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8-Slot PXI Express Chassis for PXI and PXI Express Modules

NI PXIe-1062Q

- Accepts 3U PXI, PXI Express, CompactPCI, and CompactPCI Express modules
- Up to 1 GB/s per-slot dedicated bandwidth [x4 PCI Express]
- 354 W available power for 0 to 55 °C
- 30 W per-slot cooling meets increased PXI Express cooling requirements
- Low-jitter internal 10 MHz reference clock for PXI slots with ±25 ppm stability

- Low-jitter internal 100 MHz reference clock for PXI Express slots with ±25 ppm stability
- Quiet operation for 0 to 30 °C at 43.6 dBA
- Variable speed fan controller optimizes cooling and acoustic emissions
- Remote power-inhibit control
- Complies with PXI and CompactPCI specifications

Overview

The National Instruments PXIe-1062Q 8-slot chassis is designed to meet the needs of a wide range of test and measurement applications, providing a high-bandwidth backplane to meet high-performance needs. The NI PXIe-1062Q chassis works with both PXI and PXI Express modules and can operate in a temperature range extended to 55 °C. In addition, for applications requiring quieter operation, the NI PXIe-1062Q can provide acoustic emissions as low as 43.6 dBA at temperatures below 30 °C. The NI PXIe-1062Q chassis incorporates all features of the latest PXI specification including acceptance of both PXI and PXI Express modules with a built-in 10 MHz reference clock, PXI trigger bus, and PXI star trigger for PXI modules and a built-in 100 MHz reference clock, SYNC 100, and PXI differential star trigger for PXI Express modules.

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Application and Technology

High Reliability

- 0 to 55 °C extended temperature range
- Power supply, temperature, and fan monitoring
- HALT-tested for increased reliability
- Field-replaceable power supply shuttle

Multichassis Synchronization

- PXI Express system timing slot for tight synchronization across chassis
- Rear CLK10 I/O connectors
- Switchless CLK10 routing

Optional Features

- Front and rear rack-mount kits
- Replacement power supply shuttle
- EMC filler panels
- Slot blockers for improved cooling performance
- Factory installation services

Slot	PXI Express System	PXI Express Peripheral	Hybrid	PXI
Bus Signaling	PCI Express (x4)	PCI Express (x4)	PCI (32/33) PCI Express (x4)	PCI (32/33)
Maximum, Theoretical Bandwidth, Single Direction	3 GB/s dedicated for PXI Express [3 x4 links] 132 MB/s shared for PXI	1 GB/s dedicated	132 MB/s shared (PXI) or 1 GB/s dedicated (PXI Express)	132 MB/s shared
Number of Slots	1	1[1]	2	4
[1] System timing slot				

Slot Types Accept PXI and PXI Express Modules

The NI PXIe-1062Q chassis is designed to meet high-bandwidth needs and provides the flexibility to house both PXI and PXI Express modules. The PXI Express system slot provides three x4 PCI Express links (1 GB/s single direction per link) and a x1 PCI Express link to a PCI Express-to-PCI translation bridge on the backplane. The PXI Express system timing slot provides a x4 PCI Express link to the system slot and accepts a PXI Express module or a PXI Express system timing controller for advanced timing and synchronization. The two PXI Express hybrid slots provide connectivity to either a x4 PCI Express link to the system slot or to the 32-bit/33 MHz PCI bus on the backplane. The four remaining PXI slots provide connectivity to the 32-bit/33 MHz PCI bus on the backplane.
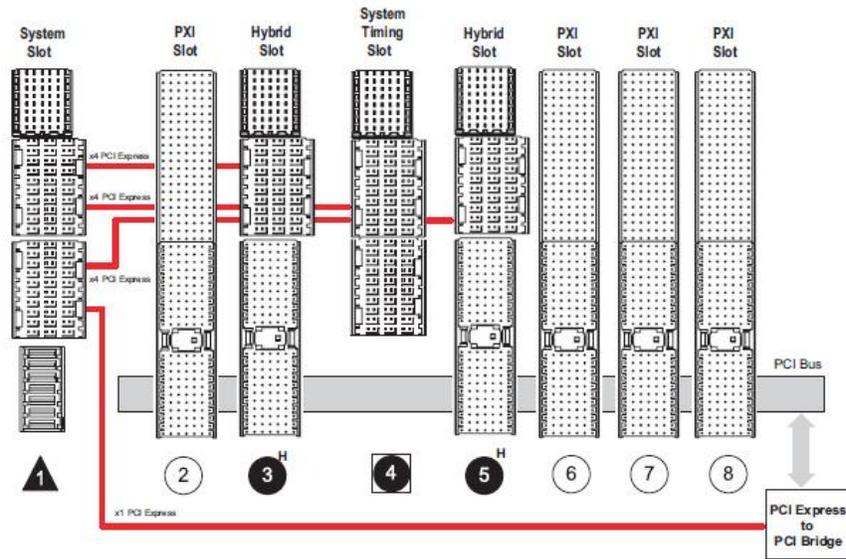

Figure 1. NI PXIe-1062Q Chassis Backplane

Optimized Cooling and Acoustic Emissions

The NI PXIe-1062Q chassis integrates two pulse-width modulation (PWM) system fans to provide forced-air cooling that meets the increased cooling demands of PXI Express and CompactPCI Express. The NI PXIe-1062Q offers a HIGH fan setting to maximize cooling at any ambient temperature and an AUTO fan setting to minimize acoustic emissions at ambient temperatures below 30 °C. The chassis monitors air intake temperature and adjusts fan speed accordingly. With this technology, the NI PXIe-1062Q achieves acoustic noise levels as low as 43.6 dBA (sound pressure level measured at operator position according to ISO 7779). The lower acoustic emissions make the NI PXIe-1062Q ideally suited for office, laboratory, or benchtop applications while the high cooling performance makes the NI PXIe-1062Q well-suited for applications requiring extended temperature ranges.
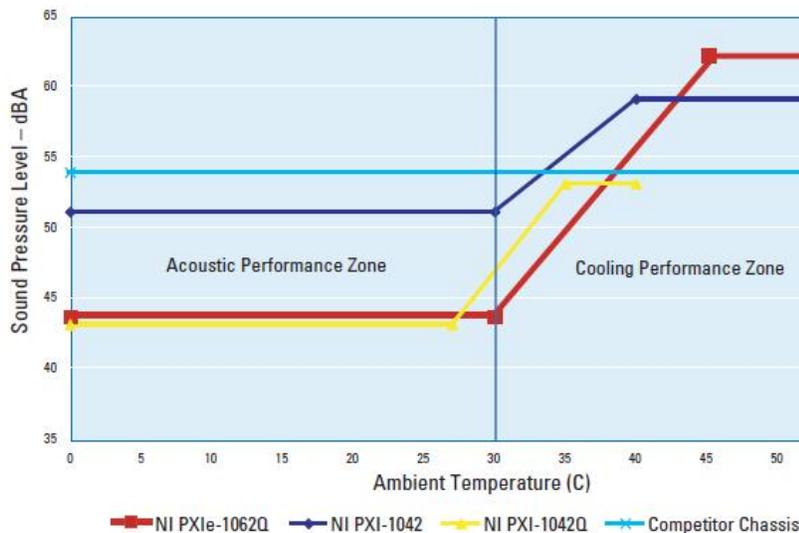

Figure 2. Chassis Acoustic Emissions Comparison

PXI Timing and Synchronization

For PXI modules, the NI PXIe-1062Q backplane provides the standard PXI timing and synchronization features. The chassis features a 10 MHz reference clock (PXI_CLK10) with an accuracy of ±25 parts per million (ppm), less than 5 ps jitter, and a maximum slot-to-slot skew of 250 ps. For triggering and handshaking needs, the NI PXIe-1062Q provides the PXI trigger bus and PXI star trigger. For PXI Express modules, in addition to PXI timing and synchronization features, the NI PXIe-1062Q backplane supplies a differential 100

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MHz reference clock (PXIe_CLK100) with an accuracy of ±25 ppm, less than 5 ps jitter, and a maximum slot-to-slot skew of 100 ps. The chassis also provides differential star trigger to the PXI Express slots to offer less than 150 ps intermodule skew. With the PXIe_SYNC100, a module installed in the NI PXIe-1062Q can generate its own CLK10 signal, deriving it from the 100 MHz reference clock.

Software System Configuration

The NI PXIe-1062Q chassis is configured with NI Measurement & Automation Explorer (MAX). With this software configuration tool, you can easily configure NI PXIe-1062Q systems without time-consuming manual installation of initialization files. MAX creates the pxisys.ini file that defines the layout and parameters of your PXI system including chassis, controller, and plug-in modules.

Replaceable Power Supply Shuttle

The NI PXIe-1062Q chassis include a removable high-performance universal AC power supply with built-in overcurrent protection. An isolated 12 VDC line provides power to the cooling fans, significantly reducing electrical noise on the chassis backplane. The NI PXIe-1062Q incorporates the power supply and fans into a single modular unit that you can replace quickly, resulting in a mean time to repair (MTTR) of less than five minutes.

External 10 MHz Reference Clock I/O Connectors

The NI PXIe-1062Q chassis include IN/OUT BNC connectors for the 10 MHz reference clock on the rear of the chassis. When the backplane detects a 10 MHz signal on the IN connector, it phase locks PXI_CLK10, PXIe_CLK100, and PXIe_SYNC100 to the external clock. The OUT connector provides a buffered, non-TTL version of the 10 MHz reference clock.

Remote Power Inhibit and Monitoring

The NI PXIe-1062Q chassis features remote power inhibit and voltage monitoring through a DB-9 connector on the rear of the chassis. Use this connector to switch off power or monitor the power remotely in the chassis.

Power Supply, Temperature, and Fan Monitoring

The NI PXIe-1062Q chassis monitors power supply voltages, air intake temperature, and fan speeds; and provides any failure feedback to the user via a bicolor LED located in the power switch button on the front of the chassis.

Chassis Installation

The NI PXIe-1062Q has a flexible design for easy installation in a variety of applications. For benchtop use, you can adjust the supporting feet to tilt the chassis for more comfortable access to module front panels. Front and rear rack-mount kits are available for 19 in. rackmounted applications.

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Ordering Information

For a complete list of accessories, visit the product page on ni.com.

Products	Part Number	Recommended Accessories	Part Number
Related Accessories			
NI PMA-1115: Portable PXI Monitor and English Keyboard Accessory	780215-01	No accessories required.	
NI PXI Carrying Case	780398-01	No accessories required.	
PXI Chassis Filler Panel Kit, 3 Double- & 3 Single-Slot Panels	778679-01	No accessories required.	
NI PXI 8-Slot Rear Rack Mount Kit	778643-02	No accessories required.	
Replacement Power Supply Shuttle for NI PXIe-1062Q	779664-01	No accessories required.	
PXI EMC Filler Panel Kit	778700-01	No accessories required.	
NI PXI 8-Slot Front Rack Mount Kit	778643-01	No accessories required.	
NI PXIe-1062 Products			
PXIe-1062Q, 8-Slot 3U PXIe/ PXI Chassis Requires: 1 Cable	779633-01	**Cable:** Shielded - Power Cord, AC, U.S., 120 VAC, 2.3 meters	763000-01
		Cable: Shielded - Power Cord, 240V, 10A, North American	763068-01

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Support and Services

System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at ni.com/advisor to find a system assurance program to meet your needs.

Technical Support

Get answers to your technical questions using the following National Instruments resources.

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offices around the world and speak the local language.

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- **Online Community** - Visit community.ni.com to find, contribute, or collaborate on customer-contributed technical content with users like you.

Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit ni.com/repair.

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- **Training memberships** and training credits - to buy now and schedule training later.

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NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit ni.com/warranty.

OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

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Detailed Specifications

This appendix contains specifications for the NI PXIe-1062Q chassis.

⚠️ **Caution** Specifications are subject to change without notice.

Electrical	
AC Input	
Input voltage range	100 to 240 VAC
Operating voltage range [1]	90 to 264 VAC
Input frequency	50/60 Hz
Operating frequency range [1]	47 to 63 Hz
Input current rating	8 A
Over-current protection	10 A circuit breaker
Line regulation	
3.3 V	<±0.2%
5 V	<±0.1%
±12 V	<±0.1%
Efficiency	70% typical
Power disconnect	The AC power cable provides main power disconnect. The front-panel power switch causes the internal chassis power supply to provide DC power to the CompactPCI/PXI Express backplane. You also can use the rear-panel D-SUB 9-pin connector and power mode switch to control the internal chassis power supply.
DC Output	
DC current capacity (I_{MP})	

+3.3 V	32 A
+5 V	30 A
+12 V	25 A
−12 V	1.5 A
5 V$_{AUX}$	2 A

Note Maximum total power is 353.6 W.

Backplane pin current capacity

Slot	+5 V	V (I/O)	+3.3 V	+12 V	−12 V	5 V$_{AUX}$
System Controller Slot	15 A	-	15 A	30 A	-	1 A
System Timing Slot	-	-	6 A	4 A	-	1 A
Hybrid Peripheral Slot with PXI-1 Peripheral	6 A	5 A	6 A	1 A	1 A	-
Hybrid Peripheral Slot with PXI-5 Peripheral	-	-	6 A	4 A	-	1 A
PXI-1 Peripheral Slot	6 A	11 A	6 A	1 A	1 A	-

Note Total system slot current should not exceed 45 A.

PCI V(I/O) pins in PXI-1 peripheral slots and hybrid peripheral slots are connected to +5 V.
The maximum power dissipated in the system slot should not exceed 140 W.
The maximum power dissipated in a peripheral slot should not exceed 38.25 W.

Load regulation

Voltage	Load Regulation
+3.3 V	<5%
+12 V	<5%
+5 V	<5%
−12 V	<5%

Maximum ripple and noise (20 MHz bandwidth)

Voltage	Maximum Ripple and Noise
+3.3 V	50 mV$_{pp}$
+12 V	50 mV$_{pp}$
+5 V	50 mV$_{pp}$
−12 V	50 mV$_{pp}$

Over-current protection	All outputs protected from short circuit and overload with automatic recovery
Over-voltage protection	
3.3 V and 5 V	Clamped at 20 to 30% above nominal output voltage
Power supply shuttle MTTR	Replacement in under 5 minutes

Chassis Cooling

Module cooling system	
NI PXIe-1062Q	Forced air circulation (positive pressurization) through two 110 cfm fans with High/Auto speed selector
Slot airflow direction	Bottom of module to top of module
Module cooling intake	Bottom rear of chassis
Module cooling exhaust	Along both sides and top of chassis
Power supply cooling system	Forced air circulation through integrated fan
Power supply cooling intake	Right side of chassis
Power supply cooling exhaust	Left side of chassis

Environmental	
Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient)
Pollution Degree	2
For indoor use only.	
Operating Environment	
Ambient temperature range	0 to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)
Relative humidity range	10 to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)
Storage Environment	
Ambient temperature range	–40 to 71 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 limits.)
Relative humidity range	5 to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

Shock and Vibration	
Operational shock	30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC-60068-2-27. Meets MIL-PRF-28800F Class 2 limits.)
Random Vibration	
Operating	5 to 500 Hz, 0.3 g_{rms}
Nonoperating	5 to 500 Hz, 2.4 g_{rms} (Tested in accordance with IEC-60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Acoustic Emissions	
Sound Pressure Level (at Operator Position)	
(Tested in accordance with ISO 7779. Meets MIL-PRF-28800F requirements.)	
Auto fan (up to ~30 °C ambient)	43.6 dBA
High fan	62 dBA
Sound Power	
Auto fan (up to ~30 °C ambient)	52.8 dBA
High fan	72 dBA

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA-C22.2 No. 61010-1

Note For UL and other safety certifications, refer to the product label, or visit ni.com./certification, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance $\mathsf{C}\mathsf{E}$

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 2006/95/EC; Low-Voltage Directive (safety)

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2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit ni.com/certification, search by module number or product line, and click the appropriate link in the Certification column.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit ni.com/environment/weee.htm.

Backplane

Size	3U-sized; one system slot (with three system expansion slots) and seven peripheral slots. Compliant with IEEE 1101.10 mechanical packaging. PXI Express Specification compliant. Accepts both PXI Express and CompactPCI (PICMG 2.0 R 3.0) 3U modules.
Backplane bare-board material	UL 94 V-0 Recognized
Backplane connectors	Conforms to IEC 917 and IEC 1076-4-101, and are UL 94 V-0 rated

System Synchronization Clocks (PXI_CLK10, PXIe_CLK100, PXIe_SYNC100)

10 MHz System Reference Clock: PXI_CLK10

Maximum slot-to-slot skew	250 ps
Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Maximum jitter	5 ps RMS phase-jitter (10 Hz–1 MHz range)
Duty-factor	45%–55%
Unloaded signal swing	3.3 V ±0.3 V

Note For other specifications refer to the *PXI-1 Hardware Specification*.

100 MHz System Reference Clock: PXIe_CLK100 and PXIe-SYNC100

Maximum slot-to-slot skew	100 ps
Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Maximum jitter	3 ps RMS phase-jitter (10 Hz–12 kHz range), 2 ps RMS phase-jitter (12 kHz–20 MHz range)
Duty-factor for PXIe_CLK100	45%–55%
Absolute differential voltage (When terminated with a 50 Ω load to 1.30 V or Thévenin equivalent)	400–1000 mV
Single-ended V_{OH}	2.0–2.5 V

Note For other specifications refer to the *PXI-5 PXI Express Hardware Specification*.

External 10 MHz Reference Out (BNC on rear panel of chassis)

Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Maximum jitter	5 ps RMS phase-jitter (10 Hz–1 MHz range)
Output amplitude	1 VPP ±20% square-wave into 50 Ω 2 VPP unloaded
Output impedance	50 Ω ±5 Ω

External Clock Source

Frequency	10 MHz ±100 PPM
Input amplitude	
Rear panel BNC	200 mV_{PP} to 5 V_{PP} square-wave or sine-wave
System timing slot PXI_CLK10_IN	5 V or 3.3 V TTL signal
Rear panel BNC input impedance	50 Ω ±5 Ω
Maximum jitter introduced by backplane	1 ps RMS phase-jitter (10 Hz–1 MHz range)

PXIe_SYNC_CTRL	
V_{IH}	3.0–5.5 V
V_{IL}	0–0.8 V

PXI Star Trigger	
Maximum slot-to-slot skew	250 ps
Backplane characteristic impedance	65 Ω ±10%

Note For PXI slot to PXI Star mapping, refer to the *System Timing Slot* section of the *NI PXIe-1062Q User Manual*. For other specifications, refer to the *PXI-1 Hardware Specification*.

PXI Differential Star Triggers (PXIe-DSTARA, PXIe-DSTARB, PXIe-DSTARC)	
Maximum slot-to-slot skew	150 ps
Maximum differential skew	25 ps
Backplane differential impedance	100 Ω ±10%

Note For PXIe slot to PXI_DSTAR mapping, refer to the *System Timing Slot* section of the *NI PXIe-1062Q User Manual*. For other specifications, the NI PXIe-1062Q complies with the *PXI-5 PXI Express Hardware Specification*.

Mechanical

Overall dimensions	
Standard chassis	
Height	6.97 in. (177.1 mm)
Width	10.68 in. (271.4 mm)
Depth	15.61 in. (396.5 mm)

Note 0.57 in. (14.5 mm) is added to height when feet are installed. When tilted with front feet extended on table top, height is increased approximately 2.08 in. (52.8 mm) in front and 0.583 in. (14.8 mm) in rear.

Weight	8.8 kg (19.4 lb)
Chassis materials	Sheet Aluminum (5052-H32, 3003-H14, and 6061-T6), Extruded Aluminum (6060-T6), and Cold Rolled Steel, PC-ABS, Santoprene, Nylon
Finish	Conductive Clear Iridite on Aluminum, Clear Chromate Zinc Plating on Cold Rolled Steel, Polyurethane Enamel

The following two figures show the NI PXIe-1062Q chassis dimensions. The holes shown are for the installation of the optional rack mount kits. You can install those kits on the front or rear of the chassis, depending on which end of the chassis you want to face toward the front of the instrument cabinet. Notice that the front and rear chassis mounting holes (size M4) are symmetrical.

NI PXIe-1062Q Chassis Dimensions (Front and Side)

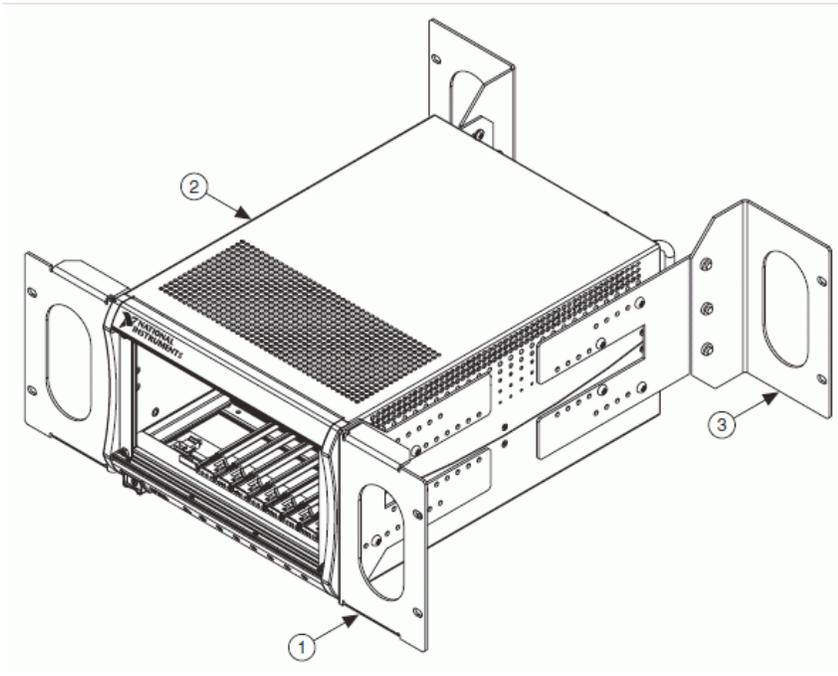Dimensions are in inches [millimeters]
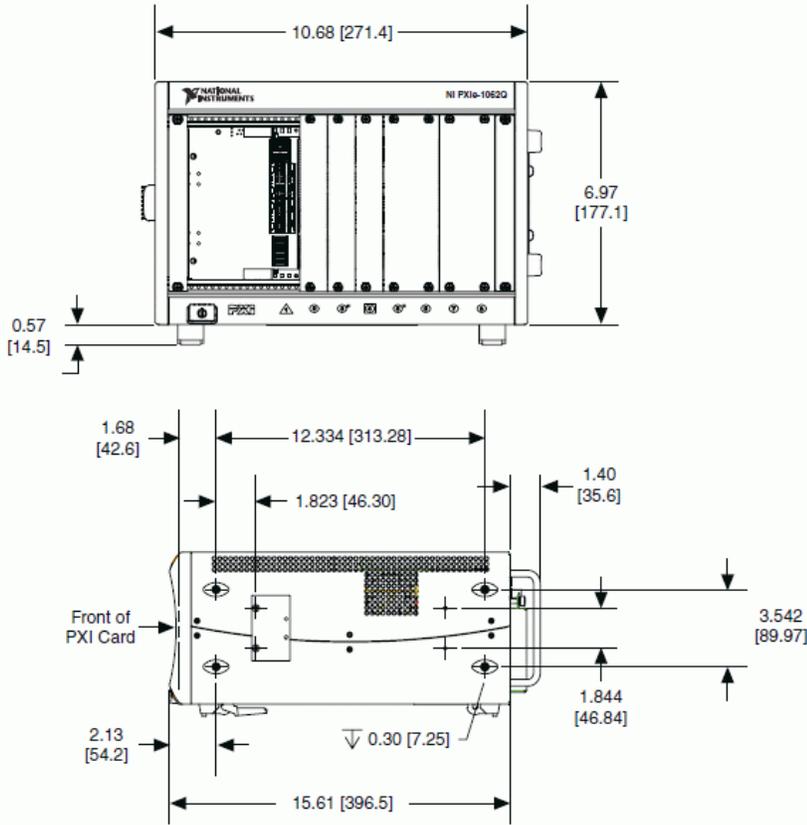
NI PXIe-1062Q Chassis Dimensions (Bottom)
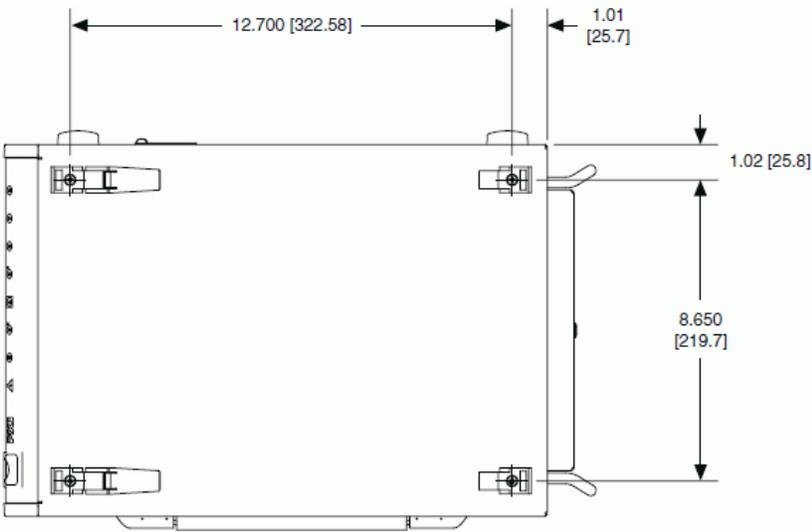
The following figure shows the chassis rack mount kit components.

NI Chassis Rack Mount Kit Components

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| 1 Front Rack Mount Kit | 2 NI Chassis | 3 Optional Rear Rack Mount Kit |

Note The chassis shown in the previous figure is representative of the NI PXI-1042/NI PXIe-1062Q product line.

[1] The operating range is guaranteed by design.

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