor	10936	5	u_16	2	yes	yes
Maintenance check seals	10944	5	u_16	2	yes	yes
Maintenance check safety functions	10952	5	u_16	2	yes	yes
Maintenance change sensor DIS 2	11000	5	i_16	2	yes	yes
Maintenance change sensor pH	10960	5	i_16	2	yes	yes
Maintenance change sensor DIS 1	10968	5	i_16	2	yes	yes
Maintenance change sensor Rx	10976	5	i_16	2	yes	yes
Code calibration layer 0202	1408	12	string	24	no	yes
Code parameter layer 1612	1440	12	string	24	no	yes
Code expert layer 1818	1472	12	string	24	no	yes

2.3.6 Units and text

The following table contains the codes of the units and text of the third register of the variables:

Code	Unit
1001	°C
1054	s
1058	min
1059	h
1060	days
1211	mA
1243	mV
1283	MOhm
1302	mS/cm
1342	%
1353	l/h
1422	pH
1423	ppm
1552	μS/cm
1558	mg/l
1559	μg/l
1660	Times per week
1661	Ppk
1662	g/l
1663	cbm/h
1664	nA/ppm
1670	/cm
1671	cbm
1672	cbm/h
1673	ml/cbm
1993	Pulse/h
1994	l/Pulse
1995	l/l
1996	- (no unit)
Text as enumeration, variable value determines which text applies, starting with 0:	
3001	NC / NO
3002	ON / OFF

3003	pH / mV
3004	Off / low / medium / high
3005	Coax / Triax
3006	PT100 / PT1000
3007	Man / auto
3008	No water / level / ext. stopp
3009	normal
3010	4-20 mA / 0-20 mA
3011	20% / 40% / 60% / 80% / 100%
3012	---- / default / SD card / contact / mA 1 / mA 2 / S1 / S2 / Relay / Flow
3013	Stop / Ring / OFF
3014	ON/OFF / P / PI / PID / 3point
3015	Pulse pause / Pulse frequency
3016	reduce / raise
3017	1 = 0-1000 / 2= 0-5 / 4= 0-10 / 8= 0-20 / 16 = 0-30
3018	µg/l / mg/l / ppm
3019	chlorine / Chlorine dioxide / ozone / H2O2
3031	Actuator Cl, Actuator, Dose pump, 2 Dose pumps, Pulse pump, 2 Pulse pumps, on/off, 2 on/off
3032	Total chlorine, combined chlorine
3033	
3034	33%, 50%
3035	°C, F
3036	Leakage surveillance, 3rd set of parameters
3037	2h, 24h, 72h
3038	Alert relay, flocculation
3039	Alarm relay, circulation
3040	Alarm relay, filter backwash
3041	Off, Mon, Tue, Wed, Thu, Fri, Sat, Sun, Mon-Fri, Mon-Sat, Mon-Sun
3042	Not used, pH, DIS 1, Rx, Temp, EC, TCl, S1-pH, S2-pH, S1-DIS 1, S2-DIS 1, S1-Rx, S2-Rx, S1-STD
3043	No, R5, R6, R5+R6, R7, R6+R7, R5+R6+R7, R8, R5+R8, R6+R8, R5+R6+R8, R7+R8, R5+R7+R8, R6+R7+R8, R5+R6+R7+R8
3044	Tank 2, Filter

2.3.7 Test functions

To test the installation, you can operate all relays and current outputs manually and define relay status and current values via interface as in the test menu, provided that these add-ons are activated in your instrument.

With register Test mode you switch the test mode on and off.

Name	1. Reg.	Number of registers	Type	Bytes	Write?	Range
Test mode	2152	3	u_8	1	yes	no
Test reentry	10592	5	u_16	2	yes	yes
Rel. 1	6552	3	u_16	2	yes	no
Rel. 2	6576	3	u_16	2	yes	no
Rel. 3	6600	3	u_16	2	yes	no
Rel. 4	10600	3	u_16	2	yes	no
Rel. 5	10608	3	u_16	2	yes	no
Rel. 6	10616	3	u_16	2	yes	no
Rel. 7	10624	3	u_16	2	yes	no
Rel. 8	10632	3	u_16	2	yes	no
mA 1	6360	5	u_16	2	yes	yes
mA 2	6424	5	u_16	2	yes	yes
mA 3	10640	5	u_16	2	yes	yes
mA 4	10648	5	u_16	2	yes	yes
mA 5	10656	5	u_16	2	yes	yes



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