



EW 7200

Modbus Serial Communication Protocol



SUMMARY

1	Modbus Functions and Resources.....	3
1.1	Data format (RTU)	3
1.2	Network.....	3
1.3	Modbus functions available and data area	4
1.4	Address configuration.....	4
1.5	Table of addresses	4
1.5.1	Description of parameters.....	4
1.5.2	Table of parameters.....	5
1.5.3	Client Table.....	14
2	Analytic Index	17

1 MODBUS FUNCTIONS AND RESOURCES

Modbus is a client/server communication protocol for communication between *network* connected devices. Modbus devices communicate using a master-slave technique in which only one device (the master) can send queries. The other *network* devices (slaves) respond by supplying the data requested by the master or by taking the action requested in the query. A slave is any device connected to the *network* which processes information and sends its output to the master using the Modbus protocol.

Masters can *address* individual slaves or send broadcast messages to the entire *network* whereas slaves only return a response to queries addressed to them individually from masters.

The Modbus standard used by Eliwell uses the RTU protocol for data transmission.

1.1 Data format (RTU)

The code model used defines the structure of the messages transmitted on the *network* and the way this information is decoded. The type of code is usually selected according to specific parameters (baud rate, parity, etc...). Some devices only support certain code models but the same one must be used for all the devices connected to a Modbus *network*.

The protocol uses the RTU binary method with the bytes containing:

8 data bits, configurable parity bit (see parameter **PtY**, *default* value= Even),

1 configurable stop bit (see parameter **StP**, *default* value = 1b)

NOTE: the baud rate must be set to 9600 bauds.

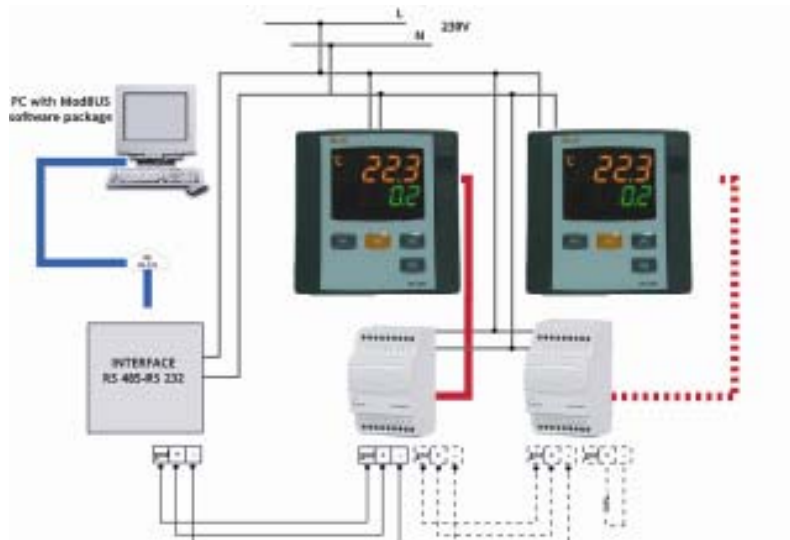
Parameters can be set so that the *device* is fully configurable

Parameters can be changed from the:

- Keyboard
- copy Card
- sending the data via the ModBus protocol straight to a single device or by sending a broadcast message using *address* 0 (broadcast *address*)

1.2 Network

Diagram of Modbus connection to multi-unit



PC/Interface connection	RS232 cable
Device/Bus Adapter connection	5-path connector TTL cable (30cm) (other sizes/lengths available)
Bus Adapter	BA150
Bus Adapter/Interface connection	RS485 cable shielded and twisted (e.g.: Belden cable model 8762)

1.3 Modbus functions available and data area

Modbus command	Description of command								
3	Reading multiple registers A maximum of 60 consecutive registers can be read. Parameters belonging to two different non-consecutive blocks cannot be read using a single command.								
16	Writing multiple registers A maximum of 60 consecutive registers can be written								
43	Reading instrument ID The following 3 fields can be read: <table border="1" data-bbox="772 524 1442 629"> <thead> <tr> <th>Field code</th> <th>Field description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Manufacturer ID (= "Invensys")</td> </tr> <tr> <td>1</td> <td>Instrument model ID (= "003E_0402")</td> </tr> <tr> <td>2</td> <td>Instrument version ID (= "00FB_0001")</td> </tr> </tbody> </table>	Field code	Field description	0	Manufacturer ID (= "Invensys")	1	Instrument model ID (= "003E_0402")	2	Instrument version ID (= "00FB_0001")
Field code	Field description								
0	Manufacturer ID (= "Invensys")								
1	Instrument model ID (= "003E_0402")								
2	Instrument version ID (= "00FB_0001")								

1.4 Address configuration

The device *address* in a ModBus message comprises one byte and consists of the family code and the device code, indicated by dBA, made up of parameters FAA and dEA respectively.

The Device *Address* therefore consists of two nibbles:

- **dEA**: low nibble
- **FAA**: high nibble

To calculate the *address* using parameters FAA and dEA:

$$dBA = FAA \times 16 + dEA$$

For example: *address* 00 01 (dEA=01; FAA=00)

Address 0 is used for broadcast queries that are recognized by all the slaves. Slaves do not respond to broadcast queries.

DEVICE CONFIGURATION PARAMETERS			
Par.	Description	Value	Limits
PtS	Protocol selection	t	t=Televis d=modbus
dEA	Device <i>address</i>	1	0...14
FAA	Family <i>address</i>	0	0...14
PtY	Modbus parity bit (none, Even, odd)	E	n=none, E=Even, o=odd
Stp	Setting stop bit (1b,2b)	2b	1b 2b
Note: If parameters PtS, PtY and Stp are changed, the controller must be turned off and then on again after they are changed to operate correctly.			

1.5 Table of addresses

1.5.1 Description of parameters

The *address* tables contain the necessary read, write and decode information for each single resource accessible in the device.

There are two tables:

- the **parameter** table contains all the device configuration parameters stored in the non-volatile memory of the device.
- the **client table** includes all the I/O and alarm status resources available in the volatile memory of the device.

Description of columns:

INDEX For the **parameter** table this value represents the order in which the parameter is displayed in the device menu. For the **client table** this value is not significant.

FOLDER This indicates the *folder* in which the **parameter** can be seen. the meanings of the values depend on the model:

Value

- 0 Parameter not visible
- 1 Parameter visible at level 1 of menu,
You can access the parameters
in this level once you have typed
Password 1 into the device
- 2 Parameter visible at level 2 of menu,

3 You can access the parameters in this level once you have typed Password 2 into the device
Parameter visible at both menu levels

LABEL Indicates the *label* used to display the **parameters** in the device menu.

ADDRESS The whole part represents the MODBUS register *address* containing the value of the resource to read or write in the instrument. The value after the comma indicates the position of the most significant bit of the data in the register; if it is not stated, it equals zero. This information is always provided when the register contains more than one data element and it is important to understand which bits actually represent the data element (the size of the data indicated in the **DATA SIZE** column is also considered). Since Modbus registers are the size of one WORD (16 bits), the *index* after the comma can vary from 0 (least significant bit –LSb–) to 15 (most significant bit –MSb–).
Examples (in binary representation the least significant bit is the rightmost bit)

ADDRESS	Register contents	DATA SIZE	value
8806	1350 (0000010101000110)	WORD	1350
8806	1350 (00000101 01000110)	Byte	70
8806,8	1350 (0000010101000110)	Byte	5
8806,14	1350 (0000010101000110)	1 bits	0
8806,7	1350 (00000 10101000110)	4 bits	10

Please note: when the register contains more than one data element, proceed as follows for the write operation:
read the current value of the register
modify the bits that represent the relevant resource
write the register

R/W Indicates the possibility of reading or writing the resource:

R	the resource is read only
W	the resource is write only
RW	the resource is read/write

DATA SIZE Indicates size of the data in bits.

WORD	=	16 bits
Byte	=	8 bits
“n” bit	=	0...15 bits depending on “n”

CPL When “Y” is indicated, the value read by the register requires conversion because the value represents a number with a sign. In other instances, the value is always positive or null.
For the conversion, see below:
if the value of the register is between 0 and 32767, the result is the value itself (zero and positive values)
if the value of the register is between 32768 and 65535, the result is the value of the register - 65536 (negative values)

RANGE This describes the *range* of values permitted for the parameter. It can be correlated with other device parameters (indicated with parameter *label*).

DEFAULT Indicates the factory set value for the standard model of the device.

EXP This is the multiplier *index* that must be applied to convert the value read by the register to the values indicated in the **RANGE** and **DEFAULT** column in order to convert them into the final values based on the unit of measurement indicated in the **M.U** column.

The multiplier is calculated using the exponential function with base 10 and the exponent indicated in the **EXP** column. When not indicated, its value is 0. Valid values are as below:

Value	=	Corresponding multiplier
-2	=	10 ⁻² (0,01)
-1	=	10 ⁻¹ (0,1)
0	=	10 ⁰ (1)
1	=	10 ¹ (10)
2	=	10 ² (100)

M.U. Unit of measurement of values when converted according to the rules indicated in columns **CPL** and **EXP**.

1.5.2 Table of parameters

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
1	0	0	SP1	16392	RW	Regulation set point 1	WORD	Y	LS1 ... HS1	0	-1	°C/°F
2	2	2	OS1	16394	RW	Offset on set point 1	WORD	Y	-300 ... 300	0	-1	°C/°F
3	3	3	db1	16396	RW	Tripping band above set point 1	WORD		0 ... 300	10	-1	°C/°F
4	3	3	dF1	16398	RW	Differential of set point 1	WORD	Y	-300 ... 300	-1	-1	°C/°F
5	3	3	HS1	16400	RW	Maximum value settable for set point 1	WORD	Y	LS1 ... HdL	80	-1	°C/°F
6	3	3	LS1	16402	RW	Minimum value settable for set point 1	WORD	Y	LdL ... HS1	-2	-1	°C/°F
7	3	3	HA1	16404	RW	Max. alarm regulator 1	WORD	Y	LA1 ... 29100	29	-1	°C/°F
8	3	3	LA1	16406	RW	Min. alarm regulator 1	WORD	Y	-3280 ... HA1	-3	-1	°C/°F
9	2	2	dn1	49316	RW	Start-up delay of regulator 1	BYTE		0 ... 255	0		sec
10	2	2	do1	49317	RW	Shutdown delay of regulator 1	BYTE		0 ... 255	0		min
11	2	2	di1	49318	RW	Delay between two consecutive starts of regulator 1	BYTE		0 ... 255	0		min
12	2	2	dE1	49319	RW	Start-up delay after the shutdown of regulator 1	BYTE		0 ... 255	0		sec
13	2	2	On1	49320	RW	ON time of regulator 1 due faulty probe	BYTE		0 ... 255	0		min
14	2	2	OF1	49321	RW	OFF time of regulator 1 due faulty probe	BYTE		0 ... 255	1		min
15	0	0	SP2	16408	RW	Regulation set point 2	WORD	Y	LS2 ... HS2	0	-1	°C/°F
16	2	2	OS2	16410	RW	Offset on set point 2	WORD	Y	-300 ... 300	0	-1	°C/°F
17	3	3	db2	16412	RW	Tripping band above set point 2	WORD		0 ... 300	10	-1	°C/°F
18	3	3	dF2	16414	RW	Differential of set point 2	WORD	Y	-300 ... 300	-1	-1	°C/°F
19	3	3	HS2	16416	RW	Maximum value settable for set point 2	WORD	Y	LS2 ... HdL	80	-1	°C/°F
20	3	3	LS2	16418	RW	Minimum value settable for set point 2	WORD	Y	LdL ... HS2	-2	-1	°C/°F
21	3	3	HA2	16420	RW	Max. alarm regulator 2	WORD	Y	LA2 ... 29100	29	-1	°C/°F
22	3	3	LA2	16422	RW	Min. alarm regulator 2	WORD	Y	-3280 ... HA2	-3	-1	°C/°F
23	2	2	dn2	49323	RW	Start-up delay of regulator 2	BYTE		0 ... 255	0		sec
24	2	2	do2	49324	RW	Shutdown delay of regulator 2	BYTE		0 ... 255	0		min
25	2	2	di2	49325	RW	Delay between two consecutive starts of regulator 2	BYTE		0 ... 255	0		min
26	2	2	dE2	49326	RW	Start-up delay after the shutdown of regulator 2	BYTE		0 ... 255	0		sec
27	2	2	On2	49327	RW	ON time of regulator 2 due faulty probe	BYTE		0 ... 255	0		min
28	2	2	OF2	49328	RW	OFF time of regulator 2 due faulty probe	BYTE		0 ... 255	1		min
29*	2	2	run	49364	RW	Select PID automatic or manual mode	BYTE		0 ... 1	1		flag
30*	2	2	dut	16442	RW	PID duty cycle in manual mode	WORD	Y	-1000 ... 1000	0	-1	num
31**	3	3	bPH	16714	RW	PID proportional band H	WORD		1 ... 9999	50	-1	°C/°F
32**	3	3	tiH	16716	RW	PID integral time H	WORD		0 ... 9999	60		sec
33**	3	3	tdH	16718	RW	PID derivative time H	WORD		0 ... 9999	15		sec
34**	2	2	biAH	16722	RW	PID static polarization H	WORD	Y	-1000 ... 1000	0	-1	num

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
35**	3	3	ttH	16720	RW	Integral time for PID windup anti-reset H	WORD		0 ... 9999	30		sec
38**	2	2	cH	49548	RW	Derivative PID weighting set point H	BYTE		0 ... 100	0		num
39**	2	2	SLOH	16710	RW	Minimum saturation of PID output H	WORD		0 ... SHIH	0	-1	num
40**	2	2	SHIH	16712	RW	Maximum saturation of PID output H	WORD		SLOH ... 1000	10	-1	num
41**	3	3	PEdH	16724	RW	Partial period with PID duty cycle H	WORD		20 ... 1310	20		sec
43***	3	3	bPC	16732	RW	PID proportional band C	WORD		1 ... 9999	50	-1	°C/°F
44***	3	3	tiC	16734	RW	PID integral time C	WORD		0 ... 9999	60		sec
45***	3	3	tdC	16736	RW	PID derivative time C	WORD		0 ... 9999	15		sec
46***	2	2	biAC	16740	RW	PID static polarization C	WORD	Y	-1000 ... 1000	0	-1	num
47***	3	3	ttC	16738	RW	Integral time for PID windup anti-reset C	WORD		0 ... 9999	30		sec
50***	2	2	cC	49551	RW	Derivative PID weighting set point C	BYTE		0 ... 100	0		num
51***	2	2	SLOC	16728	RW	Minimum saturation of PID output C	WORD		0 ... SHIC	0	-1	num
52***	2	2	SHIC	16730	RW	Maximum saturation of PID output C	WORD		SLOC ... 1000	10	-1	num
53***	3	3	PEdC	16742	RW	Partial period with PID duty cycle C	WORD		20 ... 1310	20		sec
55*	3	3	tun	49366	RW	Select auto-tuning for hot/cold adjustment	BYTE		0 ... 1	0		flag
58*	3	3	AtO	49368	RW	Auto-tuning timeout	BYTE		1 ... 100	10		ore
59*	2	2	Adt	49365	RW	Enable duty cycle parameters adaptation	BYTE		0 ... 1	1		flag
61*	2	2	PrE	49370	RW	Enable pre-tuning	BYTE		0 ... 1	0		flag
62*	2	2	ASA	49371	RW	Save parameters automatically after auto-tuning	BYTE		0 ... 1	1		flag
64**	2	2	FunH	49552	RW	Select regulation algorithm H	BYTE		0 ... 3	3		num
65**	2	2	APLH	16746	RW	Amplitude of oscillation in auto-tuning mode H	WORD		0 ... 1000	10	-1	°C/°F
66**	2	2	biAtH	16748	RW	Relay polarization in auto-tuning mode H	WORD		0 ... 1000	50	-1	num
67**	2	2	APrH	16750	RW	Relay amplitude in auto-tuning mode H	WORD		0 ... 1000	50	-1	num
68**	2	2	AHrH	16752	RW	Relay hysteresis in auto-tuning mode H	WORD		0 ... 1000	3	-1	°C/°F
74***	2	2	FunC	49554	RW	Select regulation algorithm C	BYTE		0 ... 3	3		num
75***	2	2	APLC	16762	RW	Amplitude of oscillation in auto-tuning mode C	WORD		0 ... 1000	10	-1	°C/°F
76***	2	2	biAtC	16764	RW	Relay polarization in auto-tuning mode C	WORD	Y	-1000 ... 0	-5	-1	num
77***	2	2	APrC	16766	RW	Relay amplitude in auto-tuning mode C	WORD		0 ... 1000	50	-1	num
78***	2	2	AHrC	16768	RW	Relay hysteresis in auto-tuning mode C	WORD		0 ... 1000	3	-1	°C/°F
84	0	3	AOL	49469	RW	Analog output configuration	BYTE		0 ... 4	0		num
85	0	3	AOF	49470	RW	Operation mode of analogue output	BYTE		0 ... 4	1		num
86	0	3	AOS	49471	RW	Operation mode of analogue output with probe error	BYTE		0 ... 1	1		flag

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
87	0	3	LAO	16542	RW	Lower limit of analogue output	WORD	Y	LdL ... HdL	0	-1	num
88	0	3	HAO	16544	RW	Upper limit of analogue output	WORD	Y	LdL ... HdL	10	-1	num
89	2	2	del01_h	49215	RW	Enabling delay in hours for step 0 of program 1	BYTE		0 ... 99	0		ore
90	2	2	del01_m	49214	RW	Enabling delay in minutes for step 0 of program 1	BYTE		0 ... 59	0		min
91	2	2	dur01_h	49247	RW	Duration in hours for step 0 of program 1	BYTE		0 ... 99	0		ore
92	2	2	dur01_m	49246	RW	Duration in minutes for step 0 of program 1	BYTE		0 ... 59	59		min
93	2	2	start01	49373	RW	Duration of step 0 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
94	2	2	set01	16510	RW	Set point for step 0 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
95	2	2	reg01	49389	RW	Regulator active for step 0 of program 1	BYTE		0 ... 6	0		num
96	2	2	soft01	49405	RW	Enable soft start for step 0 of program 1	BYTE		0 ... 1	0		flag
97	2	2	rele01	49421	RW	Enable auxiliary output for step 0 of program 1	BYTE		0 ... 1	0		flag
98	2	2	fine01	49437	RW	End step 0 of program 1	BYTE		1 ... 7	2		num
99	2	2	step01	49453	RW	Number of partial cycle to run for step 0 of program 1	BYTE		0 ... 7	0		num
100	2	2	del11_h	49217	RW	Enabling delay in hours for step 1 of program 1	BYTE		0 ... 99	0		ore
101	2	2	del11_m	49216	RW	Enabling delay in minutes for step 1 of program 1	BYTE		0 ... 59	0		min
102	2	2	dur11_h	49249	RW	Duration in hours for step 1 of program 1	BYTE		0 ... 99	0		ore
103	2	2	dur11_m	49248	RW	Duration in minutes for step 1 of program 1	BYTE		0 ... 59	59		min
104	2	2	start11	49374	RW	Duration of step 1 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
105	2	2	set11	16512	RW	Set point for step 1 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
106	2	2	reg11	49390	RW	Regulator active for step 1 of program 1	BYTE		0 ... 6	0		num
107	2	2	soft11	49406	RW	Enable soft start for step 1 of program 1	BYTE		0 ... 1	0		flag
108	2	2	rele11	49422	RW	Enable auxiliary output for step 1 of program 1	BYTE		0 ... 1	0		flag
109	2	2	fine11	49438	RW	End step 1 of program 1	BYTE		1 ... 7	2		num
110	2	2	step11	49454	RW	Number of partial cycle to run for step 1 of program 1	BYTE		0 ... 7	0		num
111	2	2	del21_h	49219	RW	Enabling delay in hours for step 2 of program 1	BYTE		0 ... 99	0		ore
112	2	2	del21_m	49218	RW	Enabling delay in minutes for step 2 of program 1	BYTE		0 ... 59	0		min
113	2	2	dur21_h	49251	RW	Duration in hours for step 2 of program 1	BYTE		0 ... 99	0		ore
114	2	2	dur21_m	49250	RW	Duration in minutes for step 2 of program 1	BYTE		0 ... 59	59		min
115	2	2	start21	49375	RW	Duration of step 2 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
116	2	2	set21	16514	RW	Set point for step 2 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
117	2	2	reg21	49391	RW	Regulator active for step 2 of program 1	BYTE		0 ... 6	0		num
118	2	2	soft21	49407	RW	Enable soft start for step 2 of program 1	BYTE		0 ... 1	0		flag
119	2	2	rele21	49423	RW	Enable auxiliary output for step 2 of program 1	BYTE		0 ... 1	0		flag

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
120	2	2	fine21	49439	RW	End step 2 of program 1	BYTE		1 ... 7	2		num
121	2	2	step21	49455	RW	Number of partial cycle to run for step 2 of program 1	BYTE		0 ... 7	0		num
122	2	2	del31_h	49221	RW	Enabling delay in hours for step 3 of program 1	BYTE		0 ... 99	0		ore
123	2	2	del31_m	49220	RW	Enabling delay in minutes for step 3 of program 1	BYTE		0 ... 59	0		min
124	2	2	dur31_h	49253	RW	Duration in hours for step 3 of program 1	BYTE		0 ... 99	0		ore
125	2	2	dur31_m	49252	RW	Duration in minutes for step 3 of program 1	BYTE		0 ... 59	59		min
126	2	2	start31	49376	RW	Duration of step 3 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
127	2	2	set31	16516	RW	Set point for step 3 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
128	2	2	reg31	49392	RW	Regulator active for step 3 of program 1	BYTE		0 ... 6	0		num
129	2	2	soft31	49408	RW	Enable soft start for step 3 of program 1	BYTE		0 ... 1	0		flag
130	2	2	rele31	49424	RW	Enable auxiliary output for step 3 of program 1	BYTE		0 ... 1	0		flag
131	2	2	fine31	49440	RW	End step 3 of program 1	BYTE		1 ... 7	2		num
132	2	2	step31	49456	RW	Number of partial cycle to run for step 3 of program 1	BYTE		0 ... 7	0		num
133	2	2	del41_h	49223	RW	Enabling delay in hours for step 4 of program 1	BYTE		0 ... 99	0		ore
134	2	2	del41_m	49222	RW	Enabling delay in minutes for step 4 of program 1	BYTE		0 ... 59	0		min
135	2	2	dur41_h	49255	RW	Duration in hours for step 4 of program 1	BYTE		0 ... 99	0		ore
136	2	2	dur41_m	49254	RW	Duration in minutes for step 4 of program 1	BYTE		0 ... 59	59		min
137	2	2	start41	49377	RW	Duration of step 4 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
138	2	2	set41	16518	RW	Set point for step 4 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
139	2	2	reg41	49393	RW	Regulator active for step 4 of program 1	BYTE		0 ... 6	0		num
140	2	2	soft41	49409	RW	Enable soft start for step 4 of program 1	BYTE		0 ... 1	0		flag
141	2	2	rele41	49425	RW	Enable auxiliary output for step 4 of program 1	BYTE		0 ... 1	0		flag
142	2	2	fine41	49441	RW	End step 4 of program 1	BYTE		1 ... 7	2		num
143	2	2	step41	49457	RW	Number of partial cycle to run for step 4 of program 1	BYTE		0 ... 7	0		num
144	2	2	del51_h	49225	RW	Enabling delay in hours for step 5 of program 1	BYTE		0 ... 99	0		ore
145	2	2	del51_m	49224	RW	Enabling delay in minutes for step 5 of program 1	BYTE		0 ... 59	0		min
146	2	2	dur51_h	49257	RW	Duration in hours for step 5 of program 1	BYTE		0 ... 99	0		ore
147	2	2	dur51_m	49256	RW	Duration in minutes for step 5 of program 1	BYTE		0 ... 59	59		min
148	2	2	start51	49378	RW	Duration of step 5 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
149	2	2	set51	16520	RW	Set point for step 5 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
150	2	2	reg51	49394	RW	Regulator active for step 5 of program 1	BYTE		0 ... 6	0		num
151	2	2	soft51	49410	RW	Enable soft start for step 5 of program 1	BYTE		0 ... 1	0		flag
152	2	2	rele51	49426	RW	Enable auxiliary output for step 5 of program 1	BYTE		0 ... 1	0		flag

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
153	2	2	fine51	49442	RW	End step 5 of program 1	BYTE		1 ... 7	2		num
154	2	2	step51	49458	RW	Number of partial cycle to run for step 5 of program 1	BYTE		0 ... 7	0		num
155	2	2	del61_h	49227	RW	Enabling delay in hours for step 6 of program 1	BYTE		0 ... 99	0		ore
156	2	2	del61_m	49226	RW	Enabling delay in minutes for step 6 of program 1	BYTE		0 ... 59	0		min
157	2	2	dur61_h	49259	RW	Duration in hours for step 6 of program 1	BYTE		0 ... 99	0		ore
158	2	2	dur61_m	49258	RW	Duration in minutes for step 6 of program 1	BYTE		0 ... 59	59		min
159	2	2	start61	49379	RW	Duration of step 6 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
160	2	2	set61	16522	RW	Set point for step 6 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
161	2	2	reg61	49395	RW	Regulator active for step 6 of program 1	BYTE		0 ... 6	0		num
162	2	2	soft61	49411	RW	Enable soft start for step 6 of program 1	BYTE		0 ... 1	0		flag
163	2	2	rele61	49427	RW	Enable auxiliary output for step 6 of program 1	BYTE		0 ... 1	0		flag
164	2	2	fine61	49443	RW	End step 6 of program 1	BYTE		1 ... 7	2		num
165	2	2	step61	49459	RW	Number of partial cycle to run for step 6 of program 1	BYTE		0 ... 7	0		num
166	2	2	del71_h	49229	RW	Enabling delay in hours for step 7 of program 1	BYTE		0 ... 99	0		ore
167	2	2	del71_m	49228	RW	Enabling delay in minutes for step 7 of program 1	BYTE		0 ... 59	0		min
168	2	2	dur71_h	49261	RW	Duration in hours for step 7 of program 1	BYTE		0 ... 99	0		ore
169	2	2	dur71_m	49260	RW	Duration in minutes for step 7 of program 1	BYTE		0 ... 59	59		min
170	2	2	start71	49380	RW	Duration of step 7 counted from start or set point reached by program 1	BYTE		0 ... 1	0		flag
171	2	2	set71	16524	RW	Set point for step 7 of program 1	WORD	Y	-3280 ... 29100	0	-1	°C/°F
172	2	2	reg71	49396	RW	Regulator active for step 7 of program 1	BYTE		0 ... 6	0		num
173	2	2	soft71	49412	RW	Enable soft start for step 7 of program 1	BYTE		0 ... 1	0		flag
174	2	2	rele71	49428	RW	Enable auxiliary output for step 7 of program 1	BYTE		0 ... 1	0		flag
175	2	2	fine71	49444	RW	End step 7 of program 1	BYTE		1 ... 7	1		num
176	2	2	step71	49460	RW	Number of partial cycle to run for step 7 of program 1	BYTE		0 ... 7	0		num
177	2	2	del02_h	49231	RW	Enabling delay in hours for step 0 of program 2	BYTE		0 ... 99	0		ore
178	2	2	del02_m	49230	RW	Enabling delay in minutes for step 0 of program 2	BYTE		0 ... 59	0		min
179	2	2	dur02_h	49263	RW	Duration in hours for step 0 of program 2	BYTE		0 ... 99	0		ore
180	2	2	dur02_m	49262	RW	Duration in minutes for step 0 of program 2	BYTE		0 ... 59	59		min
181	2	2	start02	49381	RW	Duration of step 0 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
182	2	2	set02	16526	RW	Set point for step 0 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
183	2	2	reg02	49397	RW	Regulator active for step 0 of program 2	BYTE		0 ... 6	0		num
184	2	2	soft02	49413	RW	Enable soft start for step 0 of program 2	BYTE		0 ... 1	0		flag
185	2	2	rele02	49429	RW	Enable auxiliary output for step 0 of program 2	BYTE		0 ... 1	0		flag

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
186	2	2	fine02	49445	RW	End step 0 of program 2	BYTE		1 ... 7	2		num
187	2	2	step02	49461	RW	Number of partial cycle to run for step 0 of program 2	BYTE		0 ... 7	0		num
188	2	2	del12_h	49233	RW	Enabling delay in hours for step 1 of program 2	BYTE		0 ... 99	0		ore
189	2	2	del12_m	49232	RW	Enabling delay in minutes for step 1 of program 2	BYTE		0 ... 59	0		min
190	2	2	dur12_h	49265	RW	Duration in hours for step 1 of program 2	BYTE		0 ... 99	0		ore
191	2	2	dur12_m	49264	RW	Duration in minutes for step 1 of program 2	BYTE		0 ... 59	59		min
192	2	2	start12	49382	RW	Duration of step 1 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
193	2	2	set12	16528	RW	Set point for step 1 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
194	2	2	reg12	49398	RW	Regulator active for step 1 of program 2	BYTE		0 ... 6	0		num
195	2	2	soft12	49414	RW	Enable soft start for step 1 of program 2	BYTE		0 ... 1	0		flag
196	2	2	rele12	49430	RW	Enable auxiliary output for step 1 of program 2	BYTE		0 ... 1	0		flag
197	2	2	fine12	49446	RW	End step 1 of program 2	BYTE		1 ... 7	2		num
198	2	2	step12	49462	RW	Number of partial cycle to run for step 1 of program 2	BYTE		0 ... 7	0		num
199	2	2	del22_h	49235	RW	Enabling delay in hours for step 2 of program 2	BYTE		0 ... 99	0		ore
200	2	2	del22_m	49234	RW	Enabling delay in minutes for step 2 of program 2	BYTE		0 ... 59	0		min
201	2	2	dur22_h	49267	RW	Duration in hours for step 2 of program 2	BYTE		0 ... 99	0		ore
202	2	2	dur22_m	49266	RW	Duration in minutes for step 2 of program 2	BYTE		0 ... 59	59		min
203	2	2	start22	49383	RW	Duration of step 2 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
204	2	2	set22	16530	RW	Set point for step 2 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
205	2	2	reg22	49399	RW	Regulator active for step 2 of program 2	BYTE		0 ... 6	0		num
206	2	2	soft22	49415	RW	Enable soft start for step 2 of program 2	BYTE		0 ... 1	0		flag
207	2	2	rele22	49431	RW	Enable auxiliary output for step 2 of program 2	BYTE		0 ... 1	0		flag
208	2	2	fine22	49447	RW	End step 2 of program 2	BYTE		1 ... 7	2		num
209	2	2	step22	49463	RW	Number of partial cycle to run for step 2 of program 2	BYTE		0 ... 7	0		num
210	2	2	del32_h	49237	RW	Enabling delay in hours for step 3 of program 2	BYTE		0 ... 99	0		ore
211	2	2	del32_m	49236	RW	Enabling delay in minutes for step 3 of program 2	BYTE		0 ... 59	0		min
212	2	2	dur32_h	49269	RW	Duration in hours for step 3 of program 2	BYTE		0 ... 99	0		ore
213	2	2	dur32_m	49268	RW	Duration in minutes for step 3 of program 2	BYTE		0 ... 59	59		min
214	2	2	start32	49384	RW	Duration of step 3 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
215	2	2	set32	16532	RW	Set point for step 3 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
216	2	2	reg32	49400	RW	Regulator active for step 3 of program 2	BYTE		0 ... 6	0		num
217	2	2	soft32	49416	RW	Enable soft start for step 3 of program 2	BYTE		0 ... 1	0		flag
218	2	2	rele32	49432	RW	Enable auxiliary output for step 3 of program 2	BYTE		0 ... 1	0		flag

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
219	2	2	fine32	49448	RW	End step 3 of program 2	BYTE		1 ... 7	2		num
220	2	2	step32	49464	RW	Number of partial cycle to run for step 3 of program 2	BYTE		0 ... 7	0		num
221	2	2	del42_h	49239	RW	Enabling delay in hours for step 4 of program 2	BYTE		0 ... 99	0		ore
222	2	2	del42_m	49238	RW	Enabling delay in minutes for step 4 of program 2	BYTE		0 ... 59	0		min
223	2	2	dur42_h	49271	RW	Duration in hours for step 4 of program 2	BYTE		0 ... 99	0		ore
224	2	2	dur42_m	49270	RW	Duration in minutes for step 4 of program 2	BYTE		0 ... 59	59		min
225	2	2	start42	49385	RW	Duration of step 4 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
226	2	2	set42	16534	RW	Set point for step 4 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
227	2	2	reg42	49401	RW	Regulator active for step 4 of program 2	BYTE		0 ... 6	0		num
228	2	2	soft42	49417	RW	Enable soft start for step 4 of program 2	BYTE		0 ... 1	0		flag
229	2	2	rele42	49433	RW	Enable auxiliary output for step 4 of program 2	BYTE		0 ... 1	0		flag
230	2	2	fine42	49449	RW	End step 4 of program 2	BYTE		1 ... 7	2		num
231	2	2	step42	49465	RW	Number of partial cycle to run for step 4 of program 2	BYTE		0 ... 7	0		num
232	2	2	del52_h	49241	RW	Enabling delay in hours for step 5 of program 2	BYTE		0 ... 99	0		ore
233	2	2	del52_m	49240	RW	Enabling delay in minutes for step 5 of program 2	BYTE		0 ... 59	0		min
234	2	2	dur52_h	49273	RW	Duration in hours for step 5 of program 2	BYTE		0 ... 99	0		ore
235	2	2	dur52_m	49272	RW	Duration in minutes for step 5 of program 2	BYTE		0 ... 59	59		min
236	2	2	start52	49386	RW	Duration of step 5 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
237	2	2	set52	16536	RW	Set point for step 5 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
238	2	2	reg52	49402	RW	Regulator active for step 5 of program 2	BYTE		0 ... 6	0		num
239	2	2	soft52	49418	RW	Enable soft start for step 5 of program 2	BYTE		0 ... 1	0		flag
240	2	2	rele52	49434	RW	Enable auxiliary output for step 5 of program 2	BYTE		0 ... 1	0		flag
241	2	2	fine52	49450	RW	End step 5 of program 2	BYTE		1 ... 7	2		num
242	2	2	step52	49466	RW	Number of partial cycle to run for step 5 of program 2	BYTE		0 ... 7	0		num
243	2	2	del62_h	49243	RW	Enabling delay in hours for step 6 of program 2	BYTE		0 ... 99	0		ore
244	2	2	del62_m	49242	RW	Enabling delay in minutes for step 6 of program 2	BYTE		0 ... 59	0		min
245	2	2	dur62_h	49275	RW	Duration in hours for step 6 of program 2	BYTE		0 ... 99	0		ore
246	2	2	dur62_m	49274	RW	Duration in minutes for step 6 of program 2	BYTE		0 ... 59	59		min
247	2	2	start62	49387	RW	Duration of step 6 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
248	2	2	set62	16538	RW	Set point for step 6 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
249	2	2	reg62	49403	RW	Regulator active for step 6 of program 2	BYTE		0 ... 6	0		num
250	2	2	soft62	49419	RW	Enable soft start for step 6 of program 2	BYTE		0 ... 1	0		flag
251	2	2	rele62	49435	RW	Enable auxiliary output for step 6 of program 2	BYTE		0 ... 1	0		flag

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
252	2	2	fine62	49451	RW	End step 6 of program 2	BYTE		1 ... 7	2		num
253	2	2	step62	49467	RW	Number of partial cycle to run for step 6 of program 2	BYTE		0 ... 7	0		num
254	2	2	del72_h	49245	RW	Enabling delay in hours for step 7 of program 2	BYTE		0 ... 99	0		ore
255	2	2	del72_m	49244	RW	Enabling delay in minutes for step 7 of program 2	BYTE		0 ... 59	0		min
256	2	2	dur72_h	49277	RW	Duration in hours for step 7 of program 2	BYTE		0 ... 99	0		ore
257	2	2	dur72_m	49276	RW	Duration in minutes for step 7 of program 2	BYTE		0 ... 59	59		min
258	2	2	start72	49388	RW	Duration of step 7 counted from start or set point reached by program 2	BYTE		0 ... 1	0		flag
259	2	2	set72	16540	RW	Set point for step 7 of program 2	WORD	Y	-3280 ... 29100	0	-1	°C/°F
260	2	2	reg72	49404	RW	Regulator active for step 7 of program 2	BYTE		0 ... 6	0		num
261	2	2	soft72	49420	RW	Enable soft start for step 7 of program 2	BYTE		0 ... 1	0		flag
262	2	2	rele72	49436	RW	Enable auxiliary output for step 7 of program 2	BYTE		0 ... 1	0		flag
263	2	2	fine72	49452	RW	End step 7 of program 2	BYTE		1 ... 7	1		num
264	2	2	step72	49468	RW	Number of partial cycle to run for step 7 of program 2	BYTE		0 ... 7	0		num
265	2	2	dSi	49329	RW	Value of soft start regulator step	BYTE		0 ... 250	0	-1	°C/°F
266	2	2	Std	49330	RW	Duration of soft start regulator step	BYTE		0 ... 255	0		ore/min/sec
267	2	2	unt	49331	RW	Unit of measurement for step duration	BYTE		0 ... 2	1		num
268	2	2	SEn	49332	RW	Selects the regulator on which the soft start function must be enabled	BYTE		0 ... 3	1		num
269	2	2	Sdi	16428	RW	Automatic back swing of Soft start function	WORD		0 ... 300	0	-1	°C/°F
270	2	2	Con	49333	RW	ON time for cyclic regulator output	BYTE		0 ... 255	0		min
271	2	2	Cof	49334	RW	OFF time for cyclic regulator output	BYTE		0 ... 255	0		min
272	2	2	Att	49335	RW	Mode of parameter HA1-HA2 and LA-LA2 (absolute or relative)	BYTE		0 ... 1	0		flag
273	2	2	Afd	16430	RW	Alarm differential	WORD		10 ... 500	20	-1	°C/°F
274	3	3	PAO	49336	RW	Temperature alarms disabling time from Power On	BYTE		0 ... 10	0		ore
275	3	3	SAO	49337	RW	Timeout for "set point not reached" alarm	BYTE		0 ... 24	0		ore
276	3	3	tAO	49338	RW	Temperature alarms delay time	BYTE		0 ... 255	0		min
277	2	2	AOP	49339	RW	Polarity of alarm output	BYTE		0 ... 1	0		flag
279	3	3	PtS	49341	RW	Protocol selection	BYTE		0 ... 1	0		flag
280	3	3	dEA	49343	RW	Device <i>address</i>	BYTE		0 ... 14	0		num
281	3	3	FAA	49342	RW	Family <i>address</i>	BYTE		0 ... 14	0		num
282	3	3	PtY	49344	RW	Modbus parity bit	BYTE		0 ... 2	1		num
283	3	3	StP	49345	RW	Modbus stop bit	BYTE		0 ... 1	0		flag
284	3	3	LOC	49346	RW	Enable keyboard lock	BYTE		0 ... 1	0		flag
285	3	3	PA1	16432	RW	Value of password 1	WORD		0 ... 999	0		num

INDEX	FOLDER		LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
	EW7220	EW7222										
286	2	2	PA2	16434	RW	Value of password 2	WORD		0 ... 999	0		num
287	3	3	ndt	49347	RW	Display with decimal point	BYTE		0 ... 1	1		num
288	3	3	CA1	16436	RW	Probe calibration	WORD	Y	-300 ... 300	0	-1	°C/°F
289	2	2	Cai	49348	RW	Calibration enabling	BYTE		0 ... 2	2		num
290	2	2	LdL	16438	RW	Minimum value that can be displayed	WORD	Y	-3280 ... HdL	-3	-1	°C/°F
291	2	2	HdL	16440	RW	Maximum value that can be displayed	WORD	Y	LdL ... 29100	29	-1	°C/°F
292	3	3	dro	49349	RW	°C/°F selection	BYTE		0 ... 1	0		num
293	3	3	H00	49350	RW	Type of probe selection	BYTE		0 ... 8	8		num
294	2	2	H01	49352	RW	Configure type of regulators	BYTE		0 ... 11	4		num
295	2	2	H02	49351	RW	Keyboard functions enabling time	BYTE		0 ... 15	5		sec
298	2	2	H06	49353	RW	Key or aux./light digital input ON with unit OFF	BYTE		0 ... 1	1		flag
299	2	2	H08	49354	RW	Standby operating mode	BYTE		0 ... 2	2		num
300	3	3	H10	49355	RW	Delay output enabling from Power On	BYTE		0 ... 255	0		min
301	0	2	H11	49356	RW	ID configuration	BYTE		0 ... 10	0		num
302	0	2	H13	49357	RW	Polarity and priority of digital inputs	BYTE		0 ... 3	0		num
303	0	2	H14	49358	RW	Enabling delay of digital inputs	BYTE		0 ... 255	0		min
304	2	2	H21	49314	RW	Configurability of digital output 1	BYTE		0 ... 4	0		num
305	2	2	H22	49359	RW	Configurability of digital output 2	BYTE		0 ... 4	0		num
306	2	2	H23	49360	RW	Configurability of digital output 3	BYTE		0 ... 4	0		num
308	2	2	H31	49361	RW	UP button configurability	BYTE		0 ... 8	0		num
309	2	2	H32	49362	RW	DOWN button configurability	BYTE		0 ... 8	0		num

NOTES:

* These parameters are visible if H01= 2, 3, 7, 8, 9, 10, 11

** These parameters are visible if H01=2, 7, 8, 10 (color =red)

*** These parameters are visible if H01=3, 7, 9, 11 (color=blue)

1.5.3 Client Table

INDEX	FOLDER	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
1		296	R	Analogue input (display) 1 – AI1	WORD	Y	-580 ... 3020	0	-1	°C/°F
2		298	R	Analogue input (control) 1	WORD	Y	-580 ... 3020	0	-1	°C/°F
3		33048,6	R	Digital input 1 – DI1	1 bit		0 ... 1	0		flag
4		33051,1	R	Analog input 1 failure – E1	1 bit		0 ... 1	0		flag
5		33051,2	R	High alarm reg. 1 – AH1	1 bit		0 ... 1	0		flag
6		33051,3	R	Low alarm reg. 1 – AL1	1 bit		0 ... 1	0		flag

INDEX	FOLDER	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
7		33051,4	R	External Alarm – EA	1 bit		0 ... 1	0		flag
8		33051,5	R	High alarm reg. 2 – AH2	1 bit		0 ... 1	0		flag
9		33051,6	R	Low alarm reg. 2 – AL2	1 bit		0 ... 1	0		flag
10		33060,0	R	Setpoint not reached	1 bit		0 ... 1	0		flag
11		34552	R	Failed autotuning	BYTE		0 ... 255	0		num
12		32811,3	R	Out 1 – RL1	1 bit		0 ... 1	0		flag
13		32802,0	R	Out 2 – RL2	1 bit		0 ... 1	0		flag
14		32802,2	R	Out 3 – RL3	1 bit		0 ... 1	0		flag
15		34283	R	Out buzzer	1 bit		0 ... 1	0		flag
16		33283,0	R	Reduced set-point	1 bit		0 ... 1	0		flag
17		33283,1	R	On	1 bit		0 ... 1	0		flag
18		33283,2	R	Soft Start	1 bit		0 ... 1	0		flag
19		33283,4	R	Auxiliary	1 bit		0 ... 1	0		flag
20		33283,5	R	Modified parameters	1 bit		0 ... 1	0		flag
21		33283,6	R	Sequence regulator	1 bit		0 ... 1	0		flag
22		34550	R	Autotuning	BYTE		0 ... 255	0		num
23		34271	R	Sequence program number active	BYTE		0 ... 255	0		num
24		34272	R	Sequence program step number active	BYTE		0 ... 255	0		num
26		33073,3	R	Cont. Cycle	1 bit		0 ... 1	0		flag
27		33058	W	Continuous Cycle On	1 bit		0 ... 1	1		flag
28		33058,1	W	Continuous Cycle Off	1 bit		0 ... 1	1		flag
29		33058,2	W	Economy Mode On	1 bit		0 ... 1	1		flag
30		33058,3	W	Economy Mode Off	1 bit		0 ... 1	1		flag
31		33058,4	W	Auxiliary output On	1 bit		0 ... 1	1		flag
32		33058,5	W	Auxiliary output Off	1 bit		0 ... 1	1		flag
33		33058,6	W	Instrument On	1 bit		0 ... 1	1		flag
34		33058,7	W	Instrument Off	1 bit		0 ... 1	1		flag
35		33059	W	Alarm silencing	1 bit		0 ... 1	1		flag
36		33059,1	W	Autotuning On	1 bit		0 ... 1	1		flag
37		33059,2	W	Autotuning Off	1 bit		0 ... 1	1		flag
38		33059,3	W	Reset changed parameters indicator	1 bit		0 ... 1	1		flag
39		33059,4	W	Instrument Off for maintenance	1 bit		0 ... 1	1		flag
40		33059,5	W	Soft Start On	1 bit		0 ... 1	1		flag
41		33059,6	W	Soft Start Off	1 bit		0 ... 1	1		flag
42		33059,7	W	Sequence program reset	1 bit		0 ... 1	1		flag

<i>INDEX</i>	<i>FOLDER</i>	<i>ADDRESS</i>	<i>R/W</i>	<i>DESCRIPTION</i>	<i>DATA SIZE</i>	<i>CPL</i>	<i>RANGE</i>	<i>DEFAULT</i>	<i>EXP</i>	<i>M.U.</i>
43		33063	W	Sequence 1 program start/continue	1 bit		0 ... 1	1		flag
44		33063,1	W	Sequence 2 program start/continue	1 bit		0 ... 1	1		flag
45		33063,2	W	Sequence program stop	1 bit		0 ... 1	1		flag
46		33063,3	W	Sequence program exit	1 bit		0 ... 1	1		flag

