

**MODBUS-RTU
Ichill 200
Release FW 2.3**

Control board format: Read Holding Registers (0x03):

The control board has the following format:

Slave Address	Function Code	Address (MSByte)	Address (LSByte)	N Reg. (MSByte)	N Reg. (LSByte)	CRC (LSByte)	CRC (MSByte)
------------------	------------------	---------------------	---------------------	--------------------	--------------------	-----------------	-----------------

Slave Address:
The address device where is addressed the data reading apply.

Function Code:
Function code required = 0x03.

Address :
Physical:

- MSByte: Upper part of the address. The 7 bit is always 1
- LSByte: Lower part of the address

Depending on the sets of logical area number 7, physical reading can happen in RAM, FLASH, EEPROM.
Without pre-established default sets is possible to enter into the first 32K of the RAM.

Logical :

- MSByte: logical area index
- LSByte: first element index that have to be read

N Reg :
Number of elements (at word) that the instrument has to return (ex. 3 = 3 words). If there isn't a different explanation, the maximum number of words is 40.
In case of physical address of the ram or of the flash, the returned word will contents:

- MSByte = 0x00 (not significant)
- LSByte = byte read by the device

CRC (hight-low byte):
It shows the CRC calculated for the frame data received and it's used to check the integrity of these data.

The reply has the following format:

Slave Address	Function Code	ByteNum	Byte Data 1	Byte Data n	CRC (LSByte)	CRC (MSByte)
------------------	------------------	---------	----------------	----------------	-----------------	-----------------

ByteNum: Numbers of byte that follows, except the CRC.
ByteDate: first data range byte.

Write Single Register (0x06):

The control board has the following format:

Slave Address	Function Code	Address (MSByte)	Address (LSByte)	DATA (MSByte)	DATA (MSByte)	CRC (LSByte)	CRC (MSByte)
------------------	------------------	---------------------	---------------------	------------------	------------------	-----------------	-----------------

Slave Address:
The address device where is addressed the data writing apply.

Function Code:
Function code required = 0x06.

Address :
Physical:

- MSByte: Upper part of the address. The 7 bit is always 1
- LSByte: Lower part of the address.

Depending on the sets of logical area number 7, physical writing can happen in RAM, FLASH, EEPROM.
Without pre-established default sets is possible to enter into the first 32K of the RAM.

Logical :

- MSByte: logical area index
- LSByte: first element index of the logical area that have to be written (0x00÷0xff)

CRC (byte hight-low):
It shows the CRC calculated for the frame data received and it's used to check the integrity of these data.

The reply has the following format:

Slave Address	Function Code	Address (MSByte)	Address (LSByte)	DATA (MSByte)	DATA (MSByte)	CRC (LSByte)	CRC (MSByte)
------------------	------------------	---------------------	---------------------	------------------	------------------	-----------------	-----------------

Write Holding Register (0x10):

The control board has the following format:

Slave Address	Function Code	Address (MSByte)	Address (LSByte)	Reg. N (MSByte)	Reg. N (LSByte)	Num. BYTE	DATA (n.byte)	CRC (LSByte)	CRC (MSByte)
------------------	------------------	---------------------	---------------------	--------------------	--------------------	--------------	------------------	-----------------	-----------------

Slave Address:

The address device where is addressed the data writing apply.

Function Code:

Function code required = 0x10.

Address :

Physical:

- MSByte: Upper part of the address. The 7 bit is always 1
- LSByte: Lower part of the address.

Depending on the sets of logical area number 7, physical writing can happen in RAM, FLASH, EEPROM. Without pre-established default sets is possible to enter into the first 32K of the RAM.

Logical :

- MSByte: logical area index
- LSByte: first element index of the logical area that have to be written (0x00÷0xff)

Reg. N :

Number of registers (at word) that have to be written. If there isn't a different explanation, the maximum number of words is 40. In case of physical address of the ram or of the flash, the data word that have to be written in the address location (byte) ram, the upper part will be removed (MSByte) and only the lower part (LSByte) is copied.

ByteNum:

Numbers of byte that follows, except the CRC. Byte number always have to be twice of the number of address elements (ByteNum = 2*Nreg).

CRC (byte high-low):

It shows the CRC calculated for the frame data received and it's used to check the integrity of these data.

The reply has the following format:

Slave Address	Function Code	Address (MSByte)	Address (LSByte)	Reg. N (MSByte)	Reg. N (LSByte)	CRC (LSByte)	CRC (MSByte)
------------------	------------------	---------------------	---------------------	--------------------	--------------------	-----------------	-----------------

✓ **Parameters communication aspects (DIXELL CONTROLLERS):**

Communication between devices is managed by the RS485 (RS232 for XJ500) that is configured as follows:

Baud Rate = 9600 bps (19200 bps per XJ500)
Data Length = 8 bit
Parity = None
Stop Bit = 1
START/STOP = 4 milliseconds of silence (about 3 characters)
MIN WAITING TIME BETWEEN ATTEMPTS = 500 milliseconds

FOR THE XJ500 SYSTEM, IN CASE OF MODBUS CONNECTION BY MEANS RS232 SERIAL LINE, RTS AND DTR SIGNALS HAVE TO BE MAINTAIN IN A LOW LOGICAL LEVEL.

✓ **address of devices:**

address of devices is carried out by a neutral byte without and possible values are contained among 1 and 247 all limits.

NB: the 0 address correspond to global address that is used only for writing commands. With a command that have 0 address, the device make the write without an answer.

✓ **Exceptions:**

Dixell's devices to side Modbus have exceptions codes to respond when the last command sent can't be delivered. The exceptions are:

A. Not implemented function (0x01)

In this case has been required a function that the device can't support. In our case this exception have to be sent every time that the master sent a function that is different from: **3 (hex 3), 16 (hex 10), 6 (hex 6)**

B. Resource index not valid (0x02)

In this case has been required an action about a resource that isn't present in the device. In our case every time that is required a not-existent logical area.

C. Resource value not valid (0x03)

In this case the resource selected value isn't included into limits established by the protocol in use. In our case:

- ☐ Every time that is request a logical area element not present
- ☐ A higher number of elements in respect to the available maximal number
- ☐ A parameter is written outside limit
- ☐ It is tried to write in a logical area of reading only

D. Reading/writing error (0x04)

The device haven't realize the reading/writing operation. In our case, every time that the reading/writing operation (Ram,E2,RTC,ecc) isn't successfully terminated.

E. Device engaged (0x06)

The device cannot carry out an operation because it' engaged in another operation. The master have to make the request in another time.

In case of exception the answer is:

Slave Address	Function code OR hex(80)	Exception code	CRC (LSByte)	CRC (MSByte)
------------------	-----------------------------	-------------------	-----------------	-----------------

If the execution of the command is successfully terminated, the device will answer with a frame described in Modbus protocol.

√ **The CRC:**
 ModBus protocol send a couple of byte to control the frame from the receivi l'invio di una coppia di byte per il controllo del frame da parte di chi lo receiving.
 The typical frame format is the following:

Address	Function	Data	CRC
Device address	Function code	Data to pass on device	Frame CheckSum

The CRC is inserted in 2 byte (H-L), is calculated by the device that transmit the frame, and is inserted at the end of this. In succession there is the code (in C) for the CRC generation.

```
#define MODBUS_GENERATOR 0xA001
Unsigned int CRC;
void ModbusCalcCRC(unsigned char* Frame,unsigned char LenFrame)
{
    unsigned char CntByte;
    unsigned char j;
    unsigned char bitVal;
    CRC = 0xFFFF;

    For(CntByte=0;CntByte<LenFrame;CntByte++)
    {
        CRC ^= Frame[CntByte];
        for(j=0;j<8;j++)
        {
            bitVal = CRC & 0x0001;
            CRC = CRC >> 1;
            if(bitVal == 1)
                CRC ^= MODBUS_GENERATOR;
        }
    }
}
```

√ **PARTICULARS NOTES:**
 To uniform interpretation mode of data, intended as groups of byte that form one word, all commands data areas that follow will have the following format:

WORD (single data register)															
High BYTE (MSByte)								Low BYTE (LSByte)							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

IMPORTANT NOTE

It is not possible to make Modbus command when the user is using the keyboard (Set displaying, Set programming input or parameters...) or in programming parameters or into functions menu, the device answers with exception 6.

2.

IDENTIFICATION AND CONFIGURATION (reading)

REGISTER	DESCRIPTION	SIZE (word)	NOTE
0	- Product family code - Firmware release	1	MSByte = Product family code LSByte = Firmware release
1	Instrument code 1 (MSWord)	1	DIXELL codification
2	Instrument code 2 (LSWord)	1	DIXELL codification
3	Series number 1 (MSWord)	1	MS WORD
4	Series number 2 (LSWord)	1	LS WORD
5	FW version date	1	- Day = bit15 / bit11 - Month = bit10 / bit7 - Year = bit6 / bit0
6	Descriptor eeprom	1	MSWord always 0 – LSWORD with data storing
7	Probe configuration	1	See description below
8	Relay configuration (I°)	1	See description below
9	Relay configuration (II°)	1	See description below
10	Digital Input configuration (I°)	1	See description below
11	Digital Input configuration (II°)	1	See description below

DIXELL CODIFICATION FOR THE COMMERCIAL CODE: 'X'

Instrument code 1 (MSWord) HIGH BYTE ASCII codification

Instrument code 1 (MSWord) LOW BYTE ASCII codification

Instrument code 2 (LSWord) :

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Numerical value from 0-999 (1000 null value)										(ASCII -hex(20) codification)					

BIT-MAP DIGITAL INPUTS

REGISTER 7		PROBES LIST MANAGED BY THE UNIT	
MSByte		LSByte	
Bit0	PB9 used as a probe	bit0	PB1 used as a probe
Bit1	PB10 used as a probe	bit1	PB2 used as a probe
Bit2	Pb11 1st Probe remote terminal presence	bit2	PB3 used as a probe
Bit3	Pb12 2nd probe remote terminal	bit3	PB4 used as a probe
Bit4		bit4	PB5 used as a probe
Bit5		bit5	PB6 used as a probe
Bit6		bit6	PB7 used as a probe
Bit7		bit7	PB8 used as a probe

BIT-MAP DIGITAL OUTPUTS

REGISTER 8		DIGITAL OUTPUT LIST MANAGED BY THE UNIT	
MSByte		LSByte	
Bit0	9 th used relay	bit0	1 st used relay
Bit1	10 th used relay	bit1	2 nd used relay
Bit2	11 th used relay	bit2	3 rd used relay
Bit3	12 th used relay	bit3	4 th used relay
Bit4	13 th used relay	bit4	5 th used relay
Bit5	14 used relay	bit5	6 th used relay
Bit6		bit6	7 th used relay
Bit7		bit7	8 th used 1relay

REGISTER 9		DIGITAL OUTPUT LIST MANAGED BY THE UNIT	
MSByte		LSByte	
<i>Bit0</i>		<i>bit0</i>	Proportional output 1 used as a relay
<i>Bit1</i>		<i>bit1</i>	Proportional output 2 used as a relay
<i>Bit2</i>		<i>bit2</i>	Proportional output 3 used as a relay
<i>Bit3</i>		<i>bit3</i>	Proportional output 4 used as a relay
<i>Bit4</i>		<i>bit4</i>	
<i>Bit5</i>		<i>bit5</i>	
<i>Bit6</i>		<i>bit6</i>	
<i>Bit7</i>		<i>bit7</i>	

BIT-MAP DIGITAL INPUTS

REGISTER 10		DIGITAL INPUTS LIST MANAGED BY THE UNIT	
MSByte		LSByte	
<i>Bit0</i>	ID9 used	<i>bit0</i>	ID1 used
<i>Bit1</i>	ID10 used	<i>bit1</i>	ID2 used
<i>Bit2</i>	ID11 used	<i>bit2</i>	ID3 used
<i>Bit3</i>	ID12 used	<i>bit3</i>	ID4 used
<i>Bit4</i>	ID13 used	<i>bit4</i>	ID5 used
<i>Bit5</i>	ID14 used	<i>bit5</i>	ID6 used
<i>Bit6</i>	ID15 used	<i>bit6</i>	ID7 used
<i>Bit7</i>	ID16 used	<i>bit7</i>	ID8 used

REGISTER 11		DIGITAL INPUTS MANAGED BY THE UNIT	
MSByte		LSByte	
<i>Bit0</i>	PB9 used as DI	<i>bit0</i>	PB1 used as DI
<i>Bit1</i>	PB10 used as DI	<i>bit1</i>	PB2 used as DI
<i>Bit2</i>		<i>bit2</i>	PB3 used as DI
<i>Bit3</i>		<i>bit3</i>	PB4 used as DI
<i>Bit4</i>		<i>bit4</i>	PB5 used as DI
<i>Bit5</i>		<i>bit5</i>	PB6 used as DI
<i>Bit6</i>	ID17 used	<i>bit6</i>	PB7 used as DI
<i>Bit7</i>	ID18 used	<i>bit7</i>	PB8 used as DI

	3.	PROBE STATUS (reading)
--	-----------	-------------------------------

REGISTER	DESCRIPTION	SIZE (word)	NOTE
256	• 1st probe status (I°)	1	1st probe value
257	• 1st probe status (II°)	1	1st probe status information (probe status table)
258	• 2nd probe status(I°)	1	2nd probe value
259	• 2nd probe status (II°)	1	2nd probe status information (probe status table)
260	• 3rd probe status (I°)	1	3rd probe value
261	• 3rd probe status (II°)	1	3rd probe status information (probe status table)
262	• 4th probe status (I°)	1	4th probe value
263	• 4th probe status (II°)	1	4th probe status information (probe status table)
264	• 5th probe status (I°)	1	4th probe value
265	• 5th probe status (II°)	1	4th probe status information (probe status table)
266	• 6th probe status (I°)	1	4th probe value
267	• 6th probe status (II°)	1	4th probe status information (probe status table)
268	• 7th probe status (I°)	1	4th probe value
269	• 7th probe status (II°)	1	4th probe status information (probe status table)
270	• 8th probe status (I°)	1	4th probe value
271	• 8th probe status (II°)	1	4th probe status information (probe status table)
272	• 9th probe status (I°)	1	9th probe value
273	• 9th probe status (II°)	1	9th probe status information (probe status table)
274	• 10th probe status (I°)	1	10th probe value
275	• 10th probe status (II°)	1	10th probe status information (probe status table)
276	• 11th probe status 1° (I°)	1	11th probe value (1 st remote terminal)
277	• 11th probe status 1° (II°)	1	11th probe status information (probe status table)
278	• 12th probe status 1° (I°)	1	12th probe value (1 st remote terminal)
279	• 12th probe status 1° (II°)	1	12th probe status information (probe status table)

PROBE STATUS table

Byte	Description
Byte (H) Bit0-1-2-3	Measurement unit: 0 =NC, 1 =°C, 2 =°F, 3 =RH%, 4 =PSI, 5 =BAR, 6 =Rpm, 7 =mA, 8 =A, 9 =mV, 10 =V 11,12,13,14,15=Not assigned.
Byte (H) bit 4	Probe resolution (1) decimal point (0) integer
Byte (H) bit 5-6-7	n.u.
Byte (L) bit 0	Error probe (1-1)
Byte (L) bit 1	
Byte (L)	n.u.

4.

DIGITAL INPUTS CONFIGURATION (reading)

REGISTER 512		DIGITAL INPUT CONFIGURATION	
MSB	STATUS MODIFICATION	LSB	MODIFICATION ENABLED
Bit0	remote Heat Pump	bit0	High pressure switch circuit 2
Bit1	remote OFF	bit1	Low pressure switch circuit 1
Bit2	remote chiller	bit2	Low pressure switch circuit 2
Bit3	Flow switch/ Supply fan overload	bit3	Compressor 1 high pressure
Bit4	Flow switch of heated side	bit4	Compressor 2 high pressure
Bit5	Antifreeze heater circuit 1	bit5	Compressor 3 high pressure
Bit6	Antifreeze heater circuit 2	bit6	Compressor 4 high pressure
Bit7	High pressure switch circuit 1	bit7	Compressor 5 high pressure

REGISTER 513		DIGITAL INPUT CONFIGURATION	
MSB	STATUS MODIFICATION	LSB	MODIFICATION ENABLED
Bit0	Compressor 6 high pressure	bit0	Condenser fan overload of circuit 2
Bit1	Compressor 1 overload	bit1	Condenser fan overload of circuit 1 and 2 (common)
Bit2	Compressor 2 overload	bit2	Water pump overload of evaporator 1
Bit3	Compressor 3 overload	bit3	Water support pump overload of evaporator
Bit4	Compressor 4 overload	bit4	Water pump overload of condenser 1
Bit5	Compressor 5 overload	bit5	Water support pump overload of condenser
Bit6	Compressor 6 overload	bit6	Recovery request for circuit 1
Bit7	Condenser fan overload of circuit 1	bit7	Recovery request for circuit 2

REGISTER 514		DIGITAL INPUT CONFIGURATION	
MSB	STATUS MODIFICATION	LSB	MODIFICATION ENABLED
Bit0	Defrost end of circuit 1	bit0	Pressure switch / compressor 6 oil
Bit1	Defrost end of circuit 2	bit1	Pump down pressure switch of circuit 1
Bit2	Energy Saving	bit2	Pump down pressure switch of circuit 2
Bit3	Pressure switch / compressor 1 oil	bit3	Generic alarm from digital input
Bit4	Pressure switch / compressor 2 oil	bit4	Generic alarm 2 from digital input
Bit5	Pressure switch / compressor 3 oil	bit5	Automatic working mode (time table)
Bit6	Pressure switch / compressor 4 oil	bit6	Only ventilation (supply fan)
Bit7	Pressure switch / compressor 5 oil	bit7	Regulation request (condensing unit)

REGISTER 515		DIGITAL INPUT CONFIGURATION	
MSB	STATUS MODIFICATION	LSB	MODIFICATION ENABLED
bit0	Cooling request (condensing unit)	bit0	Step 8 request (condensing unit)
bit1	Heating request (condensing unit)	bit1	Step 9 request (condensing unit)
bit2	Step 2 request (condensing unit)	bit2	Step 10 request (condensing unit)
bit3	Step 3 request (condensing unit)	bit3	Step 11 request (condensing unit)
bit4	Step 4 request (condensing unit)	bit4	Step 12 request (condensing unit)
bit5	Step 5 request (condensing unit)	bit5	Step 13 request (condensing unit)
bit6	Step 6 request (condensing unit)	bit6	Step 14 request (condensing unit)
bit7	Step 7 request (condensing unit)	bit7	Step 15 request (condensing unit)

REGISTER 516		DIGITAL INPUT CONFIGURATION	
MSB	STATUS MODIFICATION	LSB	MODIFICATION ENABLED
bit0	Step 16 request (condensing unit)	bit0	Sanitary water priority
bit1	Sanitary flow switch	bit1	Free cooling water pump switch
bit2	Solar panel flow switch	bit2	Antifreeze condenser circuit 1
bit3	Only sanitary hot water	bit3	Antifreeze condenser circuit 2
bit4	Overload sanitary water heaters	bit4	Condensing unit: compressor 1 request
bit5	Overload sanitary water pump	bit5	Condensing unit: compressor 2 request
bit6	Enable sanitary water second set point	bit6	Condensing unit: compressor 3 request
bit7	Supply voltage sequence phase failure	bit7	Condensing unit: compressor 4 request

REGISTER 517		DIGITAL INPUT CONFIGURATION	
MSB	STATUS MODIFICATION	LSB	MODIFICATION ENABLED
bit0	Condensing unit: compressor 5 request	bit0	Condensing unit: circuit 2 compressor 2 request
bit1	Condensing unit: compressor 6 request	bit1	Condensing unit: circuit 2 compressor 3 request
bit2	Condensing unit: circuit 1 compressor 1 request	bit2	Condensing unit: circuit 2 compressor 4 request
bit3	Condensing unit: circuit 1 compressor 2 request	bit3	Condensing unit: circuit 2 compressor 5 request
bit4	Condensing unit: circuit 1 compressor 3 request	bit4	
bit5	Condensing unit: circuit 1 compressor 4 request	bit5	
bit6	Condensing unit: circuit 1 compressor 5 request	bit6	
bit7	Condensing unit: circuit 2 compressor 1 request	bit7	

5.

FUNCTIONAL STATUS OF THE UNIT (reading – writing)

REGISTER 1280		UNIT FUNCTION	
MSByte	STATUS MODIFICATION	LSByte	MODIFICATION ENABLED
Bit0	Off status Reading mode: Bit = 0 if stand-by or remote-off, Bit = 1 if chiller mode or heat pump mode In writing mode only the power off it's possible (bit = 0)	Bit0	Off status In writing mode set bit = 1 to switch off the controller
Bit1	Reading only: On mode (bit = 1) Remote Off (bit = 0)	Bit1	Reading only: On mode (bit = 1) Remote Off (bit = 0)
Bit2	Chiller status Reading mode: Bit = 0 chiller off Bit = 1 chiller on Writing mode: Bit = 1 chiller on	Bit2	Chiller status Reading mode: Bit = 0 chiller off Bit = 1 chiller on Writing mode: Bit = 1 chiller on
Bit3	Heat pump status Reading mode: Bit = 0 heat pump off Bit = 1 heat pump on Writing mode: Bit = 1 heat pump on	Bit3	Heat pump status Reading mode: Bit = 0 heat pump off Bit = 1 heat pump on Writing mode: Bit = 1 heat pump on
Bit4	(0)	Bit4	(0)
Bit5	Reading /writing: Silencing the buzzer (bit = 1 to stop the buzzer)	Bit5	Silencing the buzzer (bit = 1 to stop the buzzer)
Bit6	Reading only: Dinamic set-point (bit =1 dinamic set point active)	Bit6	Dinamic Set point bit =1 dinamic set point active
Bit7	Energy Saving Mode (bit =1 Energy Saving active)	Bit7	Energy Saving Mode

REGISTER 1281		UNIT FUNCTION	
MSByte	STATUS MODIFICATION	LSByte	MODIFICATION ENABLED
Bit0	Compressor 1 disabled	Bit0	Compressor 1 disabled
Bit1	Compressor 2 disabled	Bit1	Compressor 2 disabled
bit2	Compressor 3 disabled	Bit2	Compressor 3 disabled
bit3	Compressor 4 disabled	Bit3	Compressor 4 disabled
bit4	Compressor 5 disabled	Bit4	Compressor 5 disabled
bit5	Compressor 6 disabled	Bit5	Compressor 6 disabled
bit6	Circuit 1 disabled	Bit6	Set circuit manual 1 disabled
bit7	Circuit 2 disabled	bit7	Set circuit manual 2 disabled

REGISTER 1282		UNIT FUNCTION	
MSByte	STATUS MODIFICATION	LSByte	-
<i>Bit0</i>	Reading only: defrost circuit 1 ongoing (bit = 1)	<i>bit0</i>	(0)
<i>Bit1</i>	Reading only: defrost circuit 2 ongoing (bit = 1)	<i>bit1</i>	(0)
<i>bit2</i>	Reading only: Circuit 1 recovery	<i>bit2</i>	(0)
<i>bit3</i>	Reading only: Circuit 2 recovery	<i>bit3</i>	(0)
<i>bit4</i>	Free cooling	<i>bit4</i>	(0)
<i>bit5</i>		<i>bit5</i>	
<i>bit6</i>		<i>bit6</i>	
<i>bit7</i>	(0)	<i>bit7</i>	(0)

Registro 1283		FUNZIONI MACCHINA	
MSByte	MODIFICA STATO	LSByte	ABILITAZIONE MODIFICA
<i>Bit0</i>	Reading only: sanitary water ongoing	<i>bit0</i>	Sanitary water ongoing
<i>Bit1</i>	Reading only: anti-legionella cycle ongoing	<i>bit1</i>	Anti-legionella cycle ongoing
<i>bit2</i>		<i>bit2</i>	
<i>bit3</i>		<i>bit3</i>	
<i>bit4</i>		<i>bit4</i>	
<i>bit5</i>		<i>bit5</i>	
<i>bit6</i>		<i>bit6</i>	
<i>bit7</i>		<i>bit7</i>	

Writing in logic area number 5:

- Enabled by WSR command (write single register)
- Enabled by WHR command (write holding register) with register = 1 (otherwise exception 3)
- A not admitted writing make exception 3 (ex. Dinamic set demand..., not abilited operation demand)
- If the keyboard is active (set visualization, set programming or parameters input ...) or in programming mode (parameters, set or clock) or into the function menu, the device respond with the exception 6.
- Only one byte is managed (the first from the bit 0) excluded element 1 for which is possible to modify at the same time all compressors and circuits status.
- Verify a writing operation with a second reading.

	6.	SET POINT
--	-----------	------------------

REGISTER	DESCRIZIONE	SIZE (word)	NOTE
1536	Set point real value	1	Only reading; value showed if machine ON in chiller or heat pump. If the controller is OFF, the answer is exception 6.
1537	Set point chiller	1	Reading / writing. Use this register for infrequent writing. The value is saved in the memory.
1538	Set point heat pump	1	Reading / writing. Use this register for infrequent writing. The value is saved in the memory.
1539	Set point sanitary water	1	Reading / writing. Use this register for infrequent writing. The value is saved in the memory.
1540	Set point anti-legionella cycle	1	Reading / writing. Use this register for infrequent writing. The value is saved in the memory.
1541	Set point chiller in volatile memory	1	Reading / writing. Use this register for frequent writing. The value is not saved in the memory.
1542	Set point heat pump in volatile memory	1	Reading / writing. Use this register for frequent writing. The value is not saved in the memory.
1543	Set point domestic hot water in volatile memory	1	Reading / writing. Use this register for frequent writing. The value is not saved in the memory.
1544	Set point antilegionella in volatile memory		Reading / writing. Use this register for frequent writing. The value is not saved in the memory.

	7.	DIGITAL OUTPUTS CONFIGURATION (reading)
--	-----------	--

REGISTER 2048		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
<i>Bit0</i>	<i>bit0</i>	Alarm
<i>Bit1</i>	<i>bit1</i>	Evaporator water pump / supply fan
<i>Bit2</i>	<i>bit2</i>	Supply evaporator water pump
<i>Bit3</i>	<i>bit3</i>	Evaporator antifreeze heater circuit 1 (first step)
<i>Bit4</i>	<i>bit4</i>	Evaporator antifreeze heater circuit 2 (second step)
<i>Bit5</i>	<i>bit5</i>	Boiler heaters circuit 1
<i>Bit6</i>	<i>bit6</i>	Boiler heaters circuit 2
<i>Bit7</i>	<i>bit7</i>	Condenser antifreeze heater circuit 1

REGISTER 2049		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
<i>Bit0</i>	<i>bit0</i>	Condenser antifreeze heater circuit 2
<i>Bit1</i>	<i>bit1</i>	Carter heater compressor 1
<i>Bit2</i>	<i>bit2</i>	Carter heater compressor 2
<i>Bit3</i>	<i>bit3</i>	Carter heater compressor 3
<i>Bit4</i>	<i>bit4</i>	Carter heater compressor 4
<i>Bit5</i>	<i>bit5</i>	Carter heater compressor 5
<i>Bit6</i>	<i>bit6</i>	Carter heater compressor 6
<i>Bit7</i>	<i>bit7</i>	Condenser water pump

REGISTER 2050		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
<i>Bit0</i>	<i>bit0</i>	Condenser support water pump
<i>Bit1</i>	<i>bit1</i>	Reversing valve circuit 1
<i>Bit2</i>	<i>bit2</i>	Reversing valve circuit 2
<i>Bit3</i>	<i>bit3</i>	Condensing fan 1 of the circuit 1
<i>Bit4</i>	<i>bit4</i>	Condensing fan 2 of the circuit 1
<i>Bit5</i>	<i>bit5</i>	Condensing fan 3 of the circuit 1
<i>Bit6</i>	<i>bit6</i>	Condensing fan 4 of the circuit 1
<i>Bit7</i>	<i>bit7</i>	Condensing fan 1 of the circuit 2

REGISTER 2051		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
Bit0	bit0	Condensing fan 2 of the circuit 2
Bit1	bit1	Condensing fan 3 of the circuit 2
Bit2	bit2	Condensing fan 4 of the circuit 2
Bit3	bit3	Pump down valve circuit 1
Bit4	bit4	Pump down valve circuit 2
Bit5	bit5	Recovery valve circuit 1
Bit6	bit6	Recovery valve circuit 2
Bit7	bit7	Free cooling valve

REGISTER 2052		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
Bit0	bit0	Auxiliary output 1
Bit1	bit1	Auxiliary output 2
Bit2	bit2	Intermittent valve compressor 1
Bit3	bit3	Intermittent valve compressor 2
Bit4	bit4	Valve for liquid injection compressor 1
Bit5	bit5	Valve for liquid injection compressor 2
Bit6	bit6	Valve 1 for sanitary water
Bit7	bit7	Valve 2 for sanitary water

REGISTER 2053		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
Bit0	bit0	Heater 1 for sanitary water
Bit1	bit1	Heater 2 for sanitary water
Bit2	bit2	Heater 3 for sanitary water
Bit3	bit3	Antifreeze heaters domestic hot water
Bit4	bit4	Solar panel water pump
Bit5	bit5	Solar panel valve
Bit6	bit6	Sanitary water pump
Bit7	bit7	Hybrid exchanger 1 circuit 1

REGISTER 2054		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
Bit0	bit0	Hybrid exchanger 2 circuit 1
Bit1	bit1	Hybrid exchanger 1 circuit 2
Bit2	bit2	Hybrid exchanger 2 circuit 2
Bit3	bit3	Defrost status
Bit4	bit4	Chiller status
Bit5	bit5	Heat pump status
Bit6	bit6	Sanitary water status
Bit7	bit7	Stand by status

REGISTER 2055		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
Bit0	bit0	Antilegionella status relay
Bit1	bit1	Solenoid valve circuit 1
Bit2	bit2	Solenoid valve circuit 2
Bit3	bit3	Compressor 1
Bit4	bit4	Part-winding/star-delta start-up compressor 1
Bit5	bit5	Star centre of the compressor 1
Bit6	bit6	Capacity step valve 1 compressor 1
Bit7	bit7	Capacity step valve 2 compressor 1

REGISTER 2056		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
<i>Bit0</i>	<i>bit0</i>	Capacity step valve 3 compressor 1
<i>Bit1</i>	<i>bit1</i>	By-pass valve compressor 1
<i>Bit2</i>	<i>bit2</i>	Compressor 2
<i>Bit3</i>	<i>bit3</i>	Part-winding/star-delta start-up compressor 2
<i>Bit4</i>	<i>bit4</i>	Star centre of the compressor 2
<i>Bit5</i>	<i>bit5</i>	Capacity step valve 1 compressor 2
<i>Bit6</i>	<i>bit6</i>	Capacity step valve 2 compressor 2
<i>Bit7</i>	<i>bit7</i>	Capacity step valve 3 compressor 2

REGISTER 2057		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
<i>Bit0</i>	<i>bit0</i>	Start-unloading with by-pass compressor 2
<i>Bit1</i>	<i>bit1</i>	Compressor 3
<i>Bit2</i>	<i>bit2</i>	Part-winding/star-delta start-up compressor 3
<i>Bit3</i>	<i>bit3</i>	Star centre of the compressor 3
<i>Bit4</i>	<i>bit4</i>	Capacity step valve 1 compressor 3
<i>Bit5</i>	<i>bit5</i>	Capacity step valve 2 compressor 3
<i>Bit6</i>	<i>bit6</i>	Capacity step valve 3 compressor 3
<i>Bit7</i>	<i>bit7</i>	Start-unloading with by-pass compressor 3

REGISTER 2058		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
<i>Bit0</i>	<i>bit0</i>	Compressor 4
<i>Bit1</i>	<i>bit1</i>	Start-unloading with by-pass compressor 4
<i>Bit2</i>	<i>bit2</i>	Star centre of the compressor 4
<i>Bit3</i>	<i>bit3</i>	Capacity step valve 1 compressor 4
<i>Bit4</i>	<i>bit4</i>	Capacity step valve 2 compressor 4
<i>Bit5</i>	<i>bit5</i>	Capacity step valve 3 compressor 4
<i>Bit6</i>	<i>bit6</i>	Start-unloading with by-pass compressor 4
<i>Bit7</i>	<i>bit7</i>	Compressor 5

REGISTER 2059		OUTPUT RELAY UNIT
MSByte	LSByte	RELAY CONFIGURATION
<i>Bit0</i>	<i>bit0</i>	Compressor 6
<i>Bit1</i>	<i>bit1</i>	
<i>Bit2</i>	<i>bit2</i>	
<i>Bit3</i>	<i>bit3</i>	
<i>Bit4</i>	<i>bit4</i>	
<i>Bit5</i>	<i>bit5</i>	
<i>Bit6</i>	<i>bit6</i>	
<i>Bit7</i>	<i>bit7</i>	

8.
ANALOG OUTPUTS CONFIGURATION (Reading only)

REGISTER	DESCRIPTION	SIZE (word)	NOTE
2304	• Condensing fan output circuit 1 (triac, 4-20 mA o 0-10 V like set up from parameter)	1	Percentage value 0 -100
2305	• Condensing fan output configuration circuit 1	1	Always 0
2306	• Condensing fan output configuration circuit 2 (triac, 4-20 mA o 0-10 V like set up from parameter)	1	Percentage value 0 -100
2307	• Condensin fan output configuration circuit 2	1	Always 0
2308	• Proportional output 1 configuration 0-10 V	1	Percentage value 0 -100
2309	• Proportional output 1 configuration 0-10 V	1	Always 0
2310	• Proportional output 2 configuration 0-10 V	1	Percentage value 0 -100
2311	• Proportional output 2 configuration 0-10 V	1	Always 0
2312	• Proportional output 3 configuration 0-10 V	1	Percentage value 0 -100
2313	• Proportional output 3 configuration 0-10 V	1	Always 0
2314	• Proportional output 4 configuration 0-10 V	1	Percentage value 0 -100
2315	• Proportional output 4 configuration 0-10 V	1	Always 0

9.

ALARMS CONFIGURATION (reading/writing)

REGISTER 3328		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>	not valid timetable	<i>bit0</i>	probe 8 alarm
<i>Bit1</i>	probe 1 alarm	<i>bit1</i>	probe 9 alarm
<i>bit2</i>	probe 2 alarm	<i>bit2</i>	probe 10 alarm
<i>bit3</i>	probe 3 alarm	<i>bit3</i>	probe 11 alarm
<i>bit4</i>	probe 4 alarm	<i>bit4</i>	probe 12 alarm
<i>bit5</i>	probe 5 alarm	<i>bit5</i>	Compressor 1 maintenance
<i>bit6</i>	probe 6 alarm	<i>Bit6</i>	Compressor 2 maintenance
<i>bit7</i>	probe 7 alarm	<i>Bit7</i>	Compressor 3 maintenance

REGISTER 3329		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>	Compressor 4 maintenance	<i>bit0</i>	Solar panel pump maintenance
<i>Bit1</i>	Compressor 5 maintenance	<i>bit1</i>	Free cooling pump maintenance
<i>bit2</i>	Compressor 6 maintenance	<i>bit2</i>	Configuration alarm 2
<i>bit3</i>	Water pump / supply fan maintenance	<i>bit3</i>	Configuration alarm 3
<i>bit4</i>	Evaporator 2 pump maintenance	<i>bit4</i>	Configuration alarm 4
<i>bit5</i>	Condenser 1 pump maintenance	<i>bit5</i>	Configuration alarm 5
<i>bit6</i>	Condenser 2 pump maintenance	<i>Bit6</i>	Configuration alarm 6
<i>bit7</i>	Sanitary water pump maintenance	<i>Bit7</i>	Configuration alarm 7

REGISTER 3330		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>	Configuration alarm 8	<i>bit0</i>	1 st remote keyboard communication failure
<i>Bit1</i>	Configuration alarm 9	<i>bit1</i>	2 nd remote keyboard communication failure
<i>bit2</i>	Configuration alarm 10	<i>bit2</i>	Free cooling configuration alarm
<i>bit3</i>	Configuration alarm 11	<i>bit3</i>	Sanitary water configuration alarm
<i>bit4</i>		<i>bit4</i>	Power supply phase sequence alarm
<i>bit5</i>		<i>bit5</i>	Configuration 1 alarm
<i>bit6</i>	Configuration alarm 15	<i>Bit6</i>	Anti-legionella alarm
<i>bit7</i>	Low inlet air temperature	<i>Bit7</i>	

REGISTER 3331 - 3332		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>		<i>bit0</i>	
<i>Bit1</i>		<i>bit1</i>	
<i>bit2</i>		<i>bit2</i>	
<i>bit3</i>		<i>bit3</i>	
<i>bit4</i>		<i>bit4</i>	
<i>bit5</i>		<i>bit5</i>	
<i>bit6</i>		<i>Bit6</i>	
<i>bit7</i>		<i>Bit7</i>	

REGISTER 3333		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>	EEPROM alarm	<i>bit0</i>	Compressor 1 overload
<i>Bit1</i>	Faulty clock	<i>bit1</i>	Compressor 2 overload
<i>bit2</i>	Compressor 1 high pressure	<i>bit2</i>	Compressor 3 overload
<i>bit3</i>	Compressor 2 high pressure	<i>bit3</i>	Compressor 4 overload
<i>bit4</i>	Compressor 3 high pressure	<i>bit4</i>	Compressor 5 overload
<i>bit5</i>	Compressor 4 high pressure	<i>bit5</i>	Compressor 6 overload
<i>bit6</i>	Compressor 5 high pressure	<i>Bit6</i>	Condensing fan overload circuit 1
<i>bit7</i>	Compressor 6 high pressure	<i>Bit7</i>	Condensing fan overload circuit 2

REGISTER 3334		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>	Evaporator 1 pump overload	<i>bit0</i>	
<i>Bit1</i>	Evaporator 2 pump overload	<i>bit1</i>	
<i>bit2</i>	Condenser 1 pump overload	<i>bit2</i>	
<i>bit3</i>	Condenser 2 pump overload	<i>bit3</i>	
<i>bit4</i>	Supply fan overload	<i>bit4</i>	
<i>bit5</i>	Contemporary heating and coling request (condensing unit)	<i>bit5</i>	
<i>bit6</i>		<i>Bit6</i>	
<i>bit7</i>		<i>Bit7</i>	

REGISTER 3335 - 3336		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>		<i>bit0</i>	
<i>Bit1</i>		<i>bit1</i>	
<i>bit2</i>		<i>bit2</i>	
<i>bit3</i>		<i>bit3</i>	
<i>bit4</i>		<i>bit4</i>	
<i>bit5</i>		<i>bit5</i>	
<i>bit6</i>		<i>Bit6</i>	
<i>bit7</i>		<i>Bit7</i>	

REGISTER 3337		ALARM LIST (always automatic)	
MSB		LSB	
<i>bit0</i>	Compressor 1 oil level	<i>bit0</i>	Condenser flow switch
<i>Bit1</i>	Compressor 2 oil level	<i>bit1</i>	Low pressure switch circuit 1 (digital input)
<i>bit2</i>	Compressor 3 oil level	<i>bit2</i>	Low pressure switch circuit 2 (digital input)
<i>bit3</i>	Compressor 4 oil level	<i>bit3</i>	Low pressure switch circuit 1 (probe)
<i>bit4</i>	Compressor 5 oil level	<i>bit4</i>	Low pressure switch circuit 2 (probe)
<i>bit5</i>	Compressor 6 oil level	<i>bit5</i>	Pump-down circuit 1 alarm
<i>bit6</i>	High inlet temperature	<i>Bit6</i>	Pump-down circuit 2 alarm
<i>bit7</i>	Evaporator flow switch	<i>Bit7</i>	Pump-down at stop circuit 1 alarm

REGISTER 3338		ALARM LIST	
MSB		LSB	
<i>bit0</i>	Pump-down at stop circuit 2 alarm	<i>bit0</i>	High temperature compressor 4 discharge
<i>Bit1</i>	Chiller antifreeze heater circuit 1	<i>bit1</i>	High temperature compressor 5 discharge
<i>bit2</i>	Chiller antifreeze heater circuit 2	<i>bit2</i>	High temperature compressor 6 discharge
<i>bit3</i>	Heat Pump antifreeze heater circuit 1 alarm	<i>bit3</i>	General alarm 1
<i>bit4</i>	Heat Pump antifreeze heater circuit 2 alarm	<i>bit4</i>	General alarm 2
<i>bit5</i>	High temperature compressor 1 discharge	<i>bit5</i>	High pressure switch circuit 1 (digital input)
<i>bit6</i>	High temperature compressor 2 discharge	<i>Bit6</i>	High pressure switch circuit 2 (digital input)
<i>bit7</i>	High temperature compressor 3 discharge	<i>Bit7</i>	High pressure switch circuit 1 (probe)

REGISTER 3339		ALARM LIST	
MSB		LSB	
<i>bit0</i>	High pressure switch circuit 2 (probe)	<i>bit0</i>	Condenser antifreeze alarm circuit 1 chiller
<i>Bit1</i>	Sanitary water flow switch	<i>bit1</i>	Condenser antifreeze alarm circuit 2 chiller
<i>bit2</i>	Solar panel flow switch	<i>bit2</i>	Condenser antifreeze alarm circuit 1 heat pump
<i>bit3</i>	Overload sanitary water heaters	<i>bit3</i>	Condenser antifreeze alarm circuit 2 heat pump
<i>bit4</i>	Overload sanitary water pump	<i>bit4</i>	Defrost alarm circuit 1
<i>bit5</i>	Compressor 1 oil differential pressure switch	<i>bit5</i>	Defrost alarm circuit 2
<i>bit6</i>	Compressor 2 oil differential pressure switch	<i>Bit6</i>	Flow meter evaporator
<i>bit7</i>	Free cooling water pump switch	<i>Bit7</i>	Flow meter condenser

Reading of logic elements allows to know system alarms configuration.

10.		RUNNING HOURS (reading)	
REGISTER	DESCRIPTION	SIZE (word)	NOTE
3584	Compressor 1 running hours	1	
3585	Compressor 2 running hours	1	
3586	Compressor 3 running hours	1	
3587	Compressor 4 running hours	1	
3588	Compressor 5 running hours	1	
3589	Compressor 6 running hours	1	
3590	Evaporator water pump 1 or Supply fan running hours	1	
3591	Evaporator water pump 2 or Supply fan running hours	1	
3592	Condenser pump 1 running hours	1	
3593	Condenser pump 2 running hours	1	
3594	Sanitary water pump running hours	1	
3595	Solar panel running hours	1	
3596	Free cooling water pump running hours	1	

- In reading mode: it's possible to read single running hours of singles loads.
- It's possible to enter into every elements only if the correspondent relay is configured as present, otherwise the device respond with exception 3

HidROS	MODBUS RTU ICHILL 200	rel 1.0
---------------	------------------------------	----------------

NOTE: For any other general support for MODBUS standard communication please see <http://www.modbus.org/>

HIIdROS S.p.A.
Web: www.hidros.it – E-mail: info@hidros.it