

Standard Industrial Monitors

VICPAS
HMI Parts Center

Catalog Numbers 6176M-15VN, 6176M-15VT, 6176M-15PN, 6176M-15PT, 6176M-17VN, 6176M-17VT, 6176M-17PN, 6176M-17PT, 6176M-19VN, 6176M-19VT, 6176M-19PN, 6176M-19PT



Important User Information

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

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

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

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



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

This manual contains new and updated information. Changes throughout this revision are marked by change bars, as shown to the right of this paragraph.

New and Updated Information

This table contains the changes made to this revision.

Topic	Page
Added 'Preface Objectives' title and updated section information	7
Added 'Abbreviations' section	7
Updated hypertext links for Rockwell Automation websites	7, 12, 42
Added Bezel column to table in 'Monitor Options' section	10
Consolidated Environment and Enclosure Information and European Union Directive information into new 'Installation Precautions' section	12
Added Important table and cross-references in 'Installation Guidelines' section	13
Added monitor tilt information and illustration in 'Installation Guidelines' section	13
Removed mounting clearance information from 'Panel Mounting' section for new 'Mounting Clearance Requirements' section	14
Consolidated all dimensions into one illustration and one table in 'Monitor Dimensions' section	15
Added 'Install the Monitor' section title and introductory paragraph	15
Added table for replacement panel mounting clips	15
Consolidated two mounting clip illustrations into Figure 1	16
Removed rack mounting information for 1550M and 1750M monitors	17
Added step 2 and illustration to 'Mounting the Monitor on a Bench or Tabletop' subsection	19
Modified illustration in 'Monitor Connections' section	19
Updated information and illustration in 'Connecting the USB and Optional USB Touchscreen Interface' subsection	22
Added the 'Installing the Touchscreen Driver' subsection	22
Added the 'Performing a Calibration' subsection	22
Changed Chapter 3 title from 'Video Setup' to 'Display Configuration'	25
Added Tip table to 'Check and Change the Display Resolution' section	25
Changed OSD lock access time from eight to three seconds	26
Changed section title from 'Perform the Automatic Video Adjustment Function' to 'Use the Auto Adjust Control'	27
Updated information and Important table in 'Use the Auto Adjust Control' section	27
Added Important table to 'Use the Auto Adjust Control' section	27
Updated information in 'General OSD Menu Navigation Guidelines' subsection	28
Added cross reference to Tip table for 'Brightness and Contrast Menu' subsection	30
Removed 'Auto' button and corresponding information in 'Color Menu' subsection	31
Added OSD Submenu and Rotation Submenu tables in 'Tool Menu' subsection	33
Added replacement screen covers table in 'Clean the Monitor' section	35
Updated and added information in Table 8, Display, in the 'Specifications' section	41
Added illustration to 'HD-15 Video Connector' section	45
Added illustration to 'DVI Video Connector' section	46

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Preface Objectives

This preface covers the following topics:

- [Purpose of This Manual](#)
- [Abbreviations](#)
- [Additional Resources](#)

Purpose of This Manual

This manual is a user guide for the monitors. It provides procedures to the following:

- Install the monitor.
- Make monitor connections.
- Configure the monitor's video setup.
- Troubleshoot the monitor.

Abbreviations

The following abbreviations are used in this publication.

Abbr	Meaning	Abbr	Meaning
BIOS	Basic input/output system	PELV	Protective extra-low voltage
COM	Communication (serial port interface)	POST	Power on self test
CRT	Cathode ray tube	SELV	Safety extra-low voltage
DIMM	Dual in-line memory module	TFT	Thin film transistor
DVI	Digital visual interface	USB	Universal serial bus
LCD	Liquid crystal display	VGA	Video graphics array
OSD	On screen display		

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Monitors Cutout Template, publication 6186M-DS001	Provides cut-out templates to panel mount 6176M industrial monitors.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.

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

Notes:

Monitor Features

Chapter Objectives

This chapter covers the following topics:

- [Monitor Overview](#)
- [Monitor Options](#)
- [Before You Begin](#)
- [Parts List](#)

Monitor Overview

Standard industrial monitors provide the latest in LCD flat panel technology. Combine these monitors with an industrial non-display computer or any computer to create a visualization, maintenance, control, or information computing solution.

Standard industrial monitors offer the following features:

- 15, 17, and 19-inch displays
- VESA and panel mount options
- Active matrix TFT display
- Native display resolutions from 1024x768 to 1280x1024
- Wide viewing angles
- Optional RS-232 or USB touchscreen interface
- USB hub for external devices such as keyboard and mouse
- One button screen auto-adjust
- OSD controls with lockout feature
- Input power, adapter (AC models)
- Space efficient chassis that is less than 58 mm (2.3 in.) deep
- Optional bench-mount adapters (for VESA mount monitors)

Monitor Options

This table summarizes the options available for standard industrial monitors.

Cat. No.	Display Size (in.)	Mounting Option	Bezel	Touch Screen
6176M-15VN	15	VESA	Plastic with reinforced steel	None
6176M-15VT				Resistive touch screen
6187M-15PN		Panel	Aluminum alloy	None
6176M-15PT				Resistive touch screen
6186M-17VN	17	VESA	Plastic with reinforced steel	None
6186M-17VT				Resistive touch screen
6186M-17PN		Panel	Aluminum alloy	None
6186M-17PT				Resistive touch screen
6186M-19VN	19	VESA	Plastic with reinforced steel	None
6186M-19VT				Resistive touch screen
6186M-19PN		Panel	Aluminum alloy	None
6186M-19PT				Resistive touch screen

Before You Begin

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

Keep the original packing material in case you need to return the monitor for repair or transport it to another location. Use both the inner and outer packing cartons to provide adequate protection for a monitor returned for service.

Parts List

The monitors are shipped with the following items:

- Industrial Monitors and Accessories CD that contains device drivers
- Installation instructions (this document)
- Cutout template (publication [6186M-DS001](#))
- Mounting clips
- Four VESA mounting screws (M4 x 0.7)
- Power adapter and line cord (both AC)
- HD-15 analog video cable
- RS-232 touchscreen interface cable (for touch-enabled monitors)
- USB touchscreen interface cable (for touch-enabled monitors)

Installation

Chapter Objectives

This chapter provides pre-installation information and procedures to mount the monitor and make connections. The chapter covers the following topics:

- [Installation Precautions](#)
- [Installation Guidelines](#)
- [Required Tools](#)
- [Mounting Clearance Requirements](#)
- [Monitor Dimensions](#)
- [Install the Monitor](#)
- [Monitor Connections](#)
- [Connect Power](#)
- [Functional Ground Screw](#)
- [Secure Cables](#)

Review each mounting type and the monitor dimensions before installation.

Installation Precautions

Read and follow these precautions before installing the monitor.

Environment and Enclosure Information



ATTENTION: This monitor is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6561 ft) without derating.

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

This monitor is supplied as open-type equipment. UL recognized and hazardous location equipment must be mounted in an enclosure that is suitably designed or rated for those specific environmental conditions that will be present, and designed to prevent personal injury resulting from accessibility to live parts.

UL Listed equipment need not be mounted inside another enclosure in ordinary (nonhazardous) locations if NEMA Type and IEC ratings are not required, but the mounting method must limit the tilt of the product to no more than 30° from vertical. The mounting means must be firmly attached to the supporting surface using screws, bolts, or clamps so the monitor cannot tip.

All monitors ship with a gasketed bezel to meet specified NEMA and IEC ratings only when mounted in a panel or enclosure with an equivalent rating.

Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#), for additional installation requirements
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by enclosures

European Union Directive

This monitor meets the European Union Directive requirements when installed within the European Union or EEA regions and have the CE mark. A copy of the declaration of conformity is available at the Rockwell Automation website at <http://www.rockwellautomation.com/certification/overview.page>.



ATTENTION: This monitor is intended to operate in an industrial or control room environment, which uses some form of power isolation from the public low-voltage mains. Some computer configurations may not comply with the EN 61000-3-2 Harmonic Emissions standard as specified by the EMC Directive of the European Union. Obtain permission from the local power authority before connecting any computer configuration that draws more than 75 W of AC power directly from the public mains.

Installation Guidelines

Follow these guidelines to make sure your monitor provides safe and reliable service:

- The installation site must have sufficient power.



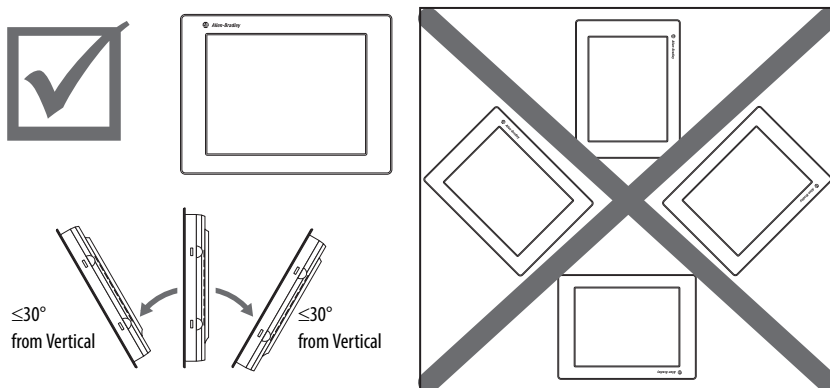
ATTENTION: To maintain an electrically safe installation, the AC powered monitors must be plugged into a grounded outlet.

- The enclosure must allow sufficient space around air inlets and outlets to provide the circulation necessary for cooling. See [Mounting Clearance Requirements on page 14](#) for further information. Never allow air passages to become obstructed.
- The ambient air temperature must not exceed the maximum operating temperature specified in [Table 13 on page 42](#). Consider heat produced by other devices in the enclosure. You may need a user-supplied fan, heat exchanger, or air conditioner to meet this condition.

TIP Hot air rises. The temperature at the top of the enclosure is often higher than the temperature in other parts of the enclosure, especially if air is not circulating.

IMPORTANT The monitor can operate at a range of extremes. However, the life span of any electronic device is shortened if you continuously operate the monitor at its highest rated temperature.

- The humidity of the ambient air must not exceed limits specified in [Table 13 on page 42](#), and must avoid condensation.
- In dry environments, static charges build up easily. Proper grounding of the equipment through the AC power cord helps to reduce static discharges, which may cause shocks and damage electronic components.
- The enclosure or cover must remain in place at all times during operation. The cover provides protection against high voltages inside the monitor and inhibits radio-frequency emissions that might interfere with other equipment.
- For VESA mounting, the installation must provide sufficient mechanical stability to minimize the effects from vibration and shock. The mounting means must be firmly attached to the supporting surface with the appropriate hardware.
- When mounted, the monitor cannot be tilted more than 30° from vertical.



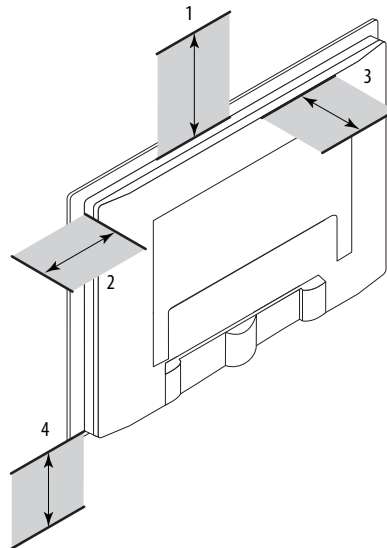
Required Tools

These tools are required for installation:

- Panel cutout tools
- #2 Phillips torque screwdriver

Mounting Clearance Requirements

Review the monitor dimensions to make sure you allow adequate clearance around the monitor for ventilation and cable connections.



Item	Monitor Location	Clearance, min
1	Top	77 mm (3 in.)
2	Side (both)	50 mm (2 in.)
3	Back	50 mm (2 in.)
4	Bottom	50 mm (2 in.)

IMPORTANT

Do not operate the monitor in an enclosure that uses minimum clearances unless adequate ventilation or other cooling methods are used to maintain the monitor temperature at its specified rating.

The ambient temperature around the monitor must not exceed the operating temperature specified in [Table 13 on page 42](#).

Monitor Dimensions

The following illustration and table show dimensions for the panel mount and VESA mount monitors.

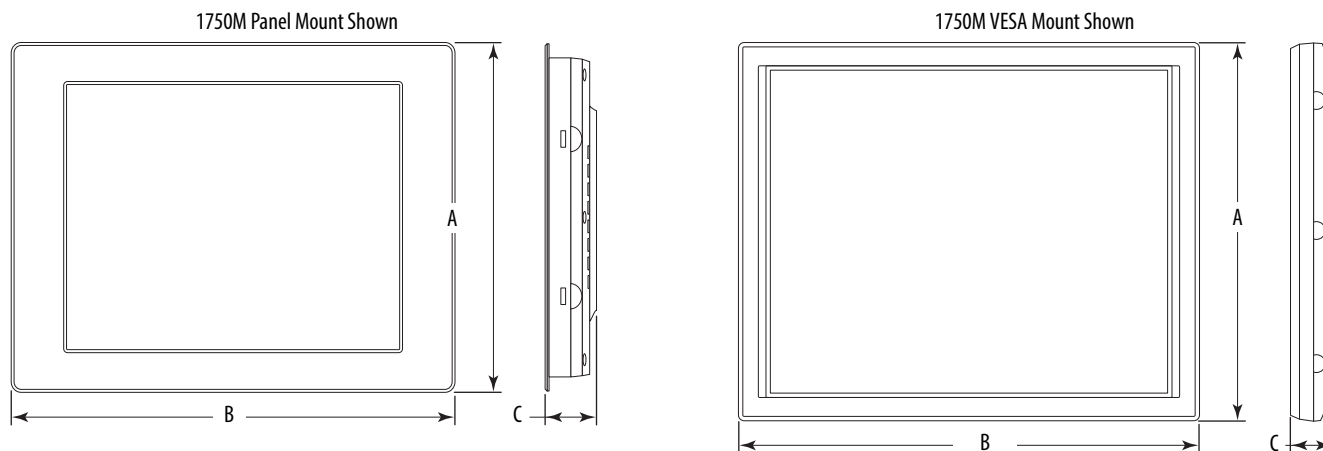


Table 1 - Monitor Dimensions

6176M Model	Mount	A (height)	B (width)	C (depth)	Panel Cutout Height	Panel Cutout Width
1550M	Panel	309 mm (12.3 in.)	410 mm (16.1 in.)	50 mm (2.0 in.)	285.6 mm (11.24 in.)	386.6 mm (15.22 in.)
	VESA	282.6 mm (11.0 in.)	383.6 mm (15.0 in.)	50 mm (2.0 in.)	—	—
1750M	Panel	356 mm (14.0 in.)	452 mm (17.8 in.)	53 mm (2.1 in.)	329.5 mm (12.97 in.)	424 mm (16.69 in.)
	VESA	326.5 mm (12.9 in.)	421 mm (16.6 in.)	53 mm (2.1 in.)	—	—
1950M	Panel	399.3 mm (15.7 in.)	482.6 mm (19.0 in.)	58 mm (2.3 in.)	363.5 mm (14.31 in.)	449.6 mm (17.70 in.)
	VESA	357 mm (14.1 in.)	444 m (17.5 in.)	58 mm (2.3 in.)	—	—

Install the Monitor

There are various ways to install the monitors:

- Panel mount
- Rack mount (for only 1950M monitors)
- VESA mount

Review each mounting type and monitor dimensions before installation.

Panel Mounting

Panel mount monitors are installed directly into a panel with mounting clips. The number of clips varies by model.

Cat. No.	Monitor Model	Mounting Clips
6176M-15PN, 6176M-15PT	1550M	10
6176M-17PN, 6176M-17PT	1750M	10
6176M-19PN, 6176M-19PT	1950M	12

Cat. No.	Description
6189V-MCLPS2	Replacement mounting clips (12)

Panel Mounting Guidelines

Observe these guidelines when installing the monitor in a panel:

- Included with the monitor is Industrial Monitors Cutout Template, publication [6186M-DS001](#), with a cutout template for each monitor model. Panel cutout dimensions are also listed in [Table 1 on page 15](#).
- Cut supporting panels to specifications before installation. Take precautions so metal cuttings do not enter components already installed in the panel.
- Supporting panels must be at least 14 gauge to be sure of proper sealing against water and dust and to provide proper support. The mounting hardware supplied accommodates panels up to 6.25 mm (0.25 in.) thick.



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

Mount the Monitor in a Panel

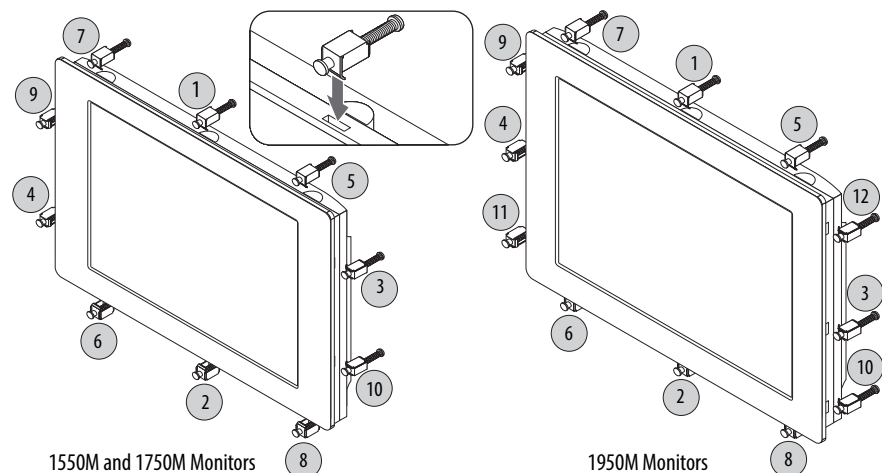
Follow these steps to mount the monitor in a panel.

1. Cut the panel opening using the appropriate cutout dimensions.
2. Attach cables to the monitor before installing if rear access to the monitor is limited after installation.

See [Monitor Connections on page 19](#) for where to attach cables.

3. Verify that the sealing gasket is properly positioned on the monitor.
This gasket forms a compression-type seal. Do not use sealing compounds.
4. Place the monitor in the panel cutout.
5. Slide the mounting clips into the slots on the top, bottom, and sides of the monitor.
6. Hand-tighten the clips in the sequence shown in [Figure 1](#) until the gasket is compressed uniformly against the panel.

Figure 1 - Tightening and Torque Sequence



7. Tighten the mounting clips to a torque of 1.1 N•m (10 lb•in) by following the torque sequence in [Figure 1 on page 16](#), making sure to not overtighten.



ATTENTION: Tighten the mounting clips to the specified torque to provide a proper seal and prevent damage to the monitor. Rockwell Automation assumes no responsibility for water or chemical damage to the monitor or other equipment within the enclosure because of improper installation.

8. Repeat the torque sequence at least three times until all mounting clips are torqued to 1.1 N•m (10 lb•in) and the sealing gasket is compressed uniformly against the panel.

Rack Mounting (1950M monitors)

The 1950M monitor is installed directly into a standard 19-inch rack.

Make sure there is adequate space behind the rack panel. Allow minimum clearances for cables and airflow. See [Panel Mounting Guidelines on page 16](#).

Mount the 1950M Monitor in a Rack

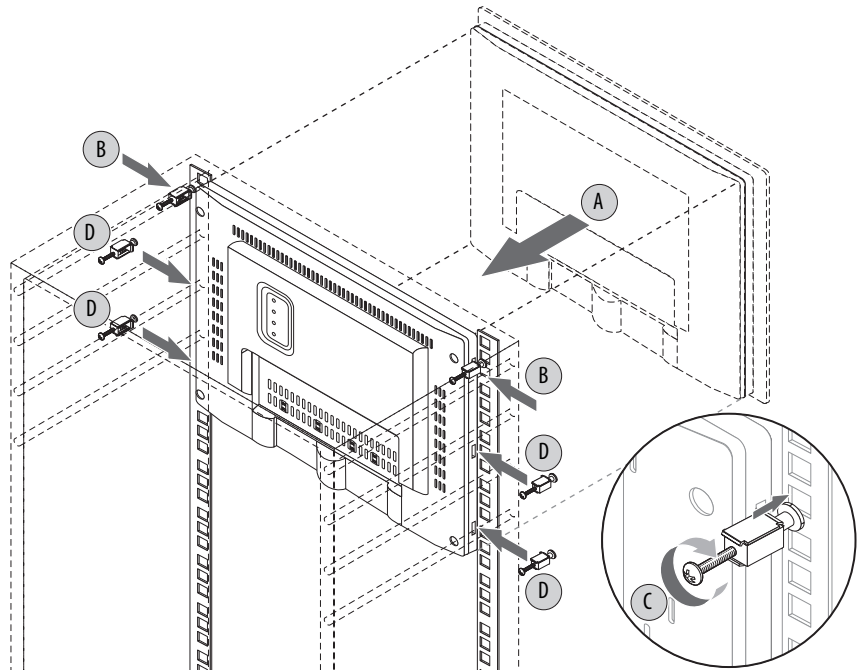
Follow these steps to mount the 1950M monitor in an EIA-rack cabinet.

1. Position the monitor into a standard 19-inch EIA-rack cabinet (A) as shown in [Figure 2 on page 18](#).

TIP For ease of installation, make sure two or more people help to install the monitor.

2. Slide the two clips into the first slots on the sides of the monitor (B).
3. Tighten the clips to a torque of 1.1 N•m (10 lb•in) (C).
4. Slide the remaining clips into the slots on the sides of the monitor (D).
5. Tighten the remaining clips to a torque of 1.1 N•m (10 lb•in) (C).

Figure 2 - Rack Mounting a 1950M Monitor



ATTENTION: The mounting rails that run vertically along the inside edges of the front opening of an EIA-rack cabinet are either wide or universal:

- **Wide rails** have holes spaced 12.7 mm (0.5 in.) and 31.8 mm (1.25 in.) on centers, in a repeating pattern. Wide rails are prevalent in Europe.
- **Universal rails** have holes spaced 12.7 mm (0.5 in.), 15.9 mm (0.625 in.), and 31.8 mm (1.25 in.) on centers, in a repeating pattern. 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 prevalent in the United States.

VESA Mounting

Use the optional bench/tabletop adapter for monitors, catalog number 6189V-MBA, to mount your VESA monitor on a bench or tabletop.

VESA Mounting Guidelines

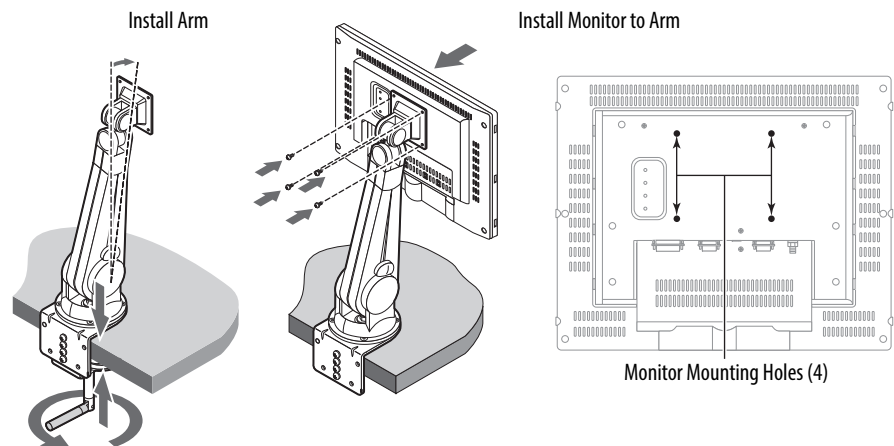
Observe these guidelines when installing the VESA monitor on an arm:

- The mounting surface and the mounting arm must be strong enough to support both the monitor and the mounting hardware.
- The interface between the arm and the monitor must meet VESA FPMPMI 100 mm (3.94 in.) standards.
- The mounting location must provide adequate clearance for positioning and moving the adjustable unit and for routing cables.

Mount the Monitor on a Bench or Tabletop

Follow these directions to mount the VESA monitor to a bench or tabletop.

1. Mount the arm to the bench or tabletop by using screws, bolts, or clamps so the monitor cannot tip.
2. Align the VESA mounting holes in the back of the monitor with the holes in the arm bracket.
3. Insert the four supplied VESA mounting screws through the arm brackets and into the monitor.

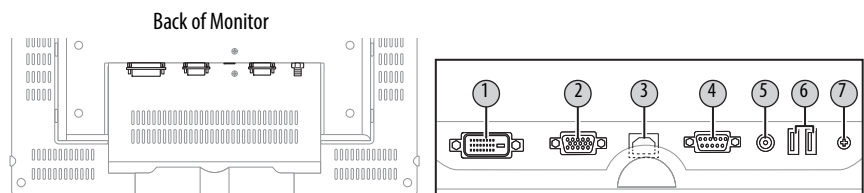


4. Tighten the screws to secure the VESA monitor to the arm.

Monitor Connections

Use the connectors on the rear of the monitor to connect the following:

- Analog video source (HD-15 VGA connector)
- Digital video source (DVI connector)
- Serial port on a computer for the optional touchscreen interface
- USB port on a computer for the optional touchscreen interface
- USB hub device ports for connecting peripheral devices
- Power (DC input connector must be used with supplied AC power adapter)



No.	Connector
1	DVI-D video input
2	HD-15 video input
3	USB Type B connection to computer
4	RS-232 input (optional)

No.	Connector
5	DC power input (AC adapter)
6	USB Type A connection to peripheral devices (2)
7	M5 ground screw

Connect to an Analog Video Source

All monitors support analog video. Your monitor is shipped with a high-quality analog video cable. Use this video cable to connect a computer to the monitor.

Cat. No.	Description
6189V-VGACBL2	Analog video cable, 1.9 m (6.3 ft)
6189V-PCIDVI	Dual analog/digital video card, PCI

Follow these steps to connect the monitor to an analog video source.

1. Connect one end of the analog video cable to the female, HD-15 video input connector on the monitor.
2. Connect the other cable end to the VGA port on the computer or to the video generator VGA port, if used.

TIP You can use a cable with a maximum length of 15 m (50 ft) at lower monitor resolutions, provided it is a high-quality video cable. Video amplifiers are available for longer distances.

You can connect the monitor to a video generator that does not conform to VGA standards if the generator provides analog RGB video signals (0.714V above reference black into 75 W) and separate horizontal and vertical sync signals. Depending on the signal, the monitor may or may not function properly.

Connect to a Digital Video Source

All monitors support digital video. Use a digital video cable to connect a computer to the DVI connector on the monitor. This cable is not supplied, but can be purchased as an accessory.

Cat. No.	Description
6189V-DVICBL2	Digital video cable, 1.8 m (6 ft)
6189V-DVICBL5	Digital video cable, 5 m (16.4 ft)
6189V-PCIDVI	Dual analog/digital video card, PCI

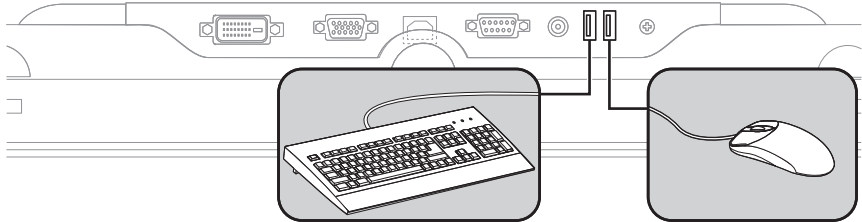
Follow these steps to connect the monitor to a digital video source.

1. Connect one end of the digital video cable to the female, DVI video input connector on the monitor.
2. Connect the other cable end to the output of any digital DVI video source.

TIP For a DVI cable longer than 5 m (16.4 ft), use a DVI cable extension. However, DVI cables longer than 5 m (16.4 ft) exceed the DVI maximum cable length specification.

Connect USB Peripheral Devices

The monitor is equipped with a USB hub that provides communication between a computer and any USB compatible device, such as a keyboard, mouse, or memory stick. The USB hub ports are enabled only when the monitor is powered on and the connection is made between the type B connector and the computer.



Connect the Optional Touchscreen Interface

An optional touchscreen provides a high-resolution touch input system. The driver software included with the monitor lets the touchscreen function with many Microsoft Windows industrial applications such as a pointing device or mouse.

A touchscreen interface to the computer can be configured using either the serial RS-232 connection or USB connection.

Connect the Optional Serial RS-232 Touchscreen Interface

The RS-232 DB9 (female) D-shell connector on the bottom side of the monitor provides the serial touchscreen interface connection to the host.

Follow these directions to connect the touchscreen interface.

1. For units with the touchscreen option, connect one end of the included touchscreen serial cable to the RS-232 port connector on the monitor.
2. Connect the other end of the cable to a serial port on the host computer.
3. Tighten the captive screws on the cable connector to secure it.

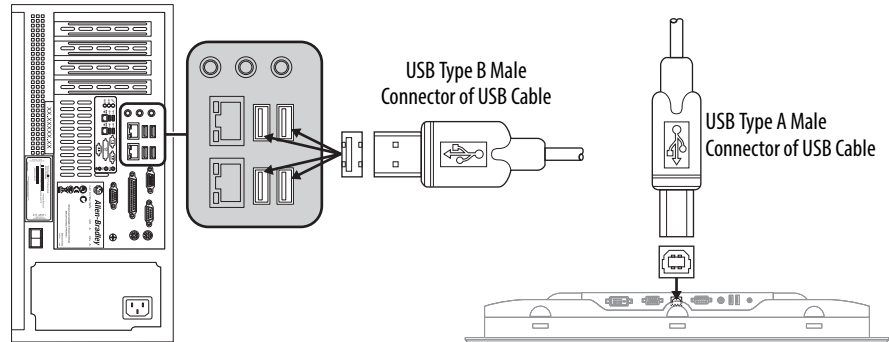
Connect the USB and Optional USB Touchscreen Interface

The USB Type A connection to the host computer is used to connect USB devices and the optional USB touchscreen interface to the host computer.

Cat. No.	Description
6189V-TCHCBL2	Serial touch cable, RS-232 cable, 1.8 m (6 ft)
6189V-USBCBL2	USB/USB touch cable, Type A to Type B, 1.8 m (6 ft)

Follow these directions to connect the touchscreen interface.

1. Connect the USB Type A male connector on the included USB cable to the USB Type A female connector on the monitor.
2. Connect the USB Type B male connector on the USB cable to the USB Type B female connector on the host computer.



Install the Touchscreen Driver

Before installing the touchscreen driver, we recommend that you check cable connections and communication rate for the interface you are using.

Interface	Action
RS-232	<ul style="list-style-type: none"> • Verify that the supplied RS-232 cable is properly installed between RS-232 input connector on the monitor and the host's COM port. • Verify that the communication rate of the COM port matches the touchscreen controller communication rate. The controller communication rate is factory-set at 9,600 baud.
USB	<ul style="list-style-type: none"> • Verify that the USB cable is properly installed between the USB input connector on the monitor and a USB port on the host computer.

You are now ready to install the touchscreen driver found on the Accessories CD or at <http://www.ab.com/linked/industrialcomputers/drivers/monitors.html>.

Perform a Calibration

After installing the driver, follow the calibration instructions in the touchscreen documentation. After calibration, the touchscreen is ready to use.

Connect Power

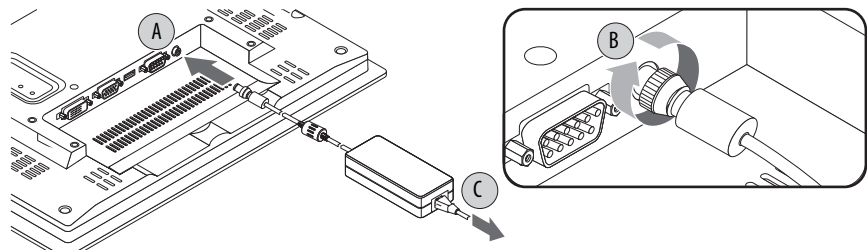
With the AC power adapter, the monitor can use a single-phase AC power supply, providing 90...264V AC at 47...63 Hz. Use only the AC adapter supplied with the monitor.

Power must be available at a nearby grounded outlet. Whenever possible, connect the monitor to the same AC power source that supplies the computer.

Cat. No.	Description
6189V-MPS3	Replacement AC power adapter

Follow these steps to connect power to the monitor.

1. Connect the supplied AC power adapter cable to the power input connector on the monitor (A).
2. Secure this connection by screwing the barrel over the threads (B).



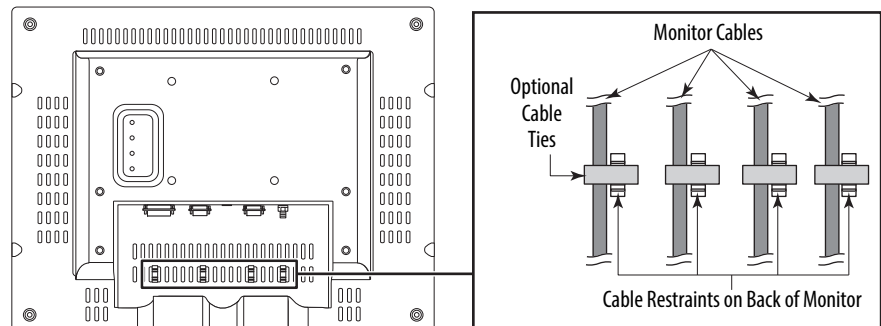
3. Connect the AC power cord to the main power supply (C).

Functional Ground Screw

Using the functional ground screw is not required for safety and regulatory compliance. However, you can use the functional ground screw on the rear panel of the monitor if a supplemental ground is desired.

Secure Cables

Use optional cable ties to organize the monitor cables and secure them to the cable restraints on the back of the monitor. Organizing your cables provides easier access and identification.



Notes:

Display Configuration

Chapter Objective

This chapter covers the following topics:

- [Set the Monitor Type](#)
- [Check and Change the Display Resolution](#)
- [How to Use the OSD Buttons](#)
- [How to Use the OSD Buttons](#)
- [Use the Auto Adjust Control](#)
- [Change Monitor Settings with OSD](#)
- [OSD Menus](#)

Set the Monitor Type

The monitors are plug-and-play compliant devices. Your computer automatically sets the monitor type. Additional setup is not required.

Check and Change the Display Resolution

Flat panel monitors are fixed-resolution devices. The image looks best when the monitors are operated at their native resolution. However, the monitors have advanced scaling capabilities to make the display look as good as possible while running in non-native modes.

These are the native resolutions of the monitors:

- 1550M: 1024x768
- 1750M and 1950M: 1280x1024

If you switch the resolution of your monitor from its native resolution, the display may look slightly distorted due to the replication techniques used to fill the full screen with an image.

To check or change your monitor's display resolution, access the Display settings in the Control Panel on your computer.

TIP A refresh rate of 60 Hz is optimal for LCD flat-panel displays. █

How to Use the OSD Buttons

To adjust your monitor, use the OSD buttons at the rear of the monitor.

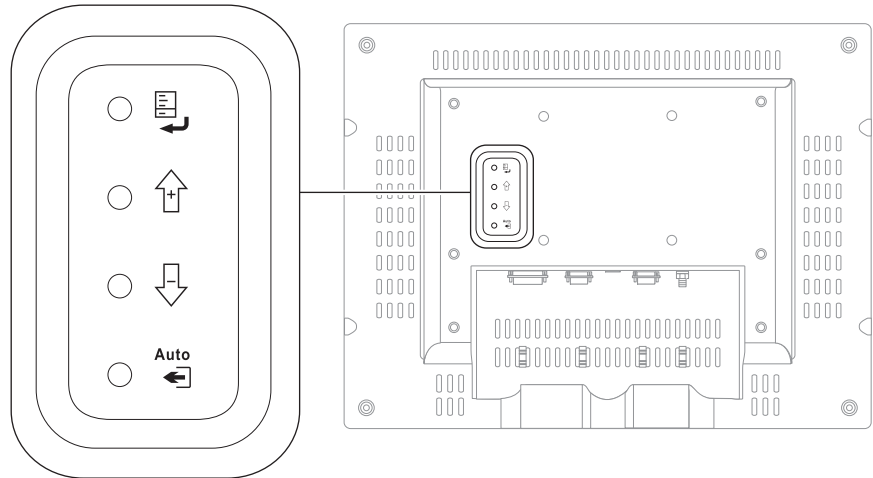


Table 2 - OSD Buttons Description

OSD Button	Control	Description
	Menu/Return	<ul style="list-style-type: none"> • Opens the OSD and submenus. • Selects the highlighted function. • Saves selections.
	Adjust Buttons (up and down arrows)	<ul style="list-style-type: none"> • Moves between OSD menus and submenus. • Increases or decreases values in OSD menus and submenus. • Increase or decrease monitor brightness level when OSD is off.
Auto 	Auto Adjust/Exit	<ul style="list-style-type: none"> • Starts the automatic (video) adjustment function. • Exits the OSD.

Lock Access to the OSD



OSD Lockout prevents unauthorized or unintentional adjustments to OSD functions.


To perform an OSD Lock or Unlock on the monitors while the OSD is off, press and hold the up and down arrow buttons simultaneously for at least three seconds. ■

Adjust the Monitor Brightness


To adjust brightness levels, use the Adjust buttons on the rear of the monitor. Press the '+' button to increase brightness and the '-' button to decrease brightness while the OSD is off. Adjusted settings are automatically saved.

Use the Auto Adjust Control

IMPORTANT The Auto Adjust function applies only to a VGA **analog** video source; there is no effect on a DVI digital video source.

When you press the Auto Adjust/Exit  button, the monitor samples the input video signal and accurately adjusts the screen size, position, and phasing. This function works with most screens that use reasonable video content, but Rockwell Automation ships a ScreenSet monitor set-up utility on a CD to display the best possible image for setup.

IMPORTANT The ScreenSet monitor set-up utility is designed for only Windows 32-bit and 64-bit operating systems.

1. Insert the Accessories CD, provided with the monitor, into your computer's CD-ROM drive.
2. Locate and start the ScreenSet utility that is named ScreenSet.exe.
3. Press the Auto Adjust/Exit  button.

The auto adjustment display appears. Your screen has the potential to flicker during the Auto Setup process. When the auto adjustment is complete, your monitor is properly adjusted and the settings are automatically saved.



TIP A computer switches through several video modes while starting. The monitor stores set-up information for each video mode. If you have trouble reading the display during the starting video modes, you can also press the Auto Adjust/Exit button during that time.





Change Monitor Settings with OSD

Use the OSD buttons on the back of your monitor to change your monitor's settings.

The OSD contains similar menu functions for each monitor. The menus are icon driven.

General OSD Menu Navigation Guidelines

See [How to Use the OSD Buttons on page 26](#) for where the Menu/Return and arrow buttons are located. See any of the six OSD main menu tabs starting on [page 30](#) for where the Back  and Exit  buttons are located.

- Press the Menu/Return  button to do the following:
 - Open the OSD main menu.
 - Activate the highlighted function.
 - Activate a highlighted sub-function.
- Press the arrow  buttons to do the following:
 - Move between the function icons.
 - Make your changes.
 - Select the sub-function if an icon has more than one sub-button.
- As you move from one function to the other, the function menu changes to represent the correct icon.
- Press the Back  button once to return to the OSD main menu where you can select another function.
- Press the Exit  button to exit the OSD main menu.

OSD Menus

You can modify the settings to the monitors by using the following menus:

- Signal Selection
- Brightness and Contrast
- Color
- Image
- Tools

OSD Main Menu

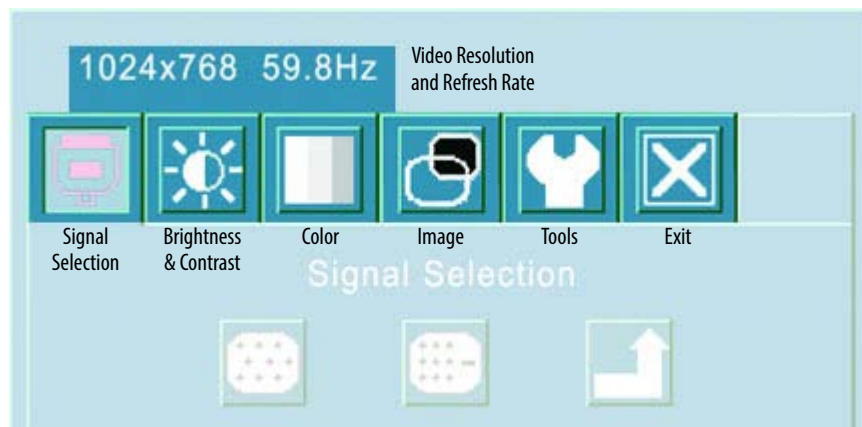


Table 3 - Main Menu Description

Main Menu	Description
Signal Selection	Accesses options for selecting analog or digital picture input. The input selection depends on the signal from the computer and the type of cable connected to the monitor.
Brightness & Contrast	Accesses functions to adjust the brightness and contrast.
Color	Accesses functions to select standard RGB levels, manually adjust RGB levels or set the color temperature.
Image	Accesses functions to auto-adjust the display settings or manually adjust the horizontal and vertical image position, frequency phase, and width level.
Tools	Accesses functions to adjust the OSD, reset factory settings.
Exit	Exits the OSD main menu.

Signal Selection Menu

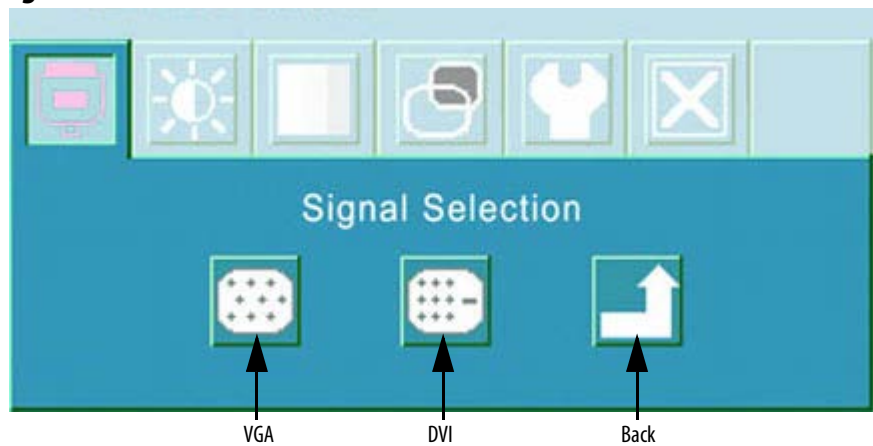


Table 4 - Signal Selection Menu Description

Icon	Function
VGA (analog input)	Displays the incoming VGA analog signal from the 15-pin VGA input connector.
DVI (digital input)	Displays the incoming DVI digital signal from the DVI input connector.
Back	Returns to the OSD main menu.

Brightness and Contrast Menu

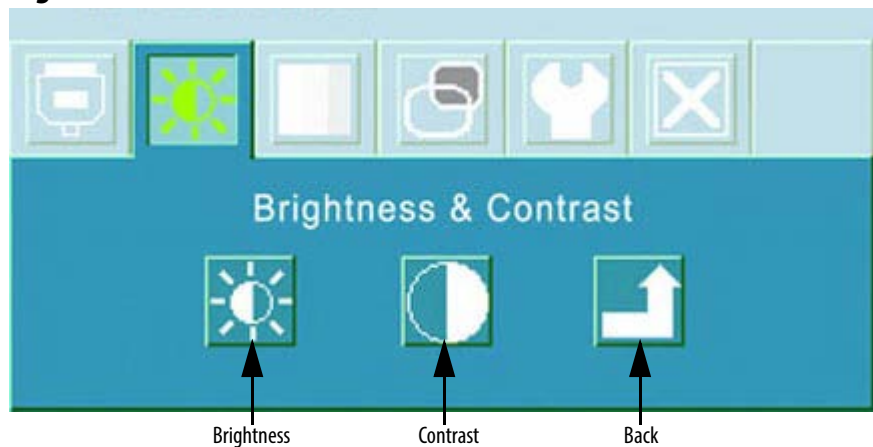
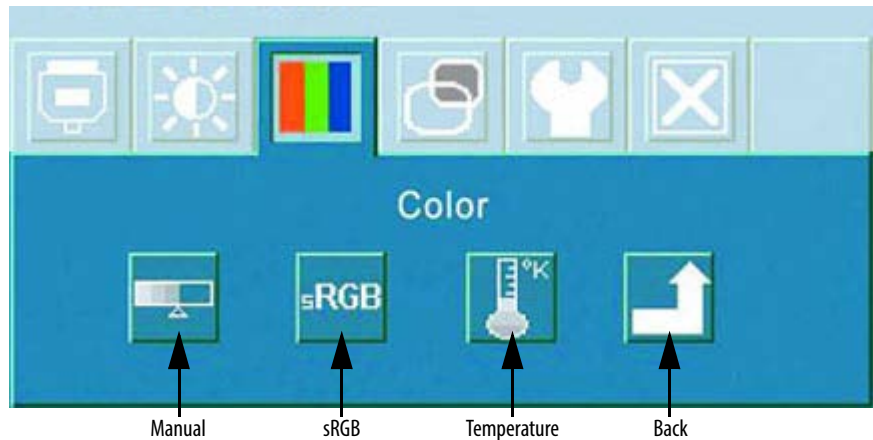


Table 5 - Brightness and Contrast Menu Description

Icon	Function	Value Range
Brightness	Adjusts the brightness of the screen.	0...100
Contrast	Adjusts the contrast of the screen.	0...100
Back	Returns to the OSD main menu.	

TIP The more common way to adjust brightness is to use the Up/Down buttons on the back of the monitor. See [page 26](#) for further information.

Color Menu



Temperature Submenu



Table 6 - Color Menu and Temperature Submenu Descriptions

Color Functions	Description	Value Range
Manual	Adjusts the amount of red, green, and blue on the screen.	0...100
sRGB	Automatically adjusts the RGB settings.	
Temperature	Adjusts the color temperature values.	
Back	Returns to the OSD main menu.	

Temperature Functions	Description	Value Range
Temperature Settings	Sets the white point/color temperature based on degrees Kelvin (K): <ul style="list-style-type: none"> • 4200 • 5000 • 6500 = typical personal computer • 7500 • 9300 = typical television and monitor default setting 	4200...9300
Back	Returns to the Color menu.	

Image Menu

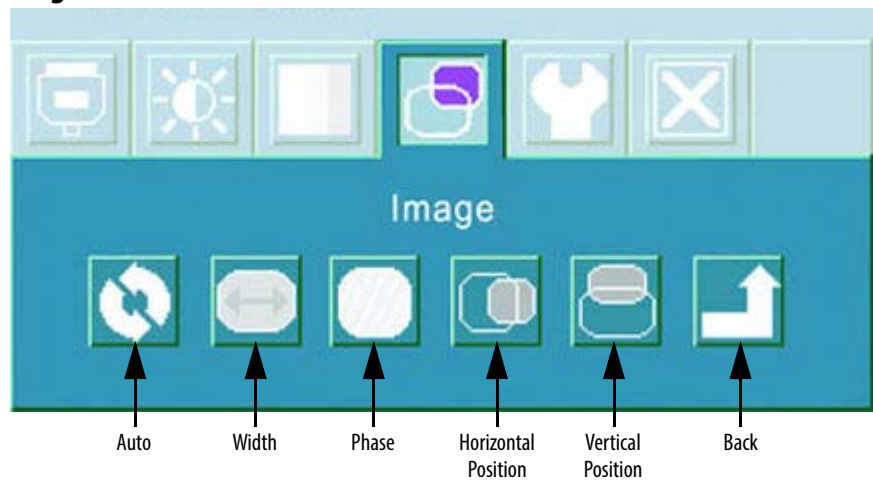
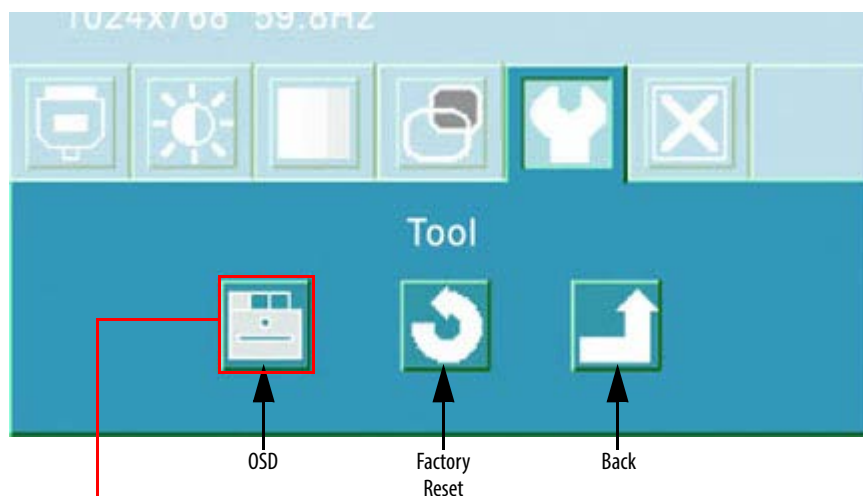


Table 7 - Image Menu Description

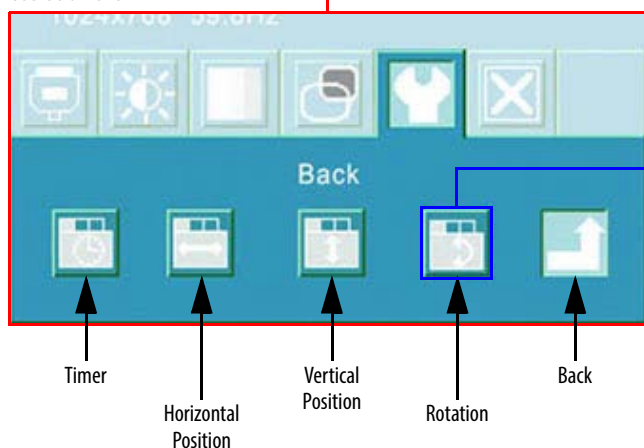
Image Functions	Description	Value Range
Auto	Automatically adjusts the horizontal and vertical image position, frequency phase, and black level.	
Width	Adjusts the width.	0...100
Phase	Adjusts the sampling phase.	0...100
Horizontal Position	Adjusts the horizontal position of the image on the screen.	0...100
Vertical Position	Adjusts the vertical position of the image on the screen.	0...100
Back	Returns to the OSD main menu.	

TIP The Image functions are not available with a DVI connection.

Tool Menu



OSD Submenu



Rotation Submenu

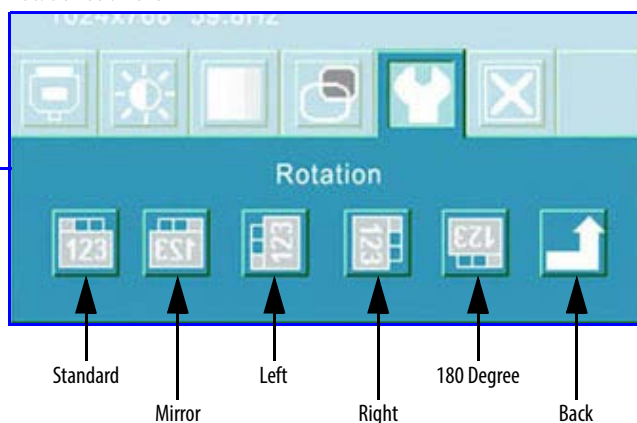


Table 8 - Tool Menu, OSD Submenu, and Rotation Submenu Descriptions

Tool Functions	Description
OSD	Accesses the OSD submenu.
Factory Reset	Resets all OSD settings to factory defaults.
Back	Returns to the OSD main menu.

OSD Functions	Description	Value Range
Timer	Sets a maximum idle time for exiting the OSD system if input is not received.	0...100 seconds in increments of 2
Horizontal Position	Adjusts the horizontal position of the OSD menu.	0...255
Vertical Position	Adjusts the vertical position of the OSD menu.	0...155
Rotation	Adjusts the direction of the OSD menu.	See submenu below
Back	Returns to the Tools menu.	

Rotation Functions ⁽¹⁾	Description
Standard	Images are upright and text is read left-to-right.
Mirror	Images and text are reversed (backwards).
Left	View moves from bottom-to-top of monitor.
Right	View moves from top-to-bottom of monitor.
180 Degree	Images and text are reversed and upside down.
Back	Returns to the Tools menu.

(1) Rotation functions apply to display but not the monitor. See installation guidelines on [page 13](#) for monitor orientation.

Notes:

Perform Routine Maintenance

Chapter Objective

This chapter describes how to clean the monitors, replace a line cord, and perform other routine maintenance.

Clean the Monitor

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 towards the screen surface to avoid scratching it with accumulated grit.

Displays and touch screens are resistant to the following chemicals:

- Ethyl alcohol
- Methyl alcohol
- Cleaning naphtha
- Commercial glass cleaners
- Ammonia in 10% diluted solution

IMPORTANT Apply the solvent 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 air dry.



ATTENTION: You can use alcoholic or ammonia cleaners to clean the polycarbonate shield or a touchscreen. However, use only one or the other at all times. A residue mixture can cause a chemical reaction.

Be careful when cleaning a touch screen shield that is installed over the screen. Abrasive and certain chemical cleaners can easily damage the surface.

Cat. No.	Description
6189V-SCRNCOVER15	15" Screen Cover for flat front bezels
6189V-SCRNCOVER17	17" Screen Cover for flat front bezels

Replace a Line Cord

To avoid shock and fire hazards, replace the monitor's power cord if the insulation breaks or if the cord develops a loose internal connection. Contact your authorized Allen-Bradley distributor for ordering information.

Other Maintenance

Qualified service personnel must perform all maintenance, except for the power cord replacement. Contact Allen-Bradley Technical Support for assistance.

Backlight Assembly Disposal



ATTENTION: The backlight assembly in this monitor contains mercury. At the end of its life, this monitor must be collected separately from any unsorted municipal waste.

Ship or Transport the Monitor

If you need to ship the monitor via common carrier or transport it to another location, you must first uninstall the monitor and place it in its original packing material.



ATTENTION: Do not ship or transport the monitor when it is installed in a machine, panel, or rack. Doing so may cause damage to the monitor. You must uninstall the monitor and place in its original packing material before shipping. Rockwell Automation is not responsible for damage incurred to a monitor that is shipped or transported while installed in a machine, panel, or rack.

Troubleshoot the Monitor

Chapter Objective

This chapter covers the following topics:

- [Run the Self-test](#)
- [Troubleshooting](#)

Run the Self-test

Use the self-test procedure to verify that your monitor is running correctly. If the monitor and computer are properly connected but the monitor remains dark and the power indicator is blinking, run the self-test.

Follow these steps to run the self-test.

1. Shut down the computer and disconnect power to the monitor.
2. Unplug the video cable from the back of the computer.
3. Apply power to the monitor.

If the monitor is functioning properly, a self-test box appears that reads:
No Signal

IMPORTANT This self-test box also appears during normal operation if the monitor is disconnected or damaged.

4. Disconnect power from your monitor and reconnect the video cable
5. Apply power to your computer and the monitor.
6. If your monitor screen remains blank after the previous procedure, check your video controller and computer system because your monitor is functioning properly.

Troubleshooting

The troubleshooting table lists typical issues you may encounter when using your monitor. It contains symptoms and possible actions to correct an issue.

Table 9 - Troubleshooting

Symptom	Action
No Sync or No Signal, going to sleep appears	<p>Check the video cable connection between the computer and monitor. Make sure you are using the video cable supplied with the monitor or a similar high quality cable.</p> <p>Perform the automatic video adjustment function.</p>
Screen is blank	<p>The video mode may be out of range. Change to the native resolution.</p> <p>Disable the screen saver.</p> <p>Adjust the brightness and contrast settings using the appropriate OSD menu.</p> <p>Verify that the power cord is connected.</p> <p>Test the outlet by plugging in a properly functioning device.</p> <p>Replace the suspected faulty cable or power cord.</p> <p>Have the monitor serviced.</p>
Video mode is not supported	Check the maximum resolution and the frequency on the video port of your computer.
Picture is scrambled	<p>The video mode may be out of range. Change to the native resolution.</p> <p>Check the video cable connection between the computer and monitor. Make sure you are using the video cable supplied with the monitor or a similar high quality cable.</p> <p>Check the maximum resolution and the frequency of the video port of your computer.</p> <p>Perform the automatic video adjustment function.</p>
Picture is not clear	<p>Verify that the refresh frequency rate is set to 60 Hz. Access the Control Panel>Displays>Settings, then click the Advanced button and the Monitors tab.</p> <p>Check the video cable connection between the computer and monitor. Make sure you are using the video cable supplied with the monitor or a similar high quality cable.</p> <p>Perform a monitor reset.</p> <p>Eliminate unnecessary accessories such as video extension cables.</p> <p>Perform the automatic video adjustment function.</p>
Vertical shaded bars on screen image	Image lock is not properly adjusted. Reset the horizontal positioning using the appropriate OSD menu.
Display is present, but bars appear across it or roll through it	Eliminate ground loops by connecting the monitor and computer to the same power source location, or installing an ac isolation transformer.
Picture bounces or has wavy oscillations	Verify that the refresh frequency rate is set to 60 Hz. Access the Control Panel>Displays>Settings, then click the Advanced button and the Monitors tab.
Picture has blurry streaks or ghosting to the right of objects on the screen	Adjust the contrast settings using the appropriate OSD menu.
Images are too bright or too dark	Adjust the brightness and contrast settings using the appropriate OSD menu. Brightness issues that cannot be corrected can be the result of a poor video signal output from the video source.
Image is not stable	<p>The video mode may be out of range. Change to the native resolution.</p> <p>Check for proper video cable installation. Replace the suspected faulty cable.</p>
Screen jitter or noisy video	<p>The video mode may be out of range. Change to the native resolution.</p> <p>Check for proper video cable installation. Replace the suspected faulty cable.</p> <p>Reroute the cables or replace suspected faulty cables.</p> <p>Check the host computer and monitor grounding.</p>
Image is dim, even with brightness, and contrast controls set to highest level	<p>Check for proper video cable installation. Replace the suspected faulty cable.</p> <p>Test the video source by connecting to another monitor that you know is operational. Brightness issues that cannot be corrected can be the result of a poor video signal output from the video source.</p>

Table 9 - Troubleshooting (continued)

Symptom	Action
Screen image is not centered or sized properly	The video mode may be out of range. Change to the native resolution.
	Adjust the horizontal and vertical position settings using the appropriate OSD menu.
	Check the image size selection using the appropriate OSD menu.
	Perform the automatic video adjustment function.
Color is not uniform	Adjust the color setting using the appropriate OSD menu.
Colors are distorted with dark or shadowed areas	Adjust the color setting using the appropriate OSD menu.
White does not look white	Adjust the color setting using the appropriate OSD menu.
Image position changes are not saved	Reposition the image using the appropriate OSD menu. Make sure you press the Menu/Return button to save selections.
The power indicator blinks amber once	The monitor is saving your changes to the OSD menu.
The power indicator is amber	The monitor is using its power management.
OSD does not respond to any button press except ON/OFF and Auto adjust.	A firm button press is required. Make sure the OSD lockout is disabled.

Notes:

Specifications

Table 10 - Display

Attribute	1550M Models	1750M Models	1950M Models
Display type	Color Active Matrix TFT LCD		
Touchscreen description	Resistive antiglare		
Touchscreen controller Series A and B Series C	Panjit EETI		
Available touchscreen drivers Series A and B Series C	<ul style="list-style-type: none"> • Windows XP Professional • Windows Server 2003 (32-bit) • Windows 7 Professional (32-bit) • Windows XP Professional • Windows Server 2003 (32-bit) • Windows 7 Professional (32-bit and 64-bit) • Windows Server 2008 (64-bit) 		
Display size (diagonal)	381 mm (15.0 in.)	432 mm (17.0 in.)	483 mm (19.0 in.)
Display area (WxH), approx	305 x 229 mm (9.0 x 12.0 in.)	338 x 270 mm (13.3 x 10.7 in.)	377 x 302 mm (14.8 x 11.9 in.)
Resolution (WxH), approx	1024 x 768 (native mode), 16.7M colors	1280 x 1024 (native mode), 16.7M colors	
Luminance (typical)	350 cd/m ² (Nits)	300 cd/m ² (Nits)	
Contrast ratio (typical)	400:1	800:1	
Response time Rising Falling	4 ms 12 ms	6 ms 3 ms	
Backlight	CCFT tubes; 50,000 hr (for 1/2 brightness)		

Table 11 - Mechanical

Attribute	1550M Models	1750M Models	1950M Models
Dimensions (HxWxD), approx			
Panel mount monitors	309.0 x 410.0 x 50.0 mm (12.2 x 16.1 x 2.0 in.)	356.0 x 452.0 x 53.0 mm (14.0 x 17.8 x 2.1 in.)	399.3 x 482.6 x 58.0 mm (15.7 x 19.0 x 2.3 in.)
VESA mount monitors	282.6 x 383.6 x 50.0 mm (11.0 x 15.0 x 2.0 in.)	326.5 x 421.0 x 53.0 mm (12.9 x 16.6 x 2.1 in.)	357.0 x 444.0 x 58.0 mm (14.1 x 17.5 x 2.3 in.)
Weight			
Panel mount monitors	4.1 kg (9.02 lb)	5.7 kg (12.54 lb)	7.5 kg (16.50 lb)
VESA mount monitors	3.1 kg (6.82 lb)	4.6 kg (10.12 lb)	6.0 kg (13.20 lb)

Table 12 - Electrical

Attribute	1550M Models	1750M Models	1950M Models
Input voltage, AC DC	90...264V, autoranging 12V (power adapter required)		
Line frequency	47...63 Hz		
Power consumption	2 A at 24 W	3 A at 36 W	3.5 A at 42 W

Table 13 - Environment

Attribute	1550M, 1750M, 1950M Models
Temperature Operating Nonoperating	0...45 °C (32...113 °F) -20...60 °C (-4...140 °F)
Relative humidity	10...90% noncondensing
Shock Operating Nonoperating	15 g (1/2 sine, 11 ms) 20 g (1/2 sine, 11 ms)
Shock Operating Nonoperating	15 g (1/2 sine, 11 ms) 20 g (1/2 sine, 11 ms)
Vibration Operating Nonoperating	0.015 in p-p, 10...53 Hz, 1.0 g peak, 53...640 Hz 0.015 in p-p, 10...53 Hz, 2.0 g peak, 53...640 Hz
Enclosure ratings ⁽¹⁾	NEMA Type 4, 12, IEC IP66

(1) Applies only to panel mounted monitors.

Table 14 - Certifications

1550M, 1750M, 1950M Models ⁽¹⁾		
• C-Tick	• CE Marked for all applicable directives	• European RoHS
• China RoHS	• RoHS Compliant	• UL/c-UL Listed

(1) See <http://www.rockwellautomation.com/certification/overview.page> for declarations of conformity, certificates, and other certification details.

Touchscreen Serial Interface

All touchscreen controllers are configured by default to provide serial communication at 9600 Kbps, 8 data bits, 1 stop bit, and no parity.

The RS-232 and USB input connectors on the monitor provide a communication channel between the touchscreen controller, which is mounted inside the monitor, and either the RS-232 or USB connector on the host computer. Because the touch controller obtains power from the monitor's power supply, no external touch power connections are necessary. The monitors ship with a serial RS-232 and USB touch screen interface cable.

Software supplied with the touchscreen must be loaded on the host computer to handle communication 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.

Set Up the Touchscreen Interface

To set up the touchscreen system, you must do the following:

- [Enable the Touchscreen Interface](#)
- [Install the Touchscreen Driver Software](#)
- [Perform a Calibration](#)

Enable the Touchscreen Interface

The monitors have an RS-232 input and USB input connector on the rear of the unit. These connectors provide the interface for the touch controller.

The table shows how to interconnect the RS-232 wiring to the host serial port.

Monitor (DCE Device) DB-9 (Male)	Signal Description	Host (DTE Device)	
		DB-9 (Female)	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

Install the Touchscreen Driver Software

Before installing the touchscreen driver software, check the following for the interface you are using:

- RS-232 Interface: Verify that the supplied RS-232 cable is properly installed between the RS-232 input connector on the monitor and the COM port (typically COM2) on the host computer.
- USB interface: Verify that the USB cable is properly installed between the USB input connector on the monitor and a USB port on the host computer.
- Verify that the COM port communication rate matches the touchscreen controller communication rate, which is factory-set at 9600 Kbps.

You are now ready to install the touchscreen driver on the Industrial Monitors and Accessories CD.

Perform 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.

Video Cables

You can use the HD-15 connector cable included with your monitor to connect the monitor to the host computer.

HD-15 Video Connector

The HD-15 video cable, 1.83 m (6 ft), has a conventional HD-15 connector at each end.

The Standard DVI Video Cable table provides the pin numbers and corresponding pin assignments for the HD-15 video connector with the DDC2B capability.

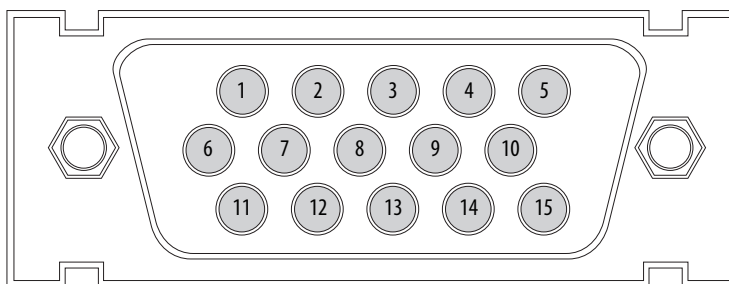


Table 15 - Standard HD-15 Video Cable

Monitor (female)	Signal Description	Host (male)
1	Red video	1
2	Green video	2
3	Blue video	3
4	Not used	4
5	Hot plug detect	5
6	Red video ground	6
7	Green video ground	7
8	Blue video ground	8

Monitor (female)	Signal Description	Host (male)
9	VGA power	9
10	Not used	10
11	Not used	11
12	DDC data	12
13	Horizontal sync	13
14	Vertical sync	14
15	DDC clock	15

DVI Video Connector

The Standard DVI Video Cable Connector table provides the pin numbers and corresponding pin assignments for the supported video connectors. Each connector is female.

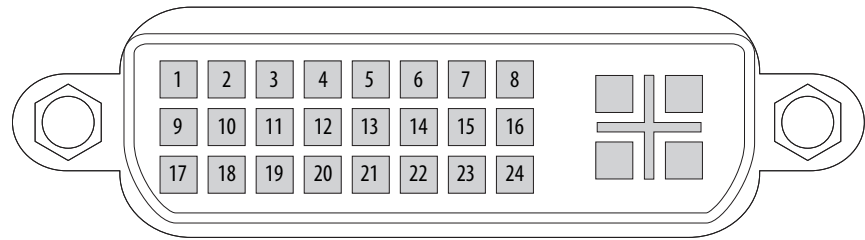


Table 16 - Standard DVI Video Cable

Pin #	DVI Port	Pin #	DVI Port
1	DATA2-	13	Not used
2	DATA2+	14	DVI power +5V
3	DATA 2/4 shield	15	Ground
4	Not used	16	Hot plug detect
5	Not used	17	DATA0-
6	DDC clock	18	DATA0+
7	DDC DATA	19	DATA 0 shield
8	Not used	20	Not used
9	DATA1-	21	Not used
10	DATA1+	22	Clock shield
11	DATA 1/3 shield	23	Clock+
12	Not used	24	Clock-

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Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support>, you can find technical manuals, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools. You can also visit our Knowledgebase at <http://www.rockwellautomation.com/knowledgebase> for FAQs, technical information, support chat and forums, software updates, and to sign up for product notification updates.

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

Installation Assistance

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

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

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

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

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

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Publication 6176M-UM001D-EN-P - December 2012

Supersedes Publication 6176M-UM001C-EN-P - September 2007

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