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User Manual

18-Slot PXI Chassis
(Model No. 40-918)



Issue 6.0 January 2015

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For Technical Support please contact Pickering Interfaces either by phone, the website or via e-mail.

WARRANTY

All products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years, excluding programmable power supplies, from the date of delivery to the original purchaser. Any product found to be defective within this period will, at the discretion of Pickering Interfaces be repaired or replaced.

Products serviced and repaired outside of the warranty period are warranted for ninety days.

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PRODUCT SAFETY

SAFETY SYMBOLS

The following safety symbols may be used on the product and throughout the product documentation.

MEANING / DESCRIPTION	SYMBOL
PROTECTIVE EARTH (GROUND) To identify any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.	
DANGEROUS VOLTAGE To indicate hazards arising from dangerous voltages.	
WARNING / CAUTION An appropriate safety instruction should be followed or caution to a potential hazard exists. Refer to the relevant instructions detailed within the product manual.	
HEAVY If this product is heavy reference should be made to the safety instructions for provisions of lifting and moving.	
STATIC SENSITIVE To indicate that static sensitive devices are present and handling precautions should be followed.	

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WARNINGS AND CAUTIONS

WARNING - HAZARDOUS ENVIRONMENTS	SYMBOL
This product is not specifically designed for use in hazardous environments, for example in explosive atmospheres. If the product is to be used in hazardous environments we recommend that the user ensures suitable protective measures are taken.	

WARNING - DANGER OF ELECTRIC SHOCK	SYMBOL
This chassis may be populated with modules that contain hazardous voltages. Before removing any module from the rack remove all supplies and disconnect user I/O signals. Unused slots in this chassis are populated with blanking plates to prevent access to user I/O signals that may be present. Blanking panels are available to order from Pickering in a variety of slot widths. If the product is not used in this manner for example by using an extender card then additional care must be taken to avoid contact with exposed signals.	

CAUTION - HANDLING OF ELECTROSTATIC-SENSITIVE DEVICES	SYMBOL
Certain semiconductor devices used in this equipment are liable to damage due to static voltage. Observe the following precautions when handling these devices in their unterminated state, or sub-assemblies containing these devices: 1. Persons removing sub-assemblies from equipment using these devices must be earthed by a wrist strap and a resistor at the point provided on the equipment. 2. Soldering irons used during the repair operations must be low voltage types with earthed tips and isolated from the mains voltage by a double insulated transformer. 3. Outer clothing worn must be unable to generate static charges. 4. Printed Circuit Boards (PCBs) fitted with these devices must be stored and transported in anti-static bags.	

CAUTION - PRODUCT DOCUMENTATION	SYMBOL
Suitably qualified & trained users should ensure that the accompanying documentation is fully read and understood before attempting to install or operate the product.	

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS
All cleaning and servicing requires the equipment to be isolated and disconnected from the power source and user I/O signals (refer to the Maintenance Section). • Appropriate manual handling procedures should be followed as dictated by the weight of the individual module or the combined weight of the modules & chassis. • Should a fault occur with the module or chassis, immediately isolate and disconnect the incoming power to the chassis and the user I/O signals. • Ensure the equipment is installed, operated and maintained by trained and authorised personnel. • For suitably equipped products in the event of an emergency press the red “emergency stop” button situated on the front of the unit.

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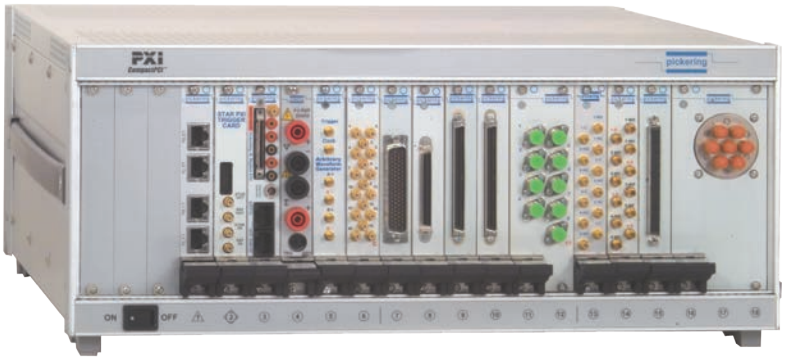
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SECTION 1 - TECHNICAL SPECIFICATION

40-918
High Performance 18 Slot PXI Mainframe

- High Performance 18 Slot PXI/cPCI Backplane
- Four Modular Power Supplies
- Compact Benchtop Footprint
- Integrated Carrying Handles
- Low Profile 4U Rugged Design
- Voltage Monitoring Included
- Power Supplies Hot Swap Capable
- Low Audible Operating Noise Versions Available
- 3 Year Warranty



Pickering Interfaces Model 40-918 PXI Chassis features the industry-standard, eighteen-slot PXI/cPCI backplane integrated into a 3U cardcage.

The 41-918 includes all the features and performance required by the PXI standard and supports a control interface or embedded controller and up to 17 additional 3U peripheral modules.

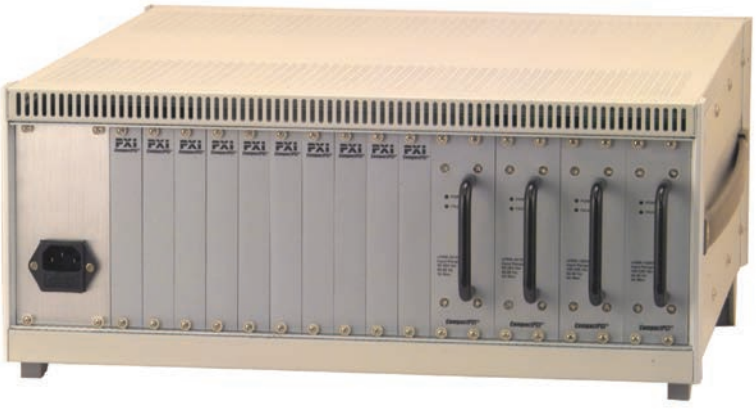
The 40-918 chassis can be controlled from a PC using Pickering Interfaces PCI to PXI Control Interface 41-921.

The 40-918 chassis has a very high capacity power supply provided by using 4 modular power supplies mounted in the rear of the chassis. The capacity of this arrangement is well suited to supporting modules with very high current demands. The modular power supplies are hot swappable, replacement power supply modules are available from Pickering as spare parts

Power supply voltage and fault monitoring is through front panel LEDs. Two 56cfm fans provide dedicated power supply cooling with easy access to the filter media.

Four 56cfm fans (total 224cfm) insure maximum PXI module cooling with minimal noise. Quick filter media and fan maintenance is provided by a removable fan tray.

For applications such as office or laboratory environments where acoustic noise levels are critical the chassis can be supplied with either lower speed fans or with fans whose speed can be set to full, medium or slow with easily accessed internal switches.



Rear View of the Chassis Showing Location of the Four Hot Swappable Power Supplies

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Backplane

Bus Design: Incorporates all the features of the PXI specification. The backplane is 64-bit with PXI triggers, Star Trigger, Local Bus & internal PXI clock.

Cooling

Airflow: Bottom intake, side/rear exhaust, pressurized cardcage.

Fans: (4) 56cfm fans (224cfm total).

Acoustic Noise: 68.4 - 70.3dB @ 1meter (A weighting)

Air Filter: Bottom accessible, washable media.

Low Acoustic Noise Versions:
Available with selectable fan speed (3 speeds set by internal switches).
Available with low noise fans.

Power Supply

AC input: 90 - 264VAC, universal input, Line Fuse protected.

Supplied with four 175W power supplies (Type 59102) with the following total capacity:

DC Outputs	Total Current
+3.3V	100A
+5V	100A
+12V	12A
-12V	4A

Note: Combined 3.3V and 5V current, 108Amps Maximum.

Power Factor: 0.99 (typical).

Efficiency: 70% (typical).

Power Supply Cooling

Airflow: Bottom intake, side/rear exhaust

Fans: (2) 56cfm fans (112cfm total).

Air Filter: Bottom accessible, washable media.

Operating/Storage Conditions

Operating Conditions (operating with specified airflow)

Operating Temperature: 0°C to +55°C
Humidity: Up to 95% non-condensing
Altitude: 5000m

Storage and Transport Conditions

Storage Temperature: -20°C to +70°C
Humidity: Up to 95% non-condensing
Altitude: 15000m

Power Supply Monitoring

Interface: Front panel LED indicators.

Functions: Power supply DC output voltage verification (90% nominal).

Indicators: Green LEDs for Power OK, Red LED for Fault.

Physical Parameters

Cardcage: Front loading 3U x 160mm, flush, 18 slots, IEEE 1101.1, 1101.10 and 1101.11

Dimensions: 482.6mm (19.00"D)
442.2mm (17.41"W)
with out rack mount flanges.
482.6mm (19.00"W)
with rack mount flanges.
177mm (6.97"H)

Weight: 14.74kg (32.5 lbs.),

Safety & CE Compliance

All modules are fully CE compliant and meet applicable EU directives: Low-voltage safety EN61010-1:2001, EMC Immunity EN61000-6-1:2001, Emissions EN55011:1998.

Product Order Codes

18 Slot, 3U, PXI Chassis	**40-918-001**
Chassis with 3 speed fans	**40-918-101**
Chassis with low noise fans	**40-918-201**
PCI to PXI Control Interface Kit	**41-921-001-KIT**

For full details of our fast PCI to PXI control Interface see the 41-921 data sheet.

Spare Parts

Replacement Power Supply Module	**44-910-003**

Mating Connectors & Cabling

Please refer to the Pickering Interfaces "**Connection Solutions**" catalog for a full list of connector/cabling options, including drawings, photos and specifications. This is available in either print or as a download.

Alternatively our web site has dynamically linked connector/cabling options, including pricing, for all Pickering PXI modules.



Latest Details

Please refer to our Web Site for Latest Product Details.
www.pickeringtest.com

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SECTION 2 - TECHNICAL DESCRIPTION

BACKPLANE

The 40-918 PXI chassis uses a 18-slot backplane which consists of 1 system slot and 17 peripheral slots (at 33 MHz) with 20.32 mm (0.8 inch) board center-to-center spacing.

Key Features:

- Compliant with PXI specification R2.1.
- Two ATX sockets and screw terminals for +3.3V, +5V, ±12V DC output connection.
- 10-layer PCB for accurate impedance control.
- ATX socket and screw terminals for DC output connection.
- 64-bit PCI bus on J1 and J2, support N-1 bus-mastering I/O slots (N: Slots).
- System controller slot is located in slot 1.
- Trigger controller slot is located in slot 2, providing individual triggers to all other peripherals.

Interoperability With CompactPCI

The 40-918 backplane is interoperable with PXI-compatible products and standard CompactPCI products. This is an important feature, as many PXI-compatible systems may not require components that do not implement PXI-specific features. For example, you may want to use a standard CompactPCI network interface card in a PXI chassis.

The signals on the P1 connector of the backplane meet the requirements of the CompactPCI specification for both the peripheral and system modules.

The PXI-specific signals are located on P2 and are only found on the signals that are reserved or not used in the CompactPCI 64-bit specification. Therefore, all modules that meet the requirements of the CompactPCI 64-bit specification will function in the 40-918. The backplane includes PCI to PCI bridges between Slots 7 and 8 and 13 and 14 that divide the backplane into 3 segments.

System Controller Slot

The System Controller slot is located in Slot 1 of the chassis as defined by the PXI specification. It has three controller expansion slots, which are used for system controller modules that are wider than one slot. As defined in the PXI specification, these slots allow the controller to expand to the left to prevent the controller from using up peripheral slots.

Star Trigger Slot

The Star Trigger (ST) slot is located at Slot 2. This slot has a dedicated trigger line between each peripheral slot (see Figure 2.1). This slot is intended for modules with Star Trigger functionality that can provide individual triggers to all other peripherals. However, if you do not require advanced trigger functionality, you can install any standard peripheral module into this slot. Peripheral Slots - there are seven peripheral slots including the Star Trigger controller slot. The Star Trigger Slot can also accept an external standard to replace the chassis reference clock, PXI_CLK10 supplied by the chassis.

Local Bus

The PXI backplane's local bus is a daisy-chained bus that connects each peripheral slot with its adjacent peripheral slots to the left and right, as shown in Figure 2.1.

For example, a given peripheral slot's right local bus connects to the adjacent slot's left local bus and so on. Each local bus is 13 lines wide and can pass analog signals between cards or provide a high-speed side-band communication path that does not affect the PXI bandwidth.

Local Bus signals may range from high-speed TTL signals to analog signals as high as 42V. Initialization software keys adjacent boards to prohibit the use of incompatible boards. This software uses the configuration information specific to each peripheral board to evaluate compatibility. This method is a flexible way to define local bus functionality that is not limited by hardware keying.

Trigger Bus

The 40-918 includes the 8 trigger bus lines defined in the PXI standard to interconnect the system and peripheral slots.

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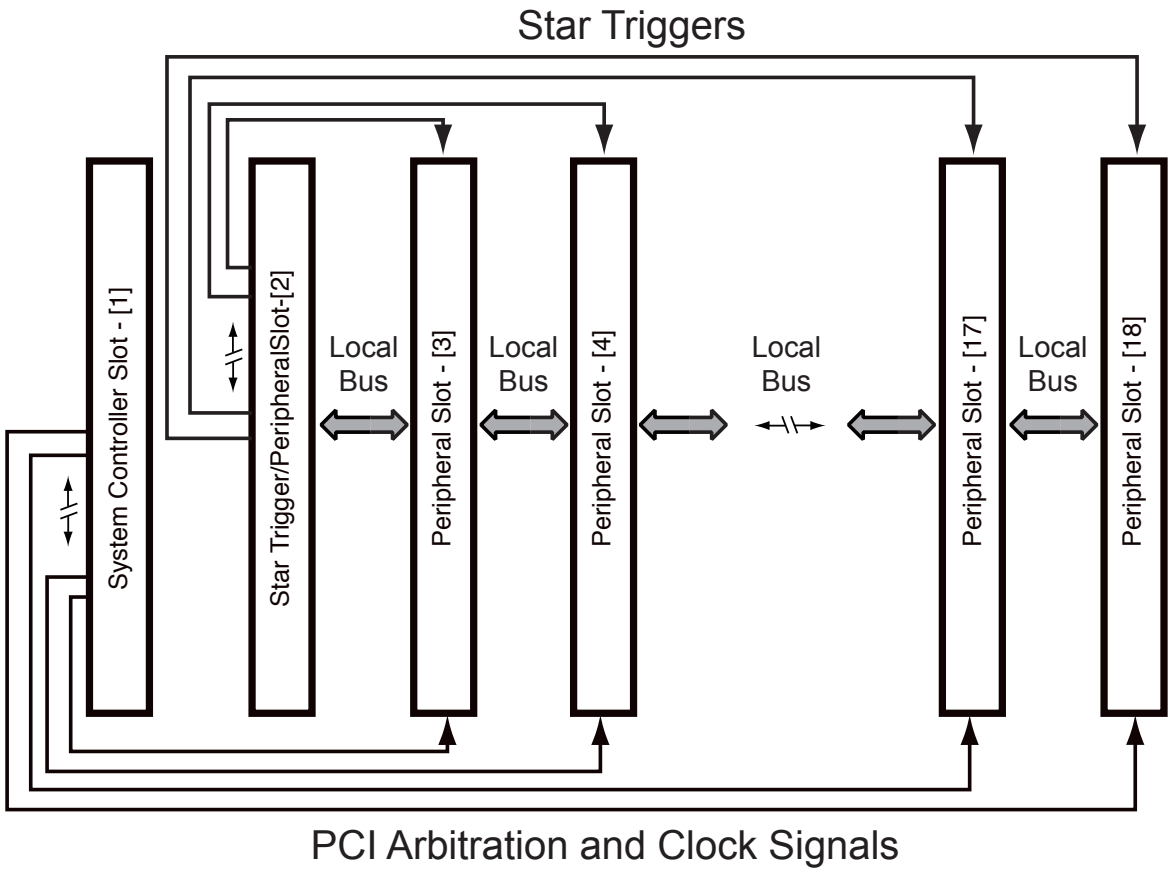


Figure 2.1 - PXI Local Bus and Star Trigger Routing

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POWER SUPPLY

The 40-918 uses four modular power supplies that are accessible from the rear of the chassis. The power supplies are operated from the 90V to 260V AC supply to the chassis and provide +5V, +3.3V, +12V and -12VDC to the PXI backplane.

The 5910(x) power supply is very easy to replace and maintain. Users may insert or remove the redundant power supply without interrupting the system operation (providing the backplane load can be supplied from one power supply module). However, for systems where the chassis is fully populated, it is recommended that the system is powered down prior to changing a power supply.

In the event of failure, replacement power supply modules are available as spare parts from Pickering with the order code: 44-910-003.

Key Features

- Eurorack-compatible module design
- 110/220VAC input, 175W
- Hot swap with N+1 load sharing
- Remote sense on main output (+5V)
- Efficiency 73%
- Built-in EMI filter
- Over voltage protection
- Short circuit protection on all outputs
- Over temperature protection at 90ºC
- DIN standard input/output connector
- Status LEDs indicate power OK and Fault
- FCC Class B regulations

Power Status Indication

Status LED	Indication
Green	Input OK
Red	Power supply FAULT

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MECHANICAL

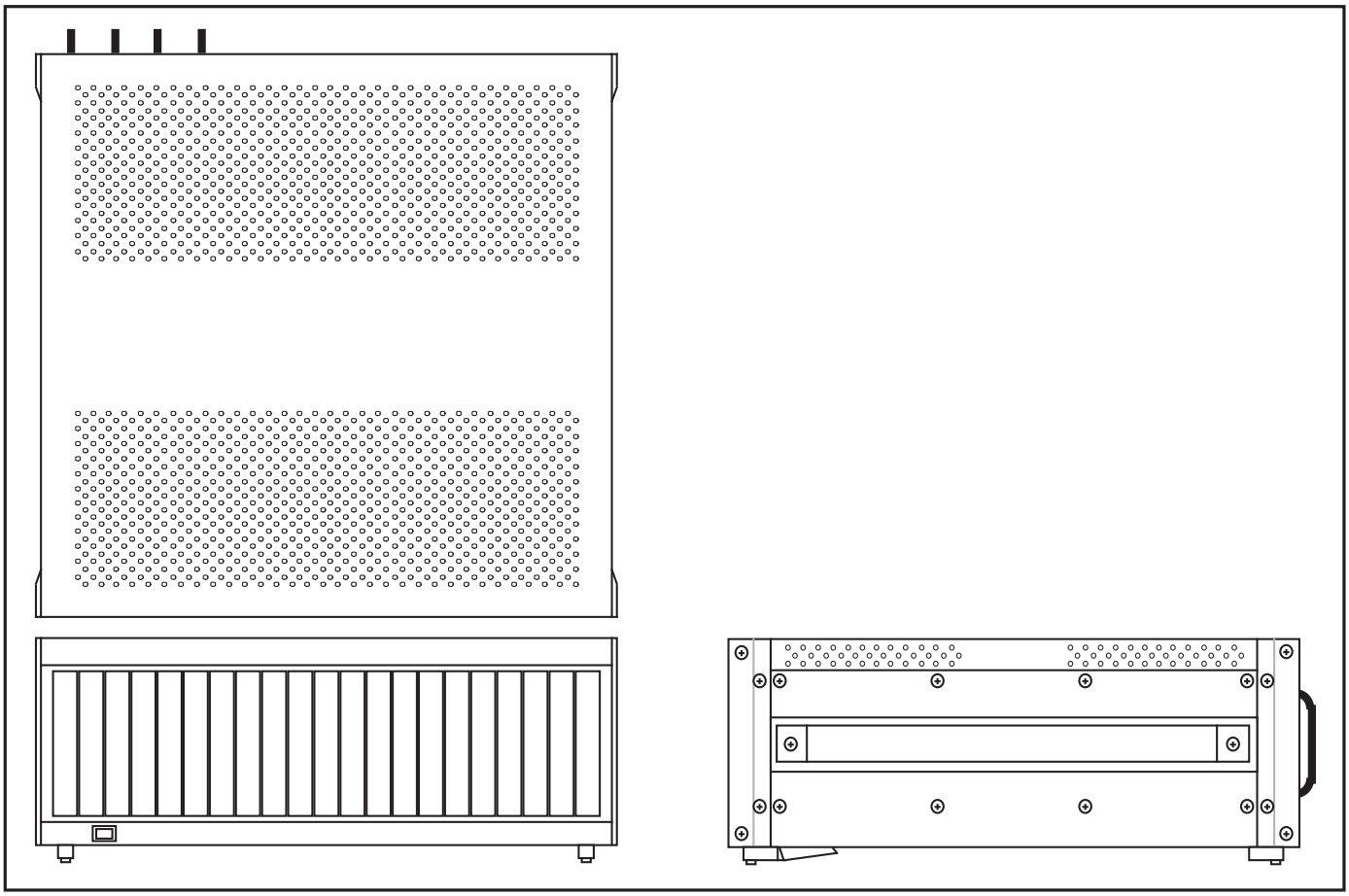


Figure 2.2 - Mechanical Drawing For The 40-918-001 PXI Chassis

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SECTION 3 - INSTALLATION AND OPERATION

Refer to the Warnings and Cautions at the front of this manual
The chassis is designed for indoor use only.



Connecting Safety Ground

WARNING





THE 40-923 CHASSIS IS DESIGNED WITH A THREE-POSITION IEC CONNECTOR THAT CONNECTS THE GROUND LINE TO THE CHASSIS GROUND. TO MINIMIZE SHOCK HAZARD, MAKE SURE YOUR ELECTRICAL POWER OUTLET HAS AN APPROPRIATE EARTH SAFETY GROUND THAT IS CONNECTED WHENEVER YOU POWER UP THE CHASSIS.

IF YOUR POWER OUTLET DOES NOT HAVE AN APPROPRIATE GROUND CONNECTION, YOU MUST CONNECT THE FACTORY WIRE SAFETY GROUND TO THE CHASSIS. TO CONNECT THE SAFETY GROUND, COMPLETE THE FOLLOWING STEPS:

1. Connect a 16 AWG (1.3 mm) wire to a chassis grounding screw using a toothed grounding lug. The wire must have green insulation with a yellow stripe or must be non-insulated (bare).

2. Attach the opposite end of the wire to permanent earth ground using toothed washers or a toothed lug.

GETTING STARTED

Unpacking

Carefully remove every item from the shipping container and check the chassis for any damage. Make sure all handles, hardware, and switches are in good condition. If damage appears, please contact Pickering Interfaces for service or replacement.

Each PXI chassis contains the following items:

- This manual (printed or on CD)
- 40-918 Chassis with Filler panels
- A power cord (110V/220V alternative)
- Installation CD (includes electronic manuals and chassis.ini files)

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Environment

The 40-918 chassis uses industrial standard mechanical components and high performance connector technologies to provide an optimized system for rugged applications.

Operating Temperature	0~55°C (32~131°F)
Storage Temperature	-20~70°C (-40~158°F)
Relative Humidity (Operating and Storage)	10~95% @ 40°C, non-condensing
Packaged Vibration	5~100Hz: 0.015G²/Hz 100~200Hz: -6 dB/Oct 200 Hz: 0.0038 G²/Hz
Unpackaged Vibration	5~55~5Hz 0.38mm Peak to Peak
Drop Test	Falling Height: 76 cm Falling: 1 corner/3 edges/6 faces
Shock Test (Operating)	Acceleration: 10G Pulse width: 11ms Pulse shape: half sine wave No. of shock: 3 shocks for bottom side

INSTALLING THE CHASSIS

AC Power Cord Compliance

The AC mains cord used with the Pickering Interfaces 40-918 chassis must meet the requirements of ANSI/UL817 for use in the United States, CSA C2.2 21 and 49 for use in Canada, and IEC 227 or 245 for use in the European Economic Area. AC mains power supply cords used with the 40-918 chassis in other countries must be approved by the authority having jurisdiction in that country.

Connecting to Line Power and Power On Test

Attach the input power to the rear panel AC inlet using an appropriate power cord. Plug the male end of the line cord into a properly grounded AC outlet that is rated for at least 2.5 Amps. The power switch allows you to turn the mainframe on or place it in standby mode. Push the power switch in the On position (if not already on). Observe that all the cooling fans operate and the four green indicator lights (four power supply Output LEDs located on rear of chassis) are illuminated.

Status Indicators

There are 8 status indicator LEDs for the four power supplies (2 per power supply module). The power supply's status LED will be Illuminated green if the voltages are within 90% of nominal. If any of the power supply's outputs fall below 90%, the green LED will be extinguished and the red fault LED will illuminate.

Fan Speed

The 4 cardcage fans and 2 power supply cooling fans are set at maximum regardless of temperature.

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Rack Mount Installation

- The PXI Mainframe is designed to be either rack mounted in a standard 19” equipment rack or placed on a tabletop.
- Ensure the PXI Mainframe and its associated rack are stable during the installation and removal of the mainframe, under normal conditions. The floor should be essentially level and leaning or other adverse force should be avoided when installing or removing the mainframe. Always be sure that all mounting hardware is installed and secured when installation is complete.
- If the unit is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Special care must be taken that the ambient temperature of the rack environment is not greater than 40°C.
- Installation of the equipment in a rack should be such that airflow into and out of the mainframe is not reduced.
- Be sure not to overload any outlet within the rack to which this product is attached, by checking all of the device nameplate ratings that are connected to a given branch circuit.
- Reliable earthing of rack-mounted equipment must be maintained. Adequate grounding should be checked and established for proper protection against shock hazards when using power strips or other means of connection other than direct connection to the branch circuit.

Site Considerations

The 40-918 is designed to operate on a bench or in an instrument rack. Determine how you want to use your 40-918 and follow the appropriate installation instructions.

Apertures in the rear and along both sides of the chassis facilitate power supply and module cooling. Shown in Figure 2-2, air enters through filters and fan inlets located in the lower rear of the chassis and exits through the upper sections on both sides and through the rear.

Cooling Considerations

The area above and below the chassis should be kept clear of obstructions to ensure the inlet and exhaust air paths are not obstructed. The user should allow at least 0.5 U separation between the top and bottom of the chassis and other instruments in the rack.

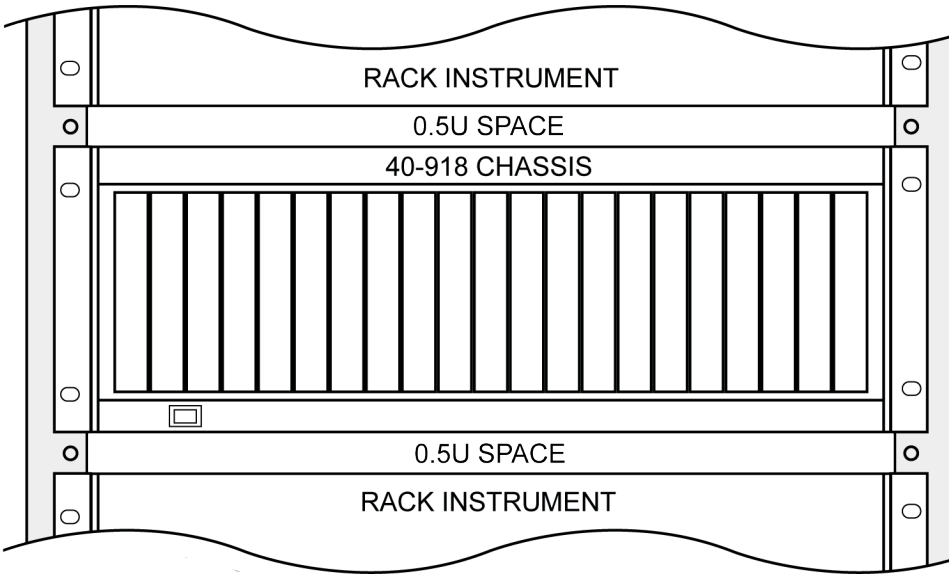


Figure 3.1 - Minimum air gap required at the top and bottom of the 40-918 chassis.

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If the chassis is placed above an instrument that vents hot air from its top cover then a mechanical separator, such as a tray, should be used to stop the chassis from taking hot air into the chassis

Side and rear air exhausts should be kept clear of obstructions

Ensure that all unused slots in the chassis have filler panels installed, as required by the PXI standard, to ensure the correct internal air flow.

Ensure the air filter on the bottom of the chassis is correctly installed after cleaning.

Front Filler Panel Installation

For maximum cooling efficency, install filler panels into all unused slots. Follow these steps to install the filler panels. The chassis comes with all require filler panels installed per the PXI spec.

- Place the filler panel to the right side of the last used slot. Line up the holes with the threaded strip holes.
- Using a flathead screwdriver, screw the two captive screws into the threaded strip holes.

INSTALLING AND IDENTIFYING A PICKERING PXI CHASSIS IN NI MAX

Any non-NI PXI chassis will not be identified by manufacturer and model in MAX unless the appropriate files are added to the controller system.

This lack of identification is not usually a problem, the chassis will appear as (Unidentified) in the MAX list, but this should not affect its performance in any way.

In order to make MAX fully identify a Pickering chassis, follow these instructions:

If you are obtaining the configuration ini files from the Pickering “Software Installation” disk then ignore steps 1, 2 and 6a, alternatively if you are downloading these files ignore step 6b.

1. Copy the required .ini file from the download location to your PC using the following link: http://www.pickeringtest.info/downloads/drivers/Chassis/
2. Copy the files to any convenient location on your PC, for example to the Desktop.
3. Launch MAX and expand: **My System**, **Devices and Interfaces**, **PXI System**.
4. The Pickering chassis will appear in the list followed by the word (Unidentified).
5. Right click on the entry and select: **Identify As**.

6a. Select the entry appropriate for the chassis, if it is not present, then select “Other” and browse to the location of the file downloaded above.

6b. Select the entry appropriate for the chassis, if it is not present, then select “Other” and browse to the location of your chassis .ini file on the Pickering “Software Installation” Disk, in the folder: “\Drivers_PXI\PXI Chassis Identification”.

7. Change the file filter to “All Files (*.*)” and select the appropriate ini file.
8. The chassis should now be correctly identifed in MAX.

INSTALLATION OF INDIVIDUAL MODULES

Please refer to the module user manual for the correct installation procedure of individual PXI modules.

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SECTION 4 - MAINTENANCE

Refer to the Warnings and Cautions at the front of this manual 

MAINTENANCE

This chapter covers the following maintenance procedure information. The maintenance information is intended for qualified service personnel. If you are not experienced in maintenance service, please contact Pickering Interfaces for further help.

- Recommened Service Intervals
- Preparation
- Cleaning

Recommended Service Intervals

- Clean the air filter every 6 months or more frequently if the mainframe is operated in a dusty environment.
- Clean dust and dirt from the exterior (and interior) of the mainframe as needed. Routine cleaning will increase the reliability of the mainframe.

Preparation

Before undertaking maintenance, please read the following information carefully:

Static Damage

Many components within the chassis are susceptible to static discharge damage. Therefore when maintaining the chassis, we suggest you always do so in a static-free environment. Please follow the standard handling procedures for static-sensitive devices and wear a grounded wrist strap or equivalent while servicing the chassis.

Parts Replacement

Please service this equipment with electrically and mechanically certified parts. Parts that are not certified and not genuine may cause harm to the service personnel. Furthermore, damage or fire may occur if replacement parts are unfit.

Modification

Please keep the chassis in its original condition. Inappropriate modifications may cause safety problems.

Explosive Atmosphere

When servicing the chassis, please keep it away from conditions where flammable gas is present. Under such condition this equipment is unsafe and may ignite gas or fumes.

Cleaning

The following explains the general cleaning procedures for the 40-908 8-Slot Chassis. Please contact Pickering Interfaces for further help and questions.

NOTE: Before cleaning the chassis, please power-off the chassis and disconnect the power cord.

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CAUTION

AVOID GETTING MOISTURE INSIDE THE CHASSIS DURING EXTERIOR CLEANING. DO NOT USE TOO MUCH MOISTURE TO DAMPEN CLEANING CLOTHS.

DO NOT WASH THE FRONT-OR-REAR PANEL CONNECTORS OR SWITCHES. WHILE CLEANING THE CHASSIS, PLEASE COVER THESE COMPONENTS.

DO NOT USE CHEMICAL CLEANING AGENTS THAT CONTAIN BENZENE, TOLUENE, XYLENE, ACETONE, OR SIMILAR SOLVENTS. THESE CLEANING AGENTS MAY DAMAGE THE COMPONENTS.

Interior Cleaning

Use a dry, low-velocity stream of air to clean the chassis interior, then use a soft-bristle brush to clean the components. If you want to use a liquid cleaning agent, use a 75% isopropyl alcohol solution and rinse with deionized water.

Exterior Cleaning

Use a dry lint-free cloth or a soft-bristle brush to clean the exterior surfaces of the chassis. If there is any dirt, wipe with a cloth moistened in a mild soap solution, then wipe with a cloth moistened with clean water to remove the soap residue. Do not use abrasive cleaning agents on any part of the chassis.

Cleaning the Fan Filters

Remove the fan filters from the bottom of the chassis. Clean the filters by washing them in a mild soap solution and rinse with clean water and allow to dry before reinstalling them back to the chassis. Alternatively, clean the filters by vacuuming or blowing air through them.

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RESETTING THE AC MAINS CIRCUIT BREAKER

If the Pickering Interfaces 40-918 chassis encounters and over-current condition, the circuit breaker located on the rear panel will trip to prevent damage to the mainframe.

Complete the following steps to reset the circuit breaker:

1. Turn the front panel power switch to the Standby position (0).
2. Disconnect the AC line cord.
3. Lift the circuit breaker handle to reset it.
4. Reconnect the AC line cord.
5. Turn the power switch to the On position (1).

If the circuit breaker trips again, complete the following steps:

1. Turn the front panel power switch to the Standby position.
2. Disconnect the AC line cord.
3. Remove all modules from the mainframe.
4. Complete the procedure described in the “Connecting to Line Power and Power On Test” section in the Installation section of this document.
5. If any of the power supply or fan status lights do not come on, indicating a bad power supply or fan, contact Pickering Interfaces.
6. If all of the status lights are illuminated, verify that the 40-918 chassis can meet the power requirements of your CompactPCI or PXI modules. Overloading the mainframe can cause the circuit breaker to trip. Refer to the Specifications section of this document.
7. The over-current condition that caused the circuit breaker to trip may be due to a faulty CompactPCI or PXI module. Refer to the documentation that was supplied with the modules for troubleshooting.

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