Operator Manual

CANX D88/D8R8

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Introduction

Presentation

The CANX is an all-in-one module with 8 digital inputs and 8 digital or relay outputs, designed to operate in CANopen with CRE TECHNOLOGY controllers.

Thanks to its all-in-one design, it allows quick installation and configuration of a digital input and digital or relay output extension for your system. Moreover, it features an expanded power supply range of 18-36VDC with voltage dip management, ensuring reliable operation even in challenging environments.

Model Variants

The CANX is available in two model variants to cater to different connectivity needs:

- **CANX D88:** 8 digital inputs (PNP or NPN, this depends on whether you connect the COM terminal to 24 VDC or to 0 VDC) and 8 digital outputs (PNP).
- **CANX D8R8:** 8 digital inputs (PNP or NPN, this depends on whether you connect the COM terminal to 24 VDC or to 0 VDC) and 8 relay outputs.

Compatibility

The CANX is compatible with all firmware version of CRE TECHNOLOGY COMPACT controllers.

Starting firmware 26.XX of CRE TECHNOLOGY COMPACT controllers, you can select a preset configuration using i4Gen Suite 2, i4Gen 2 or i4Gen Box to automatically setup the number or digital inputs/outputs and analog outputs of a coupler. The ID still needs to be set as it may vary according to your needs.

User's Notice

This manual contains all the information required for the use of this product to meet the user's requirements. It may change or be corrected at any time without notice.

The manufacturer provides this manual "as is" without warranty of any kind, and will not be liable for any indirect, special, incidental or consequential damages (including damages for loss of profit, loss of business, loss of use of data, interruption of business and the like).

Products and corporate names appearing in this manual may or may not be registered trademarks or copyrights of their respective companies. They are used only for identification or explanation and to the owner's benefit, without intent to infringe.

Safety Recommendations

Operate the device according to the correct installation steps and with great care to guarantee safety and comfort using experience. Please refer to the following safety instructions guide to avoid the danger of electric shock or fire and to use and maintain the product to make sure of a safe operating environment.

General Safety Instructions

Please follow the instructions manual for the operation guide.

Make sure to use the device in the appropriate operation temperature and humidity range.

To avoid high temperature, please DO NOT overload the maximum power of the external power supply while the system is consuming high voltage. Be aware of the maximum temperature allowance of the power supply.

Always unplug the power cable and other hardware cables from the system before cleaning.

Use only a dry cloth to clean the product.

Precautions During Operation

Make sure that there is no heat source nearby when the product is working.

Make sure to set up or use the product on a stable surface.

Make sure not to drop the product or strike it in any way.

Make sure not to move the product when the power is on.

Installation and Maintenance

Disconnect the power cables from the CANX unit prior to any installation. Be sure both the system and all external devices are turned off.

Do not open the system's front cover.

Package Contents

Figure 1. A CANX

Figure 2. A Pluggable Terminal Block

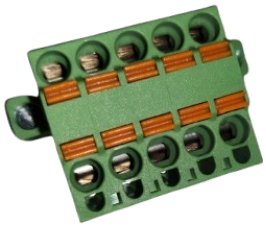


Figure 3. A 120 ohms resistor

Environmental Protection Announcement

Do not dispose of this electronic device into the trash while discarding. To minimize pollution and ensure utmost protection for the global environment, please use a WEEE compliant recycling company.

Figure 4. Environment Protection Announcement

Usage

Specifications

Case	
Case Material	ABS + PC
Color	Dark Slate Gray

LEDs	
Indicator	Green RUN LED Light
Power Supply Indicator	Green PWR LED Light
Misindication/Malfunction	Red ERR LED Light

Power	
Power Input	18-36 VDC
Consumption when powered at 24 VDC	38 mA

Communication Bus	
Bus Protocol	CANopen
Interface Port Type	Wiring Terminal
Interface Port Mode	Shielded Twisted Pair
Communication Rate	10 ~ 1000 kb/s (125 ~ 1000 kb/s if used with COMPACT controllers)
Communication Distance	5000m for 10kb/s 500m for 125kb/s 40m for 1000kb/s
Electrical Isolation	Yes

Digital Inputs (CANX D88/CANX D8R8)	
Signal Type	PNP or NPN, this depends on whether you connect the COM terminal to 24 VDC or to 0 VDC
NPN Signal Electrical Level	0-5 VDC
PNP Signal Electrical Level	15-30 VDC
Single-channel Current Consumption	5 mA
Port Protection	Over-voltage Shock Protection
Electrical Isolation	500 VAC

Digital Outputs (CANX D88)	
Signal Type	Transistor (PNP)
Rated Electrical	24 VDC (18-36 VDC)
Single-channel Rated Current	Max: 0.5 A (Total Output Current of 8 Channels at the same time: 2 A)
Port Protection	Over-voltage and Over-current Protection
Electrical Isolation	500 VAC

Relay Outputs (CANX D8R8)	
Signal Type	Relay
Rated Electrical	250 VAC / 30 VDC
Single-channel Rated Current	5 A
Port Protection	Over-voltage and Over-current Protection
Electrical Isolation	500 VAC

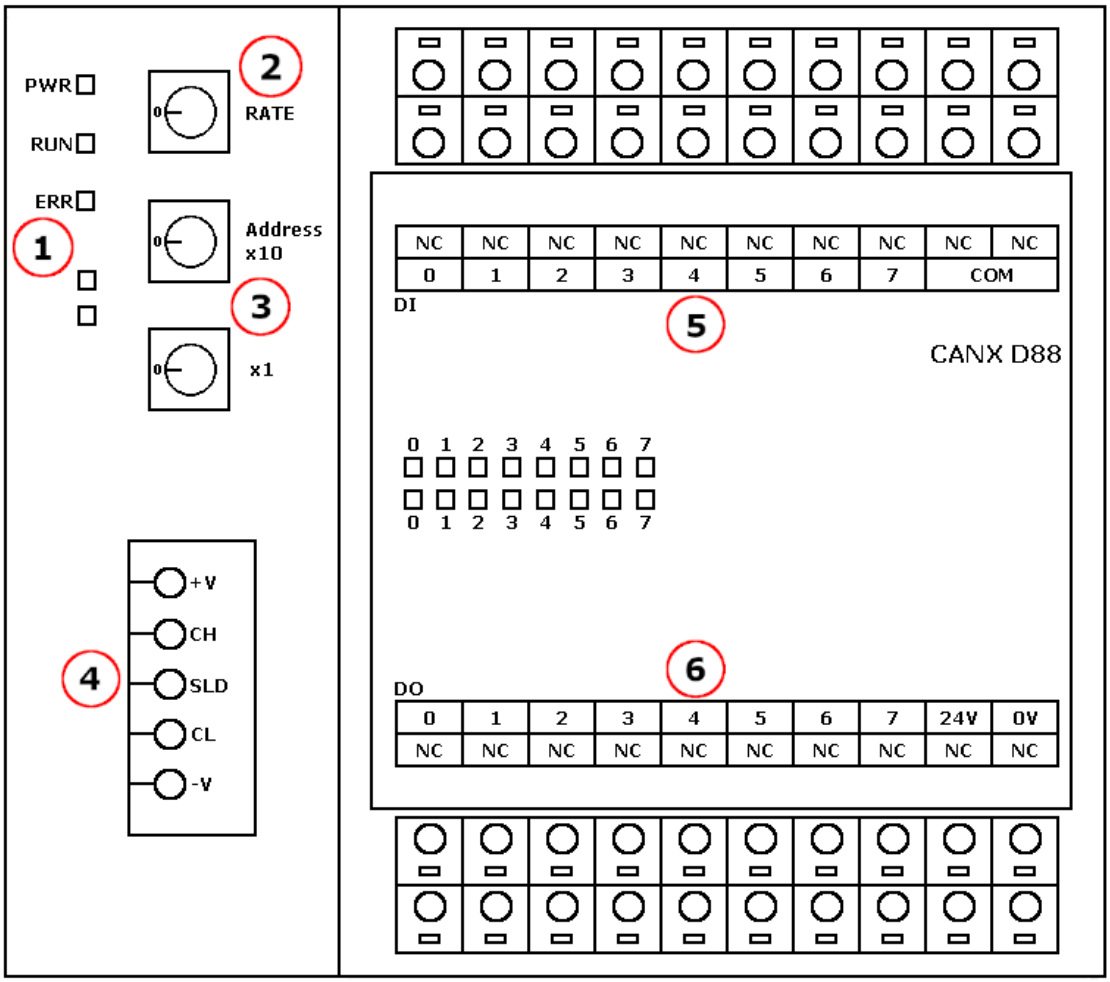
Dimensions	
Case Dimensions	90 * 100 * 45.4 mm (3.54 × 3.94 × 1.79 in)

Certifications	
Certifications	CE RoHS IP20

Environment	
Temperature	Working Temperature: -10°C ~ 60°C Storing Temperature: -25°C ~ 85°C
Humidity	Max: 95% (non condensing)

LEDs, Step Selectors, Ports and Inputs/Outputs

Figure 5. Diagram of a CANX



1. **LED Indicators:** The device includes five LED indicators (only 3 are used) providing essential status information:

PWR

Connection status	LED status
The power supply is disconnected or faulty	Off
The module is powered	On/Steady green

RUN

Connection status	LED status
The module enters the initialization state	Off
The module enters the operation stop state	1 Flash green Long Off
The module enters pre-operationstate	5HZ Flash green
The module is in operating state thus the communication is operating	On/Steady green

ERR

Connection status	LED status
The module is in running state	Off
Module failure	On/Steady red

2. **Baud Rate Settings:** The device include a step selector to set the Baud Rate speed for the CANopen communication bus:

Setting number	Baud Rate speed
0	10 kb/s
1	20 kb/s
2	50 kb/s
3	100 kb/s
4	125 kb/s
5	250 kb/s
6	500 kb/s
7	1000 kb/s

Note: If used with a CRE TECHNOLOGY controllers, only settings 4 to 7 are compatible (4 being the default settings).

3. **Address/ID Number Settings:** The device include two step selector to set the Address/ID for the CANopen communication bus. Its allows you to set an Address/ID from 0 to 99.

Important: The value 0 is used to broadcast to all nodes thus it is not a valid address/ID according to CANopen standard. Do not use it

4. **Pluggable Terminal Block:** The device has a Pluggable Terminal Block, with each output duplicated, used to power it and connect it to the CANopen bus:

Signal	Signal definition
+V	Positive pole of power supply
CH	Data signal positive
SLD	Shielded wire
CL	Data signal negative
-V	Negative pole of power supply

Note: If the module is the only one or the last on the CANopen bus, don't forget to add a 120-ohm resistor (supplied with the module in its packaging) between terminals CH and CL.

5. **Digital Input Ports:** These are the input ports for information transfer, including the COM port that allows you to use the digital inputs as PNP or NPN mode, depends on whether you connect the COM terminal to 24 VDC or to 0 VDC. For detailed information, refer to the Digital Inputs *(on page 12)* chapter.
6. **Digital Output Ports (CANX D88)/Relay Output Ports (CANX D8R8):** These are the output ports for information transfer, including the 24V and 0V ports that allows you to use the digital outputs as PNP

mode or put the voltage you want to control if you have the relay outputs. For detailed information on the digital/relay output ports, refer to the corresponding chapters: Digital Outputs (CANX D88) *(on page 16)* and Relay Outputs (CANX D8R8) *(on page 19)*.

Wiring

Tool: insulated screwdriver Ø1.5 mm (0.04 in), tightening torque: 0.8 Nm (7 lb-in) max.
Accessories: 2 & 5-terminal cable connectors, protective gloves, carpet if the floor is wet.

⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION OR ARCING
Failure to follow these recommendations may result in death or serious injury.

- The module may only be installed and maintained by qualified electricians.
- Use personal protective equipment (PPE).
- Follow good safety practices for electrical work.
- Turn off the power before installing or replacing a fuse, and before installing the module.
- Use equipment adapted to check the absence of voltage.
- Do not use a resettable fuse.

General procedure

1. Make sure the cable connectors are not plugged in.
2. Take on protective gloves.
3. Connect the wires on each cable connector in accordance with the National Wiring Regulations.
4. Plug each cable connector onto the related connector.

Recommandations

Wires section: 1.5mm²(AWG15).

To avoid ElectroMagnetic Interferences, shield cables appropriately.

For the CAN bus wiring, see the CAN bus good practices *(on page 29)* chapter for detailed informations.

Digital Inputs

Overview

The CANX features eight digital inputs that allow the device to display data from external digital signals. They can be used to display statuses from various external sources.

The digital inputs could be used as PNP or NPN mode, depends on whether you connect the COM terminal to 24 VDC or to 0 VDC.

The digital inputs have Over-voltage Shock Protection and have an Electrical Isolation up to 500 VAC.

Specifications

Each digital input on the CANX can be set independently. Low/high states can be inverted if necessary. This flexibility supports integration with a broad range of external devices, such as sensors and switches.

Usage Examples

The digital inputs can be utilized for various display purposes, including:

- Monitoring the status of industrial processes via sensor inputs.
- Displaying the operational states of machinery and equipment.
- Visualizing safety signals or alerts as part of compliance monitoring.

How to connect digital sensors

You can use 1 or 2-wire digital sensors.

Figure 6. Digital sensor 2 wires

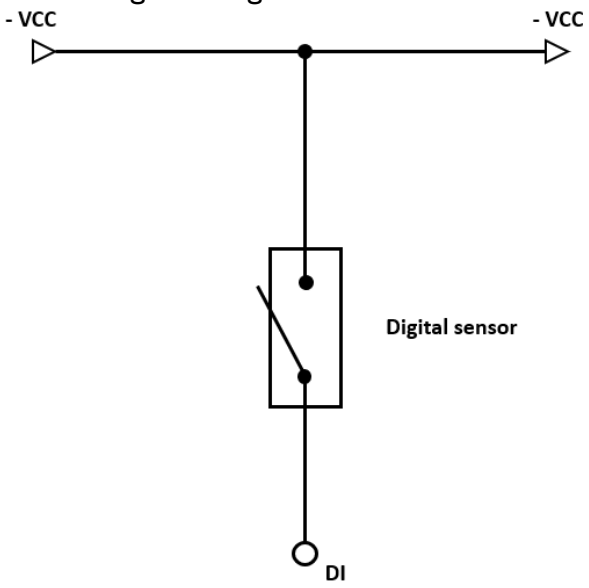
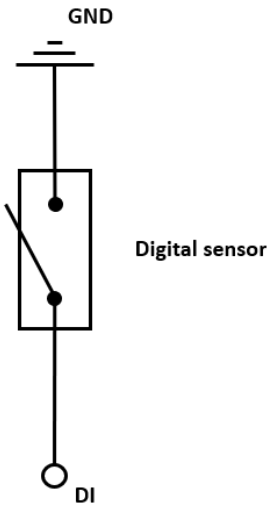


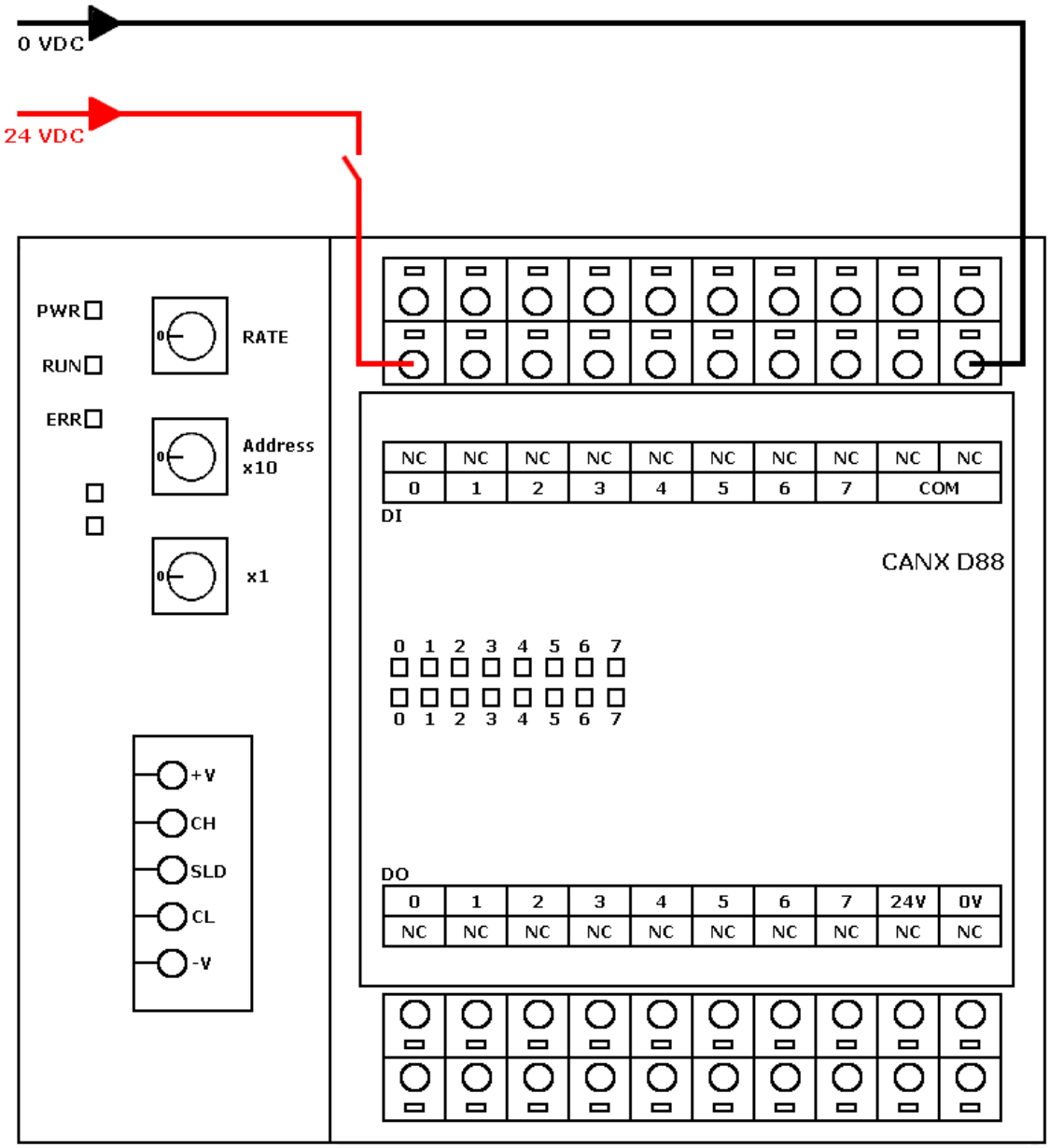
Figure 7. Digital sensor 1 wire



Digital input channel PNP Signal wiring diagram

You can use 1 or 2-wire digital sensors.

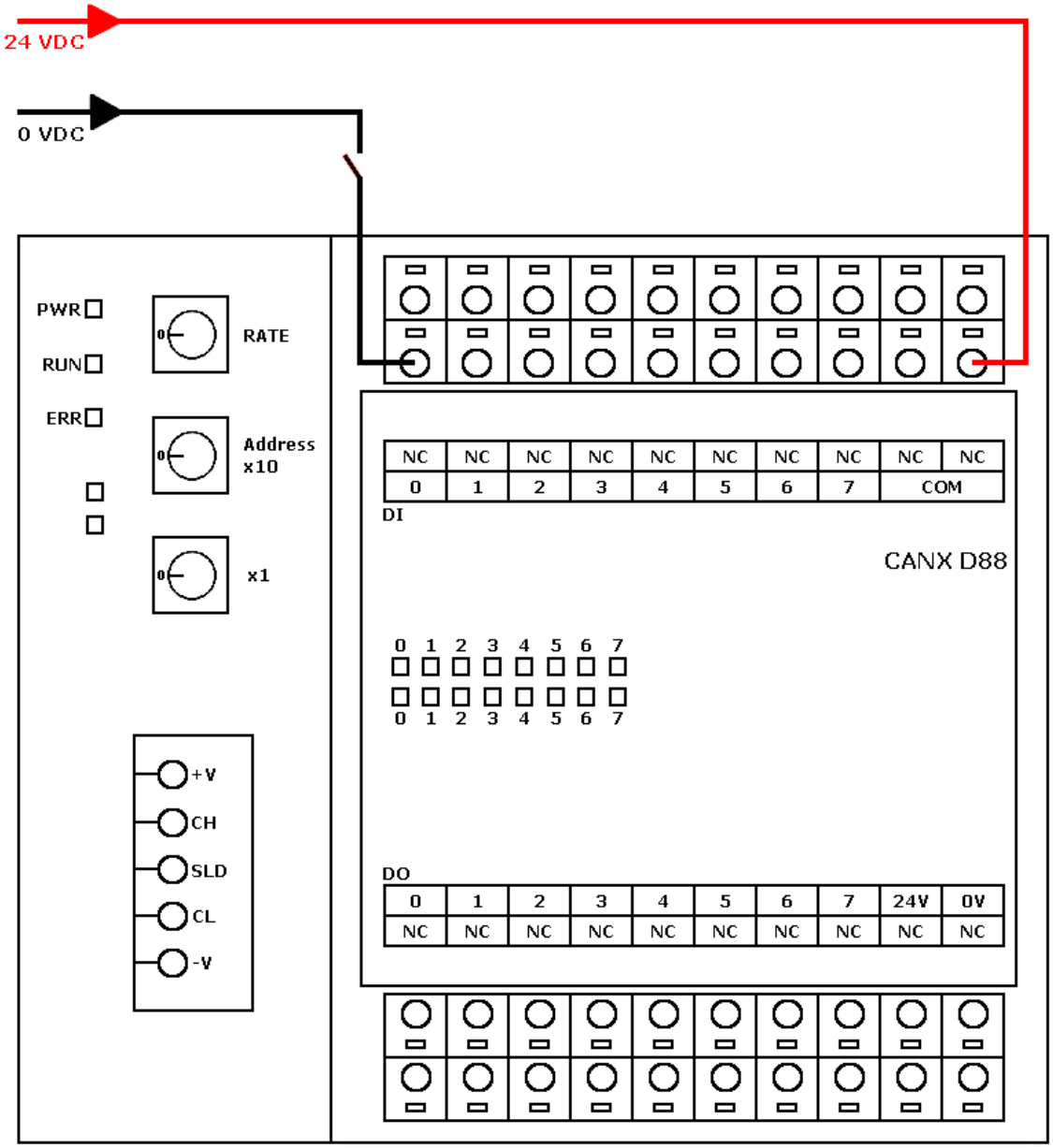
Figure 8. Digital input channels PNP connection



Digital input channel NPN Signal wiring diagram

You can use 1 or 2-wire digital sensors.

Figure 9. Digital input channels NPN connection



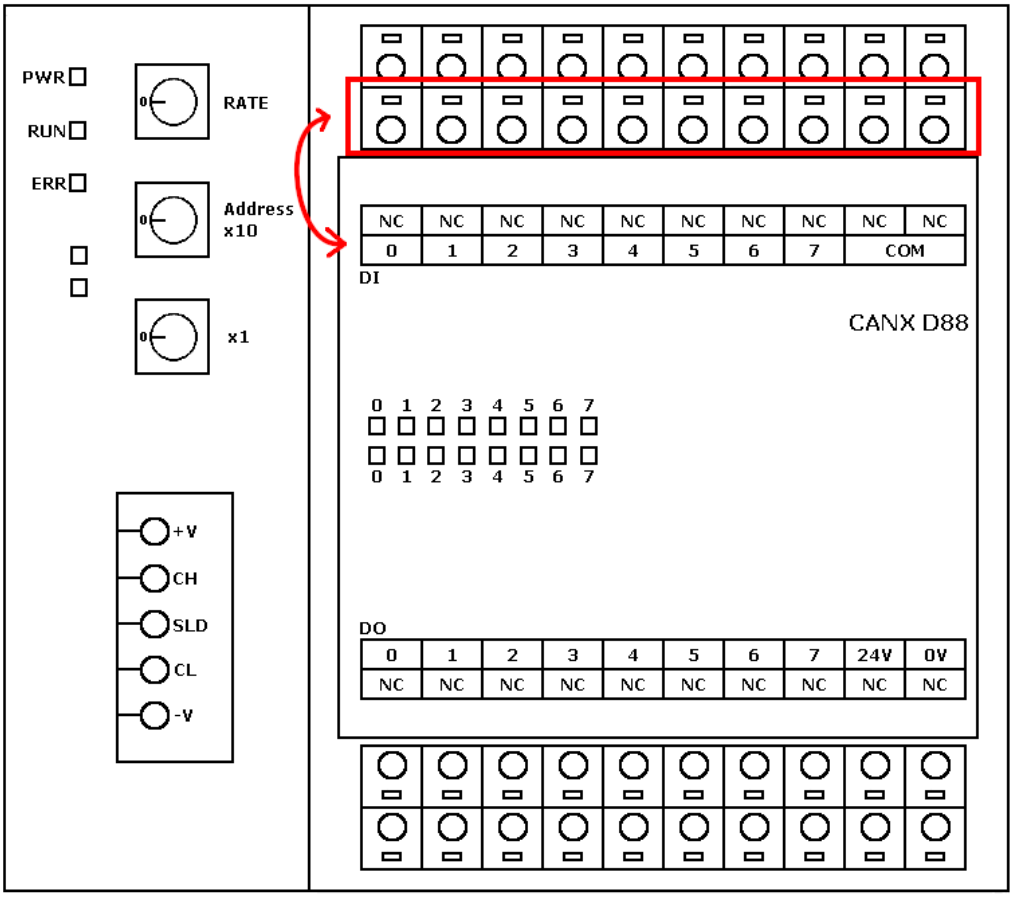
Configuration

To configure the digital inputs:

1. Determine the source of the digital signal (e.g., a sensor or manual switch).
2. Ensure that the signal specifications match the CANX input requirements (e.g. voltage levels).

3. Connect the digital signal source to the designated input ports on the CANX.

Figure 10. Digital Inputs Location



Troubleshooting

If issues arise with digital inputs, consider the following steps:

- Check the connections for any loose wires or poor contacts.
- Verify the electrical specifications of the connected devices to ensure compatibility.
- Check that the associated LED is on/off according to its input state on the CANX module.

Digital Outputs (CANX D88)

Overview

The CANX D88 is equipped with eight digital outputs which are specifically designed to send digital signals to external devices based on your needs through settings. These outputs allow users to control various devices or systems in an industrial setting, serving as a manual interface for automation and control processes. They are automatically managed by the module once settings is done; CRE TECHNOLOGY controllers will automatically manage them providing an intuitive and direct method to interact with connected systems.

The digital outputs (max: 0.5 A, total Output Current of 8 Channels at the same time: 2 A) have Over-voltage and Over-current Protection, could support a reactive load and have an Electrical Isolation up to 500 VAC.

Specifications

Each digital output can be set independently. Low/high states can be inverted if necessary. It can control a wide variety of relays or any binary driven systems.

Usage Examples

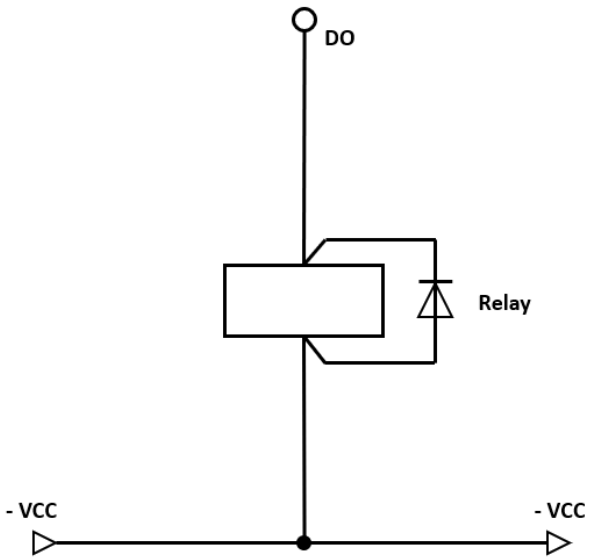
Digital outputs are typically used for manually controlling:

- Controlling lights or indicators.
- Sirens, bells, or other audible alarms in response to user-triggered conditions.
- Relays or other switching mechanisms to start or stop machinery upon manual command.

How to connect a relay

You can use a relay with a freewheel diode. If the relay does not have one, it needs to be added to protect the digital output.

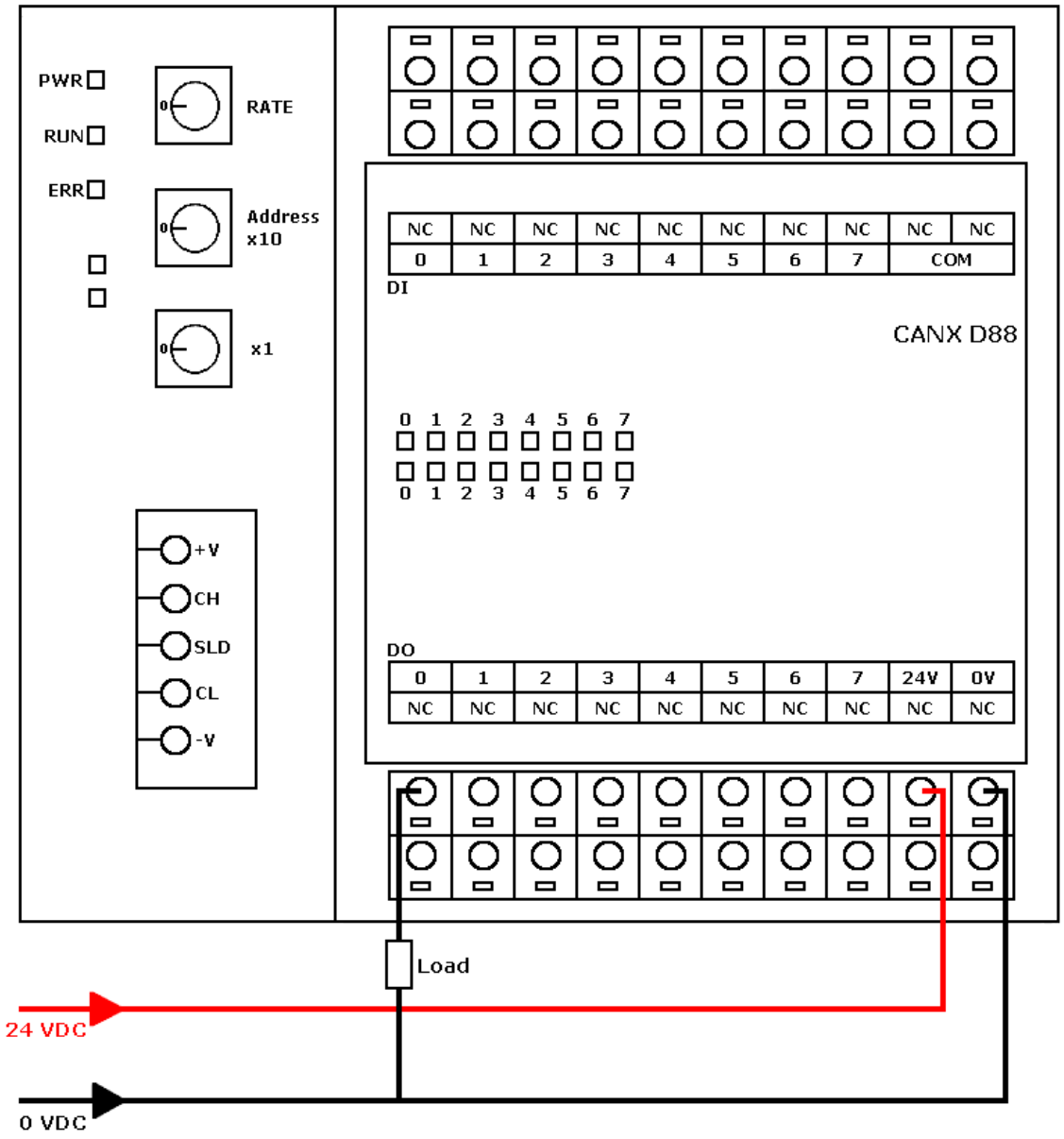
Figure 11. Relay with a freewheel diode



Digital output channel PNP Signal wiring diagram

You can use a relay with a freewheel diode. If the relay does not have one, it needs to be added to protect the digital output.

Figure 12. Digital output channels PNP connection



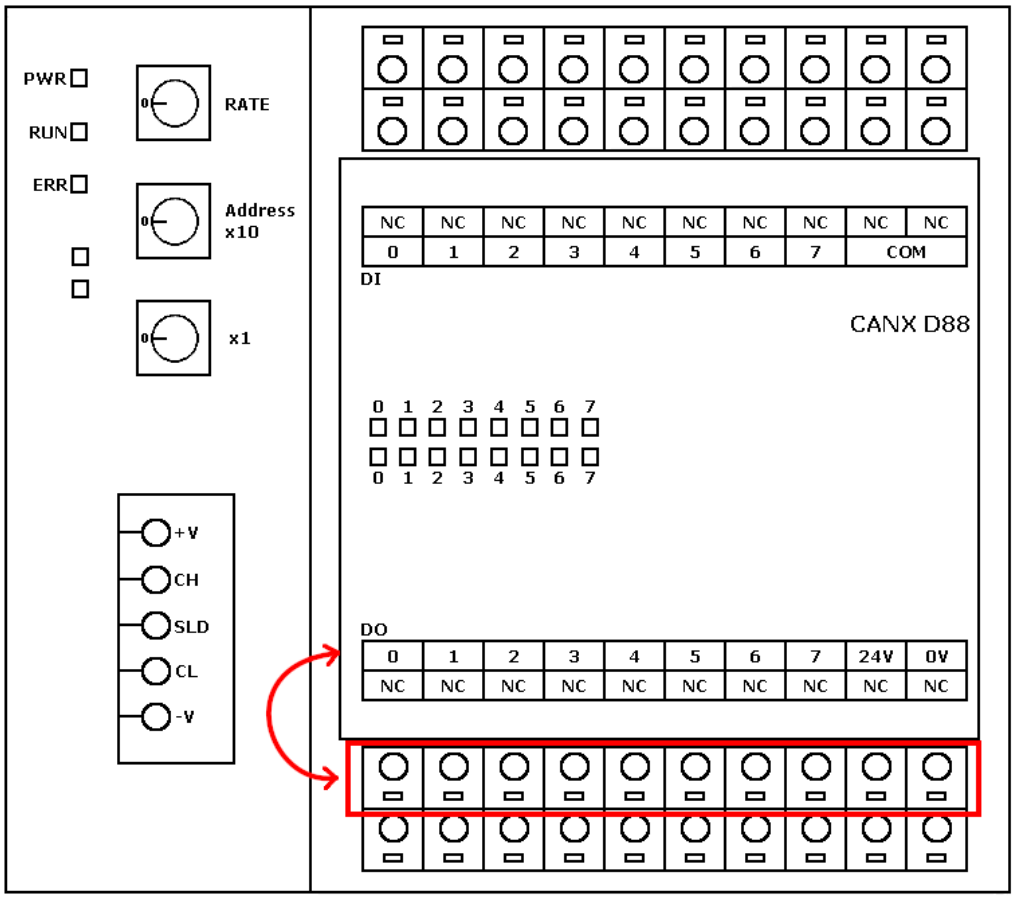
Configuration

To effectively use the digital outputs:

1. Identify the devices or systems that will be controlled by the digital output.
2. Ensure that the connected devices are compatible with the output signal characteristics (voltage and current).

3. Connect the output terminals of the CANX D88 to the input terminals of the device to be controlled.

Figure 13. Digital Outputs Location



Troubleshooting

If you encounter issues with the digital outputs, consider the following troubleshooting steps:

- Verify the connections for any loose wires or incorrect wiring.
- Check the electrical specifications of the output and the connected device to ensure they are compatible and correctly configured.
- Check that the associated LED is on/off according to its output state on the CANX D88 module.

Relay Outputs (CANX D8R8)

Overview

The CANX D8R8 is equipped with eight relay outputs which are specifically designed to send digital signals to external devices based on your needs through settings. These outputs allow users to control various devices or systems in an industrial setting, serving as a manual interface for automation and control processes. They are automatically managed by the module once settings is done; CRE TECHNOLOGY controllers will automatically manage them providing an intuitive and direct method to interact with connected systems.

The relay outputs (max: 250 VAC / 30 VDC, 5 A) have Over-voltage and Over-current Protection, could support a DC or an AC load and have an Electrical Isolation up to 500 VAC.

Specifications

Each relay output can be set independently. Low/high states can be inverted if necessary. It can control a wide variety of any binary driven systems.

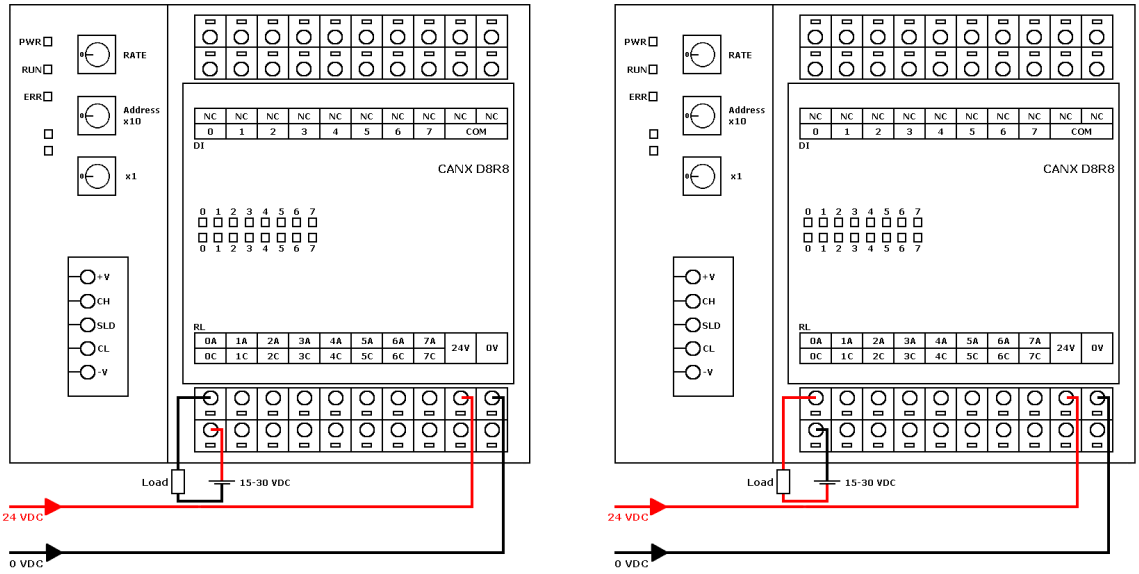
Usage Examples

Relay outputs are typically used for manually controlling:

- Controlling lights or indicators.
- Sirens, bells, or other audible alarms in response to user-triggered conditions.
- Switching mechanisms to start or stop machinery upon manual command.

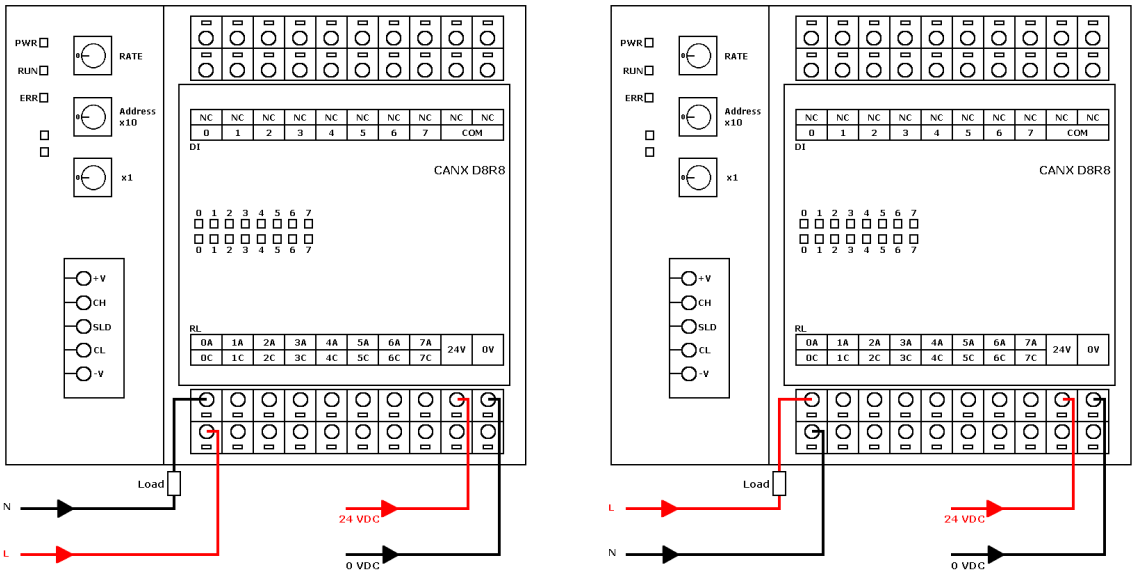
Relay output DC load wiring diagram

Figure 14. Relay output DC load wiring diagram



Relay output AC load wiring diagram

Figure 15. Relay output AC load wiring diagram



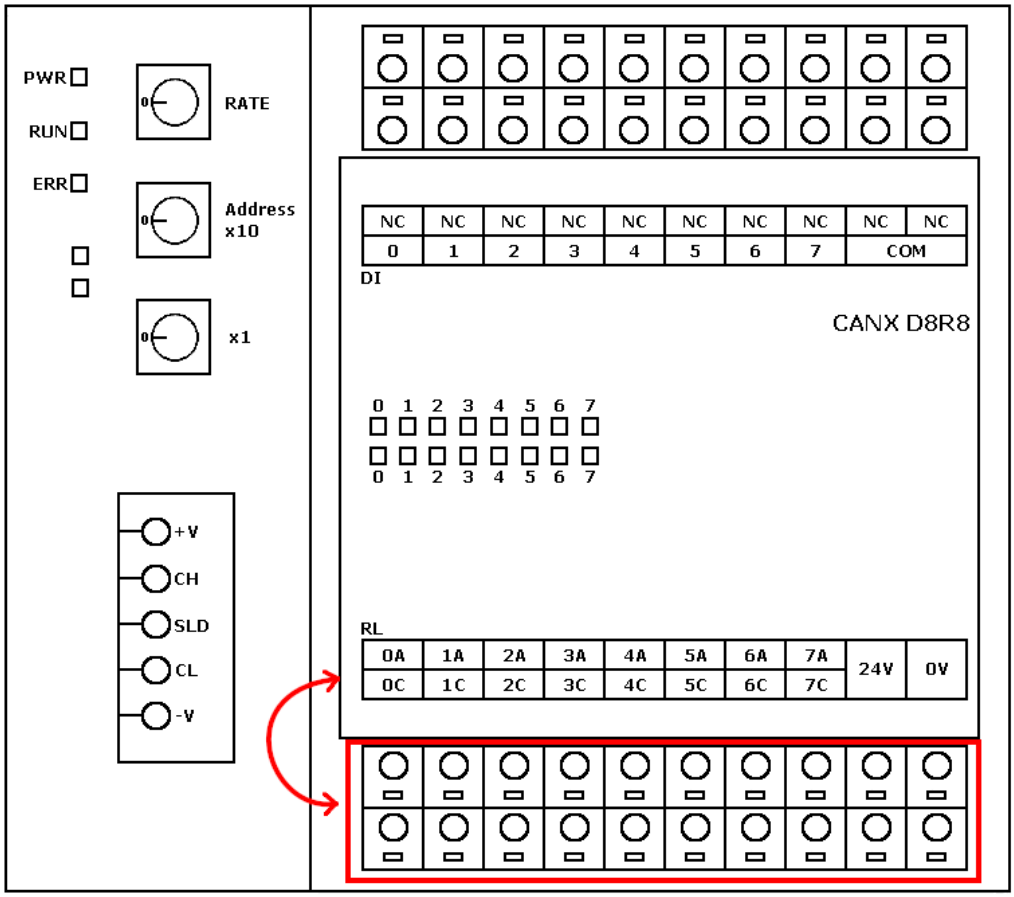
Configuration

To effectively use the relay outputs:

1. Identify the devices or systems that will be controlled by the relay output.
2. Ensure that the connected devices are compatible with the output signal characteristics (voltage and current).

3. Connect the output terminals of the CANX D8R8 to the input terminals of the device to be controlled.

Figure 16. Relay Outputs Location



Troubleshooting

If you encounter issues with the relay outputs, consider the following troubleshooting steps:

- Verify the connections for any loose wires or incorrect wiring.
- Check the electrical specifications of the output and the connected device to ensure they are compatible and correctly configured.
- Check that the associated LED is on/off according to its output state on the CANX D8R8 module.

Power Supply

Overview

The CANX is designed to accept a wide range of DC voltage inputs to accommodate various industrial environments and ensure flexibility in installation and usage.

Specifications

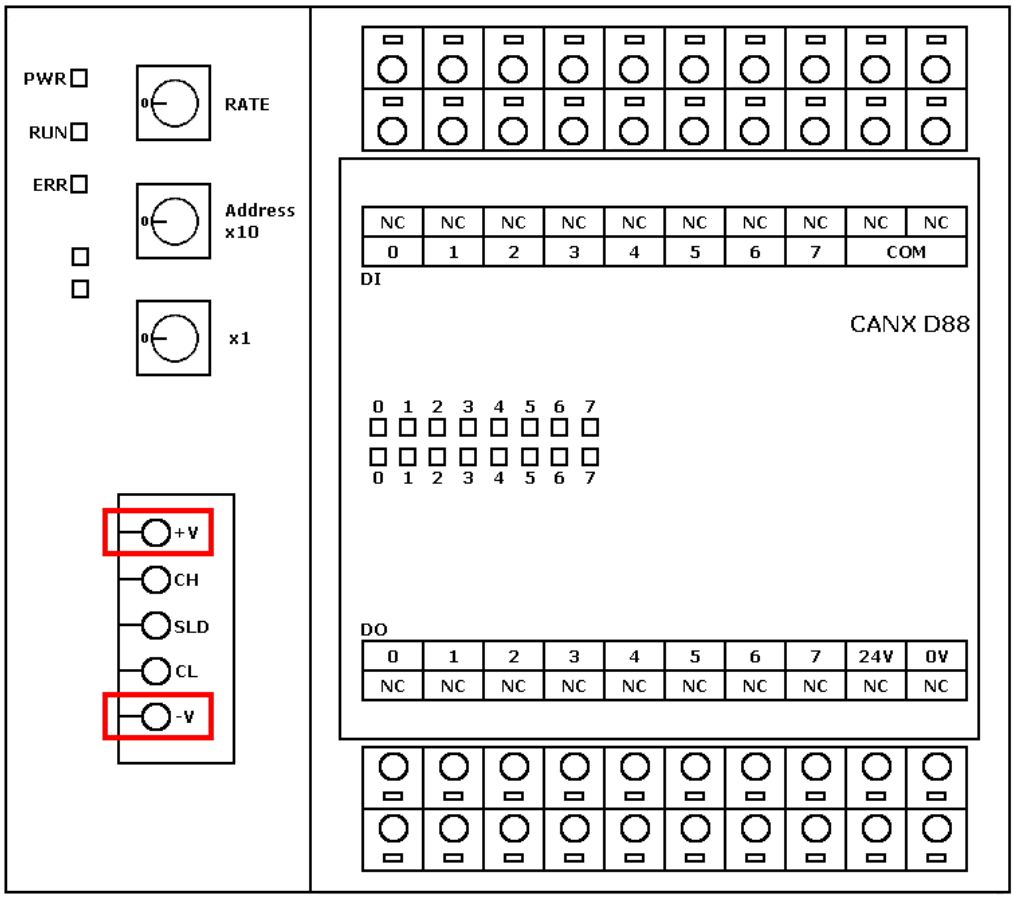
The device supports a DC input voltage range from 18 to 36 VDC. Ensuring that the power source complies with these specifications is critical to prevent damage to the CANX and to maintain optimal functionality.

Connecting the Power Supply

To connect the power supply to the CANX, follow these steps:

1. **Identify the Power Input Terminals:** Locate the clearly marked positive (+V) and negative (-V) terminals on the CANX.

Figure 17. CANX Power Input Terminals



2. **Connect the Power Cables:** Unplug the terminal block from the CANX. Attach the power wires to the proper terminals. Double-check to ensure that the connections are secured and correctly made to avoid electrical faults.

> **Warning:**
> The product does not have a reverse polarity protection. If power wires are inverted, it will be damaged.

3. **Verify the Voltage:** Use a multimeter or similar device to verify that the voltage of the power supply is within the acceptable range (18 to 36 VDC) before proceeding.
4. **Power On:** Once all connections are verified and secure, plug the terminal block to the product and switch on the power. The PWR LED should be lit up.

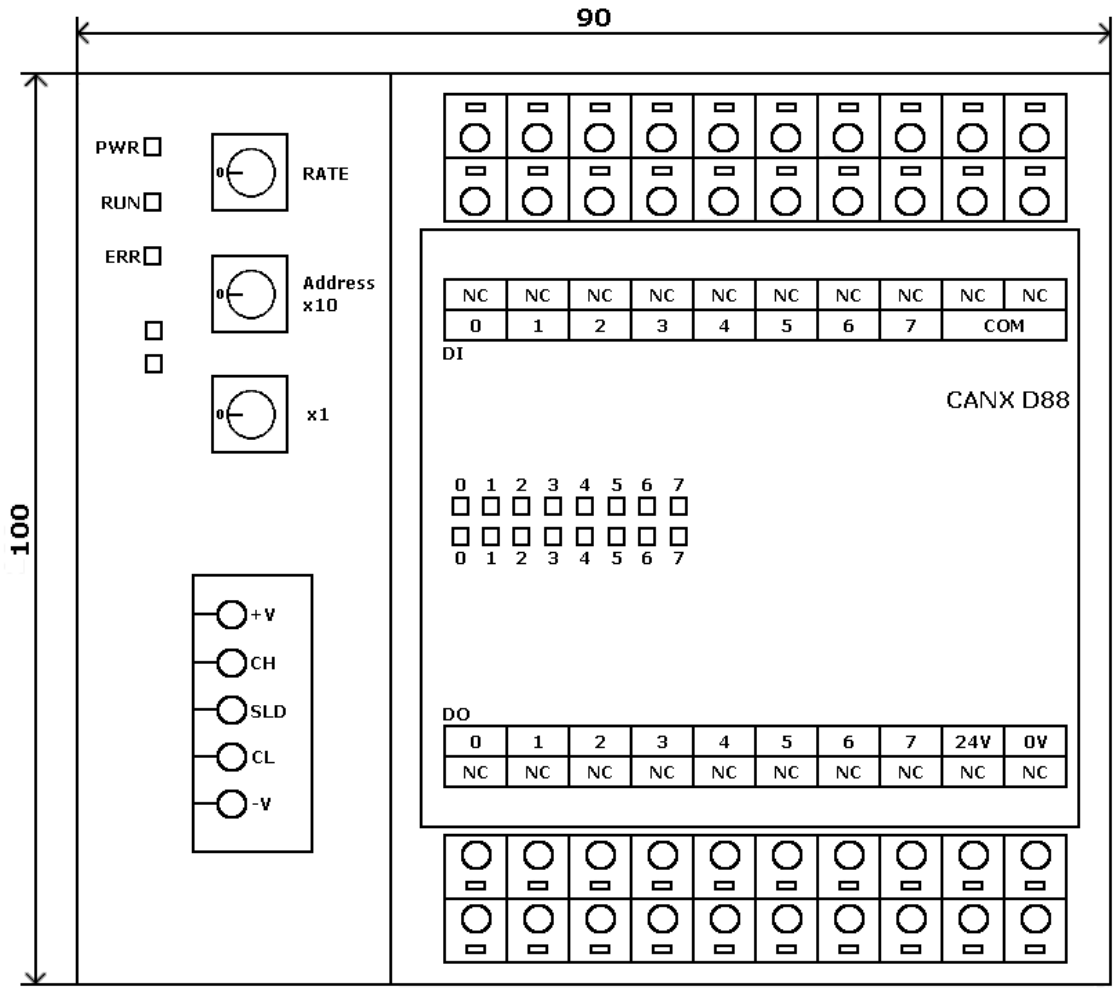
Troubleshooting

If the CANX does not power on or if there are issues during operation, consider the following:

- **Check Connections:** Re-examine all connections to ensure they are tight and correctly placed.
- **Measure Voltage:** Re-measure the voltage supply at the power input terminals to ensure it falls within the specified range and is stable.
- **Inspect for Damage:** Look for any visible signs of damage or wear on the cables and connectors that might affect performance.

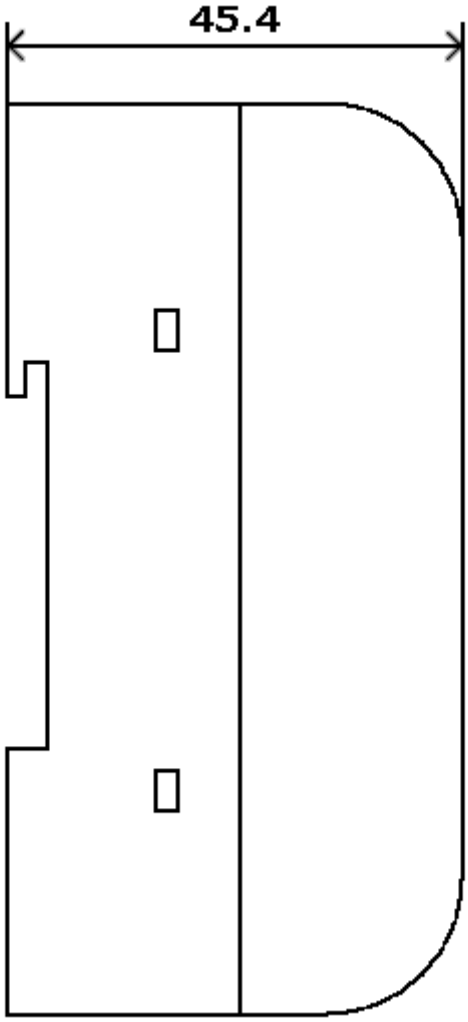
Dimensions

Figure 18. CANX Dimensions - Front View



Note: Measure unit: mm

Figure 19. CANX Dimensions - Side View



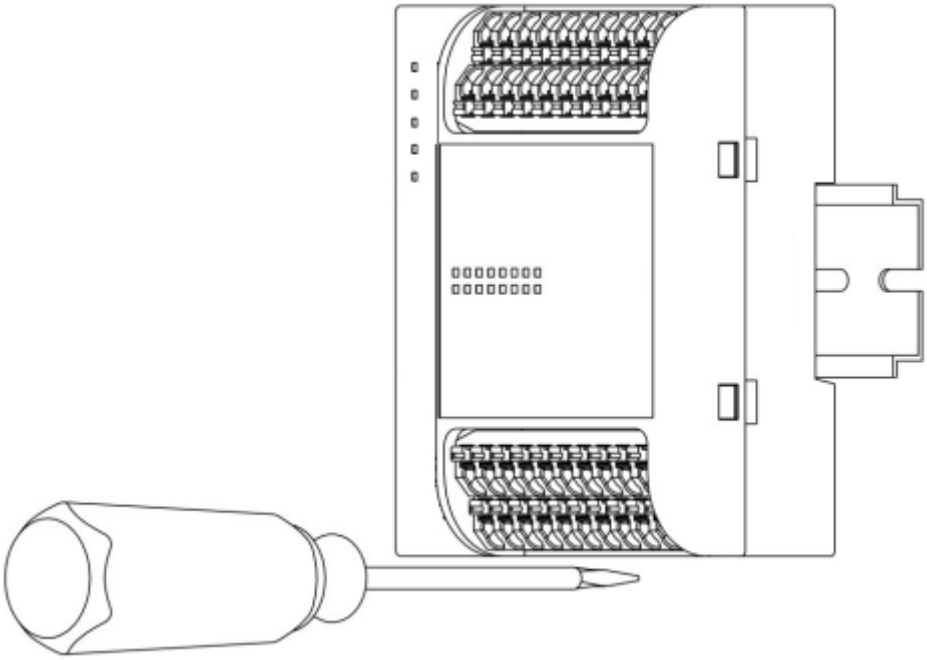
Note: Measure unit: mm

Installation

Mechanical Mounting Installation

1. First, pull out the Rail clip under the CANX module with a flat-head screwdriver.
2. Hang the CANX module on the DIN Rail, use a flat-head screwdriver to push the rail clip at the bottom into place and lock it, as shown in the figure below:

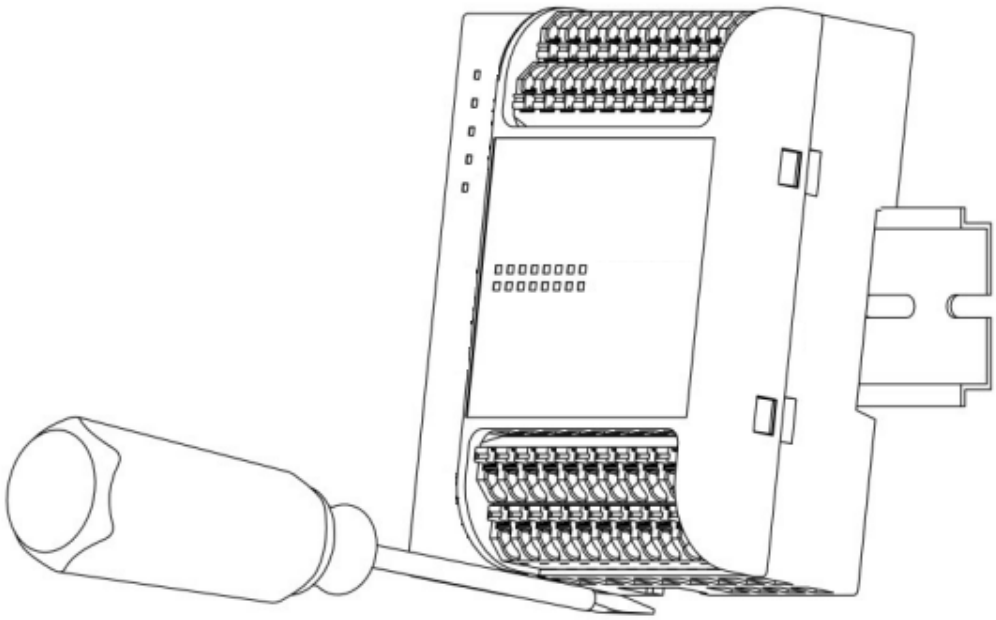
Figure 20. CANX Module Installation



Mechanical Mounting Removal

1. First, pull out the Rail clip under the CANX module with a flat-head screwdriver.
2. Gently pull the module CANX out the DIN Rail until it forms an angle with the DIN Rail, and then pushes the module out of the DIN Rail, as shown in the figure below:

Figure 21. CANX Module Removal



CAN bus good practices

This chapter describes rules to be used to ensure reliable CAN communication. These rules must be applied to all CAN protocol communications, including the **CRE-Link®** protocol and the ECU/remote I/O CAN bus. **CRE TECHNOLOGY** recommends to always use a shielded cable to connect CAN bus.

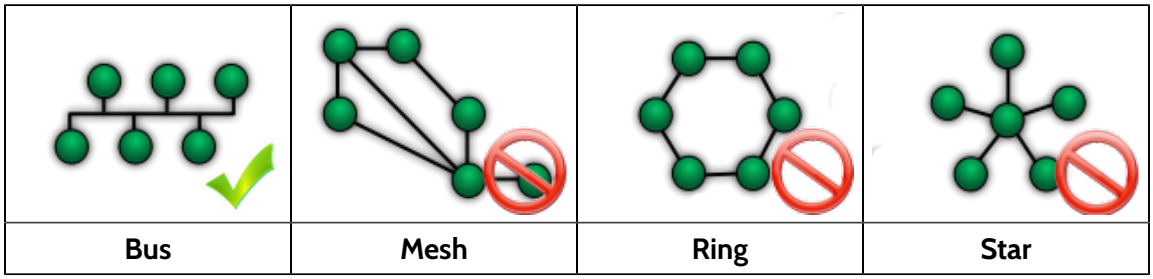
Cables

⚠ WARNING

RISK OF EQUIPMENT DAMAGE
Failure to follow this instruction can damage the CAN transmitter/receiver.
Switch off the unit before plugging or unplugging the CAN bus connector or disconnecting the wires.

Cables used must be selected to respond to CAN bus specificities. Always use shielded twisted wire pairs. Deploy the CAN bus (no mesh, ring or star topology) as shown below:

Figure 22. CAN bus accepted wiring topologies



Both ends of the CAN bus must be terminated with a 120Ω resistor. The module has a 120Ω resistor for this purpose. Wiring the terminal RES to CAN H will link CAN L and CAN H with a resistor.

The next figure gives the example of three units connected through a CAN bus. Do NOT install any resistor nor link the terminal RES and CAN H together in the middle unit.

Figure 23. CAN bus wiring example between a GENSYS COMPACT, a CANX module and an ECU

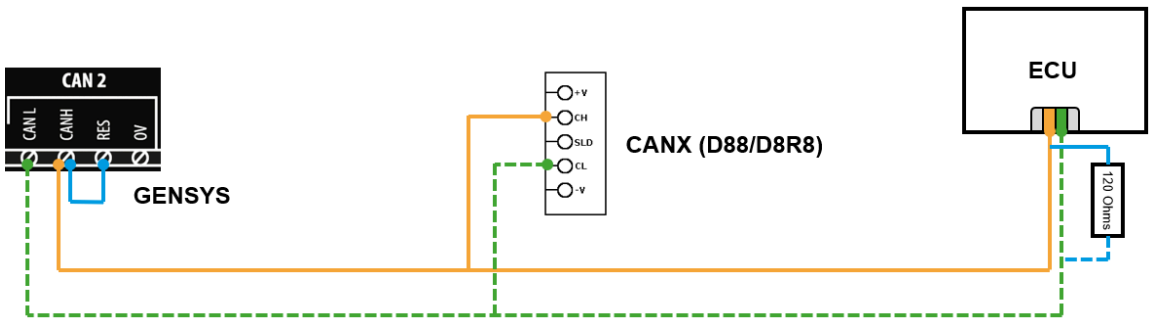
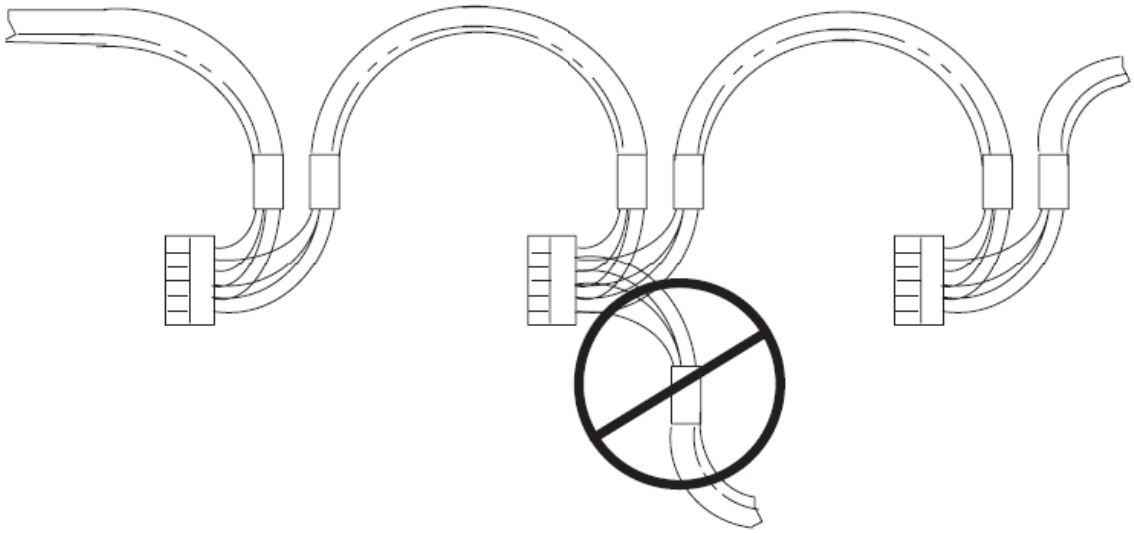
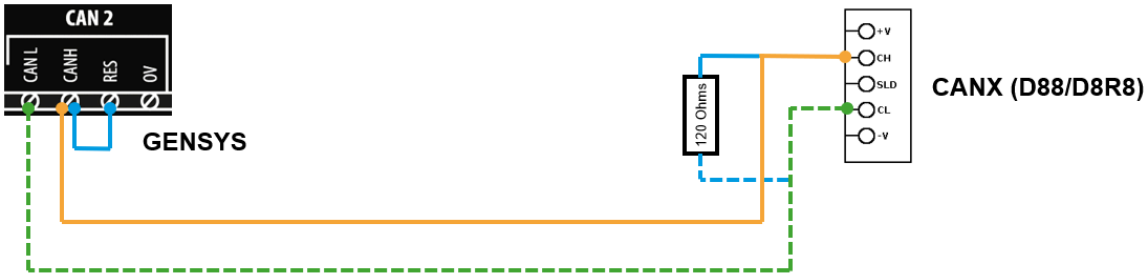


Figure 24. Wrong placement of the termination resistor on the CAN bus if more than two units



The next figure gives the example of two units connected through a CAN bus.

Figure 25. CAN bus wiring example between a GENSYS COMPACT and a CANX module



⚠ WARNING

RISK OF EQUIPMENT DAMAGE

Failure to follow this instruction may damage the CAN transmitter/receiver and the controller itself.

Do not, in any cases, connect the "0V" pin to the "-" pin of the power supply.

Note: CRE TECHNOLOGY provides a complete range of products aimed at installing your CAN bus (cords, wires, connectors...). Please contact your local **CRE TECHNOLOGY** distributor to help you to choose equipment that fits your needs.

Maximum length and bit rate

The maximal length of a CAN bus depends mostly on the communication speed, but also on the quality of wires and connectors used.

The following table shows the maximal length of a CAN bus depending on the bit rate:

Bit rate (kbit/s)	Maximal length (m)
10	5000
20	2500
50	1000
125	500
250	250
500	100
1000	40

The next table lists the standard bit rate of each CAN protocol that can be used by a **CRE TECHNOLOGY** unit:

Bus	Protocol	Bit rate (kbit/s)	Note
CAN1	**CRE-Link®** **(1)** CANopen (if MTU MDEC protocol selected on CAN2)	125	125 kbit/s recommended. Can be changed using parameter [3050].
CAN2	J1939 / MTU MDEC	250 for J1939 125 for MTU MDEC	Switches automatically to the right speed when selecting an ECU protocol with the parameter [3118].
	CANopen (if MTU MDEC protocol not selected)	125 (default)	Fixed to 250 kbit/s if J1939 is selected. Otherwise can be selected between 125/250/500/1000 kbit/s (using i4Gen Suite 2, i4Gen 2 or i4Gen Box or modification by variable number).

(1) On all CRE TECHNOLOGY controllers except the AMF COMPACT and the GENSYS COMPACT MAINS.

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130 Allée Charles-Victor Naudin, Sophia Antipolis, 06410 Biot, France

+33 (0)4 92 38 86 82 / +33 (0)4 92 38 86 86

info@cretechnology.com / support@cretechnology.com

Business Hours:
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