

High-Performance Panel Controller User Manual



Revision 1.1, May 2012

AKC-PNC-D1-224-15N-00-000 15" Hi-Performance Panel Controller

AKC-PNC-D1-224-17N-00-000 17" Hi-Performance Panel Controller



Keep all manuals as a product component during the life span of the product.
Pass all manuals to future users / owners of the product.

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Record of Document Revisions

Revision	Remarks
1.0	Preliminary edition
1.1	Added mechanical drawings to Appendix B and C, and installation instructions for Profibus and Ethernet/IP. For more information, see "Appendix B" page 33, "Appendix C" page 37, and section 2.9 page 19.

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May 2012

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1 CONSIDERATIONS AND SAFETY PRECAUTIONS

This chapter provides describes important safety instructions and item checklist for the Panel PAC. Read this section carefully and observe all instructions for your own safety for correct use of the device. This chapter also contains information on approval and interference suppression of your device.

1.1 Important Considerations

The scope of this manual is the hardware installation of your new device. Please be advised that software is required to create custom applications for your hardware. For User Interface (UI) applications, Kollmorgen strongly recommends the Kollmorgen Visualization Builder software (KVB) that is an extended application of the Kollmorgen Automation Suite Integrated Development Environment (KAS IDE).

The Kollmorgen Visualization Builder software is used to configure Human Machine Interface (HMI) panels and PC operated control applications, including applications for Programmable Automation Controllers (PAC) from Kollmorgen.

The Kollmorgen Visualization Builder makes it easy to create logical, flexible and effective HMI/PAC applications that provide the right information on the right occasion to operators and to other systems.

For more information, refer to the Kollmorgen Visualization Builder User Manual and Quick Start Guide.

1.2 Safety Instructions

Observe all warnings and instructions on the device and in this manual. The device was built and tested by Kollmorgen in accordance to EN 60950-1 and was shipped in a safe operating condition.

Note: In order to maintain this condition and ensure safe operation, the user must observe the instructions and warnings contained in this manual.

- The device must be used in accordance with the instructions for use.
- The electrical installations in the room must correspond to the requirements of the respective regulations.
- Take care that there are no cables, particularly power cables, in areas where persons can trip over them.
- Do not use a power cable in sockets shared by a number of other power consumers. Do not use an extension cable.
- Only use the power cord supplied.
- Do not place the device in direct sunlight, near heat sources or in a damp place.
- Make sure the device has adequate ventilation.

- Only devices and components which fulfill the requirements of an SELV circuit (safety extra low voltage) in accordance with EN60950 may be connected to the interfaces of the system.
- All plugs on the connection cables must be screwed or locked to the housing.
- The device is designed to be used in vertical position with the interfaces downwards.
- Repairs may only be carried out by a person authorized by Kollmorgen.
- Maintenance or repair on the open device may only be done out by qualified personnel authorized by Kollmorgen, which is aware of the associated dangers.
- The device may only be opened for the installation and removal of PCI cards in accordance with the description in this manual. These procedures must be performed only by qualified personnel.
- If extensions are made to the device, all legal stipulations and the device specifications must be observed.
- The device must be switched off before installation and any PCI and CompactFlash™ cards must be removed.
- Only original accessories approved by Kollmorgen can be used.
- It must be assumed that safe operation is no longer possible when:
 - The device has visible damage
 - The device no longer functions.

Note: In these cases the device must be shut down and secured against unintentional operation.

1.2.1 For DC Powered Systems

- The DC-input must fulfill SELV requirements of EN60950-1 standard.
- DC/DC-supplies do not fulfill the requirements for centralized DC power systems as required for use in the USA.

1.3 Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry. Therefore proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

- Transport boards in ESD-safe containers such as boxes or bags.
- Keep electrostatic sensitive parts in their containers until they arrive at the ESD-safe workplace.
- Always be properly grounded when touching a sensitive board, component, or assembly.
- Store electrostatic-sensitive boards in protective packaging or on antistatic mats.

1.3.1 Grounding Methods

The following measures help to avoid electrostatic damages to the device:

- Cover workstations with approved antistatic material. Always wear a wrist strap connected to workplace as well as properly grounded tools and equipment.
- Use antistatic mats, heel straps, or air ionizers for more protection.
- Always handle electrostatic sensitive components by their edge or by their casing.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting and removing connectors or connecting test equipment.
- Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools such as cutters, screwdrivers, and vacuum cleaners which are conductive.
- Always place drives and boards PCB-assembly-side down on the foam.

1.4 Lithium Battery

The installed board is equipped with a lithium battery. To replace this battery refer to the instructions described in the chapter, Replacing the Lithium Battery.

WARNING! There is a danger of explosion if the wrong type of battery is used for replacement. Replace only with the same or equivalent type of battery as recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

1.5 FCC Statement

This equipment was tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

1.6 Electromagnetic Compatibility

This product was designed for industrial, commercial and office use, including small business use. The most recent version of the EMC guidelines (2004/108/EC) and/or the German EMC laws apply. If the user modifies and/or adds to the equipment (e.g. installation of add-on cards), the prerequisites for the CE conformity declaration (safety requirements) may no longer apply.

1.7 Installing Additional Software on the Panel PAC

Adding additional applications not provided by or approved by Kollmorgen may affect the PAC's high performance machine and motion control performance. Kollmorgen is not responsible for the operation, consequences or support of systems in which unapproved software has been installed.

Before installing and running any additional applications not supplied by Kollmorgen, please contact a Kollmorgen KAS application engineer for review. Adding additional applications may affect the PAC's high performance machine and motion control performance. Any additional applications installed and run must be reviewed with a Kollmorgen KAS application engineer.

1.8 BIOS

WARNING!! Changing the PAC BIOS settings can drastically affect operations. Do not make any changes to the BIOS.

1.9 Item Checklist

Your Panel PAC comes securely packaged in a solid shipping carton. Upon receiving your Panel PAC, open the carton and remove the contents carefully. The shipping carton should contain the following items:

- Performance Panel Controller
- User Manual
- 24V DC Power cord (optional)
- CF Card (optional)

Note: Carefully inspect each component to ensure that nothing is missing or damaged. If any of these items is missing or damaged, contact Kollmorgen immediately. Preserve the packing material for future transportation.

2 OVERVIEW

This section provides an overview of the Panel PAC.

2.1 Description

The Panel PAC is a motion and machine controller with an integrated Human Machine Interface (HMI). The Panel PAC contains a motion and machine control real-time engine and a Window XP embedded interface for ease of use.

Machine and motion control projects for the Panel PAC are created with the KAS Integrated Development Environment software (IDE) and downloaded via an Ethernet port. The Panel PAC contains the following additional features:

- High Performance EtherCAT network for interface to Drives and Remote I/O.
- CF (Compact Flash) card Data Memory.
- NVRAM Memory to retain data when power is removed.
- USB ports for plugging in external devices.
- Runtime display showing status of each axis and overall operation of the user's project.
- Optional KVB (Kollmorgen Visualization Builder) HMI.
- A fan less system. The cooling of the Panel PAC is performed by the heat sink surface of the chassis (rear side).

The system is designed for:

- Installation in an instrument panel or other cabinets.
- Installation by VESA 75/100 compliant mounting system.

Depending on the ordered system configuration, the built-in display is 15" or 17" TFT-LCD. In front of the display is a glass protection pane with anti-reflection properties with a resistive touch screen. This protects the display surface from dirt and scratches.



Figure 2.1 Panel PAC (Front) **Figure 2.2** Panel PAC (Interface Side)

The Power button, Reset button, LED control indicators, and user interfaces such as DVI-I/VGA, USB (2.0) LANs (10/100 Mbps or 1 Gbps), and serial ports (RS232) are accessible on the rear side of the system. The front side provides a USB (2.0) port.

The Panel PAC is designed to be powered from a 24 VDC external power source.

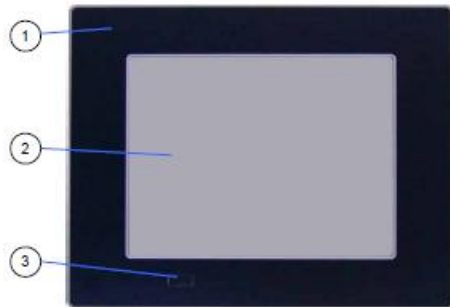
The front side of the Panel PAC system is ensured with an IP65 (NEMA 250 Type 12 and 13) protection class.

The Panel PAC is a fan less system. The cooling of the Panel PAC is performed by the heat sink surface of the chassis (rear side).

Note: When powering on the Panel PAC, make sure the air intake and exhaust openings are not obstructed.

2.2 Panel PAC (Front Side)

The following items are located on the front side of the Panel PAC:



1. Panel mount front plate
2. Display (15"/17") with corresponding resistive touch screen
3. USB (2.0) connector (covered)

Figure 2.3 Panel PAC (Front)

2.2.1 Panel Mount Front Plate

This version of front plate is suitable for the installation in an instrument panel or other cabinets. Therefore at the rear side of the front plate are twelve threaded M4 metric studs. For more information, see Rear Side.

2.2.2 Display

Depending on the ordered system configuration, the built-in TFT display is 15" or 17". For information about the built-in display, see Main Specification.

Note: The display is mechanically protected by the resistive touch screen

2.2.3 Touch Screen

The display unit is equipped with a resistive touch screen. The touch screen is internally connected to the on-board USB interface of the installed baseboard.

The touch screen registers contacts of a finger or a pen and moves the mouse pointer.

WARNING! Do not use a hard or pointed object to operate the touch screen or damage will be done to the touch screen foil surface.

2.2.4 Calibrating the Touchscreen

The installed touch screen is calibrated at the factory. Only run the calibration routine when an alignment problem exists between the mouse pointer and the contact location on the screen.

Calibration serves two purposes:

- Sets the active area of the touch screen
- Aligns the active area of the touch screen to the screen's image.



Note: Before you calibrate the touch screen, let the unit warm up for 30 minutes.

Calibration aligns the active touch-sensitive area of the touch screen with the image on the display. Calibration also determines the edges of the screen's image and locates the center of the touch screen. If the touch screen is not calibrated properly, the active area of the touch screen may not be aligned with the screen's image or may be unnecessarily small in size.

Click the "Align" button to recalibrate the touch screen as necessary:

Carefully touch the location of the markers with your stylus to recalibrate the touch screen.

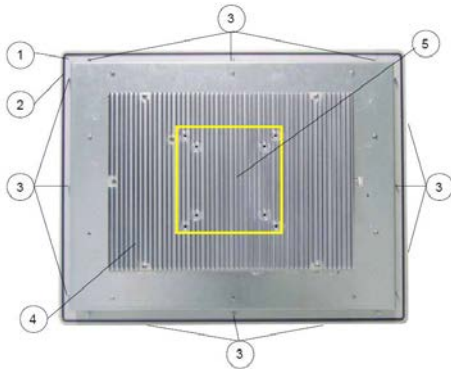
2.2.5 USB 2.0 Connector

This connector allows connection of USB compatible devices.

Note: The front side USB port with mounted plastic cover is also protected acc. IP65.

2.3 Panel PAC (Rear Side)

At the rear side of the Panel PAC is a rubber seal, 12 threaded M4 metric mounting studs, and the PC unit with the heat sink. Two screws are available for securing the PC unit to the display unit (not visible in picture below).



1. Rear side of the front plate (panel mount)
2. Rubber seal (gasket)
3. Threaded M4 metric studs
4. Heat sink with VESA® 75/100 mounting holes
5. VESA® 75/100 compliant mounting holes

Figure 2.4 Panel PAC (Rear)

2.4 Panel PAC (Interface Side)

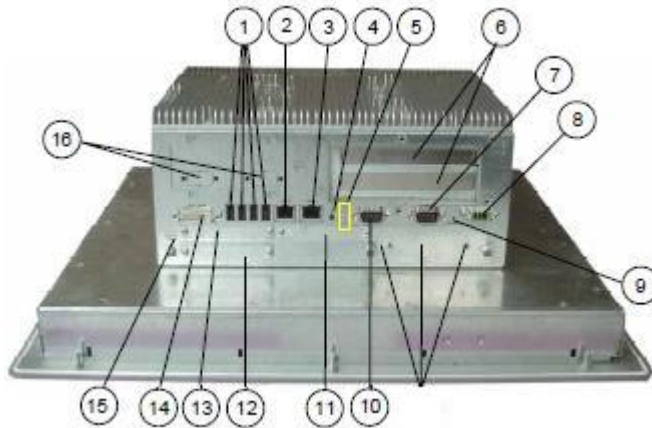


Figure 2.5 Panel PAC (Interface Side)

1. 4x USB (2.0) connector
2. LAN2 interface connector (EtherCAT)
3. LAN1 interface connector (KAS IDE)
4. Power button (ATX)
5. LED control indicators
6. Free expansion slots for PCI cards 32 bit @ 33 MHz (half size)
7. COM2 (RS232) port connector
8. DC power plug (shown with DC terminal for the power cord)
9. Reset switch
10. COM1 (RS232) port connector
11. CF slot (not equipped)
12. Card slot
13. CF slot (shown with installed CF card (type I))
14. DVI-I/VGA connector
15. Grounding Point
16. COM3 and COM4

2.5 Panel PAC Interface

This section describes each of the Panel PAC interfaces.

2.5.1 USB 2.0 Connectors

The system is equipped at the bottom side (rear) with four USB 2.0 interface connectors. These connectors provide connections for USB-compatible devices. Typical uses include ports to connect a keyboard, mouse, memory stick, or hardware key.

2.5.2 DVI-I Interface Connector

The DVI-I interface (Single Link) supports both digital and analog connections. Digital devices such as an external monitor can be connected directly to this interface of the Panel PAC, but analog devices should be connected to this interface by using a DVI to VGA adapter (not included).

2.5.3 Serial Interface Connectors (COM1 and COM2)

These RS232 connections are available as 9-pin D-SUB plugs and provide connection for serial devices that are connected to the Panel PAC.

2.5.4 Ethernet Interface Connectors

These interface connectors are provided as RJ45 sockets with integrated LEDs. The data transfer rate depends on the installed module.

Ethernet Data Transfer Rates

Ethernet Port	Data Transfer Rate
LAN1 (KAS IDE connection)	10/100/1000 Mbps
LAN2 (EtherCAT connection)	10/100/1000 Mbps

LED States

Left LED State	Link Speed	Right LED State	Link Activity
Off	10 Base-T	Off	Not active
Green	100 Base-T	Green	Active
Yellow	1000 Base-T		

2.5.5 Power Button

This section describes the power button for the Panel PAC.



1. Power button
2. HDD LED (monitors CF drive)
3. Power LED

Figure 2.6 Power Button and LEDs

The PWR button is located on the bottom side (rear) of the system. Press this button in to turn the PAC on or off.

Note: If the system is turned off by using the ATX power button, a standby-voltage of 5 V on the baseboard is still present.

The system is not completely disconnected from the main power source when turned off via the ATX power button.

The unit is only completely disconnected from the main power source, when the power cord is disconnected either from the power source or the unit. Therefore, the power cord and its connectors must always remain easily accessible.

2.5.6 LED Control Indicators

The Panel PAC is equipped with two LED indicators (bottom, rear side).

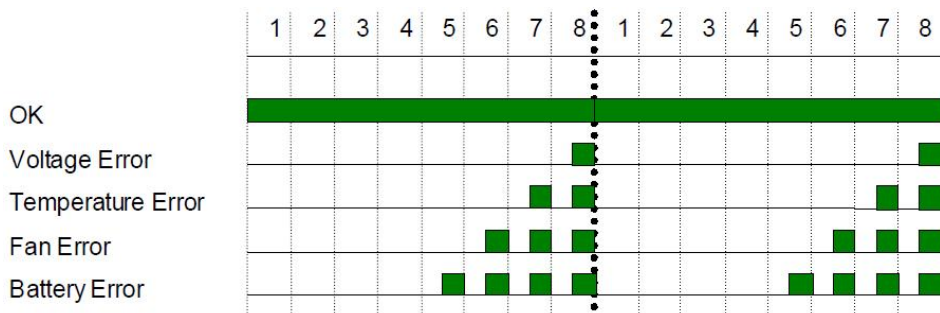
LED	Description
Power LED	Green — Lights up green when the system is powered on via the power button. Red — Lights up red when the system is in standby.
HDD LED	Red — Lights up red for Compact Flash activity.

2.5.7 Power LED Error codes

This function displays four important fail conditions:

- Voltage Error
- Temperature Error
- Fan Error
- Battery Error

These errors are notified by the status LED and by a beeper. The following illustration shows the blink/beep for different conditions:



If more than one fail condition occurs simultaneously, only the highest priority error code is shown. The priority order is:

Priority	Level	Error
1.	Most	Voltage
2.	Less	Temperature
3.	Less	Fan
4.	Least	Battery

Example: If a temperature error and a fan error occur simultaneously, only the temperature error is displayed.

		Error	Good	Error
Voltage Error	12 V	0..<11,4 V	11,4..12.6 V	> 12.6 V
	5 V	0..<11.7 V	4.7 V..5.2 V	> 5.2 V
	3.3 V	0..<V3.1 V	3.1 V..3.5 V	> 3.5 V
Temperature Error		...<-10°C	-10°C...+79°C	>79°C
Fan Error	1	...<900 1/min	900 1/min...20000 1/min	>20000 1/min
	2	...<900 1/min	900 1/min...20000 1/min	>3.5 V
Battery Error		0...<2.5 V	2.5 V...3.5 V	>3.5 V

2.5.8 Compact Flash Drive

The Panel PAC is equipped with a bottom side accessible Compact Flash drive. The Compact Flash is the main memory component in the system. The Panel PAC does not contain a HDD.

Note: The system must be powered down before the Compact Flash card is installed or removed.

2.6 Panel PAC Left Side (Expansion Card Access Side)

On the left side the expansion card access door is secured with a knurled screw. Opening this access door provides access to the free card slots of the raiser card installed onto the baseboard. For more information about Installing the expansion cards, see Installing and Removing the Expansion Cards.

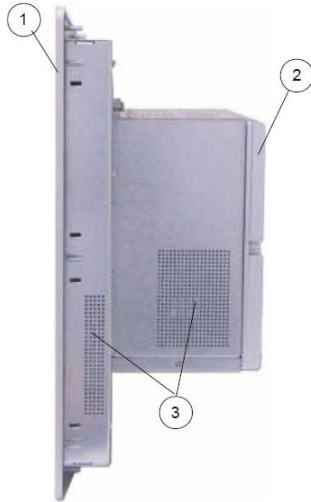


1. Heat sink with VESA 75/100 mounting holes
2. Expansion card access door with knurled screw
3. Front panel with display
4. Exhaust openings
5. Interface side (bottom)

Figure 2.8 Panel PAC (Left Side)

Note: When powering on the Panel PAC, make sure that the air intake and exhaust openings are not obstructed.

2.7 Panel PAC Right Side

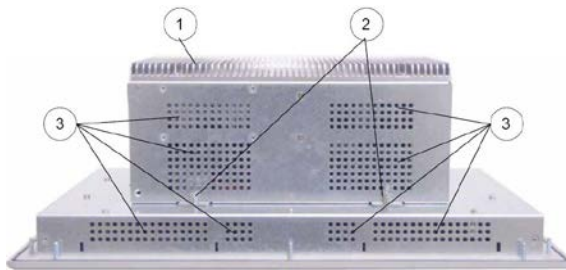


1. Front panel with display
2. Heat sink with VESA 75/100 mounting holes
3. Exhaust openings

Figure 2.9 Panel PAC (Right Side)

Note: When powering on the Panel PAC, make sure that the air intake and exhaust openings are not obstructed.

2.8 Panel PAC Top Side



1. Heat sink with VESA 75/100 mounting holes
2. Screws for securing the PC unit to the display unit
3. Exhaust openings

Figure 2.10 Panel PAC (Top Side)

Note: When powering on the Panel PAC, make sure that the air intake and exhaust openings are not obstructed.

2.9 PCI Option Cards

The Panel PAC contains two 32 bit PCI slots. You can expand your system with PCI extension cards as half size length. To expand your system with additional cards, please observe the power consumption specifications specified in the Power Specifications chapter. One example for using these slots is to add bus interface cards.

Note: Any additional cards must not exceed 25 W power consumption.

2.9.1 Profibus Installation

Both Profibus cards (Master and Slave) have to be installed in PCI slot number 1. This slot is the closest from the mother board as shown in Figure 2.11.

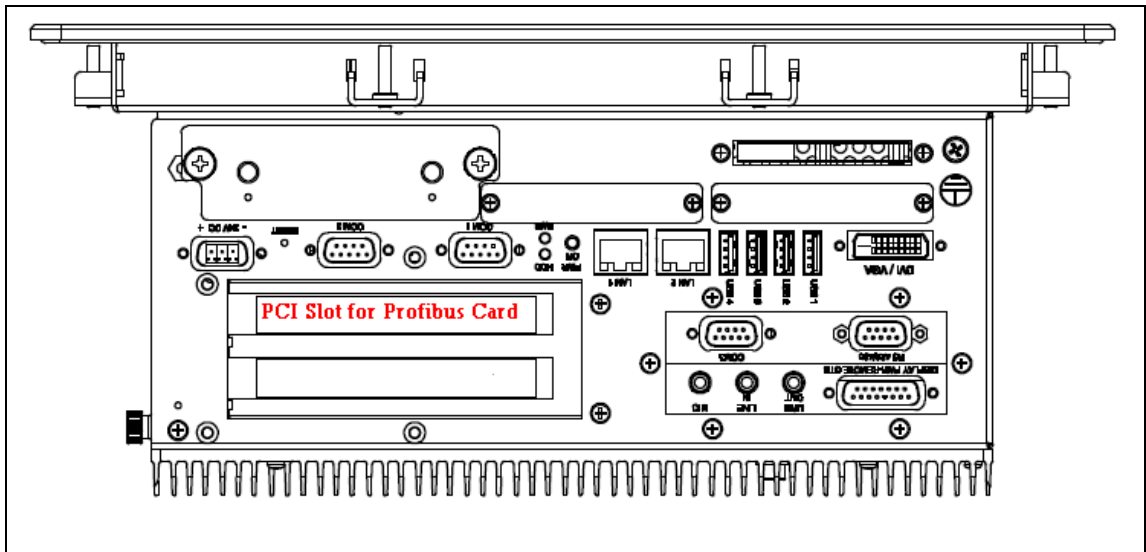


Figure 2.11: Profibus PCI Slot on a PAC with a Panel

INtime Configuration

The goal is to load the CIF Driver for Intime.

- Right-click on the Intime Icon in the windows service toolbar and select INtime configuration.
- Click on the "Autoload" icon.
- Select the Hilscher Profibus CIF driver and click on the enable button.

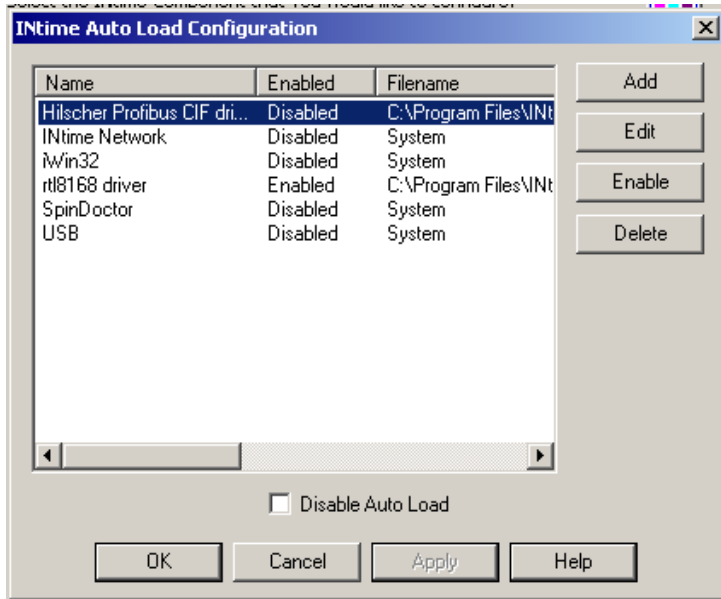


Figure 2.12: Intime Auto Load Configuration

- Restart the IPC

Settings Validation

It is important to double check that cifintimedrv.rta has been correctly loaded

- Click on the INtime icon in the service bar at the bottom right
- Open the INtime Explorer
- Make sure that the driver cifIntimedrv.rta is correctly loaded as shown in the Figure 2.13

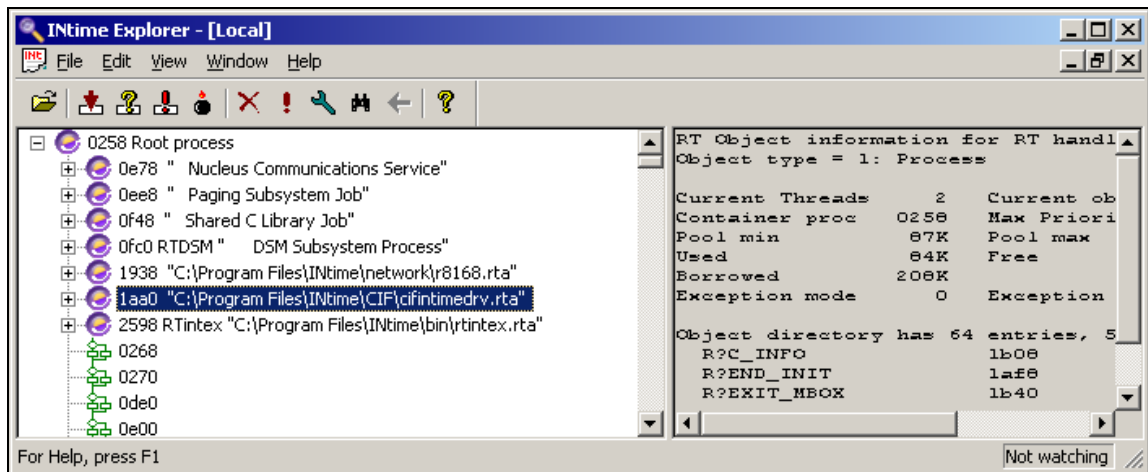


Figure 2.13: CIF driver loaded in Intime explorer

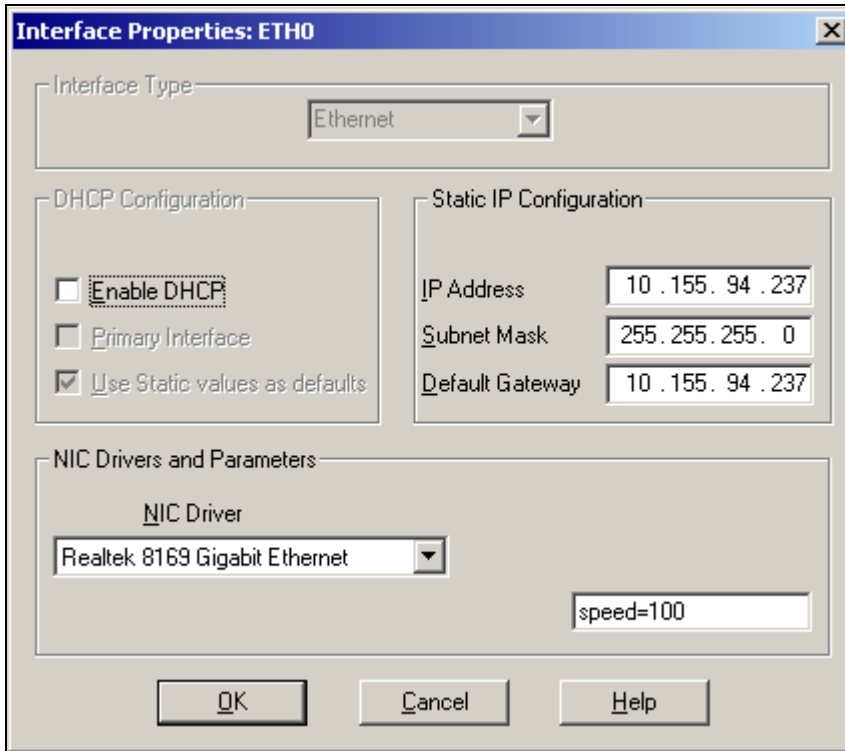


Figure 2.15: NIC Configuration

- Then click OK and then Apply
3. **Set the dependency for the EtherCAT driver.**
 - Open INtime Configuration->Autoload
 - Double-click on the “rtl8168 driver”
 - In the Dependencies click Add, select “INtime Network”, click Ok

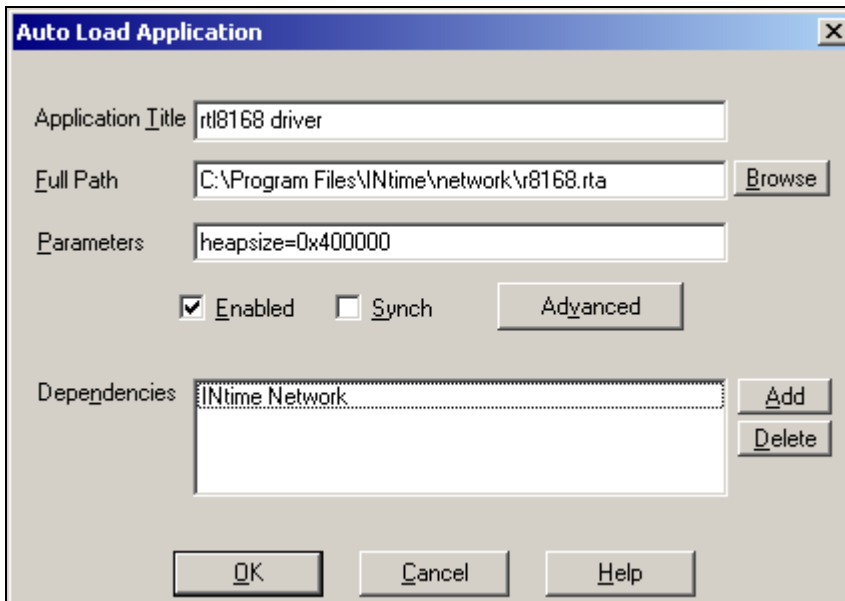


Figure 2.16: Driver r8168 setting in Autoload panel

4. Restart the INtime kernel

Settings Validation

The INtime network configuration has to be verified as well as the network driver and the network stacks.

- Click on the INtime icon in the service bar at the bottom right
- Open the INtime Explorer
- Make sure that the driver r8168.rta is correctly loaded
- Make sure that the driver r8169.rta is correctly loaded
- Make sure that the network stack(ip.rta, udp.rta, tcp.rta, rip.rta) are correctly loaded like in the Figure 2.17

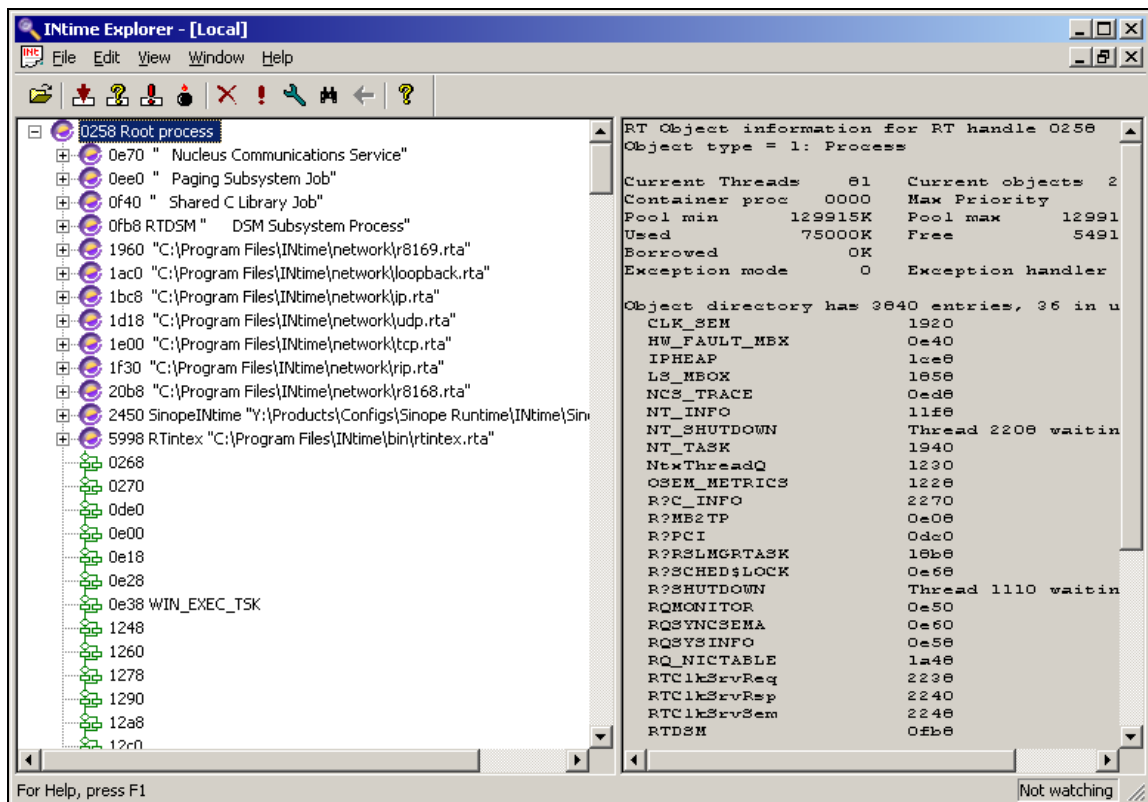


Figure 2.17: Drivers loaded in INtime Explorer

Verify that there are no conflicts with the windows interrupt management.

- Click on the INtime icon in the service bar at the bottom right
- Open the INtime Configuration
- Verify that the Realtek rtl8169/8110...has not conflict indicated
- The windows should be similar to the Figure 2.18

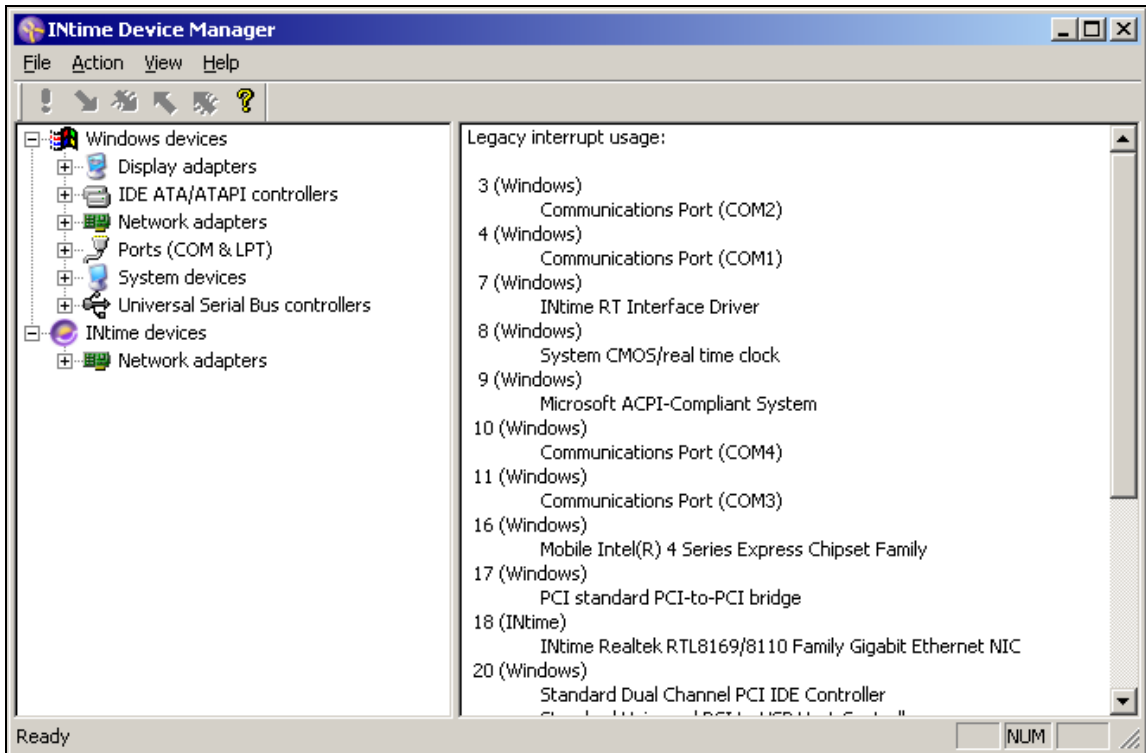


Figure 2.18: INtime Device Manager without any conflict

3 START UP

This chapter provides start up information for the Panel PAC.

3.1 DC-Connection

The DC power socket is located on the bottom side (rear) of the system.

Note: The voltage of the power source must correspond to the voltage value on the type label.

Note: The length of the DC connecting wires may not exceed 3m. Strip and twist the connecting wire-ends, but do not tin it with solder.



Figure 3.1 DC-connector (without Phoenix plug terminal)



Figure 3.2 DC-Connector (Phoenix plug terminal AWG 28-16)

For the DC-connection prepare the connecting wires with the supplied Phoenix plug. Pay attention to the correct polarity of the wires. See Figures 3.1 and 3.2 above.

The second end of each wire is prepared as required for the connection to the DC-power supply.

4 OPERATION

This chapter provides information on the operation of the Panel PAC .

4.1 Power Up

When power is applied to the 24 VDC terminal connection, the PAC powers up. On the integrated HMI the following start up screen is displayed:



The display contains the following information:

Item	Description
KAS Build	KAS runtime version loaded on the PAC
Boot Time	The time of the last power up of the PAC
CPU	CPU version contained in the PAC
Free Space	Free space available on the CF (compact flash) drive
Host Name	Name given to this PAC. It can be changed in the Control Panel/ Computer Name tab on the PAC.
IP Address	The IP Address of the PAC. IT can be changed in Network Connections on the PAC.
Memory	RAM memory size
OS Version	Windows XP
Service Pack	Service Pack 3
System Type	Embedded NT
Snapshot	Date and time
KAS AKC Image Version	Version of the Compact Flash image

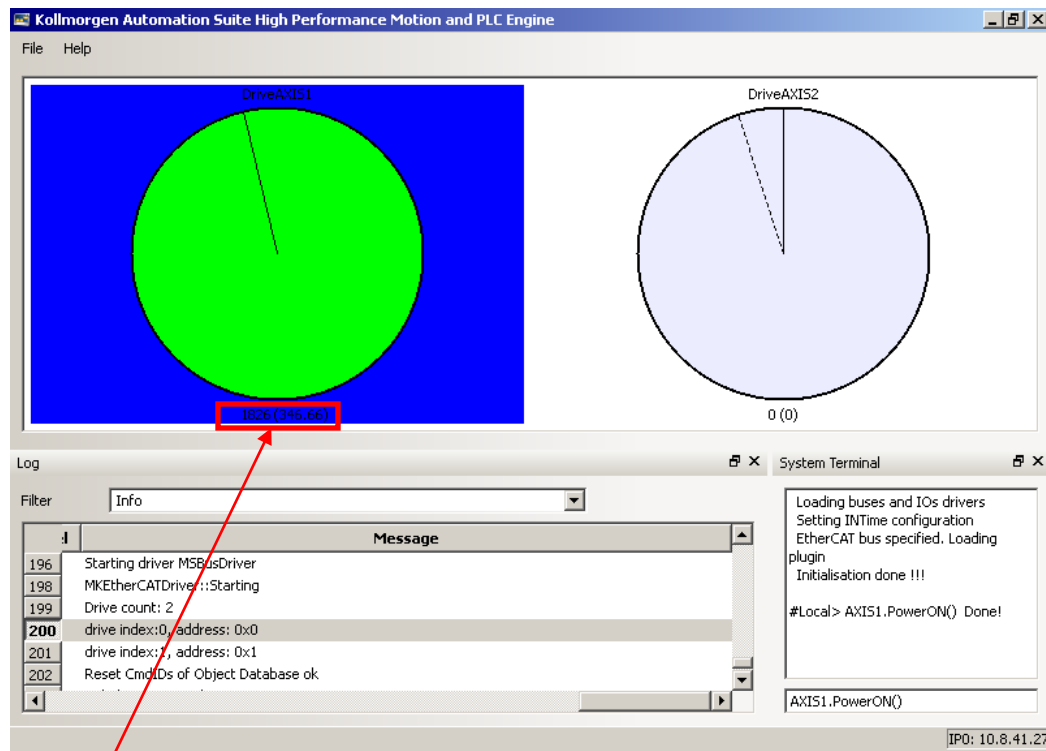
4.2 KAS Runtime and Display

The KAS runtime application is represented by the following icon on the start up screen:



The KAS runtime can be configured to start on PAC power (typical configuration) or started by clicking this icon.

When launched, the KAS Runtime interface displays:



Note:

1826 = Absolute position over complete length of travel (including modulo).

(346.66) = Absolute position within 1 motor revolution.

4.2.1 Axis Display

The colors of the wheels indicate the state of the axis:

Color	State
Gray (or background color)	Axis is Disabled
Green	Axis is Enabled
Red	Axis has a Fault

The position line on the display:

Color	State
Solid Line	Commanded Position
Dotted Line	Actual Motor Position

4.2.2 Log

The log contains similar information as the Information and Logs tab in the IDE. Use the Filter control to filter what is shown on the display. Filter options are:

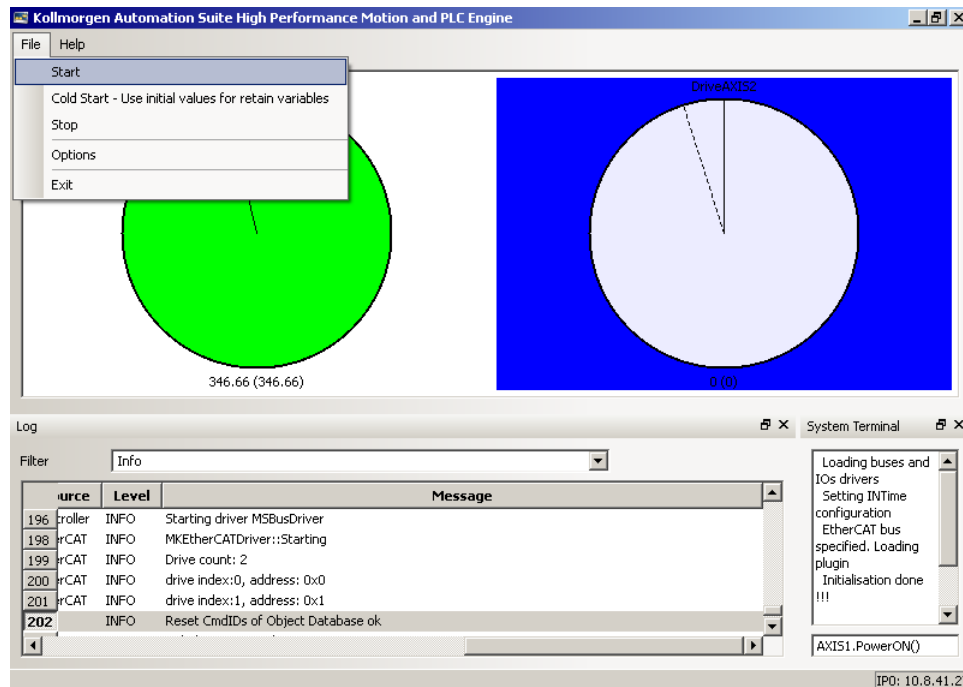
- Info
- Info OR Warning
- Warning AND IDE
- Warning NOT error
- Warning AND IDE NOT Controller

4.2.3 System Terminal

The terminal section of the runtime display allows direct commands while a project is running. The list of commands is the same as available through the System terminal window in the KAS IDE. For more information about direct commands, see section “Terminal” in the KAS IDE online help file.

4.2.4 Using the KAS Runtime Application

The File menu provides the following operations for running KAS Runtime.



The following table describes the File menu options for the KAS Runtime application.

File Menu Options	Description
Start	Starts the runtime (for use after it has been stopped)
Cold Start – Use initial values for retained variables	Starts the runtime using initial values for all of the Project variables that are located in the IDE Project Dictionary under the “Retained Variables” section
Stop	Stops the runtime
Options	Runtime Options: <ul style="list-style-type: none"> • AutoStart – User Application automatically runs when Runtime is started • (with Retained variables) - Retained variables utilized • Profibus – Profibus Option card utilized
Exit	Closes the KAS Runtime

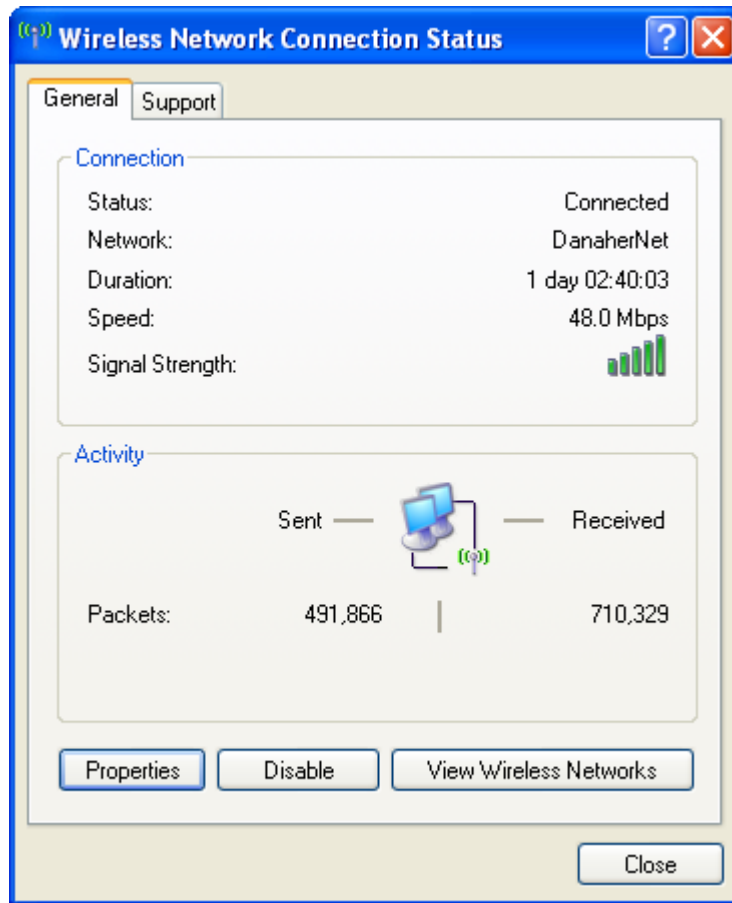
4.3 Downloading and Running Projects

The LAN1 Ethernet port is used to download programs from the KAS IDE. If there is a direct cable connection between the PC (running the IDE) and the PAC, the cable must be a crossed Ethernet cable. If the connection is through a hub, switch, or router, a straight through Ethernet cable should be used.

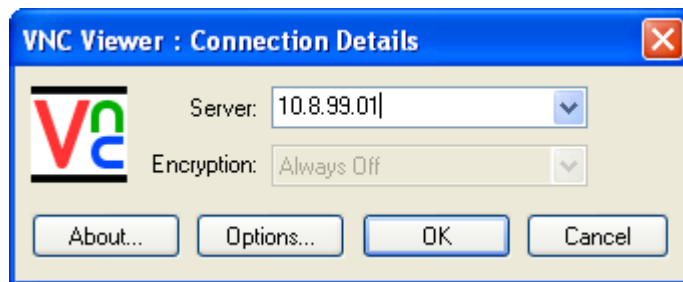
4.4 PAC Remote Connection

Using a VNC client, any computer can remote connect to a PAC with which it shares a wireless network. Follow these steps to remote connect to your PAC:

1. Check to make sure that your computer is connected to the wireless network:

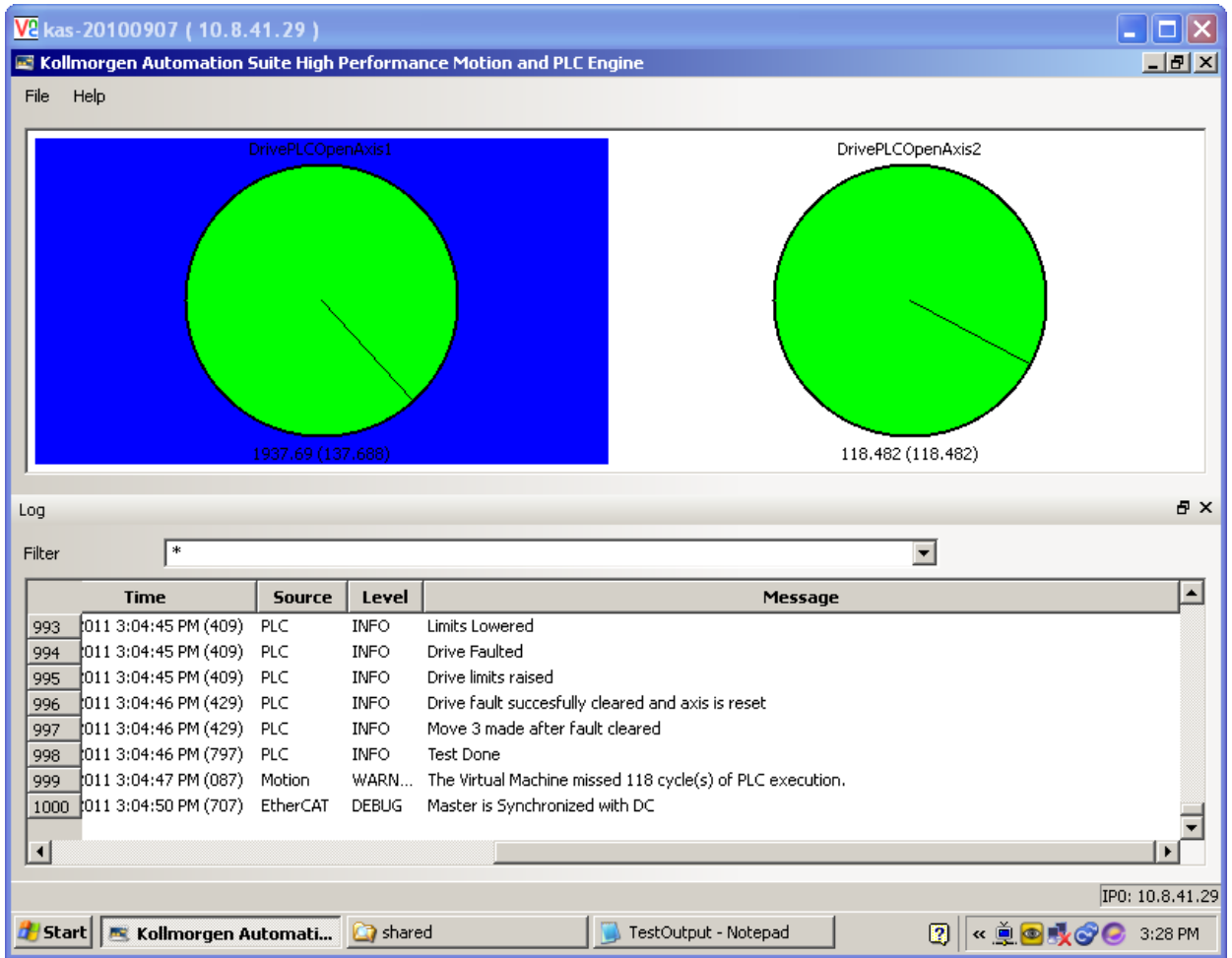


2. Download and install a VNC client from the web.
3. In the VNC client, enter the IP address of the PAC you wish to connect to.



4. When prompted, enter the password: **dhrcas**. Click ok.

After these steps are complete, the VNC client will connect to the PAC:



5 ACCESSING INTERNAL COMPONENTS

This section contains important information that you must read before accessing the internal components. You must follow these procedures properly when installing, removing or handling any board.

5.1 Important Considerations

You must observe the following instructions when installing or removing expansion cards.



The installation and removal of expansion cards must be carried-out only by qualified specialist personnel in accordance with the description in this manual.

Before removing the cover to gain access to the internal components, the system must be powered-down and the power cord must be disconnected from the power source.

To expand your system with additional cards, please observe the power consumption specification specified in the Power Specifications chapter.

Note: Each additional card must not exceed 25 W power consumption.

You must observe all safety instructions for handling assemblies with static sensitive device.



Failure to take heed of these warning instructions can result in damage to the device.

Note: Consult the documentation provided by the manufacturer of the expansion card for instructions before attempting to install or remove any expansion card from the Panel PAC.

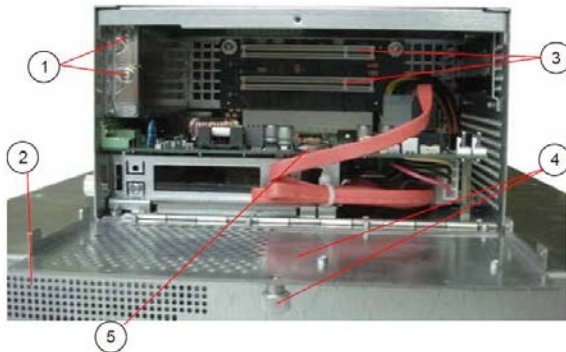
5.2 Expansion Cards

The expansion cards for the performance extension of your computer can be installed into the free slots of the riser card. You must observe the following instructions when you install or remove expansion cards.

Follow these steps to install or remove an expansion card:

1. Turn off your system and disconnect the power cord from the power source.
2. The Panel PAC must lie on a flat clean surface with the front panel downwards (make sure that the display surface is protected against scratching and damage).
3. Loosen the knurled screw on the left side of the unit that secures the access door and open the expansion card access door. Refer to Figure 2.8, position 2.

4. To remove or install an expansion card, you must remove the corresponding expansion card/slot bracket. Loosen the corresponding fastening screw on the internal side, which secures the slot bracket and remove it. Retain the screws for later use
5. Insert or remove the expansion card from the slot of the riser card.
6. If you have removed an expansion card, re-insert the slot bracket.
7. Secure the bracket (slot bracket or card bracket) to the chassis with the fastening screw.
8. Close the access door and secure it with the knurled screw.



1. Screws to secure the expansion
2. Front panel (detail) knurled screw
3. Free PCI slots (32bit@32 MHz)
cars/slot brackets
4. Expansion cards access door with
knurled screw
5. Rechargeable battery

Figure 5.1 Panel PAC (Expansion Slots)

6 MAINTENANCE AND PREVENTION

Kollmorgen embedded computer systems require minimal maintenance and care to keep them operating correctly.

- Occasionally wipe the system with a soft dry cloth.
- You should only remove persistent dirt by use of a soft, slightly damp cloth (use only a mild detergent).

WARNING! Do not use abrasives, abrasion sponges, steel wool, metal threads, or solvent like alcohol, acetone, or gasoline to clean the display's protection pane or the touch screen surface.

6.1 Replacing the Lithium Battery

The baseboard is equipped with a lithium battery. To replace this battery, proceed as follows:

1. Open the unit as described in the Installing and Removing the Expansion Cards chapter (steps 1-3).
2. If your system is equipped with expansion cards, remove them first as described in the Installing and Removing the Expansion Cards chapter (steps 5-6).
3. Remove the battery by pressing outwards against the ejector spring.
4. Insert the new battery into the socket.
5. Make sure that you insert the battery correctly. The plus pole must be on top!
6. Reinstall the removed expansion cards and reconnect the removed data cable.
7. Close the unit as described in chapter Installing and Removing the Expansion Cards (step 8).

The lithium battery must be replaced with an identical battery or a battery type recommended by Kollmorgen (Lithium battery 3.0 V for RTC, type: CR2032).



Do not dispose of lithium batteries in domestic waste. Dispose of the battery according to the local regulations dealing with the disposal of these special materials (e.g. to the collecting points for the disposal of batteries)



WARNING! There is a danger of explosion if the wrong type of battery is used for replacement. Replace only with the same or equivalent type of battery as recommended by the manufacturer. Dispose of used batteries according to the manufacturers instructions.

7 INSTALLATION

This section provides important installation notes for the Panel PAC.

7.1 Important Instructions



WARNING! Expansion card installation should be performed before installing the Panel PAC system into an industrial cabinet or into a control panel. Refer to the chapter Accessing Internal Components. Leave sufficient space at the interface side for connecting the peripheral devices.



If you mount the Panel PAC into an industrial cabinet, it is advised to use two people for the mounting, because the system weighs approx. 11 kg (approx. 24,25 lbs).



WARNING! Ensure there is sufficient air circulation around the device when installing the Panel PAC. The openings for air intake and exhaust on the device must not be obstructed.

Leave at least 5 cm (approx. 2".) of free space around the PC unit to prevent the device from possible overheating!



WARNING! The voltage feeds must not be overloaded. Adjust the cabling and the external overcharge protection to correspond with the electrical data indicated on the type label

The type label is located on the rear right hand side of the system.

Note: If you install the V panel into an instrument panel or other cabinet use the twelve threaded M4 metric studs on the rear side of the front plate.

For the panel assembly, cut a window and twelve pre-drill holes according mechanical drawings. The system must be attached firmly with twelve M4 metric nuts. The contact surface with the rubber seal must be clean and flush.

8 TECHNICAL SPECIFICATIONS

This section provides the electrical, power, mechanical, and environmental specifications for the Panel PAC.

8.1 Main Specifications

The following table provides the main specifications for the Panel PAC.

Specification	AKC-PNC-D1-224-15N	AKC-PNC-D1-224-17N
Display Size	15" TFT	17" TFT
Resolution	1024 x 768	1280 x 1024
Brightness	250cd/m ²	250cd/m ²
Touchscreen	Resistive analog	
Overall Dimensions (H x W x D)	354 x 449.4 x 163.25 mm	399 x 461 x 170.5 mm
Cut-out Dimensions (W x H)	314 x 409.5 mm	359 x 421 mm
Processor	Intel® Core™ 2 Duo 1.86 GHz	
RAM	2GB	
Compact Flash (Drive)	4 GB	
NVRAM	128k	
Lithium Battery	CR2032; 3.0 V; 0.22AH	
External Interfaces (Front)	1x USB 2.0	
External Interfaces (Bottom)	4x USB, 1x LAN 10/100, 1x LAN 100/1000, 2x RS232, 1x DVI-I	
Free Expansion Slots	2x PCI 32 bit @ 33MHz (half size)	
Operating Elements	Power button / Reset button	
LED Indicators	Power LED / HDD LED	
DC Power Plug	Bottom	
VESA 75/100 Compliant	Rear side	
Operating Systems	Runtime System and Windows XPe	

8.2 Power Specifications

The following table provides the power specifications for the Panel PAC.

Power Specification	
Total power of all additional customized applications	Maximum: 125 W
Power consumption slot (PCI)	Maximum: 25 W
Power consumption at +3.3 VDC +5 VDC and +12 VDC (combined)	Maximum: 75 W

8.3 Electrical Specifications

The following table provides the electrical specifications for the Panel PAC.

System Type	AKC-PNC-D1-224-15N	AKC-PNC-D1-224-17N
Input Voltage	24 VDC PSU +/- 20%	
Input Current	A: max. 5,4A	

8.4 Mechanical Specifications

The following table provides the electrical specifications for the Panel PAC.

Weight	Housing
11 kg (24,25 lbs.) Max.	Zinc-coated steel, aluminum front bezel

8.5 Environmental Specifications

The following table provides the environmental specifications for the Panel PAC.

Specification	AKC-PNC-D1-224-15N	AKC-PNC-D1-224-17N
Thermal Management	Fanless	
Operating Temperature	Operating: 0°C to +50° / 20 to 85% non condensing Storage: -20°C to +60° / 5 to 95% non condensing	
Altitude	Operating: 10000 ft (3.048m) Storage: 15000 ft (4.622m)	
Shock	Operating: 15 g 11 ms duration Storage: 30G, 11ms duration (half-sinus)	
Vibration	Operating: 10-500 Hz: 1G/3 axis Storage: 10-500 Hz: 2G/3 axis	

8.6 CE Directives and Standards

The following table provides the CE directives and standards for the Panel PAC.

Specification	Standards
Low Voltage Directive (Electrical Safety)	73/23/EEC modified by 93/68/EEC
EMC Directive	2006/95/EC + 2004/108/EC
CE Marking	93/68/EEC

8.7 Electrical Safety Standards

The following table provides the electrical safety standards for the Panel PAC.

Specification	Standards
Europe	EN 60950-1
USA	UL 60950-1

8.8 EMC Standards

The following table provides the EMC standards for the Panel PAC.

Specification	Standards
Europe	CE:EN61000-6-2; EN55022/A (CISPR22)
USA	US:FCC47 CFR PART15; Class A level

8.9 Certifications

The following table provides the certifications for the Panel PAC.

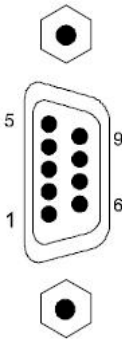
Certifications
CE, FCC, cULus

APPENDIX A

This appendix provides the plug assignments for the external connections of the Panel PAC. Low-active signals are indicated by a minus sign.

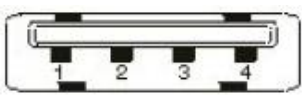
A.1 Serial Port (COM1, COM2)

The following table contains the serial port assignments for the Panel PAC.

Pin Signal Name	9-Pin D-SUB Plug (Male)
<ol style="list-style-type: none"> 1. DCD (Data Carrier Detect) 2. RXD (Receive Data) 3. TXD (Transmit Data) 4. DTR (Data Terminal Ready) 5. GND (Signal Ground) 6. DSR (Data Set Ready) 7. RTS (Request to Send) 8. CTS (Clear to Send) 9. RI (Ring Indicator) 	 <p>Figure 9.1 Panel PAC (9-Pin D-SUB)</p>

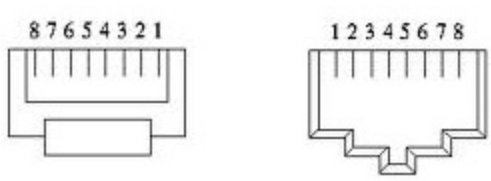
A.2 USB Port

The following table contains the USB assignments for the Panel PAC.

Pin Signal Name	4-Pin USB Socket Type A Version 2.0/1.1
<ol style="list-style-type: none"> 1. VCC 2. Data- 3. Data+ 4. GND 	 <p>Figure 9.2 Panel PAC (4-Pin USB)</p>

A.3 RJ45 Connector

The following table contains the RJ45 pin assignments for the Panel PAC.

Pin Signal Name	RJ45
<ol style="list-style-type: none"> 1. TX+ 2. TX - 3. RX+ 4. NC 5. NC 6. RX - 7. NC 8. NC 	 <p>Figure 9.3 Panel PAC RJ45 Connector</p>

A.4 DVI-I Connector (Single Link)

The following table contains the DVI-I assignments for the Panel PAC.

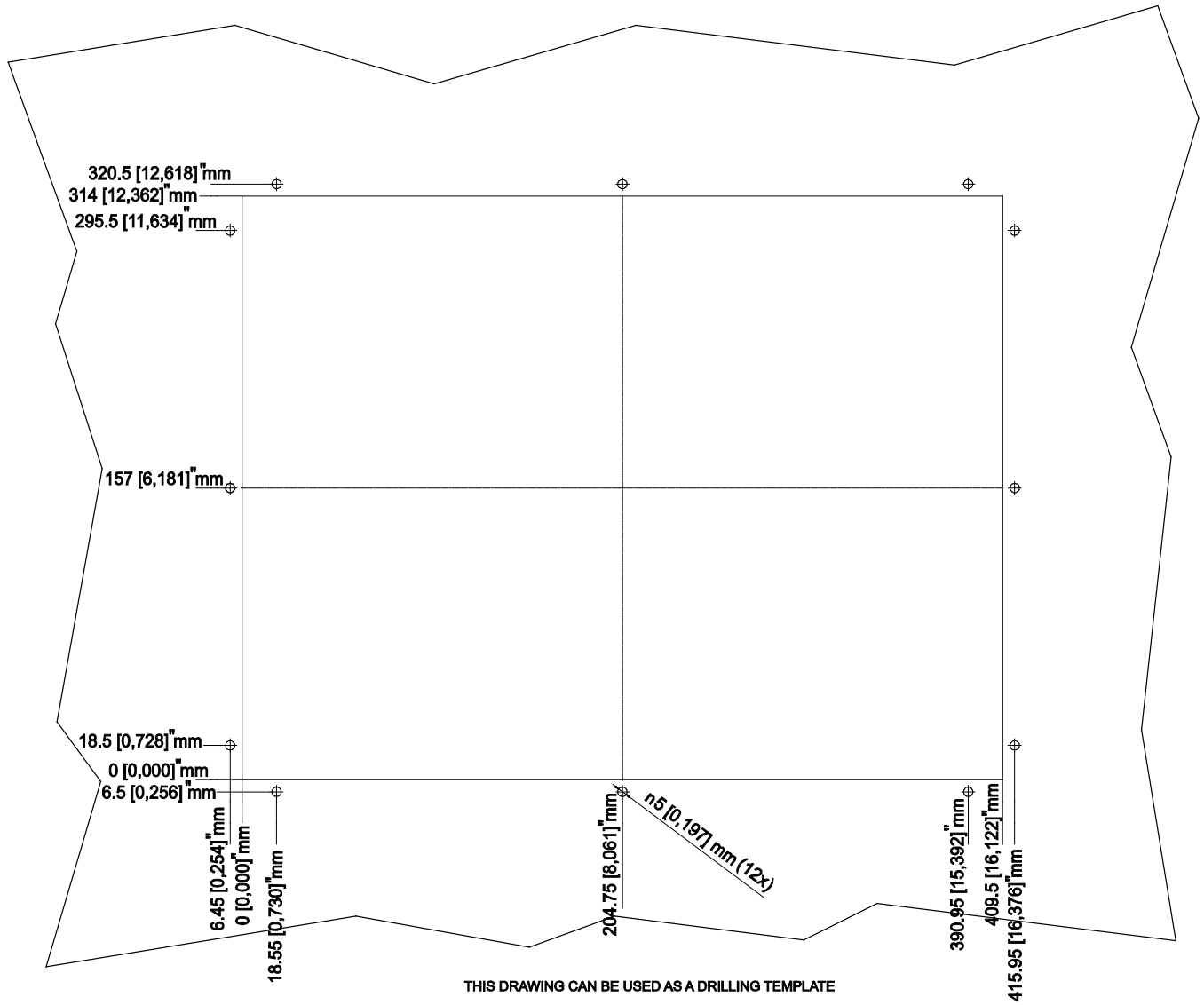
Pin	Signal Name	Description	DVI-I Connector (Female)
1	TMDS2-	Differential TMDS Data 2-	
2	TMDS2+	Differential TMDS Data 2+	
3	GND	TMDS Shield	
4-5	NC		
6	DVI_SCL	DDC EDID data clock	
7	DVI_SDA	DDC EDID data	
8	DVI_VS	Analog VSYNC	
9	TMDS1-	Differential TMDS Data 1-	
10	TMDS1+	Differential TMDS Data 1+	
11	GND	TMDS Shield	
12-13	NC		
14	DVI_5V	5V / 100mA Power Supply	
15	GND	Ground	
16	DISPDET	Hot Plug Detection	
17	TMDS0-	Differential TMDS Data 0-	
18	TMDS0+	Differential TMDS Data 0+	
19	GND	TMDS Shield	
20-21	NC		
22	GND	TMDS Shield	
23	TMDSSCL-	Differential TMDS Clock-	
24	TMDSSCL+	Differential TMDS Clock +	
C1	DVI_R	Analog red	
C2	DVI_G	Analog green	
C3	DVI_B	Analog blue	
C4	DVI_HS	Analog HSYNC	
C5	Analog GND	Analog Ground	

Figure 9.4 Panel PAC DVI-I Connector

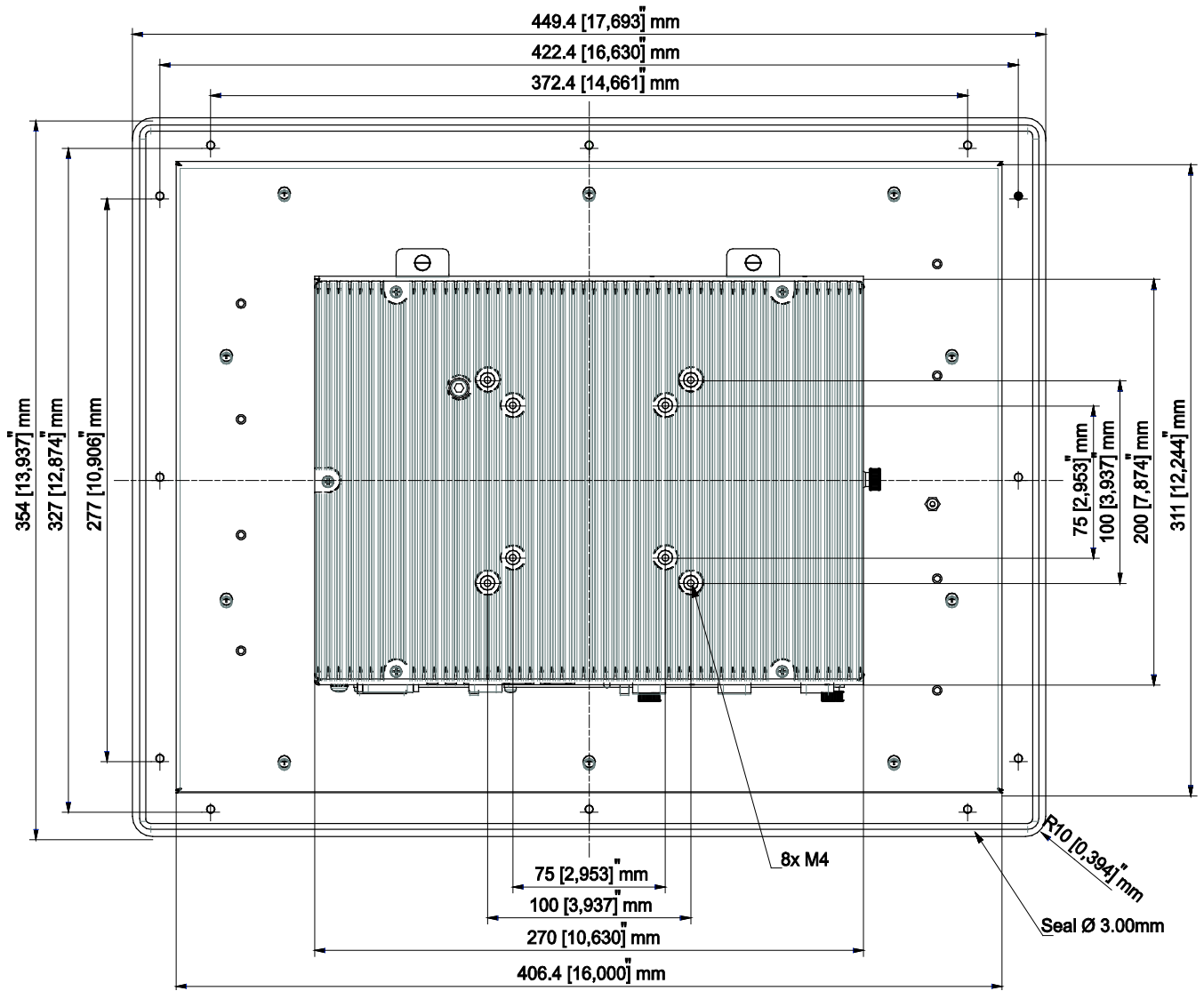
APPENDIX B

This section provides the mechanical drawings of the AKC-PNC-D1-224-15N-00-000 15" Hi-Performance Panel Controller.

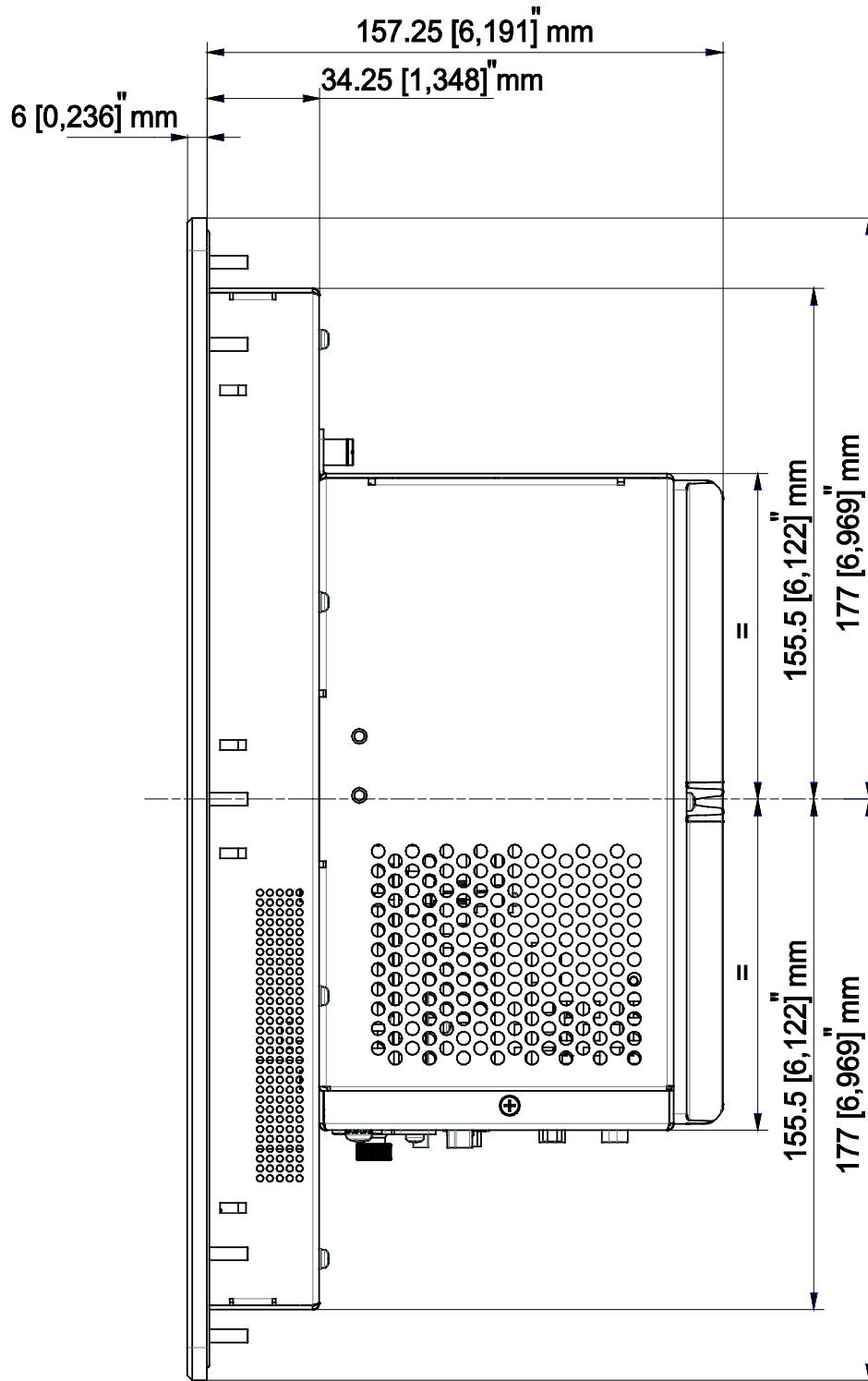
B.1 AKC-PNC-D1-224-15N-00-000 15" – Front View



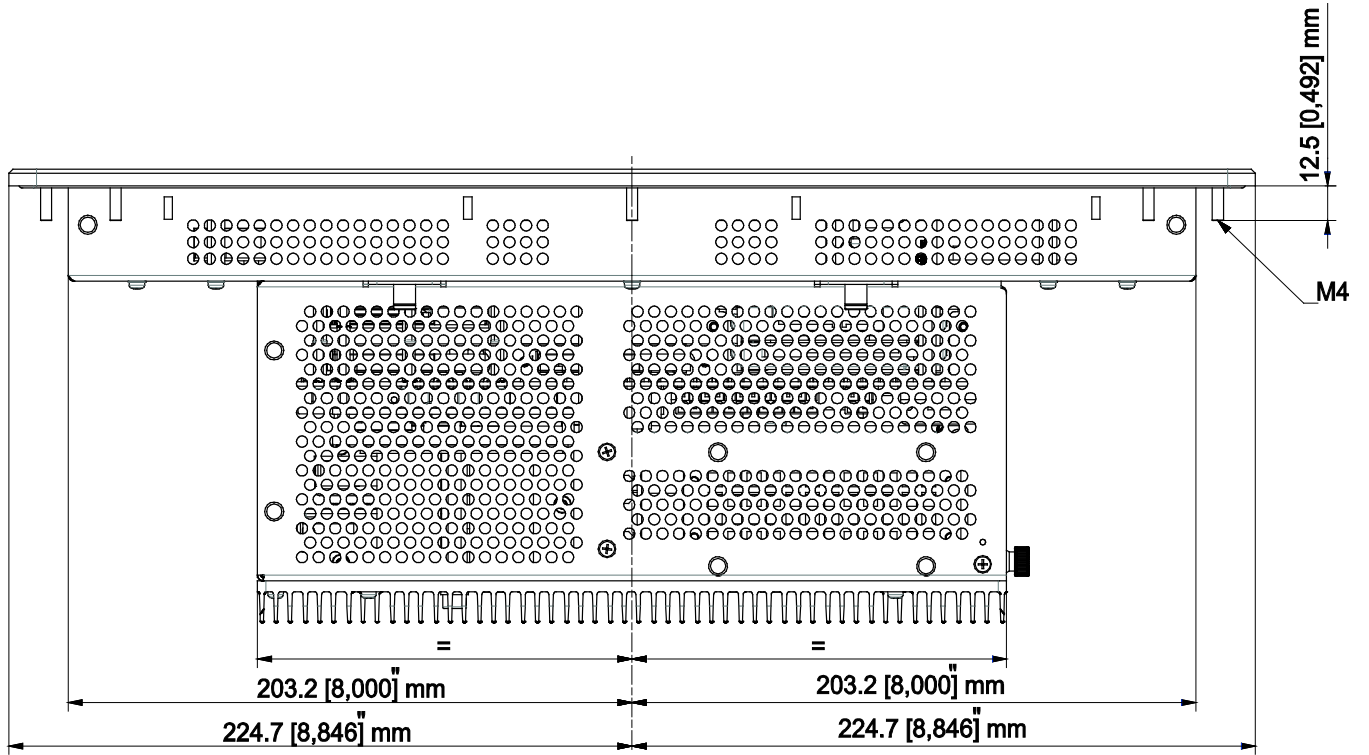
B.2 AKC-PNC-D1-224-15N-00-000 15" – Back View



B.3 AKC-PNC-D1-224-15N-00-000 15" – Side View



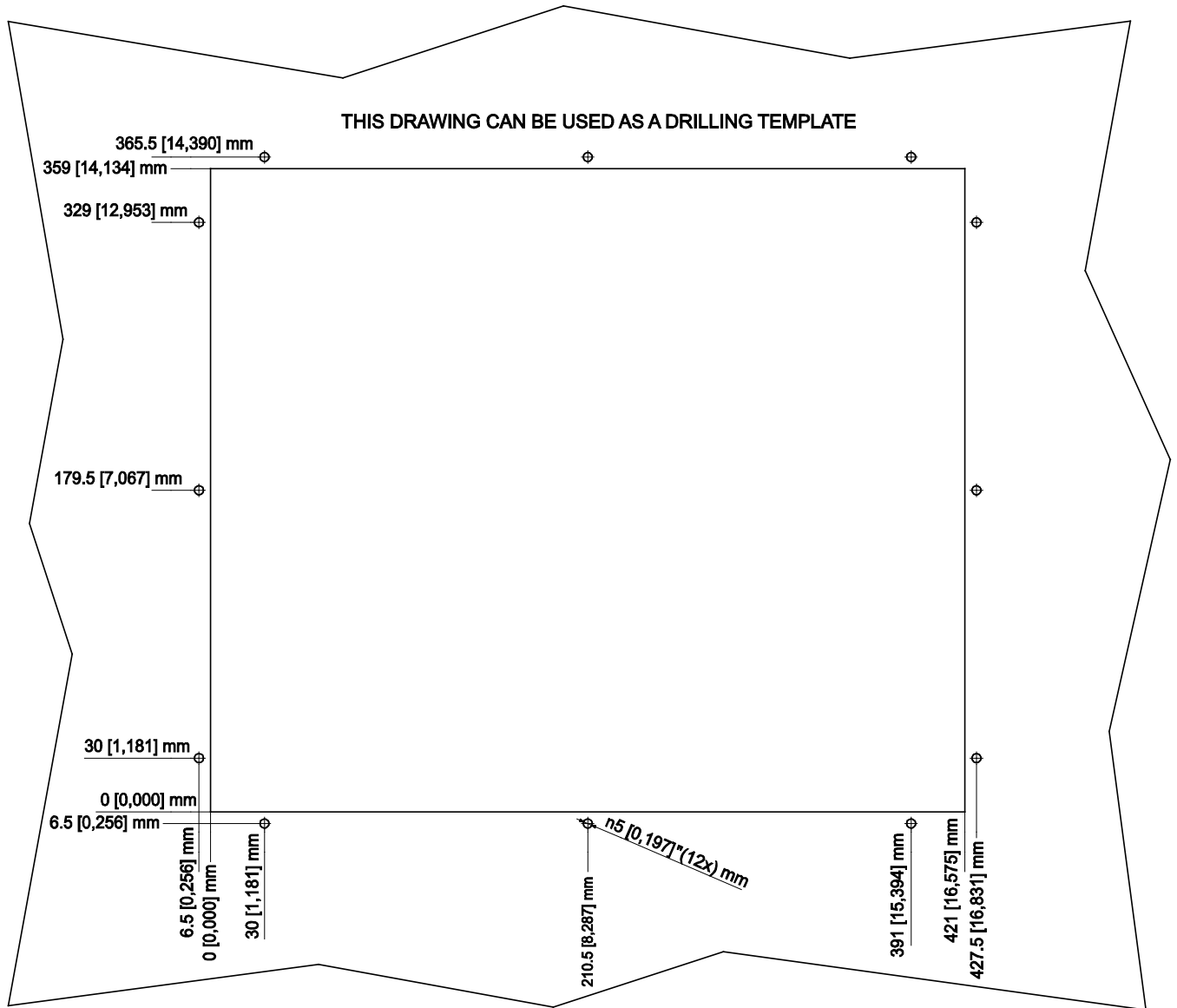
B.4 AKC-PNC-D1-224-15N-00-000 15" – Top View



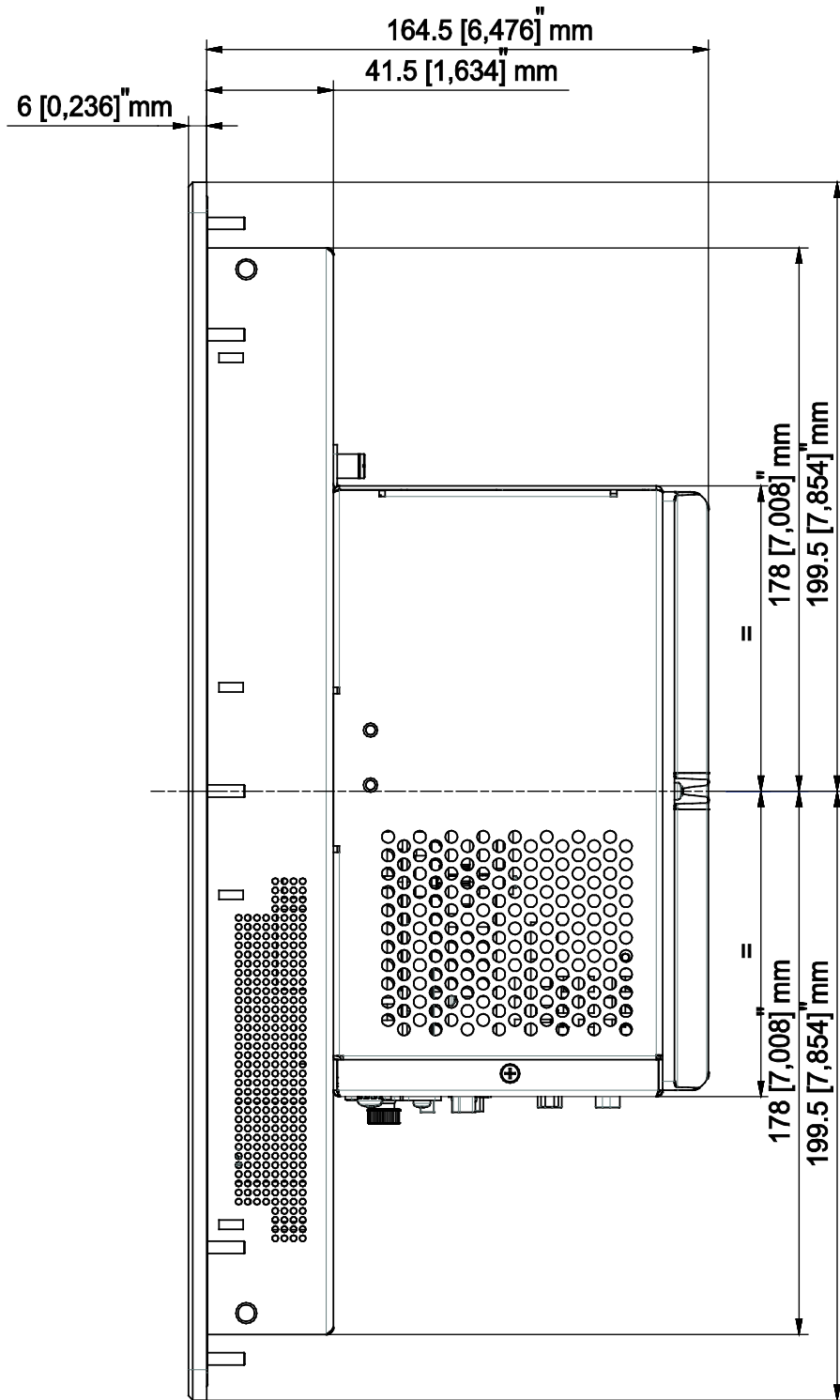
APPENDIX C

This section provides the mechanical drawings of the AKC-PNC-D1-224-17N-00-000 17" Hi-Performance Panel Controller.

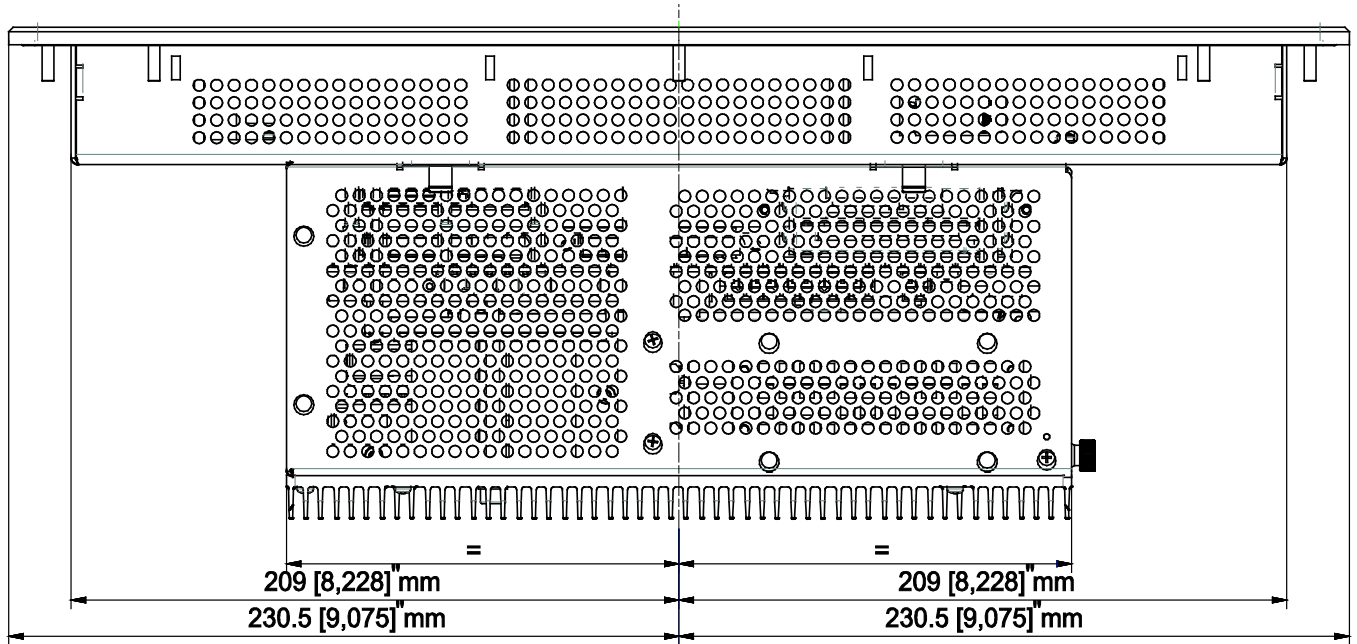
C.1 AKC-PNC-D1-224-17N-00-000 17" – Front View



C.3 AKC-PNC-D1-224-17N-00-000 17" – Side View



C.4 AKC-PNC-D1-224-17N-00-000 17" – Top View



About Kollmorgen

Kollmorgen is a leading provider of motion systems and components for machine builders. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions that are unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

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