

HI520 Dual-Channel Universal Process Controller Modbus Remote Control



Dear Customer,

Thank you for choosing a Hanna Instruments® product.

Please read this instruction manual carefully as it provides details on Modbus protocol, function codes, controller wiring and setup configuration for remote control and monitoring.

This manual has been written as a companion for [HI520](#) controller manual.



Scan the QR code to download MAN520 as well as additional information on compatible probe series or follow the link: <https://manuals.hannainst.com/HI520>.

If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com. Visit www.hannainst.com for more information about Hanna Instruments and our products.

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General Safety Precautions & Installation Recommendations

HI520 safety precautions and installation recommendations apply. Procedures and instructions detailed in this section may require special precautions to ensure the safety of the personnel performing the operations.



- Electrical connection, installation, start-up, operation, and maintenance must be carried out by specialized personnel only.
- The specialized personnel must have read and understood the instructions in this manual and should adhere to them.
- User serviceable connections are all accessible inside the enclosure.
- Do not operate or energize the instrument with the case open.
- Before powering the controller, verify wiring has been done properly.
- Always disconnect the instrument from power when making electrical connections.



- Do not run other cables through the same cable gland with the power cable.
- A clearly marked disconnect switch must be installed in the vicinity of the instrument to ensure that the electrical circuit is completely de-energized for service or maintenance.

1. INTRODUCTION

Modbus is a request-response software protocol implemented on [HI520](#) and intended for efficient and immediate remote industrial process control.

Main Features

- Allows immediate response to a problem with equipment (even from different plants)
- Minimizes production downtime as mechanical issues are quickly identified
- Traceability of stored data
- Monitors and controls processes remotely

2. MODBUS PROTOCOL BASICS

Modbus protocol defines a communication structure that occurs in pairs. One device initiates a request and then waits for a response. The initiating device is responsible for initiating every interaction (query).

The initiating device can address individual requests (client responds) or initiate a broadcast message to several clients (client does not respond).

Default parameters

Modbus communication protocol is implemented on [HI520](#) through a serial communication channel that makes controller data available to a remote user. Physical layer is implemented on a RS485 line with the following default parameters:

half duplex	8 bit data	1 start bit	1 stop bit	no parity
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RTU (Remote Terminal Unit) mode

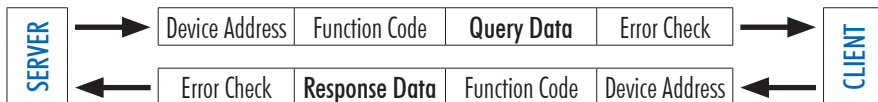
Bytes are transferred as they are and checksum is calculated over CRC algorithm.

START	ADDRESS	FUNCTION	DATA	CRC CHECK	END
T1-T2-T3-T4	8 bits	8 bits	N x 8 bits	16 bits	T1-T2-T3-T4

Note: $T1-T2-T3-T4 = 3.5$ characters times at no communication

- **Address Field** — client address range is 1 – 247, with 0 kept for broadcasting.
- **Function Field** — values range is 1 – 255.
Field is used by client device to echo server query function field for normal case or sets most significant bit of query function to 1 if an error occurs.
- **Data Field** — information regarding required operation.
Data field can be of various lengths or 0. Data uses “big-endian” convention, whereby numerical data with a size greater than 1 byte is sent with the most significant byte first e.g. 0x1234 is sent as 0x12,0x34.

General query message structure



- **Device Address** – individual client address
- **Function Code** – type of action
- **Query Data / Response Data** – transmitted data
- **Error Check** – data integrity error check field

Changing a specific parameter

1. Enter Remote Control Edit Mode.
2. Change a specific Parameter Value.
3. Save Settings.

	Inputs	Actions	Outputs
View Mode	Remote Control enabled in Setup and the communication protocol configured.	Controller settings are read only.	Remote Control Mode register is updated with new value; a timeout value is configured; timeout reloaded on each successful transaction.
Edit Mode	Controller not in manual, calibration, or local edit mode. <ul style="list-style-type: none"> • Set password register. • Set specific value for Remote Control Mode register. 	A copy of the current settings is made. All further requests will address the <i>settings image area</i> .	Remote Control Edit Mode will be available for reading in Remote Control Mode register; a timeout value is configured; timeout reloaded on each successful transaction.
Change Value	Controller is in Remote Control Edit Mode.	Use write actions for coils or holding registers.	Settings visible with read-specific functions. Timeout for remote Control Edit Mode is refreshed with each transaction.
Save Settings	Issue a specific value for Remote control Mode register.	Validity of changes made in the <i>settings image area</i> is tested. If correct, settings are transferred to <i>work area</i> . Controller enters in Hold Mode for enough time to allow saving of new values and process control initialization. Controller will exit from Remote Control Edit Mode.	Remote Control Mode register will be updated with the new values.

Modbus functions

Modbus data types

- **Coil** (1 bit) – forces the ON/OFF state of discrete outputs (DO) or modifies mode / status of client devices. Coil is both read and write. Addresses are in the 1 to 9999 range.
- **Discrete input** (1 bit) – requests input status of field discrete inputs (DI) or the client devices status. Input status data is read only. Addresses are in the 10001 to 19999 range.
- **Input register** (16 bit) – provides field analog inputs (AI) or client devices information. Input register is read only. Floating or double integer data can be handled if consecutive addresses are assigned. Addresses are in the 30001 to 39999 range.
- **Holding register** (16 bit) – receives data from field analog outputs (AO) or sets information on client device. Holding register is both read and write. Floating or double integer data can be handled if consecutive addresses are assigned. Addresses are in the 40001 to 49999 range.

Access type	Access size	Internal data type	Function Name and code
Data	bit	Physical discrete inputs	Read discrete inputs 2
		Internal bits or physical coils	Read coils 1
			Write coil 5
			Write multiple coils 15
	16 bit	Physical input register	Read input register 4
		Internal register or physical output register	Read holding register 3
			Write single register 6
			Write multiple registers 16
			Read/write multiple registers 23
			Mask write register 22
			Read FIFO queue 24
	File record access	Read file record 20	
		Write file record 21	
	Diagnostic		Read exception status 7
		Diagnostic 8	
		Get COM event counter 11	
		Get COM event log 12	
		Report server ID 17	
		Read device ID 43	

Retrieving and setting controller parameters

Parameters grouped based on functionality:

- read only — accessed with read inputs and read registers functions (03)
- read & write — accessed with functions related to coils and holding registers

Read coils (0x01)

Read from 1 to 2000 maximum contiguous status of coils

Request	Function code	1 byte	0x01
	Starting address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Quantity of coils	2 bytes	1 to 2000 (1 to 0x7D0)
Normal answer	Function code	1 byte	0x01
	Bytes count	1 byte	n
	Coil status	n bytes	1 to 2000/8 (maximum 250)

Read discrete inputs (0x02)

Read from 1 to 2000 maximum contiguous status of discrete inputs

Request	Function code	1 byte	0x02
	Starting address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Quantity of discrete inputs	2 bytes	1 to 125 (1 to 0x7D)
Normal answer	Function code	1 byte	0x02
	Bytes count	1 byte	n
	Discrete inputs — n bytes	n bytes	1 to 2000/8 (max 250)

Read holding registers (0x03)

Read from 1 to 125 maximum contiguous holding registers

Request	Function code	1 byte	0x03
	Starting address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Quantity of holding registers	2 bytes	1 to 125 (1 to 0x7D)
Normal answer	Function code	1 byte	0x03
	Bytes count	1 byte	2*N N = 1 to 125
	Holding register — 2*N bytes	n bytes	N*2 bytes

Read input registers (0x04)

Read from 1 to 125 maximum contiguous input registers

Request	Function code	1 byte	0x04
	Starting address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Quantity of input registers	2 bytes	1 to 125 (1 to 0x7D)
Normal answer	Function code	1 byte	0x03
	Bytes count	1 byte	2*N N = 1 to 125
	Input register — 2*N bytes	n bytes	N*2 bytes

Write single coil (0x05)		Write a single coil	
Request	Function code	1 byte	0x05
	Coil address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Coil value	2 bytes	0x0000 or 0xFF00
Normal answer	Function code	1 byte	0x05
	Coil address	1 byte	0x0000 to 0xFFFF
	Coil value	n bytes	0x0000 or 0xFF00

Write single register (0x06)		Write a single hold register	
Request	Function code	1 byte	0x06
	Register address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Register value	2 bytes	0x0000 to 0xFFFF
Normal answer	Function code	1 byte	0x06
	Register address	1 byte	0 to 65535 (0 to 0xFFFF)
	Register value	n bytes	0x0000 to 0xFFFF

Write multiple coils (0x0F)		Write multiple consecutive coils (1 to 123)	
Request	Function code	1 byte	0x0F
	Starting address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Quantity of outputs	2 bytes	1 to 1968 (1 to 0x7B0)
	Byte count	Outputs / 8	1 to 246 (1 to 0xF6)
Normal answer	Function code	1 byte	0x0F
	Starting address	1 byte	0 to 65535 (0 to 0xFFFF)
	Quantity of outputs	n bytes	0x0001 to 0x07B0

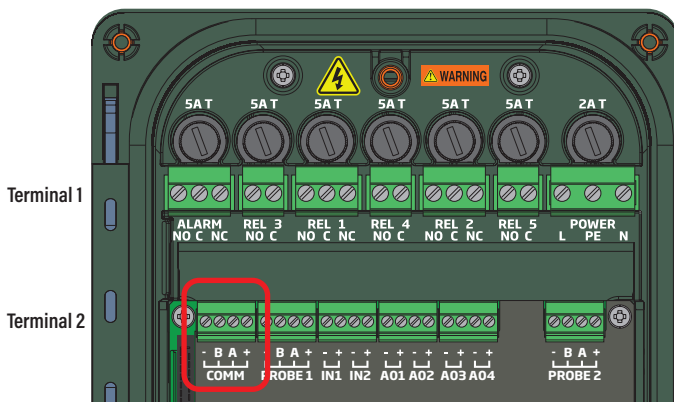
Write multiple registers (0x10)		Write a block of contiguous registers (1 to 123)	
Request	Function code	1 byte	0x10
	Starting address	2 bytes	0 to 65535 (0 to 0xFFFF)
	Quantity of registers	2 bytes	0x0001 to 0x7B
	Byte count	1 byte	Registers * 2
	Registers value		Registers * 2
Normal answer	Function code	1 byte	0x10
	Starting address	1 byte	0 to 65535 (0 to 0xFFFF)
	Quantity of registers	n bytes	0x0001 to 0x7B

Errors	Function code	1 byte	Function code + 0x80
	Starting address	2 bytes	01 or 02 or 03 or 04

3. WIRING & CONTROLLER SETTINGS CONFIGURATION

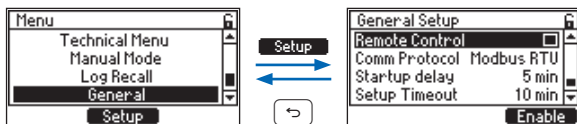
3.1. WIRING

Follow the lead markings (+ positive / – negative) to ensure that output leads are correctly wired to the COMM position on the main board.



3.2. SETUP

- Press the key to access the main menu.
- Press the keys to navigate to General setup.
- Enable **Remote Control** option.
- Press **Setup** to configure Communication Protocol parameters (to match the Modbus server).



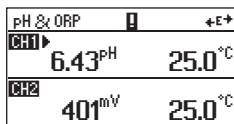
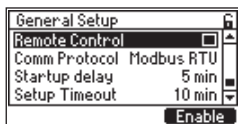
3.2.1. Configurable parameters

Remote Control

Option: Enabled, Disabled

Option must be enabled when using the Modbus protocol.

The check mark confirms the option as enabled or disabled .



Displayed icons

- ➔ remote connection to a Modbus server established
- ➔E remote connection to a Modbus server established (controller operating in editing mode)

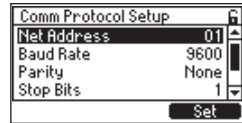
Comm Protocol (Communication Protocol)

Parameter indicates supported transmission mode (Modbus RTU).

Parameter	Options	Default
Modbus Protocol	Modbus RTU	Modbus RTU
Net Address	01 to 99	01
Baud Rate	9600, 19200, 38400, 57600, 115200, 256000	19200
Parity	None, Even, Odd	None
Stop Bits	1 or 2 bits	1 bit
RemLink_Timeout	60 to 1200 seconds	60 seconds
RemEdit_Timeout	30 to 1200 seconds	30 seconds
Bit Length	7 or 8 bits	8 bits

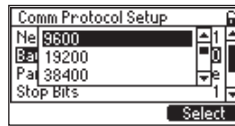
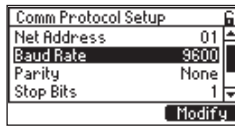
Net Address: sets the controller’s Modbus address.

- With item selected, press **Set** to modify.
- Press the **▲** **▼** keys to increase or decrease the value (keep the key pressed to increase editing speed). Press **CFM** to save.



Baud Rate: Set the desired speed for the serial communication (baud rate in bps.).

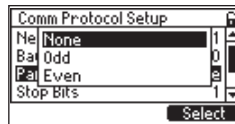
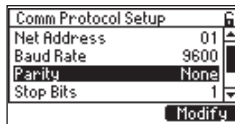
- With item selected, press **Modify** for the drop-down list to display.
- Use the **▲** **▼** keys to navigate between options. Press **Select** to save.



Note: The controller and the Modbus Server must have the same Baud Rate.

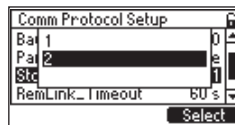
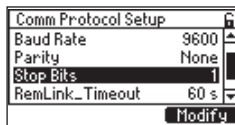
Parity: sets communication parity based on the parity mode of the connected device.

- With item selected, press **Modify** for the drop-down list to display.
- Press the **▲** **▼** keys to navigate between options. Press **Select** to save.



Stop Bits: sets stop bit option based on the stop bit of the connected device.

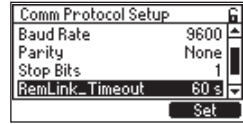
- With item selected, press **Modify** for the drop-down list to display.
- Use the **▲** **▼** keys to navigate between options. Press **Select** to save.



RemLink_Timeout

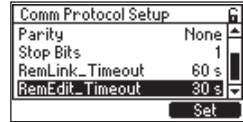
Number of seconds a remotely connected device should wait for a command acknowledgement before timing out.

- With item selected, press **Set** to modify.
- Press the **▲** **▼** keys to increase or decrease the value (keep the key pressed to increase editing speed). Press **CFM** to save.

**RemEdit_Timeout**

Number of seconds that a remotely connected device should wait before exiting Edit mode.

- With item selected, press **Set** to modify.
- Press the **▲** **▼** keys to increase or decrease the value (keep the key pressed to increase editing speed). Press **CFM** to save.



4. OPERATION MODES WHEN USING MODBUS

Mode Type	Scope	Description
Manual	Local control, controller operated manually	Controller operated manually. Note: Remote Control is not available.
Local Edit	Local edit of settings & parameters	Local edit of controller's settings and parameters. Note: Remote Control is not available.
Calibration	System calibration	Allows for controller's system calibration. Note: Remote Control is not available.
Remote Control	HI520 remote control mode	Remote operation is available. When not enabled, controller reverts to manual mode.
Remote View	View parameter & settings values	Remote Control Mode must be enabled. Use Modbus function codes to view or retrieve data. Note: Parameters cannot be updated in this mode.
Remote Edit	View & change parameter and settings values	Remote Control Mode must be enabled. Value contained in the data field is outside range or not accepted as configurable value.
Remote Save	Saves data entered in Edit Mode	Remote Control Mode must be enabled. After editing/changing parameters, the HI520 is placed on Hold and data saved.
Init (Initialization)	Loads new parameter & settings values	Following a Remote Save, the controller automatically runs through an initialization procedure to ensure new data/parameters are being used.

4.1. MODBUS GENERAL STEPS

Prerequisite for HI520 remote operation

The controller must not be in Manual, Calibration, or Local Edit Mode as these modes prevent remote operation.

Steps

1. Ensure remote communication is enabled and serial communication parameters match the Modbus server.
 - ▶ Displayed \rightleftarrows symbol confirms connection to the server is established.
 - ▶ **40195** and **40196** Holding Registers contain status and link information that is not password protected.
2. Ensure the controller has the correct Modbus ID set for use with the Modbus server.
HI520 default Modbus ID is 1, and configurable range is 1 to 99.
 - ▶ Each Modbus device has a configurable ID which must be set in order for the Modbus server to communicate with the device.
3. Determine if the unit is password protected.
 - ▶ If yes, continue with Step 4.
 - ▶ If not, skip Step 4 and continue with Step 5.
4. Send a 32-bit password to the controller using 2 consecutive Write Single Holding register (06) Modbus Function Codes or a single Write Multiple Holding registers (16) Function Code to the controller. The password register addresses are:
 - **40193** — Lower half of 32-bit value (bytes 1-0)
 - **40194** — Upper half of 32-bit value (bytes 3-2)
 - ▶ Enter the password to enable remote operation. The password does not need to be resent unless RemLink or RemEdit timeouts are registered or settings are saved.
 - ▶ Each Modbus transaction resets the timeout timer. (See *RemLink_Timeout* and *RemEdit_Timeout*).
5. Continue with data reading and writing.

Note: *If during reading parameter values, a long enough communication pause causes a Remote Link timeout, the Modbus General Steps need to be repeated.*

4.2. MODBUS SPECIAL HOLDING REGISTERS

Four special holding registers can be read and written to, regardless of operating mode, to allow a Modbus server to enter controller's password, check status, as well as view and set remote operating modes.

Address	Register	Size	Note
40193	Remote password	32-bit	Low part of 32-bit password (bytes 1-0)
40194			High part of 32-bit password (bytes 3-2)
40195	Remote Mode control	8-bit	B0 Remote link (read only) 0 = no link between controller and server 1 = link present between controller and server B1 Set Remote Control View Mode 0 = Controller settings can be done locally 1 = Controller settings can be done only remotely B2 Set Remote Control Edit Mode 0 = Settings can't be done remotely 1 = Settings are done remotely on an image of controller settable parameters B3 Save Settings done on Remote Control Edit Mode 1 = Settings done on Remote control Edit Mode are saved after review of validity change
40196	Reset Controller status	32-bit	bytes 1-0 b0 = R/W controller setup updated b1 = R/W CH1 calibration updated b2 = R/W CH2 calibration updated b3 = RO - CH1 probe update parameters b4 = R/W - CH1 probe parameters updated b5 = Cleaning active b6 = Local edit mode active b7 = Manual mode active b8 = CH1 calibration mode active b9 = Remote Control Mode active b10 = Remote Control Edit mode active b11 = Controller in Hold mode b12 = Controller in startup mode b13 = Manual Hold active b14 = External Hold active

4.3. RETRIEVING CONTROLLER PARAMETERS

1. Ensure **HI520** is correctly configured for remote communication and RemLink or RemEdit have not timed out.
 - ▶ Controller is ready for reading data.
 - ▶ **40195** and **40196** Modbus Holding Registers contain status and link information that is not password protected.
2. Use function code Write Single Holding register (06) to set B1 in **40195** Holding Register i.e. enable remote viewing.
 - ▶ Controller settings are locked (view only) and cannot be changed remotely (or locally).
3. Use function code Read Holding register (03) to confirm the B1 has been set in **40195** Holding Register.
 - ▶ Controller is in the Remote View mode.
4. Use Modbus function codes Read Coil (01), Read Input (02), Read Holding Register (03), or Read Input Register (04) to read parameter values off the controller. See *Modbus Functions* for register details.
5. Repeat step 4 as needed.
 - ▶ Modbus Exception Codes may be encountered. See *Exception Codes*.
 - ▶ Each transaction with the controller resets the timeout timer.
6. At the end of the process, use function code Write Single Holding Register (06) to clear B1 from **40195** Holding Register and disable remote viewing (allow local editing).
 - ▶ Stopping Modbus server communication with the controller until the link timeout expires, causes the Remote View mode to exit.
7. Use function code Read Holding Register (03) to confirm the B1 has been cleared from **40195** Holding Register.
 - ▶ Confirmation that controller exited Remote View mode.

4.4. EDITING & SAVING CONTROLLER PARAMETERS

1. Ensure **HI520** is correctly configured for remote communication and RemLink or RemEdit have not timed out.
 - ▶ controller is ready for reading data
 - ▶ **40195** and **40196** Modbus Holding Registers contain status and link information that is not password protected
2. Use function code Write Single Holding Register (06) to set B1 **and** B2 in **40195** Holding Register i.e. enable remote editing.
 - ▶ A copy of the controller's settings is made and it should be saved before exiting the Remote Edit mode (any changes will be lost).
 - ▶ Subsequent Modbus read/write transactions are with this copied image
3. Use function code Read Holding Register (03) to confirm B1 and B2 have been set in **40195** Holding Register.
 - ▶ Confirms the controller is in the Remote Edit mode.
4. Use correct Modbus function codes to read and write parameters. See *Modbus Functions* sections for details.
5. Repeat Step 4 as needed.
 - ▶ Controller could return Modbus Exception Codes. See *Exception Codes*.
 - ▶ Each transaction with the controller resets a timeout timer.

6. At the end of the process, use function code Write Single Holding register (06) to set B3 in 40195 Holding Register.
 - ▶ A successfully sent command is followed by the controller entering Remote Save mode. A parameters working image is stored to the controller's non-volatile memory. During this time the controller enters the Hold Mode and the new values are stored. Subsequently, the controller runs an Init process to reload new values.
7. Use function code Read Holding register (03) to confirm B2 and B3 have been cleared from 40195 Holding Register during the Remote Save process.
 - ▶ This confirms the controller has exited Remote Editing mode.

5. MODBUS FUNCTIONS

HI520 controller's parameters can be read or modified via Modbus functions.

Parameters are grouped based on their functionality. Not all addresses are used; unused addresses are not shown.

5.1. FUNCTION CODES

The HI520 supports the following standard Modbus function codes:

Decimal	Hex	Name
1	0x01	Read coil
2	0x02	Read input
3	0x03	Read holding register
4	0x04	Read input register
5	0x05	Write single coil
6	0x06	Write single holding register
15	0x0F	Write multiple coils
16	0x10	Write multiple holding registers

- Read-only parameters can be reached via Read Input (02) and Read Input Register (03) functions.
- Read & write parameters (and settings) can be accessed using:
 - A. coil functions
 - ▶ Read Coil (01), Write Single Coil (05), and Write Multiple Coils (15)
 - B. holding register functions
 - ▶ Read Holding Registers (03), Write single Holding register (06) and Write multiple Holding registers (16).

5.2. EXCEPTION CODES

Standard Modbus exception codes are returned by HI520 following a command:

Code	Name	Description
01	Illegal function	Received function code can not be executed as an action by the controller.
02	Illegal data address	Received data address can not be accessed by the controller.
03	Illegal data value	Value contained in the data field is out of range or not allowed on the controller.
04	Server device failure	An error occurred while the controller was attempting to perform requested action.

5.3. COIL REGISTERS (0XXXX ADDRESSES)

The following functions support the coil registers:

Decimal	Hex	Name
1	0x01	Read coil
5	0x05	Write single coil
15	0x0F	Write multiple coils

Address	Coil Function	Address	Coil Function
00001	KeyBeep	00026	Clean Schedule Tuesday Enable
00002	ErrorBeep	00027	Clean Schedule Wednesday Enable
00003	CH1 Setpoint 1 enable control	00028	Clean Schedule Thursday Enable
00004	CH1 Setpoint 2 enable control	00029	Clean Schedule Friday Enable
00005	CH1 Main Parameter enable Alarm High	00030	Clean Schedule Saturday Enable
00006	CH1 Main Parameter enable Alarm Low	00031	Clean Schedule Sunday Enable
00007	CH1 Temperature Parameter enable Alarm High	00033	Math Channel Enable Alarm0_High
00008	CH1 Temperature Parameter enable Alarm Low	00034	Math Channel Enable Alarm0_Low
00009	CH2 Setpoint 1 enable control	00035	Math Channel Enable Alarm1_High
00010	CH2 Setpoint 2 enable control	00036	Math Channel Enable Alarm1_Low
00011	CH2 Main Parameter enable Alarm High	00037	Math Channel Enable Alarm2_High
00012	CH2 Main Parameter enable Alarm Low	00038	Math Channel Enable Alarm2_Low
00013	CH2 Temperature Parameter enable Alarm High	00039	Math Channel Enable Alarm3_High
00014	CH2 Temperature Parameter enable Alarm Low	00040	Math Channel Enable Alarm3_Low
00015	Hold Input Enable	00049	Key USR0
00016	Clean Enable	00050	Key MENU
00017	AnOut1 enable 22 mA on Alarm	00051	Key ESC
00018	AnOut2 enable 22 mA on Alarm	00052	Key USR1
00019	AnOut3 enable 22 mA on Alarm	00053	Key UP
00020	AnOut4 enable 22 mA on Alarm	00054	Key DW
00021	Enable CH1	00055	Key USR2
00022	Enable CH2	00056	Key HELP
00025	Clean Schedule Monday Enable	00057	Key RIGHT

5.4. DISCRETE INPUTS (1XXXX ADDRESSES)

The following function supports the discrete inputs:

Decimal	Hex	Name
2	0x02	Read input

Address	Coil Function	Address	Coil Function
10001	CH1 Setpoint 1 Overtime Alarm	10038	Smart Input Alarm Low
10002	CH1 Setpoint 2 Overtime Alarm	10039	Smart Input Disconnected
10003	CH1 Main Parameter Alarm High	10040	Smart Input Locked
10004	CH1 Main Parameter Alarm Low	10041	Smart Input not Synchronized
10005	CH1 Temperature Parameter Alarm High	10049	Controller EEPROM Memory Error
10006	CH1 Temperature Parameter Alarm Low	10050	Probe EEPROM Memory Error
10007	CH1 Main Parameter Over_range Alarm	10051	Controller EEPROM Memory Checksum Error
10008	CH1 Main Parameter Under_range Alarm	10052	Controller Flash Memory Error
10009	CH1 Temperature Parameter Over_range Alarm	10053	AO Power Error
10010	CH1 Temperature Parameter Under_range Alarm	10054	Micro Temperature Error
10011	CH1 Probe Reconnect Alarm	10055	IO Power Error
10012	CH1 No Probe Alarm	10057	Controller Key USR0 status
10013	CH1 No Parameters Loaded Alarm	10058	Controller Key MENU status
10014	CH1 Probe Error	10059	Controller Key ESC status
10015	CH2 Temperature sensor broken	10060	Controller Key USR1 status
10017	CH2 Setpoint 1 Overtime Alarm	10061	Controller Key UP status
10018	CH2 Setpoint 2 Overtime Alarm	10062	Controller Key DOWN status
10019	CH2 Main Parameter Alarm High	10063	Controller Key USR2 status
10020	CH2 Main Parameter Alarm Low	10064	Controller Key HELP status
10021	CH2 Temperature Parameter Alarm High	10065	Controller Key RIGHT status
10022	CH2 Temperature Parameter Alarm Low	10066	Digital Input1 Value
10023	CH2 Main Parameter Over_range Alarm	10067	Digital Input2 Value
10024	CH2 Main Parameter Under_range Alarm	10068	Smart Input Value
10025	CH2 Temperature Parameter Over_range Alarm	10069	GREEN_STATUS_LED value
10026	CH2 Temperature Parameter Under_range Alarm	10070	RED_STATUS_LED value
10027	CH2 Probe Reconnect Alarm	10071	HOLD LED value
10028	CH2 No Probe Alarm	10073	ALARM RELAY value
10029	CH2 No Parameters Loaded Alarm	10074	RELAY 1 value
10030	CH2 Probe Error	10075	RELAY 2 value
10031	CH2 Temperature Sensor Broken	10076	RELAY 3 value
10033	Hold Alarm	10077	RELAY 4 value
10034	Main Power Failed Alarm	10078	RELAY 5 value
10035	Math CH Alarm High	10079	BUZZER value
10036	Math CH Alarm Low	10081	Remote Control Enable status
10037	Smart Input Alarm High		

5.5. INPUT REGISTERS (3XXXX ADDRESSES)

The following function supports the Input Registers:

Decimal	Hex	Name
4	0x04	Read input register

Address	Parameter	Size	Note
30001	CH1 Main Parameter Value	float	Low part of float (bytes 1-0)
30002			High part of float (bytes 3-2)
30003	CH1 Main Parameter Eng Unit	8 bytes	bytes 1-0
30004			bytes 3-2
30005			bytes 5-4
30006			bytes 7-6
30007	CH1 Main Parameter Value measure Resolution	uint8_t	
30008	CH1 Main Parameter Value display Resolution	uint8_t	
30009	CH1 Main Parameter measure Status	uint8_t	
30010	CH1 Temperature Parameter Value	float	Low part of float (bytes 1-0)
30011			High part of float (bytes 3-2)
30012	CH1 Temperature Parameter Eng Unit	8 bytes	bytes 1-0
30013			bytes 3-2
30014			bytes 5-4
30015			bytes 7-6
30016	CH1 Temperature Parameter Value measure Resolution	uint8_t	
30017	CH1 Temperature Parameter Value display Resolution	uint8_t	
30018	CH1 Temperature Parameter measure status	uint8_t	
30019	CH1 Aux1 Parameter Value	float	Low part of float (bytes 1-0)
30020			High part of float (bytes 3-2)
30021	CH1 Aux1 Parameter Eng Unit	8 bytes	bytes 1-0
30022			bytes 3-2
30023			bytes 5-4
30024			bytes 7-6
30025	CH1 Aux1 Parameter Value measure Resolution	uint8_t	
30026	CH1 Aux1 Parameter Value display Resolution	uint8_t	
30027	CH1 Aux1 Parameter measure status	uint8_t	
30028	CH1 Aux2 Parameter Value	float	Low part of float (bytes 1-0)
30029			High part of float (bytes 3-2)
30030	CH1 Aux2 Parameter Eng Unit	8 bytes	bytes 1-0
30031			bytes 3-2
30032			bytes 5-4
30033			bytes 7-6
30034	CH1 Aux2 Parameter Value measure Resolution	uint8_t	
30035	CH1 Aux2 Parameter Value display Resolution	uint8_t	
30036	CH1 Aux2 Parameter measure status	uint8_t	
30037	CH1 Probe Model	uint8_t	

Address	Parameter	Size	Note
30038	CH1 Probe Parameters No	uint8_t	
30039	CH1 Probe Measure Mode	uint8_t	
30040	CH1 Probe Measure Unit	uint8_t	
30041	CH1 Main Parameter Name	8 bytes	bytes 1-0
30042			bytes 3-2
30043			bytes 5-4
30044			bytes 7-6
30045	CH1 Engineering unit basic Name	8 bytes	bytes 1-0
30046			bytes 3-2
30047			bytes 5-4
30048			bytes 7-6
30049	CH1 Main parameter low limit Value	float	Low part of float (bytes 1-0)
30050			High part of float (bytes 3-2)
30051	CH1 Main parameter high limit Value	float	Low part of float (bytes 1-0)
30052			High part of float (bytes 3-2)
30053	CH1 Main parameter limits Resolution	uint8_t	
30054	CH1 Temperature Parameter Name	8 bytes	bytes 1-0
30055			bytes 3-2
30056			bytes 5-4
30057			bytes 7-6
30058	CH1 Temperature parameter engineering unit basic Name	8 bytes	bytes 1-0
30059			bytes 3-2
30060			bytes 5-4
30061			bytes 7-6
30062	CH1 Temperature parameter low limit Value	float	Low part of float (bytes 1-0)
30063			High part of float (bytes 3-2)
30064	CH1 Temperature parameter high limit Value	float	Low part of float (bytes 1-0)
30065			High part of float (bytes 3-2)
30066	CH1 Temperature parameter limits Resolution	uint8_t	
30067	CH1 Aux1 Parameter Name	8 bytes	bytes 1-0
30068			bytes 3-2
30069			bytes 5-4
30070			bytes 7-6
30071	CH1 Aux1 parameter engineering unit basic Name	8 bytes	bytes 1-0
30072			bytes 3-2
30073			bytes 5-4
30074			bytes 7-6
30075	CH1 Aux1 parameter low limit Value	float	Low part of float (bytes 1-0)
30076			High part of float (bytes 3-2)
30077	CH1 Aux1 parameter high limit Value	float	Low part of float (bytes 1-0)
30078			High part of float (bytes 3-2)
30079	CH1 Aux1 parameter limits Resolution	uint8_t	

Address	Parameter	Size	Note
30080	CH1 Aux2 Parameter Name	8 bytes	bytes 1-0
30081			bytes 3-2
30082			bytes 5-4
30083			bytes 7-6
30084	CH1 Aux2 parameter engineering unit basic Name	8 bytes	bytes 1-0
30085			bytes 3-2
30086			bytes 5-4
30087			bytes 7-6
30088	CH1 Aux2 parameter low limit Value	float	Low part of float (bytes 1-0)
30089			High part of float (bytes 3-2)
30090	CH1 Aux2 parameter high limit Value	float	Low part of float (bytes 1-0)
30091			High part of float (bytes 3-2)
30092	CH1 Aux2 parameter limits Resolution	uint8_t	
30093	Controller Serial No	12 bytes	bytes 1-0
30094			bytes 3-2
30095			bytes 5-4
30096			bytes 7-6
30097			bytes 9-8
30098			bytes 11-10
30199	Controller FW Version	14 bytes	bytes 1-0
30100			bytes 3-2
30101			bytes 5-4
30102			bytes 7-6
30103			bytes 9-8
30104			bytes 11-10
30105			bytes 13-12
30106	CH1 Probe Constant1 Value	uint16_t	
	0 = Incremental (–Min. Range Value ÷ Max. Range Value)		
	1 = Unit		
	DO probe		
	• DO saturation (%DO)		0 or 1
	• DO concentration (mg/L)		0
	• DO concentration (ppm)		1
	EC probe		
	• EC mode (µS)		0 or 1
	• TDS mode (mg/L)		0
	• TDS mode (ppm)		1
	• Sal % (‰)		0 or 1
	• Sal ppt (ppt)		0 or 1
	• Sal psu (psu)		0 or 1
	• Resistivity (Ohm)		0 or 1
	2 = Check Glass Impedance		
	3 = Check Reference Impedance		
	4 = Temperature Compensation (–Min. Range Value ÷ Max. Range Value)		
	5 = Manual Temperature Compensation (–Min. Range Value ÷ Max. Range Value)		
	6 = Temperature Offset (–Min. Range Value ÷ Max. Range Value)		
	7 = Calibration Timeout (–Min. Range Value ÷ Max. Range Value)		
	8 = Resolution (–Min. Range Value ÷ Max. Range Value)		{0,1,2,3}

Address	Parameter	Size	Note
30106	9 = Calibration Buffer <ul style="list-style-type: none"> • Hanna • NIST 10 = Measured mode (Probes measure in different parameters) <p>DO probe</p> <ul style="list-style-type: none"> • DO saturation (%DO) • DO concentration (mg/L) <p>EC probe</p> <ul style="list-style-type: none"> • Conductivity (μS, mS) • Total Dissolved Solids (ppm, ppt, mg/L, g/L) • Resistivity (Ohm, Kohm, Mohm) • Salinity % (%) • Sal ppt (ppt) • Sal psu (psu) 11 = Parameter Source <ul style="list-style-type: none"> • Internal • External 12 = EC Temperature Compensation Mode <ul style="list-style-type: none"> • Linear • Natural • Standard • None 		0 1 0 1 0 1 2 3 4 5 0 1 0 1 2 3
30107	CH1 Probe Constant1 Resolution	uint8_t	{0,1,2,3}
30108	CH1 Probe Constant1 Type	uint8_t	
	0 = Incremental Type 1 = Unit Type 2 = Check Glass Impedance 3 = Check Reference Impedance 4 = Temperature Compensation Type 5 = Incremental Temperature Type 6 = Incremental Temperature Offset Type 7 = Incremental Calibration Timeout 8 = Incremental Resolution Type 9 = Incremental buffer Type 10 = Meter Mode 11 = Parameter source 12 = EC temp compensation Type		
30109	CH1 Probe Constant1 Name	24 bytes	bytes 1-0
30110			bytes 3-2
30111			bytes 5-4
30112			bytes 7-6
30113			bytes 9-8
30114			bytes 11-10
30115			bytes 13-12
30116			bytes 15-14
30117			bytes 17-16
30118			bytes 19-18
30119			bytes 21-20
30120			bytes 23-22
30121	CH1 Probe Constant2 Value	uint16_t	

Address	Parameter	Size	Note
30122	CH1 Probe Constant2 Resolution	uint8_t	
30123	CH1 Probe Constant2 Type	uint8_t	
30124	CH1 Probe Constant2 Name	24 bytes	bytes 1-0
30125			bytes 3-2
30126			bytes 5-4
30127			bytes 7-6
30128			bytes 9-8
30129			bytes 11-10
30130			bytes 13-12
30131			bytes 15-14
30132			bytes 17-16
30133			bytes 19-18
30134			bytes 21-20
30135			bytes 23-22
30136	CH1 Probe Constant3 Value	uint16_t	
30137	CH1 Probe Constant3 Resolution	uint8_t	
30138	CH1 Probe Constant3 Type	uint8_t	
30139	CH1 Probe Constant3 Name	24 bytes	bytes 1-0
30140			bytes 3-2
30141			bytes 5-4
30142			bytes 7-6
30143			bytes 9-8
30144			bytes 11-10
30145			bytes 13-12
30146			bytes 15-14
30147			bytes 17-16
30148			bytes 19-18
30149			bytes 21-20
30150			bytes 23-22
30151	CH1 Probe Constant4 Value	uint16_t	
30152	CH1 Probe Constant4 Resolution	uint8_t	
30153	CH1 Probe Constant4 Type	uint8_t	
30154	CH1 Probe Constant4 Name	24 bytes	bytes 1-0
30155			bytes 3-2
30156			bytes 5-4
30157			bytes 7-6
30158			bytes 9-8
30159			bytes 11-10
30160			bytes 13-12
30161			bytes 15-14
30162			bytes 17-16
30163			bytes 19-18
30164			bytes 21-20

Address	Parameter	Size	Note
30165			bytes 23-22
30166	CH1 Probe Constant5 Value	uint16_t	
30167	CH1 Probe Constant5 Resolution	uint8_t	
30168	CH1 Probe Constant5 Type	uint8_t	
30169	CH1 Probe Constant5 Name	24 bytes	bytes 1-0
30170			bytes 3-2
30171			bytes 5-4
30172			bytes 7-6
30173			bytes 9-8
30174			bytes 11-10
30175			bytes 13-12
30176			bytes 15-14
30177			bytes 17-16
30178			bytes 19-18
30179			bytes 21-20
30180			bytes 23-22
30181	CH1 Probe Constant6 Value	uint16_t	
30182	CH1 Probe Constant6 Resolution	uint8_t	
30183	CH1 Probe Constant6 Type	uint8_t	
30184	CH1 Probe Constant6 Name	24 bytes	bytes 1-0
30185			bytes 3-2
30186			bytes 5-4
30187			bytes 7-6
30188			bytes 9-8
30189			bytes 11-10
30190			bytes 13-12
30191			bytes 15-14
30192			bytes 17-16
30193			bytes 19-18
30194			bytes 21-20
30195			bytes 23-22
30196	CH1 Probe Constant7 Value	uint16_t	
30197	CH1 Probe Constant7 Resolution	uint8_t	
30198	CH1 Probe Constant7 Type	uint8_t	
30199	CH1 Probe Constant7 Name	24 bytes	bytes 1-0
30200			bytes 3-2
30201			bytes 5-4
30202			bytes 7-6
30203			bytes 9-8
30204			bytes 11-10
30205			bytes 13-12
30206			bytes 15-14
30207			bytes 17-16

Address	Parameter	Size	Note
30208			bytes 19-18
30209			bytes 21-20
30210			bytes 23-22
30211	CH1 Probe Constant8 Value	uint16_t	
30212	CH1 Probe Constant8 Resolution	uint8_t	
30213	CH1 Probe Constant8 Type	uint8_t	
30214	CH1 Probe Constant8 Name	24 bytes	bytes 1-0
30215			bytes 3-2
30216			bytes 5-4
30217			bytes 7-6
30218			bytes 9-8
30219			bytes 11-10
30220			bytes 13-12
30221			bytes 15-14
30222			bytes 17-16
30223			bytes 19-18
30224			bytes 21-20
30225			bytes 23-22
30226	CH1 Probe Constant9 Value	uint16_t	
30227	CH1 Probe Constant9 Resolution	uint8_t	
30228	CH1 Probe Constant9 Type	uint8_t	
30229	CH1 Probe Constant9 Name	24 bytes	bytes 1-0
30230			bytes 3-2
30231			bytes 5-4
30232			bytes 7-6
30233			bytes 9-8
30234			bytes 11-10
30235			bytes 13-12
30236			bytes 15-14
30237			bytes 17-16
30238			bytes 19-18
30239			bytes 21-20
30240			bytes 23-22
30241	CH1 Probe Constant10 Value	uint16_t	
30242	CH1 Probe Constant10 Resolution	uint8_t	
30243	CH1 Probe Constant10 Type	uint8_t	
30244	CH1 Probe Constant10 Name	24 bytes	bytes 1-0
30245			bytes 3-2
30246			bytes 5-4
30247			bytes 7-6
30248			bytes 9-8
30249			bytes 11-10
30250			bytes 13-12

Address	Parameter	Size	Note
30251			bytes 15-14
30252			bytes 17-16
30253			bytes 19-18
30254			bytes 21-20
30255			bytes 23-22
30256	CH1 Probe Constant11 Value 0 = Incremental (–Min. Range Value ÷ Max. Range Value) 1 = Unit DO probe <ul style="list-style-type: none"> • DO saturation (%DO) 0 or 1 • DO concentration (mg/L) 0 • DO concentration (ppm) 1 EC probe <ul style="list-style-type: none"> • EC mode (μS) 0 or 1 • TDS mode (mg/L) 0 • TDS mode (ppm) 1 • Sal % (%) 0 or 1 • Sal ppt (ppt) 0 or 1 • Sal psu (psu) 0 or 1 • Resistivity (Ohm) 0 or 1 2 = Check Glass Impedance 3 = Check Reference Impedance 4 = Temperature Compensation (–Min. Range Value ÷ Max. Range Value) 5 = Manual Temperature Compensation (–Min. Range Value ÷ Max. Range Value) 6 = Temperature Offset (–Min. Range Value ÷ Max. Range Value) 7 = Calibration Timeout (–Min. Range Value ÷ Max. Range Value) 8 = Resolution (–Min. Range Value ÷ Max. Range Value) {0,1,2,3} 9 = Calibration Buffer <ul style="list-style-type: none"> • Hanna 0 • NIST 1 10 = Measured mode (Probes measure in different parameters) DO probe <ul style="list-style-type: none"> • DO saturation (%DO) 0 • DO concentration (mg/L) 1 EC probe <ul style="list-style-type: none"> • Conductivity (μS, mS) 0 • Total Dissolved Solids (ppm, ppt, mg/L, g/L) 1 • Resistivity (Ohm, Kohm, Mohm) 2 • Salinity % (%) 3 • Sal ppt (ppt) 4 • Sal psu (psu) 5 11 = Parameter Source <ul style="list-style-type: none"> • Internal 0 • External 1 12 = EC Temperature Compensation Mode <ul style="list-style-type: none"> • Linear 0 • Natural 1 • Standard 2 • None 3 	uint16_t	
30257	CH1 Probe Constant11 Resolution	uint8_t	{0,1,2,3}

Address	Parameter	Size	Note
30258	CH1 Probe Constant11 Type 0 = Incremental Type 1 = Unit Type 2 = Check Glass Impedance 3 = Check Reference Impedance 4 = Temperature Compensation Type 5 = Incremental Temperature Type 6 = Incremental Temperature Offset Type 7 = Incremental Calibration Timeout 8 = Incremental Resolution Type 9 = Incremental buffer Type 10 = Meter Mode 11 = Parameter source	uint8_t	
30259	CH1 Probe Constant11 Name	24 bytes	bytes 1-0
30260			bytes 3-2
30261			bytes 5-4
30262			bytes 7-6
30263			bytes 9-8
30264			bytes 11-10
30265			bytes 13-12
30266			bytes 15-14
30267			bytes 17-16
30268			bytes 19-18
30269			bytes 21-20
30270			bytes 23-22
30273	CH2 Probe Constant1 Value 0 = Incremental (–Min. Range Value ÷ Max. Range Value) 1 = Unit DO probe • DO saturation (%DO) 0 or 1 • DO concentration (mg/L) 0 • DO concentration (ppm) 1 EC probe • EC mode (µs) 0 or 1 • TDS mode (mg/L) 0 • TDS mode (ppm) 1 • Sal % (%) 0 or 1 • Sal ppt (ppt) 0 or 1 • Sal psu (psu) 0 or 1 • Resistivity (Ohm) 0 or 1 2 = Check Glass Impedance 3 = Check Reference Impedance 4 = Temperature Compensation (–Min. Range Value ÷ Max. Range Value) 5 = Manual Temperature Compensation (–Min. Range Value ÷ Max. Range Value) 6 = Temperature Offset (–Min. Range Value ÷ Max. Range Value) 7 = Calibration Timeout (–Min. Range Value ÷ Max. Range Value) 8 = Resolution (–Min. Range Value ÷ Max. Range Value)	uint16_t	{0,1,2,3}

Address	Parameter	Size	Note
30273	9 = Calibration Buffer <ul style="list-style-type: none"> • Hanna • NIST 10 = Measured mode (Probes measure in different parameters) <p>DO probe</p> <ul style="list-style-type: none"> • DO saturation (%DO) • DO concentration (mg/L) <p>EC probe</p> <ul style="list-style-type: none"> • Conductivity (μS, mS) • Total Dissolved Solids (ppm, ppt, mg/L, g/L) • Resistivity (Ohm, Kohm, Mohm) • Salinity % (%) • Sal ppt (ppt) • Sal psu (psu) 11 = Parameter Source <ul style="list-style-type: none"> • Internal • External 12 = EC Temperature Compensation Mode <ul style="list-style-type: none"> • Linear • Natural • Standard • None 		0 1 0 1 0 1 2 3 4 5 0 1 0 1 2 3
30274	CH2 Probe Constant1 Resolution	uint8_t	{0,1,2,3}
30275	CH2 Probe Constant1 Type	uint8_t	
	0 = Incremental Type 1 = Unit Type 2 = Check Glass Impedance 3 = Check Reference Impedance 4 = Temperature Compensation Type 5 = Incremental Temperature Type 6 = Incremental Temperature Offset Type 7 = Incremental Calibration Timeout 8 = Incremental Resolution Type 9 = Incremental buffer Type 10 = Meter Mode 11 = Parameter source 12 = EC temp compensation Type		
30276	CH2 Probe Constant1 Name	24 bytes	bytes 1-0
30277			bytes 3-2
30278			bytes 5-4
30279			bytes 7-6
30280			bytes 9-8
30281			bytes 11-10
30282			bytes 13-12
30283			bytes 15-14
30284			bytes 17-16
30285			bytes 19-18
30286			bytes 21-20
30287			bytes 23-22
30288	CH2 Probe Constant2 Value	uint16_t	

Address	Parameter	Size	Note
30289	CH2 Probe Constant2 Resolution	uint8_t	
30290	CH2 Probe Constant2 Type	uint8_t	
30291	CH2 Probe Constant2 Name	24 bytes	bytes 1-0
30292			bytes 3-2
30293			bytes 5-4
30294			bytes 7-6
30295			bytes 9-8
30296			bytes 11-10
30297			bytes 13-12
30298			bytes 15-14
30299			bytes 17-16
30300			bytes 19-18
30301			bytes 21-20
30302			bytes 23-22
30303	CH2 Probe Constant3 Value	uint16_t	
30304	CH2 Probe Constant3 Resolution	uint8_t	
30305	CH2 Probe Constant3 Type	uint8_t	
30306	CH2 Probe Constant3 Name	24 bytes	bytes 1-0
30307			bytes 3-2
30308			bytes 5-4
30309			bytes 7-6
30310			bytes 9-8
30311			bytes 11-10
30312			bytes 13-12
30313			bytes 15-14
30314			bytes 17-16
30315			bytes 19-18
30316			bytes 21-20
30317			bytes 23-22
30318	CH2 Probe Constant4 Value	uint16_t	
30319	CH2 Probe Constant4 Resolution	uint8_t	
30320	CH2 Probe Constant4 Type	uint8_t	
30321	CH2 Probe Constant4 Name	24 bytes	bytes 1-0
30322			bytes 3-2
30323			bytes 5-4
30324			bytes 7-6
30325			bytes 9-8
30326			bytes 11-10
30327			bytes 13-12
30328			bytes 15-14
30329			bytes 17-16
30330			bytes 19-18
30331			bytes 21-20

Address	Parameter	Size	Note
30332			bytes 23-22
30333	CH2 Probe Constant5 Value	uint16_t	
30334	CH2 Probe Constant5 Resolution	uint8_t	
30335	CH2 Probe Constant5 Type	uint8_t	
30336	CH2 Probe Constant5 Name	24 bytes	bytes 1-0
30337			bytes 3-2
30338			bytes 5-4
30339			bytes 7-6
30340			bytes 9-8
30341			bytes 11-10
30342			bytes 13-12
30343			bytes 15-14
30344			bytes 17-16
30345			bytes 19-18
30346			bytes 21-20
30347			bytes 23-22
30348	CH2 Probe Constant6 Value	uint16_t	
30349	CH2 Probe Constant6 Resolution	uint8_t	
30350	CH2 Probe Constant6 Type	uint8_t	
30351	CH2 Probe Constant6 Name	24 bytes	bytes 1-0
30352			bytes 3-2
30353			bytes 5-4
30354			bytes 7-6
30355			bytes 9-8
30356			bytes 11-10
30357			bytes 13-12
30358			bytes 15-14
30359			bytes 17-16
30360			bytes 19-18
30361			bytes 21-20
30362			bytes 23-22
30363	CH2 Probe Constant7 Value	uint16_t	
30364	CH2 Probe Constant7 Resolution	uint8_t	
30365	CH2 Probe Constant7 Type	uint8_t	
30366	CH2 Probe Constant7 Name	24 bytes	bytes 1-0
30367			bytes 3-2
30368			bytes 5-4
30369			bytes 7-6
30370			bytes 9-8
30371			bytes 11-10
30372			bytes 13-12
30373			bytes 15-14
30374			bytes 17-16

Address	Parameter	Size	Note
30375			bytes 19-18
30376			bytes 21-20
30377			bytes 23-22
30378	CH2 Probe Constant8 Value	uint16_t	
30379	CH2 Probe Constant8 Resolution	uint8_t	
30380	CH2 Probe Constant8 Type	uint8_t	
30381	CH2 Probe Constant8 Name	24 bytes	bytes 1-0
30382			bytes 3-2
30383			bytes 5-4
30384			bytes 7-6
30385			bytes 9-8
30386			bytes 11-10
30387			bytes 13-12
30388			bytes 15-14
30389			bytes 17-16
30390			bytes 19-18
30391			bytes 21-20
30392			bytes 23-22
30393	CH2 Probe Constant9 Value	uint16_t	
30394	CH2 Probe Constant9 Resolution	uint8_t	
30395	CH2 Probe Constant9 Type	uint8_t	
30396	CH2 Probe Constant9 Name	24 bytes	bytes 1-0
30397			bytes 3-2
30398			bytes 5-4
30399			bytes 7-6
30400			bytes 9-8
30401			bytes 11-10
30402			bytes 13-12
30403			bytes 15-14
30404			bytes 17-16
30405			bytes 19-18
30406			bytes 21-20
30407			bytes 23-22
30408	CH2 Probe Constant10 Value	uint16_t	
30409	CH2 Probe Constant10 Resolution	uint8_t	
30410	CH2 Probe Constant10 Type	uint8_t	
30411	CH2 Probe Constant10 Name	24 bytes	bytes 1-0
30412			bytes 3-2
30413			bytes 5-4
30414			bytes 7-6
30415			bytes 9-8
30416			bytes 11-10
30417			bytes 13-12

Address	Parameter	Size	Note
30418			bytes 15-14
30419			bytes 17-16
30420			bytes 19-18
30421			bytes 21-20
30422			bytes 23-22
30423	CH2 Probe Constant11 Value 0 = Incremental (–Min. Range Value ÷ Max. Range Value) 1 = Unit DO probe <ul style="list-style-type: none"> • DO saturation (%DO) 0 or 1 • DO concentration (mg/L) 0 • DO concentration (ppm) 1 EC probe <ul style="list-style-type: none"> • EC mode (μS) 0 or 1 • TDS mode (mg/L) 0 • TDS mode (ppm) 1 • Sal % (%) 0 or 1 • Sal ppt (ppt) 0 or 1 • Sal psu (psu) 0 or 1 • Resistivity (Ohm) 0 or 1 2 = Check Glass Impedance 3 = Check Reference Impedance 4 = Temperature Compensation (–Min. Range Value ÷ Max. Range Value) 5 = Manual Temperature Compensation (–Min. Range Value ÷ Max. Range Value) 6 = Temperature Offset (–Min. Range Value ÷ Max. Range Value) 7 = Calibration Timeout (–Min. Range Value ÷ Max. Range Value) 8 = Resolution (–Min. Range Value ÷ Max. Range Value) {0,1,2,3} 9 = Calibration Buffer <ul style="list-style-type: none"> • Hanna 0 • NIST 1 10 = Measured mode (Probes measure in different parameters) DO probe <ul style="list-style-type: none"> • DO saturation (%DO) 0 • DO concentration (mg/L) 1 EC probe <ul style="list-style-type: none"> • Conductivity (μS, mS) 0 • Total Dissolved Solids (ppm, ppt, mg/L, g/L) 1 • Resistivity (Ohm, Kohm, Mohm) 2 • Salinity % (%) 3 • Sal ppt (ppt) 4 • Sal psu (psu) 5 11 = Parameter Source <ul style="list-style-type: none"> • Internal 0 • External 1 12 = EC Temperature Compensation Mode <ul style="list-style-type: none"> • Linear 0 • Natural 1 • Standard 2 • None 3 	uint16_t	
30424	CH2 Probe Constant11 Resolution	uint8_t	{0,1,2,3}

Address	Parameter	Size	Note
30425	CH2 Probe Constant11 Type 0 = Incremental Type 1 = Unit Type 2 = Check Glass Impedance 3 = Check Reference Impedance 4 = Temperature Compensation Type 5 = Incremental Temperature Type 6 = Incremental Temperature Offset Type 7 = Incremental Calibration Timeout 8 = Incremental Resolution Type 9 = Incremental buffer Type 10 = Meter Mode 11 = Parameter source	uint8_t	
30426	CH2 Probe Constant11 Name	24 bytes	bytes 1-0
30427			bytes 3-2
30428			bytes 5-4
30429			bytes 7-6
30430			bytes 9-8
30431			bytes 11-10
30432			bytes 13-12
30433			bytes 15-14
30434			bytes 17-16
30435			bytes 19-18
30436			bytes 21-20
30437			bytes 23-22
30438	Controller Status	uint32_t	Bytes 1-0
30439			Bytes 3-2
30440	Alarm Events	uint64_t	Bytes 1-0
30441			Bytes 3-2
30442			Bytes 5-4
30443			Bytes 7-6
30444	Error Events	uint64_t	Bytes 1-0
30445			Bytes 3-2
30446			Bytes 5-4
30447			Bytes 7-6

5.6. HOLDING REGISTERS (4XXXX ADDRESSES)

The following functions support the holding registers:

Decimal	Hex	Name
3	0x03	Read holding register
6	0x06	Write single holding register
16	0x10	Write multiple holding registers

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40001	Log interval	uint8_t	0	10	0	0 = 10 s, 1 = 30 s, 2 = 1 min, 3 = 2 min, 4 = 5 min, 5 = 10 min, 6 = 15 min, 7 = 30 min, 8 = 60 min, 9 = 120 min, 10 = 180 min
40002	Date Format	uint8_t	0	5	0	0 = yyyy-mm-dd 1 = dd-mm-yyyy 2 = mm-dd-yyyy 3 = yyyy/mm/dd 4 = dd/mm/yyyy 5 = mm/dd/yyyy
40003	Time Format	uint8_t	0	1	0	0 = hh:mm:ss 24 h 1 = hh:mm:ss 12 h
40004	Decimal	uint8_t	.	,	.	
40005	Temperature Unit	uint8_t	0	1	0	0 = °C 1 = °F
40006	Controller ID	uint16_t	0	9999	1	
40007	Startup Delay	uint8_t	1	30	5	[minutes]
40008	Setup Timeout	uint8_t	1	30	10	[minutes]
40009	Communication Protocol	uint8_t	0	2	0	0 = Hanna protocol 1 = Modbus RTU 2 = Modbus ASCII
40010	Bus Address	uint8_t	1	99	1	
40011	Baud rate	uint8_t	0	5	1	0 = 9K6 1 = 19K2 2 = 38K4 3 = 57K6 4 = 115K2 5 = 256K0
40012	Parity	uint8_t	0	2	0	0 = None 1 = Odd parity 2 = Even Parity
40013	Stop bits	uint8_t	0	2	0	0 = 1 stop bit 1 = 2 stop bits
40014	Remote edit timeout	uint16_t	10	1200	30	[seconds]
40015	Remote link timeout	uint16_t	10	1200	60	[seconds]
40017	Clean Enable	uint8_t	0	1	0	0 = Clean Disable 1 = Clean Enable
40018	Clean Type	uint8_t	0	1	0	0 = Simple Cleaning 1 = Adv. Cleaning
40019	Cleaning interval time	uint16_t	1	1440	480	[minutes]
40020	Cleaning pre_wash time	uint16_t	5	300	20	[seconds]
40021	Cleaning wash time	uint16_t	5	300	20	[seconds]

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40022	Cleaning post wash time	uint16_t	5	999	20	[seconds]
40023	Cleaning Recovery time	uint16_t	5	120	10	[seconds]
40024	Cleaning Wash Cycles	uint8_t	1	10	1	
40025	Cleaning Rinse only cycles	uint8_t	0	10	0	
40026	Cleaning Schedule 1 st time to start hour	uint8_t	0	23	0	
40027	Cleaning Schedule 1 st time to start minute	uint8_t	0	59	0	
40028	Cleaning Schedule 1 st time to start enabled	uint8_t	0	1	0	0 = start disabled 1 = start enabled
40029	Cleaning Schedule 2 nd time to start hour	uint8_t	0	23	0	
40030	Cleaning Schedule 2 nd time to start minute	uint8_t	0	59	0	
40031	Cleaning Schedule 2 nd time to start enabled	uint8_t	0	1	0	0 = start disabled 1 = start enabled
40032	Cleaning Schedule 3 rd time to start hour	uint8_t	0	23	0	
40033	Cleaning Schedule 3 rd time to start minute	uint8_t	0	59	0	
40034	Cleaning Schedule 3 rd time to start enabled	uint8_t	0	1	0	0 = start disabled 1 = start enabled
40035	Input1 Function	uint8_t	0	2	0	0 = Disabled 1 = Hold 2 = Clean
40036	Input1 Active Level	uint8_t	0	1	0	0 = Low 1 = High
40037	Input2 Function	uint8_t	0	2	0	0 = Disabled 1 = Hold 2 = Clean
40038	Input2 Active Level	uint8_t	0	1	0	0 = Low 1 = High
40041	Relay 1 function	uint8_t	0	5	0	0 = Disabled
40042	Relay 2 function	uint8_t	0	5	0	1 = CtrlSetP1
40043	Relay 3 function	uint8_t	0	5	0	2 = CtrlSetP2
40044	Relay 4 function	uint8_t	0	5	0	3 = Rinse
40045	Relay 5 function	uint8_t	0	5	0	4 = Wash 5 = Hold
40046	Hold delay	uint8_t	0	99	5	[seconds]
40047	AnOut1 mode	uint8_t	0	1	0	0 = Disabled 1 = Track Channel
40048	AnOut1 data Channel	uint8_t	0	1	0	0 = CH1 (Probe 1) 1 = CH2 (Probe 2)
40049	AnOut1 parameter to follow	uint8_t	0	4	0	0 = Ctrl SetP1 1 = Ctrl SetP2 2 = Main parameter 3 = Temper. Param. 4 = Auxiliary Param.
40050	AnOut1 mA range	uint8_t	0	1	0	0 = "0-20 mA" 1 = "4-20 mA"
40051	AnOut1 Value in Hold option	uint8_t	0	1	0	0 = "Last value" 1 = "Fix value"

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40052	AnOut1 22 mA on Hold option	uint8_t	0	1	0	0 = "Disabled" 1 = "Enabled"
40053	AnOut1 parameter Value for maximum output	float				Low part of float (bytes 1-0)
40054						High part of float (bytes 3-2)
40055	AnOut1 parameter Value for minimum output	float				Low part of float (bytes 1-0)
40056						High part of float (bytes 3-2)
40057	AnOut1 parameter Value in Hold	float				Low part of float (bytes 1-0)
40058						High part of float (bytes 3-2)
40059	AnOut2 mode	uint8_t	0	1	0	0 = Disabled 1 = Track Channel
40060	AnOut2 data Channel	uint8_t	0	1	0	0 = CH1 (Probe 1) 1 = CH2 (Probe 2)
40061	AnOut2 parameter to follow	uint8_t	0	4	0	0 = Ctrl SetP1 1 = Ctrl SetP2 2 = Main parameter 3 = Temper. Param. 4 = Auxiliary Param.
40062	AnOut2 mA range	uint8_t	0	1	0	0 = "0-20 mA" 1 = "4-20 mA"
40063	AnOut2 Value in Hold option	uint8_t	0	1	0	0 = "Last value" 1 = "Fix value"
40064	AnOut2 22 mA on Hold option	uint8_t	0	1	0	0 = "Disabled" 1 = "Enabled"
40065	AnOut2 parameter Value for maximum output	float				Low part of float (bytes 1-0)
40066						High part of float (bytes 3-2)
40067	AnOut2 parameter Value for minimum output	float				Low part of float (bytes 1-0)
40068						High part of float (bytes 3-2)
40069	AnOut2 parameter Value in Hold	float				Low part of float (bytes 1-0)
40070						High part of float (bytes 3-2)
40071	AnOut3 mode	uint8_t	0	1	0	0 = Disabled 1 = Track Channel
40072	AnOut3 data Channel	uint8_t	0	1	0	0 = CH1 (Probe 1) 1 = CH2 (Probe 2)

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40073	AnOut3 parameter to follow	uint8_t	0	4	0	0 = Ctrl SetP1 1 = Ctrl SetP2 2 = Main Param. 3 = Temper. Param. 4 = Auxiliary Param.
40074	AnOut3 mA range	uint8_t	0	1	0	0 = "0-20 mA" 1 = "4-20 mA"
40075	AnOut3 Value in Hold option	uint8_t	0	1	0	0 = "Last value" 1 = "Fix value"
40076	AnOut3 22 mA on Hold option	uint8_t	0	1	0	0 = "Disabled" 1 = "Enabled"
40077	AnOut3 parameter Value for maximum output	float				Low part of float (bytes 1-0)
40078						High part of float (bytes 3-2)
40079	AnOut3 parameter Value for minimum output	float				Low part of float (bytes 1-0)
40080						High part of float (bytes 3-2)
40081	AnOut3 parameter Value in Hold	float				Low part of float (bytes 1-0)
40082						High part of float (bytes 3-2)
40083	AnOut4 mode	uint8_t	0	1	0	0 = Disabled 1 = Track Channel
40084	AnOut4 data Channel	uint8_t	0	1	0	0 = CH1 (Probe 1) 1 = CH2 (Probe 2)
40085	AnOut4 parameter to follow	uint8_t	0	4	0	0 = Ctrl SetP1 1 = Ctrl SetP2 2 = Main parameter 3 = Temper. Param. 4 = Auxiliary Param.
40086	AnOut4 mA range	uint8_t	0	1	0	0 = "0-20 mA" 1 = "4-20 mA"
40087	AnOut4 Value in Hold option	uint8_t	0	1	0	0 = "Last value" 1 = "Fix value"
40088	AnOut4 22 mA on Hold option	uint8_t	0	1	0	0 = "Disabled" 1 = "Enabled"
40089	AnOut4 parameter Value for maximum output	float				Low part of float (bytes 1-0)
40090						High part of float (bytes 3-2)
40091	AnOut4 parameter Value for minimum output	float				Low part of float (bytes 1-0)
40092						High part of float (bytes 3-2)
40093	AnOut4 parameter Value in Hold	float				Low part of float (bytes 1-0)

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40094						High part of float (bytes 3-2)
40097	CH1 Setpoint 1 parameter No.	uint8_t	0	1	0	0 = main parameter 1 = temperature
40098	CH1 Setpoint 1 status	uint8_t	0	1	9	0 = disabled 1 = active
40099	CH1 Setpoint 1 control mode	uint8_t	0	2	0	0 = On/Off control 1 = prop. control 2 = PID control
40100	CH1 Setpoint 1 over time	uint16_t	10	120	30	[minutes] 0 = overtime alarm disabled
40101	CH1 Setpoint 1 minim OnTime	uint16_t	1	10	3	[seconds]
40102	CH1 Setpoint 1 Value	float	Low limit parameter	High Limit parameter	Param. default control	Low part of float (bytes 1-0)
40103						High part of float (bytes 3-2)
40104	CH1 Setpoint 1 control action	uint8_t	0	1	0	0 = low direction 1 = high direction
40105	CH1 Setpoint 1 control period	uint16_t	10	1800	60	[seconds]
40106	CH1 Setpoint 1 deviation	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40107						High part of float (bytes 3-2)
40108	CH1 Setpoint 1 hysteresis	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40109						High part of float (bytes 3-2)
40110	CH1 Setpoint 1 reset time	uint16_t	60	60000	60000	[seconds]
40111	CH1 Setpoint 1 rate time	uint16_t	0	60000	0	[seconds]
40112	CH1 Setpoint 2 parameter No.	uint8_t	0	1	0	0 = main parameter 1 = temperature
40113	CH1 Setpoint 2 status	uint8_t	0	1	9	0 = disabled 1 = active
40114	CH1 Setpoint 2 control mode	uint8_t	0	2	0	0 = On/Off control 1 = Prop. control 2 = PID control
40115	CH1 Setpoint 2 over time	uint16_t	10	120	30	[minutes] 0 = overtime alarm disabled
40116	CH1 Setpoint 2 minim OnTime	uint16_t	1	10	3	[seconds]
40117	CH1 Setpoint 2 Value	float	Low limit parameter	High Limit parameter	Param. default control	Low part of float (bytes 1-0)
40118						High part of float (bytes 3-2)
40119	CH1 Setpoint 2 control action	uint8_t	0	1	0	0 = low direction 1 = high direction
40120	CH1 Setpoint 2 control period	uint16_t	10	1800	60	[seconds]

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40121	CH1 Setpoint 2 deviation	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40122						High part of float (bytes 3-2)
40123	CH1 Setpoint 2 hysteresis	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40124						High part of float (bytes 3-2)
40125	CH1 Setpoint 2 reset time	uint16_t	60	60000	60000	[seconds]
40126	CH1 Setpoint 2 rate time	uint16_t	0	60000	0	[seconds]
40127	CH2 Setpoint 1 parameter No.	uint8_t	0	1	0	0 = main parameter 1 = temperature
40128	CH2 Setpoint 1 status	uint8_t	0	1	9	0 = disabled 1 = active
40129	CH2 Setpoint 1 control mode	uint8_t	0	2	0	0 = On/Off control 1 = Prop. control 2 = PID control
40130	CH2 Setpoint 1 over time	uint16_t	10	120	30	[minutes] 0 = overtime alarm disabled
40131	CH2 Setpoint 1 minim OnTime	uint16_t	1	10	3	[seconds]
40132	CH2 Setpoint 1 Value	float	Low limit parameter	High Limit parameter	Param. default control	Low part of float (bytes 1-0)
40133						High part of float (bytes 3-2)
40134	CH2 Setpoint 1 control action	uint8_t	0	1	0	0 = low direction 1 = high direction
40135	CH2 Setpoint 1 control period	uint16_t	10	1800	60	[seconds]
40136	CH2 Setpoint 1 deviation	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40137						High part of float (bytes 3-2)
40138	CH2 Setpoint 1 hysteresis	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40139						High part of float (bytes 3-2)
40140	CH2 Setpoint 1 reset time	uint16_t	60	60000	60000	[seconds]
40141	CH2 Setpoint 1 rate time	uint16_t	0	60000	0	[seconds]
40142	CH2 Setpoint 2 parameter number	uint8_t	0	1	0	0 = main parameter 1 = temperature
40143	CH2 Setpoint 2 status	uint8_t	0	1	9	0 = disabled 1 = active
40144	CH2 Setpoint 2 control mode	uint8_t	0	2	0	0 = On/Off control 1 = Prop. control 2 = PID control
40145	CH2 Setpoint 2 over time	uint16_t	10	120	30	[minutes] 0 = overtime alarm disabled

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40146	CH2 Setpoint 2 minim OnTime	uint16_t	1	10	3	[seconds]
40147	CH2 Setpoint 2 Value	float	Low limit parameter	High Limit parameter	Param. default control	Low part of float (bytes 1-0)
40148						High part of float (bytes 3-2)
40149	CH2 Setpoint 2 control action	uint8_t	0	1	0	0 = low direction 1 = high direction
40150	CH2 Setpoint 2 control period	uint16_t	10	1800	60	[seconds]
40151	CH2 Setpoint 2 deviation	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40152						High part of float (bytes 3-2)
40153	CH2 Setpoint 2 hysteresis	float	Parameter dependent	Parameter dependent	Parameter dependent	Low part of float (bytes 1-0)
40154						High part of float (bytes 3-2)
40155	CH2 Setpoint 2 reset time	uint16_t	60	60000	60000	[seconds]
40156	CH2 Setpoint 2 rate time	uint16_t	0	60000	0	[seconds]
40161	CH1 Main Param. Alarm High Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40162	CH1 Main Param. Alarm Low Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40163	CH1 Main Param. Alarm High DelayOff Time	uint16_t	5	999	5	[seconds]
40164	CH1 Main Param. Alarm High Mask Time	uint16_t	0	1800	5	[seconds]
40165	CH1 Main Param. Alarm High Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)
40166						High part of float (bytes 3-2)
40167	CH1 Main Param. Alarm Low Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)
40168						High part of float (bytes 3-2)
40169	CH1 Temp. Param. Alarm High Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40170	CH1 Temp. Param. Alarm Low Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40171	CH1 Temp. Param. Alarm High DelayOff Time	uint16_t	5	999	5	[seconds]
40172	CH1 Temp. Param. Alarm High Mask Time	uint16_t	0	1800	5	[seconds]
40173	CH1 Temp. Param. Alarm High Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)
40174						High part of float (bytes 3-2)
40175	CH1 Temp. Param. Alarm Low Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40176						High part of float (bytes 3-2)
40177	CH2 Main Param. Alarm High Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40178	CH2 Main Param. Alarm Low Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40179	CH2 Main Param. Alarm High DelayOff Time	uint16_t	5	999	5	[seconds]
40180	CH2 Main Param. Alarm High Mask Time	uint16_t	0	1800	5	[seconds]
40181	CH2 Main Param. Alarm High Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)
40182						High part of float (bytes 3-2)
40183	CH2 Main Param. Alarm Low Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)
40184						High part of float (bytes 3-2)
40185	CH2 Temp. Param. Alarm High Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40186	CH2 Temp. Param. Alarm Low Enable	uint8_t	0	1	0	0 = Disable 1 = Enable
40187	CH2 Temp. Param. Alarm High DelayOff Time	uint16_t	5	999	5	[seconds]
40188	CH2 Temp. Param. Alarm High Mask Time	uint16_t	0	1800	5	[seconds]
40189	CH2 Temp. Param. Alarm High Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)
40190						High part of float (bytes 3-2)
40191	CH2 Temp. Param. Alarm Low Value	float	Param. low limit measured	Param. high limit measured	Param. dep. default	Low part of float (bytes 1-0)
40192						High part of float (bytes 3-2)
40193	Remote password	uint32_t				Low part of uint32_t (bytes 1-0)
40194						High part of uint32_t (bytes 3-2)
40195	Remote Mode control	uint8_t				
	B0 Remote link (read only) 0 = no link between controller and server 1 = link present between controller and server B1 Set Remote Control View Mode 0 = Controller settings can be done locally 1 = Controller settings can be done only remotely B2 Set Remote Control Edit Mode 0 = Settings can't be done remotely 1 = Settings are done remotely on an image of controller settable parameters B3 Save Settings done on Remote Control Edit Mode 1 = Settings done on Remote control Edit Mode, are saved to controller after a checkout on the validity of the changes.					

Address	Register Function	Size	Min. Value	Max. Value	Default Value	Details
40196	Reset Controller status	uint32_t				bytes 1-0 b0 = R/W Controller setup updated b1 = R/W Chan1 calibration updated b2 = R/W Chan2 calibration updated b3 = RO- Chan1 probe update parameters b4 = R/W - Chan1 probe parameters updated b5 = Cleaning active b6 = Local edit mode active b7 = Manual mode active b8 = Chan1 calibration mode active b9 = Remote Control Mode active b10 = Remote Control Edit mode active b11 = Controller in Hold mode b12 = Controller in startup mode b13 = Manual Hold active b14 = External Hold active
40200	Math Channel Function	uint8_t	0	4	0	0 = Disabled 1 = Difference 2 = Ratio 3 = Passage 4 = Rejection
40201	Math Channel Alarm0_HighValue	float				bytes 1-0
40202						bytes 3-2
40203	Math Channel Alarm0_LowValue	float				bytes 1-0
40204						bytes 3-2
40205	Math Channel Alarm1_HighValue	float				bytes 1-0
40206						bytes 3-2
40207	Math Channel Alarm1_LowValue	float				bytes 1-0
40208						bytes 3-2
40209	Math Channel Alarm2_HighValue	float				bytes 1-0
40210						bytes 3-2
40211	Math Channel Alarm2_LowValue	float				bytes 1-0
40212						bytes 3-2
40213	Math Channel Alarm3_HighValue	float				bytes 1-0
40214						bytes 3-2
40215	Math Channel Alarm3_LowValue	float				bytes 1-0
40216						bytes 3-2
40217	Controller Clock_Year	uint8_t	20	99	22	
40218	Controller Clock_Month	uint8_t	1	12	1	
40219	Controller Clock_Day	uint8_t	1	31	1	
40220	Controller Clock_WeekDay	uint8_t	0	6	1	
40221	Controller Clock_Hour	uint8_t	0	23	12	
40222	Controller Clock_Minute	uint8_t	0	59	0	
40223	Controller Clock_Second	uint8_t	0	59	0	

CERTIFICATION

All Hanna Instruments conform to the CE European Directives and UK standards.



Disposal of Electrical & Electronic Equipment. The product should not be treated as household waste. Instead hand it over to the appropriate collection point for the recycling of electrical and electronic equipment which will conserve natural resources.

Ensuring proper product and battery disposal prevents potential negative consequences for the environment and human health. For more information, contact your city, your local household waste disposal service, or the place of purchase.

RECOMMENDATIONS FOR USERS

Before using this product, make sure it is entirely suitable for your specific application and for the environment in which it is used. Any variation introduced by the user to the supplied equipment may degrade the controller's performance. For yours and the controller's safety do not use or store the instrument in hazardous environments.

WARRANTY

The HI520 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions. Damage due to accidents, misuse, tampering, or lack of prescribed maintenance is not covered.

If service is required, contact your local Hanna Instruments office. If under warranty, report the model number, date of purchase, serial number, and the nature of the problem. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization (RGA) number from the Technical Service department and then send it with shipping costs prepaid. When shipping any instrument, make sure it is properly packed for complete protection.