

Industrial Computers for Hazardous Locations

Catalog Numbers 6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC

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Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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

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

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

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



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.

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

Labels may also be on or inside the equipment to provide specific precautions.



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.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Installation Precautions

Read and follow these precautions before you install the computer.

Environment and Enclosure Information



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

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 22. Without appropriate precautions, there can be potential difficulties with electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as an open type equipment. To meet some regulatory requirements, the computer must be mounted in an enclosure that is suitably designed for environmental conditions that can be present and appropriately designed to help prevent personal injury resulting from accessibility to live parts. The interior of the enclosure must be accessible only by using a tool.

All 6181X-12 display computers are shipped with a gasketed bezel to meet specified NEMA, UL Type, and IEC ratings only when mounted in a panel or enclosure with an equivalent rating.

In addition to this publication, see the following:

- Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#), for more installation requirements
- NEMA 250, UL 50, and IEC 60529, as applicable, for explanations of the degrees of protection that are provided by enclosures

European Union Directive

This computer 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 the conformity is available at <http://www.rockwellautomation.com/certification>.



ATTENTION: To comply with EN 55022 and EN 55024, all I/O cables must be less than 30 m (98.42 ft) and used only indoors. These cables cannot exit the building at any point and cannot directly connect to cables outside the building.

To comply with EN 55022 and EN 55024, use the following for cable types.

Cable Type	Required Attribute
LAN	Shielded or unshielded
USB	Shielded
Serial RS-232	Shielded
DVI	Shielded

Cable Type	Required Attribute
DP	Shielded
VGA	Shielded
DC power	Unshielded

Hazardous Locations

This equipment is suitable for these location categories.

Computer Model	Cat. Nos.	Region	Rating	Temperature Range
Non-display ⁽¹⁾	6181X-NPXPDC, 6181X-NPW7DC	United States	Class I Division 2, Groups A, B, C, D T4	-20 °C ≤ T _a ≤ 70 °C ⁽³⁾ (-4 °F ≤ T _a ≤ 158 °F)
			Class I Zone 2, IIC, T4	
		Canada	Class I Division 2, Groups A, B, C, D T4	
			Class I Zone 2, IIC, T4	
		Europe	ATEX II 3 GD, Ex nA IIC Gc, Ex tc IIIC Dc	
		Global/IECEx	Ex nA IIC Gc, Ex tc IIIC Dc	
Display (12 in.) ⁽²⁾	6181X-12TPXPDC, 6181X-12TPW7DC	United States	Class I Division 2, Groups A, B, C, D T4	-20 °C ≤ T _a ≤ 55 °C (-4 °F ≤ T _a ≤ 131 °F) (display side)
			Class I Zone 2, IIC, T4	
		Canada	Class I Division 2, Groups A, B, C, D T4	-20 °C ≤ T _a ≤ 70 °C (-4 °F ≤ T _a ≤ 158 °F) (backside) ⁽³⁾
			Class I Zone 2, IIC, T4	
		Europe	ATEX II 3 GD, Ex nA nC IIC T4 Gc, Ex tc IIIC T135° Dc	
		Global/IECEx	Ex nA nC IIC T4 Gc, Ex tc IIIC T135 °C Dc	

- (1) The following applies only to non-display models in ATEX and IECEx applications:

Schedule of Limitations (U)

For EPL Gc, the industrial computer shall be completely installed in an enclosure providing a minimum degree of protection of IP54 and used in an area of not more than pollution degree 2. For EPL Dc, a minimum protection of IP6x is required. In addition, the enclosure shall also meet the applicable enclosure requirements of EN/IEC 60079-0: 2012/2011, EN/IEC 60079-15: 2010 and EN/IEC 60079-31: 2014/2013.

The USB ports shall not be used unless the area is known to be non-hazardous. All other ports or connections shall not be disconnected unless the area is known to be non-hazardous.

The user shall refer to publication [6181X-UM001](#), Industrial Computers for Hazardous Locations User Manual, regarding proper installation of the industrial computer.

- (2) The following applies only to display models in ATEX and IECEx applications:

Special Conditions for Safe Use (X)

For EPL Gc, the industrial computer shall be installed in the wall of an enclosure providing a minimum degree of protection of IP54 and used in an area of not more than pollution degree 2. For EPL Dc, a minimum protection of IP6x is required. In addition, the enclosure shall also meet the applicable enclosure requirements of EN/IEC 60079-0: 2012/2011, EN/IEC 60079-15: 2010 and EN/IEC 60079-31: 2014/2013.

The service temperature of the enclosure in which a 6181X-12T display model is installed shall not exceed 70 °C (158 °F) when the user considers heating from all other heat sources within the enclosure.

The USB ports shall not be used unless the area is known to be non-hazardous. All other ports or connections shall not be disconnected unless the area is known to be non-hazardous.

The user shall refer to publication [6181X-UM001](#), Industrial Computers for Hazardous Locations User Manual, regarding proper installation of the industrial computer.

- (3) The entire non-display computer and the backside of the display computer are required to be mounted in a restricted access location.

The following statement applies to when the computer is used in a hazardous location.



WARNING: Explosion Hazard

- Substitution of components can impair suitability for hazardous locations.
- Do not disconnect equipment unless power has been switched off and the area is known to be nonhazardous.
- Do not connect or disconnect components unless power has been switched off.
- Peripheral equipment must be suitable for the location where it is used.
- In the U.S., all wiring must be in accordance with Class I, Division 2 wiring methods of Article 501 of the National Electrical Code, and in accordance with the authority having jurisdiction. See [Control Drawing for USB Peripheral Devices on page 6](#) for allowable circuit parameters in Class I, Division 2 applications.
- In Canada, all wiring must be in accordance with Section 18-1J2 of the Canadian Electrical Code, and in accordance with the authority having jurisdiction.
- For European Zone 2 and IECEx applications:
 - Provide transient limiting in the application that limits transient overvoltages to not more than 40% above the applied voltage.
 - Non-display computers must be installed in a Pollution Degree 2 environment and fully mounted within an enclosure rated IP54 minimum.
 - Do not use the USB ports unless the area is known to be nonhazardous.
- For European Zone 2 (gases) and IECEx applications, computers with displays must be installed in a Pollution Degree 2 environment and mounted through the wall or door of an enclosure rated IP54 minimum.
- For European Zone 22 (dusts) and IECEx applications, computers with displays must be installed in a Pollution Degree 2 environment and mounted through the wall or door of an enclosure rated IP6x minimum. Computers with displays support enclosures rated up to IP66.
- In final applications, properly connect these devices to ground by using the ground terminal screw on the computer chassis.

Hot Surfaces



ATTENTION: When used above 50 °C (122 °F), the backside of display computers and entire non-display computers must be installed in a restricted access location.

Restricted Access Location

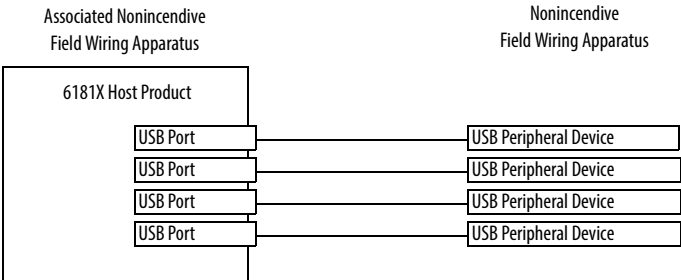
Verify that restricted access locations for the equipment meet the following conditions:

- Access is gained only by service personnel or by users who have been instructed on the reasons for restrictions to a location and about any precautions to be taken.
- Access is by using a tool, a lock and key, or other means of security controlled by the authority responsible for the location.

Control Drawing for USB Peripheral Devices

For Class I, Division 2 and Zone 2 Required Circuit Parameters

The following control drawing is provided in accordance with the National Electrical Code, Article 500 (Class I, Zone 2, Group IIB, and Class I, Division 2, Groups A, B, C, and D).



Parameter	Value	Parameter Definition
$V_{oc (USB)}$	5.25V DC	Open circuit voltage of each host USB port. The maximum applied voltage rating, $V_{max (peripheral)}$, of each peripheral device shall be greater than or equal to $V_{oc (USB)}$. $V_{max (peripheral)} \geq V_{oc (USB)}$, as appropriate
$I_{sc (USB)}$	950 mA	Maximum output current of each host USB port. The maximum current, $I_{max (peripheral)}$, to which each USB peripheral device can be subjected, shall be greater than or equal to $I_{sc (USB)}$. $I_{max (peripheral)} \geq I_{sc (USB)}$
$C_a (USB)$	20 μF	This value is the maximum total capacitance that can be connected to each USB port. The total capacitance of each USB peripheral and its cable must not exceed the indicated value. The maximum total capacitance, $C_i (peripheral)$, and cable capacitance of each separate USB peripheral device shall be less than or equal to $C_a (USB)$. $C_i (peripheral) + C_{cable} \leq C_a (USB)$
$L_a (USB)$	3.11 μH	This value is the maximum total inductance that can be connected to each USB port. The total inductance of each peripheral device and its cable must not exceed the indicated value. The maximum total inductance, $L_i (peripheral)$, and cable inductance of each separate USB peripheral device shall be less than or equal to $L_a (USB)$. $L_i (peripheral) + L_{cable} \leq L_a (USB)$

Application Information

Coordinate the circuit parameters of associated field-wired apparatus for use in hazardous locations with the host product so their combination remains nonincendive. Treat the 6181X computers and the USB peripheral devices in this manner.

The circuit parameters of the 6181X computer USB ports are indicated in the previous table. The 6181X computers provide four separately powered USB ports.

Verify that the USB peripheral devices and their associated cabling have circuit parameters with the limits listed in the table in [Control Drawing for USB Peripheral Devices on page 6](#) so they remain nonincendive when used with 6181X computer USB ports.

For the comparison of $C_{a(USB)}$, use the capacitance of each individual connected USB peripheral device, $C_{i(peripheral)}$, and its associated cable, C_{cable} .

If cable capacitance and inductance are not known, the following values can be used:

$$C_{cable} = 197 \mu\text{F/m} \text{ (60 pF/ft)}$$

$$L_{cable} = 0.7 \mu\text{H/m} \text{ (0.20 } \mu\text{H/ft)}$$

Environnements dangereux

Cet équipement peut être utilisé dans les environnements suivants :

- Classe I, Division 2, Groupes A, B, C et D .
- non dangereux.

La mise en garde suivante s'applique à une utilisation en environnement dangereux.



ATTENTION: Danger d'explosion

- La substitution de composants peut rendre cet équipement impropre à une utilisation en environnement dangereux.
 - Ne pas déconnecter l'équipement sans s'être assuré que l'alimentation est coupée et que l'environnement est classé non dangereux.
 - Ne pas connecter ou déconnecter des composants sans s'être assuré que l'alimentation est coupée.
 - L'ensemble du câblage doit être conforme à la réglementation en vigueur dans le pays où cet équipement est installé.
 - L'équipement périphérique doit être adapté à l'environnement dans lequel il est utilisé.
 - Tout équipement utilisé en environnement dangereux doit être monté dans une armoire fournissant une protection adaptée aux conditions d'utilisation ambiantes et suffisante pour éviter toute blessure corporelle pouvant résulter d'un contact direct avec des composants sous tension.
-

Les ordinateurs ont un code de température T4 (135 °C) lorsqu'ils fonctionnent dans les températures ambiantes maximales suivantes. Voir également le graphique Directives d'installation en [page 10](#) de ce document.

6181X-12.....55 °C en face avant de l'écran et 70 °C en face arrière, en cas de montage comme prévu au travers de la paroi d'un coffret.

6181X-N.....70 °C au maximum, en cas de montage comme prévu à l'intérieur d'un coffret.

N'installez pas l'ordinateur dans des environnements atmosphériques explosifs (par ex. du gaz) dont la température d'inflammabilité est inférieure à 135 °C.

Computer Options

This table summarizes the options available for the integrated display industrial computers for hazardous locations. A comparative summary of features for the computers is in [Technical Specifications on page 34](#).

Cat. No.	Model	Series	Display Size	Touch Screen	Windows OS
6181X-NPXPDC	NDM	G	N/A	N/A	XP Professional SP3
6181X-12TPXPDC	1200P		12.1 in.	Resistive	
6181X-NPW7DC	NDM		N/A	N/A	7 Professional 32 bit SP1
6181X-12TPW7DC	1200P		12.1 in.	Resistive	

The following table summarizes the accessories available for the integrated display industrial computers for hazardous locations.

Cat. No.	Description
6189X-MCLPS	Replacement mounting clips (10)
6189X-4GDDR2	4 GB RAM
6189V-CFSSD16GB	CompactFlash card, 16 GB

You can view a current list of accessories at this Rockwell Automation website:
<http://ab.rockwellautomation.com/Computers>.

Operating Systems

The following Microsoft-licensed operating systems are available:

- Windows 7 Professional (32 bit), Service Pack 1
- Windows XP Professional, Service Pack 3

Computers with Windows XP Professional Operating System

- No operating system updates have been applied to the factory image beyond Service Pack 3.
- The I386 source directory for Microsoft Windows is on the system drive of your computer off the root directory, C:\I386, for easy removal and addition of Windows components.

These computers have solid-state drives so they do not contain a recovery partition. If you need extra drive space, follow these steps:

- a. Copy the I386 directory to external media.
- b. Delete the I386 directory from C:\I386 for 400 MB of space.

These solid-state drives are customized to accommodate their unique properties as follows:

- No paging file
- System restore is disabled by default

To obtain a copy of a factory system image, contact your local technical support center or access the Rockwell Automation Product Compatibility and Download Center (PCDC) at <http://www.rockwellautomation.com/support/pcdc.page>.

Before You Begin

Before you unpack the computer, inspect the shipping carton for damage. If damage is visible, immediately contact the shipper and request assistance. Otherwise, continue to unpack.

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

Parts List

The computers ship with the following items.

Item	Description
Hardware	<ul style="list-style-type: none">• Screws to mount non-display computers• Clips to mount display computers• Industrial Computer System Cloning Utility CD (red)
Documents	<ul style="list-style-type: none">• This publication• 6181P and 6181X Industrial Computers Cutout Template, publication 6181P-DS002⁽¹⁾• Production test report

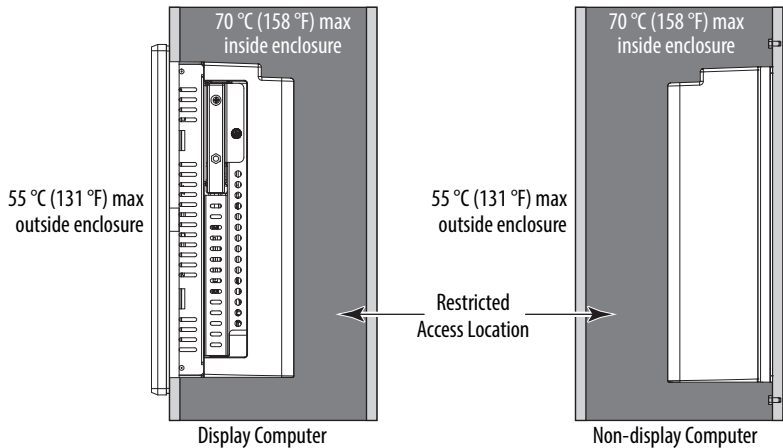
(1) Shipped only with display computers.

Installation Guidelines

Follow these guidelines to make sure that your computer provides service with excellent reliability:

- The installation site must have sufficient power.
- In dry environments, static charges can build up easily. Proper grounding of the computer helps to reduce static discharges, which can cause shock and damage electronic components.
- The enclosure must allow sufficient space around air inlets and outlets to provide the circulation necessary for cooling. See [Mounting Clearance Requirements on page 12](#) for further information. Never allow air passages to become obstructed.

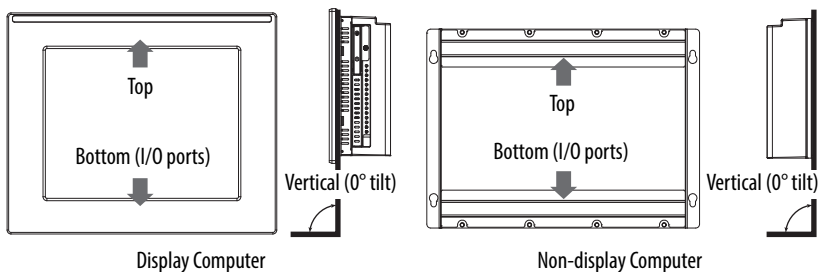
- The ambient air temperature must not exceed the maximum operating temperature in [Environmental Specifications on page 36](#). Consider a user-supplied fan, heat exchanger, or air conditioner for heat that is generated by other devices in the enclosure.



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

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

- The humidity of the ambient air must not exceed limits in [Environmental Specifications on page 36](#) and must avoid condensation.
- The enclosure or cover must always remain in place during operation. The cover provides protection against high voltages inside the computer and inhibits radio-frequency emissions that can interfere with other equipment.
- When mounted, the computer cannot be tilted from vertical.



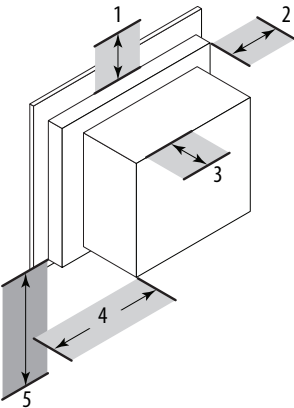
Mounting Clearance Requirements

IMPORTANT Because of self-heating, do not operate the computer in an enclosure by using the minimum clearances unless adequate ventilation or other methods are used to lower the temperature within the enclosure.

Allow enough clearance to install or remove peripheral components, such as internal drives.

The minimum required enclosure size (HxWxD) is 403 x 497 x 154 mm (15.87 x 19.57 x 6.06 in.).

Minimum Clearances



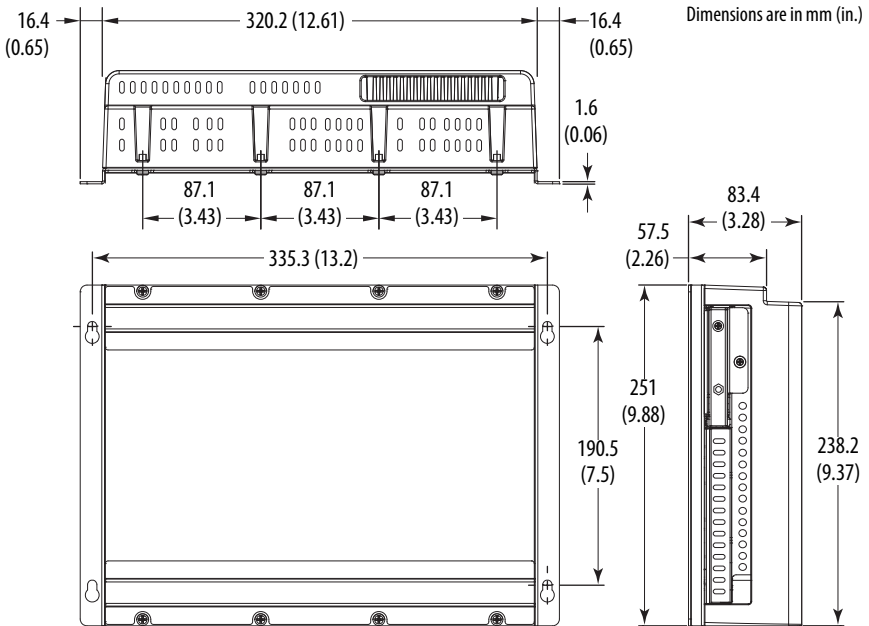
Item	Description	Value
1	Top	50 mm (2 in.)
2	Left (for airflow)	50 mm (2 in.)
3	Rear	50 mm (2 in.)
4	Right (for airflow and drive access)	127 mm (5 in.)
5	Bottom (for I/O port access and ventilation)	102 mm (4 in.)

Right and left are based on facing the front of the computer.

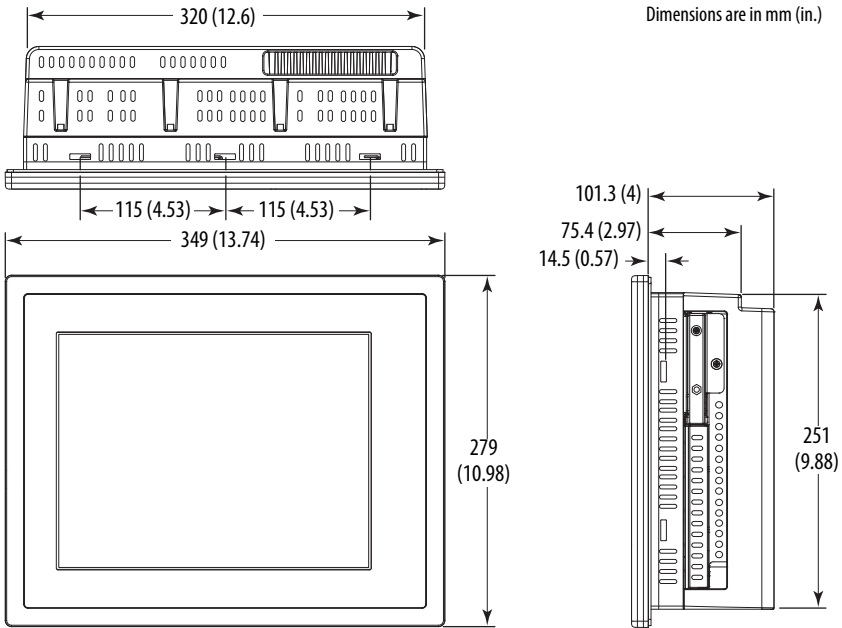
Computer Dimensions

Review computer dimensions to estimate the clearance necessary for computer installation.

Non-display Computers



Integrated Display Computers



Tools for Computer Installation

These tools are required for computer installation:

- #2 cross-head screwdriver
- Panel cutout tools (for panel mounting)
- Drill motor, drill bit, and M4 screw tap (for wall mounting)
- Antistatic wrist strap

Install the Computer

The computers support the following mounting options:

- Panel mount (display computer models)
- Wall mount (non-display computer models)

Panel Mounting Guidelines

Observe these guidelines when installing the computer in a panel:

- Remove all electrical power from the panel before making the cutout.
- Confirm that there is adequate space behind the panel. For specific information, see [Mounting Clearance Requirements on page 12](#).
- Cut supporting panels to specifications before installation. Take precautions so metal cuttings do not enter components that are already installed in the panel.

Supporting panels must be at least 14 gauge for proper sealing against water and dust, and to provide proper support. The supplied mounting hardware accommodates panel thickness between 14...8 gauge or 1.6...4.2 mm (0.063...0.165 in.).

- Make sure the area around the panel cutout is clear.



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

Panel Cutout Dimensions

Included with the shipped computer is 6181P and 6181X Industrial Computers Cutout Template, publication [6181P-DS002](#), which is a cutout template for display computer models.

The computers must be mounted to meet the following panel cutout dimensions.

Cat. Nos.	Cutout Dimensions (H x W), Approx
6181X-12TPXPDC, 6181X-12TPW7DC	254 x 324 mm (10 x 12.76 in.)

Mount the Display Computer in a Panel

Use the supplied clips to secure the display computer to the panel.

Cat. Nos.	Clips (qty.)
6181X-12TPXPDC, 6181X-12TPW7DC	10

Cat. No.	Description
6189X-MCLPS	Replacement mounting clips (10)

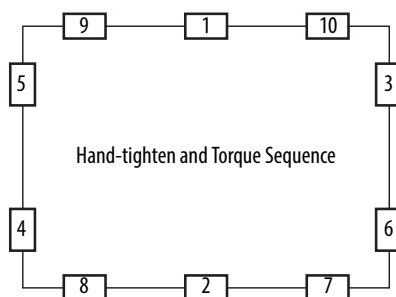
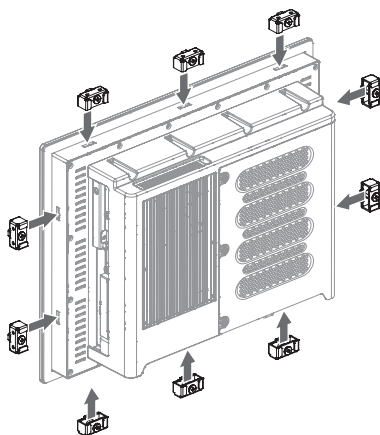
Follow these steps to mount the computer in a panel.

1. Remove power from the panel.
2. Verify that the panel surface around the area to be cut is clean and free of debris.



ATTENTION: Take precautions so metal cuttings do not enter components that are already installed in the panel to avoid personal injury or damage to the panel components.

3. Cut an opening in the panel by using the appropriate panel cutout dimensions.
4. Make sure the sealing gasket is properly positioned on the computer.
This gasket forms a compression-type seal. Do not use sealing compounds.
5. Place the computer in the panel cutout.
6. Slide the clips into the holes on the top, bottom, and sides of the computer.
7. Hand-tighten the clips around the bezel by following this tightening sequence.



8. Repeat this process at least three times until the clips are hand-tight and the gasket is compressed uniformly against the panel.
9. Tighten the clips to a torque of 1.35 N•m (12 lb•in) by following the above torque sequence, making sure to not overtighten.
10. Repeat this process at least three times until the clips are properly torqued, making sure the gasket is compressed uniformly against the panel.



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

Mount the Non-display Computer on a Wall

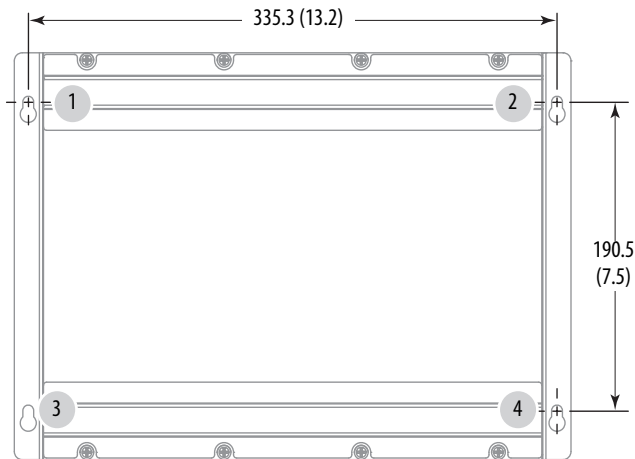
Use the four supplied screws to secure the non-display computer to a metal wall, such as a steel panel in an enclosure or equipment room.

IMPORTANT Do not mount the non-display computer on a horizontal surface.

Follow these steps to mount a non-display computer.

1. Verify that the power is disconnected.
2. After you decide where to mount the computer, drill holes in the wall to accommodate the four supplied M4 panhead screws.

The illustration shows the mounting hole locations with dimensions in mm (in.).

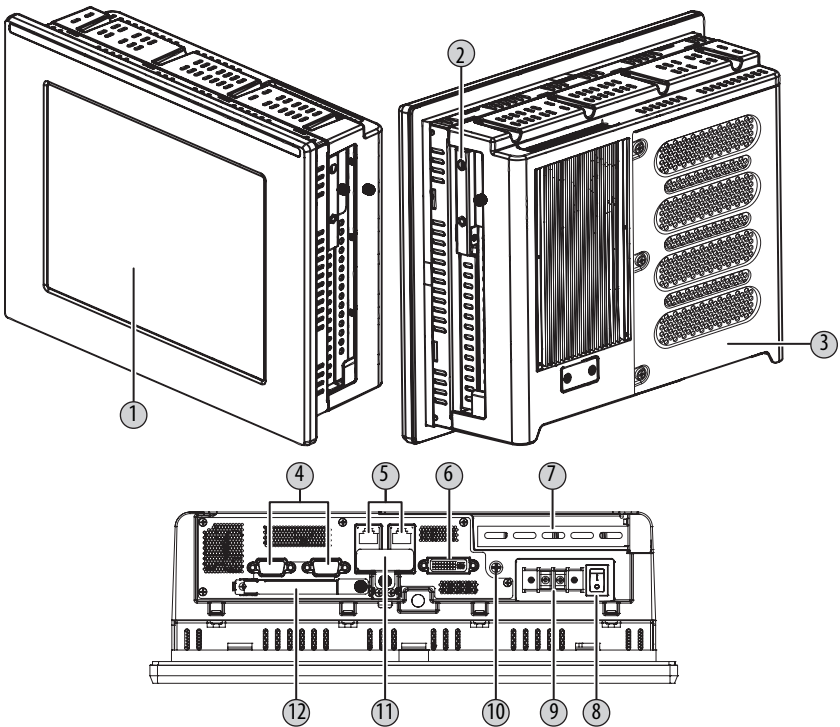


3. Attach two of the supplied screws with grommets to positions 1 and 2.
4. Mount the computer to the wall.
5. Attach the remaining two supplied screws with grommets to positions 3 and 4.
6. Tighten to a torque that is appropriate for the screw and wall material.

The recommended torque in steel is 1.13...1.36 N•m (10...12 lb•in).

Hardware Features

The illustrations show the hardware features of the industrial computers for hazardous locations.



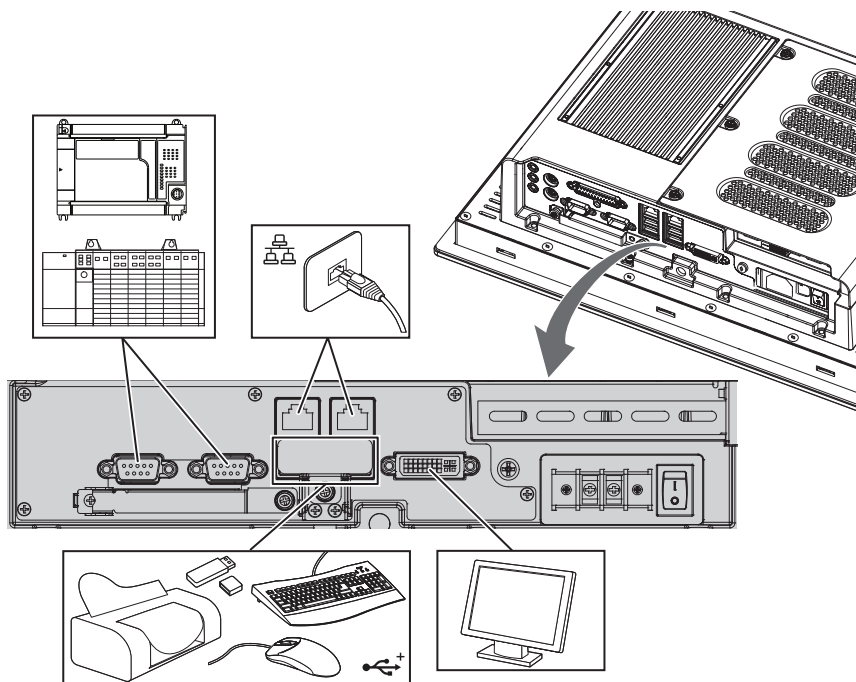
Item	Component
1	LCD panel (only on display model)
2	CompactFlash Type II card slot (right side)
3	Rear cover
4	Serial COM ports (RS-232), 2
5	1 GB LAN ports (RJ45), 2
6	DVI-I port

Item	Component
7	PCI riser slot cover
8	Power switch
9	DC input terminal block
10	Functional ground screw
11	Hinged door covering 4 USB ports ⁽¹⁾
12	CompactFlash Type II card slot (bottom) ⁽¹⁾

(1) The USB ports and the bottom CF card slot are hot swappable but only in non-hazardous locations. For more information about proper use of these ports, refer to [Hazardous Locations on page 4](#).

Connect Peripherals

The following illustration shows the I/O port panel of the computers. Peripheral components compatible with each port are shown in the boxes below.



Observe the following guidelines when connecting peripherals to the computer.

- Use screws to secure any device connected to the serial COM or DVI port.
- The USB ports are covered by a hinged door.

For more information about proper use of these ports, refer to [Hazardous Locations on page 4](#).

Connect Power

Display and non-display computers have a DC input terminal block for connection to a 18...32V DC power source.



ATTENTION: When you connect power to the computer for the first time, the following actions occur:

- The default BIOS setting automatically starts the computer after it is plugged into a power source.
- You must read and accept an End User Setup procedure for computers with a Windows operating system.

Do not disconnect power from the system until after the Windows Setup procedure is completed. Disconnecting power during this procedure can result in a corrupted system image.

Operate the computer in an industrial or control room environment, which uses some form of power isolation from the public low-voltage mains.



ATTENTION: Supply the computer circuit with its own disconnect. Use an uninterruptible power source (UPS) to help protect against unexpected power failure or power surges.

Always shut down the Windows operating system before disconnecting power to the computer to minimize performance degradation and operating system failures.

The DC power option supports operation from safety extra-low voltage (SELV) power source.

The power supply is internally protected against reverse polarity.



ATTENTION: Use an SELV isolated and ungrounded power supply as input power to the computer. This power source provides protection so that under normal and single fault conditions, the voltage between the conductors and Functional Earth/Protective Earth does not exceed a safe value.

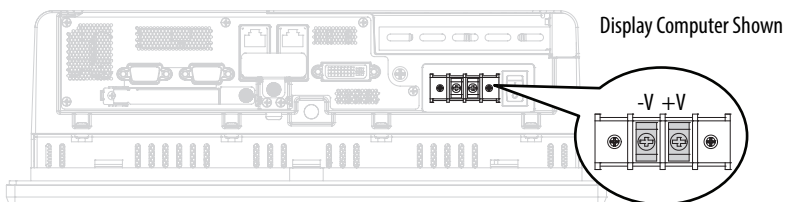
IMPORTANT A functional ground connection is required for EMC compliance.

Follow these steps to connect the computer to a DC power source.

1. Turn off the main power switch or breaker.
2. Verify that the DC power wires meet these requirements:
 - Material: Stranded copper
 - Wire gauge: 0.823...2.08 mm (18...14 AWG)

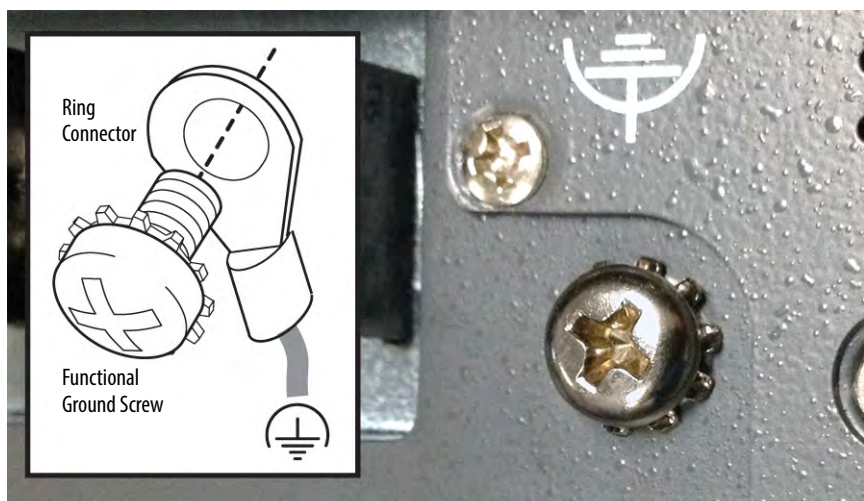
3. Secure the DC power wires to the terminal block screws.

Tighten the terminal block screws to a torque of $1.36 \text{ N}\cdot\text{m}$ (12 lb•in).



4. Secure the ground wire to the functional ground screw by using a ring connector.

Tighten the functional ground screw to a torque of $1.47 \text{ N}\cdot\text{m}$ (13 lb•in).



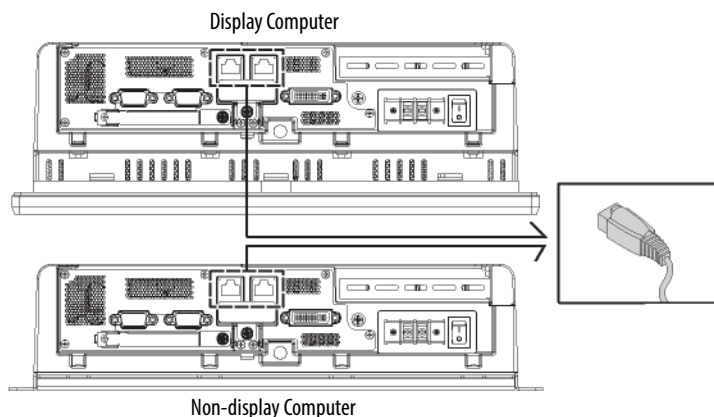
IMPORTANT When using the functional ground screw, connect the computer to earth ground by using a 1.5 mm^2 (16 AWG) or larger external wire.

Use a ground wire with an insulation color allowed by local inspection authority.

5. Apply 18...32V DC power to the computer.

Connect to a Network

The computers have two 1 GB LAN ports. The computers connect to an Ethernet network by using CAT5 or CAT5E twisted-pair Ethernet cable with RJ45 connectors.



WARNING: When you connect a LAN cable, verify that the cable is fully inserted in the LAN port and the latch is engaged. Failure to do so could result in an electrical arc that can cause an explosion in a hazardous location.

IMPORTANT

To help prevent performance degradation of Ethernet communication, do not subject the computer or cables to extreme radiation or conducted high-frequency noise.

In industrial environments, proper cable routing and power conditioning are required for Ethernet communication. Rockwell Automation recommends that you route all Ethernet cable through dedicated metal conduits. For improved performance reliability, install ferrite bead filters at the cable ends.

Accessories and Replacement Parts

You can view a list of accessories and replacement parts at the following Rockwell Automation website: <http://ab.rockwellautomation.com/Computers>.

Review the specifications of a new component before you install it to verify that it is compatible with the computer. Record the model and serial number, and any other pertinent information of new components for future reference.

IMPORTANT

We recommend that you use only Allen-Bradley approved accessories and replacement parts.

Voltage Precautions

The computers contain line voltages. Disconnect all power to the computer before you install or remove components.



SHOCK HAZARD: Disconnect all power to the computer before you remove components.

Failure to disconnect power can result in severe electrical shock to an individual or electrostatic discharge (ESD) damage to the computer and components.

Electrostatic Discharge Precautions



ATTENTION: Electrostatic discharge (ESD) can damage static-sensitive devices or microcircuitry.

- Disconnect all power before you work on the computer as detailed in Voltage Precautions on page [23](#).
 - Observe proper packaging and grounding techniques to help prevent damage.
-

Follow the precautions that are listed below:

- Transport the computer and replacement parts in static-safe containers, such as conductive tubes, bags, or boxes.
- Keep electrostatic-sensitive parts in their containers until they arrive at the designated static-free work area.
- Cover the designated work area with approved static-dissipating material:
 - Use an antistatic wrist strap that is connected to the work surface.
 - Use properly grounded tools and equipment.
- Keep the designated work area free of nonconductive materials, such as ordinary plastic assembly-aids and foam packing.
- Avoid contact with pins, leads, or circuitry.
- Always hold components with a printed circuit board (PCB) by its edges and place it with the assembly side down.

Pre-configuration

IMPORTANT When you install hardware or performing maintenance procedures that require access to internal components, we recommend that you first back up all computer data to avoid loss.



ATTENTION: Make sure to read and understand all installation and removal procedures before you begin configuring the computer hardware.

Follow these steps before you remove the cover or replace a hardware component.

1. Shut down the computer and all peripherals that are connected to it.
2. Disconnect all cables from power outlets to avoid exposure to high energy levels.
If necessary, label each cable to expedite reassembly.
3. Disconnect telecommunication cables to avoid exposure to a shock hazard from ring voltages.

Post-configuration

Follow these steps after you install or remove a hardware component.

1. Make sure all components are installed according to instructions.
2. Make sure that no tools or loose parts are left inside the computer.
3. Reinstall any expansion boards, peripherals, and system cables that were previously removed.
4. Reinstall the cover according to the instructions on page [26](#).
5. Reconnect all external cables and power to the computer.
6. Press the power switch to start the computer.

Tools for Component Replacement

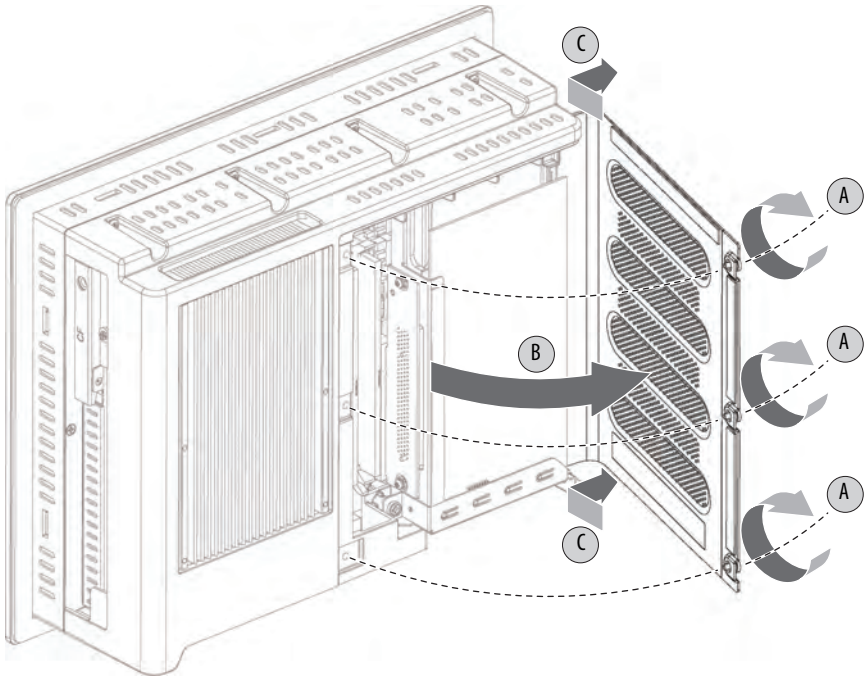
The following tools are required for component replacement:

- #2 cross-head screwdriver
- Antistatic wriststrap
- Side cutters (for cutting cable ties, if necessary)

Remove the Cover

To install, replace, or upgrade internal computer components, you must first remove the cover. Follow these steps to remove the rear cover (the display computer is shown).

1. Follow the steps for [Pre-configuration on page 24](#).
2. Loosen the three screws that secure the rear cover (A).
3. Open the cover (B) and detach it from the chassis (C).

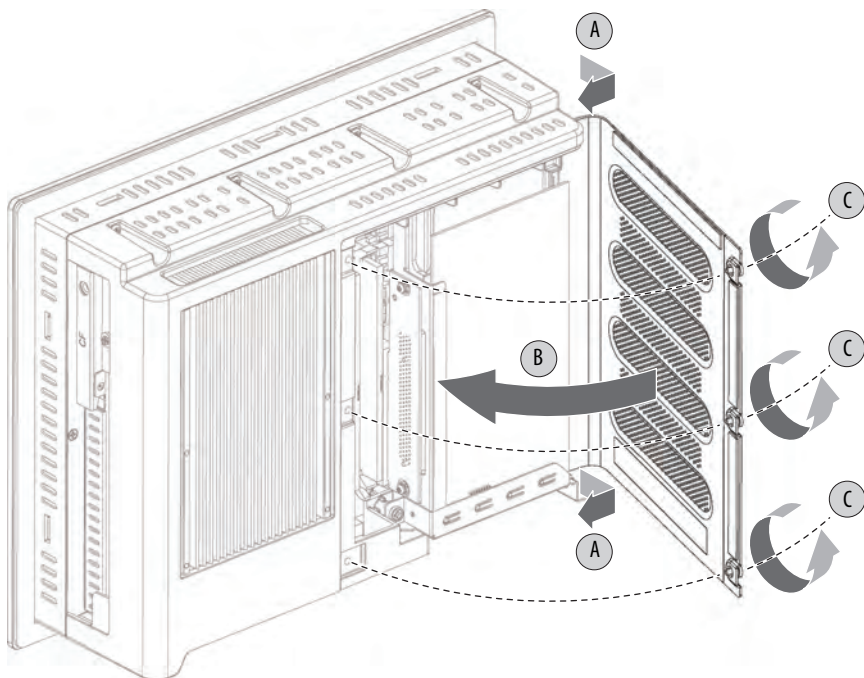


4. After you have installed, replaced, or upgraded internal computer components, reinstall the cover as detailed in [Reinstall the Cover on page 26](#).

Reinstall the Cover

Follow these steps to reinstall the rear cover (the display computer is shown).

1. Follow steps 1...3 for [Post-configuration on page 24](#).
2. Reattach the rear cover to the chassis (A).
3. Close the cover (B).
4. Tighten the three screws to secure the rear cover (C).



5. Follow steps 4 and 5 for [Post-configuration on page 24](#).

CompactFlash Card

The computers have two locations for loading CompactFlash (CF) Type II cards:

- One solid-state drive bay is on the side of the computer. Cards that are installed in this bay are bootable and function as the main drive.
- One CF slot is on the I/O port panel below the serial ports. This slot is functionally hot-swappable but only in a non-hazardous location. It is meant to be a data slot but it is bootable.



WARNING: Do not connect or disconnect components unless power has been switched off and the area is known to be nonhazardous.

See [Hardware Features on page 18](#) for CF card slot locations.



WARNING: Use only catalog numbers 6189V-CFSSD8GB and 6189V-CFSSD16GB CF cards in the 6181X computers for hazardous locations.

Substitution of components can impair suitability for hazardous locations.

Install a CF Card in the Solid-state Drive Bay

Follow these steps to load a CF card in the solid-state drive bay on the side of the computer.



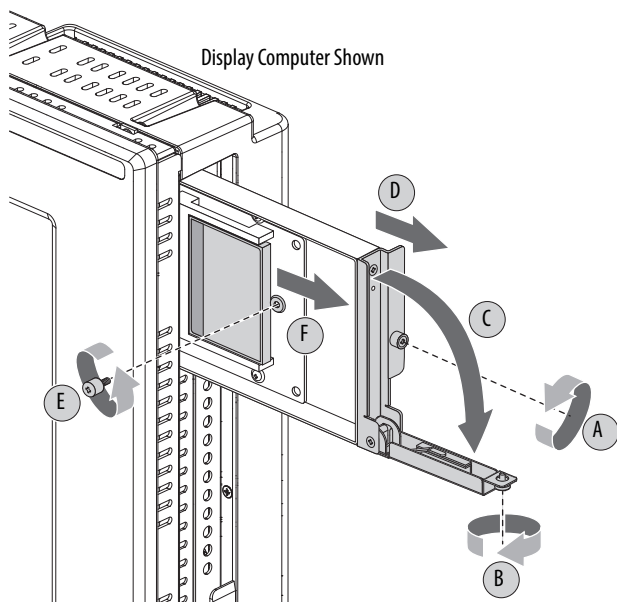
WARNING: The drive bay on the side of all computer models is not hot-swappable. You must first shut down the computer before you can insert or remove a CF card from this bay.

Do not connect or disconnect components unless power has been switched off and the area is known to be nonhazardous.

1. Follow the steps for [Pre-configuration on page 24](#).
2. Loosen the screw that secures the drive bay cover (A).
3. Loosen the screw that secures the drive bay lever (B).
4. Open the drive bay lever (C).
5. Pull out the CF card tray (D).

6. Remove the CF card lock screw (E).

If necessary, remove the existing CF card by sliding it out of the slot (F).



7. Insert the CF card into the slot (G) until it is firmly seated.



ATTENTION: When properly seated, more than 80% of the CF card easily inserts into the slot before you encounter resistance. If you encounter resistance sooner, then remove the card, rotate it 180°, and reinsert.

Do not force the card into the slot or you can damage the connector pins.

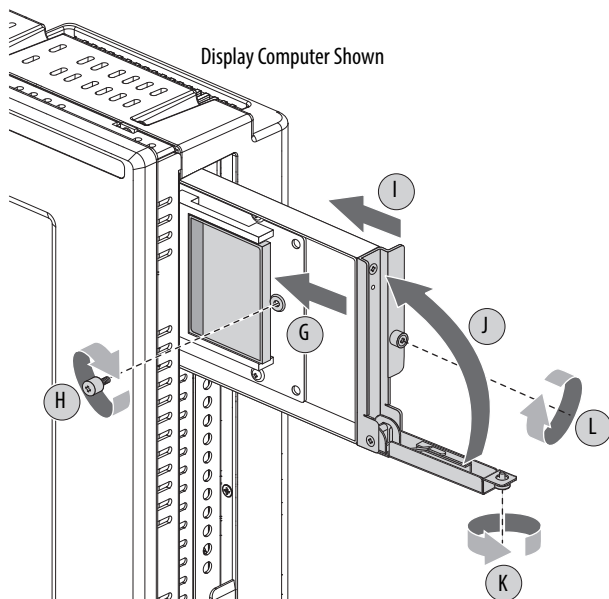
8. Replace the CF card lock screw (H).



WARNING: You must reinstall the CF card lock screw to meet hazardous locations, mechanical shock, and vibration requirements.

9. Push in the CF card tray (I).
10. Close the drive bay lever (J).
11. Tighten the screw that secures the drive bay lever (K).

12. Tighten the screw that secures the slot cover of the drive bay (L).



13. Follow the steps for [Post-configuration on page 24](#).

Install a Card in the Bottom CF Card Slot

Follow these steps to install a CF card in the bottom CF card slot.



WARNING: The CF card slot on the bottom side of all computer models is hot-swappable but only in a non-hazardous location. You can insert or remove a card from this slot while the computer is running.

When the computer is used in a hazardous location, do not insert or remove a card in the bottom CF card slot unless power has been switched off.

1. Loosen the screw that secures the CF card slot cover (A).
2. Open the CF card slot cover (B).
If necessary, remove an inserted card by pushing the button on the hinge side.
3. Insert the new CF card into the slot until it is firmly seated (C).

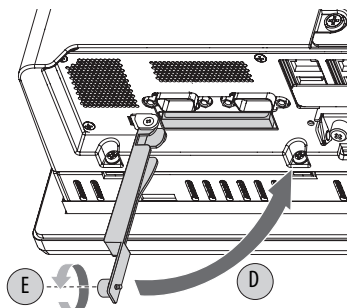
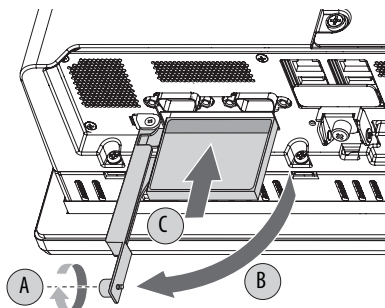


ATTENTION: When properly seated, more than 80% of the CF card easily inserts into the slot before you encounter resistance. If you encounter resistance sooner, then remove the card, rotate it 180°, and reinsert.

Do not force the card into the slot or you can damage the connector pins.

4. Close the CF card slot cover (D).

5. Tighten the CF card slot cover screw (E).



Install an Add-in Card

IMPORTANT

When used in hazardous locations, the computer supports peripheral cards rated 4 W maximum, and Class I, Division 2, Groups A, B, C, D, T4. For ATEX and IECEx applications, operation in Group IIC Category 3 gas and dust environments is supported.

At maximum computer temperature, consider the following:

- A PCI card that dissipates 4 W can experience a surrounding air temperature up to 90 °C (194 °F).
- A PCI card that dissipates 1 W can experience a surrounding air temperature up to 85 °C (185 °F).

Follow these steps to install an add-in card.

1. Disconnect power from the computer.
2. Remove the back cover from the computer.
See [Remove the Cover](#) instructions on [page 25](#) for more information.
3. Remove the one screw that secures the slot cover.
Do not discard the screw.
4. Remove the slot cover and store it for reassembly later.



ATTENTION: Do not discard the slot cover. If the add-in card is removed in the future, the slot cover must be reinstalled to maintain agency access requirements.

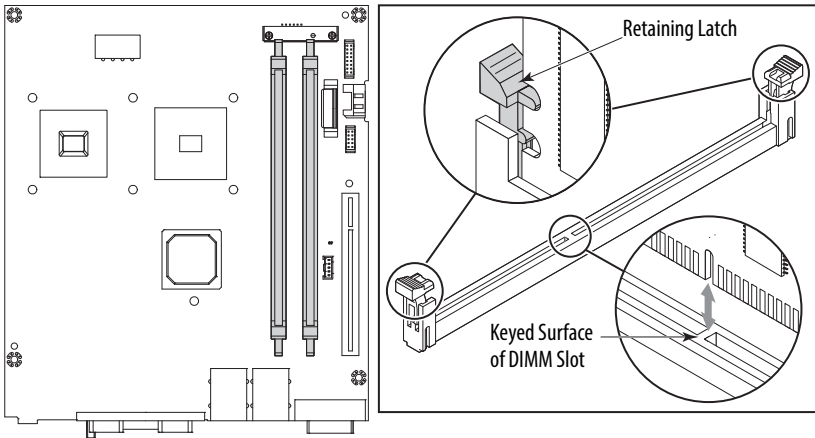
5. Hold the add-in card by its edge and remove it from its protective packaging.
6. Connect the add-in card to the compatible riser-board slot.
Verify that the card is properly seated in the slot.
7. Secure the add-in card with the screw from the slot cover.

8. Connect the necessary cables to the add-in card.
See the documentation that came with the card.
9. Reinstall the rear cover.
See [Reinstall the Cover](#) instructions on [page 26](#) for more information.

Replace or Add Memory Modules

The computers have two dual-channel DDR2 DIMM slots that support up to 4 GB maximum system memory.

Memory Module Slots and Module Alignment



ATTENTION: Some older Microsoft Windows operating systems limit usable memory capacity to approximately 3 GB.

Memory Configuration Guidelines

Follow these guidelines when you replace or add memory to the computers.



WARNING: Unless ordered differently, 6181X computers ship with 2 GB of memory in one of the two slots. If upgrading to 4 GB of memory, use only catalog number 6189X-4GDDR2, which is memory specifically for use in hazardous locations. Other memory modules are not acceptable for use in hazardous locations.

To avoid system instability, use the same brand and model number of memory in the two slots.

See <http://ab.rockwellautomation.com/Computers> for qualified replacement parts and accessories.

Replace or Add a Memory Module

Follow these steps to replace or add a memory module.

IMPORTANT Use an antistatic wriststrap connected to the work surface, and properly grounded tools and equipment.

1. Follow the steps for [Pre-configuration on page 24](#).
2. Remove the computer cover as detailed in [Remove the Cover on page 25](#).

TIP To install additional memory, proceed to step 4 of this section.

3. Remove the selected memory module.
 - a. If necessary, use side cutters to cut the cable tie from the retaining latches that hold the selected memory module (A).
 - b. Use your thumbs or two fingers to push open the lock levers, which release the memory module from its slot for easy removal. See [Memory Module Slots and Module Alignment on page 31](#).
 - c. Gently pull out the memory module to remove it from its slot.
 - d. Place the memory module on a static-dissipating work surface or inside an antistatic bag.
4. Install the new memory module.
 - a. Hold the memory module by its edges as you remove it from its antistatic bag.
 - b. Orient the module so the notch on its bottom edge aligns with the keyed surface of the DIMM slot. See [Memory Module Slots and Module Alignment on page 31](#).

TIP The keyed surface is off center to assist the correct alignment.

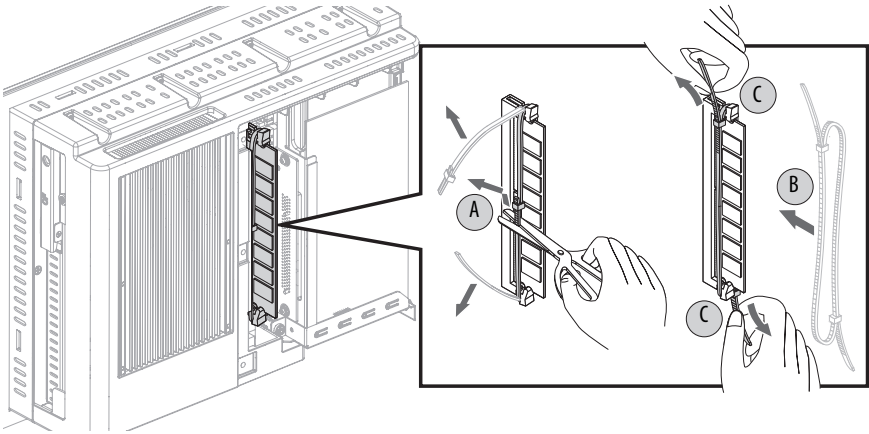
- c. Press the module fully into the slot to engage the lock levers. See [Memory Module Slots and Module Alignment on page 31](#).
- d. Fasten a replacement cable tie around the DIMM slot latches (B).



WARNING: You must reinstall the cable tie to meet hazardous location, mechanical shock, and vibration requirements, and to avoid system instability.

- e. Pull the end of the cable tie to lock it in place (C).

- f. Use side cutters to cut the excess length of the cable tie.



5. Reinstall the computer cover as detailed in [Reinstall the Cover on page 26](#).
6. Follow the steps for [Post-configuration on page 24](#).

Real-time Clock (RTC) Battery

This computer contains a lithium battery that you cannot replace. Return the computer to Rockwell Automation for battery replacement.

For return information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.



The sealed lithium battery contained in this computer could need replacement during the life of the computer.

At the end of its life, collect the battery in this computer separately from any unsorted municipal waste.

Ship or Transport the Computer

If you must ship the computer via common carrier or otherwise transport it to another location for any reason, then you must first uninstall the computer and place it in its original packing material.



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

Technical Specifications

Hardware and Software Specifications

Specification	Attribute	6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC
Hardware	Processor	Intel Core Duo U2500, 1.2 GHz/2 M L2 cache/533 MHz 9 W
	System chipset	Intel 945GME, ICH7-M
	System memory slots	Dual channel DDR2, 2 DIMM slots, 4 GB max
	System memory, installed	2 GB shipped, 4 GB max
	Expansion slot	1 half-length PCI
	CompactFlash (CF) Type II slot	2 bootable slots ⁽¹⁾
	Computer side	True IDE, OS drive installed ⁽²⁾
	Computer bottom	Data drive (shipped empty)
Software	I/O ports	DVI-I port, 2 serial COM ports, 4 USB ports
	Ethernet LAN	2 LAN ports (RJ45), 1 Gb each
	Operating systems	Windows 7 Professional (32 bit), Service Pack 1 Windows XP Professional, Service Pack 3

(1) The drive bay on the side of all computer models is not hot-swappable. You must first shut down the computer before you can insert or remove a CF card from this bay. The CF card slot on the bottom side of all computer models is hot-swappable but only in a non-hazardous location.

(2) For computers with Windows XP Professional, the CF card is 8 GB. For computers with Windows 7 Professional, the CF card is 16 GB.

Display Specifications

Attribute	6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC
Display type	Active Matrix Color TFT
Touch screen	Resistive, sunlight readable film
Display size (diagonal)	308 mm (12.1 in.)
Display brightness	600 cd/m ² (typical)
Contrast ratio	1500:1 (typical)
Native resolution	800 x 600, 16.2 M colors
Viewing angle	178° (typical)
Response time	15 ms (typical)
LED backlight lifetime	50,000 hours ⁽¹⁾

(1) Over the entire operating temperature range at the default 70% brightness.

Physical Specifications

Attribute	6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC
Weight, approx	
Non-display	6.1 kg (13.45 lb)
Display	8.4 kg (18.52 lb)
Dimensions (HxWxD), approx	
Non-display	251 x 353 x 83.4 mm (7.5 x 13.20 x 3.28 in.)
Display	279 x 349 x 101.2 mm (10.98 x 13.74 x 3.98 in.)
Pane cutout dimensions (HxW) ⁽¹⁾	254.0 x 324.0 mm (10.0 x 12.76 in.)
Mounting options	
Non-display models	Wall
Display models	Panel

(1) Applies only to display models.

Power Specifications

Attribute	6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC
Input voltage, DC	18...32V DC
Power consumption, DC (max)	
Non-display models	18...32V DC (SELV), 2.46...1.34 A, 45 W
Display models	18...32V DC (SELV), 3.28...1.79 A, 60 W
Heat dissipation ⁽¹⁾	
Non-display models	45 W (154 BTU/h)
Display models	60 W (205 BTU/h)
Peripheral loading	
PCI card, max	4 W
USB ports, max per port	500 mA

(1) Add-in cards and peripherals are included in the heat dissipation value.

Environmental Specifications

Attribute	6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC
Temperature, operating Non-display models Display models ⁽¹⁾	-20...70 °C (-4...158 °F) -20...55 °C (-4...131 °F), display side -20...70 °C (-4...158 °F), back side
Temperature, nonoperating	-30...80 °C (-22...176 °F)
Relative humidity	10...90% without condensation
Altitude, operating	2,000 m (6,561 ft)
Altitude, nonoperating	12,000 m (40,000 ft)
Shock, operating ⁽²⁾	15 g (1/2 sine, 11 ms)
Shock, nonoperating ⁽³⁾	30 g (1/2 sine, 11 ms)
Vibration, operating ⁽³⁾	0.012 in p-p (10...57 Hz); 2 g peak (57...640 Hz)
Enclosure ratings ⁽³⁾ Display models	Rated UL Type 4X and 12, also rated IP66 as classified by UL

(1) See [Installation Guidelines on page 10](#) for more information about temperature guidelines.

(2) Applies only to panel-mounted computers.

(3) Ratings apply when computer is properly mounted on a flat surface of an equivalent type enclosure.

Certifications

Attribute ⁽¹⁾	6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC
cULus	UL/c-UL Listed as Information Technology Equipment for Use in Hazardous Locations per standards ANSI / ISA 12.12.01, CSA C22.2 No. 213 Enclosure type ratings per UL50 and CSA C22.2 No. 94.2-07 Enclosure Ingress Protection Classified by UL per IEC 60529
IECEx	IEC60079-0 2011 IEC60079-15 2010 IEC60079-31 2013 IECEx PRE 15.0040X (for display computers) IECEx PRE 15.0041U (for non-display computers)
ATEX	EN60079-0 2012 EN60079-15 2010 EN60079-31 2014 Presafe 15 ATEX 6736X (for display computers) Presafe 15 ATEX 6737U (for non-display computers)
CE	EMC 2004/108/EC <ul style="list-style-type: none"> Immunity standards: EN55024 Emission standards: EN55022 Class A ATEX 94/9/EC Waste Electrical and Electronic Equipment (WEEE) 2002/96/EC Metric Directive 80/181-EEC EU Battery Directive 2006/66/EC Low Voltage Directive: LVD 2006/95/EC <ul style="list-style-type: none"> EN 60950-1

Certifications (cont.)

Attribute ⁽¹⁾	6181X-NPXPDC, 6181X-NPW7DC, 6181X-12TPXPDC, 6181X-12TPW7DC																																																																					
FCC	Class A emissions																																																																					
RoHS	<div>European RoHS 2011/65/EU</div> <div>China RoHS:</div> <table><thead><tr><th rowspan="2">部件名称 Part Name</th><th colspan="6">有毒有害物质或元素 Toxic or Hazardous Substances and Elements</th></tr><tr><th>铅 Lead (Pb)</th><th>汞 Mercury (Hg)</th><th>镉 Cadmium (Cd)</th><th>六价铬 Hexavalent Chromium (Cr(VI))</th><th>多溴联苯 Polybrominated Biphenyls (PBB)</th><th>多溴二苯醚 Polybrominated Diphenyl Ethers (PBDE)</th></tr></thead><tbody><tr><td>壳体 Housing</td><td>X</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>显示 Display</td><td>X</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>印刷电路板 Printed Circuit Board</td><td>X</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>金属螺帽 Metal Fasteners</td><td>X</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>电缆组装 Cable Assembly</td><td>X</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>风扇组装 Fan Assembly</td><td>X</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>电力供应组装 Power Supply Assemblies</td><td>X</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>电池 Battery</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></tbody></table> <div><div>本表格依据SJ/T11364 的规定编制。 This table is made per guidance of SJ/T 11364.</div><div><div>0: 表示 该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。</div><div>0: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for the part is below the limit requirement in GB/T 26572.</div><div>X: 表示 该有害物质至少在该部件的某一均质材料中的含量超出GB/T26572 规定的限量要求。</div><div>求。（企业可在此处，根据实际情况对上表中打“×”的技术原因进行进一步说明。）</div><div>X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials for the part is below the limit requirement in GB/T 26572.</div></div></div>	部件名称 Part Name	有毒有害物质或元素 Toxic or Hazardous Substances and Elements						铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr(VI))	多溴联苯 Polybrominated Biphenyls (PBB)	多溴二苯醚 Polybrominated Diphenyl Ethers (PBDE)	壳体 Housing	X	0	0	0	0	0	显示 Display	X	0	0	0	0	0	印刷电路板 Printed Circuit Board	X	0	0	0	0	0	金属螺帽 Metal Fasteners	X	0	0	0	0	0	电缆组装 Cable Assembly	X	0	0	0	0	0	风扇组装 Fan Assembly	X	0	0	0	0	0	电力供应组装 Power Supply Assemblies	X	0	0	0	0	0	电池 Battery	0	0	0	0	0	0
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RCM (formerly C-Tick)	Australian Radiocommunications Act, compliance with AS/NZS CISPR 22																																																																					

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

Additional Resources

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

Resource	Description
Industrial Computer for Hazardous Locations User Manual, publication 6181X-UM001	Gives an overview of the system and provides procedures to install the computer, set up computer connections, operate the computer, and troubleshoot the computer.
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 <http://www.rockwellautomation.com/literature>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Notes:

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 and application notes, sample code, and links to software service packs. You can also visit our Support Center at <https://rockwellautomation.custhelp.com/> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

Installation Assistance

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

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

New Product Satisfaction Return

Rockwell Automation tests all of its products to help 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/>.

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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