

NI cDAQ™-9188XT

NI CompactDAQ Extended Temperature Rugged Eight-Slot Ethernet Chassis

This document includes compliance precautions and connection information for the NI cDAQ-9188XT.



Note The guidelines in this document are specific to the NI cDAQ-9188XT. The other components in the system might not meet the same ratings. Refer to the documentation for each component in the system to determine the safety and EMC guidelines for the entire system.

Safety Guidelines



Caution Do not operate the NI cDAQ-9188XT in a manner not specified in this user manual. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to National Instruments for repair.



Note Because some C Series modules may have more stringent certification standards than the NI cDAQ-9188XT, the combined system may be limited by individual component restrictions. Refer to the *NI cDAQ-9188XT Specifications* for more details.



Hot Surface This icon denotes that the component may be hot. Touching this component may result in bodily injury.

Safety Voltages

Connect only voltages that are within these limits.

V terminal to C terminal

30 V maximum, Measurement Category I

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.



Caution Do not connect the system to signals or use for measurements within Measurement Categories II, III, or IV.



Note Measurement Categories CAT I and CAT O (Other) are equivalent. These test and measurement circuits are not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

Safety Guidelines for Hazardous Locations

The NI cDAQ-9188XT is suitable for use in Class I, Division 2, Groups A, B, C, D, T4 hazardous locations; Class I, Zone 2, AEx nA IIC T4 and Ex nA IIC T4 hazardous locations; and nonhazardous locations only. Follow these guidelines if you are installing the NI cDAQ-9188XT in a potentially explosive environment. Not following these guidelines may result in serious injury or death.



Caution Do not disconnect the power supply wires and connectors from the chassis unless power has been switched off.



Caution Do not disconnect I/O-side wires or connectors unless power has been switched off or the area is known to be nonhazardous.



Caution Do not remove modules unless power has been switched off or the area is known to be nonhazardous.



Caution Substitution of components may impair suitability for Class I, Division 2.



Caution For Division 2 and Zone 2 applications, install the system in an enclosure rated to at least IP54 as defined by IEC/EN 60079-15.

Special Conditions for Hazardous Locations Use in Europe and Internationally

The cDAQ-9188XT has been evaluated as Ex nA IIC T4 Gc equipment under DEMKO Certificate No. 12 ATEX 1202658X and is IECEx UL 14.0089X certified. Each device is marked Ⓢ II 3G and is suitable for use in Zone 2 hazardous locations, in ambient temperatures of $-40\text{ }^{\circ}\text{C} \leq T_a \leq 70\text{ }^{\circ}\text{C}$.



Caution You must make sure that transient disturbances do not exceed 140% of the rated voltage.



Caution The system shall only be used in an area of not more than Pollution Degree 2, as defined in IEC 60664-1.



Caution The system shall be mounted in an ATEX/IECEx-certified enclosure with a minimum ingress protection rating of at least IP54 as defined in IEC/EN 60079-15.



Caution The enclosure must have a door or cover accessible only by the use of a tool.

Power Requirements



Caution The protection provided by the NI cDAQ-9188XT chassis can be impaired if it is used in a manner not described in the *NI cDAQ-9188XT User Manual*.



Note Some C Series modules have additional power requirements. For more information about C Series module power requirements, refer to the documentation for each C Series module.



Note Sleep mode for C Series modules is not supported in the NI cDAQ-9188XT.

Voltage input range	9 V to 30 V (measured at the NI cDAQ-9188XT power connector)
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Maximum required input power ¹	15 W
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Caution You must use a UL Listed ITE power supply marked LPS with the NI cDAQ-9188XT.

Recommended power supply	15 W, 24 VDC
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Power Connector Characteristics

Screw-terminal wiring

Gauge	2.0 mm ² to 0.2 mm ² (14 AWG to 24 AWG) copper conductor wire
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Wire strip length	6 mm (0.24 in.) of insulation stripped from the end
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Temperature rating	85 °C
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Torque for screw terminals	0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.)
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Wires per screw terminal	One wire per screw terminal
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Connector securement

Securement type	Screw flanges provided
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Torque for screw flanges	0.4 N · m (3.5 lb · in.)
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Wiring Power to the NI cDAQ-9188XT

The NI cDAQ-9188XT requires an external power source as described in the [Power Requirements](#) section. The NI cDAQ-9188XT filters and regulates the supplied power and

¹ Includes maximum 1 W module load per slot across rated temperature and product variations.

provides power to all of the modules. The POWER LED on the front panel identifies when the power input is in use.



Caution To ensure the specified EMC performance, do not connect the power connector to a DC MAINS supply or to any supply requiring a connecting cable longer than 3 m (10 ft). A DC MAINS supply is a local DC electricity supply network in the infrastructure of a site or building.

Complete the following steps to connect a power source to the NI cDAQ-9188XT.

1. Make sure the power source is turned off.
2. If connected, loosen the connector screw flanges and remove the power screw terminal connector plug from the NI cDAQ-9188XT.



Note Do not tighten or loosen the terminal screws on the power connector while the power is on.

3. Connect the positive lead of the primary power source to the V terminal of the power connector plug and tighten the terminal screw.
4. Connect the negative lead of the primary power source to the C terminal of the power screw terminal connector plug and tighten the terminal screw.
5. Install the power connector plug on the front panel of the NI cDAQ-9188XT and tighten the connector screw flanges.
6. Turn on the external power source.

If the power source is connected to the power connector using long wiring with high DC resistance, the voltage at the power connector may be significantly lower than the specified voltage of the power source.

The C terminal is not connected to chassis ground. You can connect the C terminal to chassis ground externally. Refer to the [Power Requirements](#) section for information about the power supply input range. Refer to the [Safety Guidelines](#) section for information about the maximum voltage from terminal to chassis ground.

Preparing the Environment

Ensure that the environment you are using the NI cDAQ-9188XT in meets the following specifications.

Operating temperature (IEC 60068-2-1 and IEC 60068-2-2) -40 °C to 70 °C²



Caution To maintain product performance and accuracy specifications when the ambient temperature is between 60 °C and 70 °C, you must mount the chassis horizontally to a metal panel or surface using the screw holes or the panel mount kit.

² When operating the NI cDAQ-9188XT in temperatures below 0 °C, you must use the PS-15 power supply or another power supply rated for below 0 °C.

Measure the ambient temperature at each side of the CompactDAQ system 63.5 mm (2.5 in.) from the side and 25.4 mm (1.0 in.) from the rear cover of the system. For further information about mounting configurations, go to ni.com/info and enter the Info Code `cdaqmounting`.

Pollution Degree (IEC 60664)	2
Maximum altitude	5,000 m

Indoor use only.



Note Refer to the *NI cDAQ-9188XT Specifications* for complete specifications.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.



Caution To ensure the specified EMC performance, product installation requires either special considerations or user-installed add-on devices. Refer to the *NI cDAQ-9188XT User Manual* for further information.



Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories. Note that the input DC power cables may be unshielded.



Caution To ensure the specified EMC performance, do not connect the power connector to a DC MAINS supply or to any supply requiring a connecting cable longer than 3 m (10 ft). A DC MAINS supply is a local DC electricity supply network in the infrastructure of a site or building.



Caution To ensure the specified EMC performance, the length of any I/O cable connected to a BNC PFI port must be no longer than 30 m (100 ft).

Special Conditions for Marine Applications

Some products are Lloyd's Register (LR) Type Approved for marine (shipboard) applications. To verify Lloyd's Register certification for a product, visit ni.com/certification and search for the LR certificate, or look for the Lloyd's Register mark on the product.



Caution In order to meet the EMC requirements for marine applications, install the product in a shielded enclosure with shielded and/or filtered power and input/output ports. In addition, take precautions when designing, selecting, and installing measurement probes and cables to ensure that the desired EMC performance is attained.

Where to Go Next

The following documents contain information that you may find helpful as you use this document:

- *NI cDAQ-9188XT User Manual*
- *NI cDAQ-9188XT Specifications*

Worldwide Support and Services

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