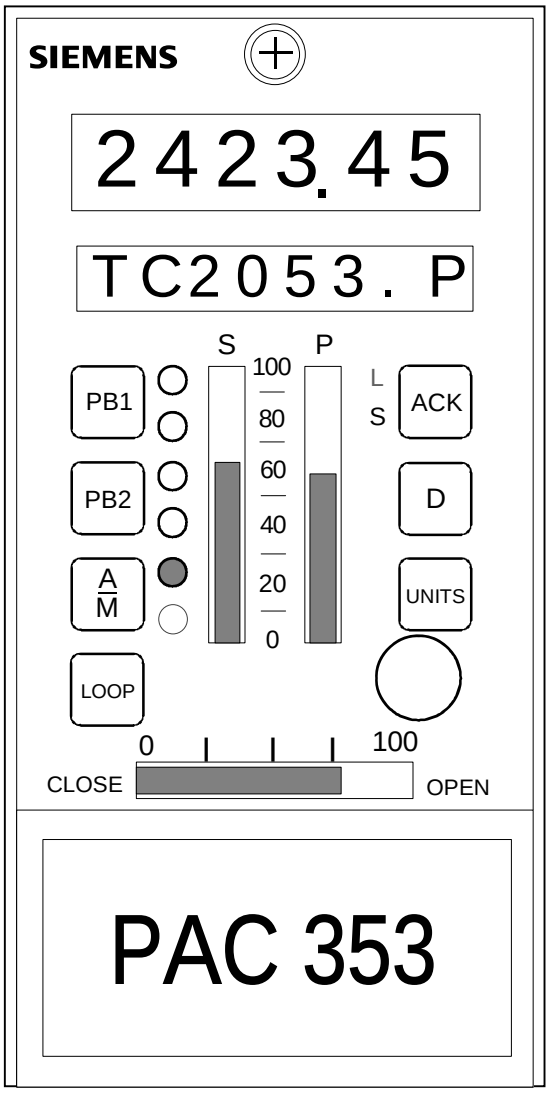
Siemens Energy & Automation	**INSTALLATION GUIDE**

IG353-1
Rev. 1
June 2005



X03141S2

PROCESS AUTOMATION CONTROLLER

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PREFACE

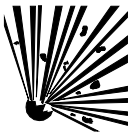
Scope

This guide provides basic mechanical and electrical installation information for use by experienced installers. It is to be used in conjunction with the Model 353 User's Manual, UM353-1, supplied on the Siemens Process Instrumentation User Manual CD included with the controller. The current version of the User's Manual, in Portable Document Format (PDF), can also be downloaded at www.sea.siemens.com/ia/.

WARNING

Electrical shock hazard
Explosion hazard

Can cause death or injury



- Remove power from all wires and terminals before working on equipment.
- In potentially hazardous atmosphere, remove power from equipment before connecting or disconnecting power, signal, or other circuit.
- Observe all pertinent regulations regarding installation in hazardous area.

This guide and the accompanying User's Manual (on CD) can not cover all details or variations in equipment or provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the support group listed in the Product Support section of this manual.

Qualified Persons

The described equipment should be installed, configured, operated, and serviced only by qualified persons thoroughly familiar with this guide and the User's Manual.

For the purpose of these documents and the product labels, a qualified person is one who is familiar with the installation, assembly, commissioning, and operation of the product, and who has the appropriate qualifications for their activities such as:

- Training, instruction, or authorization to operate and maintain devices/systems according to the safety standards for electrical circuits, high pressures, and corrosive, as well as, critical media.
- For devices with explosion protection: training, instruction or authorization to work on electrical circuits for systems that could cause explosions.
- Training or instruction according to the safety standards in the care and use of suitable safety equipment.

■

1.0 INTRODUCTION

This Installation Guide is for the Siemens 353 Process Automation Controller. It provides an outline of the mechanical and electrical installation information for use by experienced installers. Detailed information needed to bench test, install, configure, calibrate, and service the 353 is included in User's Manual UM353-1. Detailed product specifications are included in the User's Manual.

To access UM353-1 on the supplied Siemens Process Instrumentation User Manual CD, perform the brief procedure below. The manuals are in Portable Document Format (PDF). A link for downloading the free Adobe® Reader® is provided.

1. Insert the CD into your computer's CD drive.
2. If autorun is enabled, a menu of available manuals will appear. Click on the link to the desired manual.
3. If autorun is not enabled, go to Start > Run and navigate to the CD. Double click on Autorun.exe and then click Run to display the menu of available manuals.

1.1 PRODUCT DESCRIPTION

The Model 353 offers the control system designer the ultimate in flexibility and capability for the implementation of continuous solutions and batch solutions. An exploded view of the controller appears in Figure 1-1.

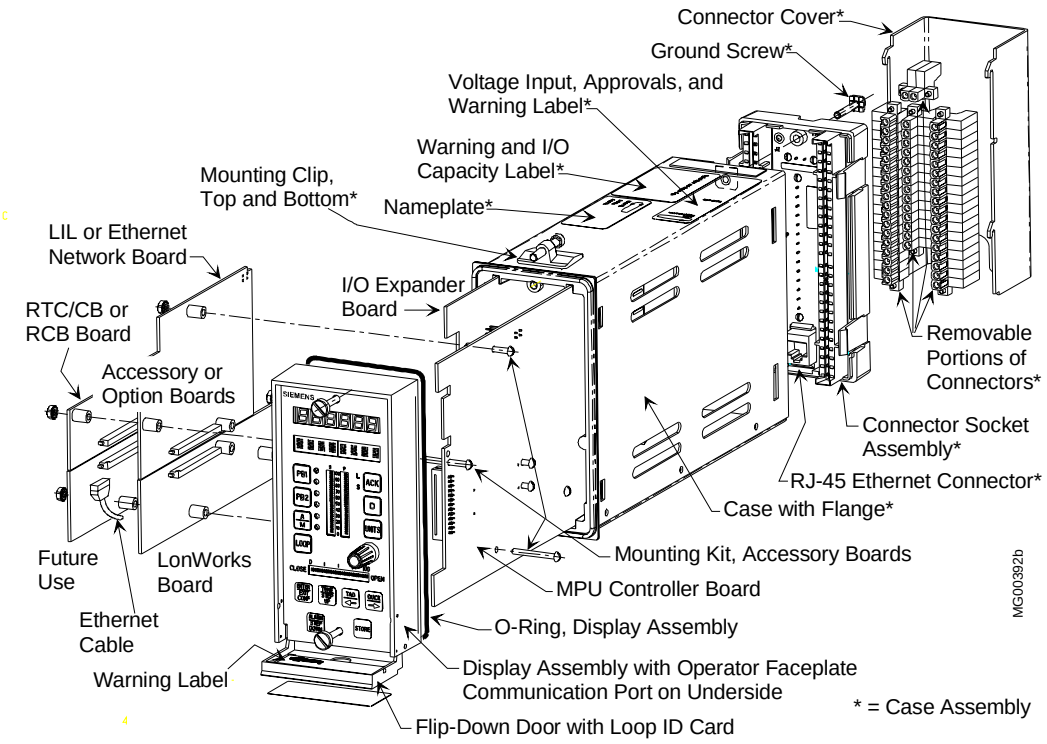


FIGURE 1-1 Model 353, Exploded View

1.2 CONFIGURATION

The controller must be configured before it can be used to control a process. It can be configured either locally or remotely. The local faceplate includes buttons located behind a flip-down door for complete configuration including the addition/deletion of loops and function blocks and the editing of function block parameters. Refer to the User's Manual for detailed configuration procedures.

1.3 PRODUCT LABELS

This section provides sample labels to assist in identifying the controller model at hand.

IMPORTANT

Before installing or servicing a controller, refer to the controller labels and the applicable specifications and hazardous area classifications in the User's Manual to ensure that the correct model with the needed certifications is at hand.

Each controller is identified by several labels located on the case and inside the drop-down door on the Display Assembly, as shown in Figure 1-1. Typical labels are shown below.

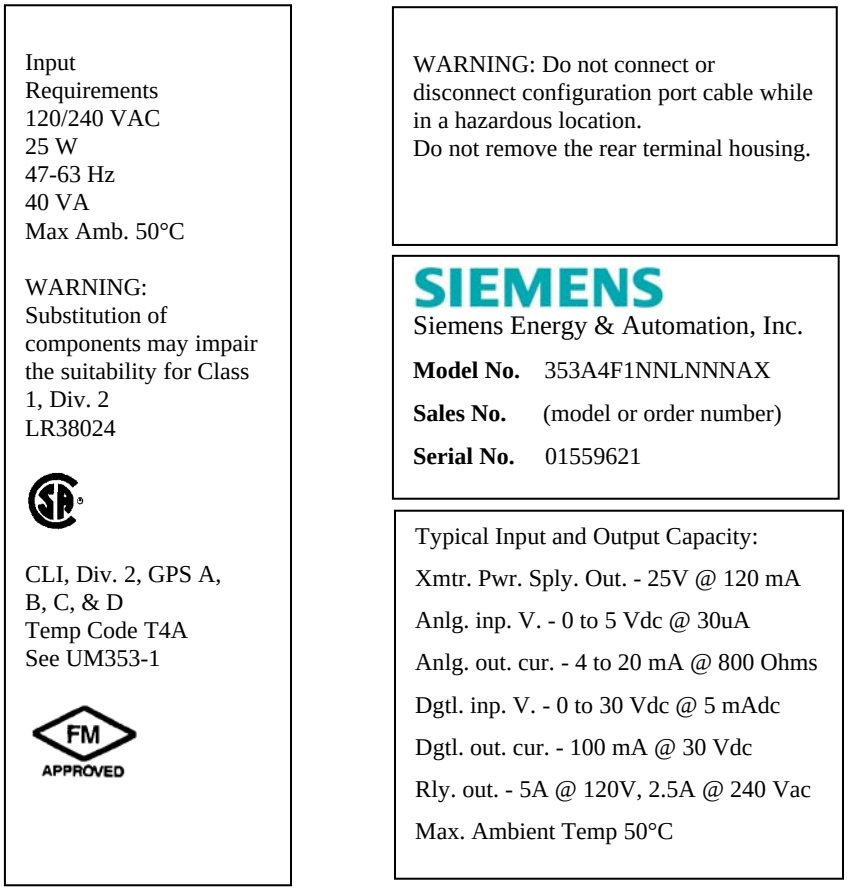


FIGURE 1-2 Product Labels

1.4 TYPICAL SHIPMENT CONTENTS

The items listed below are those typically included in a shipment and are subject to change.

1. Model 353 Process Automation Controller, model number per order, qty. 1
2. Power Input and Range Resistor Kit, PN 16354-30, qty. 1

DESCRIPTION	QUANTITY
Resistor, 250Ω, 0.1%, 3W, WW	3
Sleeving	3
Crimp-On Connector	6
Kit Installation Instruction	1

3. Mounting Clip Kit, no part number, qty. 1

   Contents: 2 Mounting Clips and 2, 8-32 x 1 Screws (see the Parts List at back of the User's Manual for part numbers)

4. I/O Expander Board Kits

   PN16353-52 I/O Expander Board Kit - The I/O Expander Board is factory installed when a Model 353 with Expansion Board option 1 is ordered.

   - When adding an I/O Expander board to a Standard Case with Ethernet connector (case Option 4), no additional connectors need be ordered.
   - For field installation of this kit, see the supplied Kit Installation Instruction (15900-390).

DESCRIPTION	QUANTITY
I/O Expander Board - Do not remove Board from static shielding bag until it is to be installed.	1
Range Resistor and Reference Junction Kit, see below	1

   PN16353-49 Range Resistor and Reference Junction Kit - This kit is supplied with the above I/O Expander Board Kit and with a factory shipped Model 353 with Expansion Board option 1.

DESCRIPTION	QUANTITY
4-20 mA to 1-5V Range Resistor, 250Ω, 0.1%, 3W, WW	1
4-20 mA to 15-75 mV Range Resistor, 3.75Ω, 0.1%, 3W, WW	2
Sleeving	5
Crimp-On Connector	6
TC Reference Junction, 100Ω	2
Kit Installation Instruction	1

5. Siemens Process Instrumentation User Manuals CD; contains UM353-1, Model 353 User's Manual, qty. 1.
6. Printed copy of Model 353 Installation Guide IG353-1 (this guide), qty. 1.
7. Additional items as required by your order. Refer to the packing list accompanying a shipment.

1.5 PRODUCT SUPPORT

This section provides the Internet site addresses, e-mail addresses, telephone numbers, and related information for customers to access Siemens product support.

IMPORTANT

An instrument must be thoroughly cleaned (decontaminated) to remove any process materials, hazardous materials, or blood born pathogens prior to return for repair. Read and complete the Siemens RMA form(s).

TABLE 1-1 Contact Information

NORTH AMERICA	Telephone	+1 800 569 2132, option 2 for Siemens-Moore brand instruments
	Fax	+1 215 646 3547
	E-mail	PITechSupp@sea.siemens.com
	Hours of Operation	8 a.m. to 5 p.m. eastern time Monday – Friday (except holidays)
	Public Internet Site	www.sea.siemens.com/ia/
	Repair Service	+1 215 646 7400 extension 3187

For contact information outside North America, visit the Siemens public Internet site www.sea.siemens.com/ia/ , locate “Customer Support Process Instrumentation,” and click on the Contact Tech Support link to access the Global Support link.

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2.0 INSTALLATION

This section outlines installation of a Siemens Model 353 Process Automation Controller. Refer to the Model 353 User's Manual, UM353-1, for detailed procedures, critical safety warnings and cautions, product specifications, and agency approvals.

IMPORTANT

The installation must conform to the National Electrical Code and all other applicable construction and electrical codes.

Section 1.4 in this guide has a list of the items in a typical controller shipment. If the Display Assembly or a circuit board(s) must be installed in the case, go to the User's Manual, Section 11.5 Assembly Replacement for installation information, including the setting of any involved jumpers.

For agency approvals and installations in a hazardous area, refer to the User's Manual, Section 14.10 Agency Approvals as necessary. CSA Hazardous Location Precautions and Special Conditions for Safe Use are included in the manual. Use of the equipment in a manner not specified by the manufacturer may impair the protection provided by the equipment.

2.1 INSTALLATION CONSIDERATIONS

A Model 353 is intended for flush panel mounting in a vibration free instrument panel or rack in an indoor or sheltered location. Mount a single controller in a single-station panel cutout or mount several controllers in a row in a multiple-station panel cutout. For a watertight panel, mount each controller in a single-station cutout.

The controller can be mounted in a user-supplied enclosure located out-of-doors or in a location whose environmental parameters exceed controller operating specifications. A thin bead of silicon sealant is often applied between the controller's Display Assembly and the mounting panel to prevent air or liquid leakage at this joint.

Do not mount the controller where direct sunlight can strike the faceplate or case. Direct sunlight can make the displays difficult to read and will interfere with heat dissipation.

Mount the controller either horizontally or with a backward tilt (i.e. the front of the case higher than the rear). If the controller is to be mounted with electronic recorders or with pneumatic recorders or stations, tilt back restrictions for these units can have a bearing on panel design and layout.

Route electrical power to the controller through a clearly labeled circuit breaker, fuse, or on-off switch that is located near the controller and is accessible by the operator. The breaker or switch should be located in a non-explosive atmosphere unless suitable for use in an explosive atmosphere.

Thermocouple inputs are accommodated with an I/O Expander board and a Reference Junction temperature sensor. At the factory, two Reference Junctions are included in a Range Resistor and Reference Installation Kit.

2.2 ENVIRONMENTAL CONSIDERATIONS

Operate a controller within its environmental specifications to help ensure reliable, trouble-free operation with minimum down time. Refer to the User's Manual, Section 14 Model Designation and Specifications for controller operating temperatures limits, operating humidity, and maximum moisture content.

CAUTION

Exceeding the specified operating temperature limits can adversely affect performance and may cause damage to the controller.

2.3 MECHANICAL INSTALLATION

The following subsections provide guidelines and procedures for mounting controllers in a panel or rack. The installation should be structurally rigid and the controllers should be squared in the panel or rack.

2.3.1 Removable Cover and Connectors

To gain access to the case mounted connectors, a connector cover may need to be removed. Reinstall the cover when wiring is completed. Each connector has a removable portion that can be separated from the case mounted portion, wired, and then reattached.

Removal

1. As shipped from the factory, the cover is supplied but not installed on the case. To remove the cover, see the Figure 2-1.
2. Locate the connector to be removed. As necessary, disconnect, unclamp, or unbundle wires connected to the connector to be removed. Be sure there is sufficient slack in the wiring for connector removal.
3. Loosen the two captive screws securing the removable portion of the connector to the fixed portion.
4. Grasp the removable portion and pull it from the fixed portion. Be careful not to stress or damage connected wires and components.

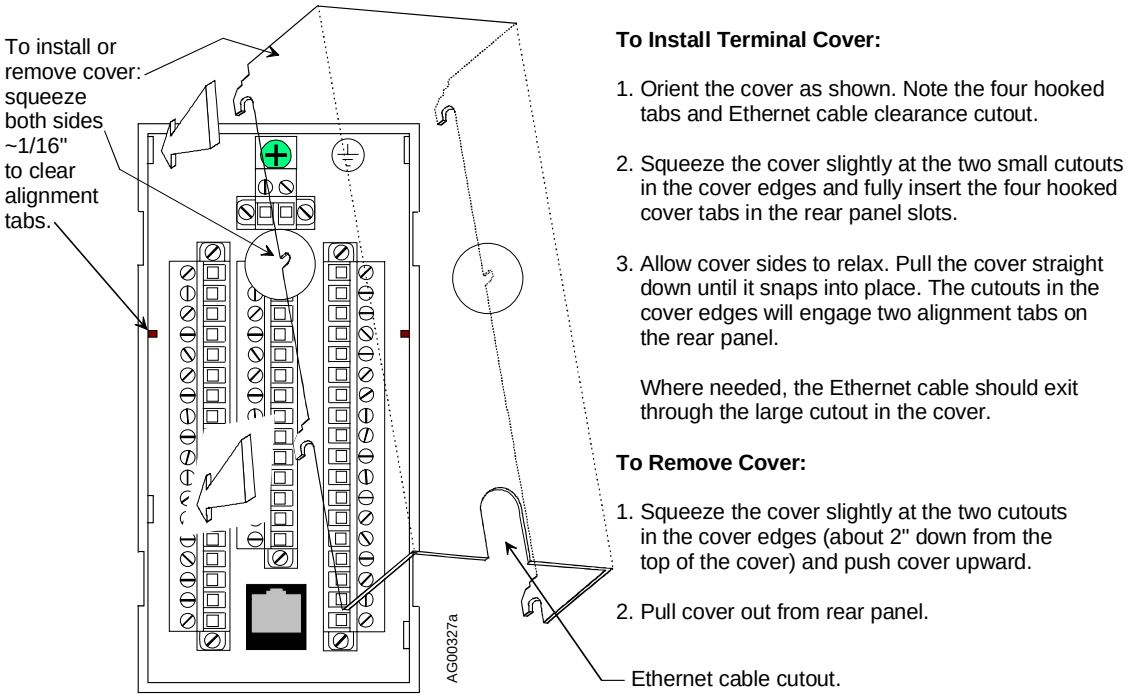


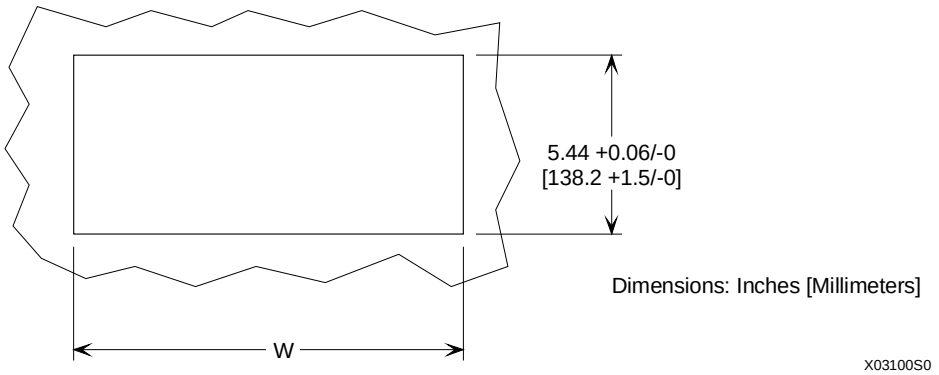
FIGURE 2-1 Cover Installation and Removal

Installation

1. Align the removable portion of the connector with the fixed portion.
2. Press the removable portion onto the fixed portion.
3. Tighten the two captive screws. Do not over tighten. Check that wires and components remain connected securely.
4. Install the cover as described in the above figure.

2.3.2 Panel and Rack Mounting Guidelines

The panel face should provide a flat and rigid mounting surface. Reinforce the back of the panel if there is a possibility that the panel face will bow. Raceways, conduit, and wiring should not interfere with the removal or accessibility of the instruments, control devices, alarms, and related equipment. See Figures 2-2, 2-3, and 2-4.



Panel Cutout Dimensions: Tolerances +0.06/-0 [+1.5/-0] Height= 5.44 [138.2] Width= (2.84 X A) + (5.67 X B) - 0.16 inches [(72.0 X A) + (144 X B) - 4.1] mm Where: A= Number of 353 and 372 Stations B= Number of 363 Recorders	Alternate (DIN Standard) Cutout For Individually Mounted 363 Recorders Only 5.44 [138.2] High X 5.44 [138.2] Wide Note: Alternate cutout does not allow for possible future substitution of 2 Model 353 or 372 stations due to width limitations.

FIGURE 2-2 Panel Cutout Dimensions

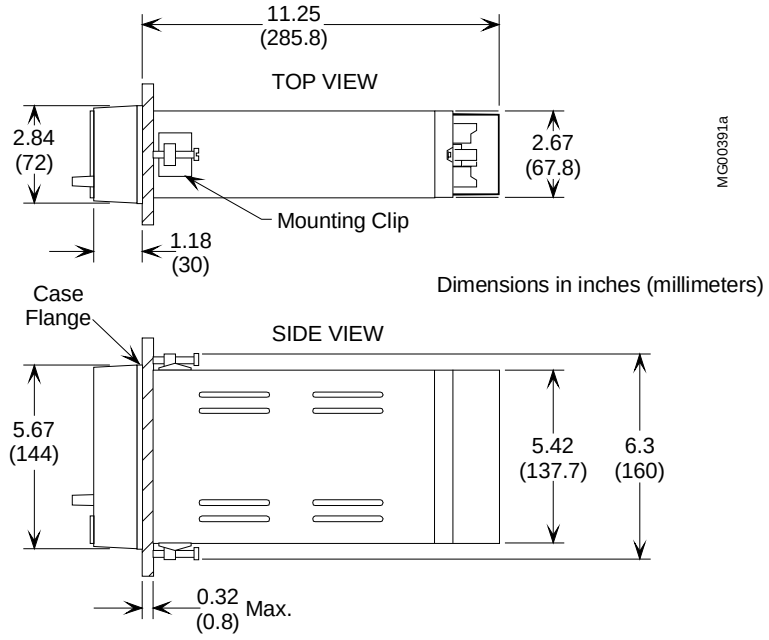


FIGURE 2-3 Model 353 Dimensions

2.3.3 Station Mounting

A straight slot screwdriver with at least a 10" (254 mm) shank is needed to tighten the two mounting clip screws.

1. Locate the supplied Mounting Clip Kit. It contains two mounting clips and two 8-32 x 1" fillister head screws. Thread the mounting screws into the mounting clips. See Figure 2-4.
2. From in front of the panel, insert the controller case into the panel cutout.
3. Slightly rotate the top mounting clip to fit it into the case cutout. Then straighten the clip and partially tighten the mounting screw. Insert, straighten and partially tighten the bottom clip.
4. Square the controller with the panel.
5. Alternately tighten top and bottom mounting clip screws until the controller is secured to the panel. Do not over tighten and distort the case.

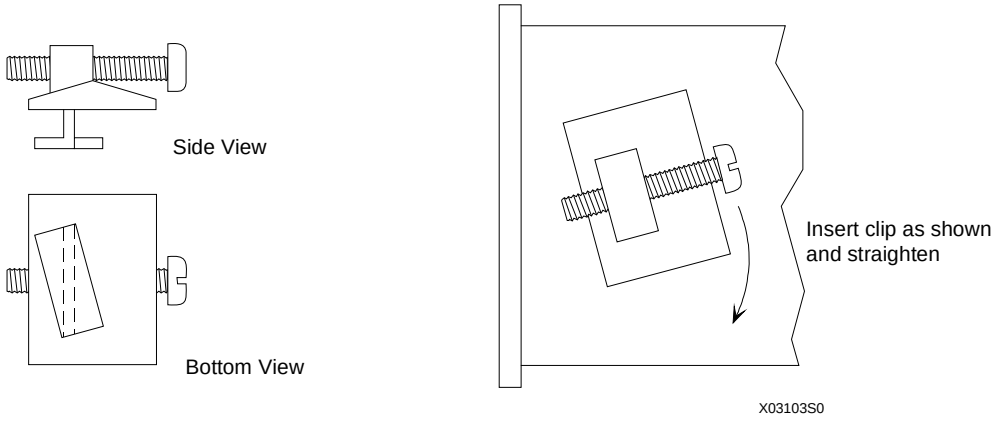


FIGURE 2-4 Case Mounting Clip

2.4 ELECTRICAL INSTALLATION

These sections contain electrical connection guidelines for wiring a Model 353. Each case rear connector and terminal is identified.

WARNING

Electrical shock hazard
Explosion hazard

Can cause death or injury

- Remove power from all wires and terminals before working on equipment.
- In a potentially hazardous atmosphere, remove power from equipment before connecting or disconnecting power, signal, or other circuit.
- Observe all pertinent regulations regarding installation in hazardous area.

2.4.1 Wiring Guidelines

Electrical Connections - Power, I/O, and LIL or Modbus network connections to a basic controller are completed through removable connectors with terminals H, N, and 3-26. When the controller includes an I/O Expander board, connectors with terminals 27-52 are also used. A case has an Ethernet connector for use when an Ethernet board is included and the MPU Controller board firmware is V2.4 or later. Connector locations are shown in Figure 2-5. Individual terminals functions are also identified in Table 2-1.

Connectors - Power terminals are identified by a letter: Hot and Neutral. The ground connection is made to a green case/safety ground screw located above the connectors. Signal I/O terminals are identified by a number: 3 through 52. A connector terminal will accept the following wire(s).

- one 14-22 AWG (2.1-0.38 mm^2)
- two 16 AWG (1.3 mm^2)
- three 18 AWG (0.96 mm^2)

Wire Size Recommendations:

- signal wiring - 18 AWG (0.96 mm^2)
- power wiring - 18 AWG (0.96 mm^2)

Wire Stripping Recommendations:

- connector terminal wiring - 1/4" (6 mm) to 5/16" (8 mm)
- green ground screw wiring - 1/8" (10 mm) to 1/2" (13 mm)

Be careful not to nick the conductor or cut away strands.

Wire Selection - Stranded wire is recommended for most connections, however, solid wire is typically used for thermocouple extension wire. Carefully select wire size, conductor material, and insulation. Some selection considerations are:

- current and voltage to be carried
- total length of each wire run
- whether wire will be bundled or run singly
- indoor or outdoor installation
- temperature extremes (Use supply wires suitable for 5°C (10°F) above ambient temperature.)
- exposure to sunlight
- vibration
- types of contaminates

Station Common, Terminal 6 - Within the Model 353, station common is connected to:

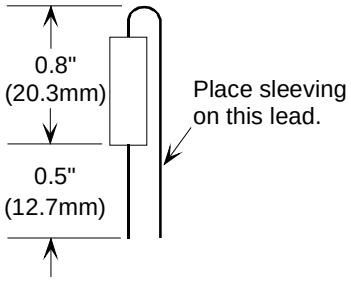
- the two-wire power supply common (COM, terminal 6)
- digital output common (DOUTC, terminal 9)
- all analog input and analog output commons (e.g., AIN1C, terminal 21)

Station common is isolated from case/safety ground. It should be connected to the user's instrument bus common at only one point. Digital input commons are isolated from the station common and case/safety ground.

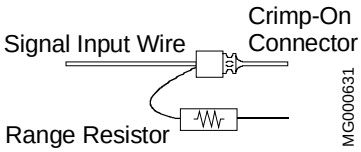
Connector Terminal and Ground Screw Torque Specifications:

- connector terminals - 5 in. lbs (0.56 N m)
- green case/safety ground screw - 20 in. lbs (2.26 N m)

Range Resistors - Supplied range resistors are either 250Ω or 3.75Ω. Get a range resistor from the installation kit and insulate the bent resistor lead with a piece of sleeving. At the lead end, approximately 1/4" (6 mm) to 5/16" (8 mm) of bare resistor lead should be exposed.

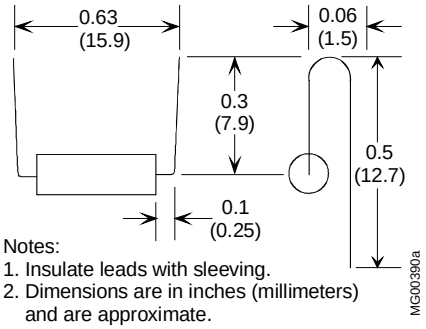


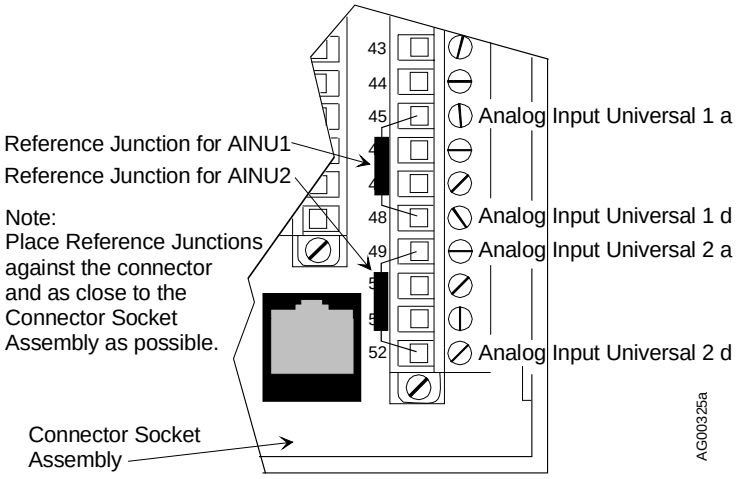
Crimp-On (solderless) Connectors - A pin-style crimp-on connector can be used when two or more wires or a combination of wires and component leads are to be inserted into a connector terminal at the rear of the case. Wires and leads are crimped in the connector and the connector pin inserted in the selected connector terminal. The connector can provide a more secure connection when multiple leads are involved. An example of its use is shown at right. Several crimp-on connectors are provided in various Model 353 installation kits and they are available from most electrical supply sources.

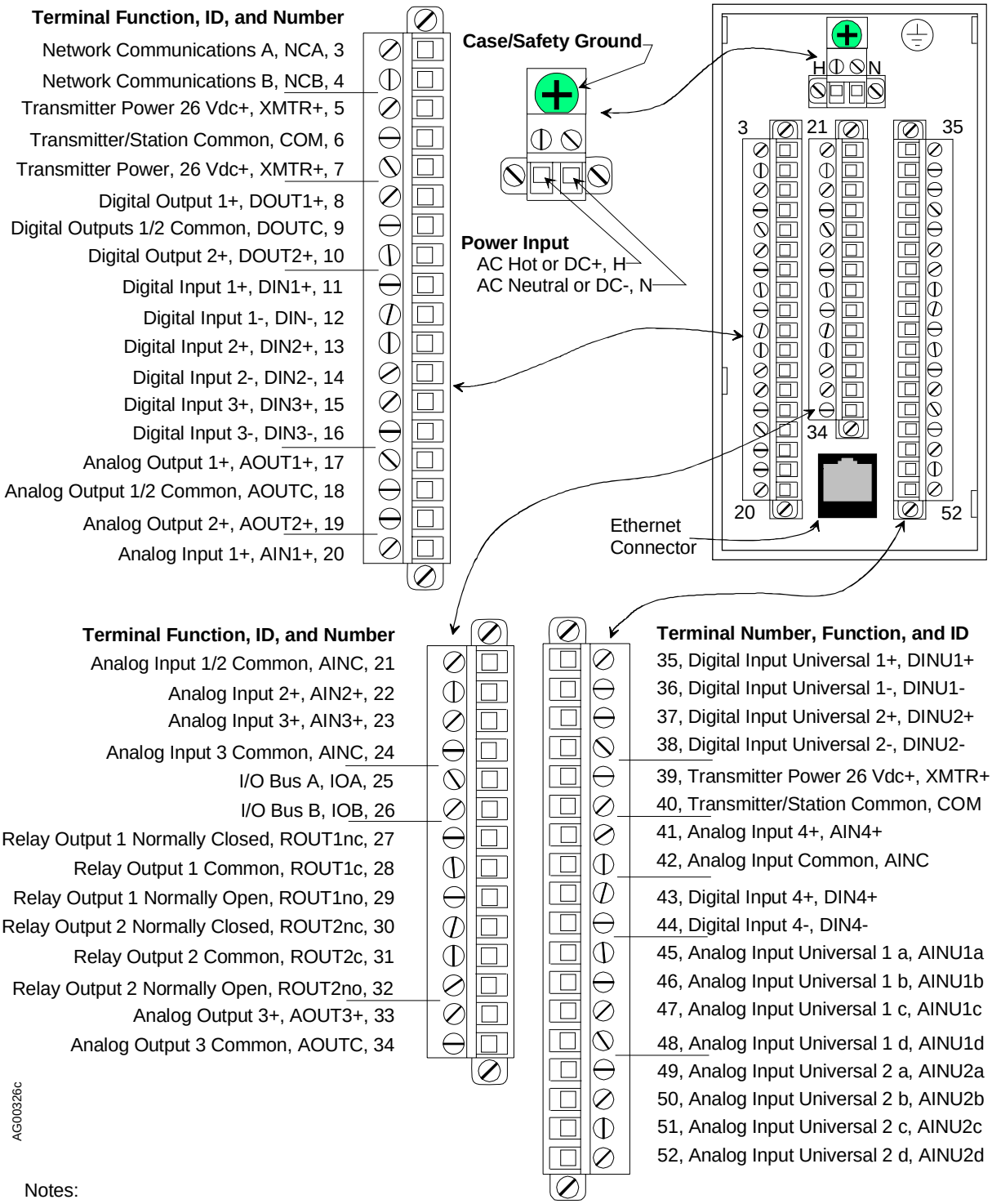


Wire Routing and Conduit - DC wiring should be separated from AC wiring and away from AC powered pushbuttons, alarms, annunciators, motors, solenoids, and similar devices. Conduit and raceways are commonly used for routing panel wiring. Wiring not installed in conduit or raceway should be clamped or supported approximately every 12 inches (300 mm).

Thermocouple Reference Junction - Slip a length of insulating sleeving over the portion of each reference junction lead that will remain exposed after installation. Carefully form the leads and install the cold junction as shown below.







Notes:

1. Terminal numbers are shown on each connector. The plug-in portions of the connectors are packed with a case. The connectors are keyed.
2. Case/Safety Ground - Connect to green screw at top center of rear terminal area.
3. NCA and NCB - Connect LIL Twinaxial Cable or twisted pair wiring. Refer to UM353-1, Section 8.4.9 for additional details.
4. IOA and IOB - LonWorks bus connections. Twisted pair wiring is typical.
5. Ground Bus - An external, user-supplied ground bus can ease connection of multiple grounds, particularly when twinaxial cable shields are to be grounded.

FIGURE 2-5 Rear Terminal Layout and Terminal Assignments

TABLE 2-1 Rear Terminal Assignments

CONTROLLER BOARD			I/O EXPANDER BOARD		
Description	**ID**	**#**	**#**	**ID**	**Description**
Power - AC Hot/ DC +	**ACH/DC+**	**H**	**27**	**ROUT1nc**	Relay Output 1 Normally Closed
Power - AC Neutral/DC -	**ACN/DC-**	**N**	**28**	**ROUT1c**	Relay Output 1 Common
Network Communication A	**NCA**	**3**	**29**	**ROUT1no**	Relay Output 1 Normally Open
Network Communication B	**NCB**	**4**	**30**	**ROUT2nc**	Relay Output 2 Normally Closed
Transmitter Power 26Vdc +	**XMTR+**	**5**	**31**	**ROUT2c**	Relay Output 2 Common
Transmitter/Station Common	**COM**	**6**	**32**	**ROUT2no**	Relay Output 2 Normally Open
Transmitter Power 26Vdc +	**XMTR+**	**7**	**33**	**AOUT3+**	Analog Output 3 +
Digital Output 1 +	**DOUT1+**	**8**	**34**	**AOUTC**	Analog Output 3 Common
Digital Outputs 1/2 Common	**DOUTC**	**9**	**35**	**DINU1+**	Digital Input Universal 1 +
Digital Output 2 +	**DOUT2+**	**10**	**36**	**DINU1-**	Digital Input Universal 1 -
Digital Input 1 +	**DIN1+**	**11**	**37**	**DINU2+**	Digital Input Universal 2 +
Digital Input 1 -	**DIN1-**	**12**	**38**	**DINU2-**	Digital Input Universal 2 -
Digital Input 2 +	**DIN2+**	**13**	**39**	**XMTR+**	Transmitter Power 26Vdc +
Digital Input 2 -	**DIN2-**	**14**	**40**	**COM**	Transmitter/Station Common
Digital Input 3 +	**DIN3+**	**15**	**41**	**AIN4+**	Analog Input 4 +
Digital Input 3 -	**DIN3-**	**16**	**42**	**AINC**	Analog Input Common
Analog Output 1 +	**AOUT1+**	**17**	**43**	**DIN4+**	Digital Input 4 +
Analog Output 1/2 Common	**AOUTC**	**18**	**44**	**DIN4-**	Digital Input 4 -
Analog Output 2 +	**AOUT2+**	**19**	**45**	**AINU1a**	Analog Input Universal 1 a
Analog Input 1 +	**AIN1+**	**20**	**46**	**AINU1b**	Analog Input Universal 1 b
Analog Input 1/2 Common	**AINC**	**21**	**47**	**AINU1c**	Analog Input Universal 1 c
Analog Input 2 +	**AIN2+**	**22**	**48**	**AINU1d**	Analog Input Universal 1 d
Analog Input 3 +	**AIN3+**	**23**	**49**	**AINU2a**	Analog Input Universal 2 a
Analog Input 3 Common	**AINC**	**24**	**50**	**AINU2b**	Analog Input Universal 2 b
I/O Bus A	**IOA**	**25**	**51**	**AINU2c**	Analog Input Universal 2 c
I/O Bus B	**IOB**	**26**	**52**	**AINU2d**	Analog Input Universal 2 d

Notes:

1. # - Terminal letters and numbers are printed on individual connectors. Model 353_1_N… has 2 connectors; Model 353_2_1… has 4 connectors and an I/O Expander board. (Underscore is a placeholder/wildcard; ellipsis indicates that subsequent characters do not affect selection.)
2. Safety/Case Ground - Wire to green screw at top center of rear terminal area.
3. NCA and NCB - Connect LIL Twinaxial Cable or twisted pair wiring. Refer to UM353-1, Section 8.5 for additional information.
4. IOA and IOB - LonWorks bus connections. Twisted pair wiring is typical.
5. Ground Bus - An external, user-supplied ground bus can ease connection of multiple grounds, particularly when twinaxial cable shields are to be grounded.

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