Installation Instructions

GuardPLC 2000 Analog Input Module

The 1755-IF8 analog input module has eight inputs. These inputs can be used as either eight single-ended inputs or four differential analog inputs which are electrically isolated from the logic side of the GuardPLC™. The measured input value can be either voltage or current. If you use the input module for current, you need a shunt resistor. The measured value is digitally transferred to the processor system as a value between 0 and 1000.

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Package Contents

This package contains:

- GuardPLC 2000 module 1755-IF8
- 2 module screws
- 2 terminal plugs
- installation instructions

Publication 1755-IN004D-EN-P - December 2002

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Rockwell Automation be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Rockwell Automation does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation and Maintenance of Solid-State Control* (available from your local Rockwell Automation office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard:

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.
ATTENTION 	Identifies information about practices or circumstances that can 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.

European Communities (EC) Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet the Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) by applying the following standards, in whole or in part:

- EN 50081-2 EMC — Generic Emission Standard, Part 2 — Industrial Environment
- EN 50082-2 EMC — Generic Immunity Standard, Part 2 — Industrial Environment
- EN 61131-2 — Programmable Controllers, Part 2 — Equipment Requirements and Tests
- EN 61000-6-2 EMC — Part 6–2, Generic Standards — Immunity for Industrial Environments

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is not required to meet Council Directive 73/23/EEC Low Voltage because it is rated less than 50V ac and 75V dc.

General Safety

Open style devices must be provided with environmental and safety protection by proper mounting in enclosures designed for specific application conditions. See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

Inserting the Module

These procedures assume that you have installed the GuardPLC 2000 Chassis (1755-A6), Power Supply Module (1755-PB720), and Controller (1755-L1). If you have not done so, see the installation instructions for these modules, 1755-IN001, 1755-IN002, and 1755-IN007, respectively.

IMPORTANT For planning information, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

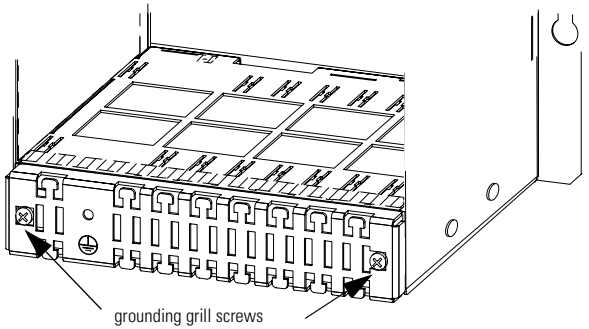
ATTENTION

Electrostatic discharge can damage integrated circuits or semiconductors if you touch backplane connector pins. Follow these guidelines when you handle the module:

- Touch a grounded object to discharge static potential.
- Wear an approved wrist-strap grounding device.
- Do not touch the backplane connector or connector pins.
- Do not touch circuit components inside the module.
- If available, use a static-safe work station.
- When not in use, keep the module in its static-shield box.

IMPORTANT Disconnect the power supply module, 1755-PB720, from the 24V dc supply voltage before you insert the module.

1. Before you insert the module, you must detach the grounding grill. To do this, remove the grounding grill screws (see figure below).



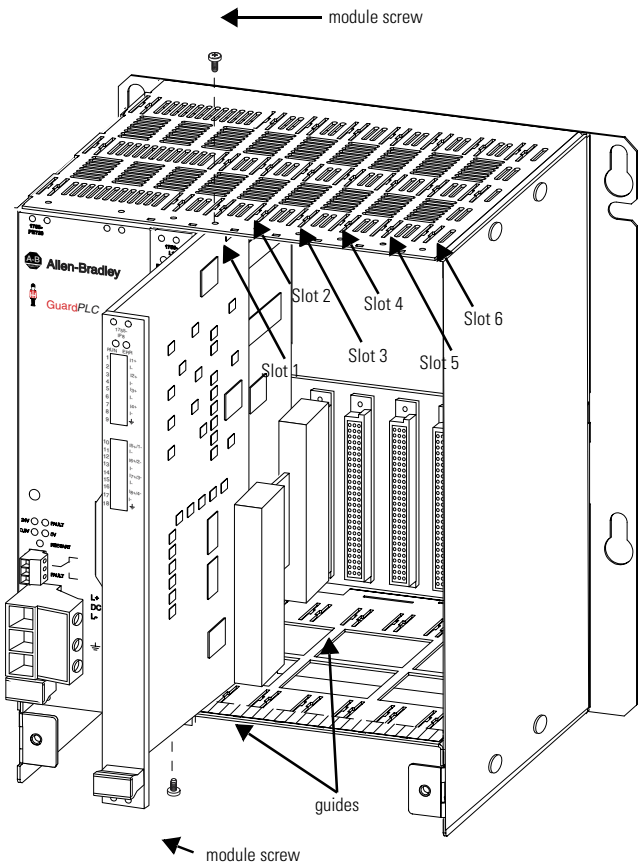
2. Remove the lower panel of the chassis and disconnect the fans.

3. Insert the module into any unused slot from 1 to 6 (see figure on page 6). Keep the module in line with the guides so the module runs smoothly in the track.

4. Begin pushing the module into the chassis. If there is resistance when you push the module into the backplane, do not force the module because the pins will bend. Remove the module and start again at step 3.

5. Continue pushing the module into the chassis until the front of the module is flush with the other modules in the chassis.

6. Secure the module with the module screws on the top and bottom of the module (see figure on page 6).



TIP If you are installing other GuardPLC 2000 modules, follow their Installation Instructions up to this point before you complete the next 3 steps.

7. Reconnect the fans.

8. Replace the lower panel of the chassis, sliding it over the tabs on the sides of the chassis and under the tabs on the back of the chassis.

9. Use the grounding grill screws to attach the grounding grill.

Connecting the Module

To connect the module, you must complete the following:

- prepare the cables
- attach the terminal plugs
- attach and ground the cables
- short circuit unused inputs
- connect the power supply

More detailed information about each of these steps follows.

IMPORTANT

Cable Requirements:

- One shielded and twisted pair cable is needed for each input.
- The cross section of the cable leads must be not more than 1.5 mm^2 (AWG 15) to be able to insert them into the terminal plugs. The cross section of the cable leads, however, must be large enough to keep the voltage drop of the external wiring as low as possible.
- The diameter of the bundle of cables must not exceed 12 mm.

Connection Information

- All the reference poles of the analog inputs are internally connected.
- The analog input module can be used with single-ended or differential inputs.
- Single-ended inputs connect between pins 1 and 2, 3 and 4, 5 and 6, etc.
- Differential inputs connect between the pins 1 and 10, 3 and 12, 5 and 14, 7 and 16.

Prepare the Cables

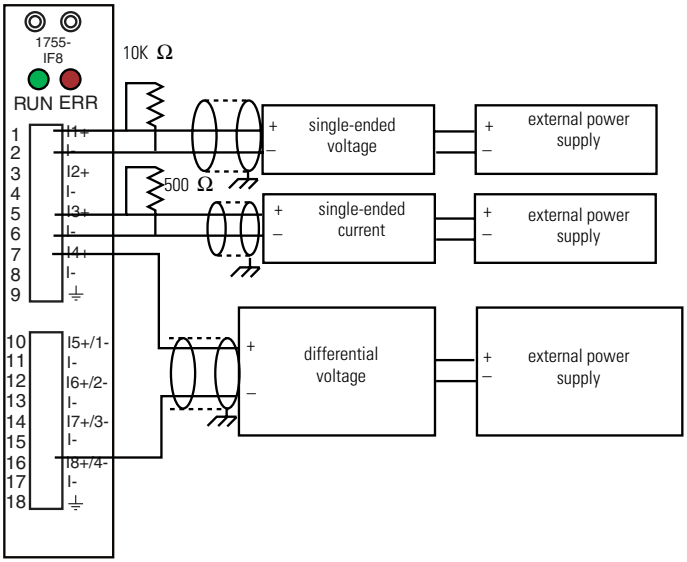
1. Remove enough of the cable insulation from the end of the bundle so that each cable can reach the terminal plug.
2. Strip about 10 mm of the insulation at the ends of the cable leads. Use end sleeves for flexible leads.

3. To ground the wires in each cable, the mesh must be in contact with the grounding grill. Remove about 2 cm of the outer cable insulation so that the mesh is exposed at the point where the cable is clipped to the grill (see Attach and Ground the Cables on page 9 for more information).

Attach the Terminal Plugs

IMPORTANT Verify polarity of wiring before connecting.

Use the following figure and steps to wire and attach the terminal plugs:

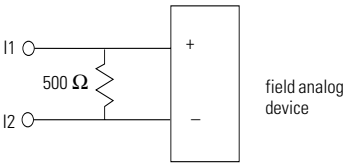


1. Insert the stripped ends of the cable leads into the terminal plugs and tighten the screws using a 2.4 mm screwdriver or smaller. Make sure that lead insulation is not fastened into the terminal plugs.

2. Push the terminal plugs into their sockets on the front plate of the module.

Current Measurement

If a current measurement is present, an external shunt of 500 Ohms is required. The shunt has to be installed in parallel. Accuracy of the shunt must be included in accuracy calculations of the input signal.

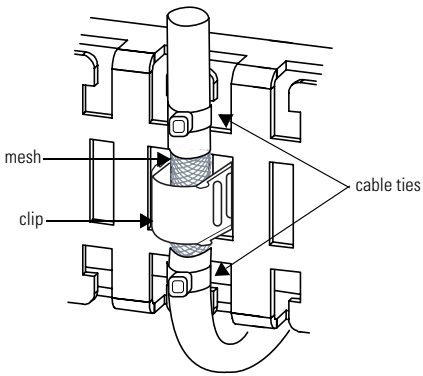


Attach and Ground the Cables

The cables are clipped to the grounding grill and are grounded by the contact made between the mesh and the grill. Use the steps below to attach and ground the cables:

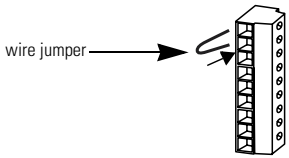
IMPORTANT Make sure that the mesh comes in direct contact with the grounding grill. If the mesh does not touch the grill, the cable is not grounded.

1. Use cable ties to attach the cable bundle to the grounding grill above and below the slots used by the clip.
2. With the mesh touching the grill, place the clip over the cables and pinch the sides until the clip is lined up with the slots (see figure below).
3. Insert the ends into the two slots; push the clip into the slots until it snaps in.



Short Circuit Unused Channels

Unused inputs have to be short circuited with wire jumpers. Place wire jumpers into any inputs that are not used, and tighten the screws (see figure below).



Connect the Power Supply

Connect the power supply unit, 1755-PB720, to the 24V dc supply voltage. The RUN indicator comes on.

Values for Logic Operation

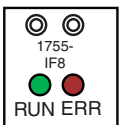
The module transfers input values (voltage or current) into a value for the user program. The relation between voltage or current input values and the value in the user program is linear.

Input voltage	Input current	Program value
-10.25V	—	-1025
-10.00V	—	-1000
0.00V	0.0 mA	0
10.00V	20.0 mA	1000
10.25V	20.5 mA	1025

Troubleshooting with the Indicators

This module has the following indicators, shown in the figure below:

- Power supply indicator (RUN)
- Module status indicator (ERR)



Power Supply Indicator (RUN)

Indication	Status
none	no power
green	correct operating voltage (24V dc)

Module Status Indicator (ERR)

Indication	Status
none	module operational
red	if the system is in "run" mode, one or more of the inputs is faulty or the module is faulty Verify the location of the fault through your RSLogix Guard software. If a faulty module is indicated, the module must be replaced immediately or the safety-related operation of the GuardPLC 2000 is not maintained. Refer to the Replacing the Module section on page 11.

While the system is in "run" mode, ERR is indicated continuously for both a module and a input channel error. Depending on the type of error, the module may switch off only one input channel (i.e., a faulty channel transmits the value 0 to the logic, but the module continues operation with the remaining channels). If the entire module is switched off, all input channels transmit the value 0 to the logic. Refer to the status variables in your RSLogix Guard program for detailed information.

Replacing the Module

ATTENTION

Electrostatic discharge can damage integrated circuits or semiconductors if you touch backplane connector pins. Follow these guidelines when you handle the module:

- Touch a grounded object to discharge static potential.
- Wear an approved wrist-strap grounding device.
- Do not touch the backplane connector or connector pins.
- Do not touch circuit components inside the module.
- If available, use a static-safe work station.
- When not in use, keep the module in its static-shield box.

IMPORTANT Disconnect the power supply module, 1755-PB720, from the 24V dc supply voltage before you the module.

If you need to replace the module, follow these steps:

1. Remove the terminal plugs from the sockets.
2. Detach the grounding grill, by removing the grounding grill screws.
3. Remove the lower panel of the chassis and disconnect the fans.
4. Remove the module screws.
5. Remove the module by pulling the handle on the bottom of the module.
6. Insert a new module as described in the Inserting the Module section on page 4.
7. Reinsert the terminal plugs into the sockets.
8. Send the faulty module to your nearest Rockwell Service Center for inspection and repair.

Specifications

1755-IF8 Specifications	
Number of inputs	8 single-ended or 4 differential
Input values rated values user values	 0 to ±10V dc or 0 to +20 mA (with shunt) 0 to ±10.25V dc or 0 to +20.5 mA (with shunt)
External shunt (for current input)	500 Ω
Overvoltage protection	30V (±15V dc)
Resolution	12 bit
Input impedance	1 MΩ(DC)
Input signal / source impedance	≤500 Ω
Accuracy	0.1% at 25°C (77°F) 0.5% at 60°C (140°F)
Operating voltage	24V dc -15 to +20% ripple ≤15%
Maximum common mode voltage to I-	±13V dc
Current consumption	150 mA / 3.3V dc 400 mA / 24V dc
Operating temperature	0°C to +60°C (+32°F to +140°F)
Storage temperature	-40°C to +85°C (-40° to +185°F)
Weight	240g (0.53 lb)
Agency Certifications (when product is marked)	UL Listed Industrial Control Equipment UL Listed Industrial Control Equipment for use in Canada Marked for all applicable directives Functional Safety 1oo2D (AK 1–6, SIL 1–3, according to DIN V 19250 and IEC 61508 respectively) Marked for all applicable acts N223

Notes:

Notes:

Rockwell Automation Support

Rockwell Automation tests all of our products to ensure that they are fully operational when shipped from the manufacturing facility.

If you are experiencing installation or startup problems, please review the troubleshooting information contained in this publication first. If you need technical assistance to get your module up and running, please contact Customer Support (see the table below); our trained technical specialists are available to help.

If the product is not functioning and needs to be returned, contact your distributor. You must provide a Customer Support case number to your distributor in order to complete the return process.

Phone	United States/Canada	1.440.646.5800
	Outside United States/Canada	You can access the phone number for your country via the Internet: 1. Go to http://support.rockwellautomation.com/ 2. Under *Contacting Customer Support* and Other Countries, click on *Click here*
Internet	Worldwide	Go to http://support.rockwellautomation.com/

www.rockwellautomation.com

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Publication 1755-IN004D-EN-P - December 2002 PN 957726-65

Supersedes Publication 1755-IN004C-EN-P - March 2002