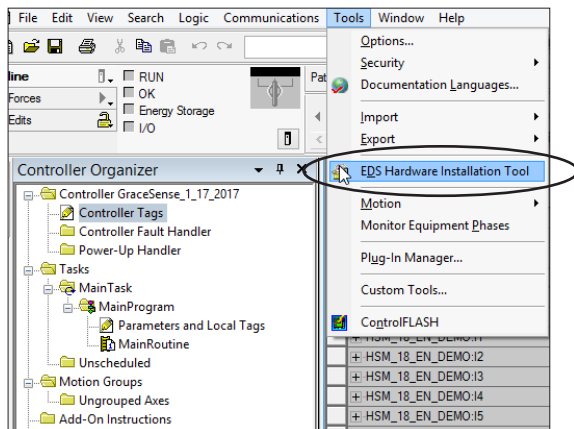


INSERTING EDS TO ROCKWELL STUDIO 5000

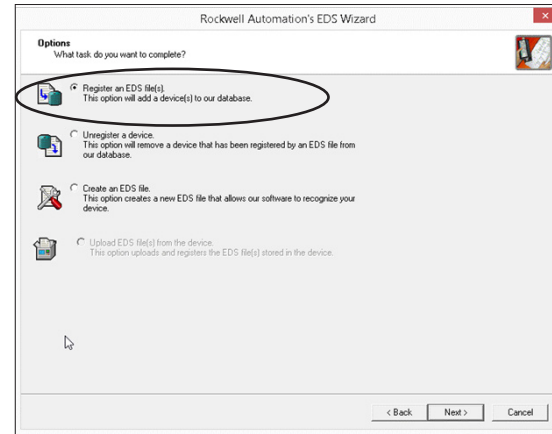
Follow the below steps to add GraceSense™ Hot Spot Monitor (HSM) product via Ethernet IP to your project. Download the Hot Spot Monitor EDS file from Gracesense.com. and open your RA Studio 5000 program.

Step 1: EDS Hardware Installation.

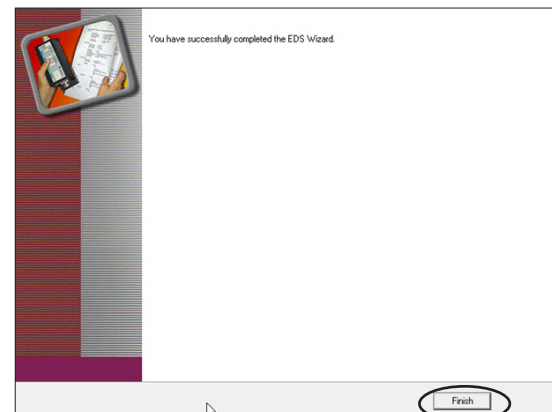
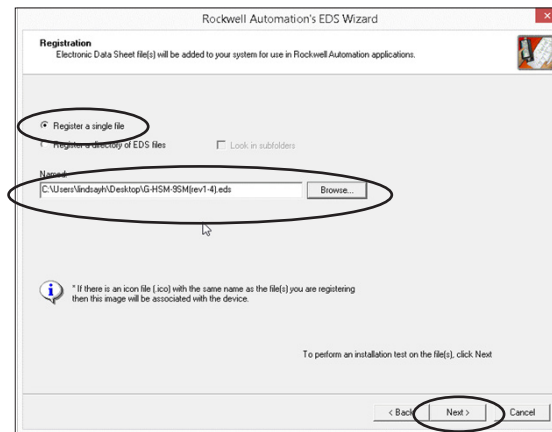
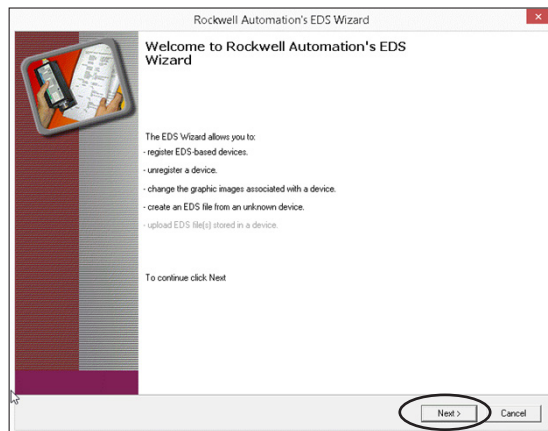
Go to Tools drop down menu in Studio 5000 and select EDS Hardware install tool.



Follow wizard setup (continued)



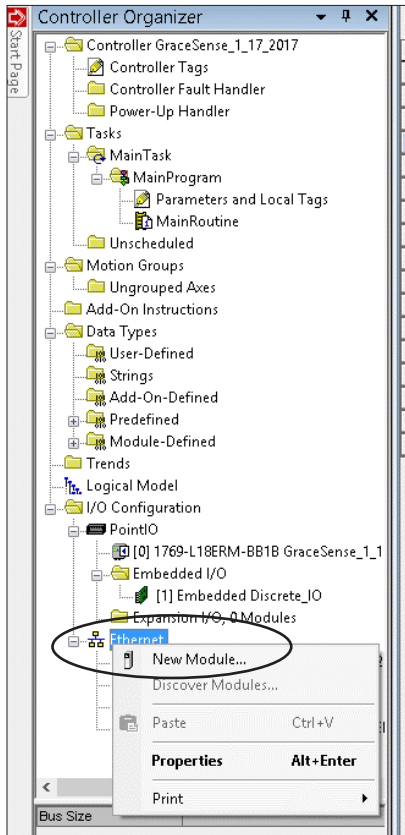
Wizard will open – follow wizard setup



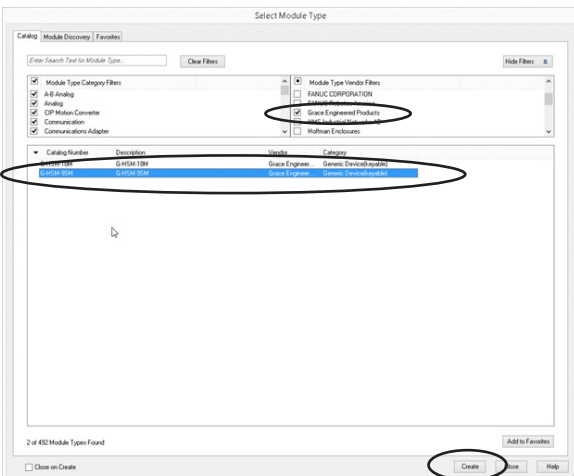
Step 2: Add module G-HSM-9SM to system.

Under the controller tree – Right click on Ethernet

Example: Unit 114



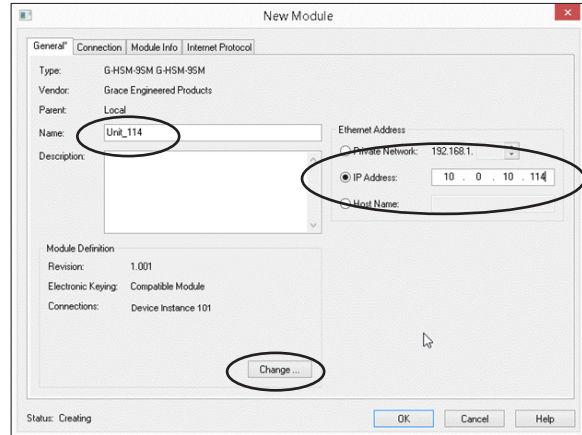
Add a new Module - under “Select Module Type”. Search for Grace Engineered Products and select correct model and click create.



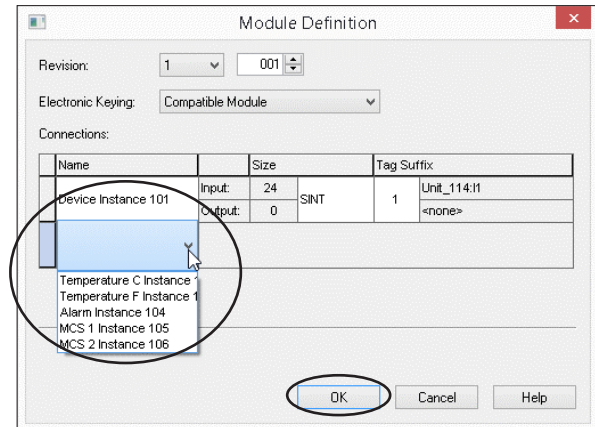
Step 3: New module configuration.

Assign name and set IP Address of unit and setup instances

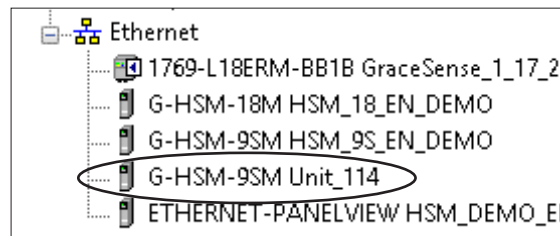
by clicking on change. Example: Name: Unit 114, IP Address: 10.0.10.114



Upon clicking change add desired instances available via the EDS File. Example: Unit 114



Added all Instances available – See Appendix A. Click ok Unit will now be available in the tree and tags will be displayed



+ Unit_11411	(...)	(...)	_05A8.G_HSM_9...
+ Unit_11412	(...)	(...)	_05A8.G_HSM_9...
+ Unit_11413	(...)	(...)	_05A8.G_HSM_9...
+ Unit_11414	(...)	(...)	_05A8.G_HSM_9...
+ Unit_11415	(...)	(...)	_05A8.G_HSM_9...
+ Unit_11416	(...)	(...)	_05A8.G_HSM_9...

Now you are ready to begin your programming

Modbus Memory Map for Grace HSM

Document 50089-1F-LST-REGISTER-GRACE-HSM.xlsx

Date created: 2016-11-25

Rev Date: 2017-3-10

INT: LH

Category	Register Name:	Range	Description:	Default	Range, format:	UOM:	EIP Offset *2	Interpretation
General Parameters	Instance 101							
	PCB Serial No. LSB	I1.Data[0]	LSW of Serial Number	N/A	0-65535	N/A	0	
	PCB Serial No. MSB	I1.Data[2]	MSW of Serial Number	N/A	0-65535	N/A	1	
	HW P/N	I1.Data[4]	HW Part Number	10121	0-65535	N/A	2	
	FW Rev	I1.Data[6]	FW Revision	N/A	0-65535	N/A	3	
System Time	Day	I1.Data[8]	Device Days from RTC	N/A	1 - 31	N/A	4	
	Month	I1.Data[10]	Device Months from RTC	N/A	1 - 12	N/A	5	
	Year	I1.Data[12]	Device Years from RTC	N/A	2000 - 2099	N/A	6	
	Hour	I1.Data[14]	Device Hours from RTC	N/A	0 - 23	N/A	7	
	Min	I1.Data[16]	Device Minutes from RTC	N/A	0 - 59	N/A	8	
	Sec	I1.Data[18]	Device Seconds from RTC	N/A	0 - 59	N/A	9	
	Device Instance 101 (size: 24 bytes)							
Board	Mem Capacity	I1.Data[20]	Amount of Log Storage Memory	N/A	0-100	%	10	
	BMO	I1.Data[22]	Board Map 0 for determining the type of HSM configuration	N/A	0x0000-0x003F	N/A	11	
Temp in C	Instance 102							
	Temp C 1	I2.Data[0]	Temperature in C of Ch 1	N/A	-50 - 200, -999, 0x7FFF	°C	0	(-)999 - Temperature invalid 0x7FFF - HSM module error
	Temp C 2	I2.Data[2]	Temperature in C of Ch 2	N/A	-50 - 200, -999, 0x7FFF	°C	1	
	Temp C 3	I2.Data[4]	Temperature in C of Ch 3	N/A	-50 - 200, -999, 0x7FFF	°C	2	
	Temp C 4	I2.Data[6]	Temperature in C of Ch 4	N/A	-50 - 200, -999, 0x7FFF	°C	3	
	Temp C 5	I2.Data[8]	Temperature in C of Ch 5	N/A	-50 - 200, -999, 0x7FFF	°C	4	
	Temp C 6	I2.Data[10]	Temperature in C of Ch 6	N/A	-50 - 200, -999, 0x7FFF	°C	5	
	Temp C 7	I2.Data[12]	Temperature in C of Ch 7	N/A	-50 - 200, -999, 0x7FFF	°C	6	
	Temp C 8	I2.Data[14]	Temperature in C of Ch 8	N/A	-50 - 200, -999, 0x7FFF	°C	7	
	Temp C 9	I2.Data[16]	Temperature in C of Ch 9	N/A	-50 - 200, -999, 0x7FFF	°C	8	
	Temp C 10	I2.Data[20]	Temperature in C of Ch 10	N/A	-50 - 200, -999, 0x7FFF	°C	9	
	Temp C 11	I2.Data[22]	Temperature in C of Ch 11	N/A	-50 - 200, -999, 0x7FFF	°C	10	
	Temp C 12	I2.Data[24]	Temperature in C of Ch 12	N/A	-50 - 200, -999, 0x7FFF	°C	11	
	Temp C 13	I2.Data[26]	Temperature in C of Ch 13	N/A	-50 - 200, -999, 0x7FFF	°C	12	
	Temp C 14	I2.Data[28]	Temperature in C of Ch 14	N/A	-50 - 200, -999, 0x7FFF	°C	13	
	Temp C 15	I2.Data[30]	Temperature in C of Ch 15	N/A	-50 - 200, -999, 0x7FFF	°C	14	
	Temp C 16	I2.Data[32]	Temperature in C of Ch 16	N/A	-50 - 200, -999, 0x7FFF	°C	15	
	Temp C 17	I2.Data[34]	Temperature in C of Ch 17	N/A	-50 - 200, -999, 0x7FFF	°C	16	
Temp C 18	I2.Data[36]	Temperature in C of Ch 18	N/A	-50 - 200, -999, 0x7FFF	°C	17		
Device Instance 102 (size: 36 bytes)								

Temp in F	Instance 103								
Temp F 1	I3.Data[0]	Temperature in F of Ch 1	N/A	-58 - 392, -999, 0x7FFF	°F	0			
Temp F 2	I3.Data[2]	Temperature in F of Ch 2	N/A	-58 - 392, -999, 0x7FFF	°F	1			
Temp F 3	I3.Data[4]	Temperature in F of Ch 3	N/A	-58 - 392, -999, 0x7FFF	°F	2			
Temp F 4	I3.Data[6]	Temperature in F of Ch 4	N/A	-58 - 392, -999, 0x7FFF	°F	3			
Temp F 5	I3.Data[8]	Temperature in F of Ch 5	N/A	-58 - 392, -999, 0x7FFF	°F	4			
Temp F 6	I3.Data[10]	Temperature in F of Ch 6	N/A	-58 - 392, -999, 0x7FFF	°F	5			
Temp F 7	I3.Data[12]	Temperature in F of Ch 7	N/A	-58 - 392, -999, 0x7FFF	°F	6			
Temp F 8	I3.Data[14]	Temperature in F of Ch 8	N/A	-58 - 392, -999, 0x7FFF	°F	7			
Temp F 9	I3.Data[16]	Temperature in F of Ch 9	N/A	-58 - 392, -999, 0x7FFF	°F	8			
Temp F 10	I3.Data[20]	Temperature in F of Ch 10	N/A	-58 - 392, -999, 0x7FFF	°F	9			
Temp F 11	I3.Data[22]	Temperature in F of Ch 11	N/A	-58 - 392, -999, 0x7FFF	°F	10			
Temp F 12	I3.Data[24]	Temperature in F of Ch 12	N/A	-58 - 392, -999, 0x7FFF	°F	11			
Temp F 13	I3.Data[26]	Temperature in F of Ch 13	N/A	-58 - 392, -999, 0x7FFF	°F	12			
Temp F 14	I3.Data[28]	Temperature in F of Ch 14	N/A	-58 - 392, -999, 0x7FFF	°F	13			
Temp F 15	I3.Data[30]	Temperature in F of Ch 15	N/A	-58 - 392, -999, 0x7FFF	°F	14			
Temp F 16	I3.Data[32]	Temperature in F of Ch 16	N/A	-58 - 392, -999, 0x7FFF	°F	15			
Temp F 17	I3.Data[34]	Temperature in F of Ch 17	N/A	-58 - 392, -999, 0x7FFF	°F	16			
Temp F 18	I3.Data[36]	Temperature in F of Ch 18	N/A	-58 - 392, -999, 0x7FFF	°F	17			

TempF Instance 103 (size: 36 bytes)

0x7FFF - HSM module error

Temperature Alarm Registers	Instance 104								
Alert Lvl	I4.Data[0]	Alert Level for operator	0	0-2	N/A	0			
Alert Code 1	I4.Data[1]	N/A	0	0x0000-0x0312	N/A	1			
CH Code	I4.Data[2]	HSM Alert Code slot 1	0	0x0000-0x0312	N/A	1			
Alert Code 2	I4.Data[3]	Channel Alarm Status	0	0x0000-0x0312	N/A	2			
CH Code	I4.Data[4]	HSM Alert Code slot 2	0	0x0000-0x0312	N/A	2			
Alert Code 3	I4.Data[5]	Channel Alarm Status	0	0x0000-0x0312	N/A	3			
CH Code	I4.Data[6]	HSM Alert Code slot 3	0	0x0000-0x0312	N/A	3			
Alert Code 4	I4.Data[7]	Channel Alarm Status	0	0x0000-0x0312	N/A	4			
CH Code	I4.Data[8]	HSM Alert Code slot 4	0	0x0000-0x0312	N/A	4			
Alert Code 5	I4.Data[9]	Channel Alarm Status	0	0x0000-0x0312	N/A	5			
CH Code	I4.Data[10]	HSM Alert Code slot 5	0	0x0000-0x0312	N/A	5			
Alert Code 6	I4.Data[11]	Channel Alarm Status	0	0x0000-0x0312	N/A	6			
CH Code	I4.Data[12]	HSM Alert Code slot 6	0	0x0000-0x0312	N/A	6			
Alert Code 7	I4.Data[13]	Channel Alarm Status	0	0x0000-0x0312	N/A	7			
CH Code	I4.Data[14]	HSM Alert Code slot 7	0	0x0000-0x0312	N/A	7			
Alert Code 8	I4.Data[15]	Channel Alarm Status	0	0x0000-0x0312	N/A	8			
CH Code	I4.Data[16]	HSM Alert Code slot 8	0	0x0000-0x0312	N/A	8			
Alert Code 9	I4.Data[17]	Channel Alarm Status	0	0x0000-0x0312	N/A	9			
CH Code	I4.Data[18]	HSM Alert Code slot 9	0	0x0000-0x0312	N/A	9			
Alert Code 10	I4.Data[19]	Channel Alarm Status	0	0x0000-0x0312	N/A	10			
CH Code	I4.Data[20]	HSM Alert Code slot 10	0	0x0000-0x0312	N/A	10			
CH Code	I4.Data[21]	Channel Alarm Status	0	0x0000-0x0312	N/A	10			

0 = OK, 1 = Warning, 2 = Alarm

Example Alarm 0x0310

First byte of the word:
(0x03) indicates type of error

0x00 ... no error
0x01 ... temperature warning ... priority medium
0x02 ... temperature alarm ... Priority highest
0x03 ... sensor module error ... priority lowest

Second byte of the word:
(0x10) indicates the channel
0x10 ... channel 16

(Bytes)

primaryWarningSetpointC	I4.Data[22]	The Primary Warning Temperature Threshold in C	90	-50 - 200	°C	11
	I4.Data[23]	N/A				
primaryAlarmSetpointC	I4.Data[24]	The Primary Alarm Temperature Threshold in C	105	-50 - 200	°C	12
	I4.Data[25]	N/A				
primaryWarningSetpointF	I4.Data[26]	The Primary Warning Temperature Threshold in F	194	-58 - 392	°F	13
	I4.Data[27]	N/A				
primaryAlarmSetpointF	I4.Data[28]	The Primary Alarm Temperature Threshold in F	221	-58 - 392	°F	14
	I4.Data[29]	N/A				
warningFlagHi	I4.Data[30]	Warning flags CH 1-8	N/A	0x0000-0x0003	N/A	15
warningFlagHi	I4.Data[31]	Warning flags CH 9-16	N/A	0x0000-0x0003	N/A	
warningFlagLo	I4.Data[32]	Warning flags-CH 17-18	N/A	0x0000-0x0FFF	N/A	16
alarmFlagHi	I4.Data[34]	Alarm flags CH 1-8	N/A	0x0000-0x0003	N/A	17
alarmFlagHi	I4.Data[35]	Alarm flags CH 9-16	N/A	0x0000-0x0003	N/A	
alarmFlagLo	I4.Data[36]	Alarm flags CH 16-18	N/A	0x0000-0x0FFF	N/A	18
relayEnableFlagHi	I4.Data[38]	Channel relay Enable (Alarm Only) CH 1-8	N/A	0x0000-0x0003	N/A	19
warningFlagHi	I4.Data[39]	Channel relay Enable (Alarm Only) CH 9-16	N/A	0x0000-0x0003	N/A	
relayEnableFlagLo	I4.Data[40]	Channel relay Enable (Alarm Only) CH 17-18	N/A	0x0000-0x0FFF	N/A	20
	I4.Data[41]	N/A				
secondarySetpointSelectFlagHi	I4.Data[42]	Enable primary or secondary setpoint CH 1-8	N/A	0x0000-0x0003	N/A	21
secondarySetpointSelectFlagHi	I4.Data[43]	Enable primary or secondary setpoint CH 9-16	N/A	0x0000-0x0003	N/A	
secondarySetpointSelectFlagLo	I4.Data[44]	Enable primary or secondary setpoint CH 17-18	N/A	0x0000-0x0FFF	N/A	22
secondaryWarningSetpointC	I4.Data[46]	The Secondary Warning Temperature Threshold in C	90	-50 - 200	°C	23
	I4.Data[47]	N/A				
secondaryAlarmSetpointC	I4.Data[48]	The Secondary Alarm Temperature Threshold in C	105	-50 - 200	°C	24
	I4.Data[49]	N/A				
secondaryWarningSetpointF	I4.Data[50]	The Secondary Warning Temperature Threshold in F	194	-58 - 392	°F	25
	I4.Data[51]	N/A				
secondaryAlarmSetpointF	I4.Data[52]	The Secondary Alarm Temperature Threshold in F	221	-58 - 392	°F	26
	I4.Data[53]	N/A				
relayStatus	I4.Data[54]	The current status of the relay	N/A	0-1	On/Off	27

Bitwise representation
of the channel warning and
alarm status:
Example: register 30057=
0x1492=0001 0100 1001
0010:
D1(CH2=1), D4(CH5=1),
D7(CH8=1), D10(CH11=1),

Modbus Current Sensor MCS1	Instance 105							
IR_SN_LO_1	I5.Data[0]	Lower 16 bits of the Serial Number	N/A	0-65535	N/A	N/A	0	MCS 1 Instance 105 (size: 64 bytes)
IR_SN_HI_1	I5.Data[2]	Upper 16 bits of the Serial Number	N/A	0-65535	N/A	N/A	1	
IR_FW_REV_1	I5.Data[4]	Firmware Revision	N/A	0-65535	N/A	N/A	2	
IR_TURN_RATIO_HI_1	I5.Data[6]	Low Side (secondary) turn ratio (eg. the 1 in 1:500)	1	0-65535	N/A	N/A	3	
IR_TURN_RATIO_LO_1	I5.Data[8]	High side (primary) turn ratio (eg. the 500 in 1:500)	500	0-65535	N/A	N/A	4	
IR_DC_OFFSET_1	I5.Data[10]	User adjustable zero offset	1	-32767 - 32767	N/A	N/A	5	
IR_MANU_DAY_1	I5.Data[12]	Day of the month when calibrated (manufactured)	N/A	1-31	N/A	N/A	6	
IR_MANU_MONTH_1	I5.Data[14]	The month when calibrated (manufactured)	N/A	1-12	N/A	N/A	7	
IR_MANU_YEAR_1	I5.Data[16]	The year when calibrated (manufactured)	N/A	2000-2999	N/A	N/A	8	
IR_MA_DC_LO_1	I5.Data[20]	Lower 16 bits of the DC current in milliamps	N/A	-32767 - 32767	N/A	mA	9	
IR_MA_DC_HI_1	I5.Data[22]	Upper 16 bits of the DC current in milliamps	N/A	-32767 - 32767	N/A	mA	10	
IR_MA_RMS_1	I5.Data[24]	AC RMS current in mA	N/A	0-65535	N/A	mA	11	
IR_A_PRIMARY_RMS_1	I5.Data[26]	Primary side (after the turns ratio) of the AC RMS current in A	N/A	0-65535	N/A	A	12	
IR_AVG_MA_RMS_1	I5.Data[28]	Averaged AC RMS current in mA	N/A	0-65535	N/A	mA	13	
IR_AVG_A_PRIMARY_RMS_1	I5.Data[30]	Averaged Primary side (after the turns ratio) of the AC RMS current in A	N/A	0-65535	N/A	A	14	
IR_MAX_PEAK_LO_1	I5.Data[32]	Lower 16 bits of peak-to-peak current	N/A	-32767 - 32767	N/A	N/A	15	
IR_MAX_PEAK_HI_1	I5.Data[34]	Upper 16 bits peak-to-peak current	N/A	-32767 - 32767	N/A	N/A	16	
IR_CREST_1	I5.Data[36]	Cresting factor of the RMS reading as %	N/A	0-65535	N/A	%	17	
IR_FREQUENCY_1	I5.Data[38]	Frequency of the current (triggers from +- 100 ADC signal)	N/A	0-65535	N/A	N/A	18	
IR_TICK_1	I5.Data[40]	MCS tick to see if it is still running	N/A	0-65535	N/A	N/A	19	
IR_TEMP_1	I5.Data[42]	The approximate temperature of the MCS board	N/A	-40 - 105	N/A	°C	20	
IR_MS_MA_LO_1	I5.Data[44]	Lower 16 bits of the instantaneous squared mean current in mA	N/A	0-65535	N/A	mA^2	21	
IR_MS_MA_HI_1	I5.Data[46]	Upper 16 bits of the instantaneous squared mean current in mA	N/A	0-65535	N/A	mA^2	22	

Modbus Current Sensor MCS2	Instance 106	Instance 106		MCS 2 Instance 106 (size: 64 bytes)
		Address	Description	
IR_SN_LO_2	16.Data[0]	Lower 16 bits of the Serial Number	N/A	0
IR_SN_HI_2	16.Data[2]	Upper 16 bits of the Serial Number	N/A	1
IR_FW_REV_2	16.Data[4]	Firmware Revision	N/A	2
IR_TURN_RATIO_HI_2	16.Data[6]	Low Side (secondary) turn ratio (eg. the 1 in 1:500)	1	3
IR_TURN_RATIO_LO_2	16.Data[8]	High side (primary) turn ratio (eg. the 500 in 1:500)	500	4
IR_DC_OFFSET_2	16.Data[10]	User adjustable zero offset	1	5
IR_MANU_DAY_2	16.Data[12]	Day of the month when calibrated (manufactured)	N/A	6
IR_MANU_MONTH_2	16.Data[14]	The month when calibrated (manufactured)	N/A	7
IR_MANU_YEAR_2	16.Data[16]	The year when calibrated (manufactured)	N/A	8
IR_MA_DC_LO_2	16.Data[20]	Lower 16 bits of the DC current in milliamps	N/A	9
IR_MA_DC_HI_2	16.Data[22]	Upper 16 bits of the DC current in milliamps	N/A	10
IR_MA_RMS_2	16.Data[24]	AC RMS current in mA	N/A	11
IR_A_PRIMARY_RMS_2	16.Data[26]	Primary side (after the turns ratio) of the AC RMS current in A	N/A	12
IR_AVG_MA_RMS_2	16.Data[28]	Averaged AC RMS current in mA	N/A	13
IR_AVG_A_PRIMARY_RMS_2	16.Data[30]	Averaged Primary side (after the turns ratio) of the AC RMS current in A	N/A	14
IR_MAX_PEAK_LO_2	16.Data[32]	Lower 16 bits of peak-to-peak current	N/A	15
IR_MAX_PEAK_HI_2	16.Data[34]	Upper 16 bits peak-to-peak current	N/A	16
IR_CREST_2	16.Data[36]	Cresting factor of the RMS reading as %	N/A	17
IR_FREQUENCY_2	16.Data[38]	Frequency of the current (triggers from +- 100 ADC signal)	N/A	18
IR_TICK_2	16.Data[40]	MCS's tick to see if it is still running	N/A	19
IR_TEMP_2	16.Data[42]	The approximate temperature of the MCS board	N/A	20
IR_MS_MA_LO_2	16.Data[44]	Lower 16 bits of the instantaneous squared mean current in mA	N/A	21
IR_MS_MA_HI_2	16.Data[46]	Upper 16 bits of the instantaneous squared mean current in mA	N/A	22