



**iPC-Plus & nPC400
High Performance Ultra-Thin
Industrial Computers
User's Guide**

Revision List

Revision Number	Description of Change	Release Date
A	Initial Release	1-2015

Nematron reserves the right to make changes in specifications described herein at any time without notice in order to improve design and reliability. Nematron does not assume any responsibility for the use of any circuitry described; no circuit patent licenses are implied. Nematron assumes no responsibility for damage caused by misuse or improper use of its products.

WARRANTY

Nematron warrants to Customer that the Products will be free from defects in material and workmanship under normal use and service for a period of two years from date of invoice. Customer's exclusive remedy for breach of this warranty is that Nematron will either (i) repair or replace, at its option, any Product which fails during the warranty period because of such defect (if Customer promptly reported the failure to Nematron in writing) or, (ii) if Nematron is unable to repair or replace, Nematron will refund the purchase price of the Product upon its return to Nematron. This warranty does not apply to any Product which has been subjected to misuse, abnormal service or handling, or which has been altered or modified in design or construction, or which has been serviced by anyone other than Nematron. The warranty set forth herein is in lieu of, and exclusive of, all other warranties, express or implied.

Chapter 1 - Introduction

The iPC-Plus Series products are high performance color TFT embedded ultra-thin industrial computers specifically designed for harsh industrial environments. This series is an extension to the ePC-Series with added features including DVD-R/W, Dual hard drives, and PCIe/PCI expansion.

The iPC-Plus Series offers four versions with 15" XGA (1024 x 768), 17" SXGA (1280 x 1024), 19" SXGA (1280 x 1024) TFT Color LCD panels, or no attached LCD (nPC400). These high-performance embedded industrial PCs offer processor options up to a state of the art Intel Celeron, i5, and i7 Processor and DRAM options up to 16 GB. Additional options include 24 VDC power supply, stainless steel front panels, rackmount front panel (iPC1950 and iPC1550KP units only), and several solid state drive options including RAID level 1. With a multitude of I/O and 2 ¾-length PCIe/PCI expansion slots included on the standard unit many automation applications are ideally suited for use with this series. The Ultra-Thin panel depth (4.45") also makes this series ideal for space constrained applications. With Class I and II Division 2 approvals this industrial PC makes installation in Hazardous Locations applications simple.

Features

- Processor Options up to Intel i7 Quad Core options
- DRAM Options up to 16 GB
- Up to two easily removable SATA solid state or hybrid hard drives
- Numerous I/O Ports
 - Two Gigabit Ethernet ports
 - 4 USB 2.0 and 2 USB 3.0 ports
 - 2 RS-232 serial port
 - 1 RS-422/485 Serial port
 - PS/2 mouse and keyboard ports
 - Audio (In/Out/Mic)
 - Analog VGA or HDMI ports for dual screen applications (with attached LCD installed)
- UL 508 and ANSI/ISA 12.12.01-2012 listed for Hazardous Locations: Class I, Division 2, Groups A, B, C, D and Class II, Division 2, Groups F and G, Class III when installed in a NEMA Type 1/4/4x/12 enclosure (does not include the optional enclosed (-EN) units)
- NEMA 4/4X/12 front bezel (panel mount versions only)
- Optional Vented back enclosure (-EN option)
 - iPC1550 only.
- 2-Year warranty
- RoHS compliant
- European CE mark compliant
- Integral 100 -240 VAC power supply
- Simplified installation with no studs
- Ultra-Thin design – less than 4.45" behind front panel
- VESA compliant – all modes up to SXGA, 75Hz (XGA on 15" unit)
- Optional 5-wire resistive touch screen
- Optional 304 stainless steel front bezel
- Optional iPC1500KP Keypad front panel (15" only)
- Optional iPC1950 Rack Mount front bezel (19" only, not NEMA sealed)
- Optional 24 VDC input power
- Windows 7 Professional (32-Bit) pre-installed
 - Windows Ultimate (64-bit) optional
 - Windows XP Professional (32-bit) optional

Specifications

Front Panels

The iPC-Plus series has NEMA 4/4X/12 sealed front panels when mounted in an appropriate NEMA rated enclosure. See Chapter 2 for more details on installation and selection of an appropriate enclosure. All three sizes have very similar front panels with different dimensions.

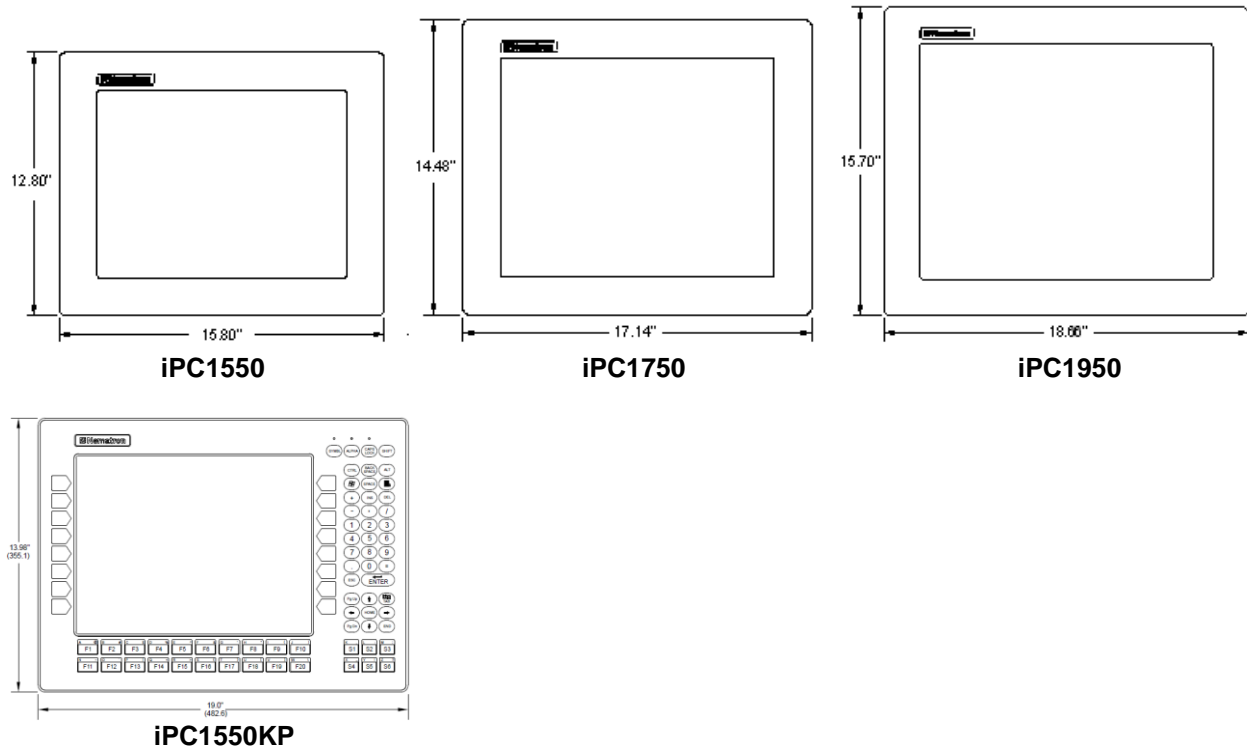


Figure 1.0: iPC-Plus Series Front Panel Comparison

The standard front panels are powder coated aluminum. The optional Stainless Steel front panel is type 304 and will not contain a logo pocket or logo on the front. The window area is clear polycarbonate when ordered without a touchscreen. The touchscreen option is heat annealed glass covered by a polyester overlay. The polyester overlay has better resistance to chemicals than the polycarbonate window. Depending on the chemicals involved in your application consideration should be given to choosing the proper window material.

In addition to the panel mounted versions there is a display-less “node” version, the nPC400. This unit is essentially the same as the other iPC-Plus units without a NEMA sealed front panel, touchscreen, and display. It is intended to be mounted inside a NEMA enclosure.

iPC1550KP Front Panel

The iPC1550KP(T) front panel is significantly different than the other touchscreen only members of the iPC-Plus series. This front panel contains nearly full alpha-numeric keyboard functionality while still providing the option for a touchscreen. The keypad front panel is connected to the main CPU board via a USB port, therefore older operating systems that do not recognize USP ports cannot be utilized.

The keypad front panel shown below has 81 keys with many of them having multiple functionality. The keypad is broken up into 6 functional sections; ATM-style Screen Keys, Function Keys, Mode and LED Indicators, Numeric and Control Keys, Cursor Control Keys, and System keys. The ATM-style Screen Keys, Function Keys, and System Keys are reprogrammable to return different key strokes. If a different key return or combination is required for these keys consult the factory for more information on this subject. The Function and System Keys have rear legend strips that can be removed and new strips reinserted with custom graphics.



Each of these sections has specific functions explained below:

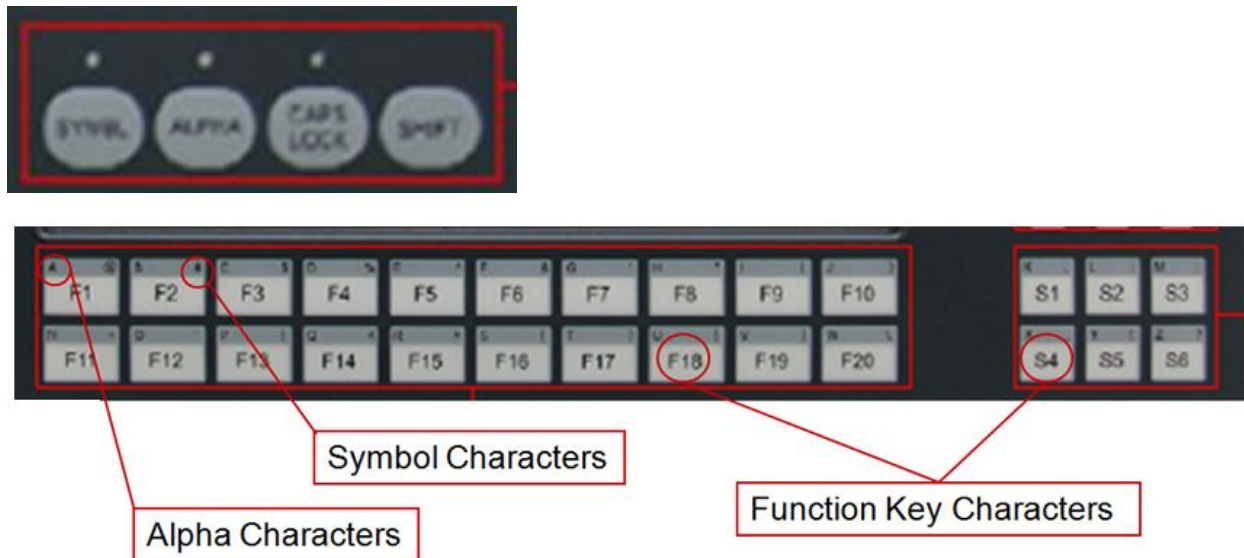
Keypad Section	Description
ATM-style Screen Keys	<p>These keys are on each side of the screen and can be directly tied to a specific screen application much like an ATM. These keys are reprogrammable but are not able to be re-legended.</p> <p>Left Keys are defined as SC1 through SC8 (top to bottom) - the default key returns for SC1 – SC8 are [CTRL+(F1 – F8 respectively)]</p> <p>Right Keys are defined as SC9 through SC16 (top to bottom) - the default key returns for SC9 – SC16 are [ALT+(F1 – F8 respectively)]</p>
Function Keys	<p>The 20 keys directly below the screen are normally Function keys. The Function keys are reprogrammable and can be re-legended. They also have Alpha characters in the top left and right corner of each key. These Alpha characters and symbols are not reprogrammable and cannot be removed by changing the legend strips.</p> <p>The default key returns for F1 – F10 are F1 – F10 respectively</p> <p>The default key returns for F11 – F20 are [SHIFT+(F1 – F10 respectively)]</p> <p>These keys are multi-functional and can return Alpha, Symbols and or “Function” keys. See the explanation of “Mode and Led Keys” below.</p>
System Keys	<p>The 6 keys in the lower right corner of the front panel are reprogrammable keys than can be used for specific application key returns. The System keys are can also be re-legended. They also have Alpha characters in the top left and right corner of each key. These Alpha characters and symbols are not reprogrammable and cannot be removed by changing the legend strips.</p> <p>The default key returns for S1 – S6 are [ALT+SHIFT+(F1 – F6 respectively)]</p> <p>These keys are multi-functional and can return Alpha, Symbols and or “Function” keys. See the explanation of “Mode and Led Keys” below.</p>
Cursor Control Keys	<p>The 9 keys just above the “System Keys” return standard PC keyboard functionality as marked on each key. These keys are not able to be reprogrammed or their legend changed. This keypad section is dedicated to cursor movement on the screen and/or in an application.</p>
Numeric and Control Keys	<p>The 26 keys just above the “Cursor Control Keys” return standard PC keyboard functionality as marked on each key. These keys are not able to be reprogrammed or their legend changed. This keypad section is dedicated to numeric and standard keyboard control keys i.e. DEL, CTRL, ESC, ENTER, etc.</p>
Mode Keys and LED Indicators	<p>At the top right hand of the front panel are four keys with special functionality. These keys allow the Alpha, Symbols, and Capital Letters to be utilized. These keys are not reprogrammable and cannot be relegended. See the section below for more detail on how these Mode keys function.</p>

Mode Keys and Led Indicator Functionality

The four keys at the top right hand of the keypad front panel are custom designed to allow the 26 keys at the bottom of the front panel (“Function Keys and System Keys”) to have multiple functionality. This multiple functionality allows these 81 keys to provide virtually every key on a standard PC keyboard. The Alpha and Symbol keys allow the left and right legends at the top of the Function and Symbol keys to be utilized. The Alpha and Symbol Key functionality is described as follows:

- “Alpha” mode on, returns Alpha characters on upper Left side of lower 26 keys
- “Symbol” mode on, returns Symbol characters on upper Right side of lower 26 keys
- “Alpha” and “Symbol” modes both off, returns F1 – F20 and S1 – S6

A more detailed explanation of the functionality of these four keys is explained as follows:



- “Alpha” and “Symbol” are mutually exclusive
 - Both LEDs off; unit is in “Function Key” mode
 - First press turns LED on and appropriate mode is selected
 - Press same key again turns LED off and returns to “Function Key” mode
 - Press the other Key and the other mode is selected (that LED turns on and the other LED turns off)
- “Caps Lock”
 - When in “Alpha Mode” and the “Caps Lock” LED is on, letters will return upper case, otherwise return lower case (like std. keyboard)
- “Shift”
 - While holding “Shift Key” in “Alpha” mode and “Caps Lock” LED is off, upper case letters will be returned
 - With “Caps Lock” LED on and holding “Shift”, lower case will be returned

I/O Panel

All versions of the iPC-Plus series have a common Input/Output configuration. Figure 2.0 shows the base configuration of the three units.

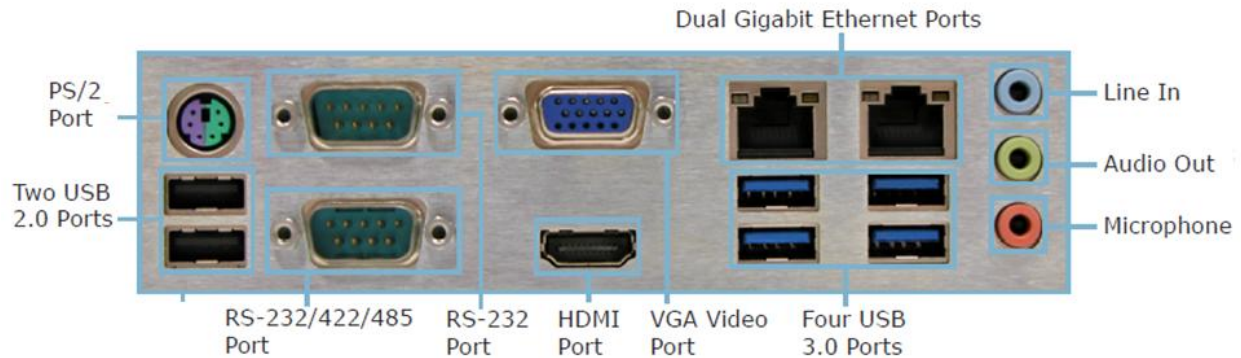


Figure 2.0: iPC-Plus Series I/O configuration

Feature	Description
Video Port	A standard 15-pin analog VGA is provided. This connection allows a second screen to be easily added to the iPC. In addition the iPC allows this second screen to be utilized in an extended desktop configuration. See section on configuring the video for more details on this feature.
Com 1	Com 1 is a standard 9-pin RS-232 serial port.
Com 2	Com 2 utilizes a standard 9-pin serial port. The iPC default configuration for this port is RS-232. Via a BIOS selection this port can alternately be configured as RS-422 or RS-485. See section on connector pin-outs and jumpers in the CPU board manual for more detailed instructions and information on the configuration of this port.
HDMI	A standard HDMI port is provided. This connection allows a second screen to be easily added to the iPC. In addition the iPC allows this second screen to be utilized in an extended desktop configuration.
Gigabit Ethernet	Two Ethernet ports are provided that are both capable of 10/100/1000 Base-T communications.
USB 2.0	Two ports capable of USB 1.1 and USB 2.0 are provided.
USB 3.0	Four ports capable of USB 1.1, USB 2.0, and USB 3.0 are provided.
PS/2 Port	One PS/2 port is provided. This port is capable of being used singularly as a mouse or keyboard port. If both devices are desired to be utilized simultaneously a special Y-cable cable must be utilized. The keyboard or mouse must be connected to the appropriately marked cable end.
Input Power	The Input power, whether AC or DC, is supplied via a Phoenix connector. See Chapter 2 on Installation for more details on how to wire this connection.
Audio IN / OUT / MIC	Audio Line IN, Audio OUT, and Microphone ports are supplied. These are unamplified signals and can be used to input or output sound.

DISPLAY

	iPC1550 & iPC1550KP	iPC1750	iPC1950
Display Diagonal	15.0" (381.0mm)	17.0" (431.8mm)	19.0" (482.6mm)
Display Size (Active Area H x V)	11.97" x 8.98" (304.0mm x 228.1mm)	13.30" x 10.64" (337.8mm x 270.3mm)	14.82" x 11.85" (376.4mm x 301.0mm)
Native Resolution	XGA, 1024 x 768	SXGA, 1280 x 1024	SXGA, 1280 x 1024
Displayable Colors	16M	16M	16M
Brightness, Typical	300 Nit	380 Nit	300 Nit
Contrast Ratio, Typical	800:1	1000:1	2000:1
Horizon/Vertical View Angle, CR>5, Typical	150°/145°	176°/170°	178°/178°
Backlight Life, Typical	50,000 hrs	50,000 hrs	50,000 hrs

TOUCH SCREEN (Optional)

Touch Screen Technology	5- Wire Analog Resistive
Interface	Internally via USB
Resolution	4096 x 4096
Positional Accuracy (Maximum Error)	0.18" (0.19" ePC1900) 4.57mm (4.83mm ePC1900)
Positional Accuracy (Standard Deviation of Error)	< 0.08" (< 2.0 mm)
Expected Life	>35,000,000 Activations

PHYSICAL

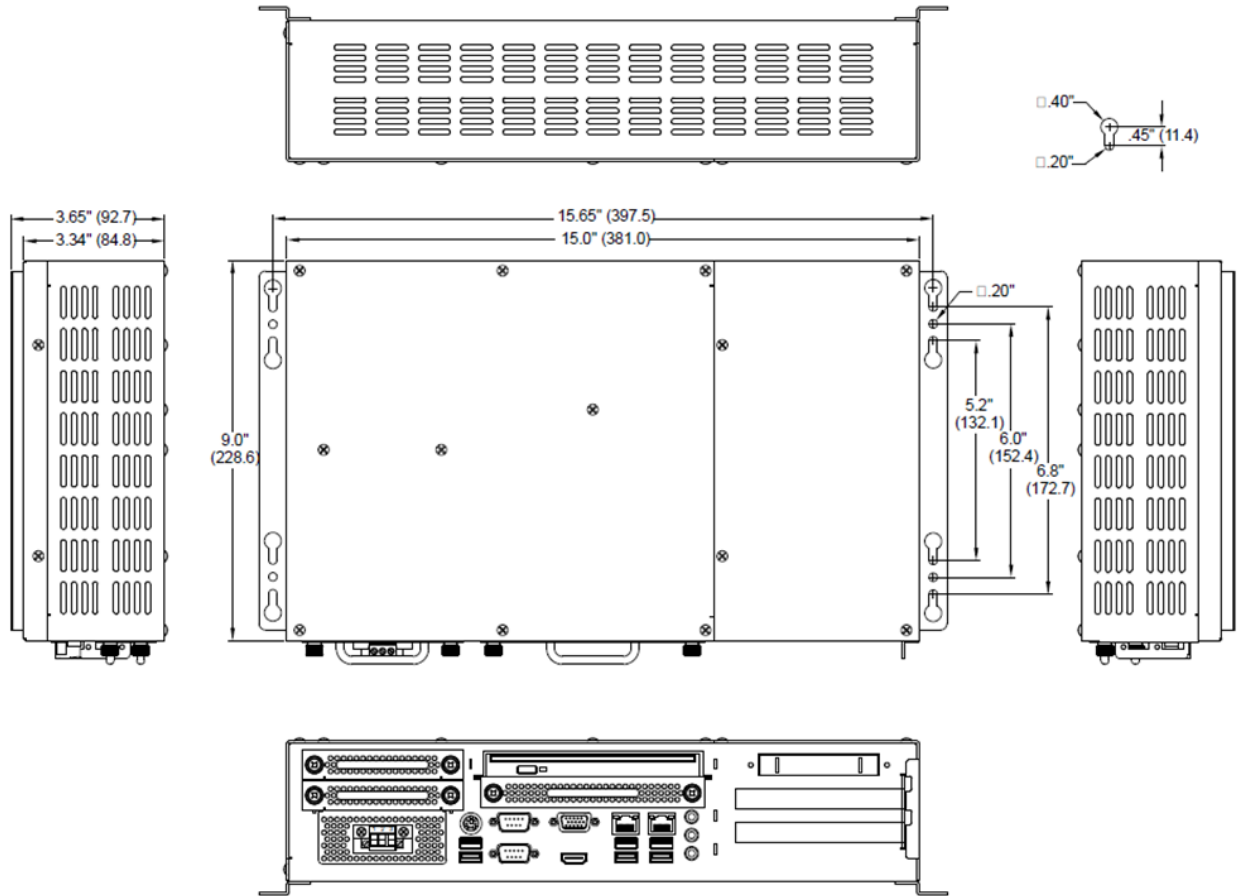
	iPC1550	iPC1550KP	iPC1750	iPC1950
Over All Dimensions (H x W x D)	12.80" x 15.80" x 4.55" (325.1mm x 401.3mm x 115.6mm)	13.98" x 19.0" x 4.65" (355.1mm x 482.6mm x 117.5mm)	14.48" x 17.14" x 4.55" (367.8mm x 435.4mm x 115.6mm)	15.70" x 18.66" x 4.70" (398.8mm x 474.0mm x 119.4mm)
Panel Mounting Depth	4.3" (109.2mm)	4.3" (109.2mm)	4.3" (109.2mm)	4.45" (113.0mm)
Cutout Dimensions (H x W)	12.00" x 15.00" (305mm x 381mm)	12.37" x 17.4" (442.0mm x 314.2mm)	13.70" x 16.35" (348mm x 415.3mm)	14.90" x 17.75" (378.5mm x 450.9mm)
Weight	20.0 lbs (9.07kg)	25.0 lbs. (11.33kg)	24.0 lbs (10.88kg)	28.0 lbs (12.7kg)

	iPC1550	iPC1550KP	iPC1750	iPC1950
Shipping Weight	25.0 lbs (11.33kg)	30.0 lbs (13.6 kg)	29.0 lbs (13.25kg)	33.0 lbs (14.96kg)
Option Weight (SS)*	+3.5 lbs (1.58kg)	N/A	+3.75 lbs (1.7kg)	+4.0 lbs (1.81kg)

* Additional weight for Stainless Steel Front Panel option.

The nPC400 is essentially the rear of the panel mount versions. It is supplied with mounting brackets so that it can be easily attached to wall or shelf in a NEMA 1 or better enclosure. The nPC400 is not a standalone device as the –EN units and must be installed in an enclosure to protect operators.

The dimensions of the nPC400 unit are as follows:



ELECTRICAL

AC Input Voltage	100 – 240 VAC, 47-63 Hz
AC Input Current	2.0 A Maximum
DC Input Voltage (Optional)	18 – 36 VDC
DC Input Current (Optional)	7.5 A Max
Input Power	nPC400 – 60 W Typical* iPC1550 - 70 W Typical* iPC1550KP – 70 W Typical* iPC1750 – 80 W Typical* iPC1950 – 90 W Typical*

* Typical Power is measured without any additional I/O or expansion options. Any additional I/O installed during application can increase this value.

ENVIROMENTAL

Operating Temperature	0°C to 50°C
Non-Operating Temperature	-20°C to 60°C
Operating & Non-Operating Humidity	20% to 80% RH, noncondensing
Operating Shock*	15g peak acceleration, 11msec
Non-Operating Shock	30g peak acceleration 11msec
Operating Vibration (5-2000 Hz) ¹	0.006" peak to peak displacement, 1g maximum acceleration
Non-Operating Vibration (5-2000 Hz) ¹	
Operating Altitude ²	Sea level – 10,000 feet
Non-Operating Altitude ²	Sea level – 40,000 feet

1 Shock and Vibration specifications are established using Solid State drives and non-rotating media.

2 Altitude Specification is established by using all internal component specifications.

AGENCY

Front Panel NEMA Rating	NEMA 4/4X/12, IP66
FCC	47 CFR, Part 15, Class A
EU CE Marking Compliance	CE, EN 55022: Class A, EN 61000-3-2: Class A, EN 61000-3-3, EN 61000-6-2,
Safety Agency Approvals	UL 508 Listed, ANSI/ISA 12.12.01- 2012 Listed*, cUL Listed CSA C22.2, #142, CSA C22.2, #143*

* See appropriate note below for the applicable unit or option being utilized.

NOTE (PANEL MOUNT VERSIONS):

SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D, CLASS II DIVISION 2, GROUPS F AND G, CLASS III HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY

FOR USE ON A FLAT SURFACE OF A TYPE 1, 4, 4X, OR 12 ENCLOSURE WITH PROVISIONS FOR CLASS I DIVISION 2 WIRING METHODS

TEMPERATURE CODE: T5

NOTE (NPC400 UNITS): SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY

FOR USE ON A FLAT SURFACE OF A TYPE 1 ENCLOSURE WITH PROVISIONS FOR CLASS I DIVISION 2 WIRING METHODS

TEMPERATURE CODE: T5

NOTE (RACK MOUNT VERSIONS):

SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D, CLASS II DIVISION 2, GROUPS F AND G, CLASS III HAZARDOUS LOCATIONS, OR NONHAZARDOUS LOCATIONS ONLY

FOR RACK MOUNT INSTALLATION ON A TYPE 1 ENCLOSURE WITH PROVISIONS FOR CLASS I DIVISION 2 WIRING METHODS

TEMPERATURE CODE: T5

NOTE: (ENCLOSED EPC VERSIONS):

A LISTED VESA STYLE MOUNT SUITABLE WITH A MINIMUM LOAD RATING OF 40 POUNDS SHALL BE USED IN THE END INSTALLATION

FOR USE IN NONHAZARDOUS LOCATIONS ONLY

TYPE 1 ENCLOSURE

WARNING – EXPLOSION HAZARD – SUBSTITUTION OF ANY COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS THE POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS. PS/2 AND AUDIO CONNECTORS ARE FOR SETUP AND MAINTENANCE ONLY, USB CONNECTIONS MUST BE SECURED WITH INCLUDED RETENTION BRACKET – SEE INSTALLATION INSTRUCTIONS

ATTENTION - RISQUE D'EXPLOSION - NE PAS BRANCHER OU DÉBRANCHER L'APPAREIL À MOINS QUE L'ALIMENTATION À ÉTÉ COUPÉE OU SI LA ZONE N'EST PAS HAZARDEUSE. LE CONNECTEUR PS/2, LINE IN, LINE OUT, ET CONNECTEURS DU MICROPHONE (SI PRÉSENTS) SONT DESTINÉS À LA CONFIGURATION ET MAINTENANCE SEULEMENT - VOIR INSTRUCTIONS DE MONTAGE

ADVERTENCIA - PELIGRO DE EXPLOSIÓN -NO CONECTE NI DESCONECTE EL EQUIPO A MENOS QUE LA ALIMENTACIÓN ELÉCTRICA HAYA SIDO DESCONECTADA O EL ÁREA SE CONSIDERE NO PELIGROSA. LOS CONECTORES PS/2, ENTRADA Y SALIDA DE LÍNEA DE AUDIO Y MIC (SI ESTÁ PRESENTE) SON PARA CONFIGURACIÓN Y MANTENIMIENTO SOLAMENTE - VEA LAS INSTRUCCIONES DE INSTALACIÓN

WARNUNG - EXPLOSIONSGEFAHR -NICHT ANSCHLIEßEN ODER ABKLEMMEN, BEVOR DIE KAMERA SICH ABGESCHALTET HAT ODER DER BEREICH NICHT MEHR GEFÄHRDET IST. PS/2, LINE IN, LINE OUT, MIC UND STECKER (FALLS VORHANDEN) NUR FÜR INSTALLATION UND WARTUNG VERWENDEN - SIEHE MONTAGEANLEITUNG.

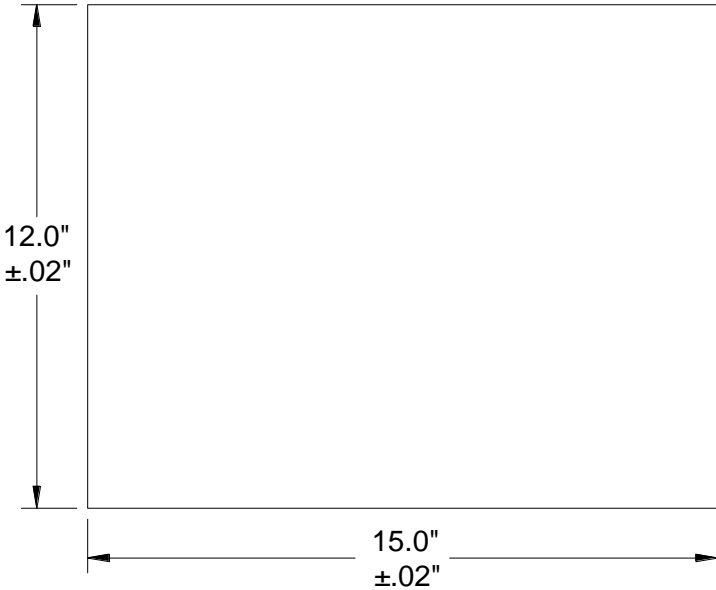
Chapter 2 - Installation of Computer

The panel mount versions of the iPC-Plus units are intended to be mounted in and used where NEMA 1, NEMA 4/4x and NEMA 12 type enclosures are employed. Enclosures made of heavier gauge metal work better because they won't deform or bend as easily when the monitor's sealing gasket is compressed. The monitor meets NEMA 4/12 sealing specifications when properly installed in an approved NEMA enclosure constructed from 14-gauge or heavier steel. The computer uses "U"-shaped clips and a special gasket to achieve the proper seal.

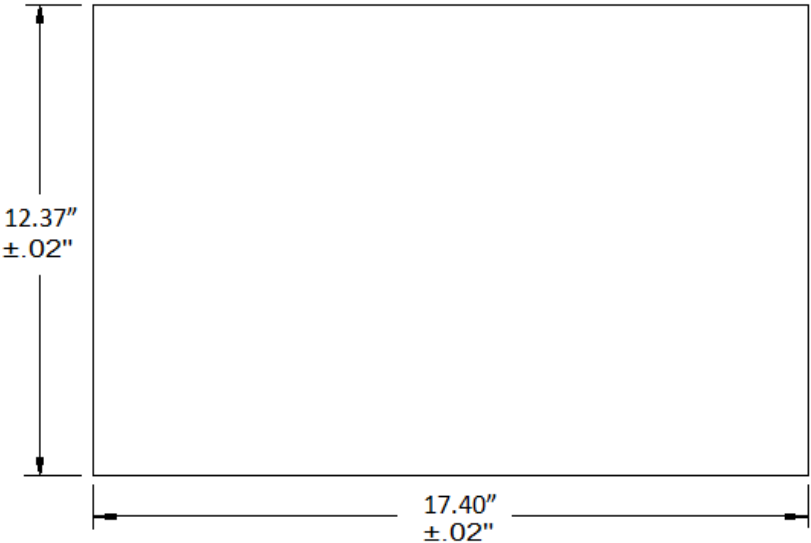
When selecting an enclosure remember to allow adequate space around the rear of the computer for good air flow. Do not block air flow from below or above the monitor. If possible mount the computer in a vertical orientation. The unit is designed to work in environments up to 50 degrees Centigrade ambient temperature inside the enclosure. Remember to account for heat dissipated from other equipment that may be installed inside the same enclosure.

To install the computer, make a cutout according to the diagrams below in one of the walls of your NEMA enclosure. Next hold the unit in place while you install the mounting clips. Tighten the clips to the point where the back of the unit's front bezel just begins to contact the front of the NEMA enclosure. The use of an adjustable torque driver is recommended. The screws should be tightened to 8 inch-pounds. Tighten the clips in a cross pattern. This will help to develop an even pressure on the sealing gasket. **DO NOT OVER TIGHTEN AS DAMAGE CAN RESULT IN THE COMPUTER CAUSING LOSS OF SEALING INTEGRITY.**

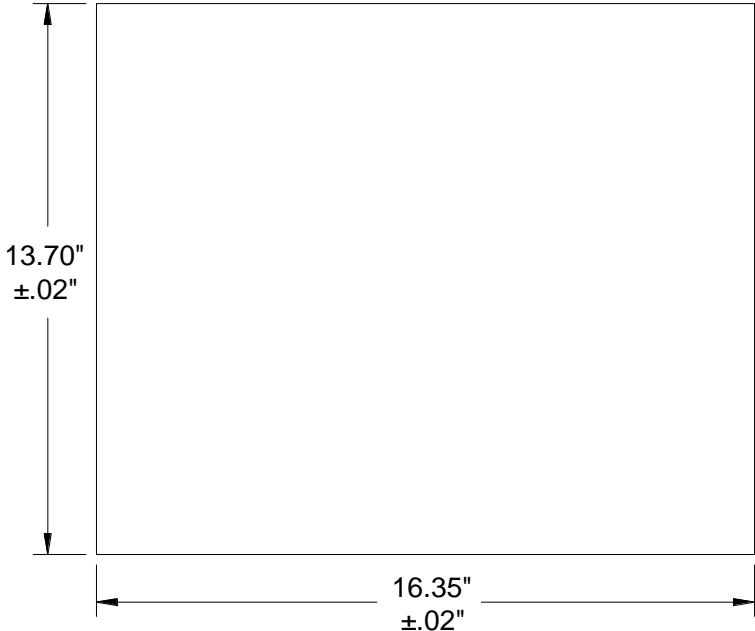
Cutout Pattern for iPC1550 / iPC1550T Industrial Computer



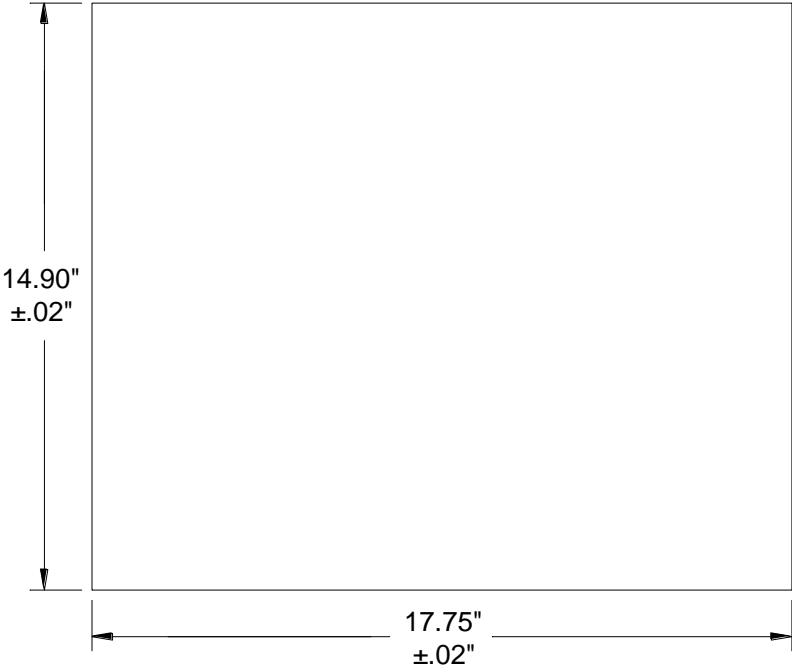
Cutout Pattern for iPC1550KP/iPC1550KPT Industrial Computer



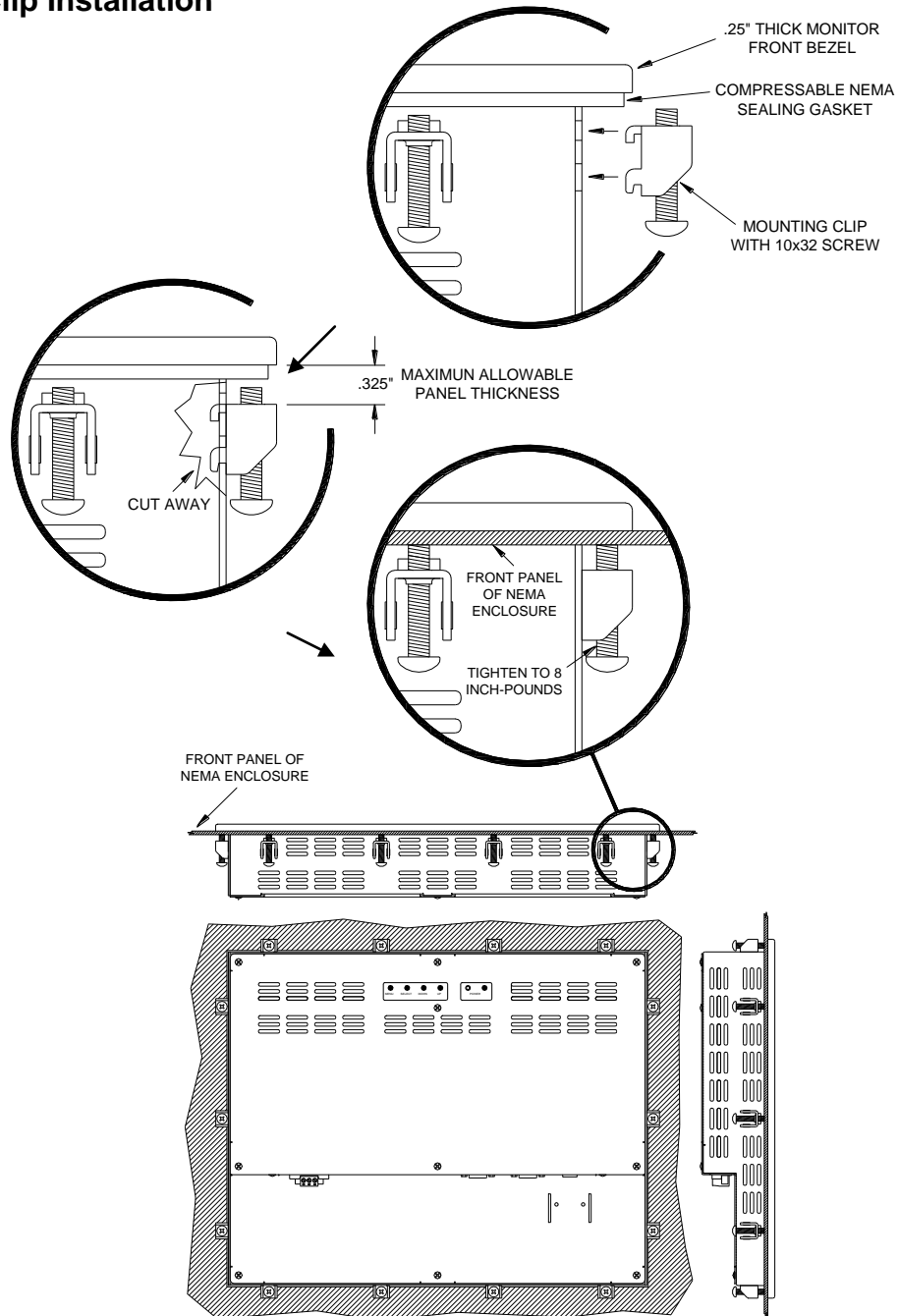
Cutout Pattern for iPC1750 / iPC1750T Industrial Computer



Cutout Pattern for iPC1950 / iPC1950T industrial Computer



Mounting Clip Installation



**REAR VIEW OF PANEL
MOUNTED iPC-Plus**

NOTE: WHEN INSTALLING THE MOUNTING CLIPS TIGHTEN THE SCREWS TO **8-10 INCH-POUNDS MAXIMUM**. OVERTIGHTENING THE SCREWS WILL RESULT IN A COMPROMISED NEMA SEAL AND MAY CAUSE TOUCH SCREEN BREAKAGE..

nPC400 Unit Installation

The nPC400 is intended to be mounted on the flat surface on the inside of a NEMA Type 1, 4/4x or NEMA 12 enclosure. See the specifications section for the dimensions and mounting dimensions required for mounting this unit.

When selecting an enclosure remember to allow adequate space around the computer for good air flow. Do not block air flow around the unit except for the mounting surface. The computer can be mounted on a horizontally or vertically to a wall or shelf within the enclosure. The unit is designed to work in environments up to 50 degrees Centigrade ambient temperature inside the enclosure. Remember to account for heat dissipated from other equipment that may be installed inside the same enclosure.

Rack Mount Unit Installation

The iPC1950 with a rack mount front panel is intended to be mounted to a 19.0" wide rack in a NEMA Type 1 or better enclosure. The unit can be mounted using standard rack mount hardware (not supplied) via the eight (4 each side) counter-bored holes in the front of the panel. The front panel is intended to be mounted in a vertical height of 9 U (16.0") on the rack. This unit is not NEMA sealed when mounted like the panel mount versions.

When selecting an enclosure remember to allow adequate space around the rear side of the computer for good air flow. The unit is designed to work in environments up to 50 degrees Centigrade ambient temperature inside the enclosure. Remember to account for heat dissipated from other equipment that may be installed inside the same enclosure.

Enclosed Unit Installation

The enclosed iPC-Plus products are intended to be stand-alone NEMA Type 1 units. These are required to be mounted to a VESA style mount with a minimum load rating of 40 pounds. A desktop stand, wall mount, or articulating arms are examples of VESA style mounts that can be utilized. These units are vented for air flow and are not dust or water proof. Care should be taken to not utilize these units in areas where high concentration of particulate matter or moisture are present. If these conditions do exist then the use of the panel mount versions in an appropriate NEMA 4, 4x, or 12 enclosure should be considered. The warranty may be voided if high levels of moisture or particulate matter are determined to be the cause of a failure. The iPC-Plus –EN units have filters on the rear to filter incoming air. These filters should be carefully removed and cleaned periodically depending on service conditions. In some applications this may need to be checked and cleaned often.

These units are designed to work in environments up to 50 degrees Centigrade ambient temperature around the enclosure. Impeding the airflow around this unit or clogged filters will severely affect the reliability of the unit by raising the internal temperature. Assure that there is adequate airflow around the unit.

NEMA Type 1 is not sealed against water and/or dust; it is simply provides protection from operators shocking themselves. It also offers a certain amount of fire containment in the event of a catastrophic failure inside the unit. As stated previously NEMA 1 is not waterproof or dust proof and is not intended to be utilized in environments exhibiting high levels of these conditions.

Example of an Enclosed Unit Mounted
To a Stand



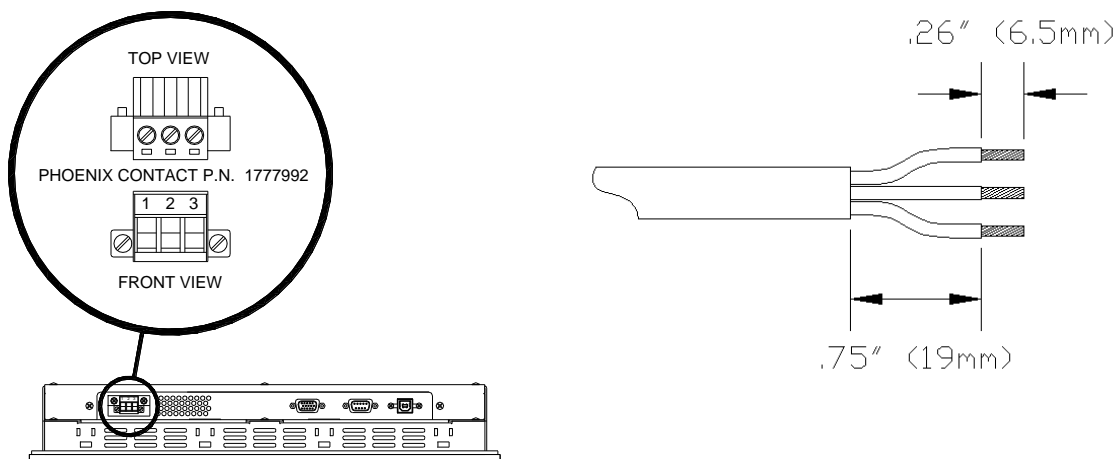
Connecting Power to the iPC-Plus

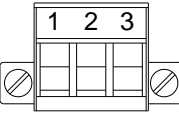
Connecting power to the Panel Mount, Rack Mount, and nPC120 units:

The iPC-Plus and nPC400 units are powered from 100-240 VAC, 50/60 Hz or optionally from 24 VDC. **Damage will occur if 100-240 VAC power is connected to an iPC-Plus unit equipped with the 24 VDC input power option.** iPC-Plus equipped units with the 24 VDC option will have a “-DC” suffix in their model number such as iPC1550-CP4500-2GB-HD-DVD-XP-DC or iPC1550T-i7-16GB-80SS-DVD—2P-W7-DC.

Because the iPC-Plus (not –EN option) is UL listed for Hazardous Location use, (Class I Division2, Groups A, B, C, D; Class II Division 2 Groups F and G: Temperature Code T5), the units do not have a power switch for switching off supplied power. Consideration should be give to the installation of an appropriately rated external power switch if the application requires powering off the iPC-Series unit.

Power is connected to the units through a removable Phoenix Contact plug (Phoenix Contact P.N. 1777992) that allows for screw termination of field wiring. This plug is included with each unit and is keyed to prevent installation in a unit with the wrong input voltage rating. **When Field Wiring to these terminals the use of 18 AWG or greater (12 AWG maximum) copper wire with 60°C or 60/75°C wire insulation and the terminal tightening torque of 7.0 lb/in. (0.79 Nm) is required.** The terminal screws are shown in “Top View” below. Connect the field wiring according to the appropriate voltage in the table below. Strip the wire insulation back on each conductor **6.5 mm (0.26 in)** and assure that the remaining wire is twisted together, not frayed, and clean. If an outer jacket over each conductor is utilized then strip the outer jacket back an additional **19.0 mm (0.75 in)** as shown in figure below. When installing the conductors take care that there are not any stray strands of wire that can contact an adjoining connection. Tinning of each lead can be utilized to prevent frays if desired. Optionally the included protective cover can be utilized to prevent electrical shocks when handling the power connector and provide strain relief for each conductor connection (see the following section for installation instructions). After the connections are made, make sure the plug retention screws (the two screws shown in the “Front View” below) are securely tightened. This will prevent the plug from pulling out. The use of these screws is mandatory when the unit is utilized in applications requiring hazardous locations approvals.



 FRONT VIEW	PIN NUMBER	100 VAC – 240 VAC INPUT	18 VDC – 36 VDC INPUT
	1	AC Line Input	+ DC Input
	2	AC Neutral Return	- DC Return
	3	Protective Earth Ground	Protective Earth Ground

NOTE: WHEN USING USB CONNECTIONS THE USE OF THE USB RETENTION BRACKET IS REQUIRED FOR HAZARDOUS LOCATIONS AND HIGHLY RECOMMENDED FOR NONHAZARDOUS LOCATIONS.

NOTE: TO PREVENT INADVERTENT DISCONNECTION OF VIDEO AND/OR SERIAL TOUCHSCREEN CABLES ASSURE THAT THE THUBSCREWS ARE SUFFICIENTLY TIGHTENED.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT UNLESS THE POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS. PS/2 AND AUDIO CONNECTORS ARE FOR SETUP AND MAINTENANCE ONLY, USB CONNECTIONS MUST BE SECURED WITH INCLUDED RETENTION BRACKET – SEE INSTALLATION INSTRUCTIONS

ATTENTION - RISQUE D'EXPLOSION - NE PAS BRANCHER OU DÉBRANCHER L'APPAREIL À MOINS QUE L'ALIMENTATION À ÉTÉ COUPÉE OU SI LA ZONE N'EST PAS HAZARDEUSE. LE CONNECTEUR PS/2, LINE IN, LINE OUT, ET CONNECTEURS DU MICROPHONE (SI PRÉSENTS) SONT DESTINÉS À LA CONFIGURATION ET MAINTENANCE SEULEMENT - VOIR INSTRUCTIONS DE MONTAGE

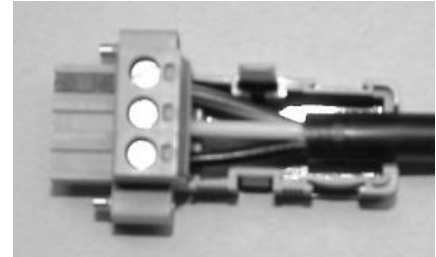
ADVERTENCIA - PELIGRO DE EXPLOSIÓN -NO CONECTE NI DESCONECTE EL EQUIPO A MENOS QUE LA ALIMENTACIÓN ELÉCTRICA HAYA SIDO DESCONECTADA O EL ÁREA SE CONSIDERE NO PELIGROSA. LOS CONECTORES PS/2, ENTRADA Y SALIDA DE LÍNEA DE AUDIO Y MIC (SI ESTÁ PRESENTE) SON PARA CONFIGURACIÓN Y MANTENIMIENTO SOLAMENTE - VEA LAS INSTRUCCIONES DE INSTALACIÓN

WARNUNG - EXPLOSIONSGEFAHR -NICHT ANSCHLIEßEN ODER ABKLEMMEN, BEVOR DIE KAMERA SICH ABGESCHALTET HAT ODER DER BEREICH NICHT MEHR GEFÄHRDET IST. PS/2, LINE IN, LINE OUT, MIC UND STECKER (FALLS VORHANDEN) NUR FÜR INSTALLATION UND WARTUNG VERWENDEN - SIEHE MONTAGEANLEITUNG.

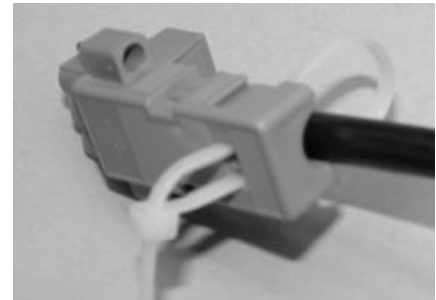
Protective Cover Installation

(Optional if desired)

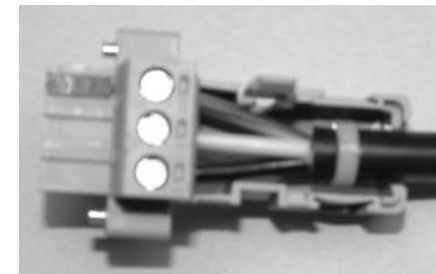
Step 1: Gather the parts of the protective cover; top shell, bottom shell, label insert, and wire tie. The picture shows wire tie (top), label insert (right), bottom shell (left), and top shell (lower right).



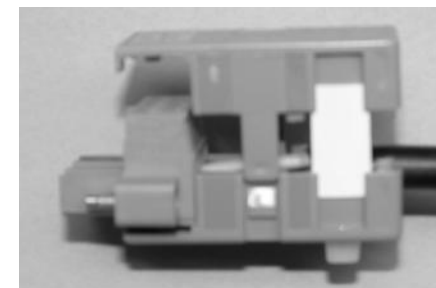
Step 2: Insert your pre-wired connector (with the screws facing up) into the bottom shell. (See manual for cable wiring instructions).



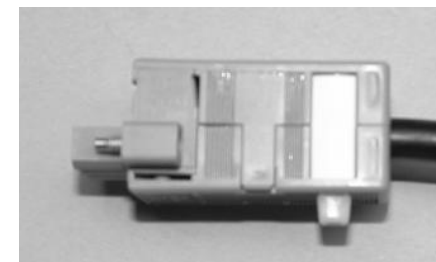
Step 3: Insert the wire tie from the bottom shell, loop around the cable and come back out of the opposite hole in the bottom shell.



Step 4: Tighten the wire tie around the cable and the bottom shell.



Step 5: Seat the top shell onto the bottom as shown. Insert label strip (if desired) in slot on top shell and bottom shell.



Step 6: Snap the top and bottom shells together.

Connecting Power to Enclosed (-EN) units:

The enclosed iPC-Plus units are powered from 100-240 VAC, 50/60 Hz only. Because these are stand alone Type 1 devices and do not require an additional NEMA type enclosure, a different type power connection is required. These units use a more standard IEC type power cord like found on most computers. There is a retention clip that can be utilized to help retain the cord from falling out. A US three prong cord is supplied. If another country connection method is required then an appropriate UL recognized power cord can be chosen locally (not supplied by Nematron). Optionally available is an IEC type connector that can be directly wired to for field wiring. This can be ordered separately from Nematron and is part number PWR-AC-EN



Enclosed ePC-Series IEC Power Cable



Power Cable Retention Clip Installed

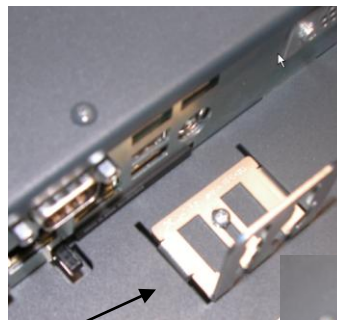
I/O Cable Management

The iPC-Plus units include a retention mechanism for securing USB connections. USB connections are not secure and can easily fall out. The use of this mechanism is suggested for all applications and is required for any hazardous locations installations. Simply remove the bracket insert your USB cables through the bracket. Connect your USB cables to the unit and move the bracket into position. Snugly push the bracket toward the USB connector and secure with the screw provided.

On the iPC panel mount, Rack Mount, and Enclosed units the USB bracket is a simple L shaped bracket with cutouts to retain up to four USB cables and a mounting screw. On the nPC400 the bracket is two pieces; one (flat piece) is secured to the bottom of the unit using two #4-40 screws and then the other functions the same as the ePC-Series USB retention bracket.



nPC400 USB Retention Bracket



iPC-Series USB Retention Bracket



With USB Cable Installed

Video and the Serial connections have jack screws in the connectors that can be utilized to secure your cable end to the unit. Ethernet connections have a plastic tab that prevents the connection from falling out. The keyboard/mouse port (splitter provided) is not secured and is intended for setup and maintenance only when in an area that is known to be nonhazardous.

See the connecting power section for details on securing the power connections. In addition to the USB Bracket there is an additional cable management bracket at the bottom of the units that can be utilized to strain relief cables. This is a flat bracket attached by 2 screws which can be utilized to hold down cables or provides an attachment point for a cable tie to be used for securing cables. Care should be taken to provide an adequate radius for any cable being utilized. Too tight a radius can damage the conductors. When tightening this securing bar care should be taken not to over crush cables; this can damage conductors.



Cable Securing Bar Installed

NOTE: WHEN USING USB CONNECTIONS THE USE OF THE USB RETENTION BRACKET IS REQUIRED FOR HAZARDOUS LOCATIONS AND HIGHLY RECOMMENDED FOR NONHARDAOUS LOCATIONS.

NOTE: TO PREVENT INADVERTENT DISCONNECTION OF VIDEO AND/OR SERIAL TOUCHSCREEN CABLES ASSURE THAT THE THUBSCREWS ARE SUFFICIENTLY TIGHTENED.

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ATTENTION - RISQUE D'EXPLOSION - NE PAS BRANCHER OU DÉBRANCHER L'APPAREIL À MOINS QUE L'ALIMENTATION À ÉTÉ COUPÉE OU SI LA ZONE N'EST PAS HAZARDEUSE. LE CONNECTEUR PS/2, LINE IN, LINE OUT, ET CONNECTEURS DU MICROPHONE (SI PRÉSENTS) SONT DESTINÉS À LA CONFIGURATION ET MAINTENANCE SEULEMENT - VOIR INSTRUCTIONS DE MONTAGE

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WARNUNG - EXPLOSIONSGEFAHR -NICHT ANSCHLIEßEN ODER ABKLEMMEN, BEVOR DIE KAMERA SICH ABGESCHALTET HAT ODER DER BEREICH NICHT MEHR GEFÄHRDET IST. PS/2, LINE IN, LINE OUT, MIC UND STECKER (FALLS VORHANDEN) NUR FÜR INSTALLATION UND WARTUNG VERWENDEN - SIEHE MONTAGEANLEITUNG.

Hard Drive Removal and Replacement

These products are equipped with an easily removable SATA hard drive. They are designed so that there is no need to remove the cover on these units to change a hard drive. The hard drive is simply removed by loosening the two thumbscrews and pulling the drive out. Remove all power to the unit before removing the drive.

There are no cables to remove when pulling the drive from the chassis. Once the drive is removed there are four screws on the back of the bracket that hold the drive. If the drive is being replaced these screws secure the drive to the plate. To reinstall the drive simply insert the bracket with hard drive attached into the chassis and slide forward. Completely push the drive in and secure the thumbscrews before reapplying power to the unit.

Various hard drive options with a mounting bracket pre-installed are available for purchase from Nematron. If a spare hard drive is required these are recommended. These spare hard drives can be used with third party software to create complete system backups for your installation.



Hard Drive Removal

Installing the Touch Screen Driver Software

If your ePC is ordered with a touchscreen and an operating system the drivers will be pre-installed. The ePC-Series utilizes a USB connection for the touchscreen, therefore the touchscreen will only function with operating systems that can recognize and utilize USB connections. The driver included with these units functions with Windows 2000, XP, VISTA, and Windows 7. If using the nPC200 with a touchscreen monitor the appropriate driver will be included with the monitor.

Operating System Recovery

If for some reason your operating system needs to be reinstalled Nematron provides an Operating System or Recovery disk. The procedure for this is dependent on the operating system. Because this series does not have an integrated DVD you will need a USB DVD-ROM drive. In some cases you will also need the "Documentation and Driver" disk that is included with each unit.

The iPC-Plus series products are only shipped with Windows XP Professional SP3, Windows 7 Professional (32-bit), and Windows 7 Ultimate (64-bit). Use of other operating systems is not recommended and not supported.

Windows XP Professional SP3 for Embedded Systems

Standard Windows XP operating system disks are no longer available from Microsoft. In order to continue shipping Windows XP for Automation applications, Nematron had to switch to a different license scheme, Windows XP Professional SP3 for Embedded Systems. This is not Embedded XP it is simply a different license procedure. By switching to this license Nematron had to create a system recovery disk. This disk is very specific to the platform and options that are included on your unit. Do not attempt to use a recovery from one type of unit on another, it may not work. This recovery disk installs the factory image with all drivers installed. On these units you will need an USB DVD-ROM. Follow the instructions on the recovery DVD for installation. When installing the image from this DVD it will not be “Activated”, unlike when you received the unit. You may need to set the video resolution after loading the image depending on the unit you are loading.

Windows 7 Professional (32-bit) and Windows 7 Ultimate (64-bit)

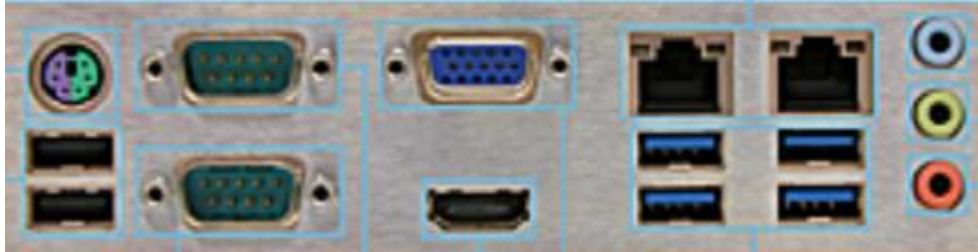
In a similar manner to Windows XP, Windows 7 Professional and Windows 7 Ultimate are also supplied with a system recovery disk. This recovery disk installs the factory image with all drivers installed. On these units you will need an USB DVD-ROM. Follow the instructions on the recovery DVD for installation. When installing the image from this DVD it will not be “Activated”, unlike when you received the unit. You may need to set the video resolution after loading the image depending on the unit you are loading.

Chapter 3. – iPC-Plus CPU and BIOS

Consult the iPC-Plus Series CPU Board User manual for more detailed specifications of the CPU board and BIOS details. This section will concentrate on the features of the iPC-Plus Series units that are externally accessible. In addition any internal details that may need adjusting will be discussed.

External I/O Connections

The following figures show the externally accessible connections.



Pinouts

