

LGR25 Controller

Technical Instructions

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What is the LGR25?

The LGR25 is a BACnet router and a protocol translator for integrating third-party points into your WebCTRL® system.

Driver and control program

Driver ¹	DRV_MELGR_VANILLA
Maximum number of control programs ²	999
Maximum number of BACnet objects ²	12000

¹ To integrate a third-party device into your WebCTRL® system, you must use the driver for the specific protocol or device. Go to <http://accounts.automatedlogic.com/download>, then select **Third-party Integration > Third-party Interface (ME-LGR & LGR)**.

² Depends on available memory.

Specifications

Power	24 Vac $\pm 10\%$, 50–60 Hz, 24 VA 26 Vdc $\pm 10\%$, 10 W
Third-party integration points	25
10/100 BaseT Ethernet Port	For communication on the Ethernet at 10 or 100 Mbps, half duplex
BACnet port	For communication with the controller network using ARC156
Port S1	For communication on EIA-232 or EIA-485. Communicates with the controller network using MS/TP (9600 bps–76.8 kbps) or a third-party device and protocol at various baud rates.
Port S2	For communication on EIA-232 or EIA-485. Communicates with the controller network using PTP (9600 bps–115.2 kbps) or a third-party device and protocol at various baud rates.
Rnet port	Supports: • Up to 15 ZS sensors • One Wireless Adapter that communicates with up to 15 wireless sensors • One Equipment Touch • Up to 4 RS Standard sensors and one RS Plus, RS Pro, or RS Pro-F sensor NOTE ZS sensors, a Wireless Adapter, and an Equipment Touch can share the Rnet, but not RS sensors.
Rnet Local Access port	For system start-up and troubleshooting

Microprocessor	32-bit Motorola Power PC microprocessor with cache memory, Fast Ethernet controller, high performance 32-bit communication co-processor, ARCNET communication co-processor, and I/O expansion CAN co-processor
Memory	16 MB non-volatile battery-backed RAM (with 12 MB available for use), 8 MB Flash memory, 32-bit memory bus
Real-time clock	Battery-backed real-time clock keeps track of time in event of power failure
Battery	10-year Lithium CR123A battery retains the following data for a maximum of 720 hours during power outages: time, control programs, editable properties, schedules, and trends. To conserve battery life, you can set the driver to turn off battery backup after a specified number of days and depend on the archive function to restore data when the power returns. A low battery is indicated by the Battery low LED or a low battery alarm in the WebCTRL® application.
Data archive	Control programs, editable properties, and schedules are archived to non-volatile Flash memory daily and after every power up or download. If a power outage occurs and the battery backup fails or is turned off, the data is automatically restored from this archive.
Protection	Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal. The power and network connections are also protected against transient excess voltage/surge events lasting no more than 10 msec.
BT485 connector	You attach a BT485 (not included) to a controller at the beginning and end of a network segment to add bias and to terminate a network segment.
Status indicators	LED's indicate status of communications and low battery status. Seven segment display indicates running, error, and power status.
Environmental operating range	-20 to 140 °F (-29 to 60 °C), 10–90% relative humidity, non-condensing
Physical	Rugged aluminum cover, removable screw-type terminal blocks
Overall dimensions	Width: 11 5/16 in. (28.7 cm) Height: 7 1/2 in. (19 cm)
Mounting dimensions	Width: 10 13/16 in. (27.5 cm) Height: 5 in. (12.7 cm)
Recommended panel depth	2 3/4 in. (7cm)
Weight	1.4 lbs (0.64 kg)
BACnet support	Conforms to the BACnet Building Controller (B-BC) Standard Device Profile as defined in ANSI/ASHRAE Standard 135-2012 (BACnet) Annex L, Protocol Revision 9
Listed by	UL-916 (PAZX), cUL-916 (PAZX7), FCC Part 15-Subpart B-Class A, CE

Zone sensors

Automated Logic® wireless sensors

You can connect a Wireless Adapter to LGR25's **Rnet** port. The Wireless Adapter communicates with up to 15 wireless sensors. When using wireless sensors, the Rnet can have:

- Up to 15 wireless and ZS sensors (any combination)
- One Wireless Adapter
- One Equipment Touch

ZS sensors

You can wire up to 15 ZS sensors to the LGR25's **Rnet** port. ZS sensors can share the Rnet with the devices listed above.

NOTE A control program can use no more than 5 ZS Sensors, so you must use multiple control programs if your Rnet network has more than 5 sensors.

RS sensors

You can wire RS sensors to the LGR25's **Rnet** port. An Rnet can consist of any of the following combinations of devices wired in a daisy-chain or star configuration:

- 1 RS Plus, RS Pro, or RS Pro-F
- 1–4 RS Standards
- 1–4 RS Standards, and 1 RS Plus, RS Pro, or RS Pro-F

NOTE RS sensors cannot share the Rnet with other devices.

Equipment Touch devices

You can wire an Equipment Touch to the LGR25's Rnet port to view or change the controller's property values, schedule equipment, view trends and alarms, and more, without having to access the system's server. The Rnet can have one Equipment Touch, one Wireless Adapter, and up to 15 ZS sensors. RS sensors cannot share the Rnet with an Equipment Touch.

To mount the LGR25

Screw the LGR25 into an enclosed panel using the mounting holes provided on the cover plate. Leave about 2 in. (5 cm) on each side of the controller for wiring.

Wiring for power



WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.



CAUTIONS

- The LGR25 is powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.
- Automated Logic® controllers can share a power supply as long as you:
 - Maintain the same polarity.
 - Use the power supply only for Automated Logic® controllers.

To wire for power

- 1 Make sure the LGR25's power switch is in the **OFF** position to prevent it from powering up before you can verify the correct voltage.
- 2 Remove power from the power supply.
- 3 Pull the screw terminal connector from the controller's power terminals labeled **24V ac/dc** and **Ground**.
- 4 Connect the transformer wires to the screw terminal connector.
- 5 Apply power to the power supply.
- 6 Measure the voltage at the LGR25's power input terminals to verify that the voltage is within the operating range of 21.6–26.4 Vac.
- 7 Insert the screw terminal connector into the LGR25's power terminals.
- 8 Turn **on** the LGR25's power.
- 9 Verify that the Run LED (a dot in the lower right corner of the **Module Status** LED) begins blinking. The **Module Status** LED will show a chase pattern when the controller is running with no errors.

Addressing the LGR25

The LGR25 needs two addresses, one for the controller network and one for the Ethernet.

The LGR25 needs...	That is unique on the...	Notes	See...
A MAC address	controller network	You set the MAC address on the controller's rotary switches.	<i>To set the controller network MAC address (page 5)</i>
An IP address	Ethernet	You can use one of the following: - The default IP address that your system creates: - IP address = 192.168.168.x where x is the controller network MAC address. - Subnet mask = 255.255.255.0 - A DHCP IP address - Assign a custom IP address	<i>To use a default IP address (page 6)</i> <i>To use a DHCP IP address (page 6)</i> <i>To use a custom IP address (page 7)</i>

NOTES

- Carefully plan your addressing scheme to avoid duplicating addresses. If third-party devices are integrated into the system, make sure your addresses do not conflict with their addresses.
- The controller network MAC address and IP address are defined in SiteBuilder in the controller's properties dialog box.
- You can address the LGR25 before or after you wire it for power.

To set the controller network MAC address



CAUTIONS

- The MAC address must be unique on the controller network.
- If you are using default IP addressing, the MAC address must match the last octet of the **Address** field in the controller's properties dialog box in SiteBuilder.

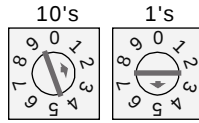
1 If wired for power, turn off the controller's power.



2 The controller only reads the rotary switch positions during power up or upon reset.

3 Use the rotary switches to set the address. Set the **Tens (10's)** switch to the tens digit of the address, and set the **Ones (1's)** switch to the ones digit.

EXAMPLE If the controller's address is 25, point the arrow on the **Tens (10's)** switch to 2 and the arrow on the **Ones (1's)** switch to 5.



To use a default IP address

CAUTION The IP address must be unique on the Ethernet.

- 1 If wired for power, turn off the controller's power.
- 2 **CAUTION** The controller only reads the rotary switch positions during power up or upon reset.
- 3 Set the **Default/Assigned** DIP switch to the **Default** position.
- 4 Set the **+100/0** DIP switch to **On** to add 100 to **x** in the IP address.

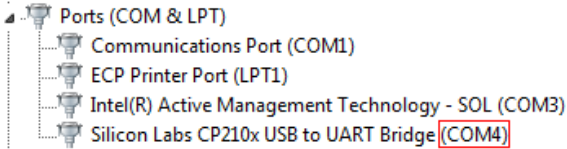
EXAMPLE If you turn on this DIP switch and the controller network MAC address is 25, the IP address is 192.168.168.125.

NOTE The default address is an intranet address. Data packets from this address are not routable to the Internet.

To use a DHCP IP address

PREREQUISITE v6.0 or later driver

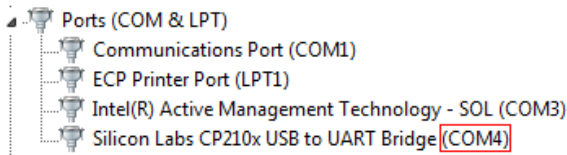
- 1 Set the LGR25's **Enhanced Access** DIP switch to **ON**.
- 2 Set the **Default/Assigned** DIP switch to **Default**.
- 3 Turn the controller's power off, then on again.
- 4 Connect a laptop with the WebCTRL® Server to the LGR25's **Local Access** port. See *To communicate through the local access port* (page 23).
- 5 In SiteBuilder, set your **Configure > Preferences > Connections** tab settings.

Field	Value
Port	The computer's port number that the USB cable is connected to. NOTE To find the port number, plug the USB cable into the computer's USB port, then select Start > Control Panel > System > Device Manager > Ports (Com & LPT). The COM port number is beside Silicon Labs CP210x USB to UART Bridge. 
Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1

- 6 On the **Network** tree, double-click the LGR25.
- 7 On the **Address** tab, click **Module Status**.
- 8 Note the LGR25's **Ethernet MAC address**.
- 9 Give the Ethernet MAC address to your DHCP network administrator and request that he reserve an IP address for that MAC address.
- 10 Get from him the reserved IP address, subnet mask, and default gateway address for the LGR25.
- 11 Repeat steps 1–6.
- 12 On the **Address** tab, select **Specify a custom or DHCP IP Address**.
- 13 Type the **IP Address**, **Subnet Mask**, and **Default Gateway Address** that the DHCP network administrator gave you.
- 14 When finished, set the LGR25's **Enhanced Access** DIP switch to **OFF** to restore normal functionality to the **Local Access** port.
- 15 Turn the controller's power off, then on again.

To use a custom IP address

- 1 Obtain the IP address, subnet mask, and default gateway address for the controller from the facility network administrator.
- 2 Set the LGR25's **Enhanced Access** DIP switch to **ON**.
- 3 Set the **Default/Assigned** DIP switch to **Assigned**.
- 4 Turn the controller's power off, then on again.
- 5 Connect a laptop with the WebCTRL® Server to the LGR25's **Local Access** port. See *To communicate through the local access port* (page 23).
- 6 In SiteBuilder, set your **Configure > Preferences > Connections** tab settings.

Field	Value
Port	The computer's port number that the USB cable is connected to. NOTE To find the port number, plug the USB cable into the computer's USB port, then select Start > Control Panel > System > Device Manager > Ports (Com & LPT). The COM port number is beside Silicon Labs CP210x USB to UART Bridge. 
Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1

- 7 On the **Network** tree, double-click the controller.
- 8 On the **Address** tab, select **Specify a custom or DHCP IP Address**.
- 9 Type the **IP Address**, **Subnet Mask**, and **Default Gateway Address**.
- 10 Click **Download Address**.

- 11 When the download is complete, click **Module Status** in the same dialog box to verify the controller's address.
- 12 When finished, set the LGR25's **Enhanced Access** DIP switch to **OFF** to restore normal functionality to the **Local Access** port.
- 13 Turn the controller's power off, then on again.

Wiring for communications

The LGR25 communicates using BACnet and/or third-party protocols, and can connect to a variety of port types at multiple baud rates. See table below.

Port	Protocol	Port type(s)	Baud rate(s)
Ethernet Port E1	BACnet/IP	Ethernet	10 Mbps
	BACnet/Ethernet		100 Mbps
	Telnet Diagnostics		
	Proprietary third-party over TCP/IP		
	NOTE All protocols can run simultaneously.		
BACnet	BACnet/ARC156 ¹	EIA-485 (2-wire)	156 kbps
S1 ²	BACnet MS/TP	EIA-485 (2-wire)	9600 bps 19.2 kbps 38.4 kbps 76.8 kbps (default)
	Third-party	EIA-232 EIA-485 (2-wire) EIA-422 (EIA-485 4-wire)	Various
S2 ²	BACnet PTP	EIA-232	9600 bps 19.2 kbps 38.4 kbps (default) 57.6 kbps 115.2 kbps
	Third-party	EIA-232 EIA-485 (2-wire)	Various
Local Access	Enhanced Access	Rnet ³	115.2 kbps

¹ ARC156 is a unique implementation of the industry standard ARCNET. For a summary of differences between ARCNET and ARC156, see the *ARC156 Wiring Technical Instructions*.

² This port supports only one protocol and one wire type at a time.

³ See *To communicate through the local access port* (page 23).

Wiring specifications

For...	Use...	Maximum Length
Ethernet	CAT5e or higher Ethernet cable	328 feet (100 meters)
ARC156 ¹ or MS/TP ²	22 AWG, low-capacitance, twisted, stranded, shielded copper wire	2000 feet (610 meters)
PTP	18–28 AWG; twisted pair preferable	50 feet (15.24 meters)

¹ See the *ARC156 Wiring Technical Instructions*.

² See the *MS/TP Networking and Wiring Technical Instructions*.



WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

To connect the LGR25 to the Ethernet

Connect an Ethernet cable to the Ethernet port.

NOTE If your system has controllers on different IP subnets separated by an IP router, you must configure one controller on each subnet as a BACnet Broadcast Management Device (BBMD). Do not configure more than one BBMD per subnet as this would cause circular routes. To avoid this problem:

- Let SiteBuilder automatically configure your BBMD tables. (SiteBuilder defines only one controller per IP subnet as a BBMD.)
- Use the BBMD Configuration Tool to make sure that a controller's BBMD table does not contain the IP addresses of other controllers on the same IP subnet.

To wire to a BACnet/ARC156 network

- 1 Turn **off** the LGR25's power.
- 2 Check the communications wiring for shorts and grounds.
- 3 Connect the communications wiring to the controller's screw terminals labeled **Net +**, **Net -**, and **Shield**.

NOTE Use the same polarity throughout the network segment.

- 4 If the LGR25 is at either end of a network segment, connect a BT485 to the LGR25.
- 5 Turn **on** the LGR25's power.
- 6 Verify communication with the network by viewing a Module Status report in the WebCTRL® interface.

To wire to a BACnet MS/TP network

- 1 Turn **off** the LGR25's power.
- 2 Check the communications wiring for shorts and grounds.
- 3 Connect the communications wiring to the controller's screw terminals labeled **Net+** and **Net-** on **Port S1**.
NOTE Use the same polarity throughout the network segment.
- 4 Set the **MSTP on S1** DIP switch to **Enable (ON)**.
- 5 If the LGR25 is at either end of a network segment, connect a BT485 to the LGR25.
- 6 Turn **on** the LGR25's power.
- 7 To change the port's baud rate, see *To set a port's baud rate using PuTTY* (page 11).
NOTE Use the same baud rate for all controllers on the network segment.

To wire to a BACnet PTP network

- 1 Turn **off** the LGR25's power.
- 2 Check the communications wiring for shorts and grounds.
- 3 Connect the communications wiring to the controller's screw terminals labeled **Tx**, **Rx**, and **Signal Ground** on **Port S2**, and jumper the **DTR** and **DCD** terminals.
NOTE Use the same polarity throughout the network segment.
- 4 Set the **PTP on S2** DIP switch to **Enable (ON)**.
- 5 Turn **on** the LGR25's power.
- 6 To change the port's baud rate, see *To set a port's baud rate using PuTTY* (page 11).
NOTE Use the same baud rate for all controllers on the network segment.

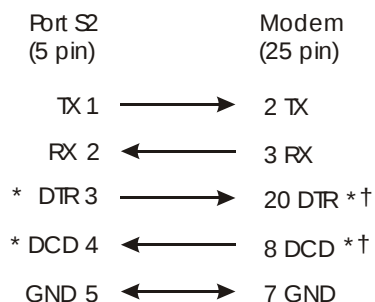
To wire a third-party device

See the *Integration Guide* for the third-party device or protocol.

To wire a modem for half-router communications

If using the LGR25 as a BACnet half-router:

- 1 Turn **off** the LGR25's power.
- 2 Connect the modem to **Port S2** using a standard modem cable connected to an S2-DB9 adapter (available from Automated Logic®) or a cable you create using the following wiring diagram:

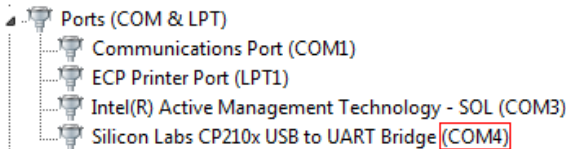


- * Wire connection usually not needed
- ** Needed only if hardware handshaking is used
- † DCD can be hooked up to the DTR signal for self-handshaking

- 3 Set the **PTP on S2** DIP switch to **Enable (ON)**.
- 4 Turn **on** the LGR25's power.
- 5 Set the port baud rate to 38400 using PuTTY. See *To set a port's baud rate using PuTTY* (page 11).

To set a port's baud rate using PuTTY

- 1 Download and install PuTTY from the *PuTTY website* (<http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>).
- 2 Connect a computer to the LGR25's **Local Access** port. See *To communicate through the local access port* (page 23).
- 3 Set the LGR25's **Enhanced Access** DIP switch to **ON**.
- 4 Turn the LGR25's power **Off**, then **On**.
- 5 Start PuTTY.
- 6 Under **Category > Connection**, select **Serial**.
- 7 Under **Options controlling local serial lines**, enter the following settings:

Field	Value
Serial line to connect to	Replace X with the computer's port number that the USB Link Kit cable is connected to. NOTE To find the port number, select Start > Control Panel > System > Device Manager > Ports (Com & LPT) . The COM port number is beside Silicon Labs CP210x USB to UART Bridge .
	
Speed (baud)	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

- 8 Click **Open**. A window similar to the one below appears.

```
BACnet Router, Ethernet MAC address = 00-E0-C9-00-4E-B8
1) Restart
2) Display Modstat
3) IP Address [192.168.168.1]
4) Subnet Mask [255.255.255.0]
5) Default Gateway [0.0.0.0]
6) BACnet/IP UDP Port [0xBAC0]
7) BACnet/IP Network [4824]
8) BACnet/Ethernet Network [4829]
9) BACnet/ARCNET Network [4825]
10) BACnet/MSTP Network [4834]
11) Display B/IP PAD Table
12) Add B/IP PAD Table Entry
13) Delete B/IP PAD Table Entry
14) Clear B/IP PAD Table
15) Set baud rate for MSTP [76800]
16) Set baud rate for PTP [38400]

• The HOME network is updated each time a network number
  is changed (#7-10).

Enter selection: _
```

- 9 Type the number of the baud rate field, then press **Enter**.
- 10 Type the new baud rate, then press **Enter**.
- 11 Type **1**, then press **Enter** to restart the controller.
- 12 When finished, set the LGR25's **Enhanced Access** DIP switch to **OFF** to restore normal functionality to the **Local Access** port.
- 13 Turn the LGR25's power **Off**, then **On**.

Wiring devices to the LGR25's Rnet port

You can wire the following devices to the LGR25's Rnet port in a daisy-chain or star configuration:

- *ZS or RS sensors* (page 13)
- *Wireless Adapter* (page 14) that communicates with wireless sensors
- *Equipment Touch* (page 15)

NOTE ZS sensors, a Wireless Adapter, and an Equipment Touch can share the same Rnet, but not RS sensors.

The Rnet communicates at a rate of 115 kbps.

Rnet wiring specifications

NOTE Use the specified type of wire and cable for maximum signal integrity.

Description	4 conductor, shielded or unshielded, CMP, plenum rated cable
Conductor	22 AWG (7x0096) bare copper
Maximum length	500 feet (152 meters)
Insulation	Low-smoke PVC (or equivalent)
Color Code	Black, white, green, red
Shielding	If shielded, Aluminum/Mylar shield (100% coverage) with TC drain wire
UL temperature rating	32–167 °F (0–75 °C)
Voltage	300 Vac, power limited
Listing	UL: NEC CL2P, or better

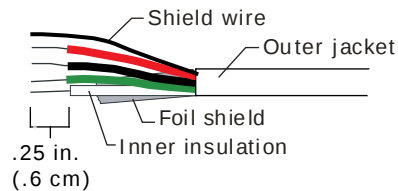
To wire a ZS or an RS sensor to the LGR25

For complete sensor installation instructions, including ZS sensor power requirements, see:

- *ZS Sensors Technical Instructions*
- *RS Sensors Technical Instructions*

1 Turn **off** the LGR25's power.

Partially cut, then bend and pull off the outer jacket of the Rnet cable(s). Do not nick the inner insulation.



2 Strip about .25 inch (.6 cm) of the inner insulation from each wire.

3 Wire each terminal on the LGR25's **Rnet** port to the terminal of the same name on the sensor.

NOTES

- If using shielded wire, connect the shield wire and the ground wire to the **Gnd** terminal.
- Verify that the **Enhanced Access** DIP switch is set to **Off**.

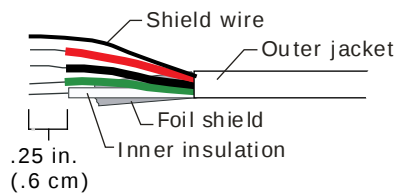
4 Turn **on** the LGR25's power.

To wire a Wireless Adapter to the LGR25

NOTES

- The Wireless Adapter requires a 24 Vac power supply. It is not powered by the Rnet.
- If the Wireless Adapter will be:
 - Daisy-chained on the Rnet with ZS sensors or an Equipment Touch, use the standard 4-conductor Rnet cable.
 - The only device on the Rnet, you can use a 3-conductor cable instead of the standard 4-conductor Rnet cable.
- For complete Wireless Adapter installation instructions, see the *Wireless Sensors Technical Instructions*.

- 1 Turn **off** the LGR25's power.
- 2 Partially cut, then bend and pull off the outer jacket of the Rnet cable(s). Do not nick the inner insulation.



- 3 Strip about .25 inch (.6 cm) of the inner insulation from each wire.
- 4 Wire the LGR25's **Rnet+**, **Rnet-**, and **Gnd** terminals to the terminals of the same name on the Wireless Adapter's Rnet connector.



NOTES

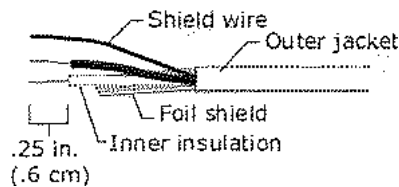
- If using shielded wire, connect the shield wire and the ground wire to the **Gnd** terminal.
 - Verify that the **Enhanced Access** DIP switch is set to **Off**.
- 5 Turn **on** the LGR25's power.

To wire an Equipment Touch to the LGR25

NOTES

- The Equipment Touch requires a 24 Vac power supply. It is not powered by the Rnet.
- If the Equipment Touch will be:
 - Daisy-chained on the Rnet with ZS sensors or a Wireless Adapter, use the standard 4-conductor Rnet wiring and follow the wiring instructions *To wire a ZS or an RS sensor to the LGR25* (page 13).
 - The only device on the Rnet, you can use a 2-conductor cable instead of the standard 4-conductor Rnet cable and follow the instructions below.
- For complete Equipment Touch installation instructions including wiring diagrams, see the *Equipment Touch Installation and Setup Guide*.

- 1 Turn **off** the LGR25's power.
- 2 Partially cut, then bend and pull off the outer jacket of the cable. Do not nick the inner insulation.



- 3 Strip about .25 inch (.6 cm) of the inner insulation from each wire.
- 4 Wire the LGR25's **Rnet+** and **Rnet-** terminals to the terminals of the same name on the Equipment Touch's connector.

NOTES

- If using shielded wire, connect the shield wire and the ground wire to the **Gnd** terminal.
 - Verify that the **Enhanced Access** DIP switch is set to **Off**.
- 5 Turn **on** the LGR25's power.

Downloading the LGR25

Download to send the following items to the LGR25:

Item	Notes
Up to 999 control programs, depending on available memory	Must be in WebCTRLx.x\webroot\<system_name>\programs .
DRV_MELGR_VANILLA driver *	Must be in WebCTRLx.x\webroot\<system_name>\drivers . NOTE To verify that you have the driver's latest version, go to http://accounts.automatedlogic.com/download , then select Drivers > ExecB . Compare the latest version to the LGR25's driver in SiteBuilder.
Editable properties	
Schedules	

* To integrate a third-party device into your WebCTRL® system, you must use the driver for the specific protocol or device. Go to <http://accounts.automatedlogic.com/download>, then select **Third-party Integration > Third-party Interface (ME-LGR & LGR)**.

If you change any of the above items or the LGR25's address after the initial download, you must download again. The first download takes longer than subsequent downloads.



CAUTIONS

- The LGR25 will lose stored data when you download.
- Equipment controlled by the LGR25 will shut down and restart when you download.
- After you download, the **Archive Valid** LED lights to indicate the downloaded items are stored in the LGR25's flash memory. This type of memory is not dependent on power or battery backup. If you need to remove power from the controller after downloading, make sure this LED is lit.

To download from the WebCTRL® interface

If your network is complete, you can download from any network browser. If not complete, connect a laptop with a local copy of the system database to the LGR25's local access port. See *To communicate through the local access port* (page 23).

- 1 On the WebCTRL® **Network**  tree, select the controller.
- 2 Click **Downloads**.
- 3 Do one of the following:
 - If the controller is in the Downloads list, go to step 4.
 - If the controller is not in the list:
 - a. Click **Add**.
 - b. In the pop-up, select the controller.
 - c. Select **All Content**.
 - d. Click **Add**.
 - e. Click **Close**.
- 4 Select the controller in the Downloads list.
- 5 Click **Start**.

NOTES

- If the download fails, locate and resolve the problem, then retry the download.
- You can also download a controller from the **Devices** page.

To set up the driver

After you download the driver and control program(s) to the LGR25, you may want to change the driver's properties in the WebCTRL® interface to suit your application.

- 1 On the WebCTRL® **Network**  tree, click  to the left of your LGR25.
- 2 Click  to the left of **Driver** to see its children.
- 3 Make changes as needed on the **Properties** page for **Driver** and any of its children.

Driver

On the **Driver** page, you can change the following properties:

- Backup battery conservation settings. See table below.
- Module clock synchronization and failure. See table below.
- Network Input microblock communication properties.

Backup Battery

Turn off internal backup battery after ___ days to conserve battery life (shutoff date/time)

How long backup battery should run after power loss.



TIP Downloading activates the battery backup. To conserve battery life when you know the LGR25 will be without power for an extended period after downloading (for example, during shipment):

- 1 Verify the **Archive Valid** LED is lit, then set this field to 0.
- 2 After you install the LGR25 and apply power, enter a number greater than 0.

BACview Control

Keypad Inactivity timeout (minutes)

Log out the user (if a user-level password is required), turn off the backlight, and display the standby screen after this period of inactivity.

Keypad user-level password

Numeric password user must enter to access system through a BACview® device.

TouchScreen Control

TouchScreen Schedule Edit Enable

Check this field to allow a user to edit this controller's schedules from an Equipment Touch's Schedules screen.

Module Clock	
Clock Fail Date and Time	Date and time the control program uses when controller's real-time clock is invalid.  TIP Use an occupied date and time (such as a Tuesday at 10 a.m.) so the equipment does not operate in unoccupied mode if the controller loses power during occupancy.
Time Synch Sensitivity (seconds)	When the controller receives a time sync request, if the difference between the controller's time and the time sync's time is greater than this field's value, the controller's time is immediately changed. If the difference is less than this field's value, the controller's time is slowly adjusted until the time is correct.
Network Microblocks	
Number of poll retries before Network Input Microblocks indicate failure	The maximum number of retries after the initial attempt that a Network microblock will attempt to communicate with its target device. If unsuccessful, the point will transition to an idle state for 30 seconds before attempting to communicate again. Change this field only if directed by Technical Support.
Periodic rebinding interval	If a microblock uses a wildcard in its address, this timer determines how often the microblock will attempt to find the nearest instance of its target. For example, if an outside air temperature address uses a wildcard, a VAV application will look for the outside air temperature on the same network segment or on the nearest device containing that object.
BACnet COV Throttling	
Enable COV Throttling	Under normal circumstances, COV Throttling should be enabled to prevent excessive network traffic if an object's COV Increment is set too low. See EXCEPTION below. When enabled, if an object generates excessive COV broadcasts (5 updates in 3 seconds), the driver automatically throttles the broadcasts to 1 per second. Also, if the object's value updates excessively for 30 seconds, an alarm is sent to the WebCTRL® application listing <u>all</u> objects that are updating excessively. A Return-to-normal alarm is sent only after <u>all</u> objects have stopped updating excessively. EXCEPTION: In rare circumstances, such as process control, a subscribing object may require COV updates more frequently than once per second. For these situations, clear this checkbox, but make sure that your network can support the increased traffic. You will also need to disable the Excessive COV alarms under the driver's Common Alarms.
Trend Sampling	
Collect a daily midnight sample for all points in this controller that are sampling on COV	For values that change infrequently, select to verify at midnight daily that the point is still able to communicate trend values.

Device

On the **Device** page, you can change the following properties:

- BACnet device object properties for the LGR25
- LGR25 communication

Configuration	NOTE The three APDU fields refer to all networks over which the LGR25 communicates.
Max Masters and Max Info Frames	Apply only if the LGR25's MS/TP network is enabled.

Notification Classes

Alarms in the WebCTRL® application use Notification Class #1. A BACnet alarm's Notification Class defines:

- Alarm priority for Alarm, Fault, and Return to Normal states
- Options for BACnet alarm acknowledgment
- Where alarms should be sent (recipients)

Priorities	NOTE BACnet defines the following Network message priorities for Alarms and Events.										
	<table><tr><th>Priority range</th><th>Network message priority</th></tr><tr><td>00–63</td><td>Life Safety</td></tr><tr><td>64–127</td><td>Critical Equipment</td></tr><tr><td>128–191</td><td>Urgent</td></tr><tr><td>192–255</td><td>Normal</td></tr></table>	Priority range	Network message priority	00–63	Life Safety	64–127	Critical Equipment	128–191	Urgent	192–255	Normal
Priority range	Network message priority										
00–63	Life Safety										
64–127	Critical Equipment										
128–191	Urgent										
192–255	Normal										
Priority of Off-Normal	BACnet priority for Alarms.										
Priority of Fault	BACnet priority for Fault messages.										
Priority of Normal	BACnet priority for Return-to-normal messages.										
Ack Required for Off-Normal, Fault, and Normal	Specifies whether alarms associated with this Notification Class require a BACnet Acknowledgment for Off-Normal, Fault, or Normal alarms.  TIP You can require operator acknowledgment for an Alarm or Return-to-normal message (stored in the WebCTRL® database). In the WebCTRL® interface on the Alarm > Enable/Disable tab, change the acknowledgment settings for an alarm source or an alarm category.										
Recipient List											
Recipients	The first row in this list is the WebCTRL® application. Do not delete this row. Click Add if you want other BACnet devices to receive alarms associated with this Notification Class.										
Recipient Description	Name that appears in the Recipients table.										

Recipient Type	Use Address (static binding) for either of the following: • Third-party BACnet device recipients that do not support dynamic binding • When you want alarms to be broadcast (you must uncheck Issue Confirmed Notifications). This use is rare.
Days and times	The days and times during which the recipient will receive alarms.
Recipient Device Object Identifier	Type the Device Instance from SiteBuilder (or from the network administrator for third-party devices) in the # field.
Process Identifier	Change for third-party devices that use a BACnet Process Identifier other than 1. The WebCTRL® application processes alarms for any 32-bit Process Identifier.
Issue Confirmed Notifications	Select to have a device continue sending an alarm message until it receives delivery confirmation from the recipient.
Transitions to Send	Uncheck the types of alarms you do not want the recipient to get.

Calendars

Calendars are provided in the driver for BACnet compatibility only. Instead, use the **Schedules** feature in the WebCTRL® interface.

Common and Specific Alarms

On these pages, you can enable/disable, change BACnet alarm properties, or set delays for the following BACnet alarms:

Common alarms:

- Module Halted
- All Programs Stopped
- Duplicate Address
- Locked I/O
- Control Program
- Program Stopped
- Excessive COV

Specific alarm:

- Dead Module Timeout
- Low Battery Alarm
- Pneumatic Unstable Alarm
- Pneumatic Leak Alarm
- Low Main Air Alarm

NOTE To set up alarm actions for controller generated alarms, see *Setting up alarm actions* in WebCTRL® Help.

Module Generated Alarm	
Description	Short message shown on the Alarms page or in an alarm action when this type of alarm is generated.
Events	
Alarm Category and Alarm Template	See <i>Customizing alarms</i> in WebCTRL® Help.
Enable	Clear these checkboxes to disable Alarm or Return to normal messages of this type from this controller.
Notification Class	Do not change this field.

Custom Translation Tables

Does not apply to the LGR25.

I/O Tuning

Does not apply to the LGR25.

Pneumatic Lines

Does not apply to the LGR25.

BACnet router properties

On the **BACnet router properties** page, you can change the following properties:

- IP address of the router in the controller and the system database
- BACnet routing settings
- Color and prime variable caching settings

IP Configuration	
Allow remote management of IP configuration	For future use.
Enable IP configuration changeover	Select to remotely change the router's IP Address, Subnet Mask, and Default Gateway Address. Type the new addresses and the UDP Port that your server is using to communicate to all controllers. In the Changeover timeout field, enter: • 0:00 to have the controller use the Next settings as soon as the controller can communicate with the Next Default Gateway Address. • A specific length of time to have the controller use the Next settings as soon as the controller can communicate with the Next Default Gateway Address, or when the timeout expires, whichever occurs first. See "To remotely change a controller's IP address" in WebCTRL® Help for more information on using this feature.
BACnet Router Options	
Ignore all Reject-Message-to-Network, Reason=1 messages	Clear to delete and rediscover a router if a network's router indicates that the network is no longer present (reason=1). Select to continue routing messages to a network even if its router indicates that the network is no longer present.
Color/Prime Variable Caching	

Disable Color Cache	Clear (enable) to improve responsiveness in retrieving colors. Select (disable): • To reduce network traffic to third-party (non-color-supporting) devices • If using the LGR25 on the controller network, not as a router NOTE Selecting this checkbox also disables dead module alarms.
Dead Module Timeout	After this period (minutes:seconds) of non-response from an ExecB controller, the router sends an alarm to the server.

BACnet half-router properties

On the **BACnet Half Router Properties** page, you can change the communication settings for an LGR25 used as a BACnet half-router (dial-up connection) on a remote network. For more information, go to <http://accounts.automatedlogic.com/findinfo> and search for *Setting up a remote network*.

Alarm Store/Forward

On the **Alarm Store and Forward** page, you can change alarm delivery settings for the LGR25 used to store and forward alarms from a remote dial-up site.

BACnet firewall

Requires v6-02 or later driver

If this IP controller is accessible from the Internet, you can increase security by enabling its BACnet firewall. When enabled, this feature prevents the controller from receiving BACnet messages from unidentified sources and allows communication only with IP addresses that you define. These can be all private IP addresses and/or a list of IP addresses. Follow the instructions in the WebCTRL® interface to set up the BACnet firewall.

Protocols

On the **Protocols** page, you can enable or disable Telnet diagnostics. This allows you to write to a text file the communication between the controller and a third party device. This file is used for troubleshooting.

Xnet

Does not apply to the LGR25.

Expanders

Does not apply to the LGR25.

To communicate through the local access port

Using a computer and a USB Link Kit, you can communicate locally with the LGR25 to download or to troubleshoot.

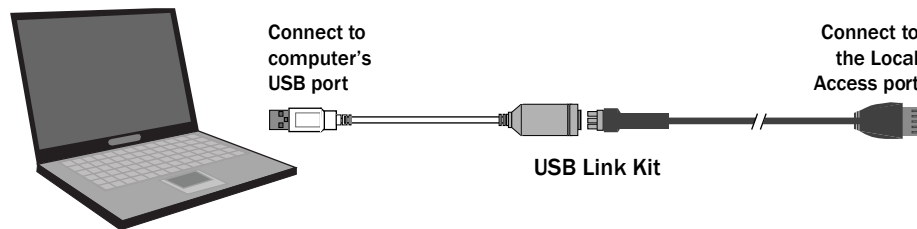
PREREQUISITES

- A computer with a USB port
- A USB Link Kit. See the *USB Link Kit Technical Instructions*.
NOTE The USB Link Kit driver is installed with a WebCTRL® v5 or later system. But if needed, you can get the latest driver from <http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx>. Install the driver before you connect the USB Link Kit to your computer.
- The controller driver drv_melgr_vanilla v1.73a.038 or later



CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link Kit and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link Kit. Purchase a USB isolator online from a third-party manufacturer.

- 1 Connect the USB Link Kit to the computer and to the controller's Local Access port.



NOTE If using a USB isolator, plug the isolator into your computer's USB port, and then plug the USB Link Kit cable into the isolator.

- 2 Set the controller's **Enhanced Access** DIP switch.

To communicate in...	Set switch to...
The WebCTRL® application	Off
PuTTY or HyperTerminal	On
SiteBuilder to set a custom IP address	On

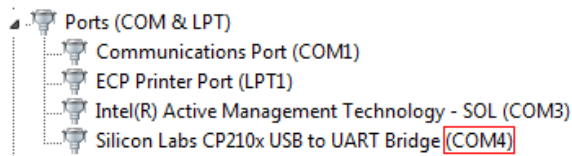
- 3 Turn the controller's power off, then on again.

To set up a Local Access connection in the WebCTRL® interface

For the WebCTRL® application to communicate with the Local Access port, you must do the following:

- 1 On the **System Configuration**  tree, select **Connections**.
- 2 On the **Configure** tab, click **Add**.
- 3 From the **Type** drop-down list, select **BACnet Local Access**.
- 4 Optional: Edit the **Description**.
- 5 Type the computer's **Port** number that the USB cable is connected to.

NOTE To find the port number, plug the USB cable into the computer's USB port, then select **Start** > **Control Panel** > **System** > **Device Manager** > **Ports (Com & LPT)**. The COM port number is beside **Silicon Labs CP210x USB to UART Bridge**.



- 6 Set the **Baud** rate to 115200.
- 7 Click **Accept**.
- 8 On the **View** tab, click the button next to the BACnet/IP network, then select **BACnet Local Access**.
- 9 Click **Accept**.
- 10 On the **Configure** tab, select **BACnet Local Access**, then click **Start**.
NOTE If an error message appears, make sure the COM port you selected is not in use. For example, PuTTY may be open and is holding the port open.
- 11 On the **Network**  tree, select the controller that you are connected to.
- 12 Click , then select **Manual Command**.
- 13 Type `rnet` here in the dialog box, then click **OK**.
- 14 On the **Properties** page, click **Module Status**. If a Modstat report appears, the WebCTRL® application is communicating with the controller.

Troubleshooting

If you have problems mounting, wiring, or addressing the LGR25, contact ALC Technical Support.

LEDs

The **Module Status** LED can display the following error codes.

Error Code...	Indicates...	Possible solutions
0	The control program or driver has not been downloaded.	Download All Content to the LGR25. See <i>Downloading the LGR25</i> (page 16).
1	A control program error	Obtain a Module Status Report (Modstat) and look for error conditions. See <i>To get the controller's serial number</i> (page 26) for instructions on obtaining a Modstat. If you cannot determine the error from the Modstat, send a screenshot of the Modstat to Technical Support.
2	The controller's memory is full	In the WebCTRL® interface, reduce the amount of trend data being stored in the controller. In SiteBuilder, reduce the amount of control programs.
3	A setup error	Verify: • The address has been set on the rotary switches. See <i>Addressing the LGR25</i> (page 5). • The address is unique on the network • DIP switches are set correctly
4	A system error	Obtain a Module Status Report (Modstat) and look for error messages. See <i>To get the controller's serial number</i> (page 26) for instructions on obtaining a Modstat. If you cannot determine the error from the Modstat, send a screenshot of the Modstat to Technical Support.
7	An abnormal restart	See solution above for #4.
8	The controller is formatting	The number 8 should display only during the short formatting period. If this number displays continuously or flashes intermittently with another number, try each of the following: • Turn the LGR25's power off, then on. • Format the LGR25. See <i>To format the controller</i> (page 26). • Download the controller. See <i>Downloading the LGR25</i> (page 16). • Replace the LGR25.

Other LED's show the status of certain functions.

If this LED is on...	Status is...
Power	The LGR25 has power.
Link	The controller is connected to the Ethernet.
LAN	The Ethernet port is transmitting or receiving data.
100	The connection speed is 100 Mbps. If LED is not lit, the connection speed is 10 Mbps.
CMnet transmit	The LGR25 is transmitting data over the controller network.
CMnet receive	The LGR25 is receiving data from the controller network.
Archive Valid	The controller's memory backup is valid.
Port S1 transmit	The LGR25 is transmitting data from Port S1 .
Port S1 receive	The LGR25 is receiving data on Port S1 .
Battery low	The battery is low.

Formatting the controller

If you cannot communicate with a controller after downloading it, as a last resort, you can manually format the controller to erase its memory.

- 1 Turn **off** the LGR25's power.
- 2  Make sure the address switches are not set to 0, 0.
- 3 Hold down the controller's **Format** button while you turn its power on.
- 4 Continue to hold down the **Format** button until the controller displays **8** and then **0**, then release the button.
- 5 Download the LGR25.

To get the LGR25's serial number

If you need the LGR25's serial number when troubleshooting, the number is on:

- a sticker on the back of the main controller board
- a Module Status report (Modstat) under **Core** (or **Main**) **board hardware**

```
Core board hardware:
Type=176, board=1, manufactured on 06/27/2013 S/N 021362247P
RAM: 512 kBytes; FLASH: 1024 kBytes, type = S
```

To obtain a modstat in the WebCTRL® interface:

- 1 Select the LGR25 in the **Network**  tree.
- 2 On the **Properties** page, click **Module Status**.

Recovering from a power outage

Battery function

The LGR25 has a 10-year Lithium CR123A battery that retains the following data for a maximum of 720 hours during power outages.

- Time
- Control programs
- Editable properties
- Schedules
- Trends

To conserve battery life, you can set the driver to turn off battery backup after a specified number of days and depend on the archive function to restore data when the power returns. See *To set up the driver > Driver* (page 17).

Archive function

The following items are archived to non-volatile Flash memory daily and after every power up or download.

- Control programs
- Editable properties
- Schedules

If a power outage occurs and the battery backup fails or is turned off after a specified number of days, the above data is automatically restored from the archive. If changes were made in the WebCTRL® interface since the last archive, you may need to download parameters after power returns to correct any mismatches.

You can see the status of the latest archive in the WebCTRL® interface on the controller's **Driver** page under **Flash Memory Archive**.

Replacing the LGR25's battery

If the LGR25's **Battery low** LED is lit or if the LGR25 sends a **Low Battery** alarm to the WebCTRL® application, replace the battery.

- 1 Verify that the LGR25's power is on.
- 2 Using a small flathead screwdriver, pry up each side of the black battery clip until it is free and you can remove it.
- 3 Remove the battery from the controller, making note of the battery's polarity.
- 4 Insert the new battery into the controller, matching the polarity of the battery you removed.
- 5 Push the black clip back onto the battery until you hear both sides click in place.
- 6 Download the LGR25.

To take the LGR25 out of service

If needed for troubleshooting or start-up, you can prevent the WebCTRL® application from communicating with the LGR25.

- 1 On the WebCTRL® **Network**  tree, select the LGR25.
- 2 On the **Properties** page, check **Out of Service**.
- 3 Click **Accept**.

Compliance

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE Compliance



WARNING This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

BACnet Compliance

Compliance of listed products to requirements of ASHRAE Standard 135 is the responsibility of BACnet International. BTL® is a registered trademark of BACnet International.



Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
2/6/17	Specifications	Added wireless sensors to the Rnet port specification.	X-D
	Zone sensors	Added wireless sensors to this topic.	
	Equipment Touch	Added Wireless Adapter to this topic.	
	Wiring devices to the Rnet port	Added Wireless Adapter to this topic.	
	To wire a Wireless Adapter to the LGR25	New topic.	
10/3/16	To set up a Local Access connection in the WebCTRL interface	Updated WebCTRL menu button in step 12.	A-D
	Appendix - LGR25 coverplate	Updated coverplate	A-D
8/12/16	LEDs	Added description of #7 LED to table.	X-TS-RB-F
3/1/16	BACnet firewall	New topic	A-D
4/16/15	Entire document	New look, no content changes	A-D
11/14/14	BACnet Compliance	Changed BACnet Manufacturers Association to BACnet International	X-D-CP-MW
10/7/14	Driver	Added the Network Microblock fields	A-TS-RB-F
7/22/14	Equipment Touch	Changed 5 ZS sensors to 15 ZS sensors	X-D
5/13/14	Specifications	Rnet Port: Added Equipment Touch and removed BACview® devices	A-D-CP-O-TC
	Zone sensors	Removed references to BACview	
	Equipment Touch	New topic	
	BACview devices	Removed topic	
	Wiring zone sensors to the LGR25	Changed to "Wiring devices to the LGR25's Rnet port"	
	To wire an Equipment Touch to the LGR25	New topic	
	To set up the driver > Driver	Added new driver property: TouchScreen Schedule Edit Enable	

* For internal use only