LUMASENSE™
TECHNOLOGIES

USER MANUAL

IEC61850 Communication

For LumaShield Signal Conditioners

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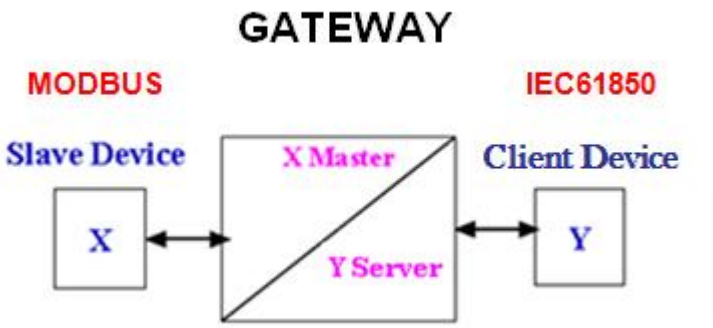
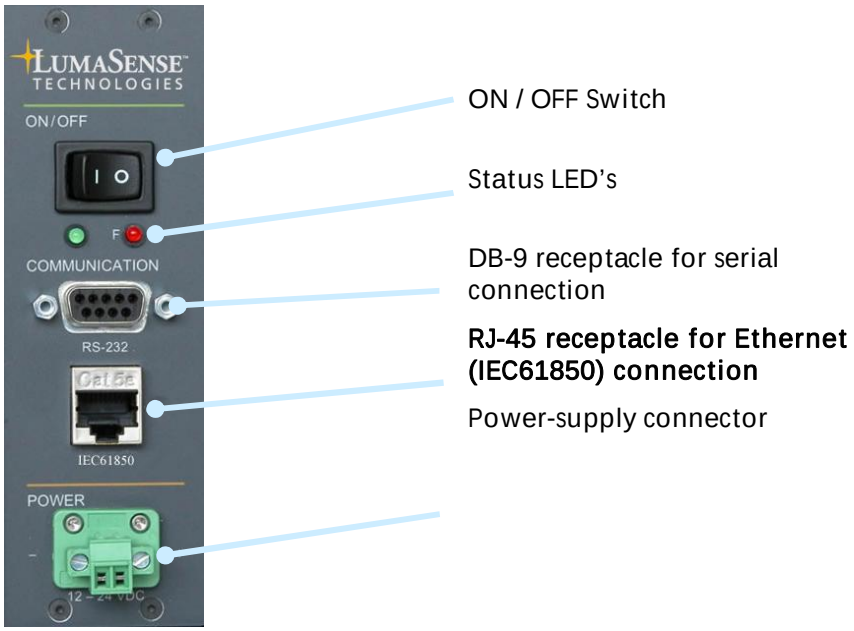
1 IEC61850 Communication Interface

To address the IEC61850 Protocol, LumaSense has integrated an internal gateway into the LumaSHIELD to perform Modbus/ IEC61850 conversion.



1.1 IEC61850 Setup

The IEC61850 communication link is established through the RJ-45 modular receptacle (8 positions) of the LumaSHIELD signal conditioner unit.



The pin assignment for the Ethernet Interface is illustrated on the following figure:

8 Pin plug	Signal Name
1	Transmit +
2	Transmit -
3	Receive +
4	Reserved
5	Reserved
6	Receive -
7	Reserved
8	Reserved

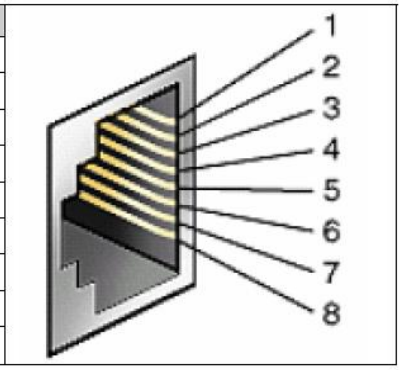


Figure 1: RJ45 Pin Assignment.

Use a shielded standard Ethernet cable to connect the signal conditioner to the network.

If you plug the instrument directly into a PC, you should use an Ethernet Crossover Cable.

1.1.1 IEC61850 Communication Settings

The table below lists the LumaSHIELD communication settings to configure the Modbus link between the LumaSHIELD and the Gateway.

Communication port	RS-485
Protocol	Modbus
Modbus ID:	107
Baud rate	9600 bps
Parity	Even

The default IP configuration of the LumaSHIELD Gateway is as follows:

IP Address: 192.168.0.121

Subnet Mask: 255.255.255.0

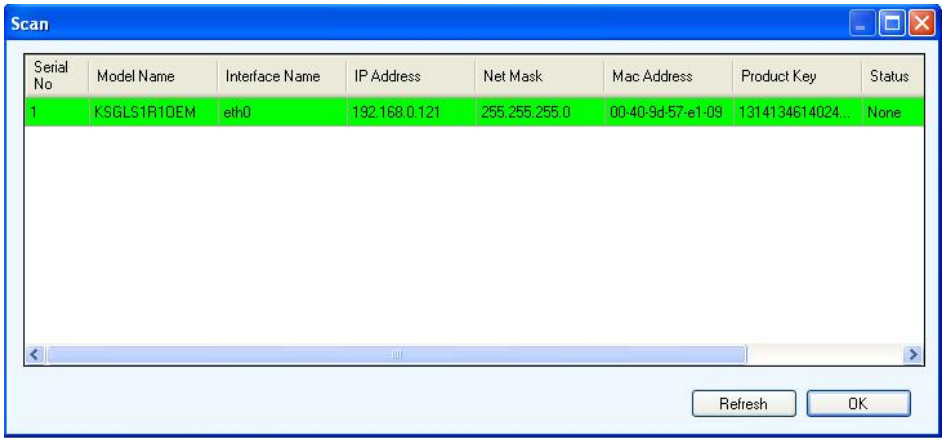
Gateway: 192.168.0.1

If you need to change the IP address, use the EasyConnect software provided on the LumaSense Technologies CD (Both 32bit and 64bit supplied).

1. Launch the **EasyConnect** software.
2. Click on "**Devices**" in the left hand window.
3. Click on the "**KSGL**" tab in the right window and then click the selection of "**KSGLS1R1OEM**" device.

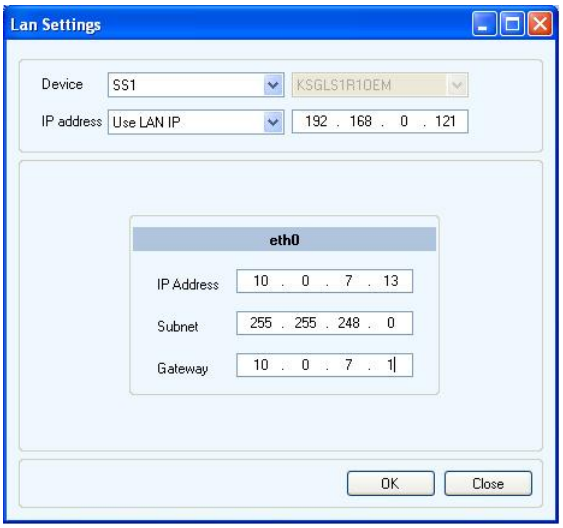
4. Click the "**Setting**" menu item, then the "**Scan**" selection.

   Make sure your device is shown. The default settings should be similar to the following:



5. Select the menu item "**Settings**", then "**IP Configuration**".

6. Verify that the proper device is selected (192.168.0.121) and then correct the bottom portion of the screen with the new settings. As shown below: moved to address 10.0.7.13.



7. Press **OK**.

   The screen will state that the IP address change requires that the module will reset. Wait about 2 minutes for it to reset and initilization to complete.

To verify that the device has changed its IP address:

Use a computer that has access to the new IP address, open a DOS Command window and ping the new IP address.

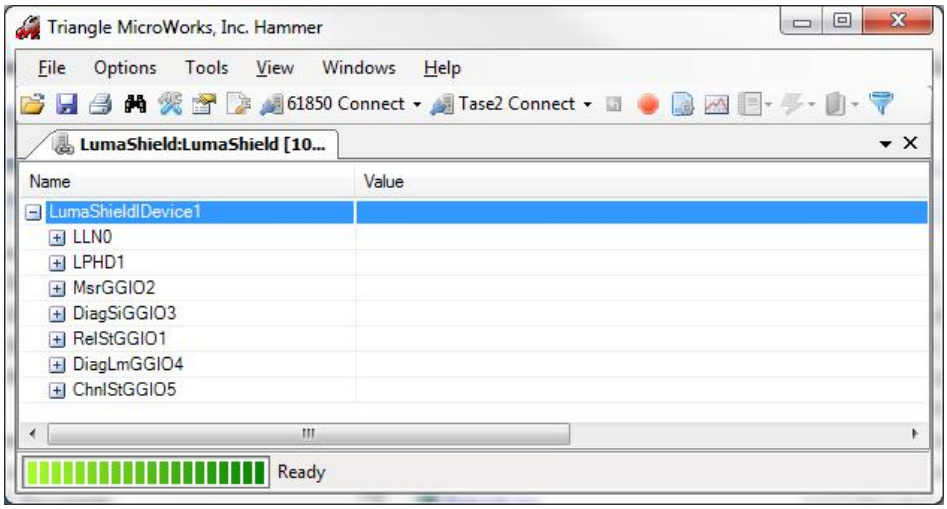
```
Reply from 10.0.7.13: bytes=32 time=1ms TTL=60
Reply from 10.0.7.13: bytes=32 time=15ms TTL=60
Reply from 10.0.7.13: bytes=32 time=1ms TTL=60
Reply from 10.0.7.13: bytes=32 time=1ms TTL=60

Ping statistics for 10.0.7.13:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 15ms, Average = 4ms
```

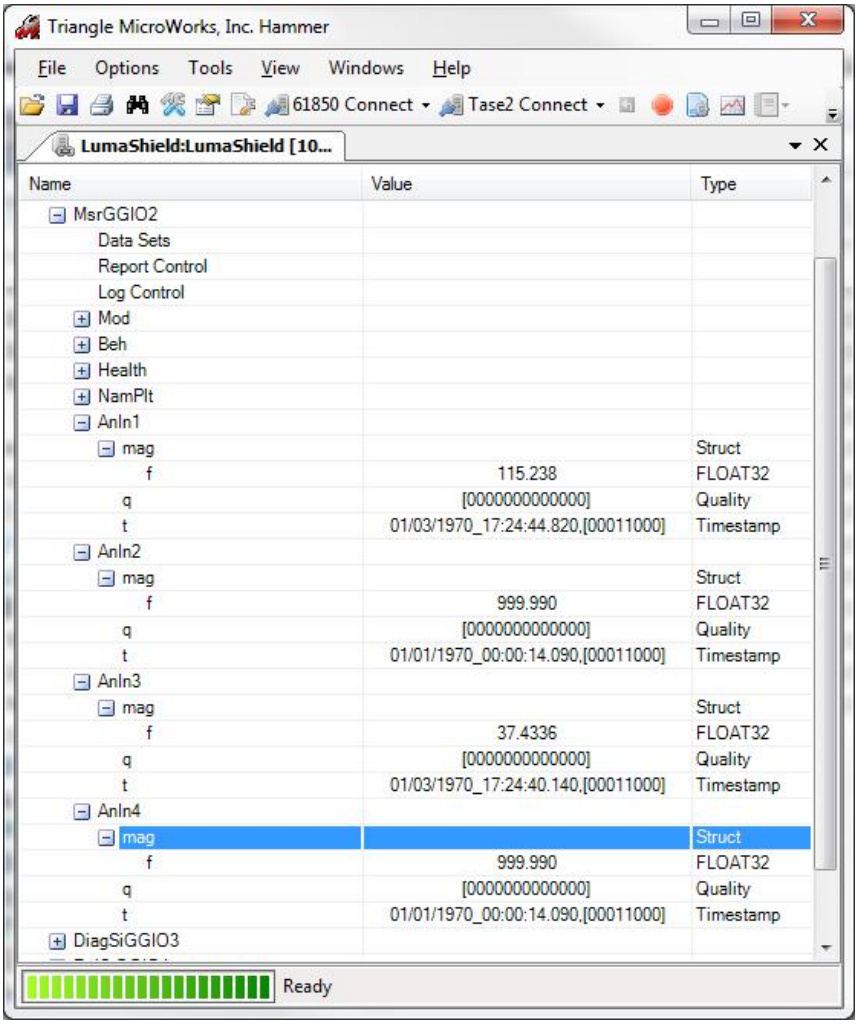
1.2 Supported IEC61850 Logical Nodes

The following examples are using the Triangle Microworks Hammer IEC-61850 Browser software (not supplied).

Shown below is the basic structure of the IED.



This screen shot shows the temperatures of an example 4 channel system.



Note: In this example, only channel 1 (AnIn1 – 115.238°C) and channel 3 (AnIn3 – 37.4336°C) have probes attached.

1.2.1 Channel Temperatures Logical Node (MsrGGIO2)

The measurements logical node contains the latest channel measure in degrees °C or °F, depending of the configuration of the LumaSHIELD.

Data	Channel	Basic Type	MMS Tag
Channels Temperature reading	Channel 1	Analog Input	MsrGGIO2MXAnIn1magf
	Channel 2	Analog Input	MsrGGIO2MXAnIn2magf
	Channel 3	Analog Input	MsrGGIO2MXAnIn3magf
	Channel 4	Analog Input	MsrGGIO2MXAnIn4magf
	Channel 5	Analog Input	MsrGGIO2MXAnIn5magf
			.....
	Channel 16	Analog Input	MsrGGIO2MXAnIn16magf

1.2.2 Channel Status Logical Node (ChnlStGGIO5)

The Channel status logical node contains a True for each enabled channel and a False for each disabled channel.

Data	Channel	Basic Type	MMS Tag
Channels status reading	Channel 1	Digital Input	ChnlStGGIO5STSPCSO1$stVal
	Channel 2	Digital Input	ChnlStGGIO5STSPCSO2$stVal
	Channel 3	Digital Input	ChnlStGGIO5STSPCSO3$stVal
	Channel 4	Digital Input	ChnlStGGIO5STSPCSO4$stVal
	Channel 5	Digital Input	ChnlStGGIO5STSPCSO5$stVal
		.....	
	Channel 16	Digital Input	ChnlStGGIO5STSPCSO16$stVal

1.2.3 Signal Diagnostic Logical Node (DiagSiGGIO3)

The Signal diagnostic logical node contains the latest signal diagnostic value.

Data	Channel	Basic Type	MMS Tag
Channels signal diag. reading	Channel 1	Analog Input	DiagSiGGIO3MXAnIn1magi
	Channel 2	Analog Input	DiagSiGGIO3MXAnIn2magi
	Channel 3	Analog Input	DiagSiGGIO3MXAnIn3magi
	Channel 4	Analog Input	DiagSiGGIO3MXAnIn4magi
	Channel 5	Analog Input	DiagSiGGIO3MXAnIn5magi
			.....
	Channel 16	Analog Input	DiagSiGGIO3MXAnIn16magi

1.2.4 Lamp Diagnostic Logical Node (DiagLmGGIO4)

The Lamp diagnostic logical node contains the latest lamp diagnostic value.

Data	Channel	Basic Type	MMS Tag
Channels lamp diagn reading	Channel 1	Analog Input	DiagLmGGIO4MXAnIn1magf
	Channel 2	Analog Input	DiagLmGGIO4MXAnIn2magf
	Channel 3	Analog Input	DiagLmGGIO4MXAnIn3magf
	Channel 4	Analog Input	DiagLmGGIO4MXAnIn4magf
	Channel 5	Analog Input	DiagLmGGIO4MXAnIn5magf
			.....
	Channel 16	Analog Input	DiagLmGGIO4MXAnIn6magf

1.2.5 Relay Status Logical Node (RelStGGIO1)

The Relay Status logical node contains a True for each enabled relay and a False for each disabled relay.

Data	Channel	Basic Type	MMS Tag
Relay Status reading	Relay 1	Digital Input	RelStGGIO1STInd1$stVal
	Relay 2	Digital Input	RelStGGIO1STInd2$stVal
	Relay 3	Digital Input	RelStGGIO1STInd3$stVal
	Relay 4	Digital Input	RelStGGIO1STInd4$stVal
	Relay 5	Digital Input	RelStGGIO1STInd5$stVal
	Relay 6	Digital Input	RelStGGIO1STInd6$stVal

1.3 Set-up the LumaSHIELD and Relays

There are three ways to configure the LumaSHIELD and Relays:

1. Directly on the keypad of the front panel. (The LumaSHIELD may be in any protocol.)
2. Using SoftSHIELD with a serial connection to the PC (The LumaSHIELD must be in SCPI mode.)
3. Using SCPI commands with a serial connection. (The LumaSHIELD must be in SCPI mode)

Before connecting to an IEC61850 network, your LumaSHIELD must be in Modbus Mode (See section 1.1.1)

Consult the LumaSHIELD or SoftSHIELD Manual for programming instructions.

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Appendix A: Table of Available Logical Nodes

Data	Channel	Basic Type	MMS Tag
Channels measure reading	Channel 1	Analog Input	MsrGGIO2MXAnIn1magf
	Channel 2	Analog Input	MsrGGIO2MXAnIn2magf
	Channel 3	Analog Input	MsrGGIO2MXAnIn3magf
	Channel 4	Analog Input	MsrGGIO2MXAnIn4magf
	Channel 5	Analog Input	MsrGGIO2MXAnIn5magf
	Channel 6	Analog Input	MsrGGIO2MXAnIn6magf
Channels status reading	Channel 1	Digital Input	ChnlStGGIO5STSPCSO1$stVal
	Channel 2	Digital Input	ChnlStGGIO5STSPCSO2$stVal
	Channel 3	Digital Input	ChnlStGGIO5STSPCSO3$stVal
	Channel 4	Digital Input	ChnlStGGIO5STSPCSO4$stVal
	Channel 5	Digital Input	ChnlStGGIO5STSPCSO5$stVal
	Channel 6	Digital Input	ChnlStGGIO5STSPCSO6$stVal
Channels signal diagnostic reading	Channel 1	Analog Input	DiagSiGGIO3MXAnIn1magi
	Channel 2	Analog Input	DiagSiGGIO3MXAnIn2magi
	Channel 3	Analog Input	DiagSiGGIO3MXAnIn3magi
	Channel 4	Analog Input	DiagSiGGIO3MXAnIn4magi
	Channel 5	Analog Input	DiagSiGGIO3MXAnIn5magi
	Channel 6	Analog Input	DiagSiGGIO3MXAnIn6magi
Channels lamp diagnostic reading	Channel 1	Analog Input	DiagLmGGIO4MXAnIn1magf
	Channel 2	Analog Input	DiagLmGGIO4MXAnIn2magf
	Channel 3	Analog Input	DiagLmGGIO4MXAnIn3magf
	Channel 4	Analog Input	DiagLmGGIO4MXAnIn4magf
	Channel 5	Analog Input	DiagLmGGIO4MXAnIn5magf
	Channel 6	Analog Input	DiagLmGGIO4MXAnIn6magf
Relay Status reading	Relay 1	Digital Input	RelStGGIO1STInd1$stVal
	Relay 2	Digital Input	RelStGGIO1STInd2$stVal
	Relay 3	Digital Input	RelStGGIO1STInd3$stVal
	Relay 4	Digital Input	RelStGGIO1STInd4$stVal
	Relay 5	Digital Input	RelStGGIO1STInd5$stVal
	Relay 6	Digital Input	RelStGGIO1STInd6$stVal

Data	Channel	Basic Type	MMS Tag
Miscellaneous	Vendor	VisString255	LLNO$NamPlt$vendor
	Software	VisString255	LLNO$NamPlt$swRev
	Description	VisString255	LLNO$NamPlt$d
	Release	VisString255	LLNO$NamPlt$configRev
	Description	VisString255	MsrGGIO2$NamPlt$d
	Description	VisString255	ChnlStGGIO5$NamPlt$d
	Description	VisString255	DiagSiGGIO3$NamPlt$d
	Description	VisString255	DiagLmGGIO4$NamPlt$d
	Description	VisString255	RelStGGIO1$NamPlt$d