ICC
INDUSTRIAL CONTROL COMMUNICATIONS, INC.

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

ETH-1000 Chillgard LC Quick Start Guide for Modbus/TCP

This document provides a brief overview of the connections and settings that must be used to connect a preconfigured ETH-1000 gateway to a MSA Chillgard LC Refrigerant Monitor. This document also contains the Modbus register mapping for the application and some troubleshooting tips. For more information, please refer to the ETH-1000 User's Manual available at http://www.iccdesigns.com/products/millennium/eth-1000.html.

Wiring

Power Supply Wiring

A 7 – 24V DC power supply must be connected to the gateway's terminal block at terminals TB:5 (POWER) and TB:6 (GND) as highlighted in Figure 2.

Figure 1: Terminal Block Power Supply Connections

05.23.2014
0720-164-MC

MSA The Safety Company

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

Wiring the Gateway to the Chillgard LC

Connect the “RS-485 To Sensor Module” terminals −, +, and G on the Chillgard LC to the gateway’s terminal block at terminals TB:2 (B), TB:1 (A), and TB:6 (GND) as shown in Figure 2. This terminal block on the Chillgard LC will have wires for both the gateway and any sensors connected to it. Additionally, a jumper wire must be placed on the gateway’s terminal block between terminals TB:1 (A) and TB:3 (Y). Another jumper wire must be placed between terminals TB:2 (B) and TB:4 (Z). as shown in Figure 2.

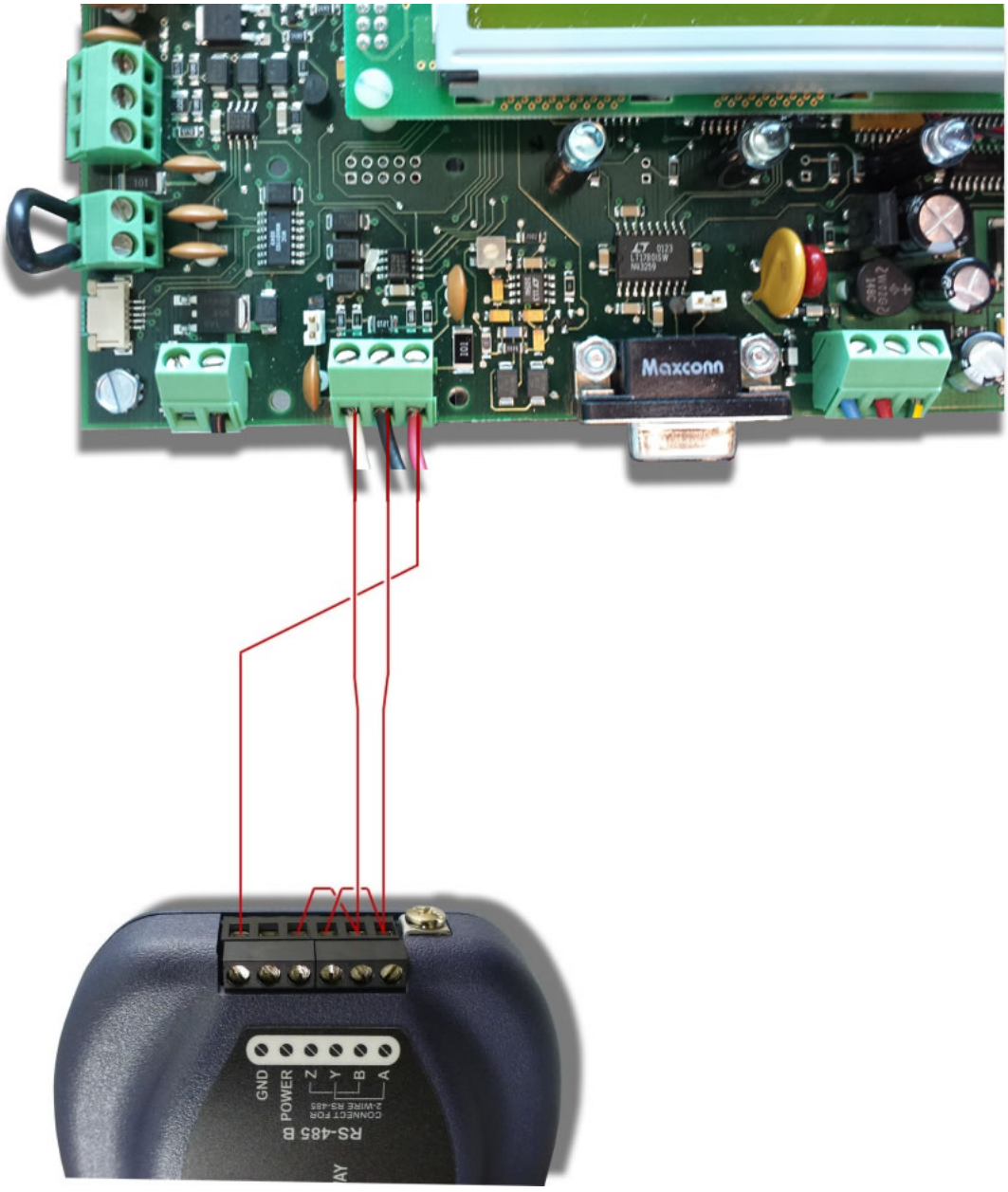

Figure 2: Gateway and Chillgard LC Connections

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

Customizing the ETH-1000's Configuration

The ETH-1000 can be configured via USB using the ICC Configuration Studio. Certain network settings may need to be modified to match a specific network configuration. To modify the gateway's configuration, open the ICC Configuration Studio and connect the gateway via the included USB cable. The software will automatically recognize the connected device and upload the current configuration file stored on the gateway. The configuration must be downloaded back to the gateway after making any changes. The latest ICC Configuration Studio is available at http://www.iccdesigns.com/icc-configuration-studio.html.

Ethernet Network Settings

The network settings may need to be modified to be compatible with your network. These settings can be modified in the ICC Configuration Studio by selecting "Ethernet" in the Project Pane and changing the settings in the Settings Pane as shown in Figure 3.

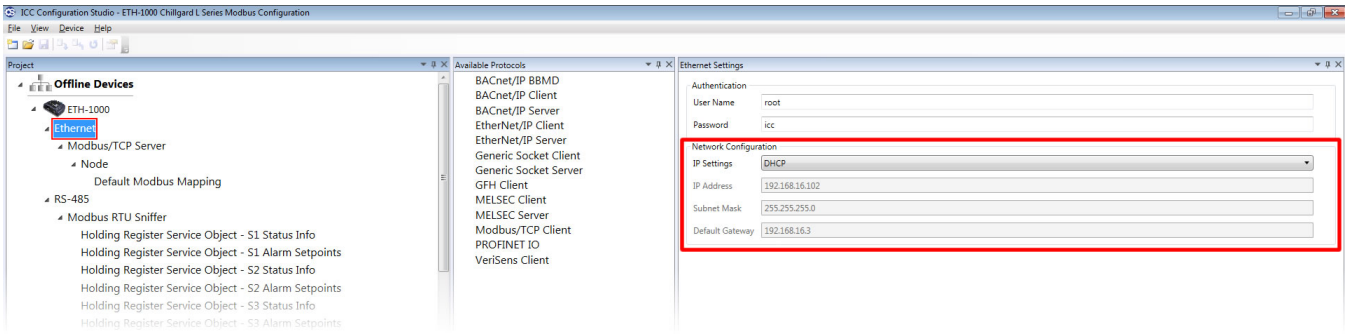

Figure 3: Network Settings

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

Modbus Register Mapping

Table 1 provides a listing of the Modbus registers supported by the configuration preloaded on the ETH-1000 gateway.

Table 1: Modbus Holding/Input Register Mapping

Register Number	Description	Definition Of Encoded Data
1	Fault & Module State for Sensor 1	0 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
2	Gas Number for Sensor 1	0 to 44 (Refer to manual for definition)
3	Gas Concentration for Sensor 1	-20 to 1050
4	Alarm State for Sensor 1	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
5	Caution Setpoint for Sensor 1	30 to 980
6	Warning Setpoint for Sensor 1	40 to 990
7	Alarm Setpoint for Sensor 1	50 to 1000
8	Reserved	
9	Fault & Module State for Sensor 2	0 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
10	Gas Number for Sensor 2	0 to 44 (Refer to manual for definition)
11	Gas Concentration for Sensor 2	-20 to 1050
12	Alarm State for Sensor 2	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
13	Caution Setpoint for Sensor 2	30 to 980

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

Register Number	Description	Definition Of Encoded Data
14	Warning Setpoint for Sensor 2	40 to 990
15	Alarm Setpoint for Sensor 2	50 to 1000
16	Reserved	
17	Fault & Module State for Sensor 3	0 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
18	Gas Number for Sensor 3	0 to 44 (Refer to manual for definition)
19	Gas Concentration for Sensor 3	-20 to 1050
20	Alarm State for Sensor 3	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
21	Caution Setpoint for Sensor 3	30 to 980
22	Warning Setpoint for Sensor 3	40 to 990
23	Alarm Setpoint for Sensor 3	50 to 1000
24	Reserved	
25	Fault & Module State for Sensor 4	0 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
26	Gas Number for Sensor 4	0 to 44 (Refer to manual for definition)
27	Gas Concentration for Sensor 4	-20 to 1050
28	Alarm State for Sensor 4	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
29	Caution Setpoint for Sensor 4	30 to 980
30	Warning Setpoint for Sensor 4	40 to 990
31	Alarm Setpoint for Sensor 4	50 to 1000
32	Reserved	

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

Register Number	Description	Definition Of Encoded Data
33	Fault & Module State for Sensor 5	0 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
34	Gas Number for Sensor 5	0 to 44 (Refer to manual for definition)
35	Gas Concentration for Sensor 5	-20 to 1050
36	Alarm State for Sensor 5	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
37	Caution Setpoint for Sensor 5	30 to 980
38	Warning Setpoint for Sensor 5	40 to 990
39	Alarm Setpoint for Sensor 5	50 to 1000
40	Reserved	
41	Fault & Module State for Sensor 6	0 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
42	Gas Number for Sensor 6	0 to 44 (Refer to manual for definition)
43	Gas Concentration for Sensor 6	-20 to 1050
44	Alarm State for Sensor 6	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
45	Caution Setpoint for Sensor 6	30 to 980
46	Warning Setpoint for Sensor 6	40 to 990
47	Alarm Setpoint for Sensor 6	50 to 1000
48	Reserved	

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

Register Number	Description	Definition Of Encoded Data
49	Fault & Module State for Sensor 7	0 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
50	Gas Number for Sensor 7	0 to 44 (Refer to manual for definition)
51	Gas Concentration for Sensor 7	-20 to 1050
52	Alarm State for Sensor 7	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
53	Caution Setpoint for Sensor 7	30 to 980
54	Warning Setpoint for Sensor 7	40 to 990
55	Alarm Setpoint for Sensor 7	50 to 1000
56	Reserved	
57	Fault & Module State for Sensor 8	50 – Warm Up Bit 0 – Normal Bit 1 – Cal/Setup Bit 2 – Factory Bit 3 – Trouble Bit 8 – Cal Sum Bit 9 – Under Range Bit 10 – Flow Loss Bit 11 – Under Voltage Bit 12 – Temperature Bit 13 – Prog Cksum Bit 14 – Lamp Fail
58	Gas Number for Sensor 8	0 to 44 (Refer to manual for definition)
59	Gas Concentration for Sensor 8	-20 to 1050
60	Alarm State for Sensor 8	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
61	Caution Setpoint for Sensor 8	30 to 980
62	Warning Setpoint for Sensor 8	40 to 990
63	Alarm Setpoint for Sensor 8	50 to 1000
64	Reserved	

1600 Aspen Commons, Suite 210
Middleton, WI, USA 53562
Tel: (608) 831-1255
Fax: (608) 831-2045
Email: sales@iccdesigns.com

Troubleshooting

This section details some troubleshooting tips to follow if any issues are encountered when installing the gateway and Chillgard LC onto a Modbus/TCP network.

1. Power
    a. Confirm that the gateway is receiving power from the 7 - 24V DC supply. The MS (Module Status) LED should light green when the gateway is powered.
2. Wiring
    a. Confirm the wiring matches the connections shown in Figure 2.
3. Configuration
    a. Confirm that the gateway is configured with the appropriate network settings using the ICC Configuration Studio as described in the Customizing the ETH-1000's Configuration section.
4. Gateway LEDs
    a. The MS (Module Status) LED should light green when the gateway is powered and should flash green when the gateway is connected via USB.
        i. If this is not observed, check the gateway's power.
    b. The RS-485 RX LED should flash red. The TX LED will always be off.
        i. If this is not observed, check the wiring between the gateway and the Chillgard LC.
        ii. Check the gateway's configuration using the ICC Configuration Studio and confirm that the RS-485 port is configured for Modbus Sniffer.
5. Chillgard LC Data Confirmation
    a. View the gateway's internal database via the Database pane in ICC Configuration Studio and select the 16-bit Unsigned data type from the dropdown. There should be some highlighted cells which do not show a value of 0.
6. Modbus Data Confirmation
    a. View the gateway's internal database via the Database pane in ICC Configuration Studio and select the 16-bit Unsigned data type from the dropdown. The data shown in the highlighted cells should match the data read on the Modbus system.