

Keyscan KC Series Controller Keyscan

User Guide



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Foreword

This user manual outlines general information for installing Keyscan access control systems utilizing the Keyscan KC Series Access Control Panels (KC-2A, KC-4A), or ACUs (Access Control Units) for short. The guide assumes the installer has knowledge of electrical, electronic, mechanical, and computer concepts, as well as having familiarity with access control systems and associated components. For reliable and safe operation of the equipment, comply with stated cable, power, ground, and environment specifications.

Electrical Precautions

Ensure all circuit breakers powering the system are off before commencing installation or modifying wiring connections. Do not apply power before completing the installation; otherwise, you may damage the circuit boards. Ensure all enclosures have earth ground connections for proper and safe system operation.

Tools

dormakaba Canada Inc. recommends having the following tools on hand to install the access control system:

- Digital voltmeter
- Wire cutters & needle nose pliers
- Electrical tape
- Set of screwdrivers
- Drill & drill bits
- Laptop computer (optional)

Important Security Instructions:

1. Read, follow, and keep instructions: Before operating the equipment, read and follow all security and operation instructions. Please keep the instructions handy for future reference.
2. **Accessories:** Please use the accessories recommended by the manufacturer or delivered with the product. The major alarming or monitoring system should comply with the local applicable fire - prevention and security standards.
3. All peripheral devices must be grounded.
4. No external connection wires should be left exposed. All connections and idle wire ends must be wrapped with insulating tape to prevent accidental contact with exposed wires from damaging the equipment.

Installation Cautions:

1. All the Wiring methods shall be in accordance with the "National Electrical Code, ANSI/NFPA70".
2. The minimum permissible wire size to be employed shall be **not smaller than No.22 AWG**.
3. The minimum permissible wire length to be employed shall be not greater than 98.5 ft. (30m) long for the following circuit listed below:
 - (a) Ethernet Jack: ETH1, J3, J6, Fire;
 - (b) Power Port: CN5, ES_DF1, ES_DF, AUXIN1, AUXIN2, AUXOP;
 - (c) Programming Connector: PD;
 - (d) Tamper: CN3; LCD: CN4, J31, UD1, J4.
4. It is recommended not to plug/unplug connection terminals frequently when the system is energized. Be sure to unplug the connection terminals before starting any relevant job.
5. Connecting auxiliary devices other than those that are outlined in this guide is not recommended.
6. A control panel should not share one power socket with any other large - current device.
7. It is preferable to install card readers and buttons at heights of **1.4-1.5m** above the ground, though the heights are subject to proper adjustment according to customers' usual practice.
8. It is strongly recommended that the exposed part of any connection terminal should **not be longer than 4mm**, and specialized clamping tools may be used to avoid short - circuit or communication failure resulting from accidental contact with excessively exposed wires.

Note: Wiring methods shall be in accordance with the "National Electrical Code, ANSI/NFPA70".
9. To save access control event records, read data periodically from control panels.
10. The connection between a card reader and a control panel should **not be longer than 500 feet (152 meters)**.
11. UL requires the use of the DPS-15 power supply to power your KC-2A or KC-4A based system. Using any other means of powering your system will be viewed as being non-compliant with UL standards.
12. All field installed wiring shall maintain a minimum 6.4mm (1/4 inch) spacing between power limited circuits and non-power limited circuits.

Cable Specifications

The following table outlines system cable specifications. Please be sure to review grounding guidelines for safe system operation. Avoid running access control cables parallel with AC wires or across fluorescent light fixtures. This can cause AC induction or transmission interference.

Device / Circuit Board	Signal Protocol	Maximum Distance	Cable Type	Notes
Readers to ACU	Wiegand	500ft / 152.4m	6 conductors shielded 22 AWG	Overall shielded cable accepted. CAT5 cable not accepted with Wiegand signal protocol.
OSDP Readers (v 2.1.5)	RS-485	4000ft / 1200m	2 pair, 4 conductor shielded twisted pair, 22-24 AWG	
Door strikes & electromagnets to ACU	N/A	500ft / 152.4m	1 pair 18 AWG	Shielded wire not required.
Contacts & exit devices (not for burglar protection)	N/A	500ft / 152.4m	1 pair 18 AWG	Shielded wire not required.
Motion sensors (PIR) (not for burglar protection)	N/A	500ft / 152.4m	2 pairs 22 AWG	Shielded wire not required.
ACU to Network	TCP/IP	328ft / 100m	CAT 5 / CAT 6	

System Function Parameters:

- 32 Bit - 20MHz, RAM 64KB and additional RAM 16MB, 4MB flash and additional flash 4GB, System Back-Up Flash 4MB
- RTOS operating system
- Two door (KC-2A) and four door (KC-4A) models available.
- Onboard Ethernet port used for system communications.
- Overcurrent, overvoltage, and inversevoltage protection for the input of power supply to the control panel.
- Overcurrent protection to card readers.
- System supports both Wiegand and OSDP reader connections.

Electrical Ratings:

Primary Operating Supply Rated Input -

Model	Primary Voltage	Current Draw	Batteries V, Amp Hr
(PCB Only)	12Vdc (Normal Standby)	250 mA	N/A
(PCB Only)	12Vdc (Full Load)	1.2 Amps (max)*	N/A

*The DPS-15 can provide up to 1.2A from both its "AUX/RDR" and "ACU" output terminals

DPS15 – Power Supply

- Input: Two – 16.5V AC 40V A (2.5A) Class 2 Transformers
- Output: Two – 13.6VDC (1.2A) – Not for Electric Locks
- Standby Battery Requirement: One 7AH – 12VDC (min)

Output Relay Ratings

Model	Relay Coil Rating	Relay Contact Rating
KC-2A, KC-4A	12Vdc	24VDC, 10A 120VAC, 10A (Form C)
OCB-8 (optional peripheral board)	12Vdc	30VDC, 5A 24VAC, 10A (Form C)

Readers:

See section "Connecting Readers to the KC Series Controller" for further information on reader wiring and current requirements. Refer to the appropriate diagram for specific reader connections. Be sure to use cables that comply with the reader's wiring specifications.

Ensure that the total current draw of all readers connected to the control board's reader terminals is within the limit of the DPS-15 power supply; otherwise, you will require a separate power supply.

Environmental Details:

- Operating temperature: 0°C - 49°C; Humidity 85%.
- Ambient Temperature: 0°C - 49°C

Mechanical Details:

- Outline dimensions of the KC-series panel: 180mm (length) × 113mm (width)
7.09in (length) × 4.45in (width)
- Mounting hole dimensions of the KC-series panel: 169.8mm (length) × 102.84mm (width)
6.69in (length) × 4.05in (width)
- Keyscan Enclosure Dimensions (H x W x D): 438.2 x 411.2 x 142 mm
17.25 x 16.19 x 5.59 in

Performance level for Access Controller:

This section contains performance level information required for UL294 compliance.

Feature	Level
Destructive Attack Test	I
Line Security	I
Endurance	IV
Standby Power	I

KC Series Access Control Panel Indicators

Refer to Figure 1: KC Series Board LEDs/Indicators & Menu Buttons for the locations of all LEDs/Indicators. When the KC Series board is powered on, normally the POWER indicator LEDs will be lit constantly.

- 12V LED - Red,
- 5 V LED - Orange,
- 3.3V LED - Green.

Except for the cases as follows:

- The CPU1 LED – Red indicator will be lit constantly.
- LINK indicator (Orange, LED1): indicates proper TCP/IP connection if it is lit constantly.
- ACT indicator (Green, LED2): indicates transmission of TCP/IP data if it flashes ;
- Power section LED INDICATION: 12V- Red LED (12V1 LED), Lock Power - Red LED (LC1 LED), 5V- Orange LED (5V1 LED), 3.3V – Green LED (3V3)
- Lock indicator (Red LEDs - RLY1A thru RLY6A): indicates unlocking if it is lit constantly.
- Door Feedback – Green LED – (DF1 thru DF4): will light up when Door Feedback is active.
- Egress - Red LED – (ES1 thru ES4): will light up when Egress active.
- Auxiliary-in – Yellow LED - (IN1 thru IN4): will light up when Auxiliary-in active.

Name on PCB	Colour	Description/behaviour
LC1	RED	Lock Power , lit constantly
3V31	GREEN	3.3V Power , lit constantly
5V1	ORANGE	5V Power , lit constantly
12V1	RED	12V Power , lit constantly
LED2	GREEN	ACT , lit constantly with proper TCP/IP connection
LED1	ORANGE	LINK , flashes when TCP/IP data transmitted
FIR	RED	
IN1, IN2, IN3, IN4	YELLOW	Auxiliary-In , will light up when Auxiliary input is active
ES1, ES2, ES3, ES4	RED	Egress , will light up when Egress active
DF1, DF2, DF3, DF4	GREEN	Door Feedback , will light up when Door Feedback is active
RLY1A, RLY2A, RLY3A, RLY4A, RLY5A, RLY6A	RED	Lock/Relay Indicator , will light up when relay is activated

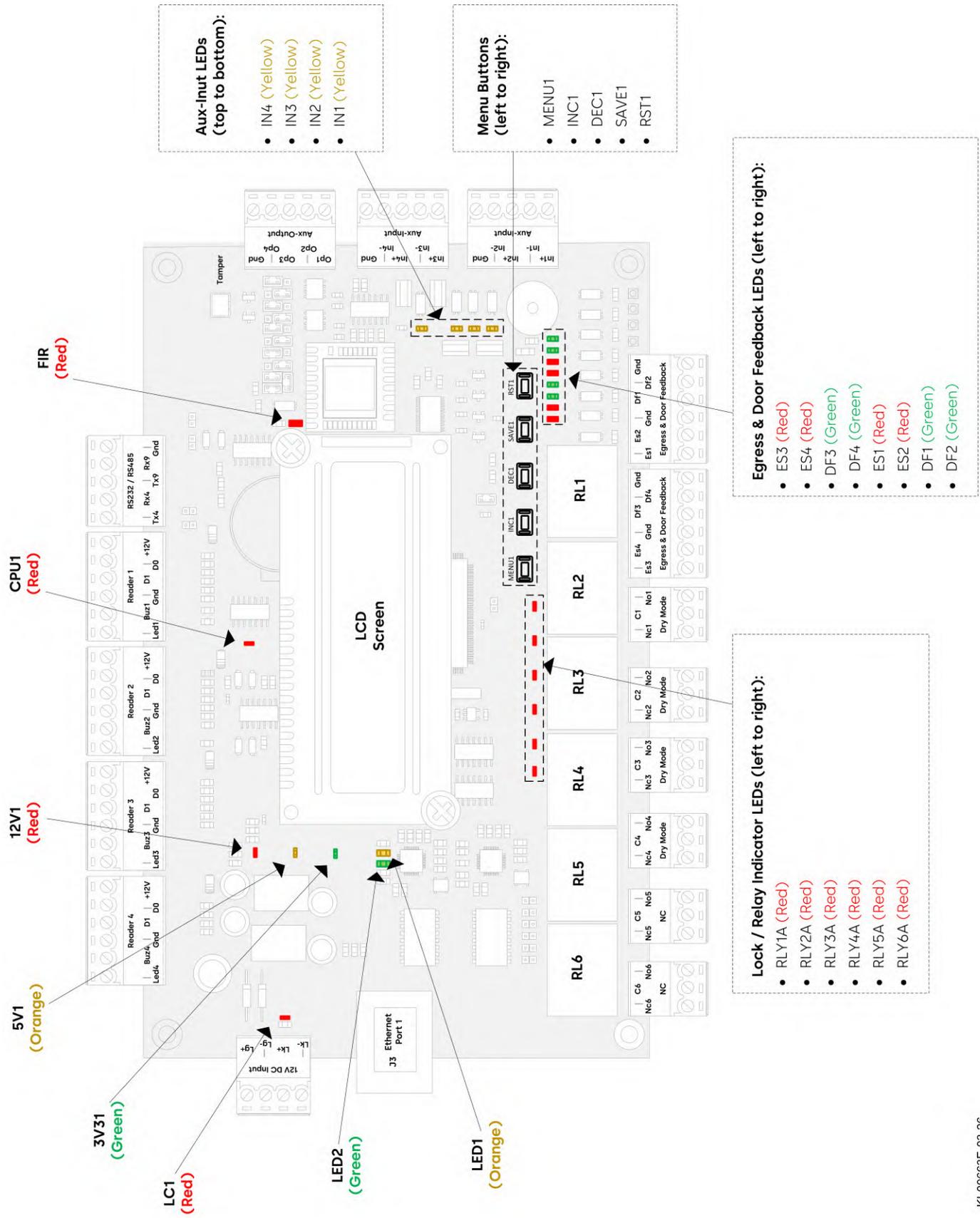
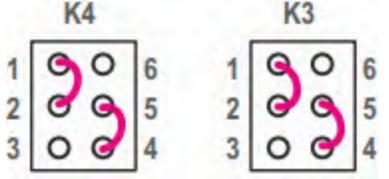
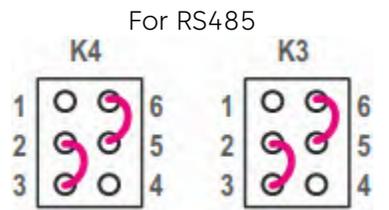
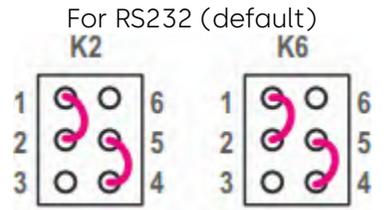
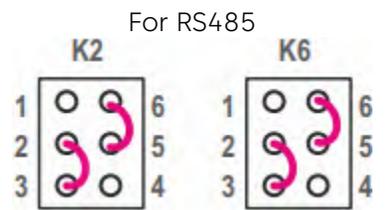


Figure 1: KC Series Board LEDs/Indicators & Menu Buttons

KC Series Access Control Panel Jumpers

Jumper #	Jumper Setting	Function	Notes
JP2	ON (default)	Watchdog Jumper	Leave jumper ON
J21	OFF (default)	Programming Jumper	N/A
K4, K3	For RS232 (default) 	Serial Communication Jumpers for Tx9 / Rx9	Set to RS485 mode for IOCB1616B connections
	For RS485 		
K2, K6	For RS232 (default) 	Serial Communication Jumpers for Tx4 / Rx4	Set to RS485 mode for OSDP reader connections
	For RS485 		
J12, J13, J40, J41	ON	AUX-IN Ground Jumpers	With jumper ON , apply 3.3-12Vdc to In+ to activate Aux-input. See Auxiliary Inputs and Outputs - Connections and Wiring
	OFF	J12 for Aux In1 J13 for Aux In2 J40 for Aux In3 J41 for Aux In4	With jumper OFF , apply 12Vdc to In+ terminal. Aux inputs can be activated by grounding In-. See Auxiliary Inputs and Outputs - Connections and Wiring

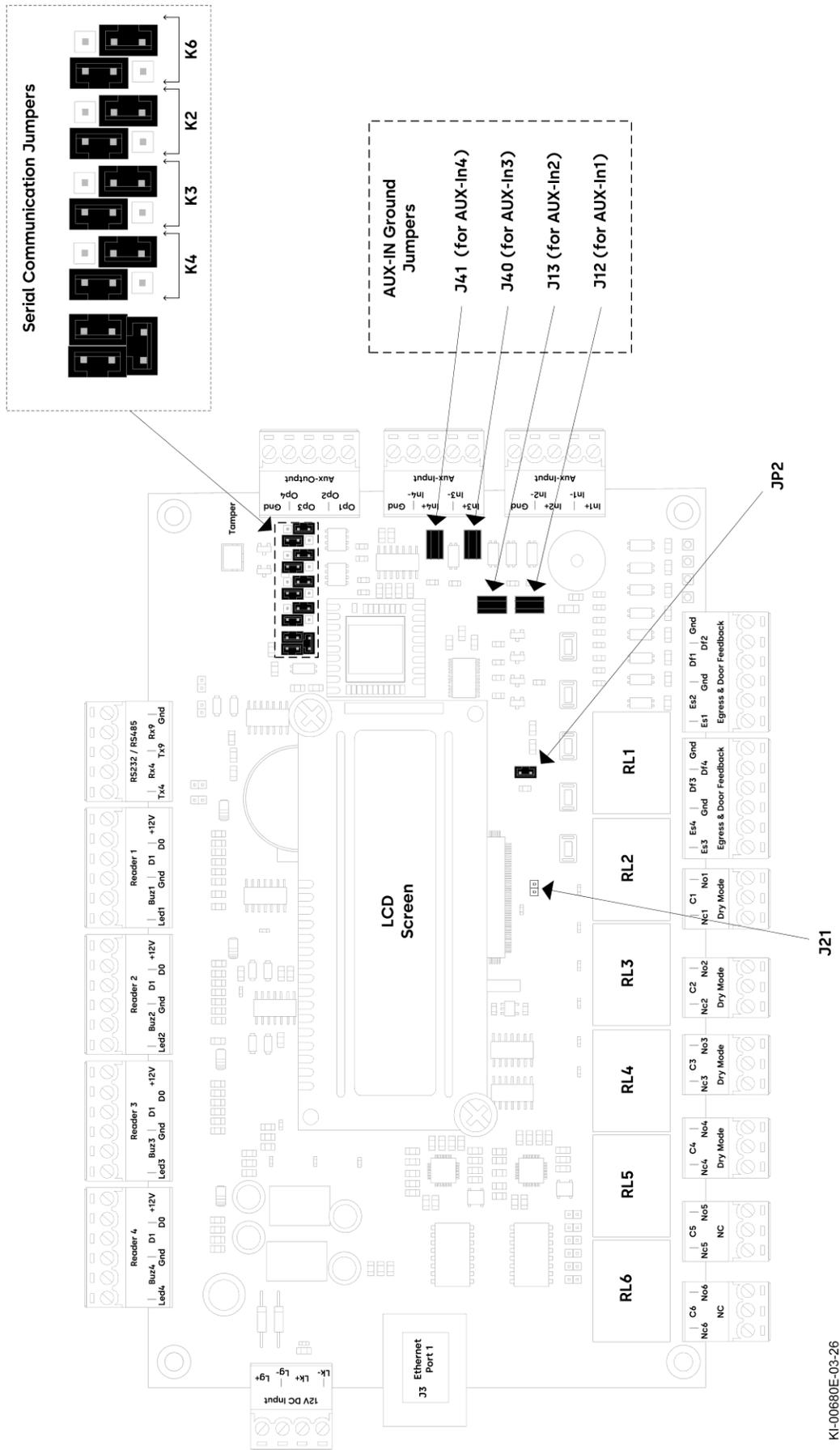


Figure 2: KC Series Board Jumpers

Connection and Installation

Mounting the Metal Enclosure

The metal enclosure has four (4) pre-drilled holes for mounting to the wall. Connect the ground lug to a true earth ground. When locating mounting areas, ensure the metal enclosure is not close to high voltage equipment and the cable lengths are within their maximum allowable distances.

For knockout and mounting hole locations/dimensions, see the diagram on the next page.

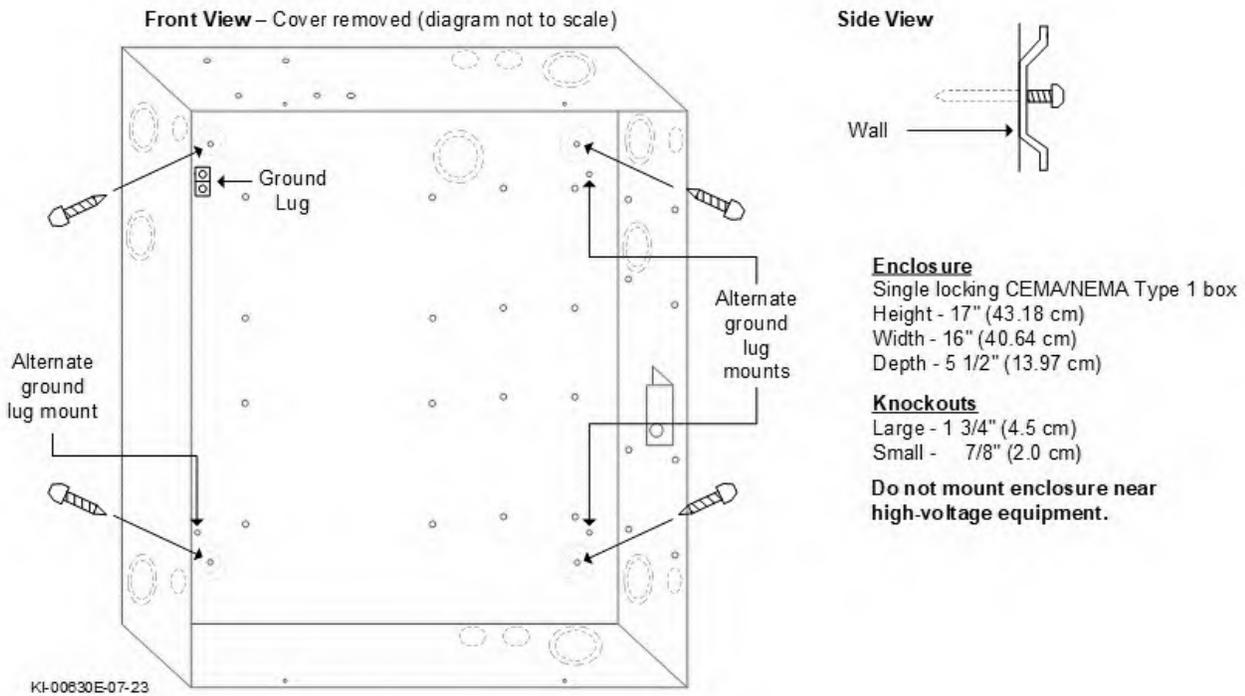


Figure 3: Mounting the Metal Enclosure

Ground Lugs

The metal enclosure includes one ground lug pre-mounted near the top and one spare ground lug, which mounts on one of the available ground lug studs. You can also re-locate the pre-mounted ground lug to minimize the length of shield used.

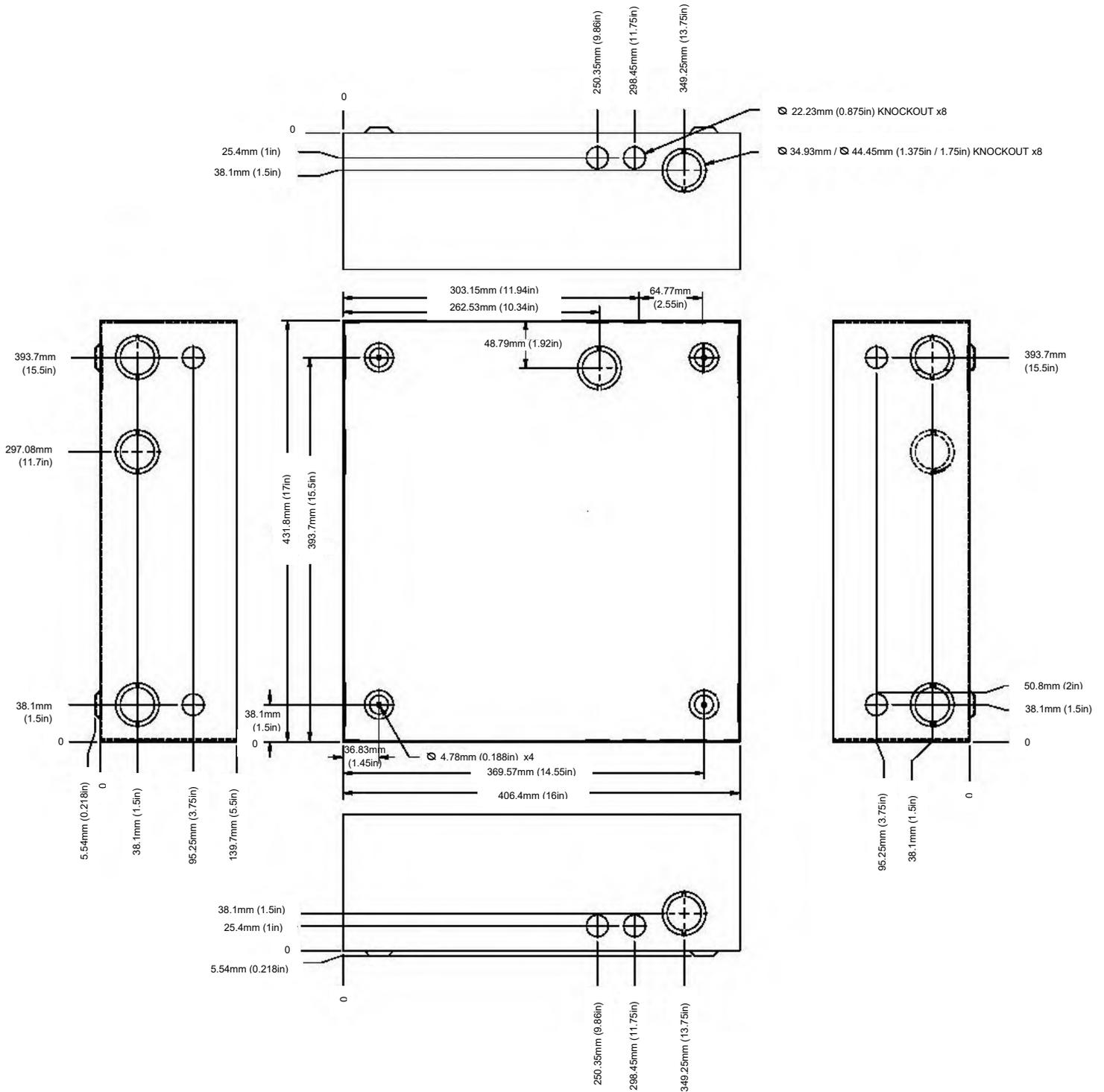


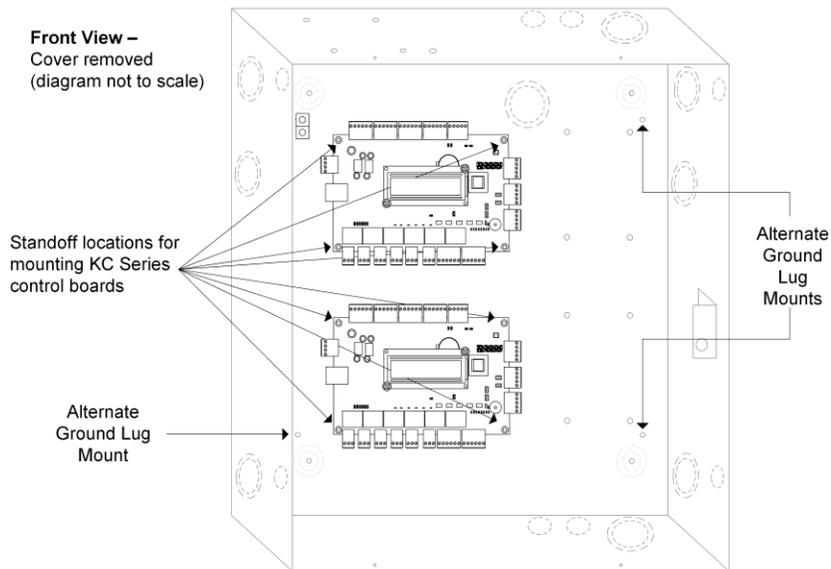
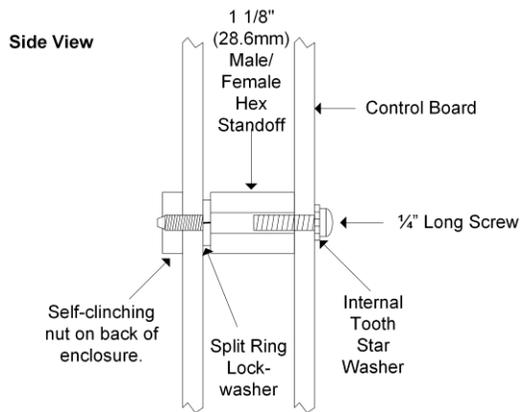
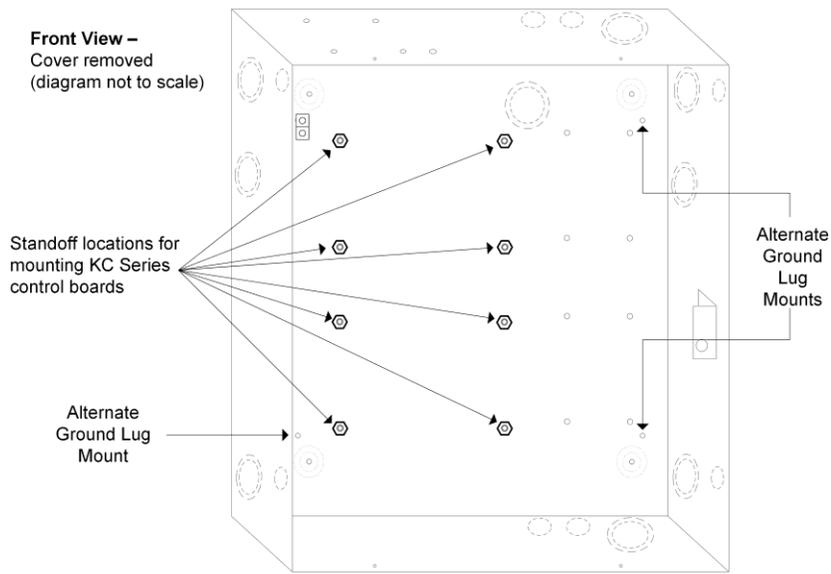
Figure 4: Enclosure Knockout & Mounting Hole Locations/Dimensions

Mounting the KC Series Control Board to the Metal Standoffs

Use the enclosed ¼" screws (6.35mm) to secure the KC Series control board to the 1 1/8" (28.6mm) metal standoffs mounted inside the metal enclosure. Only four (4) screws/standoffs are needed for mounting the KC-2A and KC-4A control panels. Be sure the internal tooth star washers are placed between the control board and the screw as shown in Figure 5: Mount and fasten KC Series control board to Standoffs.

Important

Finger-tighten the ¼" screws (6.35mm) with a screwdriver. Do not use a power screwdriver or apply excessive force tightening screws into the metal standoffs when mounting control boards. Ensure the control board is disconnected from the power when mounting; otherwise, the control board may be damaged from a potential short-circuit.



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Figure 5: Mount and fasten KC Series control board to Standoffs

Mounting the DPS-15 Power Supply

The DPS-15 is a 13.5 VDC dual linear regulated power supply for powering the KC Series access control boards and the readers with the following outputs:

- ACU output 12 VDC @ 1.2 Amperes
- AUX/RDR output 12 VDC @ 1.2 Amperes

Maximum Current Draw

The total current draw on each output should not exceed one (1) Ampere with 200mA in reserve for accommodating peak current operating demands.

CSA/UL Approved Transformers

The DPS-15 power supply requires the following class 2 CSA/UL approved transformer and a backup battery with sufficient amp hours.

- 2 x 16.5 V 40 VA

The purpose of two transformers is to comply with UL STD 294, CAN/ULC STD 60839-11-1:2016 Ed.1 and charge the battery circuit. The transformers must be located within 30 feet of the Keyscan power supply. Do not mount the transformers inside the ACU metal enclosure. Use of non-compliant transformers or deviation from the use of two (2) approved transformers per access control unit or incorrect voltages void all Keyscan warranties. The system may operate erratically if the voltage is lower than 12 VDC.

Mount the DPS-15 power supply as shown on page 19. For power supply connections, refer to Figure 18: DPS-15 Power Supply Connections.

Important

Do not use the DPS-15 to power door strikes or auxiliary equipment.

Backup Batteries

Select a battery with enough amp hours to operate the system for the total hours specified. The following table lists power duration times:

Amp-hour Battery	Amps	Estimated Power Duration
8.0	1.4	5.71 hours
7.5*	1.4	5.36 hours
7.0*	1.4	5.00 hours

* Indicates the two most commonly used backup batteries.

Plastic Standoffs

Plastic stand offs are pre-mounted on most power supplies, relay, and communication boards. In cases where stand offs are not pre-mounted, insert the double pronged end of the stand offs in the metal enclosure hole first. Then mount the circuit board to the stand offs.

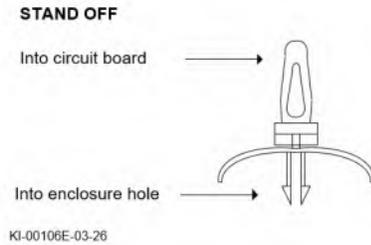


Figure 6: Plastic Stand Off

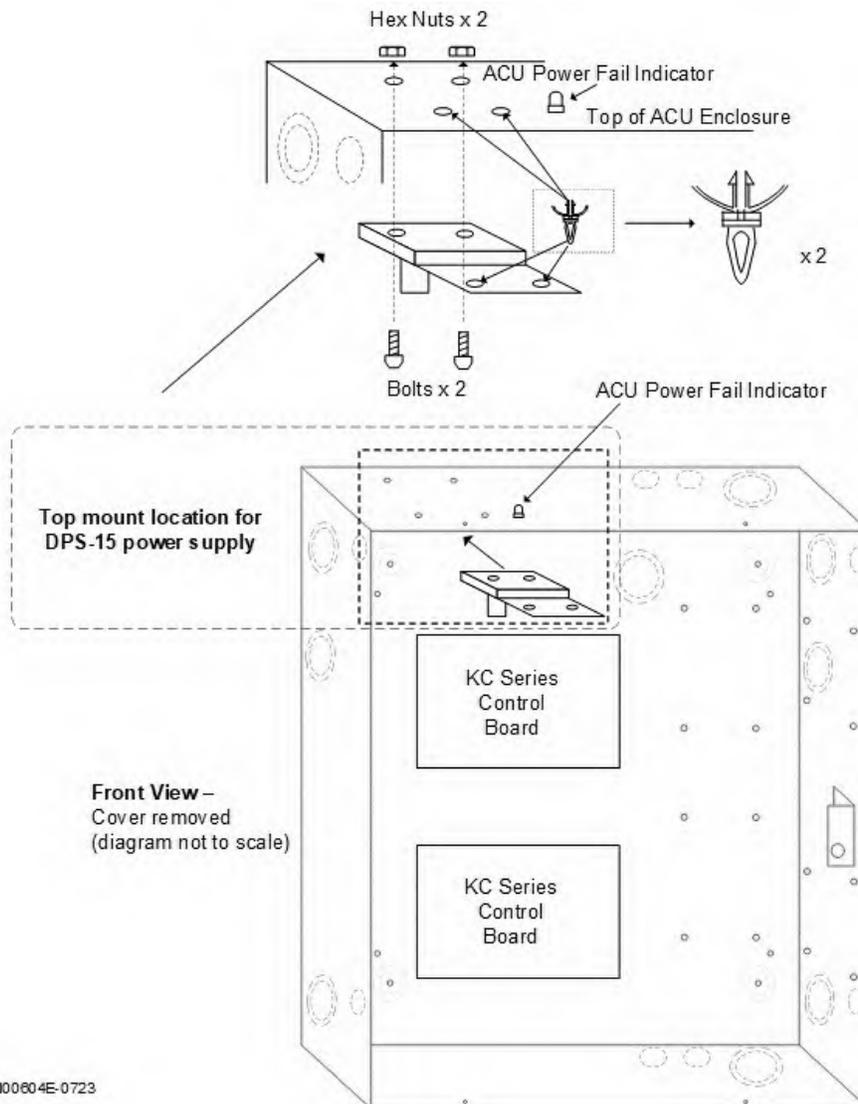
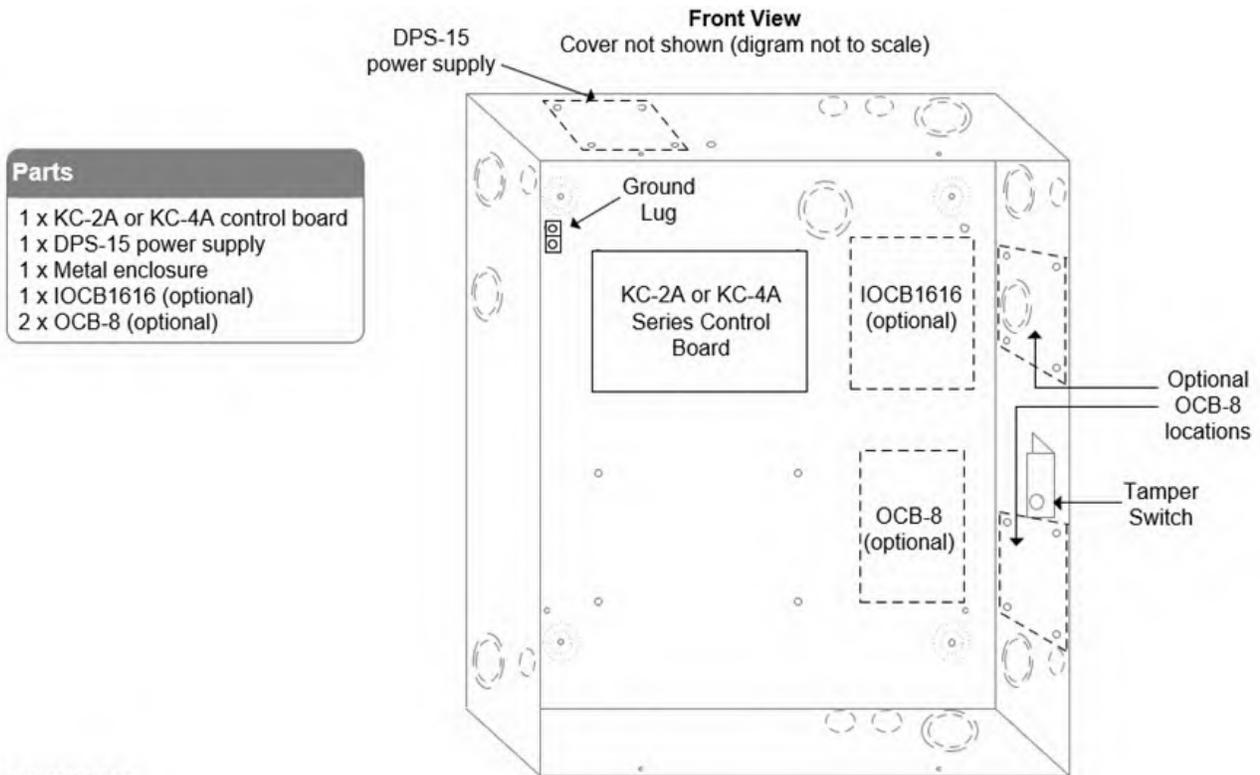


Figure 7: Mounting the DPS-15 Power Supply

Control Board – Mounting Locations

The following diagrams illustrate the mounting positions for control board series KC-2A and KC-4A access control units. Illustrations also show mounting positions for communication boards and output control boards (OCB-8).

Important - Do not mount close to high voltage equipment.



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Figure 8: KC-2A / KC-4A & Peripheral Board Mounting Positions

Connect Controller Tamper Switch

Connect the male connector from the tamper switch to the control board's female "Tamper" terminal as illustrated in the diagram below. Please remember that connecting the tamper switch, the ground strap and securing the enclosure cover are all requirements for compliance with the following standards: UL STD 294, CAN/ULC STD 60839-11-1:2016 Ed.1, FCC 15 Subpart B

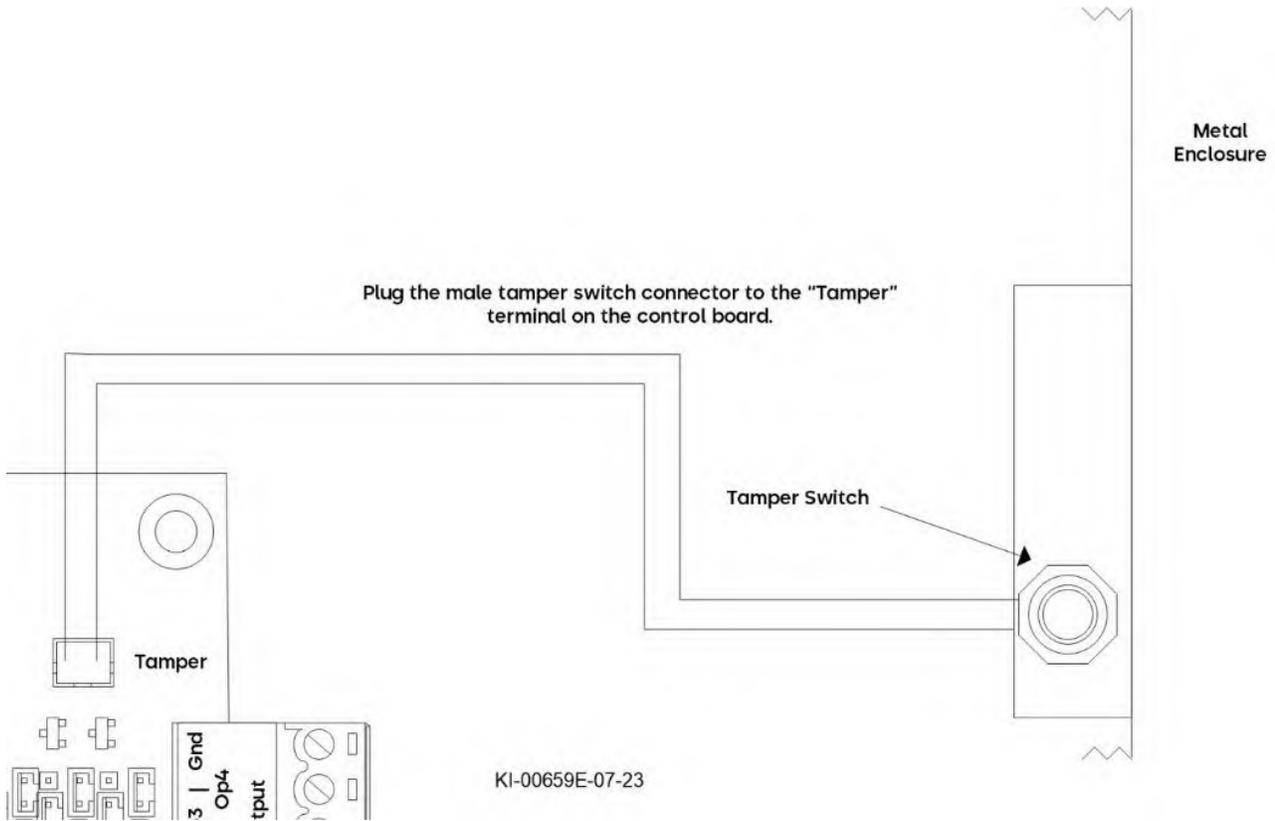


Figure 9: Enclosure Tamper Switch Connection

Connect Enclosure Ground Strap

Connect the enclosure ground strap to the designated studs on both the metal enclosure and the enclosure cover. Position the cable lug between two star washers and securely tighten with a nut as illustrated in Figure 10.

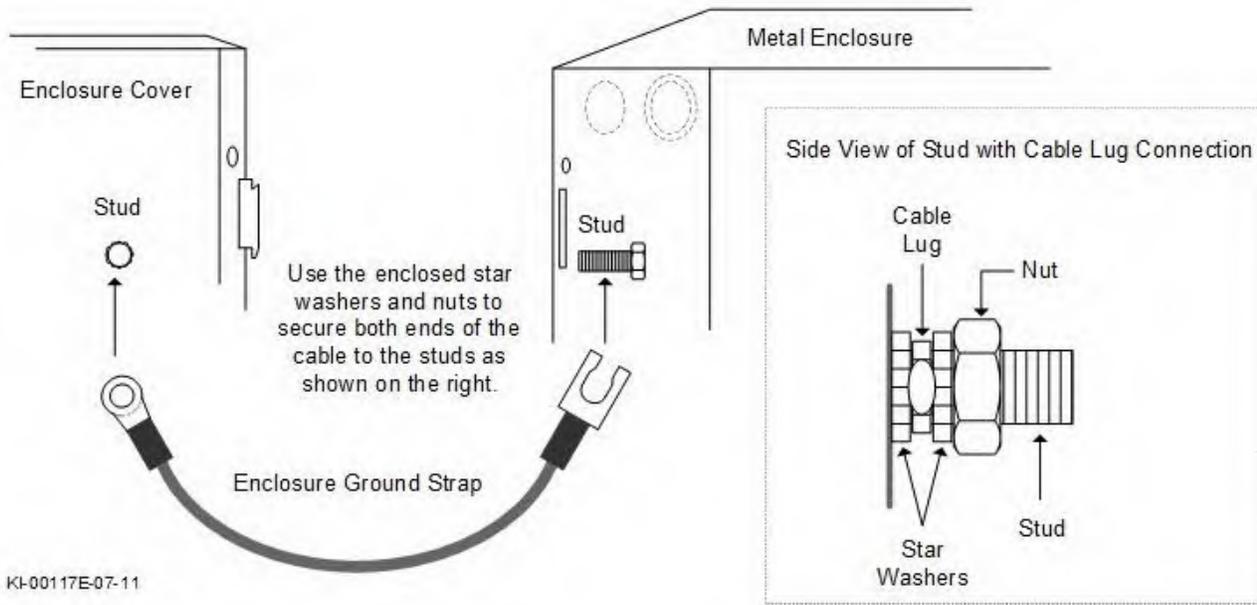


Figure 10: Enclosure Ground Strap Connection

Secure Enclosure Cover

Use the four (4) cover locking screws to secure the metal enclosure cover as shown in Figure 11.

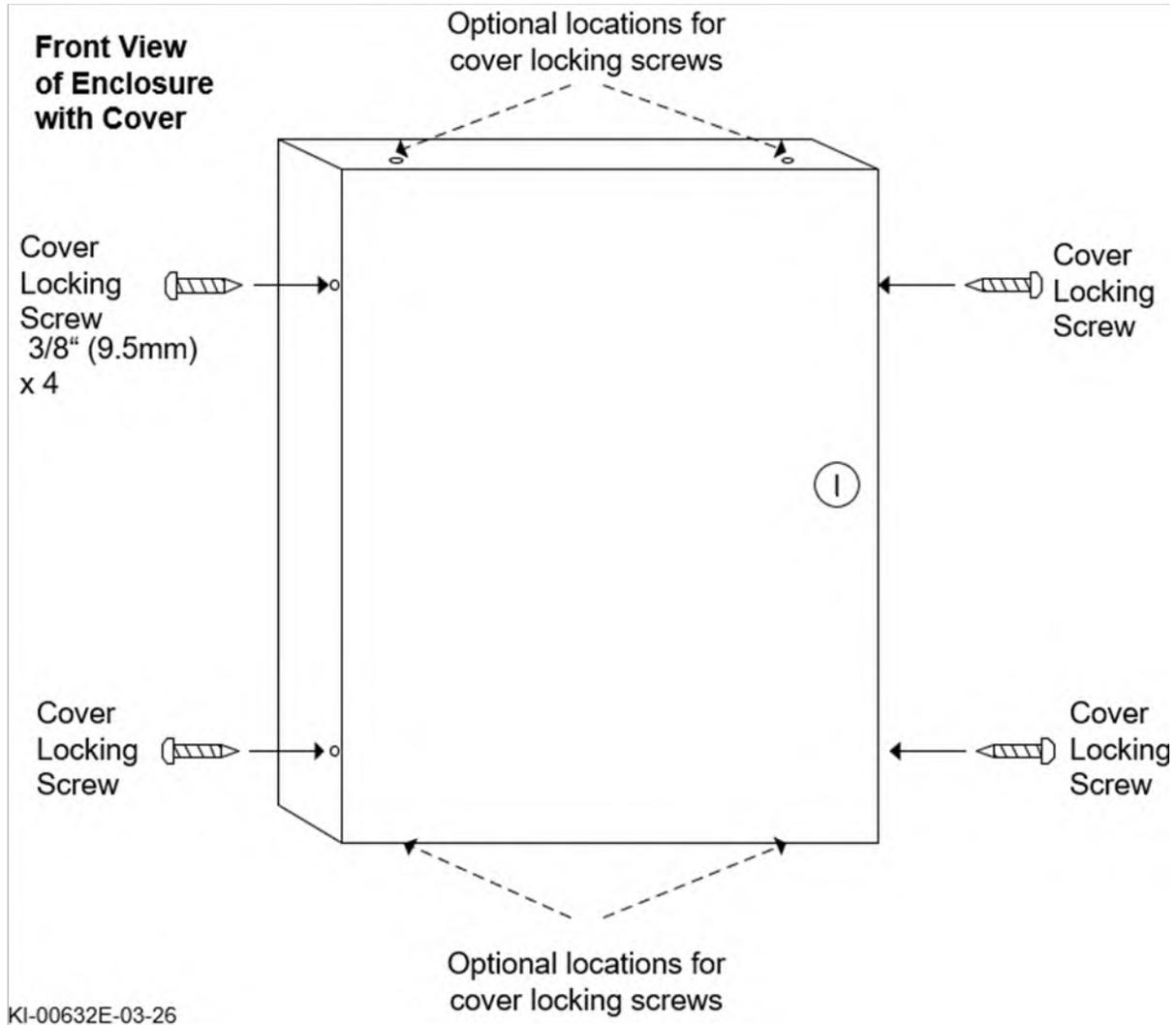
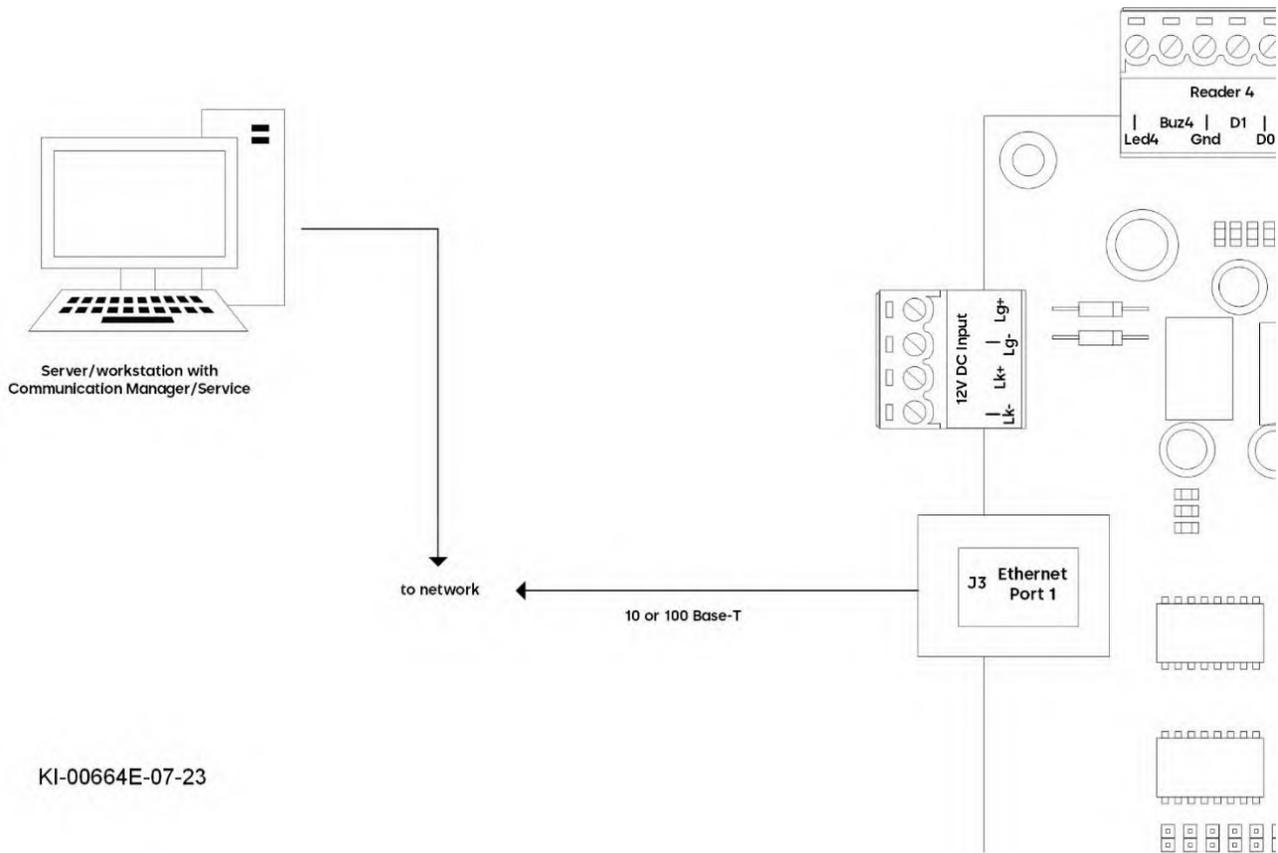


Figure 11: Securing the Enclosure Cover

Network Connection

The KC Series Access Control Panels will communicate through the network to the computer/server running the Access Control software as shown in Figure 13.



KI-00664E-07-23

Figure 13: Connecting to the network

Connecting Readers to the KC Series Controller

For readers, use six (6) conductors 22 AWG shielded cable or a cable with overall shielding.

The shielding wire must be connected to the earth ground lug at the ACU and isolated and taped at the reader.

The maximum reader distance is 500 feet (152.4 m) from the ACU when transmitting a Wiegand signal.

The maximum reader distance is 4000 feet (1200 m) from the ACU when transmitting an OSDP/RS-485 signal.

Reader Wiring

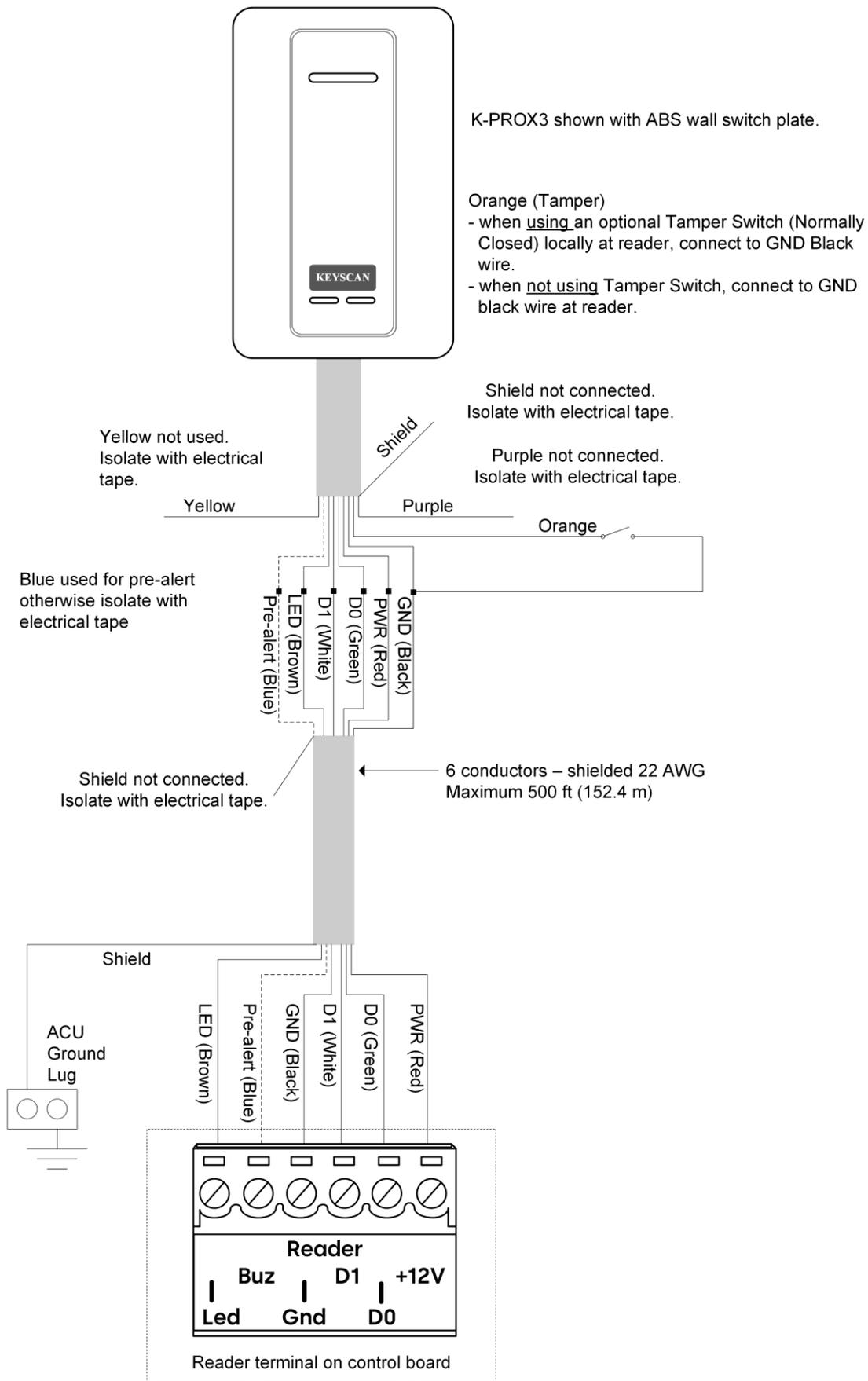
- **+12V** – Positive DC power. For readers that draw more current than the DPS-15 can provide, power using a secondary power supply
- **D0** – Data output bit 0
- **D1** – Data output bit 1
- **GND** – Ground
- **Buz** – Optional pre-alert (reader beeper)
- **Led** – Light emitting diode (LED) on reader

Keyscan & HID Readers

Example reader wiring diagrams are on the following pages. Refer to the appropriate diagram for specific reader connections.

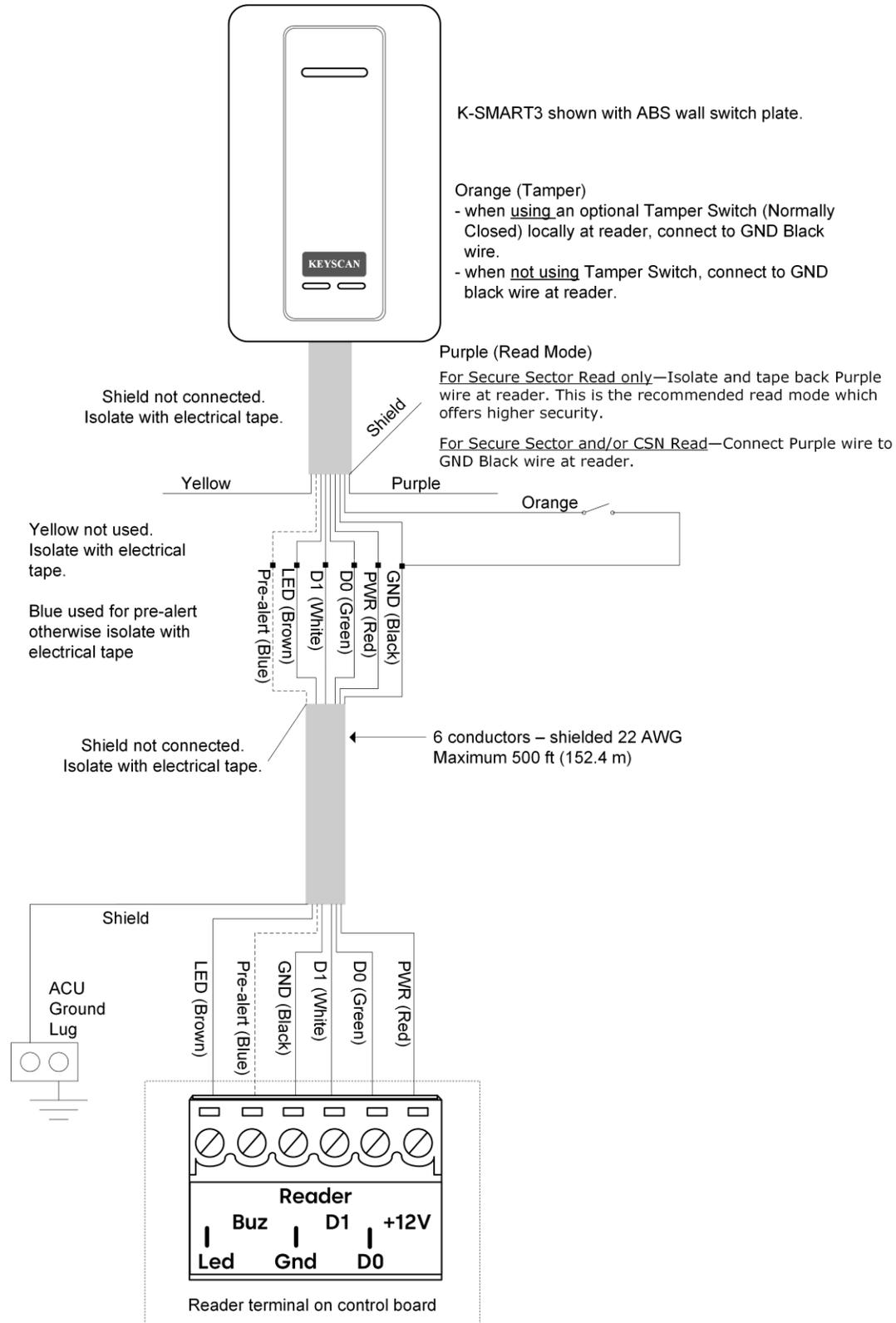
Be sure to use cables that comply with the reader's wiring specifications.

Ensure that the total current draw of all readers connected to the control board's reader terminals is within the limit of the DPS-15 power supply; otherwise, you will require a separate power supply.



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Figure 14: Keyscan K-PROX3 (125kHz) Wiring



KI-00682E-0326

Figure 15: Keyscan K-SMART3 Reader Wiring

OSDP Readers

OSDP Readers (v 2.1.5) connect to the Reader and RS485 terminal blocks on the KC Series control board as shown in Figure 16. Be sure to connect to Rx4/Tx4 of the RS485 terminal.

Note: Wiring methods shall be in accordance with the National Electrical Code, ANSI/NFPA70

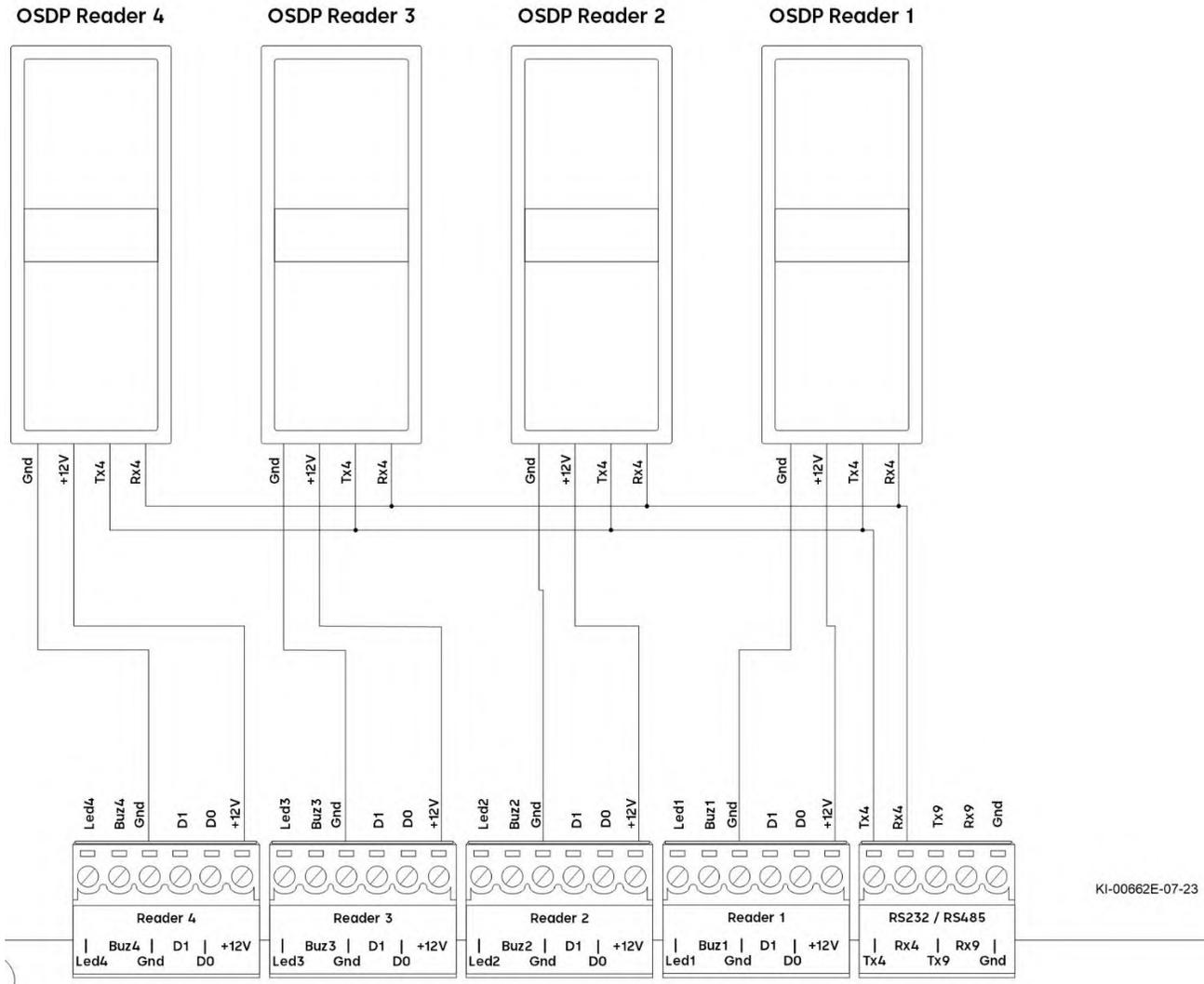


Figure 16: OSDP Reader Wiring

Note: After connecting OSDP readers, be sure to set the Serial Communication Jumpers to RS485 mode. See [KC Series Access Control Panel Jumpers](#) for details.

IOCB1616B Connection to KC Series Boards

The IOCB1616B connects to the Rx9/Tx9 terminal connections on the communications port of the KC-2A and KC-4A boards.

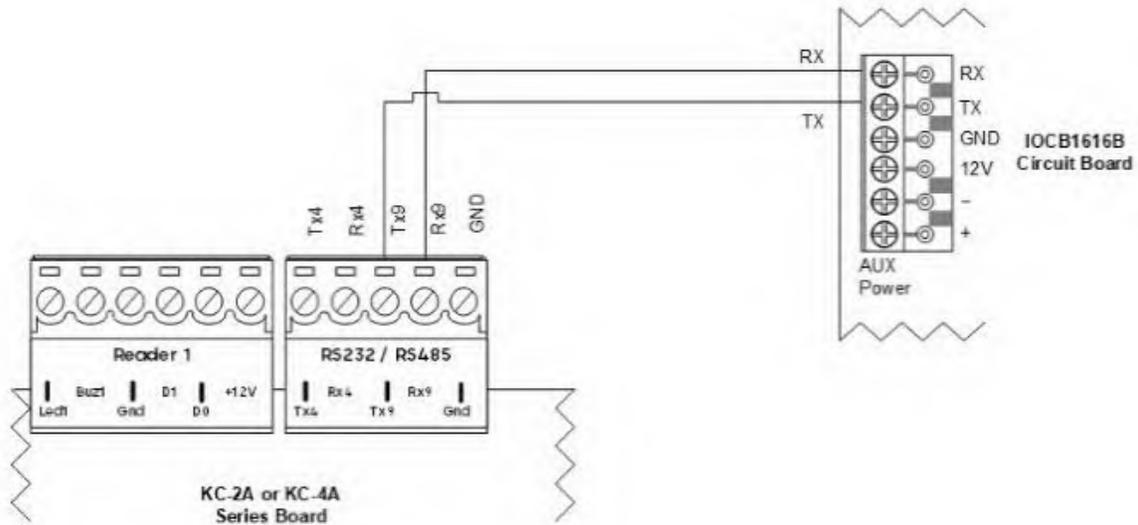


Figure 17 – IOCB1616B communication connections

Note: After connecting the IOCB1616 board, be sure to set the Serial Communication Jumpers to RS485 mode. See [KC Series Access Control Panel Jumpers](#) for details.

Connecting DPS-15 to the KC Series Controller

DPS-15 Wiring Connections

Before connecting power at the ACU, be sure to observe the following points:

- verify the devices do not exceed the power supply ratings
- check the cable and wire connections
- ensure no short circuits exist when measuring voltages
- verify the DC polarity is correct for all equipment
- ensure the backup battery is fully charged

Following the above guidelines ensures each device will function properly and not be damaged. Figure 18 shows the connection diagram for the DPS-15, including the connecting of the UL approved transformers, backup battery power, grounding, and Input power connections to the KC Series ACU/control board.

System Power-Up

Do not run the following is a guideline on initially powering up the control board.

- connect 12 VDC power to the control board as shown in Figure 18: DPS-15 Power Supply Connections
- connect fully charged backup battery
- connect 2 x 16.5V 40VA transformers - ensure that both CSA/UL approved transformers and fully charged backup battery are connected for proper system operation - do not mount the transformers or bring 120/240 VAC inside the ACU metal enclosure
- repeat battery and transformer connections for additional power supplies
- check ACU voltage test points after power is applied to the ACU – located in the bottom-right corner of the KC Series control board (+12V1, +5V1, +3V1, and GND2)
- from a server/workstation with a Keyscan Client module, upload the programming to the ACUs after electrical measurements and network connections have been verified

Notes

For battery circuit and auxiliary power output to function, connect two (2) CAS/UL approved transformers as shown in Figure 18.

Relay Output Connection – Wiring Examples:

The KC Series Access Control Panel has six relays and are configured as “dry” contacts. Four relays are used for controlling the locks power by default, and the other two relays (marked “NC” on the terminal block label) used as auxiliary outputs. The relays for auxiliary outputs may be connected to monitors, alarms, doorbells, etc. Auxiliary outputs are set through the access control software. Consult the manufacturer’s documentation for mounting door lock hardware.

The following illustrates the relay output connection wired to an electromagnetic lock:

- The COM and NC terminals shall be used to configure the lock power, Lock will be locked when power is connected and unlocked when power is disconnected.

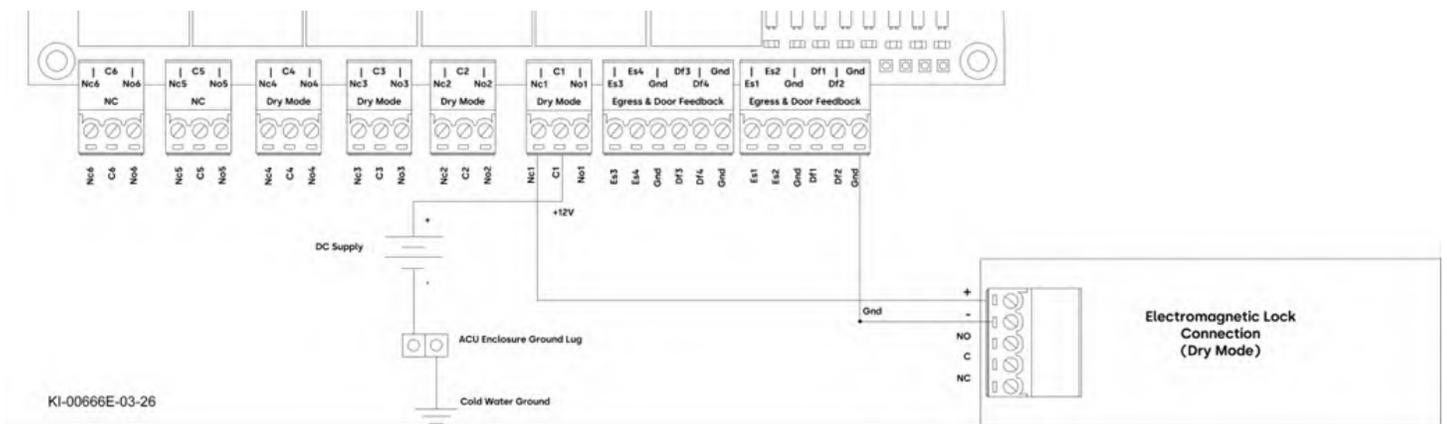


Figure 19: Electromagnetic Lock Connection

The following figure illustrates the relay output connection wired to a door strike:

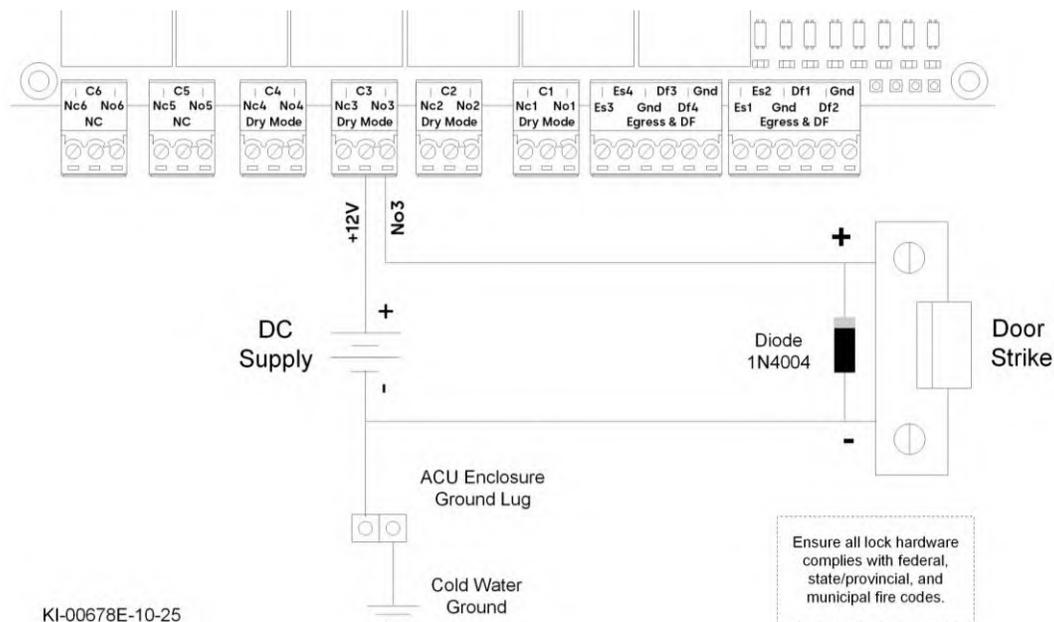


Figure 20: Door Strike wiring connection

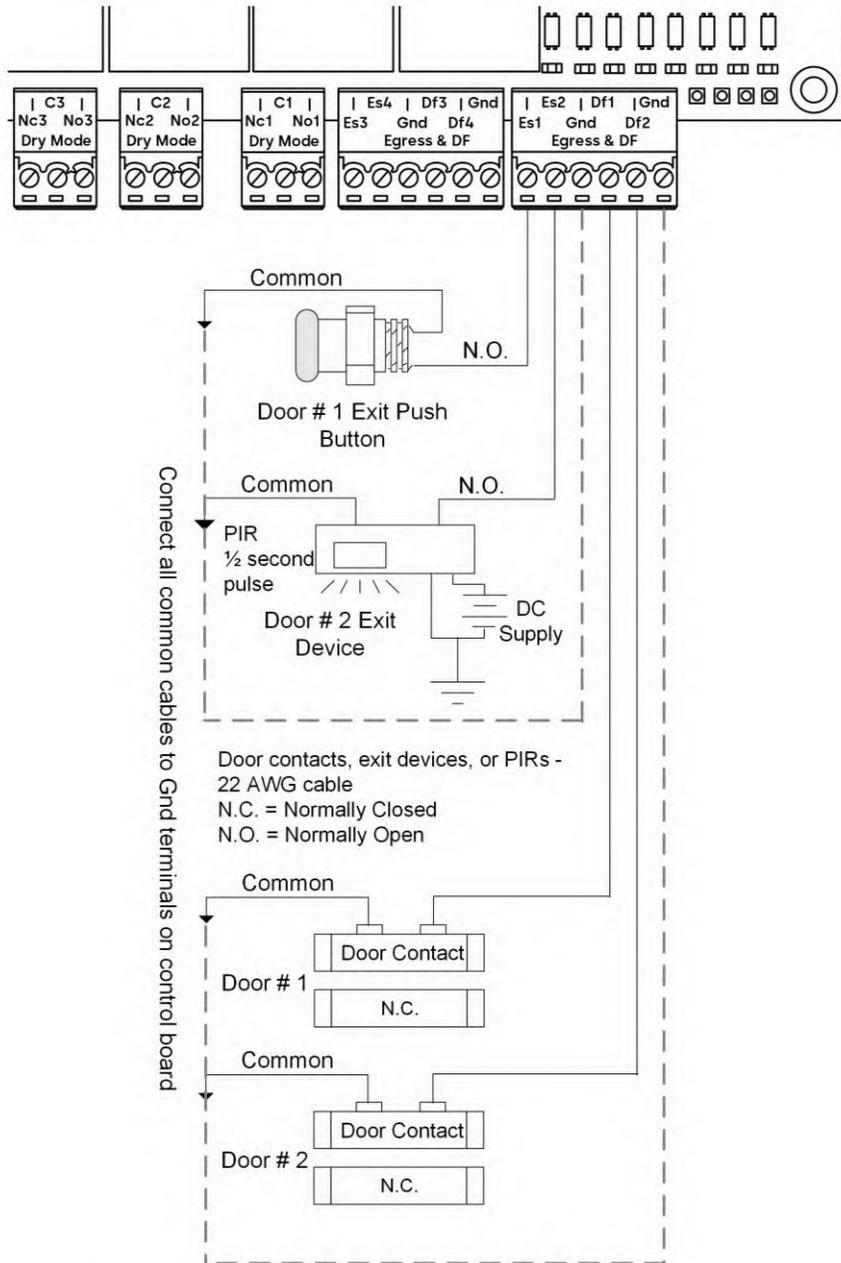
Note: Dry Mode relays 1 and 2 are reserved as Auxiliary Outputs. See [Auxiliary Inputs and Outputs - Connections and Wiring](#) for details.

Egress & Door Feedback – Wiring Examples:

The KC Series panel's "Egress & Door Feedback" terminals allow you to connect Egress/Exit Devices and Door Contacts. See the manufacturer's documentation for mounting instructions of all door hardware.

Door Contact (Df1, Df2) and Egress (Es1, Es2) Connections

Similar connections can be made to Df3/Df4 and Es3/Es4 (KC-4A only)



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Figure 21 – Egress and Door Feedback wiring connections

Auxiliary Inputs and Outputs - Connections and Wiring

The KC Series Access Control Panels have Auxiliary Inputs and Outputs that can be configured for various purposes. Using Aurora software, the Auxiliary Inputs and Outputs can be paired so an Auxiliary Input can be used to activate one of the Auxiliary Outputs.

The chart below shows how the hardware and software names for the panel's auxiliary outputs relate to each other.

Auxiliary Output Naming Conventions (KC2-A, KC-4A)	
Name On Terminal Block	Name in Software
"Aux-Output Op1"	Auxiliary Output # 1
"Aux-Output Op2"	Auxiliary Output # 2
"Aux-Output Op3"	Auxiliary Output # 3
"Aux-Output Op4"	Auxiliary Output # 4
"NC" (Nc5, C5, No5)	Auxiliary Output # 5
"NC" (Nc6, C6, No6)	Auxiliary Output # 6

Auxiliary Output Connections (Op1-Op4)

- When Inactive, the Aux-Outputs will be ON (3 to 5V output).
- When Active, the Aux-Outputs will be OFF (GND).

The wiring of the Auxiliary Inputs will depend on the state of the AUX-IN Grounding Jumpers (J12, J13, J40, J41) as shown in the [KC Series Access Control Panel Jumpers](#) chart.

Auxiliary Output Connections – Relay Outputs

- The two "NC" terminal blocks can be assigned as Auxiliary Outputs #5 and #6
- These dry relay contacts are as follows:
 - NC = Normally-closed contacts
 - C = Common
 - NO = Normally-open contacts
- Auxiliary Output relays can connect to alarm panels, CCTV systems, etc.

Auxiliary Input Connections (In1-In4) – AUX-IN Grounding Jumpers ON

- To Activate an Aux-Input, apply 3.3 to 12V DC to the **In+** terminal, and connect the **In-** terminal to Ground (GND) via the AUX-IN Grounding Jumpers.
 - J12 grounds In1-
 - J13 grounds In2-
 - J40 grounds In3-
 - J41 grounds In4-
- The 3.3-12Vdc activation voltage can come from some external circuit triggered by a door contact, switch, pushbutton, etc.
- See the manufacturer's documentation for mounting instructions of all input devices.

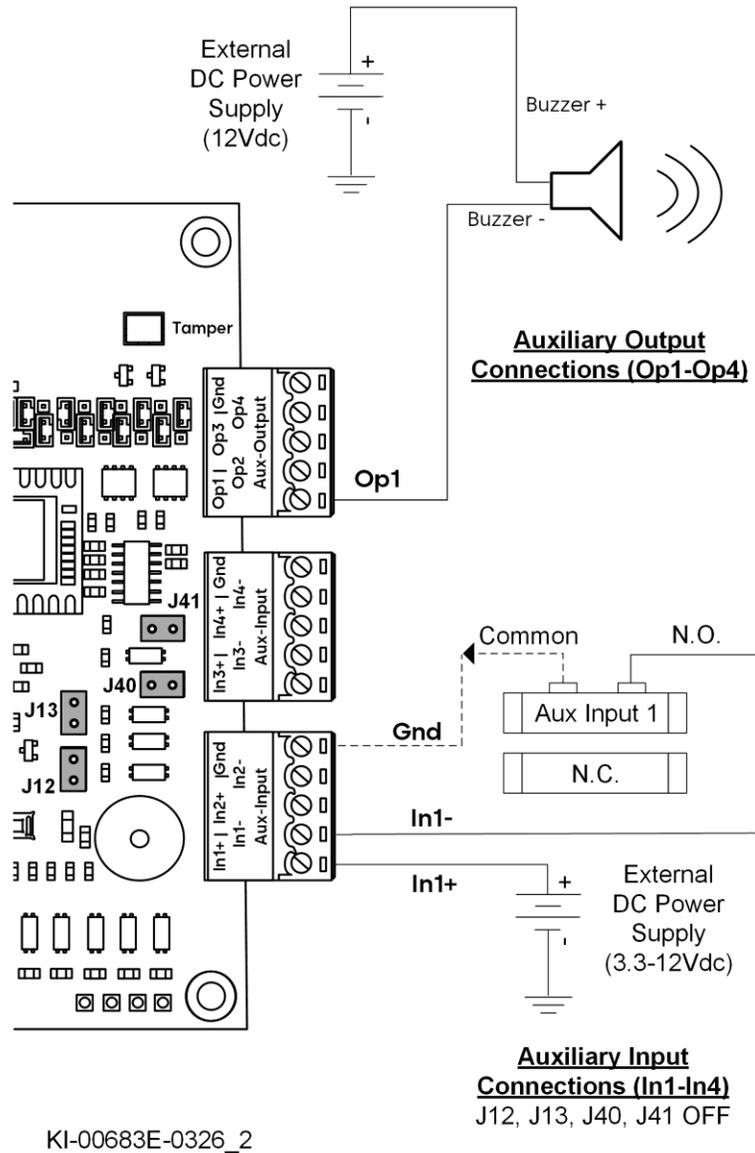


Figure 23 - Auxiliary I/O Connections (AUX-In Ground Jumpers OFF)

In the example from Figure 23, Aurora software is used to pair Auxiliary Input #1 with Auxiliary Output #1. With a 3.3-12Vdc signal at In+, the In- terminal is grounded when the Aux Input 1 contacts are closed, activating the Auxiliary Input. Since Auxiliary Output #1 is paired to this input, the Op1 pin will be grounded and the buzzer will sound.



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