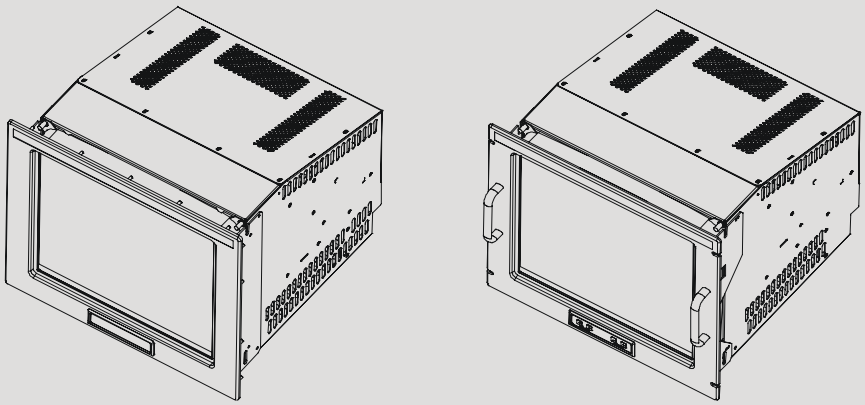
Industrial 19" CRT Monitor

Allen-Bradley

(Bulletin 6157-C)

Installation and User Manual



Rockwell Automation

Table of Contents

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) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and 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 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 cannot assume responsibility or liability for actual use based on the examples and diagrams.

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

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation is prohibited.

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

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 especially important for successful application and understanding of the product.

Industrial 19" CRT Monitor

Description

The 6157-C Industrial 19" CRT Monitor is a general-purpose monitor suitable for a wide range of industrial computing applications. It offers the following features:

- Panel and rack mount enclosures
- Pure flat screen
- Reliable and rugged industrial design
- Bright, crisp display
- Touchscreens
- Sync-on-green, separate sync, and composite sync video support
- On-screen display for easy setup
- Versatile multi-sync design (640x480 to 1600x1200 resolution)

Note: This monitor can display resolutions up to 1600x1200 at 75 Hz. If you experience unexpected results operating the monitor at this resolution, verify that the monitor is operating at 75 Hz or less.

ATTENTION: The equipment described in this document generates, uses, and emits radio frequency energy. The equipment has been tested and found to comply with FCC Rules, Part 15, subpart J, for Class A computing devices.

The use of non-shielded interface or power cords with Allen-Bradley industrial monitors is prohibited.

ATTENTION: X-ray emissions from these monitors are typically about 0.05 mR/hr maximum, well below the 0.5 mR/hr maximum recommended by the US. Department of Health and Human Resources and specified in "Federal Performance Standards for Television Receivers", Section 10, Part 1020, Title 21, of the U. S. Code of Regulation (PL90-620), Vol. 38, No. 198.

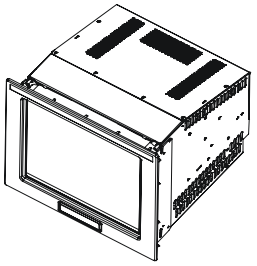
These monitors are equipped with X-ray protection circuits that cause automatic shutdown of the equipment in case its X-ray emissions begin to approach federal limits.

Models

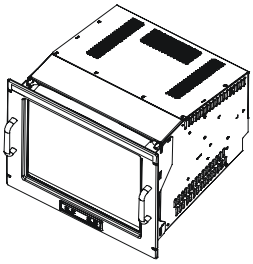
The 6157- C Industrial Monitor is available in the following models:

- Panel mount with front controls (6157-CE)
- Panel mount with rear controls (6157-CF)
- Rack mount (6157-CB)

Figure 1
6157-C Monitor Models



Panel Mount
(6157-CE/6157-CF)



Rack Mount
(6157-CB)

Available Options

The following options are available on each model of the 6157- C Industrial Monitor:

- Video interface options
  (HD-15 and five BNCs through an adapter cable)
- Resistive or capacitive touchscreen
- Surface acoustic wave (SAW) touchscreen option (6157-CB only)
- Touchscreen cable options
- Video cable options
- Power cord options

Part Numbers

The part number for your particular unit consists of the model number (6157) followed by a nine-digit code indicating the options on your unit.

Example:

6157 -	CE	D	A	A	Z	A	A	Z	Z
1	2	3	4	5	6	7	8	9	10

Following are explanations of the part numbers for the various models of the 6157-C units.

Table A
Catalog Number Explanation for 6157- C Industrial Monitors

Position	Option	Option Letter	Category Description
2	Display/ Enclosure	CB	Rack Mount, NEMA 1, 9U, Front Controls
		CE	Panel Mount, NEMA 4/4X, 9U, Front Controls
		CF	Panel Mount, NEMA 4/4X, 9U, Rear Controls
3	Touchscreen/ Display Shield	B	Resistive Antiglare Touchscreen
		D	Capacitive Antiglare Touchscreen
		G	SAW Polished Touchscreen (Rack Mount Only)
		W	Tempered Glass Anti-reflective Display Shield
		Z	None (No Display Shield)
4	Video Interface	A	HD-15
5	Power Input/ Line Cord	A	120/240 VAC, USA Power Cord
		B	120/240 VAC, No Power Cord
6	Future Options	Z	None
7	External Video Cable	A	6 ft (1.8 m) HD-15 - HD-15 Cable
		B	15 ft (4.6 m) HD-15 - HD-15 Cable
		K	1ft (0.3 m) 5-BNC - HD-15 Cable
8	Touchscreen Cable	A	6 ft (1.8 m) DE9 - DE9 Cable
		B	15 ft (4.6 m) DE9 - DE9 Cable
		Z	None
9	Future Options	Z	None
10	Enclosure Accessories	B	18" Rack Mount Slides (Pair)
		C	24" Rack Mount Slides (Pair)
		D	18" Rack Mount Slides (Pair), EIA 19" 1U Adapter Panel
		E	24" Rack Mount Slides (Pair), EIA 19" 1U Adapter Panel
		Z	None

Note: Not all options are available with all models.

Package Contents

Before unpacking a new monitor, inspect the shipping carton for damage. If damage is visible, immediately contact the shipper and request assistance. Otherwise, proceed with unpacking.

Note: Make sure you keep the original packaging for the monitor in case you need to return the monitor for repair.

The monitor shipping carton contains the following items:

- Monitor
- Package of mounting hardware
- AC power cord (optional)
- Video cable (optional)
- Enclosure accessories (i.e. rack sides for rack mount only) (optional)
- This user manual

An 6157- C Industrial Monitor with a touchscreen option is shipped with these additional items:

- Supporting software and manuals
- RS-232 serial extension cable (optional)

Installation Guidelines

When installing the unit, it is important to consider environmental factors at the site that could affect performance as well as possible effects from equipment operation on personnel and nearby equipment.

Note: Remember that heat rises—many times the temperature at the top of an enclosure is much higher than the rest of the enclosure if the air is not circulating. Without active cooling or an internal fan, the temperature at the top of an enclosure can be 10° - 20°C hotter than at the middle or bottom of the enclosure.

Important: This monitor is designed to operate at a range of extremes, however it is not good design practice to continuously operate the monitor at the highest end of the specified temperature range.

While the product will operate at its highest specified temperature, the overall life span of any electronic device is shortened when it operates at its highest rated temperature.

Following the guidelines below will help ensure that the monitor will provide safe and reliable service.

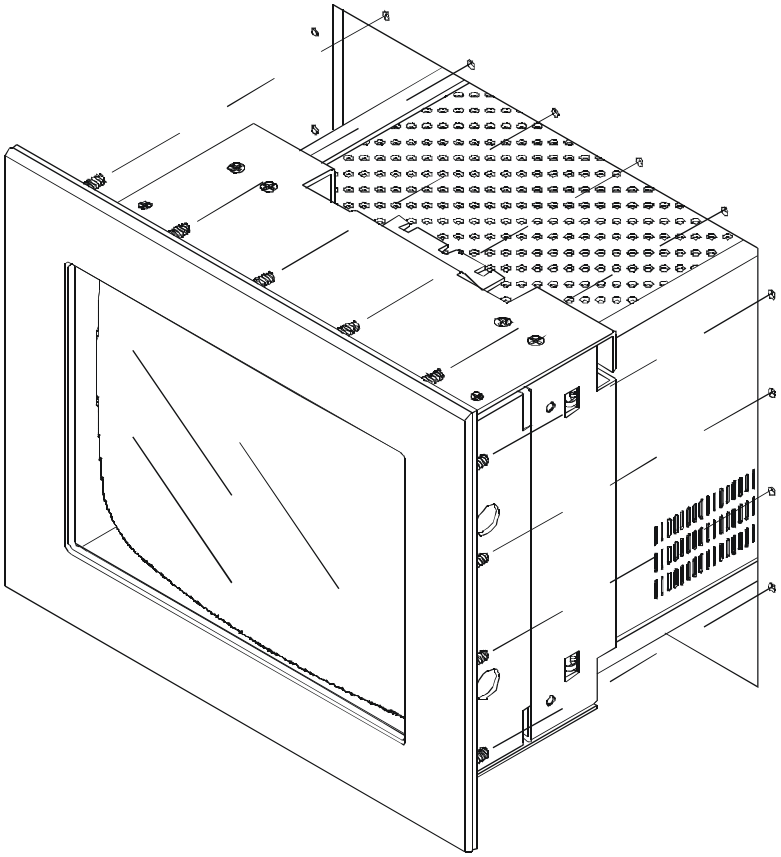
- Ensure that sufficient **power** is available from a single phase AC outlet at the site.
- Ensure that sufficient **space** is available around air inlets and outlets to provide the circulation necessary for cooling. Never allow air passages to become obstructed. The monitor is equipped with a fan to ensure proper cooling.
- **Dust and smoke** particles can cause problems, since they can collect at ventilating holes in the enclosure and interfere with cooling. Accordingly, where dust and smoke are problems it is especially important to keep air vents clean. Refer to the Routine Maintenance section (Page 39) for more information.
- Ensure that the **ambient air temperature** will not exceed the specified maximum temperature. A user supplied fan, heat exchanger, or air conditioner may be required to meet this condition in some installations.
- Leave the monitor's **enclosure or cover** in place at all times during operation. The cover affords protection against high voltages inside the monitor and inhibits radio-frequency emissions that might interfere with other equipment.
- The Federal Communications Commission has prepared a pamphlet that addresses the problem of **radio frequency interference** to radio and television reception, which should be consulted in case of problems with such interference. This publication, "How to Identify and Resolve Radio/TV Interference Problems" (Stock #004-000-00345-4) may be obtained from the US. Government Printing Office, Washington, DC 20402.
- Determine the minimum and maximum ambient **humidity** for the monitor by consulting the specification sheets at the back of this manual. Ensure that the humidity of the ambient air will not exceed these limits. In very dry environments, static charges build up very readily. Proper grounding of the equipment through the AC power cord can help reduce the likelihood of static discharges, which may cause shocks and damage electronic components.

Panel Mounting (6157-CE/ 6157-CF)

When properly installed, the panel mount version of the 6157- C Industrial Monitor is designed to provide protection against water and dust to NEMA 4 and 4X (IP 65 equivalent) and NEMA 12 (IP 52 equivalent) standards.

No slides or shelves are required because the 6157- C Industrial Monitor is designed to be supported by the panels in which it is installed.

Figure 2
Generic Panel Mount Diagram



Tools Needed

In addition to the tools required to make the cutout, you will need the following tools to mount the monitor:

- 3/8 in. deep well socket
- ¼ in. drive extension – 12 in. or longer
- ¼ in. drive ratchet or ¼ in. drive torque ratchet

Panel Mounting Guidelines

Observe the following precautions before installing the unit in a panel:

- Confirm that there is adequate space behind the panel. Remember to allow extra space for air circulation and cabling. Allow 63.5 mm (2.5 in) behind and 50.8 mm (2 in) above, below, and on each side for air circulation and cabling.
- Confirm that the cabinet is deep enough to accommodate the monitor's depth while providing rear clearance for airflow. A cabinet with depth of 523.7 mm (20.62 in.) is sufficient.
- Take precautions so that metal cuttings do not enter any components that are already installed in the panel.
- Supporting panels should be at least 14 gauge to ensure proper sealing against water and dust and to provide proper support. The mounting hardware supplied accommodates panels up to 6.4 mm (0.25 in) thick.

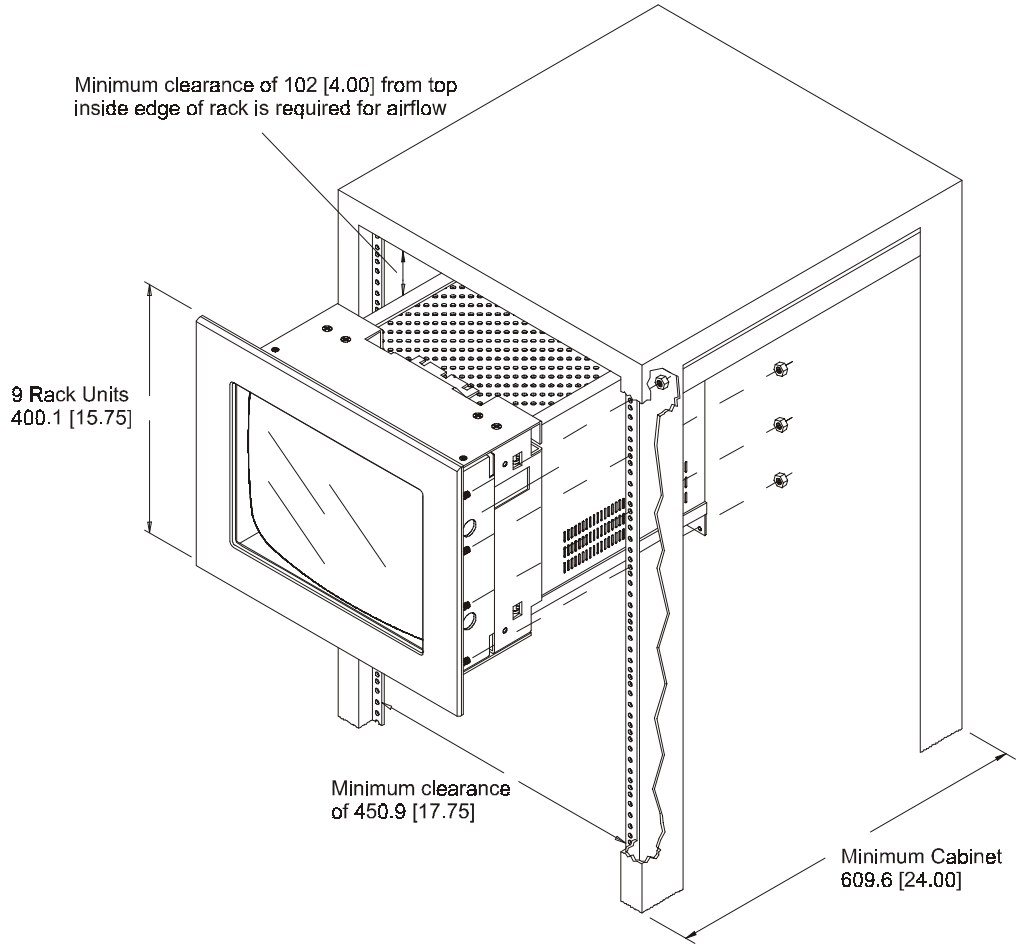
Note: Supporting panels must be cut and drilled to specifications prior to installation.

ATTENTION: Failure to follow these warnings may result in personal injury or damage to the panel components.

Mounting the 6157-CE/6157-CF in a Rack

Due to the front panel size and stud pattern, the panel mount versions of the 6157- C Industrial Monitor can be installed in an EIA 19 in. 9U panel standard rack. Refer to the following figure:

Figure 3
Generic Rack Mounting Diagram

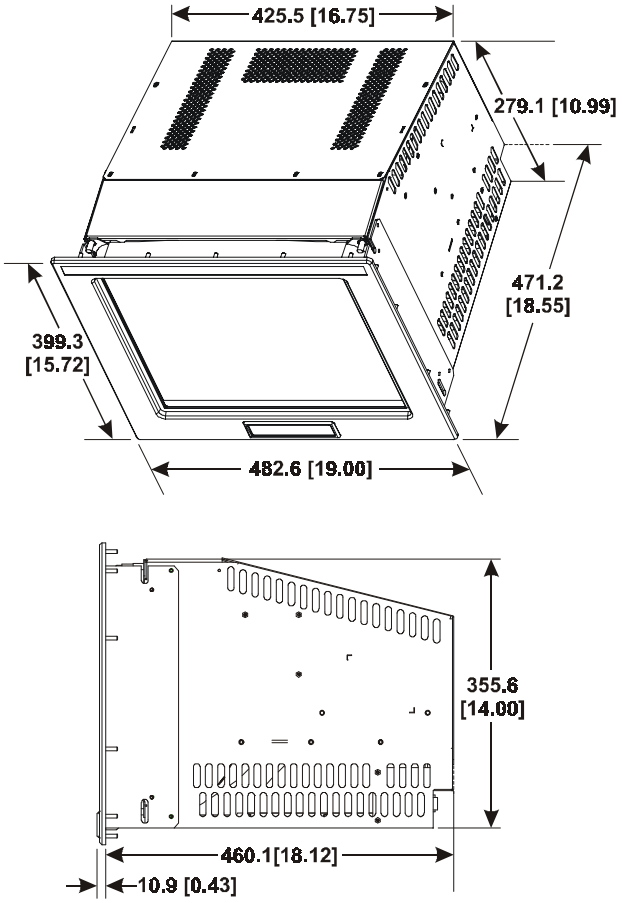


Important: If you install the panel mount versions of the 6157- C Industrial Monitor in a rack, you must ensure that the rack can support the weight of the monitor. You may need to install a support or shelf under the rear of the monitor to support the weight.

Panel Mount Dimensions (6157-CE/6157-CF)

This section provides diagrams you need to follow to install the unit. Dimensions are supplied in mm [in.]

Figure 4
6157-CE/6157-CF Industrial Monitor Dimensions



Panel Mounting Procedure

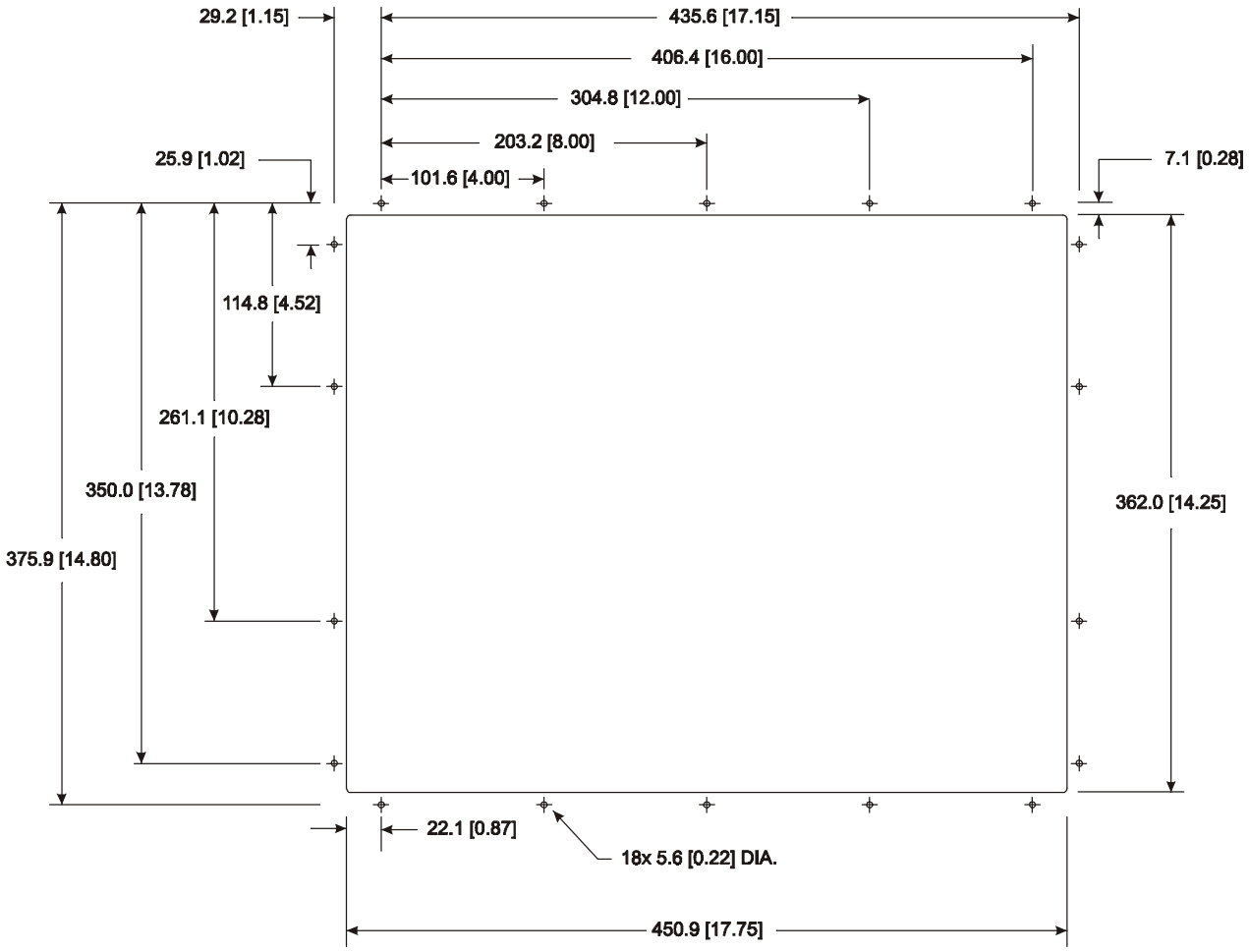
1. Confirm that the shipping carton contains a package of 10-32 lock nuts and flat washers. You will need 18 nuts and washers for installation. Extra lock nuts and washers are provided.

2. Refer to the physical dimension drawing (Figure 4) and confirm that there is adequate space behind the panel. Remember to allow extra space for circulation and cabling.

3. Refer to the panel cutout drawing below for dimensions of the panel cutout and mounting hole locations. Cut and drill the panel.

   Note: Use #10-32 or M5 self-locking nuts for mounting.

Figure 5
Panel Mounting Cutout



4. Carefully remove the monitor from its packaging. Avoid damaging the monitor gasket.

Tip: It will be easier to install the monitor if you support it with a shelf or other support adjusted to the appropriate height.

5. Insert the monitor in the panel cutout from the front. Do not damage the threaded mounting studs as you position the monitor.

6. Secure the unit with the lock nuts and washers provided. Tighten evenly to 24 inch-pounds of torque.

Important: To ensure a proper seal, be sure to install a washer and nut on each of the 18 mounting studs.

ATTENTION: Mounting nuts must be tightened to a torque of 24 inch-pounds to provide panel seal and avoid potential damage. Rockwell Automation assumes no responsibility for water or chemical damage to the monitor or other equipment within the enclosure due to improper installation.

7. Remove the protective adhesive sheet from the screen of the Industrial Monitor. The sheet is designed to prevent scratching of the polycarbonate screen protector or the optional touchscreen during shipping and installation. It should be removed before use.

Rack Mounting (6157-CB)

When properly installed, the 6157-CB industrial monitor is designed to provide protection to NEMA 1 (IP 10 equivalent) standards.

The rack mounting versions of the 6157- C Industrial Monitor are designed for installation in a rack enclosure that conforms to EIA standards for equipment with 19" (483 mm) wide rails.

Note: Retainer screws prevent the unit from being pulled out on its slides accidentally; they are not intended to support the weight of the unit.

Tools Needed

You will need the following tools and hardware:

- EIA panel mounting hardware
- Chassis slides or shelf
- Screwdriver

Rack Mounting Guidelines

Observe the following precautions when installing this unit in a rack:

- The cabinet must be tall enough to accommodate the monitor's panel height of 9 rack units, 15.75 in. (400 mm), and deep enough to accommodate the monitor's depth while providing rear clearance for cabling and air flow. A cabinet with depth of 24 in. (610 mm) is sufficient. A minimum clearance of 4 in. (102 mm) from the top inside edge of the rack is required for airflow.
- The monitor is designed to be supported in the cabinet by telescoping slides. Slide mounting points are provided on the lower sides of the monitor chassis. These mounting points are designed to accommodate General Devices Co. Chassis-Trak® Model C-300-S or equivalent slides. Slides of this kind are available from Rockwell Automation in 18 in. and 24 in. lengths, with or without 6 in. extenders.

Note: The mounting rails that run vertically along the inside edges of the front and rear openings of EIA rack cabinets can be of two types:

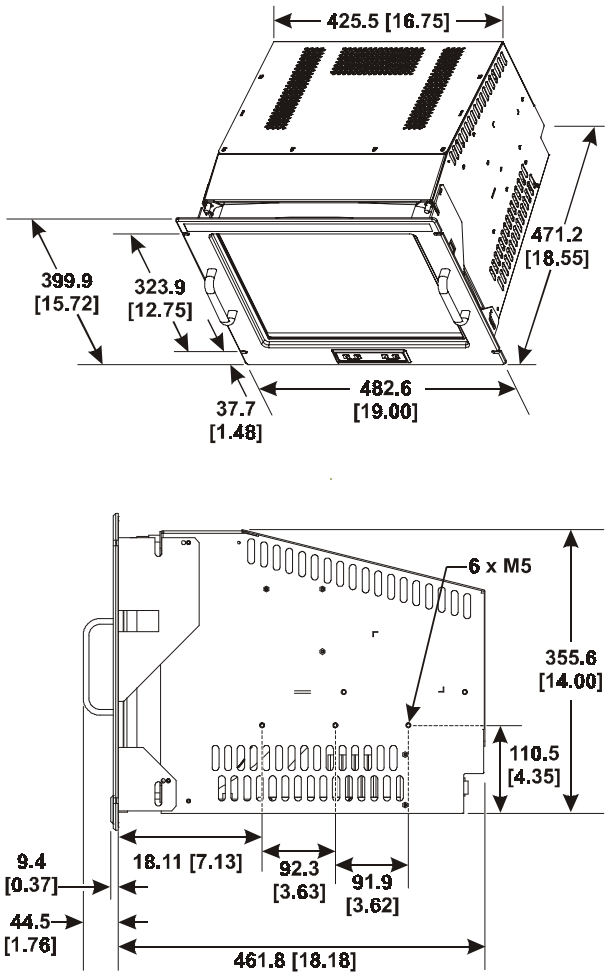
- "Wide" rails have holes spaced 0.5 in. (12.7mm) and 1.25 in. (31.8mm) on centers, in a repeating pattern. These rails are prevalent in Europe.
- "Universal" rails have holes spaced 0.5 in. (12.7mm), 0.625 in. (15.9mm), and 0.625 in. (15.9mm) on centers, in a repeating pattern. Thus, the "universal" rails have a hole pattern that contains the "wide" pattern but provides an additional hole at the midpoint of the pattern. "Universal" rails are most prevalent in the US.

ATTENTION: Failure to follow these warnings may result in personal injury or damage to the panel components.

Rack Mounting Dimensions (6157-CB)

This section provides diagrams you need to follow to install the unit.

Figure 6
6157-CB Industrial Monitor Dimensions



Rack Mounting Procedure

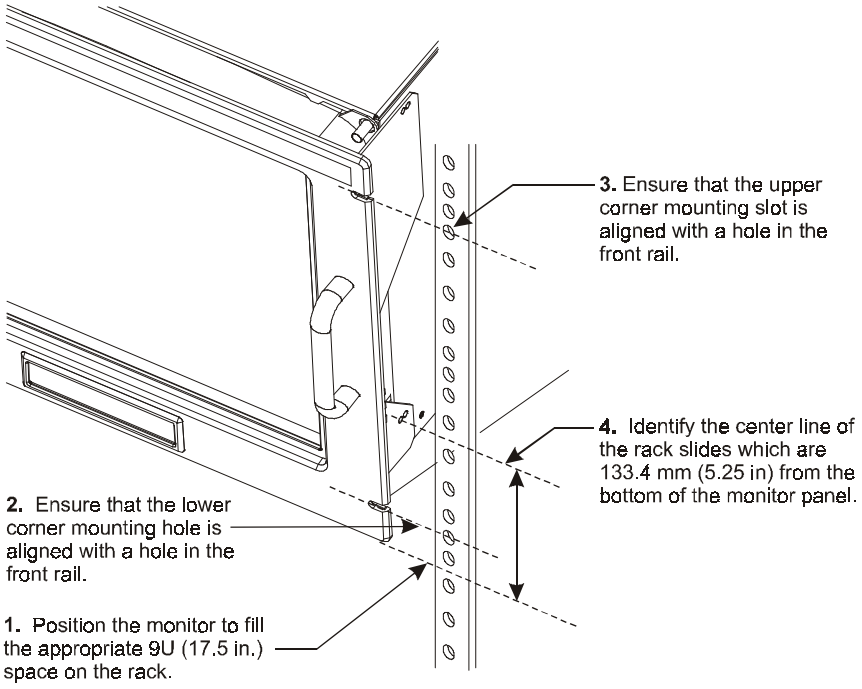
Step 1 - Locate the mounting areas:

You must allocate the required space in your enclosure for the monitor. The monitor's panel height is 9 rack units (15.75 in. or 400 mm) and you must determine if panel spacers are required above or below the monitor.

Locate the following areas to mount the slides:

- Locate the points at which the bottom edge of the monitor front panel will intersect the cabinet front mounting rails. The four slots in the monitor front panel should be aligned with holes in the front mounting rails.
- Locate points on the front rails 5.25 in. (133 mm) above the points of where the bottom edge of the monitor panel intersects the rail. These points indicate the center line of each slide.
- Locate points on the rear rails equal in height to the slide center line points on the front rails.

Figure 7
Mounting Areas on a Rack



Note: Clearance between the inside edges of the front mounting rails is nominally 17.75 in. (451 mm) for standard cabinets.

This clearance can vary somewhat and might or might not be adjustable. Ensure that the clearance is at least 17.65 in. (448 mm) for standard monitors and at least 17.73 in. (450 mm) for monitors with magnetic shields option installed.

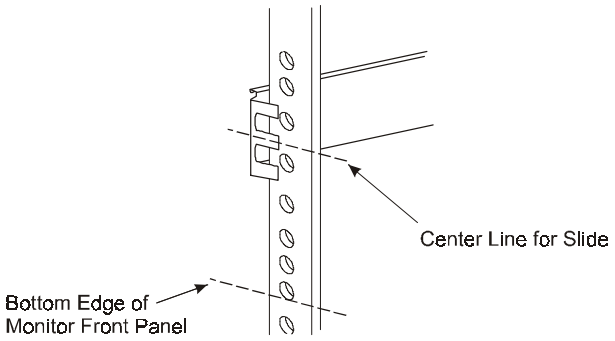
Note: Magnetic shields are secured with nylon rivets inserted through their sides. The rivet heads require clearance greater than 17.73 in. (450 mm). If this additional clearance is not available, the rivets must be removed before the monitor is installed in the cabinet.

Step 2 - Install the slides in the cabinet:

1. Disassemble each slide by pressing out the spring-loaded stop that holds the intermediate section of the slide to the stationary section. Pull the intermediate section all the way out of the stationary section.

2. Mount the stationary section of one slide to the front and rear mounting rails using the hardware supplied with the slides. Ensure that the slide is aligned on the center line you located previously.

Figure 8
Chassis Slide Aligned on Center Line



3. Tighten the mounting screws enough to hold the slides in place.

4. Repeat these steps to mount the stationary section of the other slide to the front and rear mounting rails on the opposite side.

5. Measure the space between the inside edges of the stationary slides to determine the clearance. Adjust the spacing to 16.8 in. (427 mm

6. Fully tighten the mounting screws holding the stationary sections to the front and rear mounting rails of the cabinet.

7. Locate the holes in the front mounting rails corresponding to the monitor's front panel mounting holes. Install clip nuts behind the holes in the rails if the holes are not threaded.

Step 3 - Mount the slides on the monitor:

1. Take up the sections of the slides previously removed from the stationary sections. Pull the interior sections out of the intermediate sections far enough to gain access to the mounting holes in the interior sections.

2. Align the interior section's mounting holes with corresponding holes on the brace of the monitor chassis. Attach the interior section of the slide to the side of the chassis with hardware supplied. Tighten screws securely.

3. Repeat these steps to attach the interior section of the other slide to the opposite side of the chassis.

Step 4 - Install the monitor in the cabinet:

1. Position the monitor chassis, with slide extensions installed, in front of the prepared cabinet.

2. Lift the monitor chassis to the height required to align the intermediate sections of the slides (attached to the chassis) with the corresponding stationary sections (attached to the cabinet rails).

ATTENTION: To avoid danger of personal injury or accidental damage to equipment, it is recommended the monitor be lifted by two persons, both wearing back braces.

3. Push the intermediate sections of the slides into the stationary sections until the retaining locks are engaged.

4. If the monitor will be accessible from the rear after installation, cabling may be installed from the rear at a later time. Otherwise, power and video cabling should be installed at this time, while the monitor is supported by the slides in extended position.

5. Slide the chassis into the cabinet. Secure the monitor chassis to the cabinet by installing screws through the four holes in the monitor front panel in such a way that they engage the threaded holes on the clip nuts installed previously behind corresponding holes in the rails.

   Note: Retainer screws prevent the unit from being pulled out on its slides accidentally; they are not intended to support the weight of the unit.

6. Remove the protective adhesive sheet from the screen of the Industrial Monitor. The sheet is designed to prevent scratching of the polycarbonate screen protector or the optional touchscreen during shipping and installation. It should be removed before use.

Connecting the 6157- C Industrial Monitor

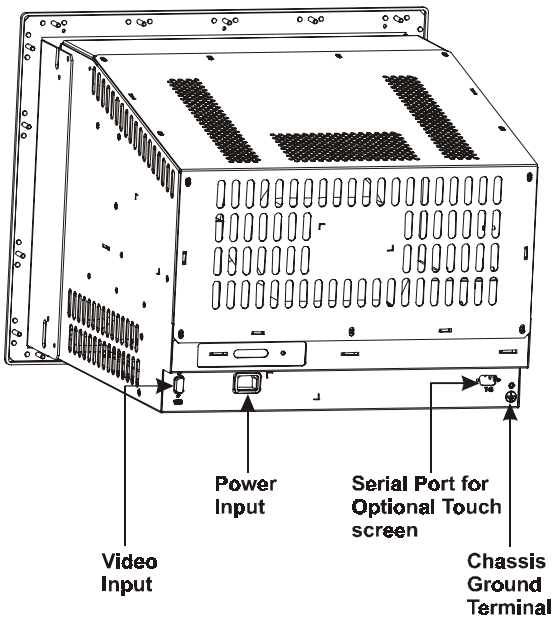
The rear panel of the 6157- C Industrial Monitor has connectors for attaching cables to accomplish the following:

- Connecting to a host video source (HD-15 VGA or optional HD-15 to BNC adapter)
- Connecting to a host touchscreen control port (DE-9 connector) (optional)
- Connecting to AC power

Note: Some connectors on your monitor may differ from the following figure.

The following figure illustrates the standard configuration for the 6157- C Industrial Monitor.

Figure 9
Rear Panel



Connecting the Video Source

The video connection to the host is made through a HD-15 (female) connector or to BNC connectors using a 5-BNC to HD-15 adapter cable. For more information on using an HD-15 video cable to connect to the host computer, refer to Appendix B (Page 46).

To establish a signal using the HD-15 connector:

1. Obtain a shielded, properly terminated video cable of length as short as possible. Longer cables (up to approximately 50 feet in some cases) may be used, provided they are properly constructed. Your package may include a 6- or 15-foot video cable, if specified.

2. Connect one end of the cable to the female HD-15 video input connector on the rear panel of the monitor.

3. Connect the other end to the output of any IBM-compatible VGA adapter or other video generator.

   Note: It may be possible to connect the monitor to video generators that do not conform to VGA standards. The main requirement is that the generator provide analog RGB video signals (0.714V or 1V above reference black into 75 ohms) and separate horizontal and vertical sync signals. Please contact your Rockwell Automation representative for more information,

To establish a signal using the BNC to HD-15 BNC adapter cable:

1. Obtain 75-ohm coaxial cables fitted with BNC connectors. Make sure the cables are of equal length.

   Note: A BNC to HD-15 adapter cable is available from Rockwell Automation for connecting the monitor to a BNC terminated RGB video source.

2. Connect one end of the cable to the appropriate BNC input connectors (R, G, B, HS/CS, VS) on the video source.

   Note: The BNC cables are color coordinated for the red, green, and blue connectors. The horizontal and vertical sync connectors are typically gray and black. The letters H (horizontal sync) and V (vertical sync) are embossed on the plastic covering of the appropriate connectors.

3. Connect the other end to the corresponding connector of the BNC to HD-15 adapter cable.

4. Connect the adapter to the HD-15 video connector on the rear panel of the monitor.

Connecting the Touchscreen Interface

The serial touchscreen interface connection to the host is made through an RS-232 DE-9 (female) connector located on the rear panel.

The optional touchscreen provides a high-resolution touch input system. Driver software included with the package allows the touchscreen to function with many popular DOS and Windows®-based industrial applications as a pointing device (mouse).

Note: Refer to the manual included with the touchscreen option and Appendix A of this manual (page 43) for additional details on the installation and operation of the touchscreen.

To connect the touchscreen:

1. For units with the touchscreen option, make sure you have one of the optional serial cables.

2. Connect one end of the touchscreen serial cable to the T/S port connector on the rear of the monitor.

3. Connect the other end to any serial communications port on the host computer.

4. Tighten the captive screws on the cable connector to secure it.

Connecting AC Power

The 6157- C Industrial Monitor requires a single-phase power supply providing 100-130 or 198-264 VAC at 50-60 Hz. Power must be available at a grounded three-pin outlet located nearby. Whenever possible, connect the monitor to the same AC source that supplies the computer.

To connect AC power to the monitor:

1. Turn off the main switch or breaker.

2. Use the ground terminal of the monitor to establish a chassis-to-earth ground connection. Secure one end of a ground strap to the ground terminal. Connect the other end of the ground strap to a good earth ground.

   The ground terminal is an M5 screw.

ATTENTION: Chassis ground must be connected for safe operation of the monitor. The AC receptacle on the monitor is a 3-wire type with chassis ground pin, and the mating AC cord supplied is a 3-wire type, designed for connection to a grounded 3-pin AC outlet. However, a properly ground AC outlet is not always available, and grounding using a 3-wire cord can easily be defeated. If you fail to ground the monitor properly, the setup may result in personal injury from electrical shock or damage to the equipment.

3. Connect the socket end of the AC power cord to the mating connector on the rear panel of the monitor.

4. Connect the plug end of the AC power cord to the main outlet.

5. Restore AC power to the outlet.

Operating the 6157- C Industrial Monitor

The 6157- C Industrial Monitor is furnished with operation keys that allow digital on-screen adjustments. On-screen adjustments are performed from the on-screen display (OSD). Using the operation keys on the front panel or rear chassis (depending on the enclosure option), you can maneuver to the appropriate selection or setting in the menu.

Figure 10
Operation Keys

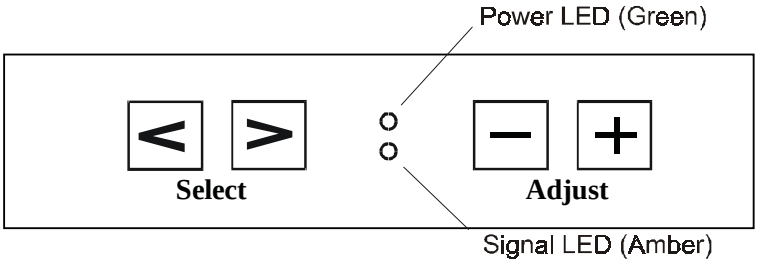


Table B
Operation Keys Description Table

Control	Description
< and >	Arrow keys have several functions: • Displays the main menu. • If the main menu is displayed, pressing these keys moves the cursor to desired variable that needs adjusting. Arrow keys to move to the left (<) and to the right (>). • Toggles between the control box and any of its secondary control boxes
+	This operation key: • Increases the setting in the control box displayed • Closes the main menu when the exit box is highlighted. This action memorizes any settings and completes the adjustments. • Answers “Yes” to questions.
-	This operation key: • Decreases the setting in the control box displayed • Closes the main menu when the exit box is highlighted. This action memorizes any settings and completes the adjustments. • Answers “No” to questions.

Status LEDs

The 6157- C Industrial Monitor has two status LED indicators on the keypad. The following table lists the functions assigned to the LEDs:

Table C
6157- C Industrial Monitor Status LED Indicators

LED	Description
Power LED (Green)	Indicates that power is applied to the monitor.
Status LED (Amber)	Indicates that the monitor is not receiving a video signal.

Note: For information on troubleshooting the 6157- C Industrial Monitor, refer to Page 40.

Auto Degauss

Degauss is automatically activated when the display has been powered off for at least 20 minutes and power is applied.

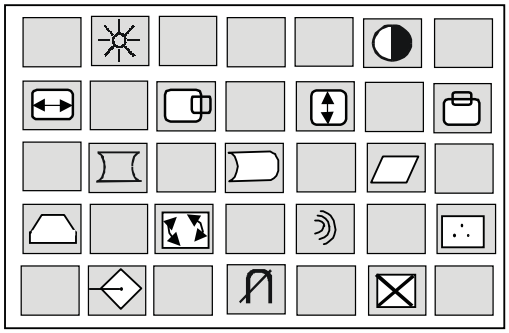
Auto Registration

If adjustments have been made, the new settings are saved after ten seconds of inactivity when the display automatically closes the windows.

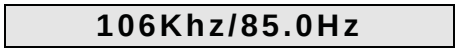
Self-Test Display

When there is no signal input (no connection), the OSD shows the following:

Figure 11
Self-Test Display



When the synchronization signal is out of specification, the OSD will show current horizontal and vertical frequency on red image, then disappear. For example:



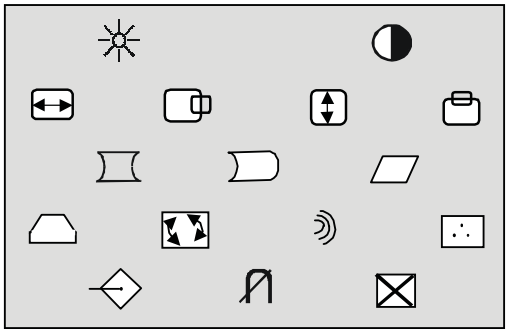
Adjusting the On-Screen Display (OSD)

This section explains the on-screen display and explains how to make operation adjustments.

To display the main menu:

Press > or < to display the menu. The on-screen display appears on the screen.

Figure 12
On-Screen Display



You can make all the necessary adjustments by making selections in the on-screen display using one or all of the operation keys. The following table describes the controls on the on-screen display.

Table D
On-Screen Display Definitions

Symbol	Control	Action
	Brightness	Increases or decreases the intensity (illumination) of the image.
	Contrast	Increases or decreases the strength (lightness or dimness) of the image.
	Horizontal Sizing	Increases or decreases the size of the image horizontally.
	Horizontal Position	Moves images horizontally on screen left (-) or right (+).
	Vertical Sizing	Increases or decreases the size of the image vertically.
	Vertical Position	Moves images horizontally on screen up (+) or down (-).
	Pincushion	Adjusts the side pincushion (or barreling)
	Pinbalance	Adjusts the curvature of the left and right sides of the screen image.

Symbol	Control	Action
	Parallel	Corrects the image shape to a rectangle.
	Trapezoid	Corrects the image shape to a rectangle.
	Rotation	Corrects the screen tilt. For example, adjusts the screen image to be horizontally level.
		Reduces the optical effect of wavy lines on the display image.
	Color	Adjusts the color temperature or white balance of the image.
	Recall	Resets the display settings to their original factory values.
	Degauss	Demagnetizes the CRTs metal frame for improved image clarity.
	Exit	Select Exit to close the on-screen display main window.

Before advancing to these adjustments, you need to understand the basic functions of the operation keys. To aid in this understanding, a sample procedure is provided below:

Sample Procedure

1. Display the on-screen display (OSD) window by pressing > or <.
2. Press > or < to highlight the variable you want to adjust. Refer to Table B.
3. Press + or – to adjust the variable.
4. Repeat steps 2-3 for any variables you need to adjust.
5. Press > or <to select the exit icon from the OSD.
6. Press + or – to exit the OSD.

Note: If you do nothing for ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Brightness Control ☼

Use the brightness control to adjust the overall intensity of the display. After allowing the CRT to warm up for at least a minute, adjust for the least amount of brightness needed to make the display clearly viewable.

Adjust the brightness to match the brightness level in the room so that the level will be easy to see.

1. Display the OSD.

2. Use the arrow keys (> or <) to select the brightness adjustment box.

3. Adjust the brightness value to its lowest setting. (For example, black background with no text).

4. Adjust the brightness until black changes to dark gray.

5. Adjust the brightness down until the bar changes back to black. This is the optimal brightness setting given the current lighting conditions.

   Note: Pressing the arrow keys simultaneously while the brightness adjustment box is displayed sets the standard level.

6. Proceed to make other adjustments as necessary.

   Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Contrast Control

Use the contrast control to adjust the difference between the monitor's light and dark elements. With a suitable image displayed on the screen, adjust the contrast control to achieve the best balance between image brightness and fine detail rendition.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the contrast adjustment box.

   Note: Pressing the arrow keys simultaneously while the contrast adjustment box is displayed sets the standard level.

3. Press + or – to adjust the contrast value given the current lighting conditions.
4. Proceed to make other adjustments as necessary.

   Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Horizontal Position

Use the horizontal position controls to center the image horizontally on the screen.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the horizontal position box.
3. Press + or – to move the image to the left or right until it is centered on your screen.

   Note: You can use the arrow keys (> or <) to toggle between the horizontal size and horizontal position control boxes.

4. Proceed to make other adjustments as necessary.

   Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Horizontal Size

Use the horizontal size controls to makes the image wider or narrower.

Note: Before adjusting the horizontal size, you must first center the image in the screen using the horizontal position controls.

Pressing > toggles between the horizontal size and horizontal position control boxes.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the horizontal size box.
3. Press + or – narrow or widen the image on your screen.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Vertical Position

Use the vertical position controls to center the image vertically on the screen.

Note: Pressing > toggles between the vertical size and vertical position control boxes.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the vertical position box.
3. Press + or – to move the image up or down until it is centered on the screen.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Vertical Size

Use the vertical size controls to make the image taller or shorter.

Note: Before adjusting the vertical size, first center the image in the screen.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the vertical size box.
3. Press + or – key heighten or shorten the image on the screen.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Vertical Pincushion

Use the vertical pincushion controls to correct the image for barrel or pincushion distortion.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the vertical pincushion box.
3. Press the + or – key to straighten the sides of the screen image.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Trapezoid 

Use the trapezoid controls to correct trapezoidal distortion of the image.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the trapezoid box.
3. Press + or – to make the image wider or narrower at the top of the screen.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Pinbalance 

Use the pinbalance controls to adjust the curvature of the left and right sides of the screen image.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the pinbalance box.
3. Press + or – key to adjust the curvature at the left and right sides of the image until the sides of the image are straight.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Parallelogram 

Use the parallelogram controls to correct parallelogram distortion of the image on the screen.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the parallelogram box.
3. Press the + or – key to skew the image to the left or right.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Rotation 

Use the rotation controls to adjust for tilt of the image on the screen.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the rotation box.
3. Press the + or – key to adjust the tilt of the image on the screen.
4. Proceed to make other adjustments as necessary.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Color Temperature

Use the color temperature controls to adjust the color white in an image (in Kelvin). The higher the temperature, the redder, or warmer, the image color scheme. The lower the temperature, the bluer, or colder, the image color scheme.

1. Display the OSD. Press > or < to move to the color control icon.

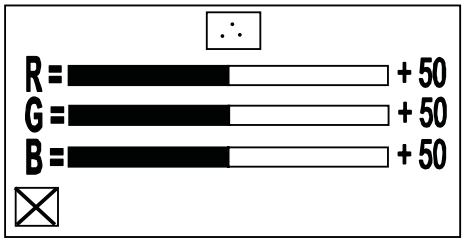
2. Press + or — to select the color icon. The following appears:

   9300K 6500K 5500K

Note: Before making any adjustments, record the initial color setting because memory recall will not reset this value.

3. Press > or < to choose 9300K, 6500K, 5500K, or the color icon.

4. Press + or — to enter your choice. If you select the color icon, the screen color adjustment window will appear.



5. Press > or < to select R (red), G (green), or B (blue) and then press + or — to adjust the selected value. Repeat this step to adjust all three color variables.

6. Press the > or < keys to select the exit icon, then press + or — to return to the OSD main window. The window closes automatically after ten seconds.

Recall 

Use this option to reset the display settings to their original factory values.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the recall box.
3. Press the + or – key to reset the display values to their original factory settings.

Degauss 

The display screen is degaussed automatically each time the monitor is powered on. This degaussing eliminates color impurities and other distortions of the display by neutralizing the effects of magnetic fields in the surrounding environment.

When the unit is left on for a long period, or is repositioned following power-up, the screen may pick up additional magnetic flux, causing colors to appear "blotchy" or otherwise distorted. For full effectiveness, allow at least 20 minutes between manual degaussings. Shorter intervals may result in an incomplete removal of flux and residual color impurities.

Note: The internal degauss will not prevent color impurities caused by local magnetic fields. Metal enclosures can easily become magnetized by welding and machinery operations.
Use a hand held degaussing coil to remove residual magnetism from the enclosure.

Note: If the unit is located near electric transformers, motors, loudspeakers or other strong magnetic sources, degaussing alone may not be sufficient to eliminate interference. Try reorienting the unit relative to the magnetic source or moving the monitor further away.
If this still does not solve the problem, contact Rockwell Automation about magnetic shielding.

The degaussing operates for approximately five seconds after selection. In this duration, the front panel keys are not operational.

Exit ☒

Use the exit icon on the screen to close the OSD main window.

1. Display the OSD.
2. Use the arrow keys (> or <) to select the exit box.
3. Press the + or – key to exit the OSD.

Note: If you wait ten seconds, the display will automatically close the window, memorize the settings and complete the adjustments.

Routine Maintenance

Cleaning

Occasionally clean the display panel and cabinet with a soft cloth dampened (not soaked) with a mild (non-abrasive) glass cleaner. Keep turning a fresh side of the cloth toward the screen surface to avoid scratching it with accumulated grit.

Note: The solvent should be applied only to the cloth, and not directly on the monitor screen. Do not use paper products as they may scratch the surface. To minimize the risk of abrasion, allow the screen to stand dry.

Special care should be taken when cleaning a touchscreen or polycarbonate shield that is installed over the screen. Abrasive and certain chemical cleaners can easily damage the surface.

Note: For best results cleaning a monitor with the optional antireflective tempered glass display shield, a solution of denatured alcohol is recommended to thoroughly clean the display.

Replacing a Line Cord

To avoid shock and fire hazards, the monitor's power cord should be replaced if the insulation becomes broken or if it develops a loose internal connection.

Fuse Replacement

The 6157- C Industrial Monitor is equipped with one fuse, which can be replaced by a qualified technician.

ATTENTION: Fuse replacement requires work in areas that can present dangerous voltages. Always disconnect the AC power cord and wait one minute before attempting fuse replacement. Replace the rear cover before restoring power to the monitor.

The fuse is located inside the monitor chassis, mounted on the main board in front of the IEC320 power connector. To access the fuse, you must remove the rear cover of the unit. Replace the fuse as required with a 5X20mm , T4AH 250V fuse.

Other Maintenance

Qualified service personnel should perform all maintenance, except for the power cord replacement described above.

Troubleshooting

You can refer to this table to help identify the cause and offer a solution to a problem. This table lists typical problems you may encounter.

Table E
Troubleshooting Table

Symptom	Possible Problem	Action
No screen image and the green power LED is not lit.	Power cord not connected.	Open power switch. Reconnect power cord at monitor and at AC outlet. Close power switch.
	No power available at AC outlet.	Test AC outlet by plugging in a lamp or other known good device.
	Power cord faulty.	Replace power cord. Refer to Page 39.
	Blown fuse.	Have monitor serviced.
	Monitor faulty.	Have monitor serviced.
The green power LED is lit, but no screen image when power switch is closed.	Screen saver or power management feature activated.	Disable screen saver by activating an input to the host system. Press a key or move the mouse to cancel power save mode.
	Brightness and contrast controls not properly adjusted.	Adjust brightness and contrast controls.
The amber status LED is lit, and no screen image.	Monitor not synched to video source.	Check for proper video cable installation. Replace suspected faulty cable. Check to ensure that video source is operating within the monitor's range.
	Monitor faulty.	Have monitor serviced.
No raster visible even when brightness and contrast are set full ON.	Monitor out of adjustment or faulty.	Have monitor serviced.
Raster dimly visible with brightness and contrast controls set full ON, but no display present	Video cable problem.	Check for proper installation of video cable(s). Refer to installation instructions. Replace suspected faulty cable(s).
	Fault in video source.	Test video source by connecting to another monitor that is known to be operational.
	Fault in monitor.	Have monitor serviced.
Display is present, but garbled or rolling	Monitor not synched to video source.	Refer to installation instructions. Check for proper video cable installation. Replace suspected faulty cable. Check to ensure that video source is operating within the monitor's range.
Display is present and stable, but appears "wrapped" at one side or otherwise not properly centered or sized.	Size and position controls not properly adjusted.	Adjust controls for proper size and position of display. Refer to operator instructions
Display is present and stable, but missing some color(s)	Video cable problem.	Check for proper video cable installation. Replace suspected faulty cable. Check video source.
	Fault in monitor.	Have monitor serviced.
Display is present and stable, but colors are not pure	Monitor requires degaussing.	Manually degauss the monitor. Refer to Page 37.
	Enclosure requires degaussing.	Manually degauss the enclosure. Refer to Page 37.

Symptom	Possible Problem	Action
Display is present, but “jitters” or is severely distorted **NOTE:** Do not confuse the flicker associated with an interlaced video mode with jitter.	Interfering external AC or DC magnetic shield	If possible, reposition the monitor beyond the proximity of large transformers, motors, bus bars, etc. Ask Rockwell Automation about various shielding options available to protect the monitor.
Display is present, but “bars” appear across it.	“Noise” generated by other equipment in the environment is present at the video inputs	Consult the application note that discusses methods of eliminating noise.
Connected monitor to computer. When powered, the PC locked up	Graphics card driver is not compatible with monitor	Update the graphics card drivers to the latest version.

Allen-Bradley Support

Allen-Bradley offers support services worldwide, with over 75 Sales/Support Offices, 512 authorized Distributors and 260 authorized Systems Integrators located throughout the United States alone, plus Allen-Bradley representatives in every major country in the world.

Local Product Support

Contact your local Allen-Bradley representative for:

- Sales and order support
- Product technical training
- Warranty support
- Support service agreements

Refer to the Rockwell Automation/Allen-Bradley Internet site at http://www.ab.com for local contact information.

Technical Product Assistance

If you need to contact Allen-Bradley for technical assistance, please review the information in the Troubleshooting section first. Then call your local Allen-Bradley representative or contact Allen-Bradley technical support at (440) 646-5800.

For additional product information and a description of the technical services available, visit the Rockwell Automation/Allen-Bradley Internet site listed above.

Appendix A: Touchscreen Serial Interface

Description

All touch controllers are configured by default to provide serial communications at 9600 baud, 8 data bits, 1 stop bit, no parity.

For Allen-Bradley monitors equipped with touchscreens, a serial communications cable is required. A suitable cable can be obtained from Rockwell Automation or you can create one.

The cable provides a communications channel between the touchscreen controller, which is mounted inside the monitor, and an RS-232-C serial port on the host computer. Because the touch controller obtains power from the monitor's power supply, no external touch power connections are necessary.

Software supplied with the touchscreen must be loaded on the host computer to handle communications with the touch controller over the channel.

Because the touchscreen emulates a mouse, there may be compatibility issues involving how the touchscreen emulates mouse buttons, especially multiple buttons. For a complete discussion of these issues and how to troubleshoot them, refer to the touchscreen documentation.

Setting Up the Touchscreen Interface

This section describes how to set up the touchscreen system using the 6157- C Industrial Monitor. Setup involves the following:

- Enabling the touchscreen interface
- Installing the software on the host computer that will handle communications with the touchscreen controller
- Performing a calibration

Enabling the Touchscreen Interface

The 6157- C Industrial Monitor provides a female DE-9 connector on the rear panel. This connector provides the serial interface for the touch controller.

Interconnecting wiring to the host serial port connection is shown in the following table.

Table F
Touchscreen Interface

Monitor (DCE Device)		Host (DTE Device)	
DE-9 (Female)	**Signal Description**	**DE-9 (Male)**	**DB-25 (Male)**
1	Not Connected (DCD)	1	8
2	Transmit Data (TXD)	2	3
3	Receive Data (RXD)	3	2
4	Data Terminal Ready (DTR)	4	20
5	Common Signal Return (SG)	5	7
6	Not Connected (DSR)	6	6
7	Request To Send (RTS)	7	4
8	Clear To Send (CTS)	8	5
9	Not Connected	9	22

Installing the Touchscreen Driver Software

To install the touchscreen driver software correctly, obtain the following information about the host hardware:

- The COM port in use for the touchscreen. Ensure that the RS-232 cable is properly installed between the monitor port and the host's COM port.
- The baud rate at which the controller is operating. You will need to match the baud rate at the COM port. The controller baud rate is factory set at 9600.

Note: If you are using older touchscreen software, you may be prompted for the type of touchscreen controller being used. The 6157-C uses the following controllers:

- Resistive: Elo TouchSystems Model E271-2210
- Capacitive: MicroTouch Model SMT-3
- SAW: Elo TouchSystems Model 2310 Serial

Once you have obtained this information, install the software using the installation disks found in the touchscreen accessory package.

Note: Before installation, you may want to check the touchscreen manufacturer's site on the World Wide Web for the latest software drivers. Enter these addresses in your Internet browser:

- www.elotouch.com for resistive and SAW touchscreens
- www.microtouch.com for capacitive touchscreens.

Performing a Calibration

After installing the driver software, follow the instructions in the touchscreen documentation.

Following installation of the touchscreen software and calibration, the touchscreen is ready to use.

Appendix B: Video Cables

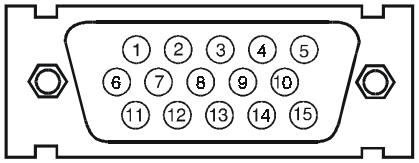
You can connect the 6157- C Industrial Monitor to the host computer with an HD-15 connector or with a BNC to HD-15 adapter cable.

HD-15 Connectors

An HD-15 video cable equipped with a conventional HD-15 connector at each end connects the 6157- C Industrial Monitor to the host computer.

Note: This figure is the view looking into the pin end of the male connector or solder term end of the female connector.

Figure 13
HD-15 Video Connector



The following table provides the pin numbers and corresponding pin assignments for the HD-15 video connector with the DDC2B capability:

Table G
Standard HD-15 Video Cable

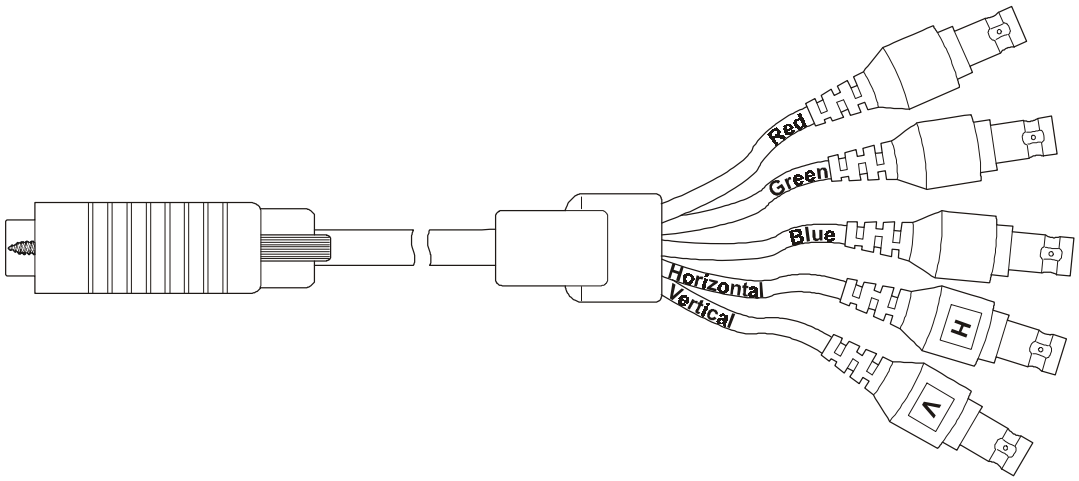
Monitor (Female)	Signal Description	Host (Male)
1	Red Video	1
2	Green Video	2
3	Blue Video	3
4	Ground	4
5	Ground	5
6	Red Video Ground	6
7	Green Video Ground	7
8	Blue Video Ground	8
9	Not Used	9
10	Sync Ground	10
11	Ground	11
12	Bi-Directional Data (SDA)	12
13	Horizontal Sync	13
14	Vertical Sync (VCLK)	14
15	Data Clock (SCL)	15

BNC Connectors

The BNC cables you use with this monitor uses a conventional HD-15 connector at the monitor end to connect the 6157- C Industrial Monitor to the host computer with five BNC connectors:

- **R**, **B**, and **G**: Red, Green, and Blue input connectors to establish color. These are used for RS-343 analog signals.
- **HS/CS**: Separate horizontal/composite sync signal from the video source.
- **VS**: Separate vertical sync signal from the video source.

Figure 14
BNC Video Connector



The following table describes the signal types you can use with these BNC connectors:

Table H
BNC Signal Types

BNC Signal Type	Description	R	G	B	HS/ CS	VS
Sync-on-Green	Use the three video connectors. Horizontal and vertical syncs are supplied on the green video line.	X	X	X		
Separate Composite Sync	Use the three video connectors plus the horizontal sync/composite sync input.	X	X	X	X	
Separate Horizontal and Vertical Sync	Use the three video connectors plus the horizontal sync/composite sync and vertical sync input.	X	X	X	X	X

Specifications

Display	
CRT Type	19 in. diagonal pure flat, 0.25mm dot pitch RGB short persistence, Anti-glare treated, Anti-static, INVAR shadow mask
Degaussing	Manual and automatic
Nominal Display Area	
(4:3 aspect) Horizontal	14.17 in. (360mm)
(4:3 aspect) Vertical	10.63 in. (270mm)
Diagonal	17.72 in. (450mm)
Non Linearity (CHP Method)	
Horizontal	7% max
Vertical	6% max
Regulation	2mm max peak deviation
Misconvergence	0.3mm max inside (centered circle 225mm diameter) 0.4mm max outside
Luminance (typical)	35 fL, small white square
CIE coordinates	
White	x:=0.283, y:=0.298 (9300K +8MPCD)

Video	
Resolution	1600x1200 max at 75Hz max
Supported Standards	IBM VGA (640x480 at 60Hz, 720x400 @ 70 Hz) VESA (640x480 at 60/75/85Hz, 800x600 at 60/75/85 Hz, 1024x768 at 60/75/85 Hz, 1280x1024 at 60/75/85 Hz, 1600x1200 at 75 Hz)
Horizontal Scan Rate	Variable: 30-98kHz
Vertical Scan Rate	Variable: 50H-160Hz
Video Dot Rate	210MHz
Video Input Signal	RGB analog (white level = 0.714V above ref. black, into 75 Ohms, single ended)
Sync Input Signals	• Separate horizontal and vertical sync control, TTL signal levels • Sync on green • Composite sync
Input Connection	HD-15, Plug and Play DDC1/2B

Controls and Indicators	Front Panel: On-Screen Display, Power, Sync detection

Operator Input	Touchscreen Option: Resistive, capacitive, or SAW touchscreen, with serial controller and driver software

Environmental	
Panel Rating Panel Mount Rack Mount	 NEMA 4/4X/12, (IP65/IP52) (6157-CE/6157-CF) NEMA 1 (IP10) (6157-CB)
Operating Temperature	0ºC to 40ºC
Storage Temperature	-20ºC to 60ºC
Relative Humidity	10% to 90% non-condensing
Operating Altitude	Sea level to 10,000 ft (3,048m)
Non-Operating Altitude	Sea level to 40,000 ft (12,192m)
Operating Electrostatic Discharge	8.0K VDC (IEC 801-2, level 3)
Non-Operating Electrostatic Discharge	20.0K VDC
Operating Shock	10g (1/2 sine, 11msec)
Non-Operating Shock	20g (1/2 sine, 11msec)
Operating Vibration	0.003in. p-p, 5-57Hz, 0.5g peak, 57-640Hz sine
Non-Operating Vibration	0.006in. p-p, 5-57Hz, 1.0g peak 51-640Hz sine

Electrical	
Line Voltage	100-130/198-264 VAC, autoswitching
Line Frequency	50-60Hz
Ground Leakage	1.0 uA max at 1.5K VDC
Power Consumption	135W max

Physical	
Panel Mount	
Panel Bezel Dimensions (W x H x D)	19.0 in. x 15.7 in. x 0.43 in. (483mm x 399mm x 11mm)
Overall Dimensions (from rear surface of front panel to back)	16.75 in. x 14.0 in. x 18.1 in. (426mm x 356mm x 460mm)
Net Weight	64lb (29.0kg)
Rack Mount	
Panel Bezel Dimensions (W x H x D)	19.0 in. x 15.7 in. x 0.4 in. (482mm x 399mm x 10mm)
Overall Dimensions (from rear surface of front panel to back)	16.75 in. x 14.0 in. x 18.2 in. (426mm x 356mm x 462mm)
Net Weight	64lb (29.0kg)

Certifications - Agency Approvals		
		UL 1950 Recognized Component, C-UL 950 Recognized Component
CE	LVD (73/23/EEC)	EN 60950 (per UL 1950 3rd ed. without D3 dev.)
	EMC (89/336/EEC) Emissions Immunity	 EN 50081-2 EN 50082-2
N223		Australian C-Tick
DHHS		DHHS 21 CFR 1020.10 Compliant
		FCC Class A

Rockwell Automation

Rockwell Automation helps its customers receive a superior return on their investment by bringing together leading brands in industrial automation, creating a broad spectrum of easy-to-integrate products. These are supported by local technical resources available worldwide, a global network of system solutions providers, and the advanced technology resources of Rockwell.

Worldwide representation.

Argentina • Australia • Austria • Bahrain • Belgium • Bolivia • Brazil • Bulgaria • Canada • Chile • China, People's Republic of • Colombia • Costa Rica • Croatia • Cyprus • Czech Republic • Denmark • Dominican Republic • Ecuador • Egypt • El Salvador • Finland • France • Germany • Ghana • Greece • Guatemala • Honduras • Hong Kong • Hungary • Iceland • India • Indonesia • Iran • Ireland • Israel • Italy • Jamaica • Japan • Jordan • Korea • Kuwait • Lebanon • Macau • Malaysia • Malta • Mexico • Morocco • The Netherlands • New Zealand • Nigeria • Norway • Oman • Pakistan • Panama • Peru • Philippines • Poland • Portugal • Puerto Rico • Qatar • Romania • Russia • Saudi Arabia • Singapore • Slovakia • Slovenia • South Africa, Republic of • Spain • Sweden • Switzerland • Taiwan • Thailand • Trinidad • Tunisia • Turkey • United Arab Emirates • United Kingdom • United States • Uruguay • Venezuela

Rockwell Automation Headquarters, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414 382-2000, Fax: (1) 414 382-4444
Rockwell Automation European Headquarters, Avenue Hermann Debroux, 46 1160 Brussels, Belgium, Tel: (32) 2 663 06 00, Fax: (32) 2 663 06 40
Rockwell Automation Asia Pacific Headquarters, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846
World Wide Web: http://www.ab.com

998078-010

Publication 6157-UM001A-EN-P