VLT® MICRO Series

Drives Solutions

VLT® MICRO Series Overview

VLT MICRO (230 VAC 3Ø) shown actual size

The Ideal Drive for Limited Space

The VLT® MICRO is the perfect drive for OEMs and panel builders needing a small AC motor control in the 1/2 to 2 HP, 230 VAC and 1 to 3 HP, 460 VAC range. It offers a small footprint, sophisticated control and a user friendly keypad. To top it off, it has excellent reliability and simple functionality ... all at a low price!

Contents

VLT MICRO Features and Benefits

- Simple installation
- Panel or optional DIN rail mount
- Optional remote keypad mounting kit
- Compact overall size saves space and installation cost
- Designed for: 1/2 to 2 HP, 230 VAC constant torque applications and 1 to 3 HP, 460 VAC constant torque applications
- Programmable DC braking makes it easier to adapt the unit to various applications
- All models are enclosed in a protected chassis (IP 20) and are UL and cUL listed
- Easy access to all terminal connections
- Programmable digital inputs and outputs
- Forced air-cooled
- Low noise operation
- Provides DC performance from a low cost and low maintenance AC motor
- Overload current — 150% of rated current for 1 minute
- Automatic voltage regulation
- S-curve or linear ramp profiles
- Momentary power failure restart
- Parameter lock/reset

Applications

- Conveyors
- Pumps
- Fans

Protection Features

- Self-testing
- Over-voltage
- Over-current
- Under-voltage
- Overload
- Over-heating
- External fault
- Electronic thermal
- Ground fault

Options

- Remote keypad kit
- Din rail adaptor kit
- Brake resistors
- EMC filters

Features – Keypad and Display Functions

Built-in software eliminates the need for additional hardware — saving space, time and money

Digital Controls Make Operating a Breeze

The digital keypad/display module comes mounted on the front panel of the VLT MICRO. This module has two functions: display and control. Display shows the current status of the drive. Control provides the programming interface. As you'll see, running the VLT MICRO couldn't be easier!

MODE

Function/Program Mode

Pressing the "MODE" key repetitively displays the status, such as the reference frequency, output frequency, or output current.

ENTER

Enter

Pressing the "ENTER" key stores the parameters in memory.

RUN

Run

This key is used to start operation. It has no effect when the drive is controlled by the external control terminals.

STOP RESET

Stop/Reset

This stops and resets the parameter after faults occur with the drive.

▲ ▼

Up/Down

Press the "Up" or "Down" keys momentarily to change parameter settings. These keys may also be used to scroll through different operating values or parameters.

RUN STOP FWD REV

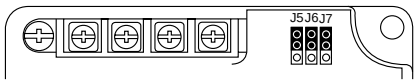
LED Indicators

These indicators light up during RUN, STOP, FWD and REV operations.

Features – Installation and Start-up

Programming

The VLT MICRO is programmed by means of the digital keypad. In order to operate in the Quick Set-Up Mode the Pin Header/Jumpers (located next to the input terminals) should all be set in the up position.



Note: Speed reference is controlled by the Up and Down arrow keys. If a potentiometer is to be used as the speed reference parameter, Parameter 00 will need to be programmed to d01.

Wiring

There are two wiring systems in an AC motor drive: the power wiring and the control circuit. The power wiring terminals are located at the top of the drive. Control Circuit terminals are located at the bottom of drive. All terminals blocks are covered by a plastic housing, which can be lifted to gain access to the terminals. When no connections are made to the control terminals, the drive can be operated by the digital keypad/ display.

Parameter Settings

Set the following parameters according to the motor nameplate:

Maximum motor frequency ..... Parameter 04
Maximum motor voltage ..... Parameter 05
Motor rated current ..... Parameter 52

$$\text{Parameter 52} = \frac{\text{Motor Full Load Amps}}{\text{Drive Max Cont. Amps}} \times 100$$

Set the ramp times:

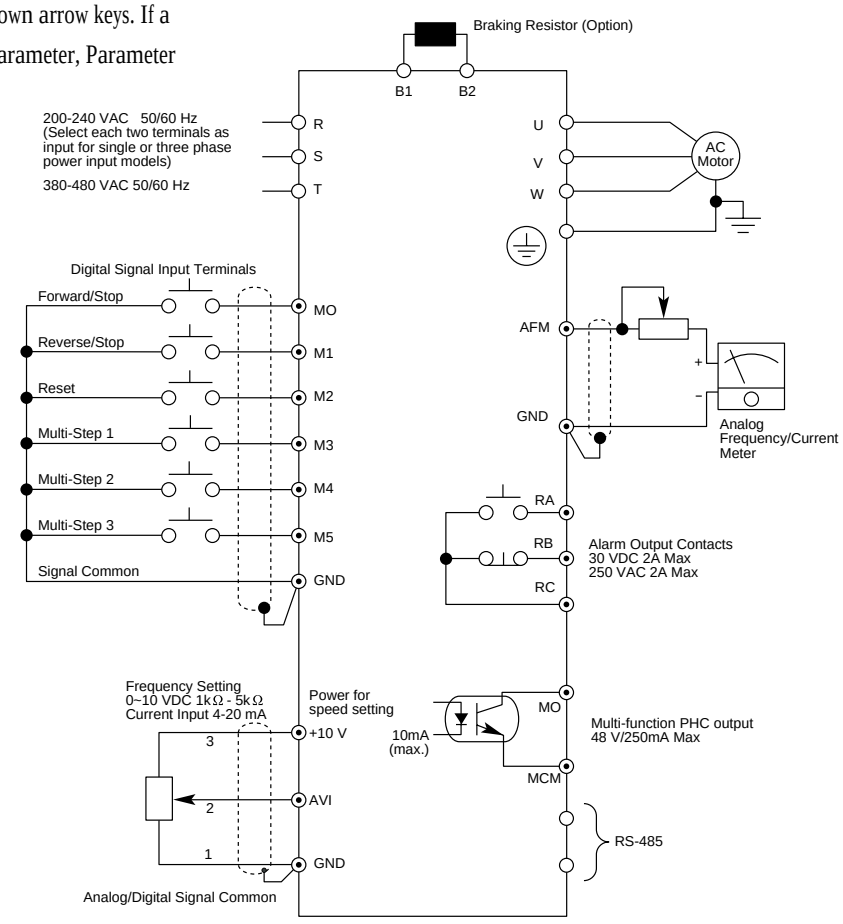
Accel time ..... Parameter 10
Decel time ..... Parameter 11

Set ramp selection:

d00 linear accel/decel ..... Parameter 101

Motor Start

Press the Run key to start the motor. Adjust desired speed using the Up and Down arrow keys.



Performance Data – 1Ø or 3Ø 200-240 VAC

VLT Order Number	1/3Ø UL 1/3Ø UL/CE	176F7300 176F7306	176F7301 176F7307	176F7302 176F7308
Output				
Output Current				
Continuous	(200-240 VAC) [A]	2.5	5.0	7.0
Intermittent	(200-240 VAC) [A]	3.7	7.5	10.5
Continuous KVA	(200-240 VAC) [KVA]	1.0	1.9	2.7
Typical Shaft Output	[HP]	0.5	1.0	2.0
Max. Motor Cable Size	[AWG]	14	14	14
	[mm^2]	2	2	2
Input				
Max. Input Current	(1Ø, 200-240 VAC) [A]	6.3	11.4	15.7
	(3Ø, 200-240 VAC) [A]	2.9	6.3	8.8
Max. Power Cable Size	[AWG]	14	14	14
	[mm^2]	2	2	2
Max. Pre-Fuses[1)]	[A]	10	20	25
Environment				
Estimated Power Loss at Rated Max. Load (240 VAC)	[W]	34	61	94
Enclosure			Protected Chassis (IP 20)	
Weight	1Ø [lbs.]	1.75	2.0	2.25
	3Ø [lbs.]	1.75	1.75	2.0

1) 200-240 VAC; Bussmann JJN type or exact equivalent

Recommended Bussman

Type JJN or JJS Input Fuses	Part Number
0.5 HP 230 VAC 1Ø	JJN 10
1 HP 230 VAC 1Ø	JJN 20
2 HP 230 VAC 1Ø	JJN 25
0.5 HP 230 VAC 3Ø	JJN 10
1 HP 230 VAC 3Ø	JJN 20
2 HP 230 VAC 3Ø	JJN 25

Performance Data – 3Ø 380-480 VAC

VLT Order Number	3Ø UL/CE	176F7312	176F7313	176F7314
Output				
Output Current				
Continuous	(380-480 VAC) [A]	3.0	4.0	5.0
Intermittent	(380-480 VAC) [A]	4.8	6.1	8.1
Continuous KVA	(380-480 VAC) [KVA]	2.3	3.1	3.8
Typical Shaft Output	[HP]	1.0	2.0	3.0
Max. Motor Cable Size	[AWG]	14	14	14
	[mm^2]	2	2	2
Input				
Max. Input Current	(380-480 VAC) [A]	4.2	5.7	7.0
Max. Power Cable Size	[AWG]	14	14	14
	[mm^2]	2	2	2
Max. Pre-Fuses[1)]	[A]	10	15	20
Environment				
Estimated Power Loss at Rated Max. Load (460 VAC)	[W]	59	82	113
Enclosure			Protected Chassis (IP 20)	
Weight	[lbs.]	2.25	2.5	2.75

1) 380-480 VAC; Bussmann JJN type or exact equivalent

Recommended Bussman

Type JJN or JJS Input Fuses	Part Number
1 HP 460 VAC 3Ø	JJS 10
2 HP 460 VAC 3Ø	JJS 15
3 HP 460 VAC 3Ø	JJS 20

General Technical Data

AC Line Supply (R, S, T):

Supply voltage single-phase 200-240 V units ..... 1 x 200/208/220/230/240 V ±10%
Supply voltage three-phase 200-240 V units ..... 3 x 200/208/220/230/240 V ±10%
Supply voltage 380-480 V units ..... 3 x 380/400/415/440/460/480 V ±10%
Supply frequency ..... 50/60 Hz
Max. imbalance of supply voltage ..... ±2% of rated supply voltage
Power factor ..... 0.90/1.0 at rated load
Switching on supply input L1, L2, L3 ..... max. 100 times per
Max short circuit rating ..... 5000 A
Efficiency 0.95

VLT Output Data (U, V, W):

Output voltage ..... 0-100% of supply voltage
Output frequency ..... 0.1 - 400 Hz
Rated motor voltage, 200-240 V units ..... 200/208/220/230/240 V
Rated motor voltage, 380-480 V units ..... 380/400/415/440/460/480 V
Rated motor frequency ..... 50/60 Hz
Switching on output ..... Unlimited
Ramp times ..... 0.1-600 sec.

Torque Characteristics:.

Starting torque ..... 150% for 1 min.
Starting torque ..... 200% for 5 sec.
Acceleration torque 100%
Overload torque ..... 150% for 1 min.

Control Card, Digital Inputs:

Number of programmable digital inputs 6
Terminal nos. M0, M1, M2, M3, M4, M5

Control Card, Analog Inputs:

No. of programmable analog inputs (selectable voltage or current) 1
Terminal number ..... AV 1
Voltage level ..... 0 - 10 VDC
Input resistance, R_i ..... approx. 47 kΩ
Current range ..... 4 - 20 mA
Input resistance, R_i ..... approx. 250 Ω
Resolution ..... 10 bit + sign
All analog inputs are galvanically isolated from the supply voltage.

Control Card Analog Outputs:

Number of programmable analog outputs 1
Terminal numbers ..... AFM
Voltage range at analog output ..... 0 - 10 VDC
All digital and analog outputs are galvanically isolated from the supply voltage.

General Technical Data

Control Card, 10 VDC Supply:

Terminal number ..... +10V
Max. load ..... 10 mA

Digital Output

Number of programmable optocoupler outputs 1
Terminal numbers MO1-MCM
Max. output ..... ≤48 VDC, 50 mA

Control Card, RS485 Serial Communication:

Terminal number ..... RJ -11

Relay Outputs:

No. of programmable relay outputs 1
Terminal numbers ..... RA-RC (N.O.), RB-RC (N.C.) Form C
Max. terminal load rating ..... 120 VAC/28 VDC, 5 A
240 VAC, 2.5 A

Brake Resistor Terminals:

Terminal numbers B1, B2

Cable Lengths and Cross-Sections:

Use 75°C copper wire minimum
Max. motor cable length ..... 165 ft. (50 m)
Max. cable cross-section for line, motor and brake ..... 14 AWG (2.0 mm^2)
Max. cross-section for control terminals ..... 14 AWG (2.0 mm^2)

Control Characteristics:

Frequency range ..... 0.1 - 400 Hz
Resolution on output frequency ..... ±0.1 Hz
Speed, control range (open loop) ..... 1:20 of synchro. speed
Speed, accuracy (open loop) ..... < 1800 rpm: max. error 2%
> 1800 rpm: max. error of 0.5% of actual speed
All control characteristics are based on a 4-pole asynchronous motor

Environment:

Enclosure ..... Protected Chassis (IP 20)
Vibration test ..... 1 g less than 20 Hz, 0.6 G 20-50 Hz
Max. relative humidity ..... less than 90% (non-condensing)
Ambient temperature ..... –10 - +50°C
Temperature during storage/transport ..... –20 - +60°C
Max. altitude above sea level ..... 3300 ft. (1000 m)

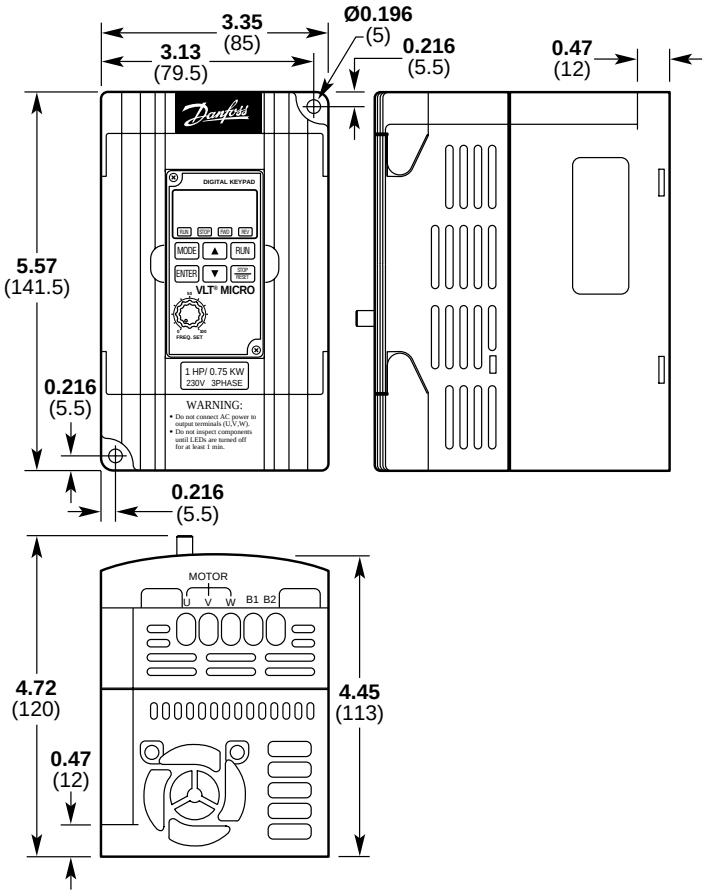
VLT MICRO Series Protection:

- Self-testing, over-voltage, over-current, under-voltage, overload, over-heating, external fault, electronic thermal, ground fault

Mechanical Dimensions and Mounting Requirements

1/3Ø 200-240 VAC

in (mm)

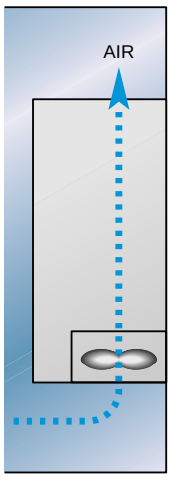


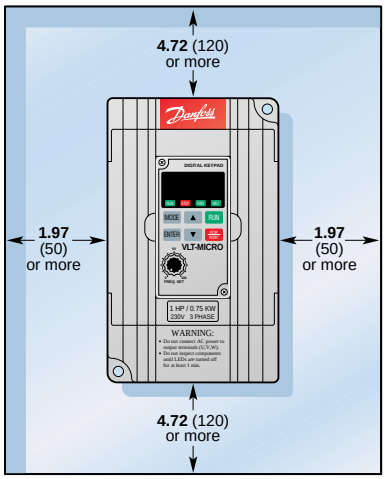
VLT MICRO Order Numbers

176F7300, 176F7301, 176F7302 (1/2-2 HP) 200-240 VAC

Mounting Requirements

Installation of the VLT MICRO is simple! The drive should be installed vertically to provide proper ventilation with adequate space between the drive and a wall or other equipment, and should be mounted in an enclosure appropriate for the application environment.

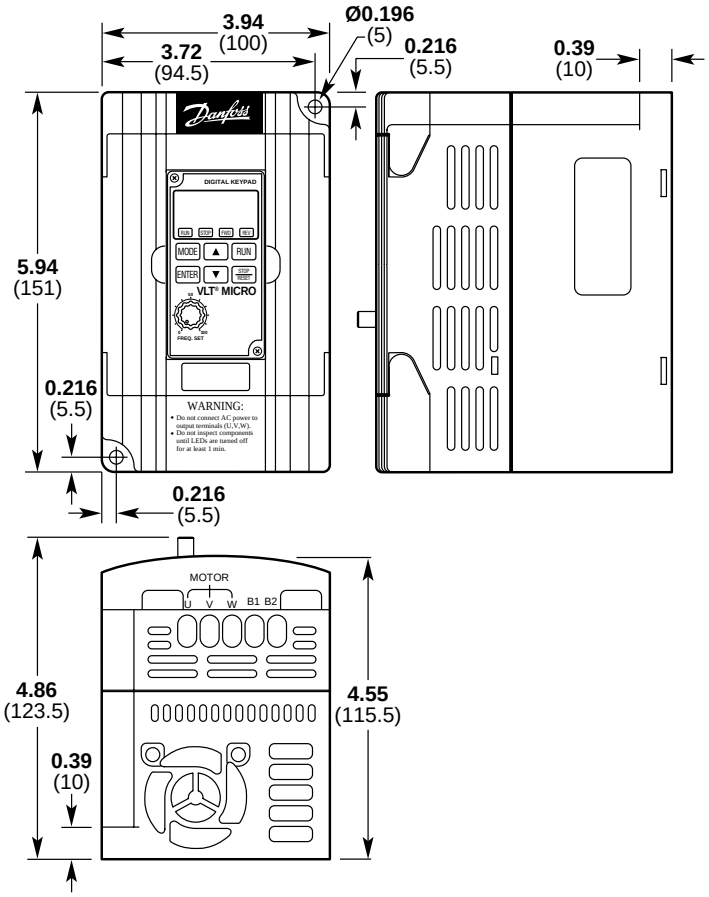




Mechanical Dimensions and Mounting Requirements

in (mm)

1/3Ø 200-240 VAC CE Models
3Ø 380-480 VAC CE Models



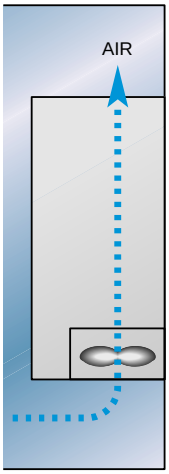
VLT MICRO Order Numbers

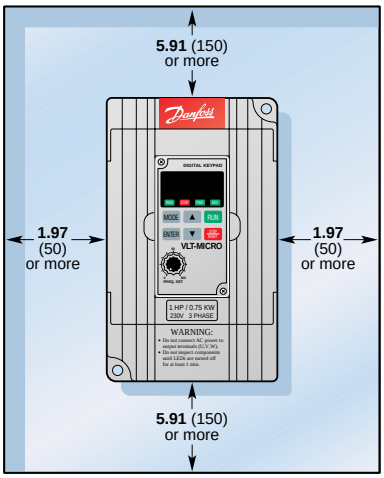
176F7306, 176F7307, 176F7308 (1/2-2 HP) 200-240 VAC

176F7312, 176F7313, 176F7314 (1-3 HP) 380-480 VAC

Mounting Requirements

Installation of the VLT MICRO is simple! The drive should be installed vertically to provide proper ventilation with adequate space between the drive and a wall or other equipment, and should be mounted in an enclosure appropriate for the application environment.



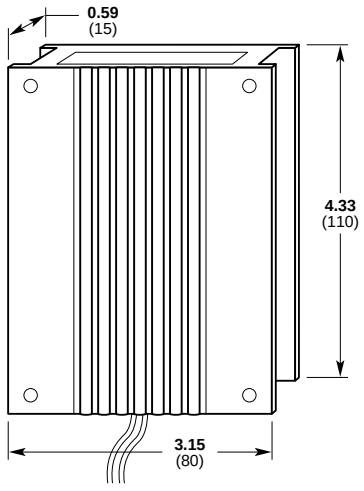


Options – Brake Resistors

200-240 VAC VLT MICRO Brake Resistors

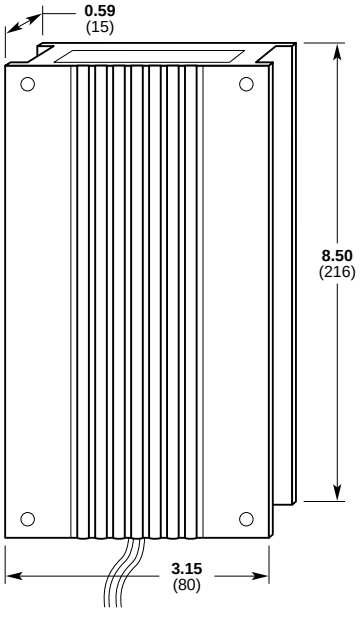
HP	VAC	Ohms	Pmax (W)	Order Number	Duty Cycle
0.5	200-240	330	250 (A)	175U1003	30%
0.5	200-240		160	175U0900	40%
0.75	200-240	220	250 (A)	175U1004	20%
0.75	200-240		250 (A)	175U0901	40%
1	200-240	150	250 (A)	175U1005	14%
1	200-240	150	250 (A)	175U0989	30%
1	200-240		320	175U0902	40%
2	200-240	72	500 (B)	175U0992	15%
2	200-240		850	175U0903	40%
380-2480 VAC VLT MICRO Brake Resistors					
1	380-460	620	250 (A)	175U1001	10%
1	380-460	620	500 (B)	175U0982	30%
1	380-460		320	175U0910	40%
2	380-460	310	500 (B)	175U0984	15%
2	380-460		850	175U0912	40%
3	380-460	210	500 (B)	175U0987	5%
3	380-460		1000	175U0913	40%

Drawing A: 250 W Resistors



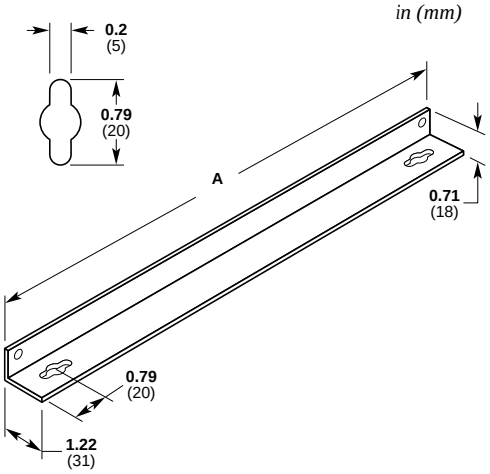
in (mm)

Drawing B: 500 W Resistors



VLT MICRO Brake Resistor Mounting Brackets

in (mm)

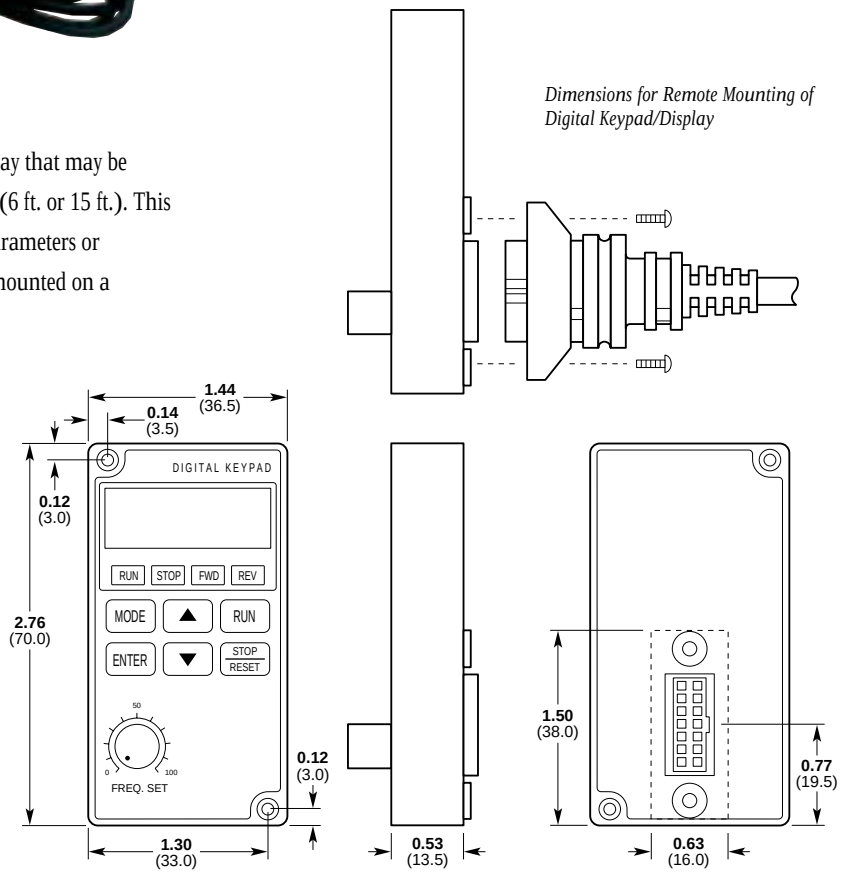


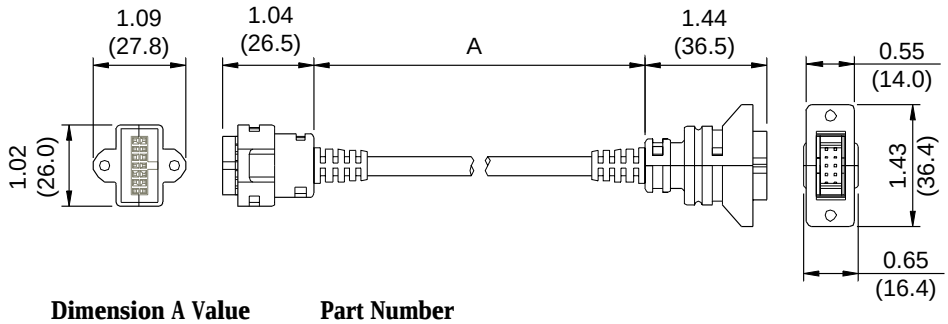
Mounting Bracket	Dim A	Part Number
For 250 W Resistors	4.34 (110)	175U0011
For 500 W Resistors	8.52 (216)	175U0009

Options – Remote Keypad Kit

The VLT MICRO provides a removable Keypad/Display that may be mounted remotely using one of the optional cables (6 ft. or 15 ft.). This is particularly helpful in providing access to unit parameters or monitoring operation when the Keypad/Display is mounted on a control panel's cover.

Dimensions for Remote Mounting of Digital Keypad/Display





in (mm)

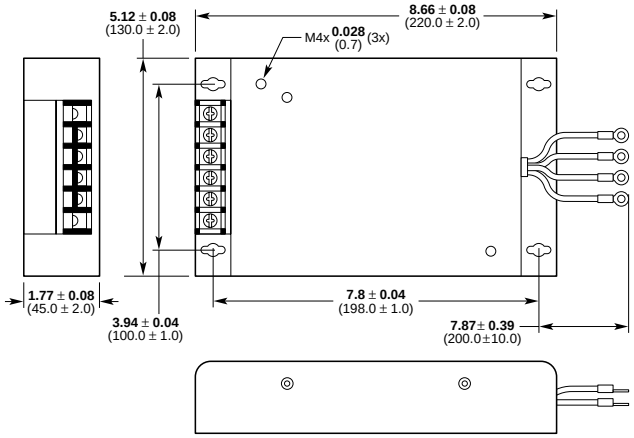
Dimension A Value	Part Number
6 ft. (2 m)	176F7310
15 ft. (5 m)	176F7325

Options – RFI Filter

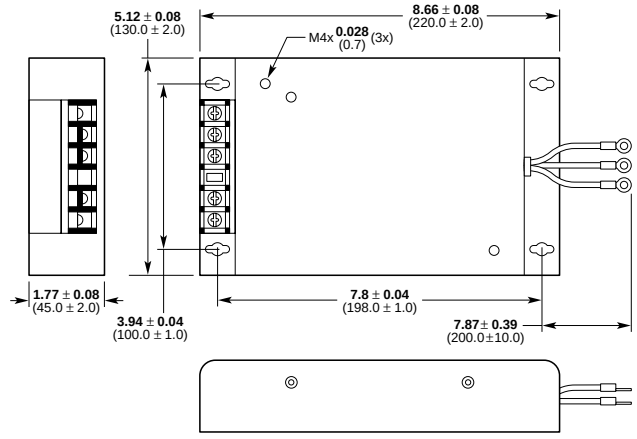
The optional RFI Filters provide compliance to Class 1A EMC Emission Standards when used with a VLT MICRO.

	Part Number
200-240 1Ø	176F7327
200-240 3Ø	176F7328
380-480 3Ø	176F7326

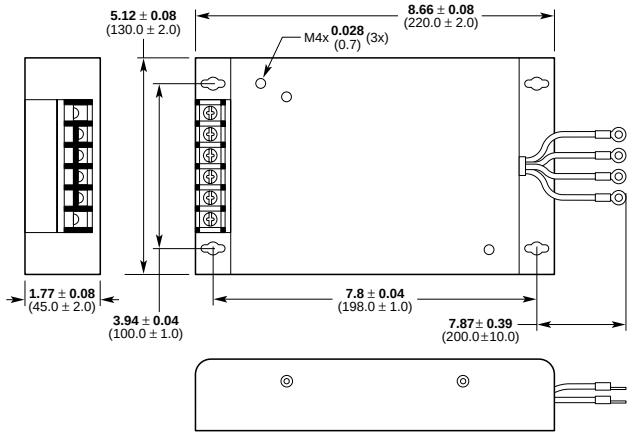
Dimensions for model 176F7326 *in (mm)*



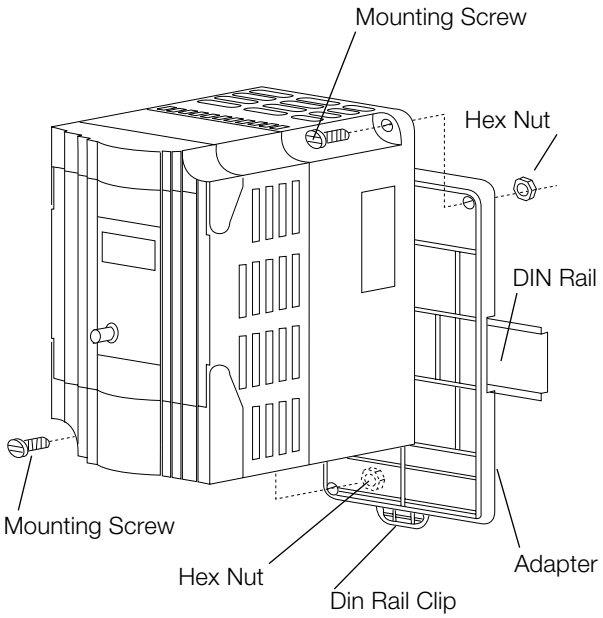
Dimensions for model 176F7327 *in (mm)*



Dimensions for Model 176F7328 *in (mm)*



Options – DIN Rail Adapter Bracket Kit



DIN Rail mounting of the RFI MICRO provides both a secure method of mounting, as well as easy interchangeability.

	Part Number
230 VAC	176F7311
460 VAC and 230 VAC 1Ø	176F7315

VLT MICRO Ordering Information

VLT MICRO	Model Number	
0.5 HP	230 VAC 1Ø UL	176F7300
1 HP	230 VAC 1Ø UL	176F7301
2 HP	230 VAC 1Ø UL	176F7302
0.5 HP	230 VAC 1Ø UL/CE	176F7306
1 HP	230 VAC 1Ø UL/CE	176F7307
2 HP	230 VAC 1Ø UL/CE	176F7308
1 HP	460 VAC 3Ø UL/CE	176F7312
2 HP	460 VAC 3Ø UL/CE	176F7313
3 HP	460 VAC 3Ø UL/CE	176F7314

Options and Accessories	Part Number
Remote Keypad Kit	
Includes all hardware and 2 m cable	176F7310
Includes all hardware and 5 m cable	176F7325
DIN Rail Adaptor	
DIN Rail Adaptor Bracket Kit (230 VAC)	176F7311
DIN Rail Adaptor II Bracket Kit (230 VAC 1Ø CE & 460 VAC)	176F7315
RFI Filters	
200-240 1Ø	176F7327
200-240 3Ø	176F7328
380-480 3Ø	176F7326
Brake Resistors – 230 VAC	
0.5 HP 30% Duty Cycle	175U1003
0.5 HP 40% Duty Cycle	175U0900
0.75 HP 20% Duty Cycle	175U1004
0.75 HP 40% Duty Cycle	175U0901
1 HP 14% Duty Cycle	175U1005
1 HP 30% Duty Cycle	175U0989
1 HP 40% Duty Cycle	175U0902
2 HP 15% Duty Cycle	175U0992
2 HP 40% Duty Cycle	175U0903
Brake Resistors – 460 VAC	
1 HP 10 or 14% Duty Cycle	175U1001
1 HP 30 or 40% Duty Cycle	175U0982
1 HP 40% Duty Cycle	175U0910
2 HP 15 or 16% Duty Cycle	175U0954
2 HP 40% Duty Cycle	175U0912
3 HP 5 or 9% Duty Cycle	175U0987
3 HP 40% Duty Cycle	175U0913