

GuardLogix Controllers

Catalog Numbers 1756-L61S, 1756-L62S, 1756-L63S,
1756-LSP

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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](http://literature.rockwellautomation.com) 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.

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

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 . |
|---|---|
| <p>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.</p> | <p>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.</p> |
| <p>WARNING</p>  <p>EXPLOSION HAZARD</p> <ul style="list-style-type: none"> 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. | <p>AVERTISSEMENT</p>  <p>RISQUE D'EXPLOSION</p> <ul style="list-style-type: none"> 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. |

Environment and Enclosure Information

ATTENTION



Environment and Enclosure

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 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 difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

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 a flame spread rating of 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, for additional installation requirements, Allen-Bradley publication [1770-4.1](#).
 - NEMA Standards 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.
-

General Safety Information

ATTENTION



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.

Preventing Electrostatic Discharge

ATTENTION



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 grounding wriststrap.
 - 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.
-

Prepare the Chassis

Before you install a controller, follow these preliminary steps.

1. Install a ControlLogix chassis (catalog number 1756-A4/B, 1756-A7/B, 1756-A10/B, or 1756-A17/B) according to the ControlLogix Chassis Installation Instructions, publication [1756-IN080](#).
2. Install one of the following ControlLogix power supplies according to the corresponding installation instructions.

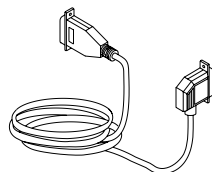
| For this power supply | Follow the instructions in this publication |
|---------------------------|---|
| 1756-PA72 | ControlLogix Power Supplies Installation Instructions, publication 1756-IN078 |
| 1756-PB72 | |
| 1756-PA75 | ControlLogix Power Supplies Installation Instructions, publication 1756-IN613 |
| 1756-PB75 | |
| 1756-PA75R ⁽¹⁾ | ControlLogix Redundant Power Supplies Installation Instructions, publication 1756-IN573 |
| 1756-PB75R ⁽¹⁾ | |

(1) A 1756-PSCA2/A redundant power-supply chassis adapter is required for use with redundant power supplies. Refer to ControlLogix Redundant Power Supplies Chassis Adapter Module Installation Instructions, publication [1756-IN590](#).

Make Sure That You Have All of the Components

A key and the 1756-BA2 battery ship with the 1756-L6xS controller, while the 1756-LSP safety partner ships with the 1756-BA2 battery.

If you want to connect a device to the serial port of the controller (for example, connect a computer to the controller), use a 1756-CP3 serial cable.



You can use a 1784-CF64 or 1784-CF128 CompactFlash card with GuardLogix controllers, firmware revision 18 and later.

IMPORTANT

You must use a 1756-L6xS primary controller **and** a 1756-LSP safety partner to achieve SIL 3/PLe.

Install a CompactFlash Card

WARNING



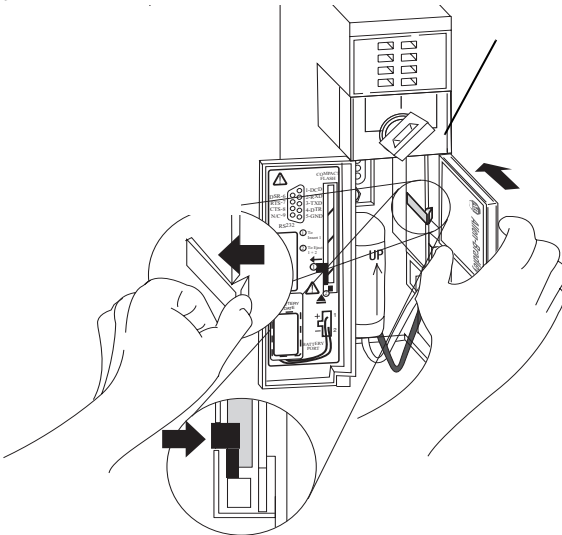
When you insert or remove the CompactFlash card an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION



If you are **not** sure of the contents of the CompactFlash card, **before** you install the card, turn the keyswitch of the controller to the PROG position. Depending on the contents of the card, a power cycle or fault could cause the card to load a different project or operating system into the controller.

1. Turn the keyswitch to the PROG position.
2. Open the door of the controller.
3. Push the CompactFlash latch to the left.
4. Insert the CompactFlash card with the A-B logo pointing left.
5. Release the latch and make sure it slides over the CompactFlash card.



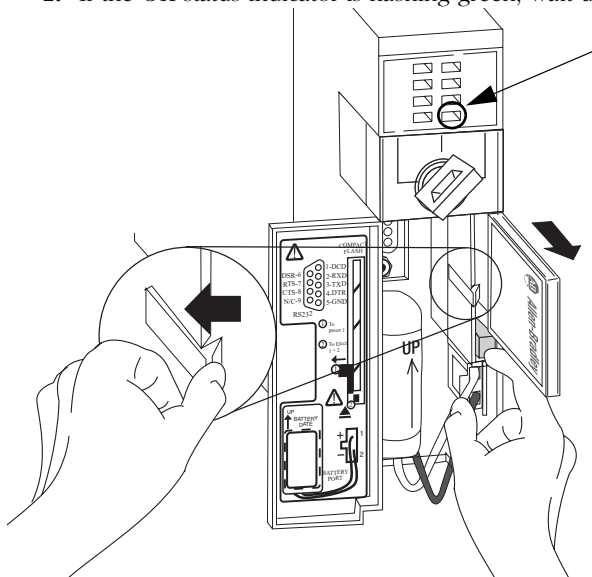
Remove a CompactFlash Card

WARNING



When you insert or remove the CompactFlash card 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.

1. If the OK status indicator is flashing green, wait until it turns solid green.



2. Open the door of the controller.
3. Push and hold the CompactFlash latch to the left.
4. Push the eject button and remove the card.
5. Release the latch.

Connect the Battery

This controller contains a lithium battery, which is intended to be replaced during the life of the product.

WARNING



When you connect or disconnect the battery, 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.

For safety information on the handling of lithium batteries, including handling and disposal of leaking batteries, see Guidelines for Handling Lithium Batteries, publication [AG 5-4](#).

ATTENTION



Store batteries in a cool, dry environment. We recommend 25 °C (77 °F) with 40%...60% relative humidity. You may store batteries for up to 30 days between -45...85 °C (-49...185 °F), such as during transportation. To avoid possible leakage, **do not** store batteries above 60 °C (140 °F) for more than 30 days.

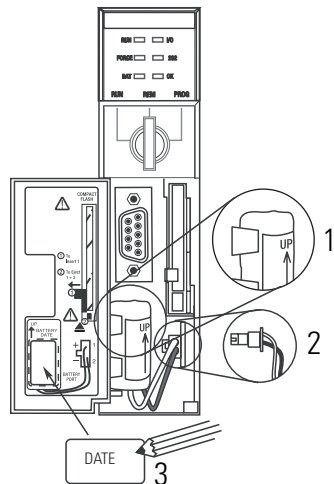
To maintain the memory of the controller while the controller is without power, connect a battery. Follow the procedure for both the 1756-L6xS controller and 1756-LSP safety partner.

IMPORTANT

Connect only a 1756-BA2 battery to the controller. If you connect a different battery, you may damage the controller.

Follow these steps to install a new 1756-BA2 battery:

1. Insert the battery as shown.
2. Connect the battery:
 - + Red
 - Black
3. Write the date you installed the battery on the battery label and attach the label to the inside of the controller door.



Install the Controller into the Chassis

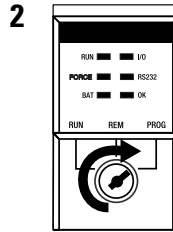
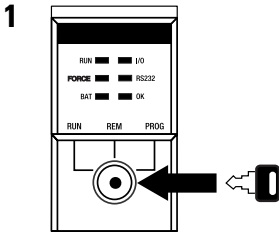
WARNING



When you insert or remove the module while backplane power is on, 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. Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contact may create electrical resistance that can affect module operation.

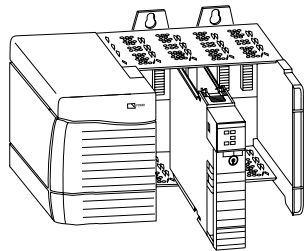
1. Insert the key into the 1756-L6xS controller.
2. Turn the key to the PROG position.



The 1756-LSP safety partner does not have a keyswitch.

3. Align the circuit board with the top and bottom guides in the chassis.
4. Slide the controller into the chassis.

The controller is fully installed when it is flush with the power supply or other installed modules and the top and bottom latches are engaged.



IMPORTANT

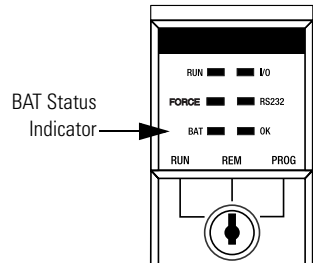
You must install the 1756-LSP safety partner in the slot immediately to the right of the 1756-L6xS controller. Follow steps 3 and 4 above to install the 1756-LSP safety partner.

Check the BAT Status Indicator

Follow these steps for both the 1756-L6xS controller and 1756-LSP safety partner.

1. Turn on the chassis power.
2. Check the status of the BAT indicator.

| If | Then |
|-----|---|
| Off | Go to Update the Controller on page 11. |
| On | Go to step 3. |

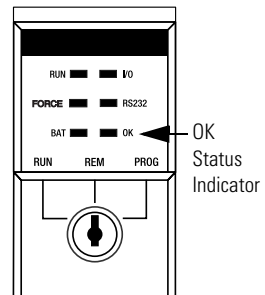


3. Check that the battery is correctly connected to the controller or safety partner.
4. If the BAT status indicator remains on, install another battery.
5. If the BAT status indicator remains on after you complete step 4, contact your Rockwell Automation representative or local distributor.

Check the OK Status Indicator

Follow these directions for both the 1756-L6xS controller and 1756-LSP safety partner.

| If the OK Indicator is | Then | Next step |
|------------------------|---|------------------------------------|
| Solid green | The controller is OK and its firmware has been updated. | No further action is required. |
| Flashing red | The controller is OK but it requires a firmware update. | Go to Update the Controller below. |



Update the Controller

Follow these steps for the 1756-L6xS controller. With ControlFlash, version 8 (RSLogix 5000, version 18) software, the 1756-LSP safety partner updates automatically, when the 1756-L6xS controller is updated.

1. Connect the controller or chassis to the same network as your workstation.
2. Start ControlFlash software.
3. Choose Next >.
4. Select the catalog number of the controller and choose Next >.
5. Expand the network until you see the controller.

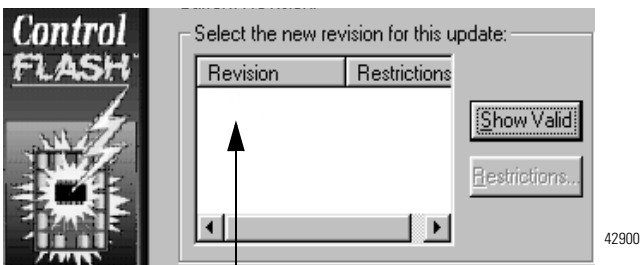
To expand a network one level, do one of the following:

- Double-click the network.
- Select the network and press →
- Click + .

IMPORTANT

If the required network is not shown, first configure a driver for the network in RSLinx software.

6. Select the controller and click OK.



7. Select the revision level to which you want to update the controller and choose Next >.

IMPORTANT

If the Revision list is empty, download a new upgrade kit. An upgrade kit ships on a supplemental CD along with RSLogix 5000 software.

Note that some older upgrade kits do not work with new controllers.

8. To start the update of the controller, click Finish and then click Yes.

After the controller is updated, the status dialog box displays 'Update complete'.

9. Click OK.

10. To close ControlFlash software, click Cancel and then Yes.

Connect a Serial Cable

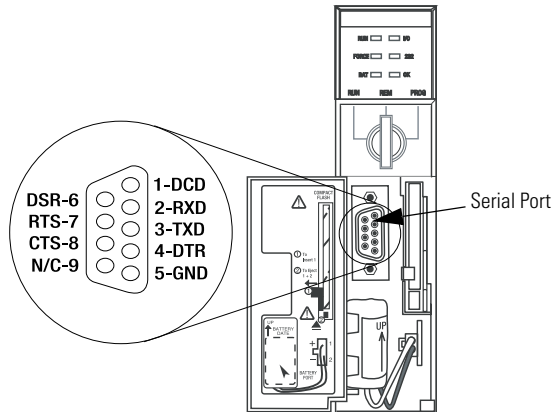
WARNING



If you connect or disconnect the serial cable with power applied to this module or the serial device on the other end of the cable, an electrical arc can occur. This could cause an explosion in hazardous location installations.

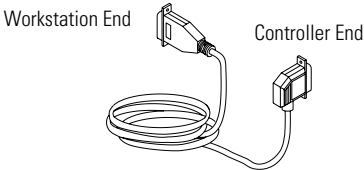
Make sure that power is removed or the area is nonhazardous before proceeding.

Use the serial port on the 1756-L6xS controller for RS-232 communication.



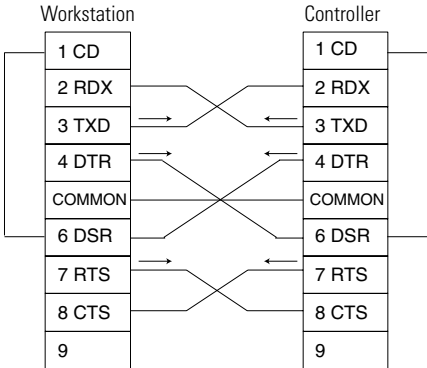
To connect a workstation to the serial port, use one of these cables:

- 1756-CP3 serial cable
- 1747-CP3 cable from the SLC product family (If you use this cable, the controller door may not close.)



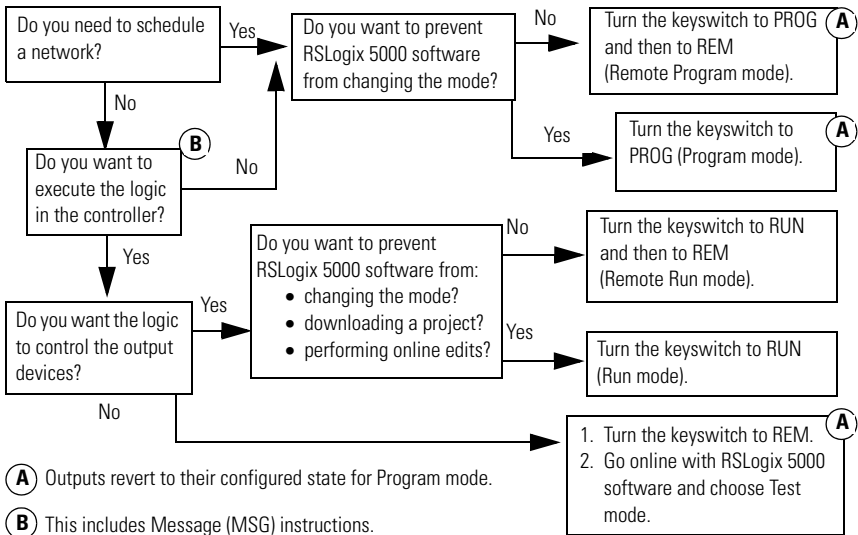
If you make your own serial cable:

- limit the length to 15.2 m (50 ft).
- wire the connectors as shown.
- attach the shield to both connectors.



Choose the Operating Mode of the Controller

- IMPORTANT**
- Controller communication occurs regardless of mode.
 - All modes produce and consume tags.



Replace the Battery

ATTENTION



To prevent possible battery leakage, even if the BAT LED is off, replace a 1756-BA2 battery according to the following schedule.

| If the temperature 2.54 cm (1 in.) below the chassis is | Replace the battery within |
|---|---|
| 0...35 °C (32 °...95 °F) | No replacement is required until the BAT LED turns on |
| 36...40 °C (96 °...104 °F) | 3 years |
| 41...45 °C (105 °...113 °F) | 2 years |
| 46...50 °C (114 °...122 °F) | 16 months |
| 51...55 °C (123 °...131 °F) | 11 months |
| 56...60 °C (132 °...140 °F) | 8 months |

WARNING



When you connect or disconnect the battery, 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.

Because the GuardLogix controller is a 1oo2 controller (two processors), we strongly recommend that both controller batteries be replaced at the same time.

Follow this procedure to replace the battery.

1. Turn on the chassis power.

IMPORTANT

If you remove the battery and lose power, the project in the controller will be lost.

2. Determine if the battery shows signs of leakage or damage.

| If | Then |
|-----|---|
| Yes | Before handling the battery, review Guidelines for Handling Lithium Batteries, publication AG-5.4 |
| No | Go to the next step. |

3. Remove the old battery.
4. Dispose of the old battery in accordance with local regulations.

ATTENTION



Do not incinerate or dispose of lithium batteries in general trash collection. They may explode or rupture violently. Follow all local regulations for disposal of these materials. You are legally responsible for hazards created during disposal of your battery.



This product contains a sealed lithium battery which may need to be replaced during the life of the product.

At the end of its life, the battery contained in this product should be collected separately from any unsorted municipal waste.

The collection and recycling of batteries helps protect the environment and contributes to the conservation of natural resources as valuable materials are recovered.

5. To install a new battery, follow the [Connect the Battery](#) procedure on page 8.

General Specifications

| Cat. No. | 1756-L61S | 1756-L62S | 1756-L63S | 1756-LSP |
|---------------------------------|---|-------------------|-------------------|-------------------|
| Memory - standard tasks | 2 MB | 4 MB | 8 MB | N/A |
| Memory - safety task | 1 MB | 1 MB | 3.75 MB | (2) |
| Backplane current at 5V DC | 1200 mA | 1200 mA | 1200 mA | 1200 mA |
| Backplane current at 24V DC | 14 mA | 14 mA | 14 mA | 14 mA |
| Power dissipation | 3.5 W | 3.5 W | 3.5 W | 3.5 W |
| Thermal dissipation | 11.9 BTU/hr | 11.9 BTU/hr | 11.9 BTU/hr | 11.9 BTU/hr |
| Weight, approx. | 0.32 kg (11.3 oz) | 0.32 kg (11.3 oz) | 0.32 kg (11.3 oz) | 0.32 kg (11.3 oz) |
| Isolation voltage | 30V (continuous), Basic Insulation Type, RS232 to system Type tested at 720V DC for 60 seconds | | | |
| North American Temperature Code | T4A | | | |
| Wiring category ⁽¹⁾ | Category 2 on communications ports | | | |
| Programming cable | 1756-CP3 or 1747-CP3 serial cable | | | |
| Replacement battery | 1756-BA2 (0.50 g lithium) | | | |

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

(2) Safety memory is the same as the corresponding primary controller (1756-L6xS).

Environmental Specifications

| Attribute | Value |
|--------------------------|--|
| 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): <ul style="list-style-type: none"> • 0...60 °C (32...140 °F) |
| Temperature, storage | IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): <ul style="list-style-type: none"> • -40...85 °C (-40...185 °F) |
| Relative humidity | IEC 60068-2-30 (Test Db, Un-packaged Damp Heat): 5...95% noncondensing |
| Vibration | IEC60068-2-6 (Test Fc, Operating): 2 g @ 10...500 Hz |
| Operating shock | IEC60068-2-27 (Test Ea, Unpackaged Shock): 30 g |
| Nonoperating shock | IEC60068-2-27 (Test Ea, Unpackaged Shock): 50 g |
| Emissions | CISPR 11: Group 1, Class A |
| ESD immunity | IEC 61000-4-2: <ul style="list-style-type: none"> • 6 kV contact discharges • 8 kV air discharges |
| Radiated RF immunity | IEC 61000-4-3: <ul style="list-style-type: none"> • 10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz • 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz • 10V/m with 200 MHz 50% Pulse 100% AM @ 1890 MHz • 1V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz |
| EFT/B immunity | IEC 61000-4-4: <ul style="list-style-type: none"> • ±4 kV @ 5 kHz on communication ports |
| Surge transient immunity | IEC 61000-4-5: ±2 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 |
| Enclosure type rating | None (open-style) |

Certifications

When marked, the components have the following certifications. See the Product Certification link at <http://ab.com> for current Declarations of Conformity, Certificates, and other certification details.

| Certification | Description |
|----------------------------------|---|
| Functional Safety ⁽¹⁾ | Certified by TÜV: capable of SIL 1 to 3, according to IEC 61508; and PLe/Cat. 4 according to ISO 13849-1 Certified by UL: capable of SIL 3, see UL File E256621. |
| c-UL-us | UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810. |
| CSA | CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C. |
| FM | FM Approved Equipment for use in Class I, Division 2 Group A, B, C, D Hazardous Locations |
| CE | European Union 2004/108/EC EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61000-6-4; Industrial Emissions • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) |
| C-Tick | Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions |

(1) When used with specified software versions and as described in the GuardLogix Controller Systems Safety Reference Manual, publication [1756-RM093](#).

Additional Resources

| Resource | Description |
|--|--|
| GuardLogix Controllers User Manual, publication 1756-UM020 | Information on configuration and programming specific to the GuardLogix system |
| GuardLogix Controller Systems Safety Reference Manual, publication 1756-RM093 | Information on the Safety concept of the GuardLogix controller system |
| GuardLogix Safety Application Instruction Set Reference Manual, publication 1756-RM095 | Information on the GuardLogix Safety Application Instruction Set |
| Logix5000 Controllers Common Procedures Programming Manual, publication 1756-PM001 | Information on programming Logix5000 controllers |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | In-depth information on grounding and wiring programmable controllers |

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

| | |
|-----------------------|--|
| United States | 1.440.646.3434 Monday – Friday, 8 a.m. – 5 p.m. EST |
| Outside United States | Please contact your local Rockwell Automation representative for any technical support issues. |

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

| | |
|-----------------------|--|
| United States | Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor in order to complete the return process. |
| Outside United States | Please contact your local Rockwell Automation representative for the return procedure. |

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