



Serial Communications for the Trane TR1™ Series VFDs

LonWorks®





Ease of Installation and Operation



The LonWorks card allows any Trane TR1 Series VFD to become a node on a LonWorks system. In this peer-to-communications system, devices can communicate without a central control system.

A Trane TR1 Series VFD is connected to a LonWorks system by a simple two-wire connection and can be programmed either through LonWorks or through the VFD's keypad. Hand operation of the Trane TR1 Series VFD is possible even when LonWorks is enabled.

Modes of Operation

The system integrator takes advantage of the flexibility of Trane TR1 Series VFD control circuitry by determining the ideal monitoring system and style of control for the building. Control and monitoring can be handled over the LonWorks network, over traditional hard-wired connections, or even some combination of both. The drive can also simply follow a speed signal supplied by the network, or it can use its advanced closed loop PID controller to monitor the status of the system and determine the appropriate speed.



Open Loop Operation

In Open Loop mode, the Trane TR1 Series VFD receives a speed command through either a hardwired analog speed reference signal or via the LonWorks serial bus. The start/stop command is also usually supplied via the network.

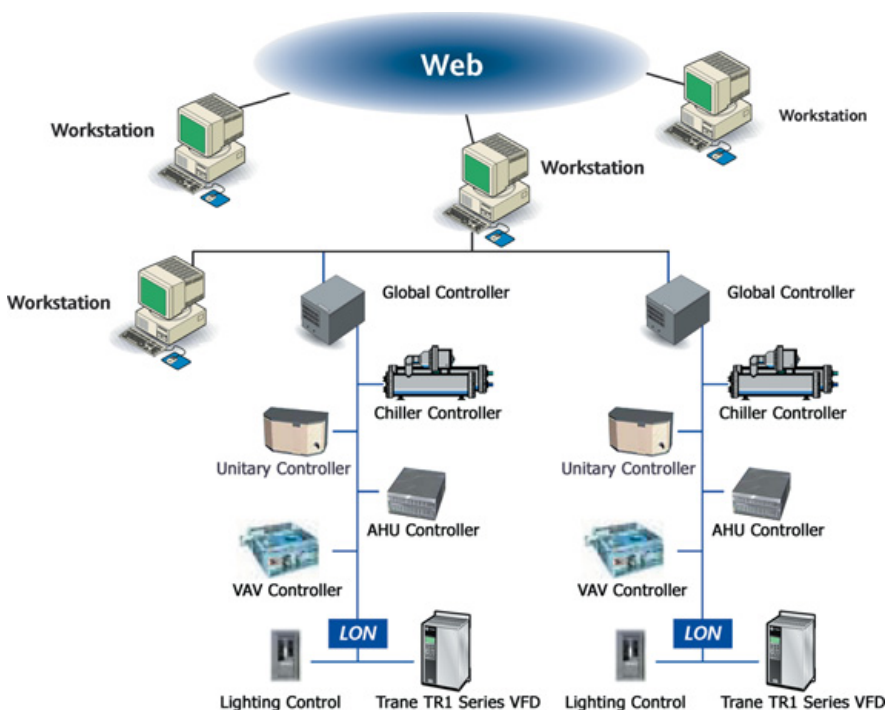
Closed Loop Operation

In closed loop operation, the Trane TR1 Series VFD adjusts motor speed based on a feedback signal from the system and a setpoint reference it receives through the LonWorks serial bus. The automation control system modifies the setpoint reference based on the changing needs of the system.

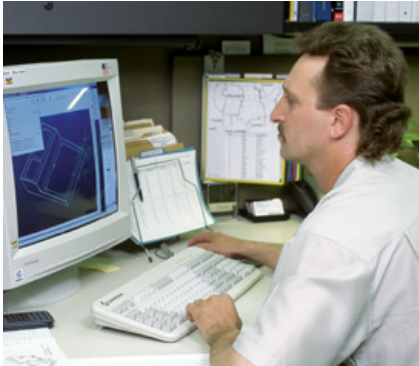
The feedback signal is usually hardwired to the drive, eliminating unnecessary delays in data transfer to the drive's closed loop controller. The signal is then relayed to the automation control system for monitoring purposes. The responsiveness of the Trane TR1 Series VFD's PID controller can be adjusted locally, at the VFD's keypad, or remotely, through the LonWorks serial bus.

Operational Flexibility

At any time, the Trane TR1 Series VFD's operation mode can be switched by a digital or serial bus command over the LonWorks Network.



System Monitoring



Several levels of status data on the Trane TR1 Series VFD are available to the system:

Basic Status

Information regarding the Trane TR1 Series VFD's operational status, including:

- Trane TR1 Series VFD run status
- Confirmation that the Trane TR1 Series VFD is running at the specified speed
- Motor speed (Trane TR1 Series VFD output frequency)
- Motor current (to confirm that the load is still present)

Exception Monitoring

The Trane TR1 Series VFD reports data resulting from any unusual occurrences in the system via the serial bus.

Common indicators include:

- Current limit indication
- General warning status
- Trane TR1 Series VFD thermal warning/alarm
- Motor thermal warning/alarm
- General alarm status

Energy Monitoring

To fully utilize the energy saving capabilities of Trane TR1 Series VFDs, the network collects energy-related information, such as:

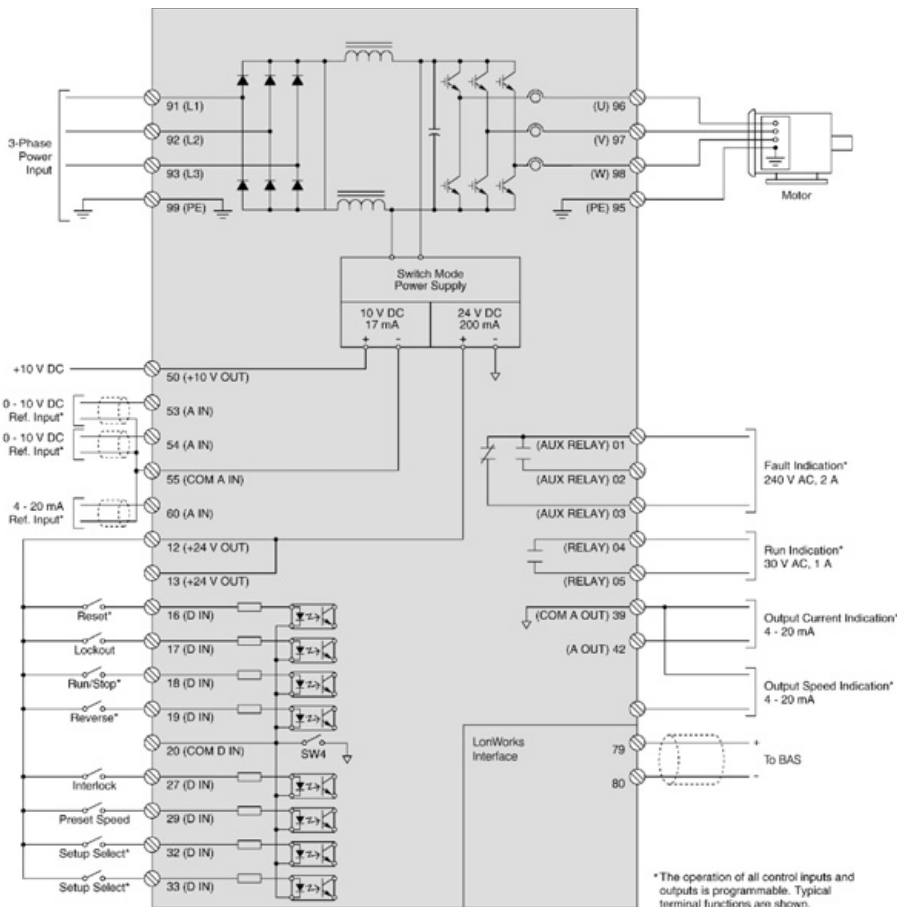
- Trane TR1 Series VFD output power (kW)
- Trane TR1 Series VFD output energy (kWh)
- Trane TR1 Series VFD running hours

This data is then used to optimize system performance without the expense of buying and installing external energy monitoring equipment.

Advanced Features

In addition to monitoring commands issued to the Trane TR1 Series VFD, the LonWorks serial bus can also monitor the status of active inputs and outputs on the VFD. In this way, the Trane TR1 Series VFD can act as an input or output module for the system. For example, a differential pressure switch can be wired to a VFD digital input where it can provide the LonWorks network with flow confirmation or filter status. The Trane TR1 Series VFD's analog inputs and relay outputs can be used similarly.

The capability of the Trane TR1 Series VFD to respond to serial commands can be utilized to provide additional safety functions. A digital stop command, for example, can function as a safety interlock, supplementing the use of standard hard-wired safety interlocks connected to freeze stats, fire stats, smoke alarms, or similar devices.



Designed to the LonMark Functional Profile for Variable Speed Motor Drives, the Trane TR1 Series VFD LonWorks interface is certified to LonMark version 3.3, which ensures that it provides the interoperability that LonMark networks demand.

Commonly Used Serial Communication Points

See the LonWorks operation manual for a complete point map.

Status Signals from the Drive, Analog - General

Drive Output Frequency
 Motor Current
 Motor Voltage
 Drive Output Power
 Output Energy (kWh)
 Drive Running Hours
 DC Bus Voltage
 Motor Thermal Level
 Drive Thermal Level
 Speed / Setpoint Reference
 Heatsink Temperature
 Number of Over Temps
 Number of Over Voltages
 Number of Power-ups
 Operating Hours
 Digital Input Status
 Analog Input Signal Values

Status Signals from the Drive, Analog - Closed Loop

Feedback

Status Signals from the Drive, Digital - General

Drive Ready
 Start Signal Applied
 Start Delay Active
 Running
 Running at Reference
 Output Frequency within Range
 Forward / Reverse
 Drive Control Mode: Hand / Auto
 Normal Drive Accelerating or Decelerating
 Autoramping
 Sleep Mode Active
 Sleep Mode Setpoint Boost Active

Status Signals from the Drive, Digital - Warnings

Warning
 Current Limit Warning
 High Reference Warning
 High Voltage Warning
 Low Voltage Warning
 Motor Thermal Warning
 Motor Thermistor Warning

Status Signals from the Drive, Digital - Alarms

Alarm
 Trip Locked Alarm
 External Fault (Safety Interlock) Alarm
 Analog Input Signal Lost Alarm
 Ground Fault Alarm
 Input Phase Loss Alarm
 High Voltage Alarm
 Low Voltage Alarm
 Current Limit Alarm
 Over Current Alarm
 Output Short Circuit Alarm
 Drive Thermal Alarm
 Motor Thermal Alarm
 Motor Thermistor Alarm



Trane
 A business of American Standard Companies
www.trane.com

Literature Order Number	xxx-SLBxxx-EN
File Number	0604
Supersedes	xxxxxxx
Stocking Location	Inland

For more information contact your local district office or e-mail us at comfort@trane.com

Trane has a policy of continuous product and product data improvement and reserves the right to change design and specifications without notice.