Installation Instructions

SmartGuard 600 Controllers

Catalog Numbers 1752-L24BBB, 1752-L24BBBE

ALLEN-BRADLEY • ROCKWELL SOFTWARE **Rockwell Automation**

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

WARNING	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.
SHOCK HAZARD	Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
BURN HAZARD	Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.	Informations sur l'utilisation de cet équipement en environnements dangereux.
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

WARNING ⚠	EXPLOSION HAZARD - • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**AVERTISSEMENT** ⚠	RISQUE D'EXPLOSION – • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

General Safety Information

ATTENTION ⚠	**Safety Programmable Electronic Systems (PES)** Personnel responsible for the application of safety-related programmable electronic systems (PES) shall be aware of the safety requirements in the application of the system and shall be trained in using the system.

ATTENTION

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Environment and Enclosure

This equipment is intended for use in Pollution Degree 2 Industrial environment, in Overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as open type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with flame spread rating or 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see:

- Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

- NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

ATTENTION

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Prevent Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.

- Wear an approved wrist grounding strap.

- Do not touch connectors or pins on component boards.

- Do not touch circuit components inside the equipment.

- Use a static-safe workstation, if available.

- Store the equipment in appropriate static-safe packaging when not in use.

ATTENTION	**Protective Debris Strip**
⚠	Do not remove the protective debris strip until after the controller and all the other equipment near the controller is mounted and wiring is complete.
	Once wiring is complete, remove the protective debris strip. Failure to remove the strip before operating can cause overheating.

| ATTENTION	Serious injury may occur due to the loss of required safety function.
⚠	• Do not use test outputs as safety outputs.
	• Do not use DeviceNet standard I/O data or explicit message data as safety data.
	• Do not use the safety indicators for safety operations.
	• Do not connect loads beyond the rated value to safety outputs or test outputs.
	• Wire the controller properly so that the 24V DC line does not accidentally touch the outputs.
	• Ground the 0V line of the power supply for external output devices so that the devices do not turn on when the safety output line or test output line is grounded.
	• Do not dismantle, repair, or modify the controller. Doing so may impair the safety functions.

About the SmartGuard 600 Controller

SmartGuard 600 controllers, catalog numbers 1752-L24BBB and 1752-L24BBBE, are programmable electronic systems featuring 16 digital inputs, 8 digital outputs, 4 test pulse sources, and connections for USB and DeviceNet safety communication. In addition, the 1752-L24BBBE controller offers EtherNet/IP connectivity.

SmartGuard 600 controllers are certified for use in safety applications up to and including Safety Integrity Level (SIL) 3, according to IEC 61508, Performance Level PL(e) according to ISO 13849-1, and Category (CAT) 4, according to EN 954-1.

1752-L24BBB Controller
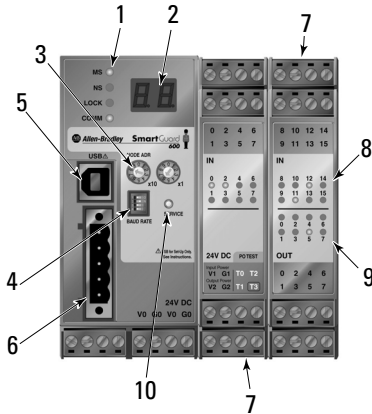
Number	Feature
1	Module status indicators
2	Alphanumeric display
3	Node address switches
4	Baud rate switches
5	USB port
6	DeviceNet communication connector
7	Terminal connectors
8	Input status indicators
9	Output status indicators
10	Service switch

1752-L24BBBE Controller
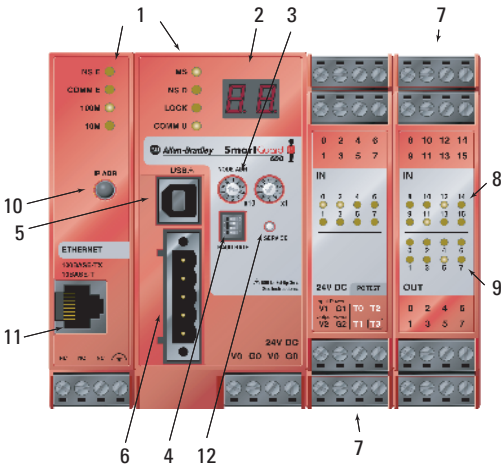
Number	Feature
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5	USB port
6	DeviceNet communication connector
7	Terminal connectors
8	Input status indicators
9	Output status indicators
10	IP address display switch
11	Ethernet connector
12	Service switch

Before You Begin

Before you install the controller, set its DeviceNet node address and communication rate.

IMPORTANT	Turn off power to the controller before setting the node address or communication rate via the switches.
	Do not change the switch settings while the power supply is on. The controller will detect this as a change in the configuration and will switch to the ABORT mode.

Set the Node Address

Use a small screwdriver to set the DeviceNet node address by using the two rotary switches on the front panel of the controller. Use care not to scratch the switches. Values from 00…63 are valid. The default setting is 63.

Follow these steps to set the node address.

1. Set the tens digit of the node address (decimal) by turning the left rotary switch.

2. Set the ones digit by turning the right rotary switch.

3. To set the node address by using RSNetWorx for DeviceNet software, set the rotary switches to a value from 64…99.

IMPORTANT	A node address duplication error will occur if the same node address is set for more than one node.

Setting the Communication Rate

The default communication rate for a DeviceNet network is 125 Kbps.
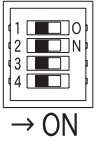
If you choose to use a different communication rate, the length of the trunkline and types of cable determine which communication rates your application can support.

DeviceNet Communication Rates and Cable Lengths

Communication Rate	Distance, Max			Cumulative Drop Line Length
	Flat Cable	**Thick Cable**	**Thin Cable**	
125 Kbps	420 m (1378 ft)	500 m (1640 ft)	100 m (328 ft)	156 m (512 ft)
250 Kbps	200 m (656 ft)	250 m (820 ft)	100 m (328 ft)	78 m (256 ft)
500 Kbps	75 m (246 ft)	100 m (328 ft)	100 m (328 ft)	39 m (128 ft)

Set the communication rate by using the DIP switch on the front of the controller.

DIP Switch Settings

DIP Switch Pin	1	2	3	4	Communication Rate
	OFF	OFF	OFF	OFF	125 Kbps
	ON	OFF	OFF	OFF	250 Kbps
	OFF	ON	OFF	OFF	500 Kbps
→ ON	ON	ON	OFF	OFF	Set by software
	ON or OFF	ON or OFF	ON	OFF	Set by software
	ON or OFF	ON or OFF	ON or OFF	ON	Automatic baud-rate detection

| **IMPORTANT**	If you change the communication rate of your network, make sure that all devices change to the new communication rate. Mixed communication rates produce communication errors.

Set the IP Address for Ethernet Communication

Connect the 1752-L24BBBE controller to the network via a 100 Mbps Ethernet switch, which will help reduce collisions and lost packets, and increase bandwidth.

The 1752-L24BBBE controller is shipped with BOOTP enabled for setting the IP address. You can use any commercially available BOOTP server. If you do not have BOOTP Server capabilities on your network, download the free Rockwell Automation BOOTP server from http://www.ab.com/networks/bootp.html.

To set the IP address by using the Rockwell Automation BOOTP utility, follow these steps.

1. Run the BOOTP utility.

2. Double-click the hardware address of the device you want to configure.
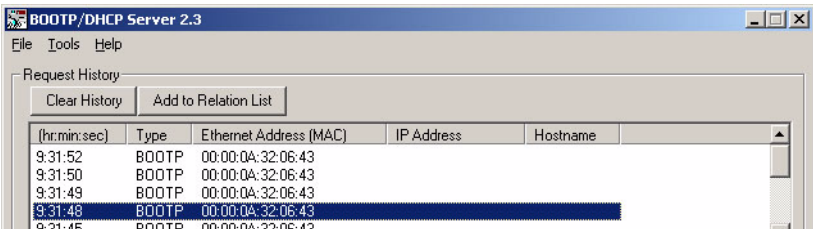
3. In the the New Entry pop-up dialog box, type the IP address you want to assign to the device, and click OK.

New Entry	
Ethernet Address (MAC):	00:00:0A:32:06:43
IP Address:	192 . 168 . 1 . 30
Hostname:	
Description:	
	OK Cancel

The controller appears in the Relation List.

For detailed information on EtherNet/IP communication, refer to the EtherNet/IP Performance and Application Solution, publication ENET-AP001.

Install the SmartGuard 600 Controller

To install the SmartGuard 600 controller, you must mount it on the DIN rail, wire the terminals, and make communication connections.

Mount the SmartGuard 600 Controller

IMPORTANT	For effective cooling:
	• mount the controller on a horizontal DIN rail. Do not mount the controller vertically.
	• provide a gap of at least 50 mm (2.0 in.) above and below the controller and 5 mm (0.20 in.) on each side.
	• select a location where air flows freely or use an additional fan.
	• do not mount the controller over a heating device.

Mount the controller only to a DIN rail. Follow these steps to mount the controller to an EN 50022-35x7.5 or EN 50022-35x15 DIN rail.

1. Hook the top slot over the DIN rail.

2. Snap the bottom of the controller into position while pressing the controller down against the top of the rail.

Top Slot
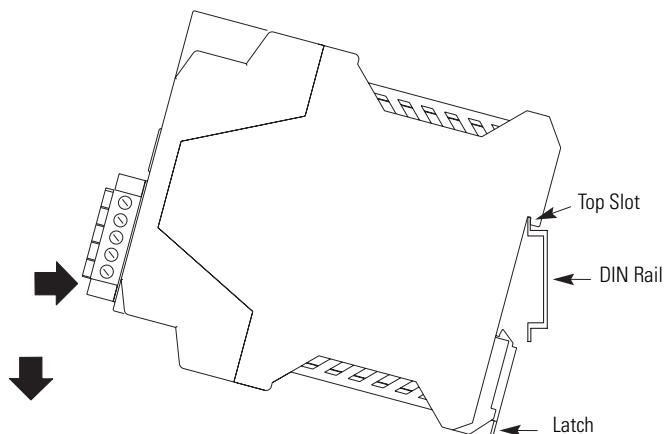
DIN Rail

Latch

3. Attach end plates to each end of the DIN rail.

To remove the controller from the DIN rail, use a screwdriver to pull down the latch and lift the controller off of the rail. The 1752-L24BBB controller has one latch and the 1752-L24BBBE controller has two latches on the bottom of the controller.

Grounding the SmartGuard 600 Controller

ATTENTION

This product is grounded through the DIN rail to chassis ground. Use zinc plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end anchors appropriately.

You must provide an acceptable grounding path for each device in your application. Functionally ground the controller through its V0/G0 power connection.

In addition, if you are using the 1752-L24BBBE controller, you should connect the Ethernet ground terminal to an acceptable ground.

Ethernet Ground
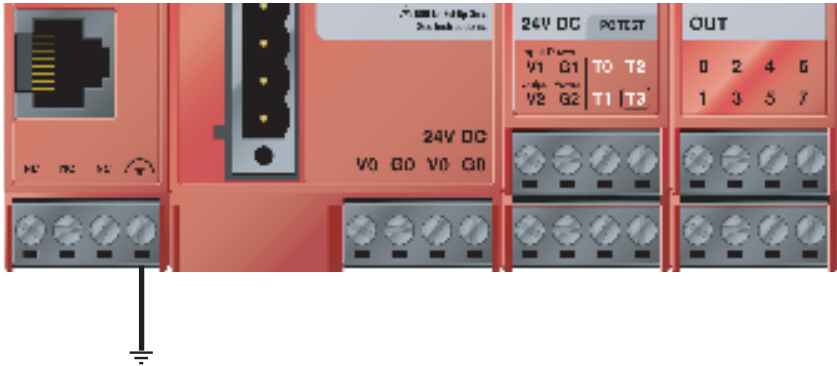
Refer to the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1, for additional information.

Connecting a Power Supply

Power for the controller is provided via an external 24V DC power source. The output hold time must be 20 ms or longer.

To comply with the CE Low Voltage Directive (LVD), DeviceNet connections and I/O must be powered by a DC source compliant with safety extra low voltage (SELV) or protected extra low voltage (PELV).

To comply with UL restrictions, DeviceNet connections and I/O must be powered by DC sources whose secondary circuits are isolated from the primary circuit by double insulation or reinforced insulation. The DC power supply must satisfy the requirements for Class 2 circuits or limited voltage/current circuits defined in UL 508.

TIP	The following Rockwell Automation 1606 power supplies are Class 2, SELV- and PELV-compliant, and they meet the isolation and output hold-off time requirements of the SmartGuard 600 controller:

- 1606-XLP30E
- 1606-XLP72E
- 1606-XL60DR
- 1606-XLP50E
- 1606-XLP95E
- 1606-XLSDNET4
- 1606-XLP50EZ
- 1606-XLDNET4

The SmartGuard controller has three V/G terminal pairs that require a power connection. There are two V0/G0 pairs, but because they are internally connected, you need to only connect one V0/G0 pair. You can use the other pair to distribute power to other devices.

Power Supply Connections
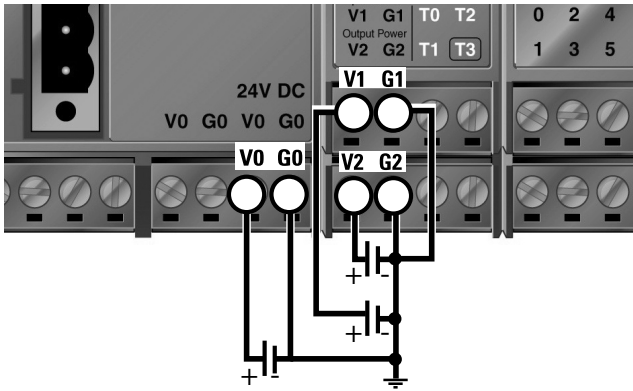
Wiring the SmartGuard 600 Controller

See for appropriate wire size and torque specifications.

Controller Terminal Descriptions

Terminal Designation	Description
V0	Power terminal for internal circuit (logic).
G0	Power terminal for internal circuit (logic).
V1	Power terminal for input circuits and test outputs.
G1	Power terminal for input circuits and test outputs.
V2	Power terminal for safety outputs.
G2	Power terminal for safety outputs.
IN0…IN15	Terminals for safety inputs.
T0…T3	These are test output terminals that can provide pulse test sources for safety inputs IN0...IN15. T3 can also support wire off detection and burned out bulb detection for a load such as a muting lamp.
OUT0…OUT7	Terminals for safety outputs.

WARNING	If you connect or disconnect wiring while the field-side power is applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

WARNING	If you connect or disconnect the removable terminal block (RTB) while the field-side power is applied, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

IMPORTANT	Prepare stranded wires by attaching ferrules with plastic insulation covers (compliant with the DIN 46228-4 standard). Ferrules similar in appearance but not compliant may not match the terminal block on the controller.

Wiring Input Devices

ATTENTION	Applying an inappropriate DC or any AC voltage may result in a loss of safety function, product damage, or serious injury. Properly apply only the specified voltage to controller inputs.

Input devices with mechanical contact outputs, such as emergency stop buttons and safety limit switches, use both a safety input terminal and a test output terminal. This enables the circuit to reach a Category 4 rating.

When safety devices are connected via test outputs to an input circuit on the SmartGuard controller, we recommend the length of the wire to be 30 m (98.4 ft) or less.

Input Devices with Mechanical Contact Outputs
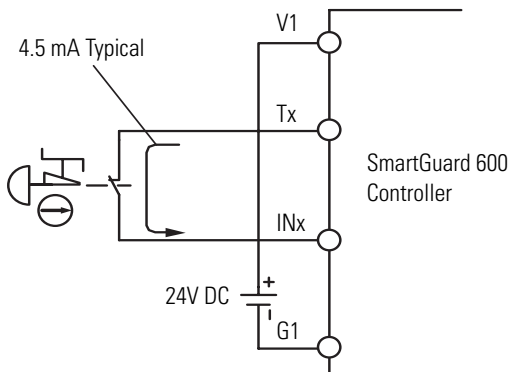
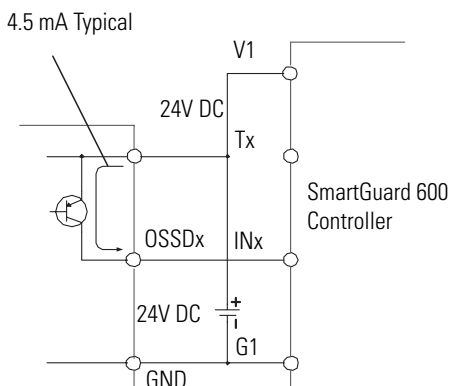Devices, such as light curtains, with current-sourcing PNP semiconductor outputs send a signal to the SmartGuard 600 controller safety-input terminal and do not use a test output.

Input Devices with PNP Semiconductor Outputs

Wiring Output Devices

| ATTENTION	Serious injury may occur due to a loss of required safety functions.
⚠	Do not connect loads beyond the rated value of safety or test outputs.
	Do not use test outputs as safety outputs.
	Wire the controller properly so that the 24V DC lines do not touch the safety or test outputs.
	Do not apply the power supply to the test output terminals.
	Ground the 0V line of the power supply for external output devices so that the devices do not turn on when the safety output line or the test output line is grounded.
	Separate I/O cables from high voltage or high current lines.

Output Device Wiring

SmartGuard 600 Controller

V2

0.5 A Max

OUTx

+ 24V DC

Load

G2
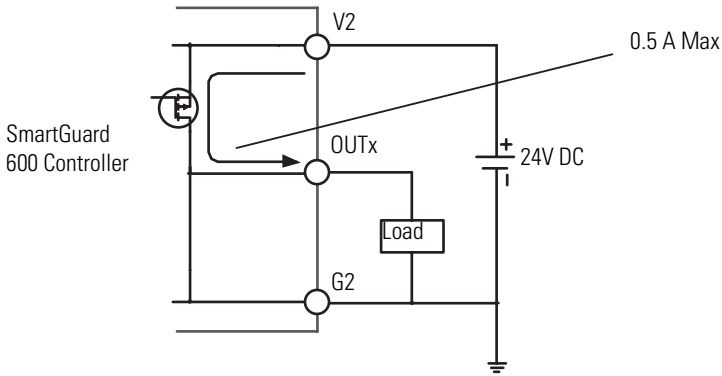
Making Communication Connections

> **WARNING**
>
> ⚠
>
> Do not connect or disconnect the communication cable with power applied to this controller or any device on the network, because an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

You can configure the network and controller on the DeviceNet network by using a 1784-PCD card inside your personal computer and RSNetWorx for DeviceNet software. You can also configure the network and controller by using the controller's USB port and RSNetWorx for DeviceNet software.

In addition, you can communicate via the EtherNet/IP network. The EtherNet/IP address and subnet mask are configured with the RSLinx module configuration. The 1752-L24BBBE controller is shipped with BOOTP enabled for setting the IP Address. See for details.

Connect to the DeviceNet Port

Follow these steps to connect to the DeviceNet port.

1. Wire the connector according to the colors on the connector.

Wire No.	Wire Color	Connects to
1	Red	V+
2	White	CAN H
3	—	Drain
4	Blue	CAN L
5	Black	V-
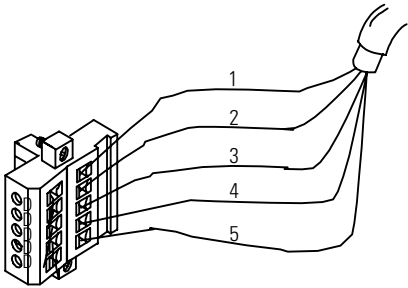
2. Attach the connector to the DeviceNet port.

3. Tighten the screws to 0.25…0.3 N•m (2.21…2.65 lb•in).

For detailed DeviceNet connection information, refer to the DeviceNet Media Design Installation Guide, publication DNET-UM072. Also refer to the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Connecting to the USB Port

Connect the USB communication connector to your personal computer when you want to configure the network and controller by using RSNetWorx for DeviceNet software. Use a commercially available USB-A to USB-B male/male cable to make the connection.

ATTENTION

The USB cable length must be less than 3 m (10 ft).

The USB port is intended for temporary programming purposes only and is not intended for permanent connection.

WARNING

If you connect or disconnect the USB cable with power applied to this module or any device on the USB network, an electrical arc could occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Connecting to the Ethernet Port

Use an RJ45 connector to connect the controller to the EtherNet/IP network.

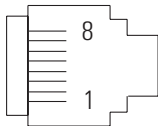| ATTENTION	The cable length must be less then 100 m (328 ft) between hub and nodes.

WARNING	If you connect or disconnect the Ethernet cable with power applied to this controller or any other device on this network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Ethernet Pin Placement

Pin No.	Pin Name	Pin Placement
8	Not used	
7	Not used	
6	RD-	
5	Not used	8
4	Not used	1
3	RD+	
2	TD-	
1	TD+	

Interpreting the Status Indicators

The SmartGuard 600 controller features status indicators for module, DeviceNet and EtherNet/IP network status, lock, USB and EtherNet/IP communication, individual input and output status, as well as an alphanumeric status display for DeviceNet error codes, DeviceNet node address, and EtherNet/IP address information.

Alphanumeric Status Display

The controller's alphanumeric display provides information about the module's status. Under normal operating conditions, the display shows the node address of the module, 00…63 in decimal format. If the controller is operating in a standalone configuration (not networked), the display shows 'nd'. The display flashes when the controller is self-testing, configuring, or in Idle mode. If a fault exists, the display alternates between the error code and the node address where the error occurred. If a fatal error has occurred, the display shows the error code only.

When the service switch is pressed, the display shows the controller's safety-configuration signature two digits at a time. The configuration signature can also be viewed on the Safety tab of the Controller Properties dialog box in RSNetWorx for DeviceNet software. You can use the configuration signature to verify that the program and configuration of the controller has not been changed.

When the IP address display switch is pressed for 1 second or longer, the display shows the EtherNet/IP address that is set. The error code 'n4' is displayed if an error occurs in the EtherNet/IP configuration.

Status Indicators

Use these tables to interpret the color and status combinations of the status indicators and take recommended actions where applicable.

Module Status (MS) Indicator Descriptions

If the Module Status (MS) indicator is	It means	Take this action
Off	No power.	Refer to the corrective action following this table.
Green, on	The controller is operating in Run mode and under normal conditions.	No action required.
Green, flashing	The controller is idle.	
Red, flashing	A recoverable fault exists.	Refer to the corrective action following this table.
Red, on	An unrecoverable fault exists.	
Red/green flashing	Self-test in progress. Or, the controller's configuration is being downloaded or is incomplete or incorrect.	

If your Module Status indicator is off, follow these steps.

1. Cycle the power supply.

2. Take corrective actions for noise.

3. Contact Rockwell Automation.

If your Module Status indicator is flashing red, follow these steps.

1. Configure the switches properly.

2. Reset the configuration data.

If your Module Status indicator is solid red (on), follow these steps.

1. Cycle the power supply.

2. Check external wiring.

3. Take corrective actions for noise.

4. Contact Rockwell Automation.

If your Module Staus indicator is flashing red and green, follow these steps.

1. Configure the switches properly.

2. Set the safety network number.

3. Reconfigure the device.

DeviceNet Network Status (NS D) Indicator Descriptions

If the DeviceNet Network Status (NS D) indicator is	It means	Take this action
Off	The controller is not online or may not have power from the DeviceNet network.	Refer to the corrective action following this table.
Green, on	The controller is online; connections are established.	No action required.
Green, flashing	The controller is online; no connections are established.	
Red, on	Communication failure due to duplicate MAC ID (error code F0) or Bus OFF (error code F1).	Refer to the corrective action following this table
Red, flashing	Communication timeout.	
Red/green flashing	The Safety Network Number (SNN) is being set.	No action required.

If your Network Status indicator is off, follow these steps.

1. Cycle the power supply.

2. Check external wiring.

3. Take corrective actions for noise.

4. Contact Rockwell Automation.

If your Network Status indicator is on or flashing red, follow these steps.

1. View the Alphanumeric display for the node address of the error and error code.

2. Check that node addresses have not been duplicated.

3. Make sure the communication rate is the same for all nodes.

4. Check that cables are not loose, disconnected or too long.

5. Verify that terminating resistors have been installed only at both ends of the main line.

6. Take corrective action for noise.

7. Make sure target devices are configured, verified, and in normal operating state.

Lock Configuration (Lock) Status Indicator Descriptions

If the Lock Configuration (Lock) status indicator is	It means	Take this action
Yellow, on	A locked valid configuration exists.	No action required.
Yellow, flashing	An unlocked valid configuration exists.	Lock the configuration before operating the safety system.
Off	The configuration is invalid.	Reconfigure the controller.

USB Communication (COMM U) Status Indicator Descriptions

If the USB Communication (COMM U) status indicator is	It means	Take this action
Yellow, flashing	The controller is communicating.	No action required.
Off	The controller is not communicating.	

I/O (inputs 0...15, outputs 0...7) Status Indicators Descriptions

If the I/O status indicators are	It means	Take this action
Red, on	A failure has been detected in the input or output circuit or a discrepancy error has occurred in the I/O set for Dual-channel mode.	Refer to the corrective action following this table.
Red, flashing	A failure has been detected in the associated I/O circuit's dual channel configuration.	
Off	The input or output signal is off.	
Yellow, on	The input or output signal is on.	No action required.

If your I/O Status indicator is on or flashing red, follow these steps.

1. Check that the signal wire:

   - is not making contact with the power source (positive side).
   - does not have an earth fault.
   - is not disconnected.

2. Make sure there is not a short-circuit between signal wires.

3. Check that there is no overcurrent for the output.

4. Make sure there is no failure in the connected devices.

5. Verify that the Discrepancy Time settings are valid.

If your I/O Status indicator is off, follow these steps.

1. Check that the power supply voltage is set within the specified range.

2. Make sure a cable or wire is not disconnected.

EtherNet/IP Network Status (NS E) Indicator Descriptions

If the EtherNet/IP Network Status (NS E) indicator is	It means	Take this action
Off	The controller does not have an IP address or is not turned on.	Refer to the corrective action following this table.
Green, flashing	The controller has no established connections but has obtained an IP address.	
Green, on	The controller has at least one established connection (even to the message router).	No action required.
Red, flashing	One or more of the connections in which this device is the target has timed out. This shall be left only if all timed out connections are reestablished or if the device is reset.	Refer to the corrective action following this table.
Red, on	The controller has detected that its IP address is already in use.	Reset the IP address.

If your EtherNet/IP Status indicator is off, follow these steps.

1. Apply power to the controller.

2. Set the IP address.

If your EtherNet/IP Status indicator is flashing green, follow these steps.

1. Check the wiring to the controller.

2. Configure the originator to connect to the target.

If your EtherNet/IP Status indicator is flashing red, follow these steps.

1. Check external wiring.

2. Check the endpoints.

3. Check the switches.

EtherNet/IP Communication (COMM E) Status Indicator Descriptions

If the EtherNet/IP Communication (COMM E) status indicator is	It means	Take this action
Green, on	The controller is communicating on the Ethernet network.	No action required.
Off	The controller is not communicating on the Ethernet network.	

Ethernet Network Speed (100) Status Indicator Descriptions

If the Ethernet Network Speed (100) status indicator is	It means	Take this action
Yellow, on	The communication rate is 100 Mbps.	No action required.
Off[1]	The communication rate is 10 Mbps.	Check that the Network Speed (10) indicator is on.

(1)   If this indicator is Off along with the Network Speed (10) indicator, check your Ethernet connection.

Ethernet Network Speed (10) Status Indicator Descriptions

If the Ethernet Network Speed (10) status indicator is	It means	Take this action
Yellow, on	The communication rate is 10 Mbps.	No action required.
Off[1]	The communication rate is 100 Mbps.	Check that the Network Speed (100) indicator is on.

(1)   If this indicator is Off along with the Network Speed (100) indicator, check your Ethernet connection.

Refer to the SmartGuard 600 Controller User Manual, publication 1752-UM001, for more information on recovering from I/O errors.

ATTENTION	Status indicators are not reliable indicators for safety functions. They should be used only for general diagnostics during commissioning and troubleshooting. Do not use status indicators as operational indicators.

Specifications

SmartGuard 600 Controllers - 1752-L24BBB, 1752-L24BBBE

Attribute	1752-L24BBB	1752-L24BBBE
Dimensions (HxWxD), approx.	99.0[4]x 99.4 x 131.4 mm[5] (3.90[4] x 3.91 x 5.18[5] in.)	99.0[4] x 113.0 x 131.4[5] mm (3.90[4] x 4.48 x 5.18[5] in.)
Weight, approx.	460 g (1.23 lb)	575 g (1.54 lb)
DeviceNet current load, max	15 mA @ 24V DC	
Supply voltage[1]	20.4…26.4V DC (24V DC, -15…10%)	
Inrush current - unit power supply	4.8 A peak for 600 μs @ V0/G0	
Inrush current - safety input power supply	2.6 A peak for 3 ms @ V1/G1	
DeviceNet voltage range	11…25V DC	
Current consumption (V0 - internal logic circuit)	230 mA @ 24V DC	280 mA @ 24V DC
Overload protection	Shut down of the affected output with cyclic reconnecting	
Isolation voltage	50V, Functional insulation type Tested at 600V AC for 60 s, between all groups	
Wire type	Copper	
Wiring category[2]	2 - on power, signal, and communication ports	2 - on power, 1 - on signal, 1 - communication ports
Wire size	For power supply and I/O, use 0.2…2.5 mm^2 (12…24 AWG) solid wire, or 0.34…1.5 mm^2 (16…22 AWG) standard flexible wire. Before connecting, prepare standard wires by attaching ferrules with plastic insulation collars (DIN 46228-4 standard compatible) For Ethernet connections: RJ45 connector according to IEC 60603-7, 2 or 4 pair Category 5e minimum cable according to TIA 569-B.1 or Category 5 cable according to ISO/IEC 24701	
I/O terminal screw torque	0.56…0.79 N•m (5…7 lb•in)	
North American temperature code	T4A	
Input type	Current sinking	
Voltage, on-state input, min	11V DC	
Voltage, off-state input, max	5V DC	
Current, off-state input, max	1 mA	
Input current	4.5 mA	
Input impedance	2.6 kΩ	

SmartGuard 600 Controllers - 1752-L24BBB, 1752-L24BBBE

Attribute	1752-L24BBB	1752-L24BBBE
Test output type	Current sourcing	
Pulse test output current[3]	0.7 A	
Test output surge current	0.7 A	
Pulse test off-state voltage, max	1.2V	
Pulse test output leakage current, max	0.1 mA	
Muting lamp output current (T3) • More than 25 mA • Less than 5 mA	• Normal operation (to avoid fault when used as a muting lamp output) • Fault (a fault indication is generated when used as a muting lamp output)	
Output type	Current sourcing	
Output current	0.5 A	
Output surge current	0.5 A	
Voltage, off-state output max	1.2V	
Leakage current, off-state output, max	0.1 mA	
Heat dissipation	9.3 W under max load	
Ethernet Communication		
CIP connections	Not applicable	2
Auto negotiation	Not applicable	Supported
Data rate	Not applicable	10/100 Mbps
Duplex	Not applicable	Full/half
Allowable unit communication bandwidth	Not applicable	3000 pps[6]
Explicit message communication	Not applicable	502 Bytes[7]

(1)   V0/G0 for internal logic circuit; V1/G1 for external input devices and test outputs; V2/G2 for external output devices.
(2)   Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.
(3)   T0...T3 total current at the same time: 1.4 A.
(4)   Height includes terminal connectors.
(5)   Depth includes DeviceNet connector.
(6)   PPS is packets per second. It indicates the number of send or receive packets that can be processed per second.
(7)   The maximum message length for class 3 connection and UCMM connection.

Environmental Specifications

Attribute	1752-L24BBB	1752-L24BBBE
Temperature, storage	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40…70 °C (-40…158 °F)	
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -10…55 °C (14…131 °F) (surrounding air temperature)	
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Nonoperating Damp Heat): 10…95% noncondensing	
Vibration	IEC 60068-2-6 (Test Fc, Operating): 0.35 mm @ 10…57 Hz 5 g @ 57…150 Hz	IEC 60068-2-6 (Test Fc, Operating): 5 g @ 10…500 Hz
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 15 g	
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g	
Enclosure type rating	Meets IP20	
Emissions	CISPR 11: Group 1, Class A	
ESD immunity	IEC 61000-4-2: • 4 kV contact discharges • 8 kV air discharges	IEC 61000-4-2: • 6 kV contact discharges • 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: • 10 V/m with 1 kHz sine-wave 80% AM from 80…1000 MHz • 10 V/m with 1 kHz sine-wave 80% AM from 1.4…2.0 GHz • 10 V/m with 200 Hz 50% Pulse 100% AM at 900 MHz • 10 V/m with 200 Hz 50% Pulse 100% AM at 1200 MHz • 3 V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz	IEC 61000-4-3: • 10 V/m with 1 kHz sine-wave 80% AM from 80…1000 MHz • 10 V/m with 1 kHz sine-wave 80% AM from 1.4…2.0 GHz • 20 V/m with 200 Hz 50% Pulse 100% AM at 800, 900, 1200 MHz • 3 V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz

Environmental Specifications

Attribute	1752-L24BBB	1752-L24BBBE
EFT/B immunity	IEC 61000-4-4: • ±2 kV @ 5 kHz on power ports • ±2 kV @ 5 kHz on signal ports • ±2 kV @ 5 kHz on communication ports	IEC 61000-4-4: • ±2 kV @ 5 kHz on power ports • ±1 kV @ 5 kHz on signal ports • ±1 kV @ 5 kHz on communication ports
Surge transient immunity	IEC 61000-4-5: • ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports • ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports • ±1 kV line-earth (CM) on communication ports	IEC 61000-4-5: • ±500V line-line (DM) and ±1 kV line-earth (CM) on power ports • ±1 kV line-earth (CM) on signal ports • ±1 kV line-earth (CM) on communication ports
Conducted RF immunity	IEC 61000-4-6: • 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz	

Certifications

Certification[1] (when product is marked)	Value
c-UL-us	UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See UL File E194810.
CE	European Union 2004/108/EEC EMC Directive, compliant with: • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
TÜV	TÜV Certified for Functional Safety Functional Safety: SIL 1 to 3, according to IEC 61508; Performance Level PL(e) according to ISO 13849-1, Category 1 to 4, according to EN954-1; NFPA79; when used as described in the SmartGuard Controllers Safety Reference Manual, publication 1752-RM001.
UL	UL Certified for Functional Safety. See UL File E256621.

(1)   See the Product Certification link at http://ab.com for Declarations of Conformity, Certificates, and other certifications details.

Additional Resources

These documents contain additional information concerning related Rockwell Automation products.

Resource	Description
SmartGuard 600 User Manual, publication 1752-UM001	Information on wiring, configuring, operating, and troubleshooting a SmartGuard 600 controller.
SmartGuard 600 Safety Reference Manual, publication 1752-RM001	Information on the safety concept of the SmartGuard 600 controller, as well as PFD and PFH values and reaction time calculations.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://literature.rockwellautomation.com. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.