PACSystems™ RX3i
CANopen Master Module
(IC695CNM001)

EMERSON.

Contents

Warning Notes as Used in this Publication

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Note: Notes merely call attention to information that is especially significant to understanding and operating the equipment.

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met during installation, operation, and maintenance. The information is supplied for informational purposes only, and Emerson makes no warranty as to the accuracy of the information included herein. Changes, modifications, and/or improvements to equipment and specifications are made periodically and these changes may or may not be reflected herein. It is understood that Emerson may make changes, modifications, or improvements to the equipment referenced herein or to the document itself at any time. This document is intended for trained personnel familiar with the Emerson products referenced herein.

Emerson may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not provide any license whatsoever to any of these patents.

Emerson provides the following document and the information included therein as-is and without warranty of any kind, expressed or implied, including but not
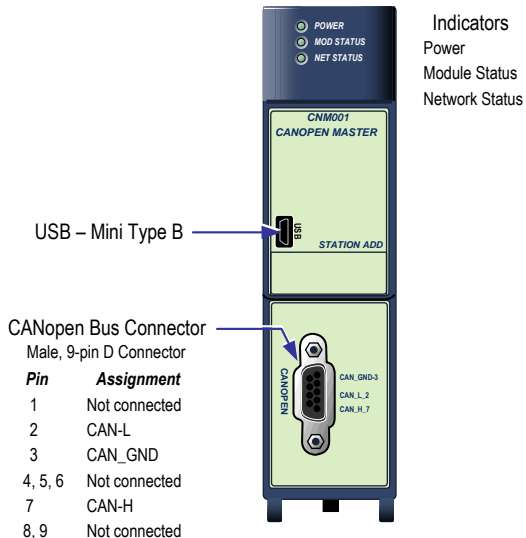
limited to any implied statutory warranty of merchantability or fitness for particular purpose.

1. User Features

1.1. Overview

Indicators
Power
Module Status
Network Status

USB – Mini Type B

CANopen Bus Connector
Male, 9-pin D Connector

Pin	Assignment
1	Not connected
2	CAN-L
3	CAN_GND
4, 5, 6	Not connected
7	CAN-H
8, 9	Not connected

1.2. Indicators

Power

LED State		Module State
Green	🟢	The module has backplane power.
Off	⚪	There is no backplane power to the module.

Module Status

LED State		Module State
Green	🟢	The module is operating normally.
Green/yellow, blinking	🟢🟡	Module is waiting for firmware download.
Yellow	🟡	Firmware download in progress.
Off	⚪	Power supply for the device is missing or hardware defect.

Network Status

LED State		Module State
Off	⬜	**Reset:** The module is executing a reset.
Green, single flash	🟢	**Stopped:** The device is in the stopped state.
Green, blinking	🟢	**Preoperational:** The module is in the preoperational state.
Green	🟢	**Operational:** The device is in the operational state.
Red, single flash	🔴	**Warning Limit reached:** At least one of the CANopen module's error counters has reached or exceeded the warning level (too many error frames).
Red, double flash	🔴	**Error Control Event:** A guard event (NMT Slave or NMT-master) or a heartbeat event (Heartbeat consumer) has occurred.
Red, on	🔴	**Bus Off:** The CANopen module is not active on the bus.

2. Hardware Installation

A CNM001 module must be installed in the main RX3i rack in any slot except slot 0 or the expansion slot. A CNM001 module in an RX3i Universal Backplane can be installed or removed while power is applied to the system (hot swapped).

This product is intended for use with the RX3i system. Its components are considered open equipment [having live electrical parts that may be accessible to users] and must be installed in an ultimate enclosure that is manufactured to provide safety. As a minimum, the enclosure shall provide a degree of protection against solid objects up to 12mm (e.g. fingers). This equates to a NEMA/UL Type 1 enclosure or an IP20 rating (IEC60529) providing at least a pollution degree 2 environment. For use in hazardous areas, see 2.1, "Installation in Hazardous Areas. "

⚠ WARNING

- Inserting or removing a module with power applied to the system may cause an electrical arc. This can result in unexpected and potentially dangerous action by field devices. Arcing is an explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power before removing or inserting a module.

For details about installing RX3i rack systems, refer to GFK-2314.

2.1. Installation in Hazardous Areas

The system containing the CNM001 module must be mounted within an ultimate enclosure that can be accessed only by the use of a tool.

The following information is for products bearing the UL marking for Hazardous Locations or ATEX marking for explosive atmospheres:

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 OR ZONE 2 HAZARDOUS AREAS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D, ZONE 2 OR NON-HAZARDOUS AREAS ONLY.

⚠ WARNING

- EXPLOSION HAZARD – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2 OR ZONE 2;
- EXPLOSION HAZARD – WHEN IN HAZARDOUS AREAS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND
- EXPLOSION HAZARD – DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

2.2. Connecting CNM001 to CANopen Network

The CNM001 module provides a balanced (differential) two-wire interface over shielded twisted pair cable to the CANopen network.

Maximum cable length is determined by the data rate used. The CNM001 module does not support multiple masters.
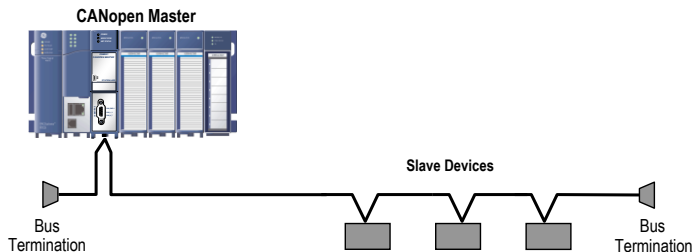
Sample CANopen Network

Shield to
connector
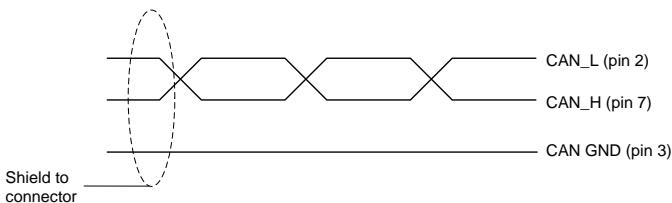
CANopen Cable

The cable shield should be connected to each device on the network.

Network Data Rates and Bus Lengths

The CNM001 module supports the estimated bus lengths and data rates defined in CiA 303 version 1.8.0. For performance details, refer to the *PACSystems RX3i CANopen Master Module User's Manual,* GFK-2831.

Network Termination

A 120 ohm termination resistor is required at the each end of the bus. Where termination is required, you must use a bus terminal with built-in selectable termination.

3. Configuration

You will need:

- PACSystems CPU Firmware 7.70 or later.

- SYCON.net configuration software, available from Hilscher. Refer to their website: http://www.hilscher.com. Search for "Communication Solutions DVD for cifX, comX and netJACK."

- Device driver for the CNM001 module USB connection. (Available on the "Communication Solutions DVD for cifX, comX and netJACK" DVD.)

- Mini USB cable for connecting SYCON.net to the module.

- PAC Machine Edition configuration and programming software from Emerson, version 7.00 or later.

- Serial or Ethernet cable for connecting the PAC Machine Edition programmer to the RX3i CPU.

- EDS files for the slave devices in your system, available from the device manufacturers.

- PACSystems RX3i CANopen Master Module User's Manual, GFK-2831, available from https://www.emerson.com/Industrial-Automation-Controls/support.

Two steps are required to configure the IC695CNM001 module as a master on a CANopen network:

1. Configure the CANopen network using *SYCON.net* and download the configuration to the CNM001 module through the USB port.

   The CNM001 master module must be configured as node 1. The slave devices are configured as nodes under the master module.

Notes: *If the Configuration command is unavailable when you right click the node containing the CANopen Master, you must first select Disconnect, and then select Configuration.*

In the CANopen Master configuration screen, make sure the ***netXDriver*** *device driver is the only driver selected. Clear all other driver selections.*

---

2. Configure the CNM001 module in **PAC Machine Edition** as a third-party module and download the configuration to the RX3i CPU.

    ▪   Specify the reference data addresses and lengths for input and output scan data, and
    ▪   Select the status data that the RX3i CPU will scan from the CNM001 module.

    Note that "transmit" and "receive" are defined from the slave's point of view: TPDOs are mapped to the CPU as %AI input scan data and RPDOs are mapped as %AQ output scan data.

For detailed configuration procedures and examples, refer to the *PACSystems RX3i CANopen Master Module User's Manual,* GFK-2831.

1. **Note:**   *A maximum of 272 bytes (136 words) of scanned data can be configured for input data (%I, %AI and %R in) and for output data (%Q, %AQ and %R out). If either quantity exceeds this limit, the configuration will fail to store and faults will be logged in the Controller Fault Table.*

2. **Note:**   *By default the module is configured to scan 4 bytes of module status data and 16 bytes of slave device health data first. These bytes must be counted when checking for the maximum of 272 bytes of input scan data.*

4. Diagnostic Data

Module Status Data (32 bits)

Bit Number	Definition
0	Module OK 1 = Module is present and available 0 = CNM001 module is not powered up or not available (not configured or faulted)
1	All slaves healthy 1 = All configured slaves are OK 0 = At least one slave is faulted
2	PDO Counters enabled 1 = PDO counters are enabled 0 = PDO counters are not enabled
3 – 31	*Reserved*

Node Status Data (128 bits)

This data consists of one bit per slave device, with bit position indicating the address. For example slave address 2 is indicated by bit 1 (first bit is bit 0).

Node Status Bit =	Definition
0	• The device is either not configured, or configured and not exchanging data. Loss of or inactive communication between the master and the slave device. • Failed data path. • PDO Counter Timeout parameter has been exceeded. Note: *If any slave node status bit is 0, the all slaves healthy module status bit will also be 0.*
1	The slave is configured and is exchanging data.

5. Additional Information

5.1. PACSystems RX3i User Manuals

PACSystems RX3i and RX7i CPU Reference Manual, GFK-2222

PACSystems RX3i System Manual, GFK-2314

PACSystems RX3i CANopen Master Module User's Manual, GFK-2831

User manuals, product updates and other information sources are available on the Support website, https://www.emerson.com/Industrial-Automation-Controls/support under *Controllers and IO*, *RX3i Controllers.*

5.2. Information about CANopen

For detailed information about CANopen, contact the CAN in Automation e.V. (CiA) organization: http://www.can-cia.org/

Technical Support & Contact Information

Home link: http://www.Emerson.com/Industrial-Automation-Controls
Knowledge Base: https://www.emerson.com/Industrial-Automation-Controls/support

Note: If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

Emerson reserves the right to modify or improve the designs or specifications of the products mentioned in this manual at any time without notice. Emerson does not assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use and maintenance of any Emerson product remains solely with the purchaser.

EMERSON.