

eliwell

ECH 200 BD

Modbus Serial Communication Protocol



SUMMARY

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1 FUNZIONI E RISORSE MODBUS

Modbus is a client/server communication protocol between devices connected on a *network*.

Modbus instruments communicate using a master/slave technique in which only one device (master) can send messages. The other devices on the *network* (slave) respond by returning the data requested by the master or performing the action indicated in the message sent. A slave is a device connected to the *network* that processes information and sends the results to the master using the Modbus protocol.

The master can send messages to individual slaves, or send messages to the whole *network* (broadcast), whereas the slave instruments respond to the messages only individually and to the master device.

The Modbus standard used by Eliwell provides for the use of RTU coding for data transmission.

1.1 Data Format (RTU)

The coding model used defines the structure of messages transmitted on the *network* and the way in which this information is decoded. The type of coding is normally selected according to specific parameters (baud rate, parity, etc.), also, certain devices only support certain coding models, however it must be the same for all the instruments connected to a Modbus *network*.

The protocol uses the binary RTU method with the byte made up as follows:
8 bits for data, even parity bit (not configurable), 1 stop bit.

NOTE: the transmission speed must be set to 9600 baud.

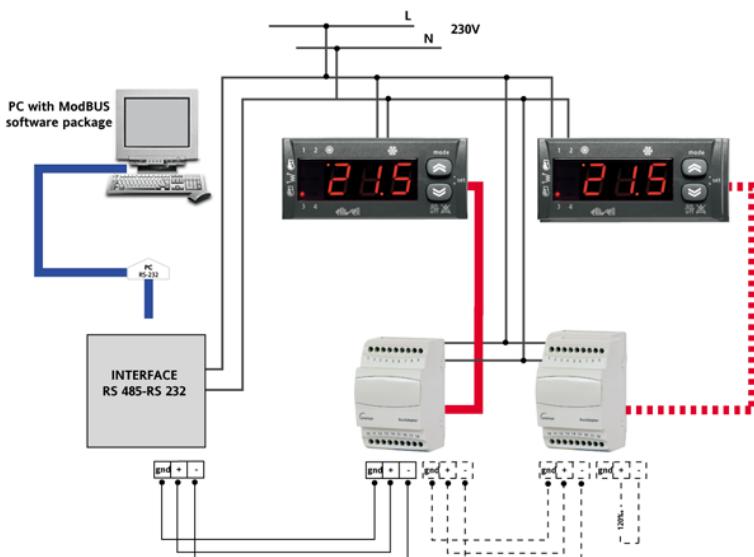
Setting the parameters allows the *instrument* to be fully configurable

They can be modified by means of:

- instrument keyboard
- copy Card
- sending the data using the ModBus protocol, directly to an individual instrument, or by broadcast, using *address* 0 (broadcast)

1.2 Network

ModBus to multiple device connection diagram



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

1.3 Modbus functions available and data areas

Function Code	Command description
3*	Read 16 consecutive registers for Client side Read 1 single register for parameters.
16	Write 15 consecutive registers for Client side Write 1 register for parameters

Product Identification

The product in question can be univocally recognised by means of the hexadecimal Family/Release version values. Regarding the product ECH 200 BD:

Fam/Ver: "3F01" formed of family code 3F = 63 and version 01= 1



IMPORTANT! The reading of 2 registers (WORD) must be requested to obtain 1 in response. If reading of only one register is requested a reading of the highest byte will be obtained.



IMPORTANT! To write values to WORD it is necessary to send a write request with 2 registers, and a dimension 2 response will be obtained.

1.4 Address configuration

The *address* of a device inside a ModBus message is made up of one byte and is formed of the family code and the instrument code, made up of parameters H44 and H45 respectively.

The *address* (Device *Address*) is thus formed of two nibbles:

- **H45:** low nibble
- **H44:** high nibble

To calculate the *address* starting from parameters H44 and H45:

$$\text{address} = \text{H44} \times 16 + \text{H45}$$

INSTRUMENT CONFIGURATION PARAMETERS			
Par.	Description	Range	Value
H44	Family serial <i>address</i>	0...14	0
H45	Device serial <i>address</i>	0...14	1
H26	Communication protocol configuration Note: If H26 is changed the controller must be turned off and then on again after they are changed to operate correctly	1=Modbus 0=Televis	1

For example: *address* (HEX) 16 (H44=01; H45=00)

Address 0 is used for broadcast messages, which are recognised by all slaves. Slaves do not respond to a broadcast type request.

1.5 Address tables

1.5.1 Description of parameters

The *address tables* contain the information required to read, write and decode each individual resource accessible in the instrument.

There are two tables:

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

Description of columns:

INDEX

For the *parameters table* this value represents the order in which the parameter is displayed in the instrument's menu. For the *client* table this value is not significant.

FOLDER

This indicates the *label* of the *folder* containing the parameter in question

LABEL

This indicates the *label* used to display the *parameters* in the instrument's menu.

ADDRESS

The whole part represents the *address* of the MODBUS register containing the value of the resource to be read or written in the instrument. The value after the point indicates the position of the most significant data bit inside the register; if not indicated it is taken as zero. This information is always provided when the register contains more than one information item, and it is necessary to distinguish which bits actually represent the data (the working size of the data indicated in the

column **DATA SIZE** is also taken into consideration). Given that the modbus registers have the size of one WORD (16 bit), the **index** number after the point can vary from 0 (least significant bit –LSb–) to 15 (most significant bit –MSb–). Examples (in binary form the least significant bit is the first on the right):

ADDRESS	Contents of register	DATA SIZE	Value
8806	1350 (0000010101000110)	WORD	1350
8806	1350 (0000010101000110)	Byte	70
8806,8	1350 (0000010101000110)	Byte	5
8806,14	1350 (0000010101000110)	1 bit	0
8806,7	1350 (0000010101000110)	4 bit	10

Important: when the register contains more than one data item, during the write operation proceed as follows:

- read current register value
- modify the bits that represent the resource concerned
- write the register

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

R the resource is read-only
 W the resource is write-only
 RW the resource can be both read and written

DATA SIZE Indicates the size of the data in bits.

WORD = 16 bits
 Byte = 8 bits
 "n" bit = 0...15 bits based on the value of "n"

CPL When the field indicates "Y", the value read by the register requires conversion, because the value represents a number with a sign. In the other cases the value is always positive or null.

To carry out conversion, proceed as follows:

if the value in the register is between 0 and 32.767, the result is the value itself (zero and positive values)
 if the value in the register is between 32.768 and 65.535, the result is the value of the register – 65.536
 (negative values)

RANGE Describes the interval of values that can be assigned to the parameter. It can be correlated with other parameters in the instrument (indicated with the parameter **label**).

DEFAULT Indicates the factory-set value for the standard model of the instrument.

EXP This is the multiplier **index** to be applied for converting the value read from the register to the values indicated in the **RANGE** and **DEFAULT** column to convert them into the final values according to the measurement unit indicated in the column **M.U.**

The multiplier is calculated with the base 10 exponential function and with the exponent indicated in the **EXP** column.
 When not indicated the value is 0. The following values are valid:

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. Measurement unit for values converted according to the rules indicated in the **CPL** and **EXP** columns.

1.5.2 Parameters table

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
1	SEt	G01	2048	RW	Set point Cooling	WORD	Y	H04 ... H03	120	-1	°C/°F	
2	SEt	G02	2049	RW	Set point Heating	WORD	Y	H02 ... H01	450	-1	°C/°F	
3	CnF	H01	2051	RW	Max set point Heating	WORD	Y	H02 ... 900	550	-1	°C/°F	
4	CnF	H02	2052	RW	Min set point Heating	WORD	Y	-400 ... H01	300	-1	°C/°F	
5	CnF	H03	2053	RW	Max set point Cooling	WORD	Y	H04 ... 900	300	-1	°C/°F	
6	CnF	H04	2054	RW	Min set point Cooling	WORD	Y	-400 ... H03	0	-1	°C/°F	
7	CnF	H05	2055	RW	AI1 configuration	WORD		0 ... 5	1		num	
8	CnF	H06	2056	RW	AI2 configuration	WORD		0 ... 3	1		num	
9	CnF	H07	2057	RW	AI3 configuration	WORD		0 ... 5	1		num	
10	CnF	H08	2058	RW	AI4 configuration	WORD		0 ... 4	1		num	
11	CnF	H09	2059	RW	Pressure end of scale value	WORD		0 ... 350	300		Kpa*10	
12	CnF	H10	2060	RW	ID1 polarity	WORD		0 ... 1	1		flag	
13	CnF	H11	2061	RW	ID2 polarity	WORD		0 ... 1	1		flag	
14	CnF	H12	2062	RW	ID3 polarity	WORD		0 ... 1	1		flag	
15	CnF	H13	2063	RW	ID4 polarity	WORD		0 ... 1	1		flag	
16	CnF	H14	2064	RW	ID5 polarity	WORD		0 ... 1	1		flag	
17	CnF	H15	2065	RW	AI1 polarity	WORD		0 ... 1	1		flag	
18	CnF	H16	2066	RW	AI2 polarity	WORD		0 ... 1	1		flag	
19	CnF	H17	2067	RW	AI3 polarity	WORD		0 ... 1	1		flag	
20	CnF	H18	2068	RW	ID3 configuration	WORD		0 ... 6	1		num	
21	CnF	H19	2069	RW	ID4 configuration	WORD		0 ... 6	2		num	
22	CnF	H20	2070	RW	ID5 configuration	WORD		0 ... 6	3		num	
23	CnF	H21	2071	RW	AI4 configuration if digital input	WORD		0 ... 6	0		num	
24	CnF	H22	2072	RW	RL2 output relay configuration	WORD		0 ... 1	0		num	
25	CnF	H23	2073	RW	RL3 output relay configuration	WORD		0 ... 2	0		num	
26	CnF	H24	2074	RW	RL4 output relay configuration	WORD		0 ... 2	0		num	
27	CnF	H25	2075	RW	Analog output configuration	WORD		0 ... 2	0		num	
28	CnF	H26	2076	RW	Communication protocol configuration	WORD		0 ... 1	0		flag	
29	CnF	H27	2077	RW	Configuration mode selection	WORD		0 ... 2	0		num	
30	CnF	H28	2078	RW	Heat pump presence	WORD		0 ... 1	1		flag	
31	CnF	H29	2079	RW	Set point AUTOMODE	WORD		0 ... 255	0		°C/°F	
32	CnF	H30	2080	RW	Differential AUTOMODE	WORD		0 ... 255	0	-1	°C/°F	
33	CnF	H31	2081	RW	Enabled "dynamic set point"	WORD		0 ... 1	0		flag	

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
34	CnF	H32	2082	RW	Offset "dynamic set point" Cooling	WORD	Y	-127 ... 127	0	-1	°C/F	
35	CnF	H33	2083	RW	Offset "dynamic set point" Heating	WORD	Y	-127 ... 127	0	-1	°C/F	
36	CnF	H34	2084	RW	set point "dynamic set point" Cooling	WORD	Y	-127 ... 127	0		°C/F	
37	CnF	H35	2085	RW	Set point "dynamic Set point" Heating	WORD	Y	-127 ... 127	0		°C/F	
38	CnF	H36	2086	RW	Proportional Band "dynamic set point" Cooling	WORD	Y	-255 ... 255	0	-1	°C/F	
39	CnF	H37	2087	RW	Proportional Band "dynamic set point" Heating	WORD	Y	-255 ... 255	0	-1	°C/F	
40	CnF	H38	2088	RW	Reversing valve polarity	WORD		0 ... 1	0		flag	
41	CnF	H39	2089	RW	AI1 offset	WORD	Y	-127 ... 127	0	-1	°C/F	
42	CnF	H40	2090	RW	AI2 offset	WORD	Y	-127 ... 127	0	-1	°C/F	
43	CnF	H41	2091	RW	AI3 offset	WORD	Y	-127 ... 127	0	-1	°C-Kpa*10	
44	CnF	H42	2092	RW	AI4 offset	WORD	Y	-127 ... 127	0		°C/F	
45	CnF	H43	2093	RW	Power supply frequency	WORD		0 ... 1	0		flag	
46	CnF	H44	2094	RW	Device serial <i>address</i>	WORD		0 ... 14	0		num	
47	CnF	H45	2095	RW	Family serial <i>address</i>	WORD		0 ... 14	0		num	
48	CnF	H46	2096	RW	User password	WORD		0 ... 255	0		num	
49	CnF	H47	2097	RW	Copy card password	WORD		0 ... 255	0		num	
50	CnF	H48	2098	RW	Compressors per circuit	WORD		1 ... 2	1		num	
51	CnF	H49	2099	RW	Condensation algorithms Configuration	WORD		0 ... 3	3		num	
52	CnF	H50	2100	RW	Compressor selection rule	WORD		0 ... 1	0		flag	
53	CnF	H51	2101	RW	Comp.2 relay polarity/part. valve	WORD		0 ... 1	0		flag	
54	CnF	H52	2102	RW	Temperature unit (C/F)	WORD		0 ... 1	0		flag	
55	CnF	H53	2103	RW	SET mode displaying for air/air plant	WORD		0 ... 1	0		flag	
56	CnF	H54	2104	RW	Customer Code 1	WORD		0 ... 999	0		num	
57	CnF	H55	2105	RW	Customer Code 2	WORD		0 ... 999	0		num	
58	CnF	H56	2106	RW	Alarm relay polarity	WORD		0 ... 1	0		flag	
59	CnF	H57	2107	RW	Enabled alarm relay in off mode	WORD		0 ... 1	0		flag	
60	ALL	A01	2108	RW	Low pressure bypass time	WORD		0 ... 255	0		sec	
61	ALL	A02	2109	RW	Low pressure alarm events per hour	WORD		0 ... 255	255		num	
62	ALL	A03	2110	RW	Bypass time for flow switch alarm following pump on	WORD		0 ... 255	0		sec	
63	ALL	A04	2111	RW	Active flow switch input duration	WORD		0 ... 255	0		sec	
64	ALL	A05	2112	RW	Inactive flow switch input duration	WORD		0 ... 255	0		sec	
65	ALL	A06	2113	RW	Flow switch events per hour	WORD		0 ... 255	255		num	

Read on 1 WORD Write on 1 WORD											
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.
66	ALL	A07	2114	RW	Bypass thermal protection compressor alarm	WORD		0 ... 255	0		sec
67	ALL	A08	2115	RW	Events per hour for thermal protection comp. alarm	WORD		0 ... 255	255		num
68	ALL	A09	2116	RW	Events per hour for fan thermal alarm	WORD		0 ... 255	255		num
69	ALL	A10	2117	RW	Bypass anti-freeze alarm	WORD		0 ... 255	0		min
70	ALL	A11	2118	RW	Set point anti-freeze alarm	WORD	Y	r10...r09	2		°C/°F
71	ALL	A12	2119	RW	Hyteresis anti-freeze alarm	WORD		0 ... 255	20	-1	°C/°F
72	ALL	A13	2120	RW	Anti-freeze alarm events per hour	WORD		0 ... 255	255		num
79	ALL	A20	2127	RW	Special antifreeze: water pump on set point	WORD		0 ... 255	8		°C/°F
80	ALL	A21	2128	RW	Special antifreeze: heat mode on set point	WORD		0 ... P81	5		°C/°F
81	ALL	A22	2129	RW	Special antifreeze: off set point	WORD		A20 ... 255	12		°C/°F
82	ALL	A23	2130	RW	Special antifreeze: enabled function	WORD		0 ... 1	0		flag
83	ALL	A24	2131	RW	Enabled low pressure alarm during defrost	WORD		0 ... 1	1		flag
84	ALL	A25	2132	RW	Set point inlet over temperature alarm 1	WORD		0 ... 255	100		°C/°F
85	ALL	A26	2133	RW	Inlet Over temperature duration	WORD		0 ... 255	30		sec*10
86	CP	C01	2134	RW	ON-OFF compressor delay	WORD		0 ... 255	6		sec*10
87	CP	C02	2135	RW	ON-ON compressor delay	WORD		0 ... 255	23		sec*10
88	CP	C03	2136	RW	Cooling mode hysteresis	WORD		0 ... 255	20	-1	°C/°F
89	CP	C04	2137	RW	Heating mode hysteresis	WORD		0 ... 255	20	-1	°C/°F
90	CP	C05	2138	RW	Steps differential	WORD		0 ... 255	30	-1	°C/°F
91	CP	C06	2139	RW	Delay ON first / ON second compressor	WORD		0 ... 255	5		sec
92	CP	C07	2140	RW	Delay OFF first / OFF second compressor	WORD		0 ... 255	5		sec
93	CP	C08	2141	RW	Monitoring functions blocked	WORD		0 ... 1	0		flag
94	CP	C09	2142	RW	Tank compensation lock set point in cooling	WORD		0 ... 255	4		°C/°F
95	CP	C10	2143	RW	Tank compensation lock set point in heating	WORD		0 ... 255	45		°C/°F
96	CP	C11	2144	RW	Delta of increase in tank compensation set point	WORD		0 ... 255	5	-1	°C/°F
97	CP	C12	2145	RW	Reset time of tank compensation increases	WORD		0 ... 255	24		sec
98	CP	C13	2146	RW	Tank compensation	WORD		0 ... 255	2	-1	num
99	FAn	F01	2147	RW	Fan output configuration	WORD		0 ... 3	0		num
100	FAn	F02	2148	RW	Fan pickup time	WORD		0 ... 255	10		sec/10

Read on 1 WORD Write on 1 WORD											
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.
101	FAn	F03	2149	RW	Fan phase shift	WORD		0 ... 100	5		num
102	FAn	F04	2150	RW	Triac pulse length	WORD		0 ... 255	8		usec*100
103	FAn	F05	2151	RW	Operation on compressor ON	WORD		0 ... 1	0		flag
104	FAn	F06	2152	RW	Min fan speed Cooling	WORD		0 ... 100	30		num
105	FAn	F07	2153	RW	Silent fan speed Cooling	WORD		0 ... 100	80		num
106	FAn	F08	2154	RW	T/P set point for min fan speed Cooling	WORD	Y	-500 ... 800	100		°C-Kpa*10
107	FAn	F09	2155	RW	Proportional band Cooling	WORD		0 ... 255	40		°C-Kpa*10
108	FAn	F10	2156	RW	Cut-off differential	WORD		0 ... 255	20		°C-Kpa*10
109	FAn	F11	2157	RW	Cut-off hysteresis	WORD		0 ... 255	10		°C-Kpa*10
110	FAn	F12	2158	RW	Cut-off bypass time	WORD		0 ... 255	0		sec
111	FAn	F13	2159	RW	Max fan speed Cooling	WORD		0 ... 100	100		num
112	FAn	F14	2160	RW	T/P set point for max fan speed Cooling	WORD	Y	-500 ... 800	180		°C/10-Kpa*10
113	FAn	F15	2161	RW	Min fan speed Heating	WORD		0 ... 100	30		num
114	FAn	F16	2162	RW	Silent fan speed Heating	WORD		0 ... 100	80		num
115	FAn	F17	2163	RW	T/P set point for min fan speed Heating	WORD	Y	-500 ... 800	180		°C/10-Kpa*10
116	FAn	F18	2164	RW	Proportional band Heating	WORD		0 ... 255	40		°C/10-Kpa*10
117	FAn	F19	2165	RW	Max fan speed in Heating	WORD		0 ... 100	100		num
118	FAn	F20	2166	RW	T/P set point for max fan speed Heating	WORD	Y	-500 ... 800	120		°C/10-Kpa*10
119	FAn	F21	2167	RW	Enabled defrosting ventilation on	WORD		0 ... 1	0		flag
120	FAn	F22	2168	RW	T/P set point for max fan speed Heating	WORD	Y	-500 ... 800	0		°C/10-Kpa*10
123	FAn	F25	2171	RW	Preventilation in Cooling	WORD		0 ... 255	0		sec
124	PUP	P01	2172	RW	Water pump configuration	WORD		0 ... 3	0		num
125	PUP	P02	2173	RW	Pump ON - compressor ON delay	WORD		0 ... 255	0		sec
126	PUP	P03	2174	RW	Compressor OFF - pump OFF delay	WORD		0 ... 255	0		sec
127	Fro	r01	2175	RW	Electric heater configuration in defrost	WORD		0 ... 1	0		flag
128	Fro	r02	2176	RW	Enabled electric heater Cooling mode	WORD		0 ... 1	0		flag
129	Fro	r03	2177	RW	Enabled electric heater Heating mode	WORD		0 ... 1	0		flag
130	Fro	r04	2178	RW	Configuration electric heater probe Heating	WORD		0 ... 1	0		flag
131	Fro	r05	2179	RW	Configuration electric heater probe Cooling	WORD		0 ... 1	0		flag
132	Fro	r06	2180	RW	Electric heater configuration in OFF or STANDBY	WORD		0 ... 1	0		flag
133	Fro	r07	2181	RW	Set point electric heater Heating	WORD	Y	r10 ... r09	4		°C/F
134	Fro	r08	2182	RW	Set point electric heater Cooling	WORD	Y	r10 ... r09	4		°C/F

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
135	Fro	r09	2183	RW	Max set point electric heater	WORD	Y	r10 ... 127	10		°C/°F	
136	Fro	r10	2184	RW	Min set point electric heater	WORD	Y	-127 ... r09	0		°C/°F	
137	Fro	r11	2185	RW	Hysteresis electric heater	WORD		0 ... 255	1	-1	°C/°F	
138	Fro	r12	2186	RW	Set point for external antifreeze electric heaters	WORD	Y	r10 ... r09	-5		°C/°F	
139	Fro	r13	2187	RW	Set point external temp. for heat pump off	WORD	Y	-127 ... 127	-5		°C/°F	
140	Fro	r14	2188	RW	delta external temp. heat pump off	WORD		0 ... 255	1	-1	°C/°F	
141	Fro	r15	2189	RW	Enabled supplementary Electrical Heaters	WORD		0 ... 1	0		flag	
142	dFr	d01	2190	RW	Defrost enable	WORD		0 ... 1	0		flag	
143	dFr	d02	2191	RW	Set point T/P start defrost	WORD	Y	-500 ... 800	100		°C/10-Kpa*10	
144	dFr	d03	2192	RW	Cumulative time before defrost start	WORD		0 ... 255	30		min	
145	dFr	d04	2193	RW	Set point T/P end defrost	WORD	Y	-500 ... 800	150		°C/10-Kpa*10	
146	dFr	d05	2194	RW	Max defrost time	WORD		0 ... 255	15		min	
147	dFr	d06	2195	RW	Valve delay at defrost start	WORD		0 ... 255	30		sec	
148	dFr	d07	2196	RW	Dripping time	WORD		0 ... 255	30		sec	
149	dFr	d08	2197	RW	Set point start defrost (if H49=1)	WORD	Y	-500 ... 800	80	-1	°C/°F	
150	dFr	d09	2198	RW	Set point end defrost (if H49=1)	WORD	Y	-500 ... 800	150	-1	°C/°F	
151	dFr	d10	2199	RW	Enabled defrost compensation	WORD		0 ... 1	0		flag	
152	dFr	d11	2200	RW	Offset defrost compensation	WORD	Y	-255 ... 255	0		°C/10-Kpa*10	
153	dFr	d12	2201	RW	set point defrost compensation	WORD	Y	-127 ... 127	0		°C/°F	
154	dFr	d13	2202	RW	Proportional band for defrost compensation	WORD	Y	-255 ... 255	0	-1	°C/°F	
176		G01	5120	RW		WORD		0 ... 770	3		num	
177		G02	5121	RW	Parameter visibility	WORD		0 ... 770	3		num	
178		H01	5123	RW	Parameter visibility	WORD		0 ... 770	3		num	
179		H02	5124	RW	Parameter visibility	WORD		0 ... 770	3		num	
180		H03	5125	RW	Parameter visibility	WORD		0 ... 770	3		num	
181		H04	5126	RW	Parameter visibility	WORD		0 ... 770	3		num	
182		H05	5127	RW	Parameter visibility	WORD		0 ... 770	3		num	
183		H06	5128	RW	Parameter visibility	WORD		0 ... 770	3		num	
184		H07	5129	RW	Parameter visibility	WORD		0 ... 770	3		num	
185		H08	5130	RW	Parameter visibility	WORD		0 ... 770	3		num	
186		H09	5131	RW	Parameter visibility	WORD		0 ... 770	3		num	
187		H10	5132	RW	Parameter visibility	WORD		0 ... 770	3		num	

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
188		H11	5133	RW	Parameter visibility	WORD		0 ... 770	3		num	
189		H12	5134	RW	Parameter visibility	WORD		0 ... 770	3		num	
190		H13	5135	RW	Parameter visibility	WORD		0 ... 770	3		num	
191		H14	5136	RW	Parameter visibility	WORD		0 ... 770	3		num	
192		H15	5137	RW	Parameter visibility	WORD		0 ... 770	3		num	
193		H16	5138	RW	Parameter visibility	WORD		0 ... 770	3		num	
194		H17	5139	RW	Parameter visibility	WORD		0 ... 770	3		num	
195		H18	5140	RW	Parameter visibility	WORD		0 ... 770	3		num	
196		H19	5141	RW	Parameter visibility	WORD		0 ... 770	3		num	
197		H20	5142	RW	Parameter visibility	WORD		0 ... 770	3		num	
198		H21	5143	RW	Parameter visibility	WORD		0 ... 770	3		num	
199		H22	5144	RW	Parameter visibility	WORD		0 ... 770	3		num	
200		H23	5145	RW	Parameter visibility	WORD		0 ... 770	3		num	
201		H24	5146	RW	Parameter visibility	WORD		0 ... 770	3		num	
202		H25	5147	RW	Parameter visibility	WORD		0 ... 770	3		num	
203		H26	5148	RW	Parameter visibility	WORD		0 ... 770	3		num	
204		H27	5149	RW	Parameter visibility	WORD		0 ... 770	3		num	
205		H28	5150	RW	Parameter visibility	WORD		0 ... 770	3		num	
206		H29	5151	RW	Parameter visibility	WORD		0 ... 770	3		num	
207		H30	5152	RW	Parameter visibility	WORD		0 ... 770	3		num	
208		H31	5153	RW	Parameter visibility	WORD		0 ... 770	3		num	
209		H32	5154	RW	Parameter visibility	WORD		0 ... 770	3		num	
210		H33	5155	RW	Parameter visibility	WORD		0 ... 770	3		num	
211		H34	5156	RW	Parameter visibility	WORD		0 ... 770	3		num	
212		H35	5157	RW	Parameter visibility	WORD		0 ... 770	3		num	
213		H36	5158	RW	Parameter visibility	WORD		0 ... 770	3		num	
214		H37	5159	RW	Parameter visibility	WORD		0 ... 770	3		num	
215		H38	5160	RW	Parameter visibility	WORD		0 ... 770	3		num	
216		H39	5161	RW	Parameter visibility	WORD		0 ... 770	3		num	
217		H40	5162	RW	Parameter visibility	WORD		0 ... 770	3		num	
218		H41	5163	RW	Parameter visibility	WORD		0 ... 770	3		num	
219		H42	5164	RW	Parameter visibility	WORD		0 ... 770	3		num	
220		H43	5165	RW	Parameter visibility	WORD		0 ... 770	3		num	

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
221		H44	5166	RW	Parameter visibility	WORD		0 ... 770	3		num	
222		H45	5167	RW	Parameter visibility	WORD		0 ... 770	3		num	
223		H46	5168	RW	Parameter visibility	WORD		0 ... 770	3		num	
224		H47	5169	RW	Parameter visibility	WORD		0 ... 770	3		num	
225		H48	5170	RW	Parameter visibility	WORD		0 ... 770	3		num	
226		H49	5171	RW	Parameter visibility	WORD		0 ... 770	3		num	
227		H50	5172	RW	Parameter visibility	WORD		0 ... 770	3		num	
228		H51	5173	RW	Parameter visibility	WORD		0 ... 770	3		num	
229		H52	5174	RW	Parameter visibility	WORD		0 ... 770	3		num	
230		H53	5175	RW	Parameter visibility	WORD		0 ... 770	3		num	
231		H54	5176	RW	Parameter visibility	WORD		0 ... 770	3		num	
232		H55	5177	RW	Parameter visibility	WORD		0 ... 770	3		num	
233		H56	5178	RW	Parameter visibility	WORD		0 ... 770	3		num	
234		H57	5179	RW	Parameter visibility	WORD		0 ... 770	3		num	
235		A01	5180	RW	Parameter visibility	WORD		0 ... 770	3		num	
236		A02	5181	RW	Parameter visibility	WORD		0 ... 770	3		num	
237		A03	5182	RW	Parameter visibility	WORD		0 ... 770	3		num	
238		A04	5183	RW	Parameter visibility	WORD		0 ... 770	3		num	
239		A05	5184	RW	Parameter visibility	WORD		0 ... 770	3		num	
240		A06	5185	RW	Parameter visibility	WORD		0 ... 770	3		num	
241		A07	5186	RW	Parameter visibility	WORD		0 ... 770	3		num	
242		A08	5187	RW	Parameter visibility	WORD		0 ... 770	3		num	
243		A09	5188	RW	Parameter visibility	WORD		0 ... 770	3		num	
244		A10	5189	RW	Parameter visibility	WORD		0 ... 770	3		num	
245		A11	5190	RW	Parameter visibility	WORD		0 ... 770	3		num	
246		A12	5191	RW	Parameter visibility	WORD		0 ... 770	3		num	
247		A13	5192	RW	Parameter visibility	WORD		0 ... 770	3		num	
248		A14	5193	RW	Parameter visibility	WORD		0 ... 770	3		num	
249		A15	5194	RW	Parameter visibility	WORD		0 ... 770	3		num	
250		A16	5195	RW	Parameter visibility	WORD		0 ... 770	3		num	
251		A17	5196	RW	Parameter visibility	WORD		0 ... 770	3		num	
252		A18	5197	RW	Parameter visibility	WORD		0 ... 770	3		num	
253		A19	5198	RW	Parameter visibility	WORD		0 ... 770	3		num	

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
254		A20	5199	RW	Parameter visibility	WORD		0 ... 770	3		num	
255		A21	5200	RW	Parameter visibility	WORD		0 ... 770	3		num	
256		A22	5201	RW	Parameter visibility	WORD		0 ... 770	3		num	
257		A23	5202	RW	Parameter visibility	WORD		0 ... 770	3		num	
258		A24	5203	RW	Parameter visibility	WORD		0 ... 770	3		num	
259		A25	5204	RW	Parameter visibility	WORD		0 ... 770	3		num	
260		A26	5205	RW	Parameter visibility	WORD		0 ... 770	3		num	
261		C01	5206	RW	Parameter visibility	WORD		0 ... 770	3		num	
262		C02	5207	RW	Parameter visibility	WORD		0 ... 770	3		num	
263		C03	5208	RW	Parameter visibility	WORD		0 ... 770	3		num	
264		C04	5209	RW	Parameter visibility	WORD		0 ... 770	3		num	
265		C05	5210	RW	Parameter visibility	WORD		0 ... 770	3		num	
266		C06	5211	RW	Parameter visibility	WORD		0 ... 770	3		num	
267		C07	5212	RW	Parameter visibility	WORD		0 ... 770	3		num	
268		C08	5213	RW	Parameter visibility	WORD		0 ... 770	3		num	
269		C09	5214	RW	Parameter visibility	WORD		0 ... 770	3		num	
270		C10	5215	RW	Parameter visibility	WORD		0 ... 770	3		num	
271		C11	5216	RW	Parameter visibility	WORD		0 ... 770	3		num	
272		C12	5217	RW	Parameter visibility	WORD		0 ... 770	3		num	
273		C13	5218	RW	Parameter visibility	WORD		0 ... 770	3		num	
274		F01	5219	RW	Parameter visibility	WORD		0 ... 770	3		num	
275		F02	5220	RW	Parameter visibility	WORD		0 ... 770	3		num	
276		F03	5221	RW	Parameter visibility	WORD		0 ... 770	3		num	
277		F04	5222	RW	Parameter visibility	WORD		0 ... 770	3		num	
278		F05	5223	RW	Parameter visibility	WORD		0 ... 770	3		num	
279		F06	5224	RW	Parameter visibility	WORD		0 ... 770	3		num	
280		F07	5225	RW	Parameter visibility	WORD		0 ... 770	3		num	
281		F08	5226	RW	Parameter visibility	WORD		0 ... 770	3		num	
282		F09	5227	RW	Parameter visibility	WORD		0 ... 770	3		num	
283		F10	5228	RW	Parameter visibility	WORD		0 ... 770	3		num	
284		F11	5229	RW	Parameter visibility	WORD		0 ... 770	3		num	
285		F12	5230	RW	Parameter visibility	WORD		0 ... 770	3		num	
286		F13	5231	RW	Parameter visibility	WORD		0 ... 770	3		num	

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
287		F14	5232	RW	Parameter visibility	WORD		0 ... 770	3		num	
288		F15	5233	RW	Parameter visibility	WORD		0 ... 770	3		num	
289		F16	5234	RW	Parameter visibility	WORD		0 ... 770	3		num	
290		F17	5235	RW	Parameter visibility	WORD		0 ... 770	3		num	
291		F18	5236	RW	Parameter visibility	WORD		0 ... 770	3		num	
292		F19	5237	RW	Parameter visibility	WORD		0 ... 770	3		num	
293		F20	5238	RW	Parameter visibility	WORD		0 ... 770	3		num	
294		F21	5239	RW	Parameter visibility	WORD		0 ... 770	3		num	
295		F22	5240	RW	Parameter visibility	WORD		0 ... 770	3		num	
298		F25	5243	RW	Parameter visibility	WORD		0 ... 770	3		num	
299		P01	5244	RW	Parameter visibility	WORD		0 ... 770	3		num	
300		P02	5245	RW	Parameter visibility	WORD		0 ... 770	3		num	
301		P03	5246	RW	Parameter visibility	WORD		0 ... 770	3		num	
302		r01	5247	RW	Parameter visibility	WORD		0 ... 770	3		num	
303		r02	5248	RW	Parameter visibility	WORD		0 ... 770	3		num	
304		r03	5249	RW	Parameter visibility	WORD		0 ... 770	3		num	
305		r04	5250	RW	Parameter visibility	WORD		0 ... 770	3		num	
306		r05	5251	RW	Parameter visibility	WORD		0 ... 770	3		num	
307		r06	5252	RW	Parameter visibility	WORD		0 ... 770	3		num	
308		r07	5253	RW	Parameter visibility	WORD		0 ... 770	3		num	
309		r08	5254	RW	Parameter visibility	WORD		0 ... 770	3		num	
310		r09	5255	RW	Parameter visibility	WORD		0 ... 770	3		num	
311		r10	5256	RW	Parameter visibility	WORD		0 ... 770	3		num	
312		r11	5257	RW	Parameter visibility	WORD		0 ... 770	3		num	
313		r12	5258	RW	Parameter visibility	WORD		0 ... 770	3		num	
314		r13	5259	RW	Parameter visibility	WORD		0 ... 770	3		num	
315		r14	5260	RW	Parameter visibility	WORD		0 ... 770	3		num	
316		r15	5261	RW	Parameter visibility	WORD		0 ... 770	3		num	
317		d01	5262	RW	Parameter visibility	WORD		0 ... 770	3		num	
318		d02	5263	RW	Parameter visibility	WORD		0 ... 770	3		num	
319		d03	5264	RW	Parameter visibility	WORD		0 ... 770	3		num	
320		d04	5265	RW	Parameter visibility	WORD		0 ... 770	3		num	
321		d05	5266	RW	Parameter visibility	WORD		0 ... 770	3		num	

Read on 1 WORD Write on 1 WORD												
INDEX	FOLDER	LABEL	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT*	EXP	M.U.	
322		d06	5267	RW	Parameter visibility	WORD		0 ... 770	3		num	
323		d07	5268	RW	Parameter visibility	WORD		0 ... 770	3		num	
324		d08	5269	RW	Parameter visibility	WORD		0 ... 770	3		num	
325		d09	5270	RW	Parameter visibility	WORD		0 ... 770	3		num	
326		d10	5271	RW	Parameter visibility	WORD		0 ... 770	3		num	
327		d11	5272	RW	Parameter visibility	WORD		0 ... 770	3		num	
328		d12	5273	RW	Parameter visibility	WORD		0 ... 770	3		num	
329		d13	5274	RW	Parameter visibility	WORD		0 ... 770	3		num	
332		Set	5275	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
333		tp	5276	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
334		Err	5277	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
335		Id	5278	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
336		PAr	5279	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
337		PSS	5280	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
338		OHr	5281	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
339		Coo	5282	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
340		HEA	5283	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
341		CnF	5284	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
342		CP	5285	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
343		FAn	5286	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
344		ALL	5287	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
345		PUP	5288	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
346		Fro	5289	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
347		dFr	5290	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
348		OH1	5291	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
349		OH2	5292	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	
350		OHP	5293	RW	<i>Label</i> visibility	WORD		0 ... 770	3		num	

* NOTE: Each parameter can be assigned a “visibility value” as described below:

Value Meaning

- 3 The parameter or *label* is always visible
- 258 The parameter or *label* is visible if the user password is entered correctly (password = Pa H46)
- 770 The parameter or *label* is visible if the user password is entered correctly (password = Pa H46). The parameter cannot be modified.
- 768 The parameter is only visible using a PC

1.5.3 Client Visibility

Read on 16 WORD Write on 15 WORD											
INDEX	FOLDER	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.	
1		1134	R	Analog input 1	WORD	Y	-670 ... 3020	0	-1	°C/°F	
2		1136	R	Analog input 2	WORD	Y	-670 ... 3020	0	-1	°C/°F	
3		1138	R	Analog input 3	WORD	Y	-670 ... 3020	0	-1	°C/°F	
4		1140	R	Analog input 4	WORD	Y	-670 ... 3020	0	-1	°C/°F	
5		1123,6	R	Digital input 1	1 bit		0 ... 1	0		num	
6		1123,7	R	Digital input 2	1 bit		0 ... 1	0		num	
7		1123,3	R	Digital input 3	1 bit		0 ... 1	0		num	
8		1123,4	R	Digital input 4	1 bit		0 ... 1	0		num	
9		1123,5	R	Digital input 5	1 bit		0 ... 1	0		num	
10		1123,2	R	Digital input 6	1 bit		0 ... 1	0		num	
11		1123,1	R	Digital input 7	1 bit		0 ... 1	0		num	
12		1123,0	R	Digital input 8	1 bit		0 ... 1	0		num	
13		1204	R	Analog output 1	BYTE		0 ... 255	0		num	
14		1034	R	Analog output 2	BYTE		0 ... 255	0		num	
15		1188,0	R	Out 1	1 bit		0 ... 1	0		num	
16		1188,1	R	Out 2	1 bit		0 ... 1	0		num	
17		1188,2	R	Out 3	1 bit		0 ... 1	0		num	
18		1188,3	R	Out 4	1 bit		0 ... 1	0		num	
19		1188,4	R	Alarm	1 bit		0 ... 1	0		num	
20		1188,5	R	Out 6	1 bit		0 ... 1	0		num	
21		1187,0	RW	Cool mode	1 bit		0 ... 1	0		num	
22		1187,1	RW	Heat mode	1 bit		0 ... 1	0		num	
23		1187,2	RW	On	1 bit		0 ... 1	0		num	
24		1117,2	R	Keyboard change-over enabled	1 bit		0 ... 1	0		num	
25		1118,1	R	Demand step 1	1 bit		0 ... 1	0		num	
26		1118,2	R	Demand step 2	1 bit		0 ... 1	0		num	
27		1118,3	R	Fan cut-off	1 bit		0 ... 1	0		num	
28		1118,4	R	Max speed fan	1 bit		0 ... 1	0		num	
29		1118,5	R	Demand compressor 1	1 bit		0 ... 1	0		num	
30		1118,6	R	Demand compressor 2	1 bit		0 ... 1	0		num	

Read on 16 WORD Write on 15 WORD										
INDEX	FOLDER	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
31		1118,7	R	Heaters	1 bit		0 ... 1	0		num
32		1119,0	R	Ventilation step on	1 bit		0 ... 1	0		num
33		1119,3	R	Hot Start	1 bit		0 ... 1	0		num
34		1119,5	R	Regolazione digitale del termoregolatore	1 bit		0 ... 1	0		num
35		1119,7	R	Abilita autotest	1 bit		0 ... 1	0		num
36		1120,0	R	Boiler status	1 bit		0 ... 1	0		num
37		3351	RW	Oper. Hours Compressor 1	WORD		0 ... 65535	0		num
38		3353	RW	Oper. Hours Compressor 1	WORD		0 ... 65535	0		num
39		3355	RW	Oper. Hours Pump	WORD		0 ... 65535	0		num
41		1213,1	R	Maximum pressure switch	1 bit		0 ... 1	0		num
42		1213,2	R	Minimum pressure switch	1 bit		0 ... 1	0		num
43		1213,3	R	Flow switch	1 bit		0 ... 1	0		num
44		1213,4	R	Fan thermal protection	1 bit		0 ... 1	0		num
45		1213,5	R	Antifreeze alarm (main)	1 bit		0 ... 1	0		num
46		1214,1	R	Configuration error	1 bit		0 ... 1	0		num
47		1214,2	R	Analog input 1 failure	1 bit		0 ... 1	0		num
48		1214,3	R	Analog input 2 failure	1 bit		0 ... 1	0		num
49		1214,4	R	Analog input 3 failure	1 bit		0 ... 1	0		num
50		1214,5	R	Analog input 4 failure	1 bit		0 ... 1	0		num
51		1214,6	R	High inlet water temperature	1 bit		0 ... 1	0		num
52		1214,7	R	Thermal protection compressor 1	1 bit		0 ... 1	0		num
53		1215,0	R	Thermal protection compressor 2	1 bit		0 ... 1	0		num
55		1216,1	R	Maximum pressure switch (manual reset)	1 bit		0 ... 1	0		num
56		1216,2	R	Minimum pressure switch (manual reset)	1 bit		0 ... 1	0		num
57		1216,3	R	Flow switch (manual reset)	1 bit		0 ... 1	0		num
58		1216,4	R	Fan thermal protection (manual reset)	1 bit		0 ... 1	0		num
59		1216,5	R	Internal anti-freeze alarm threshold exceeded (manual reset)	1 bit		0 ... 1	0		num
60		1217,1	R	Error on digital inputs change-over (manual reset)	1 bit		0 ... 1	0		num
61		1217,2	R	Analogue input failure 1 (manual reset)	1 bit		0 ... 1	0		num
62		1217,3	R	Analogue input failure 2 (manual reset)	1 bit		0 ... 1	0		num
63		1217,4	R	Analogue input failure 3 (manual reset)	1 bit		0 ... 1	0		num
64		1217,5	R	Analogue input failure 4 (manual reset)	1 bit		0 ... 1	0		num

**Read on 16 WORD
Write on 15 WORD**

INDEX	FOLDER	ADDRESS	R/W	DESCRIPTION	DATA SIZE	CPL	RANGE	DEFAULT	EXP	M.U.
65		1217,6	R	High inlet water temperature (manual reset)	1 bit		0 ... 1	0		num
66		1217,7	R	Compressor thermal protection alarm 1 (manual reset)	1 bit		0 ... 1	0		num
67		1218,0	R	Compressor thermal protection alarm 2 (manual reset)	1 bit		0 ... 1	0		num

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ECH 200 BD Modbus
2006/06/0
Cod: 8MA10049