TR200™ Series

Variable Frequency Drives
TR200 Series VFD Introduction

At Trane, our philosophy is grounded in a commitment to offering solutions that support energy efficiency and take a sustainable approach to the environment. We believe in creating High Performance Buildings. Integrated Comfort™ systems are a single-source offering incorporating high-quality HVAC products and controls, backed by a trusted and experienced sales force and extensive service network. They can also encompass fire safety and security systems from a single source. Trane builds upon 30 years of experience in the controls industry and our firm commitment to new technology in practical day-to-day applications. Our variable frequency drive, the TR200 Series, is an example of this commitment.

Today more than ever, facility professionals are required to use a range of strategies for energy efficiency. A variable frequency drive is an electronic system that provides infinitely variable speed control of three-phase AC induction motors. It accomplishes this by converting fixed frequency and voltage input power into adjustable frequency and voltage. With an installed VFD, you control the speed of the AC pump or fan motor to meet the exact needs of your building’s customers and environment. A key benefit of a variable frequency drive is to provide savings through the reduction of energy consumption by changing the speed of a motor to meet actual demand. The savings are significant when compared to a motor running constantly at full speed. Controlling the flow of air and water in HVAC systems is an effective, permanent way to meet the ever-changing demands put on the system.

The Trane TR200 Series VFD is an advanced design VFD, fully dedicated to the optimal operation of HVAC applications. It offers energy savings, prolonged motor life, user-friendliness and built-in functionality designed to meet the rigorous demands of HVAC applications. Motor control is based on a vector drive system providing full motor power at rated speed without derating. Automatic Motor Adaptation ensures optimum motor torque performance. The Automatic Energy Optimizer function optimizes the voltage output of the VFD to the actual load of the motor, thus minimizing its power consumption.

The following are trademarks or registered trademarks of their respective companies: Trane, TR200, IntelliPak, Voyager III are from Trane; BACnet from ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers); LonWorks from Echelon Corp; Modbus from Groupe Schneider
TR200 Series VFD Benefits

ENERGY SAVINGS

- **Simplified automatic energy optimization (AEO)**—continually monitors the motor’s speed and load and adjusts the applied voltage to maximize energy savings.
- **Sleep mode**—automatically stops or restarts the drive when its speed is outside set levels for a specified time, providing energy savings without separate controllers.

COST SAVINGS

- **Intelligent HVAC controller**—four auto-tuning PIDs control the drive and up to three other devices, eliminating external controllers and reducing cost.
- **Built-in HVAC protocols**—allow TR200 drives to become an intelligent part of the building management system.
- **Built-in protection**—integrated technology eliminates the need for external protection devices while maximizing the life of the motor and other system components.

TROUBLE-FREE OPERATION

- **Dual DC-link reactors**—non-saturating reactors provide better harmonic performance than a 5% AC line or saturating DC reactors.
- **Automatic high ambient derate**—if the ambient temperature exceeds the normal limit, the drive can be set to warn of its overtemperature and continue to run, keeping the HVAC system functional. To control its temperature, the drive will reduce the output carrier frequency and, if necessary, reduce the output current.

EASY TO INSTALL

- **Compact size**—efficient heatsink design significantly reduces the footprint of TR200 Series drives, particularly in the smaller frame sizes.
- **Run-permissive circuit**—the ability to accept a “system ready” signal assures that dampers or other auxiliary equipment are in the proper state for drive operation.
- **Real-time Clock**—adds sophisticated performance to basic control schemes for increased comfort and energy savings.
- **Plenum rated**—all drives and options are UL listed for installation in air handling compartments.

EASY TO USE

- **Simple and flexible menu structure**—many installations require nothing more than scrolling through the twelve “QUICK MENU” items to confirm the default settings. Users can also select up to 20 parameters to be included in a “PERSONAL MENU” for easy access.
- **Trane Drive Utility commissioning and troubleshooting software**—easy connection via the onboard USB port provides PC access to drive parameters without disconnecting the keypad or interrupting communications.
- **Advanced firefighter’s override**—provides options for emergency operation (using either the drive only or coordinated with the bypass) that increase the safety of building inhabitants.

Trane TR200 Series drives play an important role in a system to reduce energy usage, extend motor life, optimize AC motor speed control, maximize occupant comfort and reduce costs. They are available factory-mounted and commissioned on Trane IntelliPak™, Voyager III™ and M-Series and T-Series Climate Changers. In addition, TR200 Series support of open standard protocols make them compatible with virtually all HVAC equipment and building automation systems. They can also be ordered specifically for a project and easily installed on-site for new and retrofit applications. With a complete range available from 1½ to 1350 HP, the features and flexibility of TR200 Series VFDs make them ideal for stand-alone control of cooling towers, exhaust fans, pumps and a variety of air handlers.
IMPRESSION RANGE OF STANDARD I/O

- 2 analog inputs (current or voltage) for sensors, setpoint sources or basic speed command
- 6 digital inputs (either PNP or NPN) for hardwired start/stop, safeties, run-permissive, preset speed and much more—two can be used as digital outputs
- 1 analog output for indication of operation or to control other HVAC devices
- 2 Form C relay outputs (240V, 2 amps) for remote indication of operation or to control other HVAC devices
- 200mA of 24 VDC to power customer devices such as sensors and valves

USB CONNECTION

PC access to drive parameters without interrupting communication

STANDARD COMMUNICATION

EIA-485 for direct connection to Modbus, Siemens Building Technologies FLN and Johnson Controls N2 with every drive. Monitoring and controlling over serial communications reduces installation cost. All outputs are available for commanding over the network.

CONTROL BUILT FOR PERFORMANCE

- I/O and communication terminals are galvanically isolated and separated from power terminals to limit interference
- Terminals are spring loaded for security
- Terminals accept a wide range of wire sizes
- Unpluggable terminals

ADVANCED OPTIONS MADE EASY

Plug and play option modules further enhance the standard capabilities of TR200 drives. They fit seamlessly under the drive keypad, simplifying installation. These factory or field-installable modules often eliminate the need for external devices, resulting in a lower overall cost of ownership.

COMMUNICATION OPTION MODULES

- BACnet (MCA116)
- LonWorks (MCA 115)

I/O OPTION MODULES

For additional control and monitoring capabilities:

General Purpose I/O (MCB 101)
- 3 digital inputs
- 2 digital outputs
- 1 analog current output
- 2 analog voltage inputs

Relay Option (MCB 105)
- 3 Form C relay outputs

External 24VDC (MCB 107)
- Allows 24 VDC external supply to be connected to the drive for powering of control and options

Analog I/O (MCB 115)
- 3 analog voltage outputs
- 3 Pt100/Ni1000 inputs
TR200 Series VFD Features

- **Cold plate cooling technology**
  For efficient heat dissipation

- **Balanced DC-link reactors**
  For reduced harmonics

- **Advanced controller options**
  Address the needs of complex applications

- **Surface-mount components**
  For compactness and reliability

- **USB interface**
  For easy connection to PC software suite

- **Removable terminal strips**
  Angled for easy access

- **Option modules**
  Provide additional functionality

- **Hot-pluggable keypad**
  Features on-board memory with user-friendly ergonomic design

- **Removable, temperature-controlled fan**
  For easy servicing
# TR200 Series VFD User Benefits

<table>
<thead>
<tr>
<th>DRIVE FEATURE</th>
<th>USER BENEFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot-pluggable HVAC keypad with memory</td>
<td>Four drive setups can be uploaded to the keypad and saved. To program multiple drives, upload the parameter settings to the keypad, then place that keypad on each of the other drives and download these same settings to every other drive.</td>
</tr>
<tr>
<td>Operates without a keypad in place</td>
<td>Assures tamper-proof operation. Drive status shown even with the keypad removed.</td>
</tr>
<tr>
<td>Keypad can easily be remote mounted</td>
<td>The standard keypad can be remotely mounted 10 feet from the drive with a standard 9-pin cable. The remotely mounted keypad is gasketed and carries a NEMA/UL Type 12 and NEMA/UL Type 3R rating.</td>
</tr>
<tr>
<td>Simple and flexible menu structure</td>
<td>Many installations require nothing more than scrolling through the twelve “QUICK MENU” items to confirm that these defaults are correct. Users can also select up to 20 parameters to be included in a “PERSONAL MENU” for easy access.</td>
</tr>
<tr>
<td>Intelligent HVAC controller</td>
<td>Four auto-tuning PIDs control the drive and up to three other devices, eliminating external controllers and reducing cost.</td>
</tr>
<tr>
<td>USB port</td>
<td>PC access to drive parameters without disconnecting the keypad or interrupting communications.</td>
</tr>
<tr>
<td>Built-in EIA-485 interface</td>
<td>Fully equipped for serial communication. Up to 31 drives can be connected to one serial bus up to 5,000 feet long.</td>
</tr>
<tr>
<td>Built-in HVAC protocols</td>
<td>The inclusion of all popular HVAC protocols allows TR200 Series drives to become an intelligent part of the building management system.</td>
</tr>
<tr>
<td>Automatic Motor Adaptation (AMA)</td>
<td>Measures motor stator resistance and reactance without turning the motor or decoupling the load. The drive then automatically uses this information to optimize performance and efficiency.</td>
</tr>
<tr>
<td>Simplified Automatic Energy Optimization (AEO)</td>
<td>Eliminates the need to select a V/Hz pattern. AEO continually monitors the motor's speed and load and adjusts the applied voltage to maximize energy savings. Even at full speed, voltage will be reduced if the load is less than 100%. This automatically compensates for oversized motors or systems that are not fully loaded.</td>
</tr>
<tr>
<td>Energy monitoring</td>
<td>Real energy savings information is always available without the additional expense of external equipment.</td>
</tr>
<tr>
<td>Advanced firefighter's override</td>
<td>Provides options for emergency operation (using the drive only or coordinated with the bypass) that increase the safety of building inhabitants.</td>
</tr>
<tr>
<td>Real-time clock</td>
<td>Adds sophisticated performance to basic control schemes for increased comfort and energy savings.</td>
</tr>
<tr>
<td>Auto ramping</td>
<td>Ensures no-trip acceleration and deceleration.</td>
</tr>
<tr>
<td>High breakaway current</td>
<td>Up to 160% breakaway current available for high friction loads.</td>
</tr>
</tbody>
</table>
## TR200 Series VFD User Benefits

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<thead>
<tr>
<th>DRIVE FEATURE</th>
<th>USER BENEFIT</th>
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</thead>
<tbody>
<tr>
<td>VVC&lt;sup&gt;PLUS&lt;/sup&gt; output switching pattern</td>
<td>Superior Voltage Vector Control provides high efficiency and full motor performance.</td>
</tr>
<tr>
<td>Automatic high ambient derate</td>
<td>If the ambient temperature exceeds the normal limit, the drive can be set to warn of its overtemperature and continue to run, keeping the HVAC system functional. To control its temperature, the drive will reduce the output carrier frequency and then, if necessary, reduce the output current.</td>
</tr>
<tr>
<td>Preventive maintenance scheduling</td>
<td>The TR200 Series drive can monitor system usage and notify the operator when preventive maintenance is required.</td>
</tr>
<tr>
<td>Dual DC-link reactors</td>
<td>Non-saturating reactors provide better harmonic performance than a 5% AC line or saturating DC reactor.</td>
</tr>
<tr>
<td>Built-in protection</td>
<td>Eliminate the need for external protection devices while maximizing the life of the motor and other system components.</td>
</tr>
<tr>
<td></td>
<td>• Motor preheat</td>
</tr>
<tr>
<td></td>
<td>• Overload and thermistor input</td>
</tr>
<tr>
<td></td>
<td>• No-flow, broken belt, dry pump and end-of-curve detection</td>
</tr>
<tr>
<td>Automatic Switching Frequency Modulation (ASFM)</td>
<td>Adjusts the carrier frequency based on the load.</td>
</tr>
<tr>
<td></td>
<td>• Provides a quiet motor at critical low flow conditions</td>
</tr>
<tr>
<td></td>
<td>• Provides full rated output without derate at high load</td>
</tr>
<tr>
<td>Protected from input or output switching</td>
<td>Input or output can be disconnected while the drive is running without the need for interlocks to protect the drive.</td>
</tr>
<tr>
<td>Full torque to base speed</td>
<td>Direct drive fans run without derating. The full output torque can be set to coincide with the maximum design operating speed of the driven equipment, up to 60 Hz.</td>
</tr>
<tr>
<td>Flying start</td>
<td>Allows starting into a “windmilling” fan at any speed, in either direction.</td>
</tr>
<tr>
<td>Sleep mode</td>
<td>Automatically stops the drive when its speed drops below the “sleep” level for a specified time, and automatically restarts when the speed command exceeds the “wake” level. Provides increased energy savings without separate controllers.</td>
</tr>
<tr>
<td>Run-permissive circuit</td>
<td>The ability to accept a “system ready” signal assures that dampers or other auxiliary equipment are in the proper state for drive operation.</td>
</tr>
<tr>
<td>Safety Interlock</td>
<td>Provides external fault indication.</td>
</tr>
<tr>
<td>UL and C-UL listed</td>
<td>All drives and options sold for US and Canadian applications carry this safety certification.</td>
</tr>
<tr>
<td>CE marked</td>
<td>All drives carry the CE mark for sale into international markets.</td>
</tr>
<tr>
<td>Plenum rated</td>
<td>All drives and options are UL listed for installation in air handling compartments.</td>
</tr>
</tbody>
</table>
TR200 Series VFD HVAC Control Features

**HVAC INTELLIGENT CONTROL**

TR200 Series drives include a PID controller with four setpoints and three feedbacks, a feature not currently offered anywhere else in the market. The built-in combination of HVAC system control features and flexible I/O result in the highest level of control possible at the lowest overall cost of ownership.

Four on-board, self-tuning PID controllers can operate as a basic air handling unit controller. One PID maintains fan speed while up to three other PID loops can be used to operate other HVAC devices.

In pump applications, short-cycle prevention allows maintained operation within a desired range without the wear and tear produced by system overstarting. Combined with a flowmeter or a differential pressure transmitter, the TR200 Series drive can measure and regulate flow and replace throttling valves for more accurate control and energy savings.

Fan tracking allows return fans to maintain the desired pressure by utilizing two airflow sensors. An enhanced sleep mode saves energy and system wear by shutting down fans during idle periods.

**REAL-TIME CLOCK**

The energy savings potential of the TR200 Series drive is maximized with a real-time clock, allowing the system to respond to the changing needs of the building throughout the day and week. The real-time clock allows the system to anticipate conditions or temporarily override the setpoint, enhancing control, comfort and efficiency. It also allows the drive to provide reminders when preventive maintenance is required.

Previously, a building automation system was required to obtain these features. The real-time clock gives these sophisticated functions to any facility.

With the real-time clock, the fault log in all TR200 Series drives contains not only a list of the ten most recent drive faults, but also the year, month, day, hour and minute of each fault, greatly simplifying troubleshooting.
FIRERIGHT’S OVERRIDE MODE

In any enclosed space, fire and smoke control is a major life-safety concern. Firefighter’s override mode allows the HVAC system to control and contain fire or extract smoke using air flow and air pressure. When operating in override, the drive ignores most operating conditions that would otherwise cause it to fault and shut down. It continues to operate as long as possible regardless of line, load or environmental conditions.

Firefighter’s override can run the drive at any speed in forward or reverse. It can be activated either by a normally open or normally closed contact from the fire panel or through the building automation system. The drive can be set to switch automatically to a constant speed bypass if operation through the drive becomes impossible due to failure of the drive’s power circuitry. The bypass will then run the motor at full speed from the power line until firefighter’s override is deactivated.

Firefighter’s override is standard in all TR200 Series drives, and can be configured through user-accessible parameters. It can be set up and activated at any time. As fire codes or the needs of the facility change, the adaptable TR200 Series drive is ready.

CASCADE CONTROLLER

With features and functions that eliminate the need for external controllers, the TR200 cascade controller feature increases the efficiency of your multiple pump or blower systems. Through accurate flow, pressure and level control, it provides lower energy consumption than valve throttling or the traditional across-the-line on/off cycling of pumps and blowers.

Other features serve to minimize wear and tear on driven equipment. Lead pump alternation functionality distributes running time equally among all connected pumps, maximizing their overall life.
While offering single-source solutions, Trane stands committed to open-standard protocols to meet the needs of building professionals. The TR200 Series demonstrates this with “plug-and-play” communication capabilities that reduce or eliminate the need for integration gateways.

The TR200 support of major building communication protocols allows seamless communication with open standard protocols such as BACnet™, LonWorks™ and Modbus™ as well as other popular building automation system protocols. Whether factory-installed on Trane HVAC equipment, field-installed on new equipment, or retrofit on existing equipment, the result is an easily programmable drive in an easy-to-manage package that simplifies installation and results in a lower total cost of ownership.

**NETWORK COMMUNICATION**

- Standard EIA-485 interface
- Built-in serial communication —allows seamless communication over networks using Modbus™ RTU and most building automation systems communications protocols.
- Option modules for BACnet™ and LonWorks®—factory- and field-installable; mounts easily and securely inside the drive.
- Easy installation and operation—simple two-wire connection and programmable through the network or the drive’s keypad.

**HVAC-SPECIFIC FEATURES BUILT IN**

- Keypad-programmable automatic bypass
- Common start/stop selectable operation in drive and bypass mode
- Coordinated run-permissive in drive and bypass mode
- Advanced firefighter’s override coordinated with TR200 Series drive override mode
- Serial and BAS control of drive and bypass operation

**PROPORTIONAL, INTEGRAL, DERIVATIVE (PID) CONTROLLER**

- Closed loop control
- Two setpoints and two feedbacks—a feature unique to TR200 Series drives
- Eliminates the need for extra I/O modules
- Allows for two-zone regulation
- Cooling tower systems—improved efficiency by automatically matching its speed to air flow requirements
- Pump applications
  - Used with a flowmeter, can maintain a given rate
  - Used with a differential pressure transmitter, can provide more accurate control and energy savings
  - Optional cascade controller board provides a wide range of efficient control in large pumping systems
**TR200 Series VFD Features**

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**ELECTRO-MECHANICAL BYPASS**

Door mounted operators:
- Drive / Off / Bypass selector
- Bypass pilot light indication
- Test selection added with 3-contactor bypass units

**24 VDC switch mode power supply**
- Operates off any two of the three input phases
- Continued drive operation at a reduced load when any input phase is lost
- Eliminates contactor dropout on voltage conditions as low as 70% of nominal voltage

**Advanced standard and optional features**
- Common start/stop available
- Run-permissive available
- Basic firefighter's override available, which runs the motor in bypass, ignoring stop commands
- Auto bypass with adjustable time delay available
- Class 20 overload

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**ELECTRONICALLY CONTROLLED BYPASS**

**Motor Protection**
- Phase loss / imbalance protection
- Overload motor protection in bypass
- Overload reset from keypad, digital input or BAS

**24 VDC switch mode power supply**
- Operates off any two of the three input phases
- Continued drive operation at a reduced load when any input phase is lost
- Eliminates contactor dropout on voltage conditions as low as 70% of nominal voltage
- Separate power source for drive logic

**Additional protection features**
- Drive input fuses supplied with every panel
- Bypass run-time hour meter
- Password protection prevents unauthorized bypass operation
- Manual bypass initiation override ensures operation
- Bypass control through the drive smart logic controller and real-time clock
- Bypass fault logging and time stamping
TRANE DRIVE UTILITY

The Trane Drive Utility software offers advanced programming functionality for TR200 Series drives, greatly reducing programming and setup time.

Drives are managed in a standard folder-based user interface that's familiar and easy to understand. Parameter settings for each drive are contained in a single file, allowing easy duplication of parameter sets between drives.

Project folders can also store user-defined files such as PDFs, CAD drawings, or Word documents. Trane Drive Utility software is the one PC tool for all your drive programming tasks.

Trane Drive Utility features include:

- Online and offline commissioning
- Drive upgrade tools
- On-board help files for each drive parameter
- Logging of alarms and warnings for improved system performance and documentation
- Conversion wizards to simplify drive conversion projects
- Graphical programming tools for simplified programming of the TR200's Smart Logic Controller
- Real-time data collection using the Scope function
- Configuration and access to the TR200 drive's internal data buffer, providing up to four channels of high speed (down to 1 millisecond) data collection
With an unmatched combination of drive, motor, and system protection features, the TR200 Series drive is a cost-effective overall solution. Designed and built for long-term, worry-free operation without the need for external devices to protect driven equipment, the TR200 Series drive provides secure, reliable results, right out of the box.

**SYSTEM PROTECTION**

**Belt monitoring**
The TR200 Series drive’s sophisticated belt monitoring measures both speed and load and calculates the difference between actual torque and expected torque at all speeds. A time delay allows for reduced load during deceleration.

**No-flow detection**
Operation under dead head conditions provides no flow to the system and may damage the pump. Differential pressure switches or flow meters increase the installation costs and add complexity. The TR200 Series drive can automatically detect no-flow situations and take the appropriate corrective action.

**End-of-curve protection**
The TR200 Series drive can automatically detect over-flow conditions that indicate operation off the end of the pump curve. Its response can be customized to trigger an alarm and stop the pump, issue a warning while maintaining operation, or perform a variety of other functions to protect both the pump and the system.

**Automated vibration avoidance**
Fan systems often have resonant speeds that must be avoided to reduce vibration and noise. The TR200 Series drive automates the process of setting up frequency avoidance bands, minimizing system commissioning time.

**DRIVE PROTECTION**

Metal oxide varistors (MOV) and capacitor snubbers in both the AC and DC input circuitry reduce the impact of voltage spikes on the input. In addition, a balanced pair of DC-link reactors between the input rectifier and the bank of DC-bus capacitors reduces the severity of any current surge resulting from abrupt changes in the AC supply line.

Conformal coating is available to protect electronic components in aggressive environments.

**MOTOR PROTECTION**
The TR200 Series drive’s built-in I2T motor overload, thermistor input and motor preheat functions increase the life of the controlled motor without the added cost of separately supplied protection. The drive’s built-in I2T motor overload is UL-listed as a true overload device, eliminating the need for external motor protection hardware.

**HARMONIC MITIGATION**

DC-link reactors limit harmonic distortion on the power line, reducing RMS input current by more than 40% compared to drives without input reactors.

Other drive manufacturers address harmonics with AC line reactors, usually external to the drive. Often, these optional AC line reactors are 50% larger than the DC-link reactors standard on the TR200 Series drive. This results in significant additional heat generation and reduced efficiency. The harmonic performance of the DC-link reactors in the TR200 Series drive is equal to that of a 5% AC line reactor, but without the associated voltage drop and efficiency losses.
TR200 Series VFD Dimensions

FRAME RATINGS BY HP

Contact Trane for dimensional information on drives larger than 350 HP.

<table>
<thead>
<tr>
<th>Frame</th>
<th>Enclosure</th>
<th>HP Range</th>
<th>Base Drive Dimensions (Inches)*</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>•</td>
<td>0.5–3</td>
<td>14.6</td>
<td>3.5</td>
</tr>
<tr>
<td>A3</td>
<td>•</td>
<td>5</td>
<td>14.6</td>
<td>5.1</td>
</tr>
<tr>
<td>A5</td>
<td>•</td>
<td>0.5–5</td>
<td>16.5</td>
<td>9.5</td>
</tr>
<tr>
<td>B1</td>
<td>•</td>
<td>7.5–10</td>
<td>18.9</td>
<td>9.5</td>
</tr>
<tr>
<td>B2</td>
<td>•</td>
<td>20</td>
<td>25.6</td>
<td>9.5</td>
</tr>
<tr>
<td>C1</td>
<td>•</td>
<td>25–30</td>
<td>26.8</td>
<td>12.1</td>
</tr>
<tr>
<td>C2</td>
<td>•</td>
<td>50–60</td>
<td>30.3</td>
<td>14.6</td>
</tr>
<tr>
<td>D1</td>
<td>•</td>
<td>150–200</td>
<td>45.6</td>
<td>16.5</td>
</tr>
<tr>
<td>D2</td>
<td>•</td>
<td>250–350</td>
<td>60.6</td>
<td>16.5</td>
</tr>
<tr>
<td>ALL</td>
<td>NEMA 3R</td>
<td>ALL</td>
<td>ALL</td>
<td>ALL</td>
</tr>
</tbody>
</table>

*Base drive dimensions are also valid for T1 packages (see below) on A5 and larger frames

T1, T2 AND T3 PACKAGES

A2 and A3 frames feature vertical construction for T1, T2 and T3 packages.

For A5 frames and larger, T2 and T3 packages will utilize enclosure(s) the same size as the drive enclosure. These enclosure(s) will be mounted directly to the right side of the drive.

T1: Drive only
or
drive with disconnect (with or without fuses)

T2: Drive with bypass
or
Non-bypass panel with AC line reactor, LC filter or contactor motor selection option

T3: Drive with bypass
and
AC line reactor or LC filter with or without contactor motor selection option
TR200 Series VFD Dimensions
A2 and A3 Frames

DRIVE ONLY

IN (MM)

A2 MOUNTING BASE

A3 MOUNTING BASE

T1

IN (MM)

OPTIONAL DRIVE Disconnect

AIRFLOW

WITHOUT A OR B OPTION

WITH A OR B OPTION

MIN 3.94 (100)

MIN 3.94 (100)

3X Ø 0.89 (23)

3X Ø 1.1 (28)

4.92 (125)

5.91 (150)

5.12 (130)

1.1

1.1

4.53 (115)

4.92 (125)

0.98 (25)

0.98 (25)

3X Ø 0.89 (23)

2.56 (65)

2.56 (65)

2.56 (65)

2.56 (65)

3X Ø 1.1 (28)

4.13 (105)

4.13 (105)

4.13 (105)

4.13 (105)

6.3 (160)

6.3 (160)

6.3 (160)

6.3 (160)

0.98 (25)

0.98 (25)

0.98 (25)

0.98 (25)

3X Ø 1.1 (28)

4.13 (105)

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4.13 (105)

3X Ø 0.89 (23)

2.56 (65)

2.56 (65)

2.56 (65)

2.56 (65)
TR200 Series VFD Dimensions
A2 and A3 Frames

T2

WITHOUT A OR B OPTION

WITH A OR B OPTION

IN (MM)

T3

WITHOUT A OR B OPTION

WITH A OR B OPTION

DETAIL A

DETAIL B
TR200 Series VFD Dimensions

B2 Frames

T1

OPTIONAL DRIVE DISCONNECT
ALLOW 100MM CLEARANCE FOR FAN REMOVAL

T2

OPTIONAL EM CONTROL
OPTIONAL DRIVE DISCONNECT
ALLOW 100MM CLEARANCE FOR FAN REMOVAL

T3

OPTIONAL EM CONTROL
OPTIONAL CONTACTOR MOTOR SELECT
OPTIONAL DRIVE DISCONNECT
ALLOW 100MM CLEARANCE FOR FAN REMOVAL
TR200 Series VFD Dimensions

C2 Frames

T1

IN (MM)

MIN 8.86 (225)

AIRFLOW

DETIAL C

4.41 (112)

AIRFLOW

MIN 8.86 (225)

0.35 (9)

0.39 (10)

0.5 (13)

0.7 (19)

DETAIL A

1.34 (34)

11.94 (303)

14.93 (379)

12.98 (330)

7 (178)

1.34 (34)

11.94 (303)

14.6 (370)

0.83 (21)

30.2 (770)

29.09 (739)

0.39 (10)

12.8 (325)

25.59 (650)

0.69 (18)

2.73 (69)

43.93 (1116)

2.73 (69)

38.39 (975)

OPTIONAL DRIVE DISCONNECT

ALLOW 100MM CLEARANCE FOR FAN REMOVAL

T2

MIN 8.86 (225)

0.35 (9)

0.39 (10)

0.5 (13)

0.7 (19)

DETAIL B

1.77 (45)

0.98 (25)

0.98 (25)

0.77 (19)

16.22 (412)

13.72 (349)

7.82 (199)

1.34 (34)

11.94 (303)

14.93 (379)

12.98 (330)

7 (178)

1.34 (34)

11.94 (303)

14.6 (370)

0.83 (21)

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29.09 (739)

0.39 (10)

12.8 (325)

25.59 (650)

0.69 (18)

2.73 (69)

43.93 (1116)

2.73 (69)

38.39 (975)

OPTIONAL DRIVE DISCONNECT

ALLOW 100MM CLEARANCE FOR FAN REMOVAL

T3

MIN 8.86 (225)

0.35 (9)

0.39 (10)

0.5 (13)

0.7 (19)

DETAIL B

1.77 (45)

0.98 (25)

0.98 (25)

0.77 (19)

16.22 (412)

13.72 (349)

7.82 (199)

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OPTIONAL DRIVE DISCONNECT

ALLOW 100MM CLEARANCE FOR FAN REMOVAL

OPTIONAL DRIVE DISCONNECT

OPTIONAL DRIVE DISCONNECT

OPTIONAL EM CONTROL

OPTIONAL CONTACTOR

MOTOR SELECT

OPTIONAL DRIVE DISCONNECT

ALLOW 100MM CLEARANCE FOR FAN REMOVAL

OPTIONAL DRIVE DISCONNECT

ALLOW 100MM CLEARANCE FOR FAN REMOVAL

OPTIONAL DRIVE DISCONNECT

ALLOW 100MM CLEARANCE FOR FAN REMOVAL
**DRIVE INPUT POWER**

- **Input voltage, 3-phase**: 200–240, 380–460 or 525–600 VAC
- **Input voltage range for full output**: Nominal ±10%
- **Undervoltage trip point**: 164, 313 VAC or 394 VAC (792 for 100 HP and above) VAC
- **Overvoltage trip point**: 299, 538 or 690 VAC
- **Input frequency**: 50 or 60 Hz, ± 2 Hz
- **Displacement power factor**: 0.98 or greater at all speeds and loads
- **Total power factor**: 0.90 or greater at full load and nominal motor speed

**ENVIRONMENTAL LIMITS**

- **Efficiency**: 97% or greater at full load and nominal motor speed
- **Ambient operating temp.**: 14°F to 113°F
  
  (-10°C to 45°C) frames A2–C2; 14°F to 104°F (-10°C to 40°C) frames D1–E1
- **Humidity**: < 95%, non-condensing
- **Altitude**: maximum without derating: 3,300 ft. (1,000 m)
- **Drive / options enclosure(s)**: NEMA/UL Types 1 or 12; 3R optional

**CONTROL CONNECTIONS**

- **Follower signal, analog input**: 2; selectable voltage or current, direct and inverse acting
- **Programmable digital inputs**: 6 (2 can be used as digital outputs)
- **Programmable analog outputs**: 1; 0/4 to 20 mA
- **Programmable relay outputs**: 2 standard Form C 240 VAC, 2 A; 1 or 3 additional optional
- **Auxiliary voltage**: +24 V DC, maximum 200 mA

**CONTROL OPTIONAL**

- **MCB 101 General Purpose I/O**: 3 DI, 2 DO, 2 AI (voltage) and 1 AO (current)
- **MCB 105 Relay Card**: 3 standard Form C 240 VAC, 2 A
- **MCB 107 24V DC Supply**: Allows external 24 V DC power to be connected to the TR200 Drive
- **MCB 115 Programmable I/O**: Available 2nd half of 2009

**SOFTWARE**

- **Lost speed reference action**: Selectable to go to a preset speed, max. speed, last speed, stop, turn off, or stop and trip
- **Time delay for lost speed reference action**: 1 to 99 seconds
- **Adjustable auto restart time delay**: 0 to 600 seconds
- **Automatic restart attempts**: 0 to 20 or infinite
- **Automatic restart time delay**: 0 to 600 sec. between attempts
- **Relay ON delay and relay OFF delay**: 0 to 600 seconds
- **Maximum number of preset speeds**: 16
- **Maximum number of frequency stepovers**: 4
- **Maximum stepover width**: 100 Hz
- **Maximum number of accel rates**: 4
- **Maximum number of decel rates**: 4
- **Delayed start**: 0 to 120 seconds
JUST AS IMPORTANT AS WHAT’S IN YOUR VFD...

...IS WHAT’S BEHIND IT

And behind every Trane Variable Frequency Drive you will find a world leader in HVAC equipment, controls and services. Whether preinstalled on Trane equipment, field applied or retrofit, the Trane TR Series VFD comes with the most important feature of all—our proven capabilities throughout the life of your facilities:

**Design**
- Right application
- Right product

**Installation**
- Properly installed
- On time

**Operation**
- Meet or exceed expectations
- Performance savings

**Service**
- Minimize downtime
- Provide support

We have a dedicated team of professionals located at over 150 local offices in the US and Canada and a network of over 200 parts centers to get you what you want, when you need it. To learn more about our drives and what’s behind them, visit [www.trane.com/vfd](http://www.trane.com/vfd).

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

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