TR1™ Series VFD

Variable Frequency Drives

November 2006 175R5568

TR1-SLB005-EN

TR1 Series VFD Introduction

Trane TR1 ™ Series VFD

The most commonly used motor in HVAC installations today is the inexpensive and durable three-phase, asynchronous AC induction motor. A standard asynchronous AC induction motors is designed so that its operating speed is dependent on the frequency of the power applied. When operated from the power line, this frequency is fixed, resulting in two position control, either on or off. This means that your typical HVAC fan or pump is running at 100% speed even when the environment of the building requires something less than 100% heating or cooling. The HVAC variable frequency drive is the solution to this problem.

A variable frequency drive (VFD) is an electronic system that provides infinitely variable speed control of three-phase AC induction motors. It does so by converting fixed frequency and fixed voltage input power into adjustable frequency and adjustable voltage. With a VFD installed in your HVAC system, you control the speed of the AC pump or fan motor to meet the exact need of the building's environment.

The Trane TR1 Series VFD is an advanced design VFD, fully dedicated to the optimal operation of HVAC applications. It offers energy savings, user-friendliness and built-in functionality designed to meet the rigorous demands of today's HVAC applications. Motor control is based on the VVC^{PLUS} 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.

Controlling the flow of air and water in HVAC systems is the only effective way to meet the ever-changing demands put on an HVAC system. The Trane TR1 Series VFD is your ultimate solution to reducing energy usage and maximizing occupant comfort.

Not all of the options available on the standalone drives described in this brochure will be available on the factory-installed drives as standard options.

TR1 Series VFD Contents

TR1 Series VFD Features

Complete Range of Drives and Options

Available from 1½ to 600 HP in NEMA/UL Type 1, 12, and 3R enclosures, TR1 Series drives offer a full range of pre-engineered options. To meet the demands of more unique applications, TR1 Series drives can be engineered to meet any HVAC panel requirement.

Control and Comfort Improvement

TR1 Series drives precisely maintain the exact flow required by the demands placed on the system at any given time. Controlled airflow creates a more pleasant environment by reducing drafts and noise, and eliminates entirely the obvious change in airflow and sound caused by cycling.

TR1 Series drives are capable of accommodating two feedback signals and two setpoints, each from a different source, providing balance and precision to the overall system.

Compatible with Virtually all Building Automation Systems

Modbus RTU, Johnson Controls Metasys N2 and Siemens Apogee FLN are built into every unit. LonWorks and BACnet are available as options.

Input Protection

Abrupt AC power line voltage surges and sags can damage electronic equipment. TR1 Series drives employ two distinct strategies to protect themselves from the consequences of power line fluctuations:

Metal oxide varistors (MOVs) and capacitor snubbers in both the AC and DC input circuitry reduce the magnitude of any voltage spike that is present on the AC power line.

In addition, the TR1 Series uses a balanced pair of DC-link reactors between the input rectifier and the bank of DC-bus capacitors. These reactors reduce the severity of any current surge generated by an abrupt change in the applied AC line voltage.

Harmonics Control

The DC-link reactors built into all TR1 Series drives 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 TR1 Series. This results in significant additional heat generation and reduced efficiency. The harmonic performance of the DC-link reactors in the TR1 Series is equal to that of a 5% AC line reactor, but without the associated voltage drop and efficiency losses.

EMI/RFI Control

All TR1 Series drives are designed to contain and control EMI and RFI to stringent European standards EN 55011 Class A1 and EN 61800-3. Additional filtering options are available for even the most sensitive installations.

Reduction in Maintenance Costs

Inherent soft start eliminates equipment stress caused by across-the-line motor starting. Belt slip during startup is eliminated. The amount of make-up water and its treatment costs are reduced in cooling towers. The need to trim impellers on oversized pumps may be eliminated entirely. Any oversized system can be fine tuned by setting the maximum speed to the maximum desired flow rate.

Power Factor

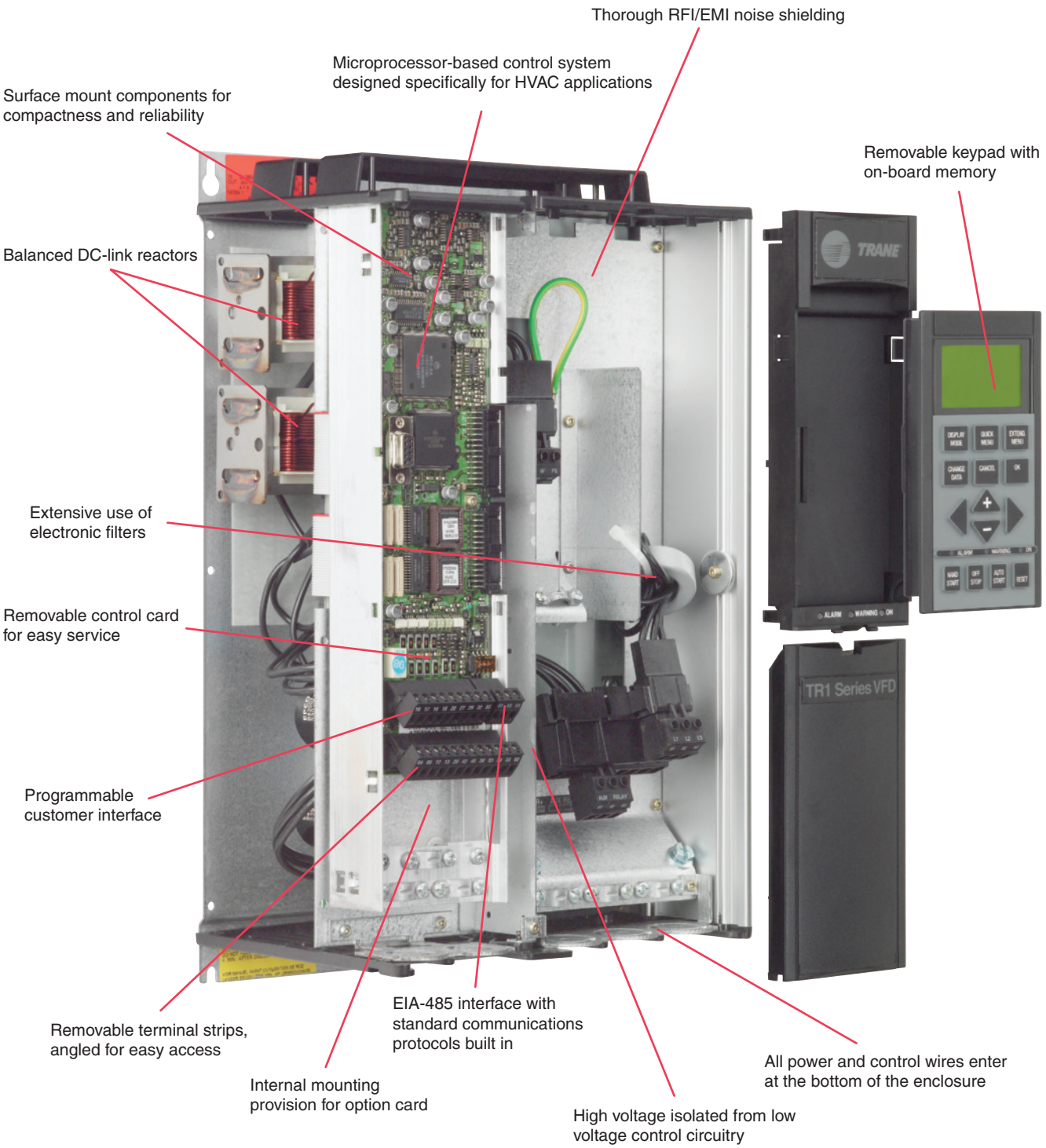
TR1 Series drives provide a near unity power factor, higher than that of the motor. Additionally, the power factor remains constant, regardless of the speed or the load.

Energy Savings

Energy savings of 50 to 70% are common when compared with constant flow systems. When compared with other methods of flow control, savings to 40% are typical.

TR1 Series VFD Features

Typical front view with front and side panels removed



TR1 Series VFD Features

- **Interchangeable keypad with memory**

  All keypads are identical and easily removable. Four drive setups can be uploaded to the keypad and saved, allowing the selection of summer/winter modes or return to previous settings.

- **Operates without a keypad in place**

  Assures tamper-proof operation. Drive status shown even with the keypad removed.

- **Keypad can be easily remote mounted**

  The standard keypad is gasketed and carries a NEMA 12 and NEMA 3R rating. It can be remotely mounted 10 feet from the drive with a standard 9-pin cable.

- **Parameters can be uploaded and downloaded**

  In many installations, multiple drives will need to be programmed identically. After programming one TR1 Series VFD, its settings can be uploaded into its keypad, which can then be removed and placed on other TR1 Series drives. The parameter sets can then be downloaded from the keypad to each of the drives, greatly reducing commissioning time.

- **Preset typical HVAC defaults**

  Many installations require nothing more than scrolling through the twelve “QUICK MENU” items to confirm the default values.

- **Built-in dual setpoint PID controller**

  The TR1 Series can examine two feedback signals, compare them with two setpoints and make various process control decisions.

- **Built-in EIA-485 interface**

  The TR1 Series VFD is fully equipped for serial communication. Up to 31 drives can be connected to one serial bus up to 5,000 feet long.

- **Built-in N2, FLN and Modbus RTU communication**

  These popular user-selectable HVAC protocols allow communication with no hardware changes or additional cost.

- **Simplified Automatic Energy Optimization (AEO)**

  This automatic, dynamic control 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%, automatically compensating for oversized motors or systems that are not fully loaded.

- **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 then, if necessary, reduce the output current.

- **Automatic Motor Adaptation (AMA)**

  AMA is a test algorithm that 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.

- **Constant torque start and 160% breakaway current available**

  Constant torque start assures that the load accelerates to the commanded speed. Current can be set at up to 160% for up to 0.5 seconds to break away high friction loads.

TR1 Series VFD Features

- **VVC^{PLUS} Output Switching Pattern**

  Unique digital voltage vector control provides nearly perfect output sine wave, full rated motor voltage at rated frequency, high efficiency for both drive and motor, and full motor performance without derate.

- **Built-in dual DC-link reactors**

  Standard DC-link reactors provide harmonic mitigation equivalent to a 5% AC line reactor without the voltage drop and efficiency losses associated with AC line reactors.

- **Automatic Switching Frequency Modulation (ASFM)**

  Adjusts the carrier frequency based on the load and provides a quiet motor at critical low flow conditions as well as full rated output without derating at high load.

- **Protected from input or output switching**

  Input or output may be disconnected while the drive is running without the need for interlocks to protect the drive.

- **Full torque at any selected speed up to base speed**

  Direct driven fans can now be 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.

- **Auto ramping**

  Ensures no-trip acceleration and deceleration.

- **Flying start**

  Allows starting into a “windmilling” fan at any speed, in either direction.

- **Sleep mode**

  Automatically stops the drive when its speed drops below the set “sleep” level for a specified time, and automatically restarts when the speed command exceeds the set “wake” level, saving energy and reducing wear on driven components.

- **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.

- **Safety Interlock**

  Provides external fault indication.

- **Temperature-controlled cooling fans**

  All drive cooling fans are controlled by actual heatsink temperature. Drives run as quietly as possible, with minimized losses.

- **UL and C-UL Listed**

  All drives and options sold for US and Canadian applications carry this safety certification.

- **CE Marking**

  All drives for sale into international markets carry the CE marking.

- **ISO 9001**

  All drives and options are built to ISO quality standards.

- **Plenum rated**

  All drives are UL listed for installation in air handling compartments.

User-Friendly Local Control

Every TR1 Series drive is equipped with the same easy-to-use keypad. No matter what size drive or option and control package is specified, the same removable, interchangeable keypad comes standard with every unit.

The TR1 keypad offers more than simple Hand/Start, Off/Stop, Auto Start control:

- **Transfer of parameters between units** – parameters can be programmed into one drive, and, using the keypad, can be downloaded into other drives despite differences in horsepower or voltage.
- **Remote mounting available** – the optional remote keypad kit allows remote mounting of the TR1 keypad. The kit includes the standard 10 foot, nine-pin cable. Removal of the keypad does not affect the drive's NEMA 1 or NEMA 12 ratings, and the gasketed keypad itself carries a NEMA 12 and NEMA 3R rating.
- **Operation without the keypad** – the keypad can be removed for tamper-proof operation. ON, WARNING and ALARM drive status lights are still shown, and the drive will continue to run at the last commanded local speed or will operate in remote operation through network communication.
- **Complete programmability of display** – the keypad's four line, backlit, alphanumeric display can be programmed to display four different measurements at a time. Avaiable units of measurement include: °F, °C, %, Pa, bar, RPM, frequency, gallons/min., ft.^{3}/sec., p.s.i., and fifteen others. These four measurements can be displayed in any order, with one selected as the large, main display.
- **Plain language alarms and warnings** – alarms and warnings are displayed in easy-to-understand alphanumeric form, eliminating the need for decoding or referring to long tables in manuals.

All drive parameters are accessible through the keypad. The Quick Menu key offers immediate access to 12 startup parameters, including Motor Power, Motor Voltage, Motor Nominal Speed, Ramp Up/Down Time, and Minimum/Maximum Frequency. TR1 Series drives are shipped with application-specific parameters pre-programmed; the Quick Menu allows input of motor nameplate data for rapid and easy commissioning.

Communications Capabilities

Network Communication

Facilities that employ building automation systems (BAS) with a computerized communication control system can be thought of as “Intelligent Buildings,” combining centralized control with adaptable control components. The TR1 Series offers “out-of-the-box” communication capabilities that are unmatched in variable frequency drives.

- **Standard EIA-485 interface –** TR1 Series drives come fully equipped for serial communication. Up to 31 drives can be connected to one serial bus up to 5,000 feet long. With an optional repeater, as many as 126 drives can be accommodated.
- **Built-in serial communication for Modbus RTU, Johnson Controls Metasys® N2, and Siemens Apogee® FLN** – all TR1 Series drives are built with the ability to communicate seamlessly over networks using these protocols.
- **LonWorks® communication can be provided as an option** – a LonWorks® board securely mounts inside TR1 Series drives.
- **A TR1 BACLink™ portal can be remotely mounted in a NEMA 1 enclosure for BACnet communication** – up to 10 drives can be connected to a single BACLink portal.
- **Ease of installation and operation** – all TR1 Series drives are built with the ability to communicate seamlessly on a Modbus RTU network. A drive is connected to a Modbus RTU network by a simple two-wire connection and can be programmed either through the network or through the drive’s keypad. Hand and hard-wired operation of the drive are both possible even with Modbus enabled.

Closed Loop Control

TR1 Series drives include a Proportional, Integral, Derivative (PID) controller with two setpoints and two feedbacks, which is a feature not offered anywhere else in the market. Not only does the built-in PID controller eliminate the need for extra I/O modules to maintain closed loop control, but having two setpoints and feedbacks allows for two-zone regulation.

The built-in PID controller in TR1 Series drives can greatly improve the efficiency of cooling tower systems. Once a drive is programmed, it can automatically match its speed to the air flow requirements.

The built-in PID controller is also useful in pump applications. A TR1 Series drive, combined with a flowmeter, can measure and regulate flow to accurately maintain a given rate. When used with a differential pressure transmitter, the TR1 Series can work with throttling valves to provide more accurate control and energy savings.

TR1 Series drives also offer an optional cascade controller for pumps. This add-in board allows staging of up to four additional drives and/or fixed speed motors. By using the PID controller in the master drive, this can provide an exceptionally wide range of efficient control in large pumping systems.

Options to Fit the Application

Side-by-side configuration with input disconnect and three-contactor bypass

Drive with disconnect switch and input fuses

TR1 Series drives can be built to meet any HVAC requirement. Pre-engineered HVAC option packages are available in a variety of configurations. Options include:

- Two-contactor bypass
- Three-contactor bypass
- Automatic bypass
- Motor selection
- Multiple motor operation
- Main power and drive disconnect switches
- Main and drive fuses or circuit breakers
- EMI/RFI filters to reduce the coupling of radio frequency electronic noise onto the AC power line
- Input AC line reactors for harmonics control
- Pressure-to-electrical transducers
- Factory-authorized startup and extended warranties.

TR1 Series drives are available in a NEMA/UL Type 1 vertical design with disconnect and input fuses. This configuration provides a compact unit that is an ideal fit in crowded equipment rooms.

A side-by-side bypass package is also offered for all voltages and sizes. A broad range of standard and engineered-to-order configurations are available.

All drives and option packages are factory built and carry UL and C-UL listings. All drives and option packages are built in facilities certified ISO 9001 and ISO 14001.

Options to Fit the Environment

The TR1 can meet the demands of the most rigorous HVAC environments.

Indoor Environments

- NEMA/UL Type 1 – all drives are available as standard in a NEMA/UL Type 1 enclosure. This enclosure is suitable for use in relatively clean and dry indoor environments.
- NEMA/UL Type 12 – all drives except 600 volt units below 100 HP are also available in a NEMA/UL Type 12 enclosure. This enclosure is suitable for use in indoor locations that may be too dirty for NEMA 1 enclosures.

The side-by-side option packages are available in both NEMA/UL Type 1 and NEMA/UL Type 12 enclosures.

Outdoor Environments

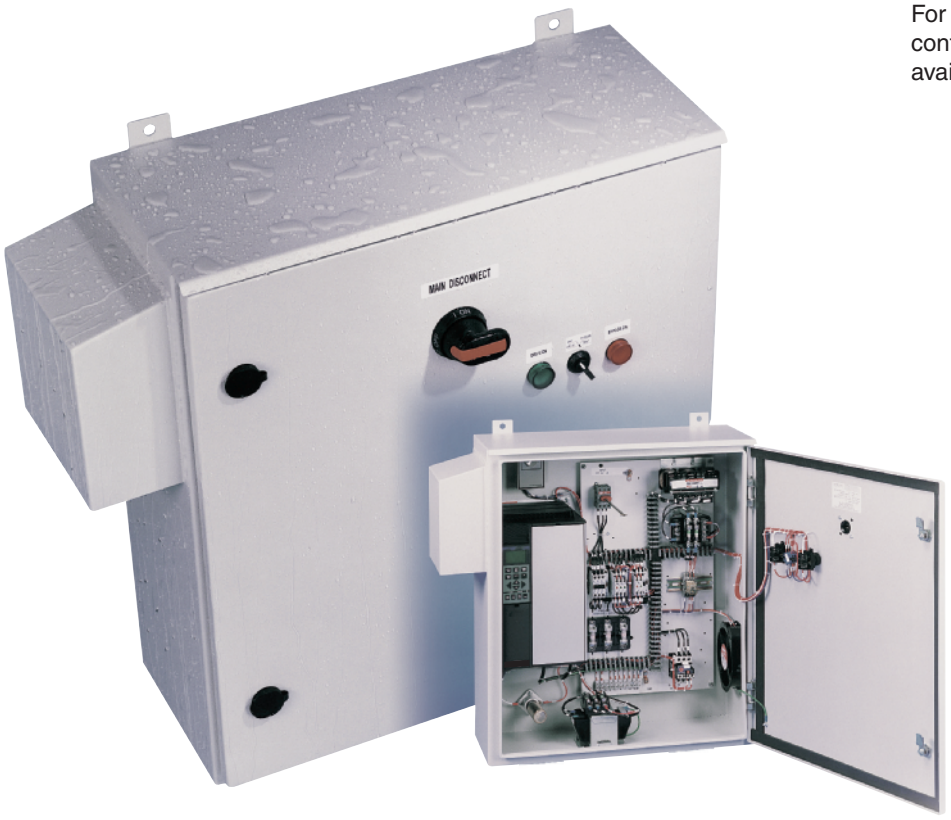
TR1 Series drives through 75 HP at 460 or 600 volts and 30 HP at 208 or 230 volts may also be supplied with a UL-listed Type 3R enclosure suitable for outdoor use. These rainproof enclosures allow the versatile TR1 Series drive to be located with all of its options on a rooftop or other outdoor location. Enclosure fans help keep the drive within its temperature limits in high ambient temperatures, and a thermostatically controlled heater helps prevent condensation in cool, damp environments.

It is recommended that all Type 3R enclosures be located out of direct sunlight.

A made-to-order outdoor enclosure may be supplied for larger drives.

Moist or Corrosive Environments

For moist or corrosive atmospheres, conformal coated circuit boards are available for all drives.



UL-listed Type 3R outdoor enclosure with drive and three-contactor bypass.

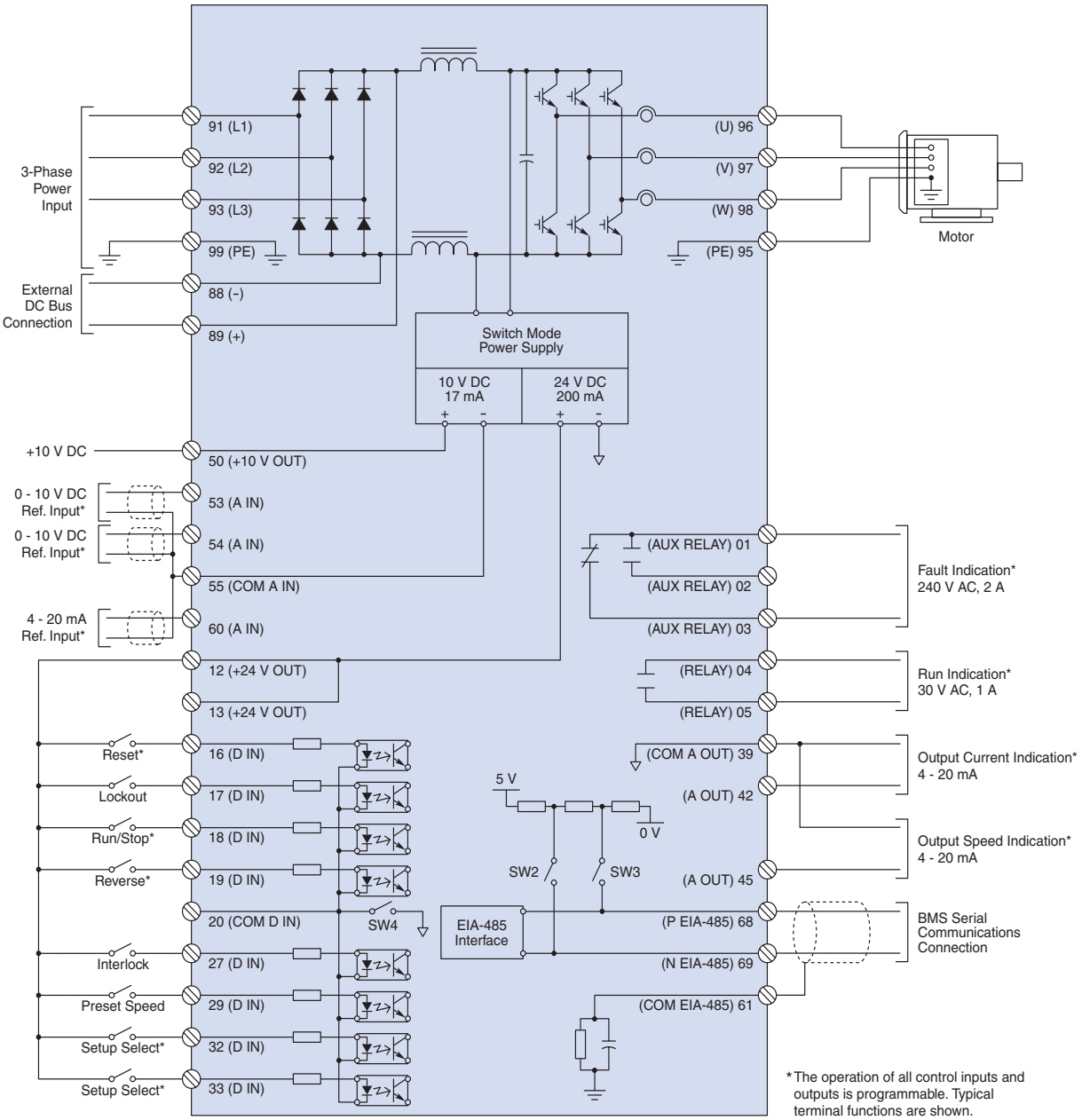
TR1 Series VFD Performance Data

Input Voltages, select model based on input voltage	200 through 240; 380 through 460, or 550 through 600 V AC
Motor Voltages	200, 208, 220, 230, 240, 380, 400, 415, 440, 460, 550 or 575 V AC
Input Voltage Range for Full Output	Nominal ±10%
Undervoltage Trip Point	164, 313, or 394 V AC
Overvoltage Trip Point	299, 538, or 690 V AC
Input Frequency	50 or 60 Hz, ±2 Hz
Output Frequency	Selectable 0 to 120 Hz
Drive Efficiency	97% or greater at full load and nominal motor speed
Input Section	Full wave three phase bridge rectifier
Output Section	Insulated gate bipolar transistors (IGBT)
Input Displacement Power Factor	0.98 or greater at all speeds and loads
Follower Signal	0 to 5 V DC, 0 to 10 V DC, 0 to 20 mA, 4 to 20 mA fully selectable, direct and inverse acting
Lost Analog Reference Action	Selectable to go to a preset speed, go to maximum speed, stay at last speed, stop, turn off, or stop and trip
Time Delay for Lost Analog Reference Action	1 to 99 sec.
Output Current Limit Setting	Adjustable to 110% of drive rating
Current Limit Timer	0 to 60 sec. or infinite
Adjustable Maximum Speed	From minimum speed setting to 120 Hz
Adjustable Minimum Speed	From maximum speed setting to 0 Hz
Adjustable Acceleration Time	To 3,600 sec. to base speed
Adjustable Deceleration Time	To 3,600 sec. from base speed
Adjustable Auto Restart Time Delay	0 to 600 sec.
Starting Torque	Constant torque until commanded speed reached
Breakaway Torque Time (1.6 times drive rated current)	0.0 to 0.5 sec.
Display Languages	English, Spanish, French, German, Italian, Portuguese, Swedish, Dutch, Danish
Maximum Number of Preset Speeds	16
Maximum Number of Frequency Stepovers	4
Maximum Number of Accel/Decel Rates	4
Number of Programmable Digital Inputs	8
Number of Programmable Analog Inputs	Three: 2 voltage, 1 current
Number of Programmable Analog Outputs	2
Number of Programmable Relay Outputs	1 standard Form A 30 V AC, 1 A, 1 standard Form C 240 VAC, 2 A, 1 or 4 additional optional
Low Frequency and High Frequency Warnings	0 to 120 Hz
Low Current and High Current Warnings	0 to maximum current
Low Reference and High Reference Warnings	-999,999 to 999,999
Low Feedback and High Feedback Warnings	-999,999 to 999,999
Start Voltage	0 to 10%
Delayed Start	0 to 120 sec.
DC Braking Time	0 to 60 sec.
DC Braking Start	0 to maximum frequency
DC Braking Current	0 to 50% of rated motor current
Automatic Restart Attempts	0 to 20 or infinite
Automatic Restart Time Delay	0 to 600 sec. between each attempt
Relay ON Delay and Relay OFF Delay (for the standard Form C relay and 4 relay option)	0 to 600 sec.
Drive and Options Enclosure	NEMA/UL Types 1 and 12; 4 and 3R optional
Ambient Operating Temperature Range	14°F to 104°F (-10°C to 40° C) except NEMA/UL Type 1 models as noted on p. 14
Humidity	<95%, non-condensing
Maximum Elevation without Derate	3,300 ft. (1000 m)

The diagram below shows how a TRANE TR1 Series VFD typically interfaces with other components in the HVAC system. The terminal numbers and functions are identical on all TRANE TR1 Series VFDs.

The analog and digital input terminals, and the analog and relay output terminals are all programmable. The functions shown here are typical, but show only a small portion of the total capability.

The standard EIA-485 connections allow direct communication with Johnson Controls Metasys® N2, Siemens Apogee® FLN, and Modbus RTU networks. An optional relay output card (not shown) can provide one or four additional Form C relays.



*The operation of all control inputs and outputs is programmable. Typical terminal functions are shown.

TR1 Series VFD Technical Specifications

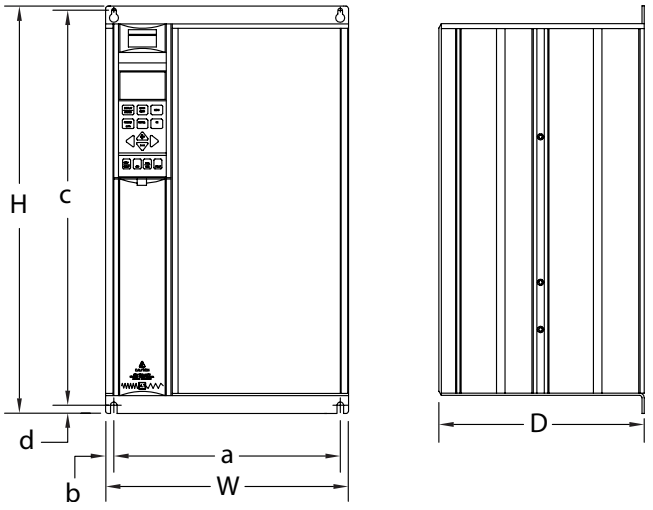
Model Number	Maximum Nominal Output HP	Maximum Drive Output Current*						
		208V		230V				
		Drive Only	Drive w/ Panel	Drive Only	Drive w/ Panel	380V	460V	600V
TR1 6002	1½	6.9	6.6	6.9	6.6	3.0	3.0	2.4
TR1 6003	2	7.8	7.5	7.8	7.5	4.1	3.4	2.7
TR1 6004	3	11.0	10.6	11.0	10.6	5.6	4.8	3.9
TR1 6006	5	17.5	16.7	17.5	16.7	10.0	8.2	6.1
TR1 6008	7½	26.0	24.2	26.0	24.2	13.0	11.0	9.0
TR1 6011	10	33.0	30.8	33.0	30.8	16.0	14.0	11.0
TR1 6016	15	48.3	46.2	48.3	46.2	24.0	21.0	17.0
TR1 6022	20	62.1	59.4	62.1	59.4	32.0	27.0	22.0
TR1 6027	25	78.2	74.8	78.2	74.8	37.5	34.0	27.0
TR1 6032	30	92.0	88.0	92.0	88.0	44.0	40.0	32.0
TR1 6042	40	120	114	104	104	61.0	52.0	41.0
TR1 6052	50	143	143	130	130	73.0	65.0	52.0
TR1 6062	60	170	169	154	154	90.0	77.0	62.0
TR1 6072	75					106	106	77.0
TR1 6102	100					147	130	108
TR1 6122	125					177	160	131
TR1 6152	150					212	190	155
TR1 6172	200					260	240	192
TR1 6222	250					315	302	242
TR1 6272	300					395	361	290
TR1 6352	350					480	443	344
TR1 6402	450					600	540	400
TR1 6502	500					658	590	500
TR1 6552	550					745	678	
TR1 6602	600					800	730	570
TR1 6652	600							630

*Max drive output current rating of drive must always equal or exceed nameplate running amps of motor(s).

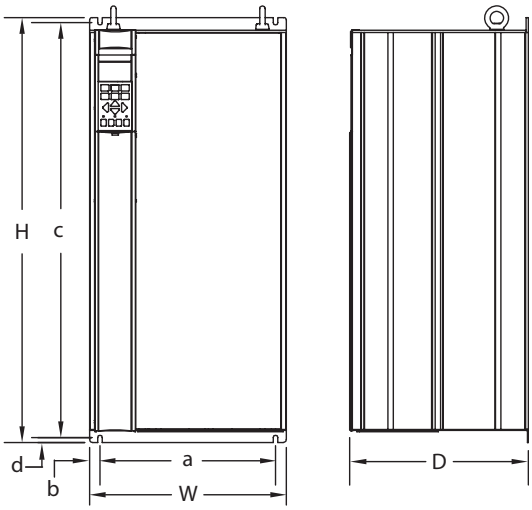
NEMA/UL Type 1 models are suitable for operation at a maximum ambient temperature of 122°F (50°C) when used with motor leads of 50 ft. (15 m) or less.

Dimensions

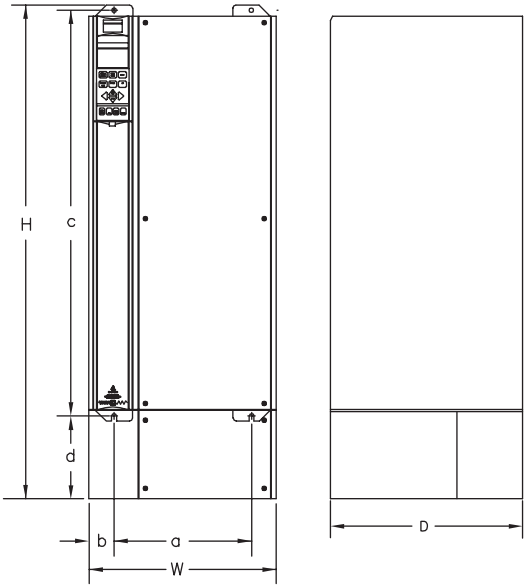
Basic Drive NEMA/UL Type 1



Drawing 1



Drawing 2



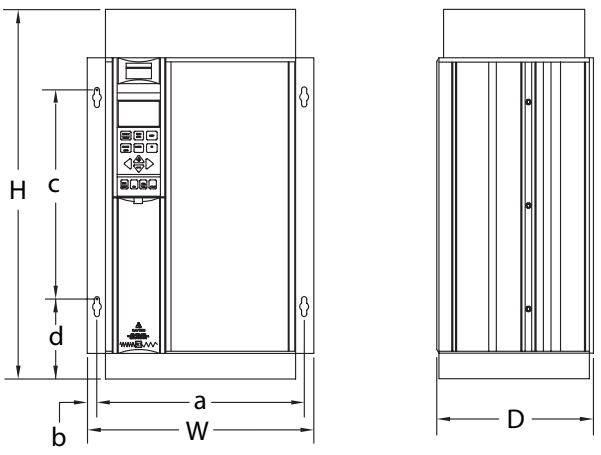
Drawing 3

Model Number				NEMA/UL Type 1 Dimensions (inches)							Weight	
208 V	380 V	460 V	600 V	H	W	D	a	b	c	d	(lbs)	Drawing
TR1 6002-6003	TR1 6002-6005	TR1 6002-6004	—	15.55	8.66	6.30	7.87	0.39	15.12	0.24	18	1
TR1 6004	TR1 6006-6011	TR1 6006-6011	TR1 6002-6011	15.55	8.66	7.87	7.87	0.39	15.12	0.24	23	1
TR1 6006-6011	TR1 6016-6027	TR1 6016-6027	TR1 6016-6027	22.05	9.53	10.24	7.87	0.83	21.26	0.39	51	2
TR1 6016-6022	TR1 6032-6042	TR1 6032-6042	TR1 6032-6042	27.56	9.53	10.24	7.87	0.83	26.77	0.39	66	2
TR1 6027-6032	TR1 6052-6072	TR1 6052-6072	TR1 6052-6072	31.50	12.13	11.65	10.63	0.75	30.71	0.39	95	2
—	TR1 6102-6122	TR1 6102-6122	—	31.49	14.57	13.19	13.00	0.79	30.72	0.38	119	2
TR1 6042-6062	—	—	—	37.56	14.57	13.19	10.63	1.97	30.71	6.46	267	3

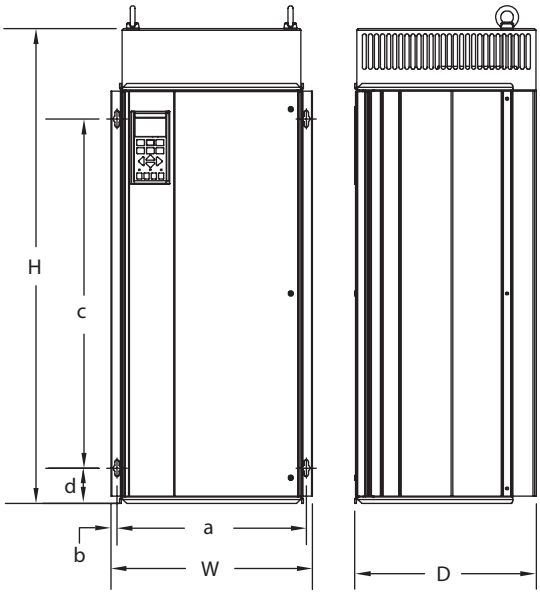
Note: dimensions for 230 V units are identical to 208 V units of same power size.

Dimensions

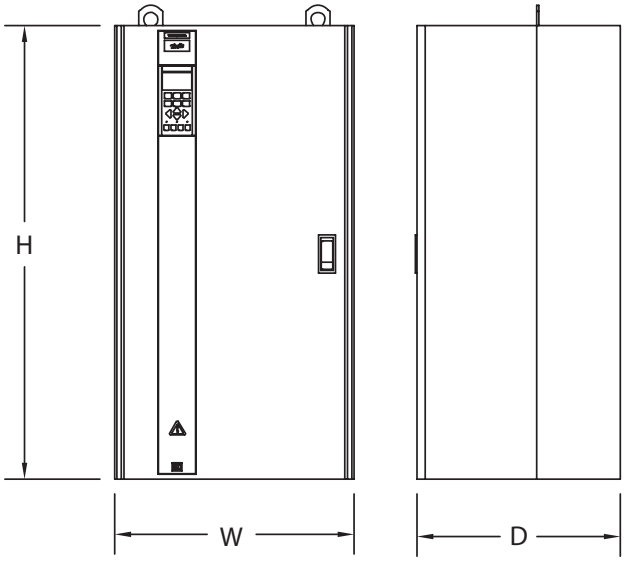
Basic Drive NEMA/UL Type 12



Drawing 1



Drawing 2

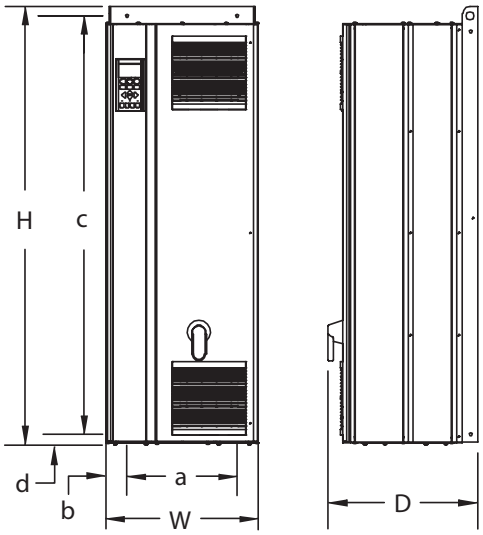


Drawing 3

Model Number			NEMA/UL Type 12 Dimensions (inches)							Weight	
208 V	380 V	460 V	H	W	D	a	b	c	d	(lbs)	Drawing
TR1 6002-6003	TR1 6002-6005	TR1 6002-6004	18.11	11.10	7.68	10.16	0.47	10.24	2.66	25	1
TR1 6004	TR1 6006-6011	TR1 6006-6011	20.87	11.10	7.68	10.16	0.47	12.99	2.66	31	1
TR1 6006-6016	TR1 6016-6032	TR1 6016-6032	31.89	13.78	11.02	12.83	0.47	22.05	2.66	92	2
TR1 6022-6032	TR1 6042-6072	TR1 6042-6072	37.01	15.75	11.02	14.76	0.47	27.17	2.66	134	2
—	TR1 6102-6122	TR1 6102-6122	36.93	15.67	14.13	14.72	0.47	27.17	2.76	170	2
TR1 6042-6062	—	—	36.89	19.49	16.57	—	—	—	—	273	3

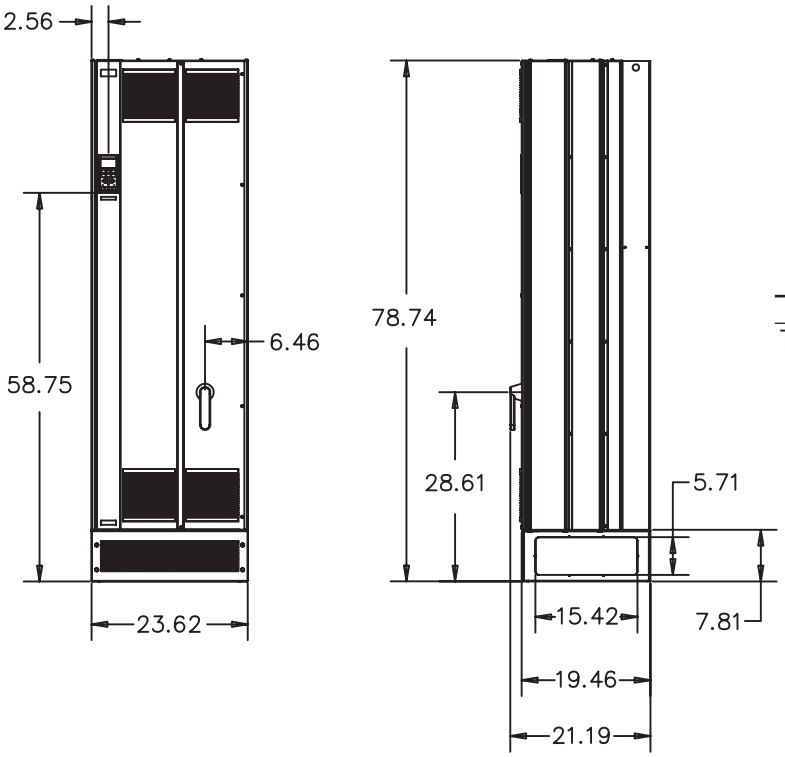
Dimensions

Basic Drive NEMA/UL Types 1 and 12



Model Number			Dimensions (inches)							Weight
380 V	460 V	600 V	H	W	D	a	b	c	d	(lbs)
TR1 6152-6172	TR1 6152-6172	TR1 6102-6222	47.5	16.5	16.4	12.0	2.3	45.4	1.1	229
TR1 6222-6352	TR1 6222-6352	TR1 6272-6402	62.5	16.5	16.4	12.0	2.6	60.4	1.1	332

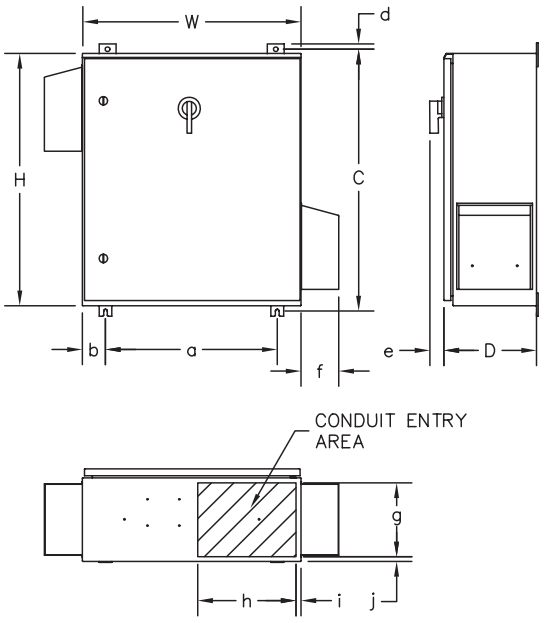
Inches



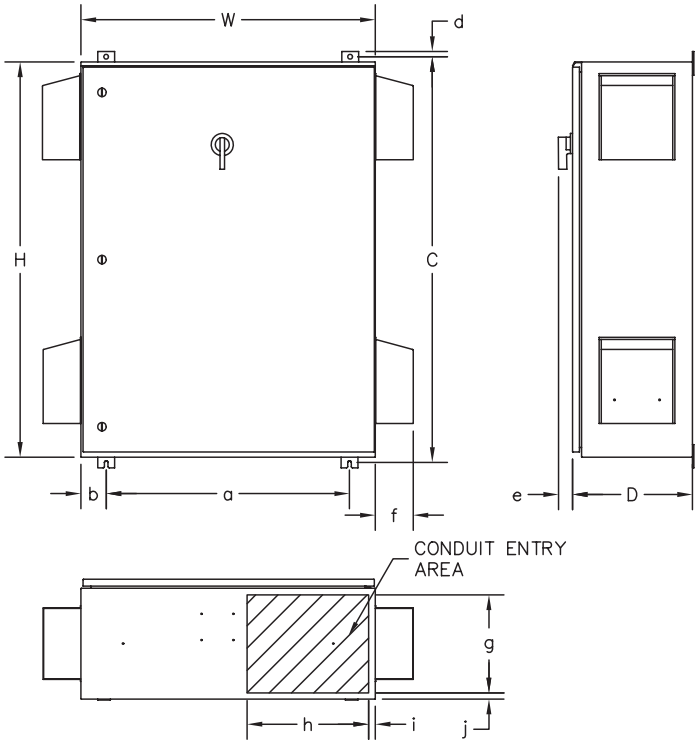
Model Number			Weight
380 V	460 V	600V	(lbs)
TR1 6402-6602	TR1 6402-6602	TR1 6402-6652	689

Dimensions

Basic Drive NEMA/UL Type 3R Enclosure



Drawing 1



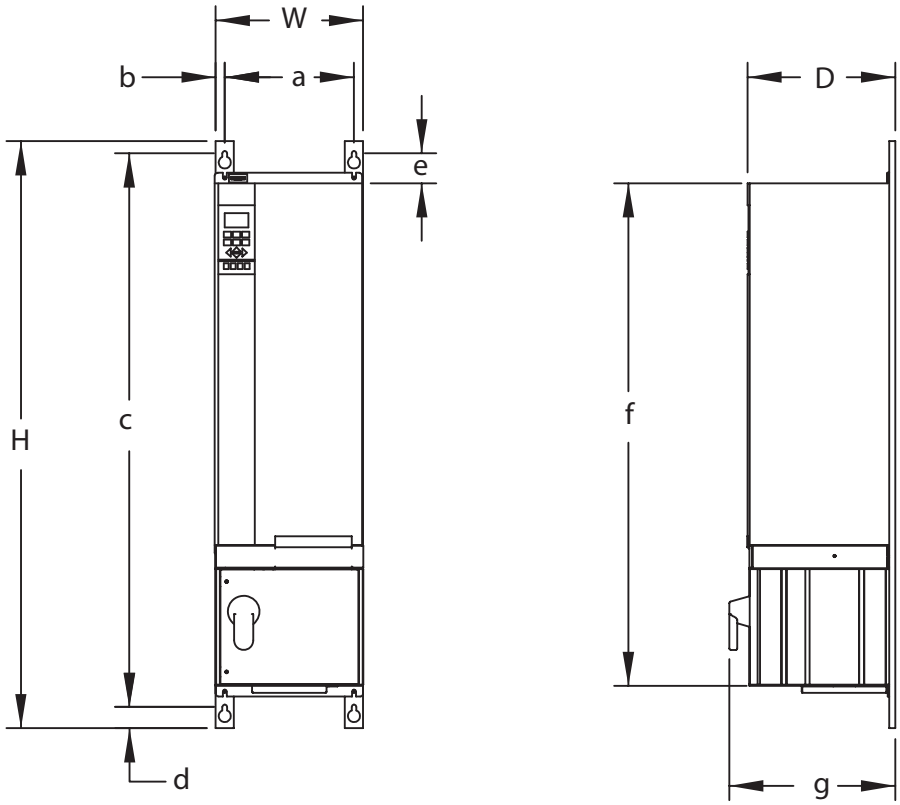
Drawing 2

Enclosure houses drive and all standard options.

Model Number			Dimensions (inches)													Weight*	
208 V	460 V	600 V	H	W	D	a	b	c	d	e	f	g	h	i	j	(lbs)	Drawing
TR1 6002-6004	TR1 6002-6011	TR1 6002-6011	30.00	26.00	11.00	20.00	3.00	31.25	0.63	1.77	4.50	6.90	12.00	2.00	2.00	140	1
TR1 6006-6011	TR1 6016-6027	TR1 6016-6027	38.00	28.00	12.30	22.00	3.00	39.25	0.63	1.77	4.50	8.20	9.70	2.00	2.00	200	1
TR1 6016-6022	TR1 6032-6042	TR1 6032-6042	38.00	28.00	12.30	22.00	3.00	39.25	0.63	1.77	4.50	8.20	9.70	2.00	2.00	250	2
TR1 6027-6032	TR1 6052-6072	TR1 6052-6072	47.00	35.00	14.25	29.00	3.00	48.25	0.63	1.77	4.50	10.20	14.25	2.00	2.00	330	2

Dimensions

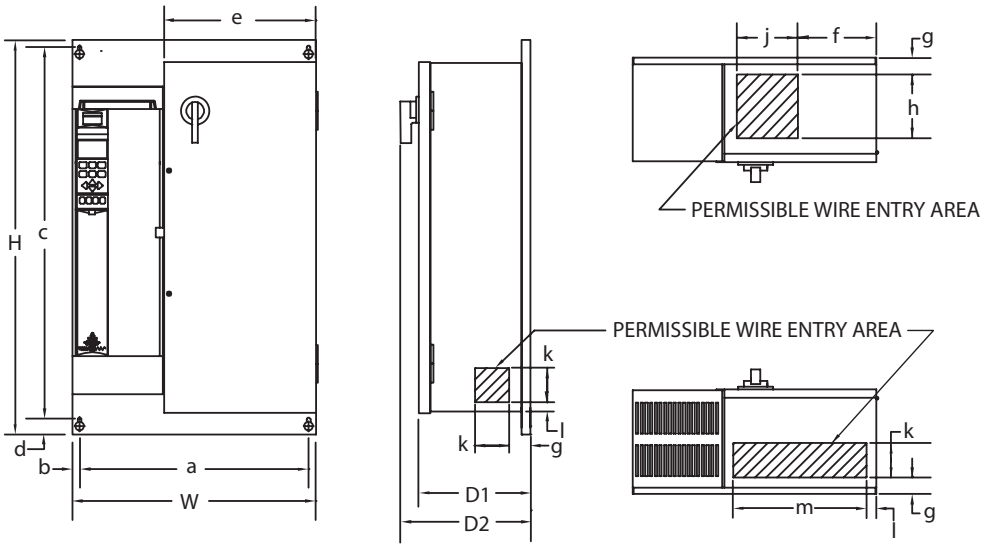
Integrated Fused Disconnect NEMA/UL Type 1



Contact TRANE for options available with integrated enclosures

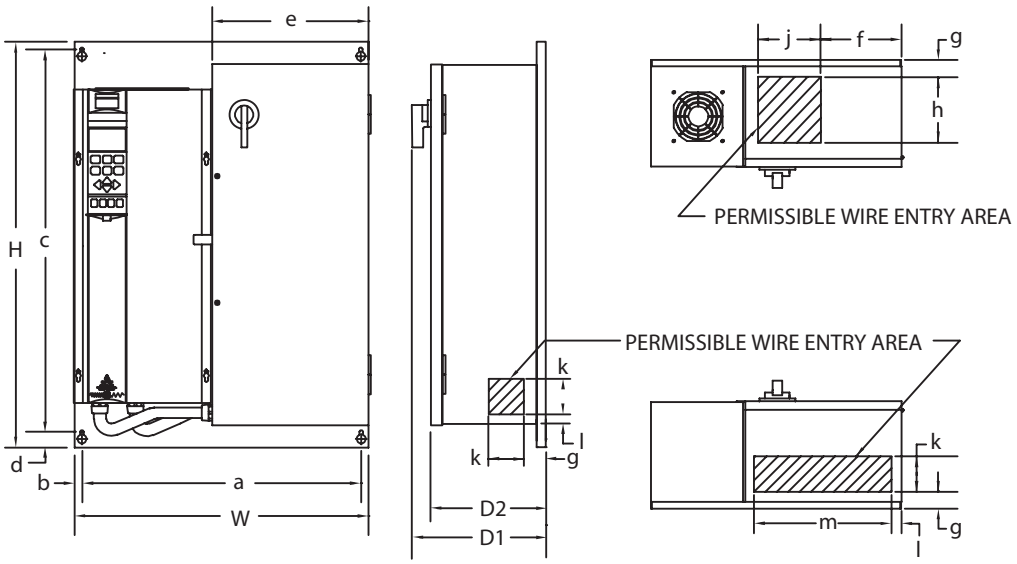
Model Number			Dimensions (inches)										Weight*
208 V	460 V	600 V	H	W	D	a	b	c	d	e	f	g	(lbs)
TR1 6002-6004	TR1 6002-6011	TR1 6002-6011	28.66	9.37	8.39	7.87	0.75	25.91	1.75	2.64	21.50	9.88	43
TR1 6006-6011	TR1 6016-6027	TR1 6016-6027	37.34	9.53	10.74	7.87	0.75	34.59	1.75	2.47	30.39	12.21	56
TR1 6016-6022	TR1 6032-6042	TR1 6032-6042	42.85	9.53	10.74	7.87	0.75	40.10	1.75	2.47	35.91	12.21	78
TR1 6027-6032	TR1 6052-6072	TR1 6052-6072	48.28	12.13	12.15	10.63	0.75	45.53	1.75	2.50	41.34	13.65	103

NEMA/UL Type 1



Model Number			Dimensions (inches)																Wt.*
208 V	460 V	600 V	H	W	D1	D2	a	b	c	d	e	f	g	h	j	k	l	m	(lbs)
TR1 6002-6004	TR1 6002-6011	TR1 6002-6011	30.40	24.85	8.59	9.09	23.35	0.75	28.03	1.64	16.14	7.50	1.75	4.00	6.50	4.50	1.50	12.00	90
TR1 6006-6022	TR1 6016-6042	TR1 6016-6042	41.28	25.50	10.95	11.45	24.00	0.75	38.89	1.64	16.14	7.50	1.75	4.00	6.50	4.50	1.50	12.00	158
TR1 6027-6032	TR1 6052-6072	TR1 6052-6072	50.81	33.41	12.36	12.86	31.61	0.90	48.35	1.64	21.36	12.00	1.75	4.00	7.00	4.50	1.50	15.00	229

NEMA/UL Type 12

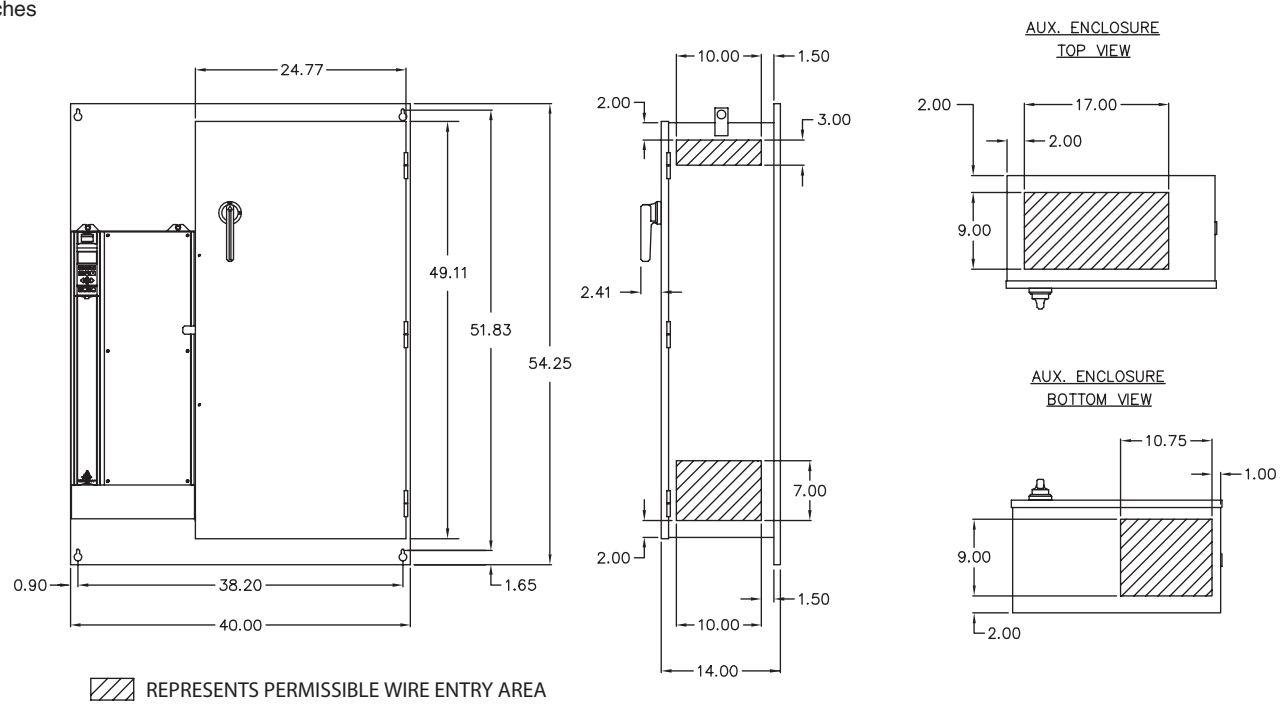


Model Number		Dimensions (inches)																Wt.*
208 V	460 V	H	W	D1	D2	a	b	c	d	e	f	g	h	j	k	l	m	(lbs)
TR1 6002-6004	TR1 6002-6011	30.40	27.13	7.77	8.27	25.63	0.75	28.03	1.64	16.14	7.50	1.75	4.00	6.50	4.50	1.50	12.00	116
TR1 6006-6016	TR1 6016-6032	41.28	29.84	11.78	12.28	28.34	0.75	39.54	1.64	16.14	7.50	1.75	4.00	6.50	4.50	1.50	12.00	193
TR1 6022-6032	TR1 6042-6072	50.81	36.98	11.78	12.28	35.18	0.75	48.35	1.64	21.36	12.00	1.75	4.00	7.00	4.50	1.50	15.00	267

Dimensions

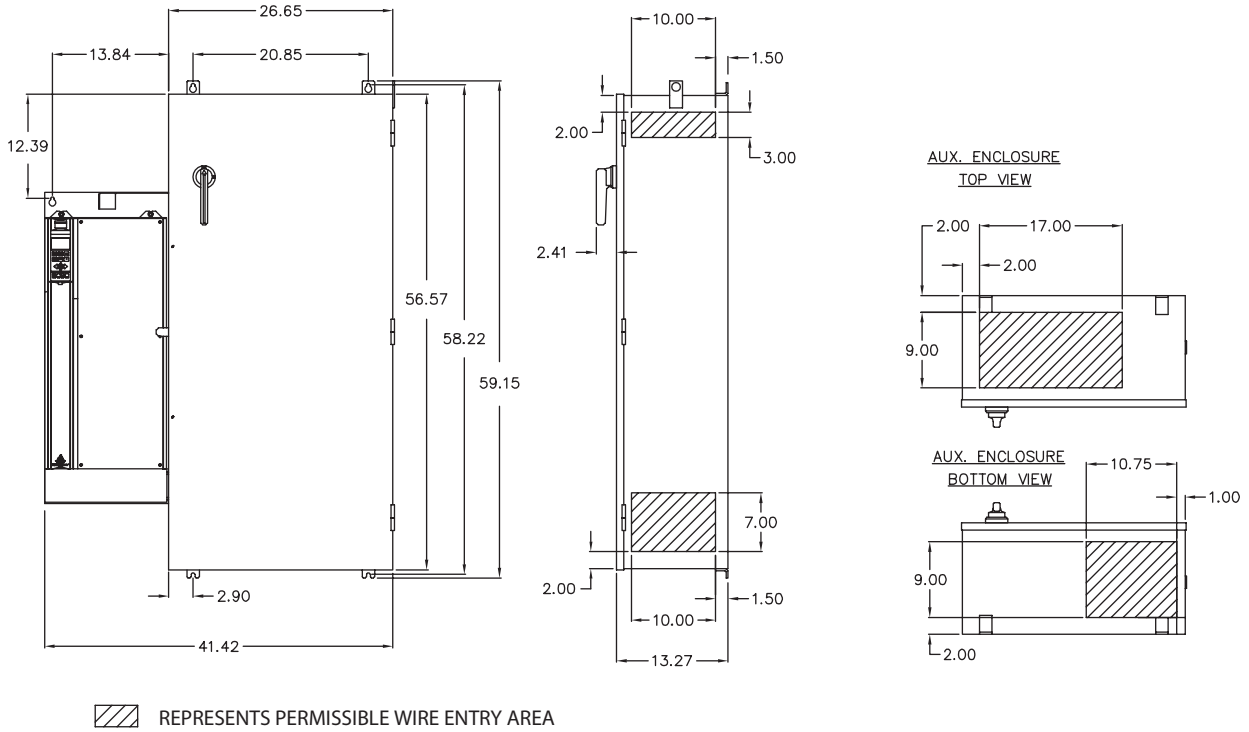
Drive with Bypass Enclosure NEMA/UL Type 1

Inches



Model Number		Weight*
208 V	460 V	(lbs)
TR1 6042-6062	TR1 6102-6122	454

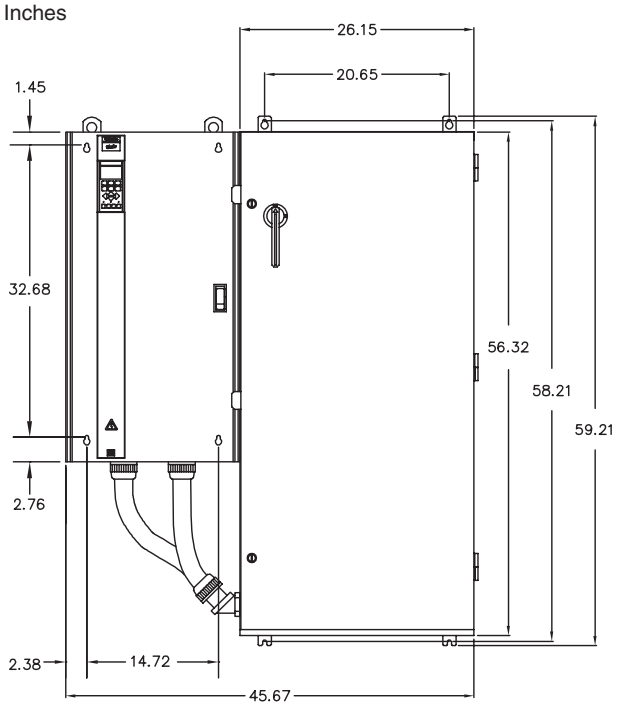
The enclosure shown below is required for dual motor or contactor motor selection. All other standard options will fit in the enclosure above.

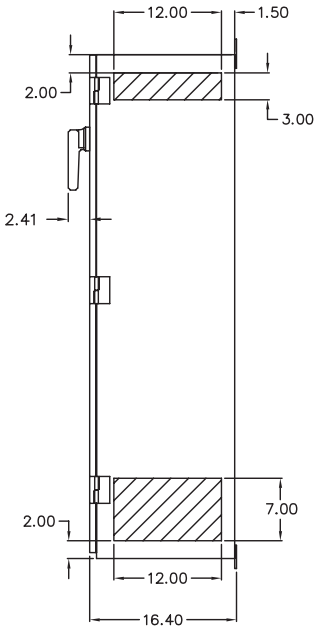


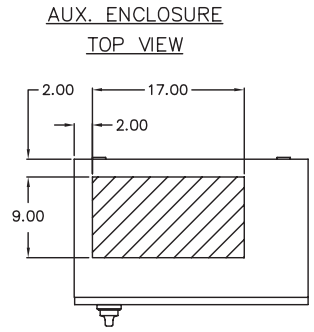
Dimensions

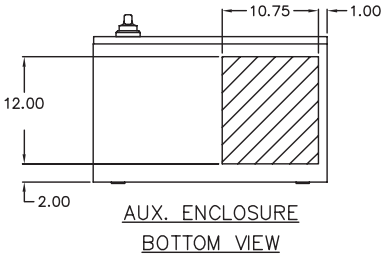
Drive with Bypass Enclosure NEMA/UL Type 12

Inches



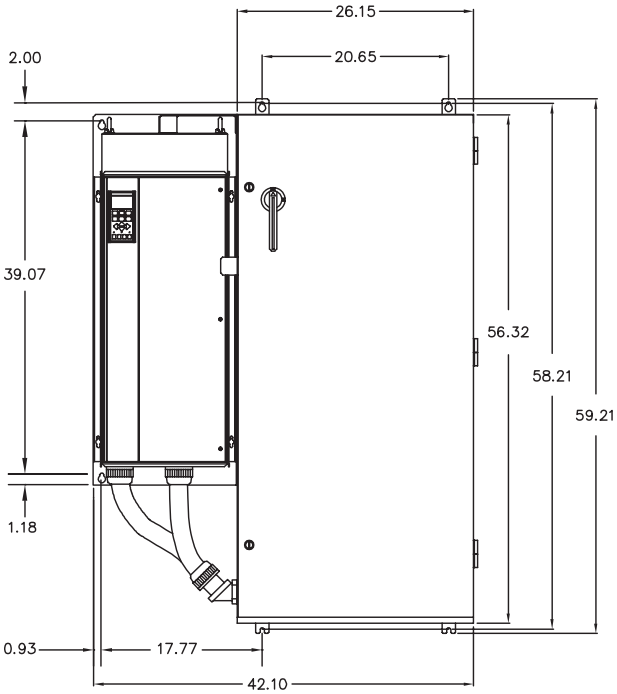


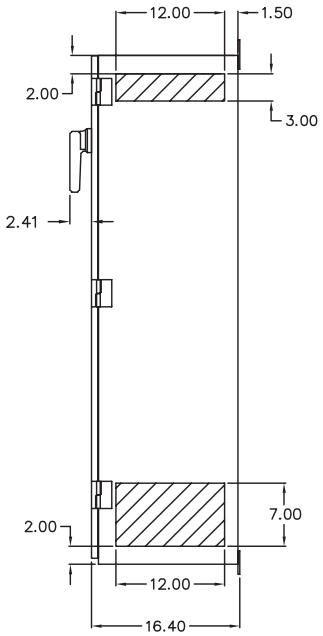


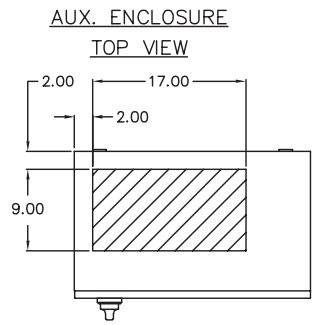


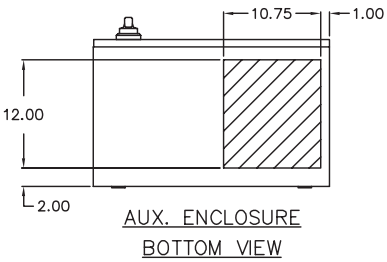
REPRESENTS PERMISSIBLE WIRE ENTRY AREA

Model Number		Weight*
208 V (above)	460 V (below)	(lbs)
TR1 6042-6062	TR1 6102-6122	460









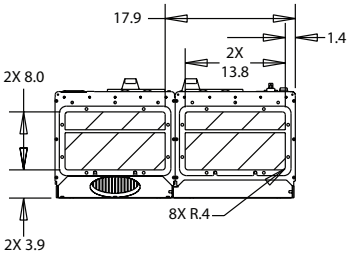
REPRESENTS PERMISSIBLE WIRE ENTRY AREA

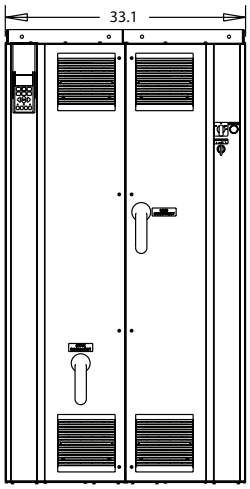
Dimensions

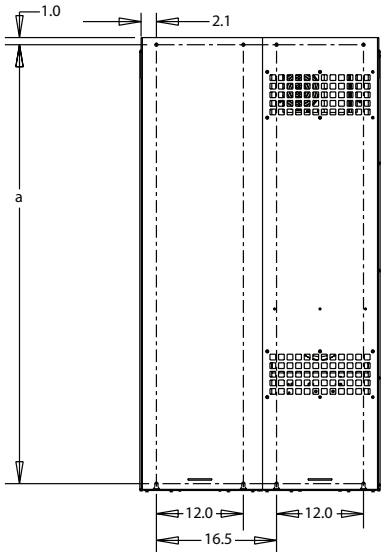
Drive with Bypass Enclosure NEMA/UL Types 1 & 12

Inches

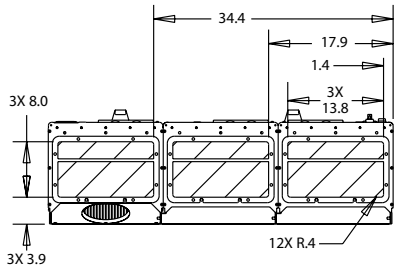
2-door

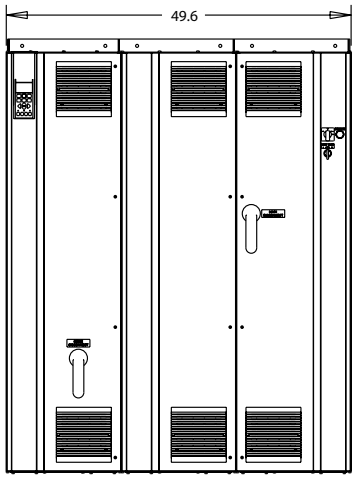


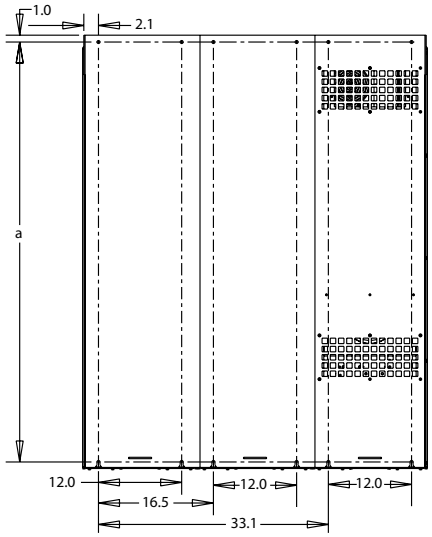




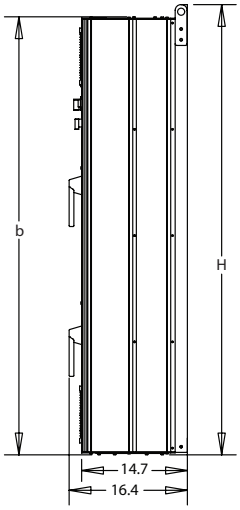
3-door







Side view of 2-door and 3-door



Model Number					Wt. (lbs)*	
460 V	600 V	H	a	b	2-door	3-door
TR1 6152-6172	TR1 6102-6172	47.6	45.4	45.9	390	650
TR1 6222-6352	TR1 6222-6402	62.5	60.4	60.8	576	920

The following options will be supplied in the 3-door enclosure:

- Bypass in combination with dual motor
- Bypass in combination with contactor motor selection
- Bypass in combination with input reactor
- Bypass in combination with output LC filter

All other standard options will be supplied in the two-door enclosure.

*All weights are estimated and will vary depending on options ordered.

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

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

Literature Order Number	TR1-SLB005-EN
File Number	—
Supersedes	July 2006
Stocking Location	Commercial Communications, Inc.