

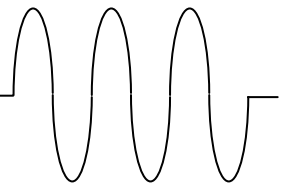
MTE Corporation

dV/dT Filter

Series A

380 - 600 VAC

USER MANUAL



PART NO. INSTR - 019
REL. 091009

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IMPORTANT USER INFORMATION

NOTICE

The MTE Corporation dv/dt Filter is designed to reduce dv/dt and peak voltages to motors fed from a wide variety of PWM inverters. The suitability of this filter for a specific application must therefore be determined by the customer. In no event will MTE Corporation assume responsibility or liability for any direct or consequential damages resulting from the use or application of this filter. Nor will MTE Corporation assume patent liability with respect to the use of information, circuits or equipment described in this instruction manual.

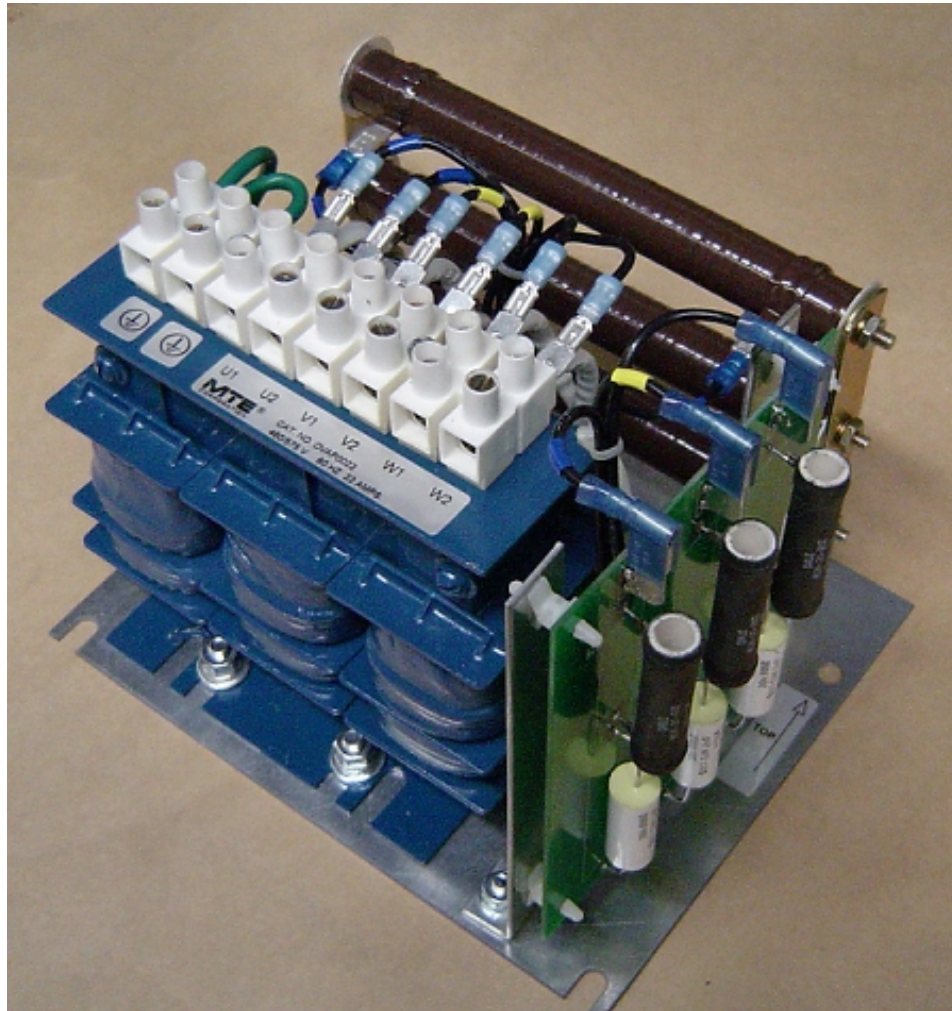


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1. IMPORTANT SAFETY INFORMATION

WARNING

ONLY A QUALIFIED ELECTRICIAN CAN CARRY OUT THE ELECTRICAL INSTALLATION OF THIS FILTER

WARNING

High voltage is used in the operation of this filter. Use Extreme caution to avoid contact with high voltage when operating, installing or repairing this filter. **INJURY OR DEATH MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED.**

After removing power, allow at least five minutes to elapse and verify that the capacitors have discharged to a safe level before contacting internal components. Connect a DC voltmeter across the capacitor terminals. Start with the meter on the highest scale and progressively switch to a lower scale as the indicated voltage falls below the maximum value of the scale used.

WARNING

The opening of the branch circuit protective device may be an indication that a fault current has been interrupted. To reduce the risk of fire or electrical shock, current-carrying parts and other components of the filter should be examined and replaced if damaged.

WARNING

An upstream disconnect/protection device must be used as required by the National Electrical Code (NEC).

WARNING

Even if the upstream disconnect/protection device is open, the inverter down stream of the filter may feed back high voltage to the filter. The inverter safety instructions must be followed. **INJURY OR DEATH MAY RESULT IF THE INVERTER SAFETY PRECAUTIONS ARE NOT OBSERVED.**

WARNING

The filter must be grounded with a grounding conductor connected to all grounding terminals.

WARNING

Only spare parts obtained from MTE Corporation or an authorized MTE distributor can be used.

2. INTRODUCTION

This manual was specifically developed to assist in the installation, interconnection and operation of the MTE Corporation dV/dT filter.

This manual is intended for use by personnel experienced in the operation and maintenance of inverters. Because of the high voltages required by the filter, inverter and the potential dangers presented by rotating machinery, it is essential that all personnel involved in the operation and maintenance of this filter know and practice the necessary safety precautions for this type of equipment. Personnel should read and understand the instructions contained in this manual before installing, operating or servicing the filter and inverter to which it is connected.

Upon Receipt of this Filter:

The MTE dV/dT Filter has been subjected to demanding factory tests before shipment. Carefully inspect the shipping container for damage that may have occurred in transit. Then unpack the filter and carefully inspect for any signs of damage. Save the shipping container for future transport of the filter.

In the event of damage, please contact and file a claim with the freight carrier involved immediately.

If the equipment is not going to be put into service upon receipt, cover and store the filter in a clean, dry location. After storage, ensure that the equipment is dry and that no condensation has accumulated on the internal components of the filter before applying power.

Repair/Exchange Procedure

MTE Corporation requires a Returned Material Authorization Number before it can accept any filters that qualify for return or repair. If problems or questions arise during installation, setup, or operation of the filter, please call us for assistance at:

Inside Sales Manager
Phone: 262-946-2800

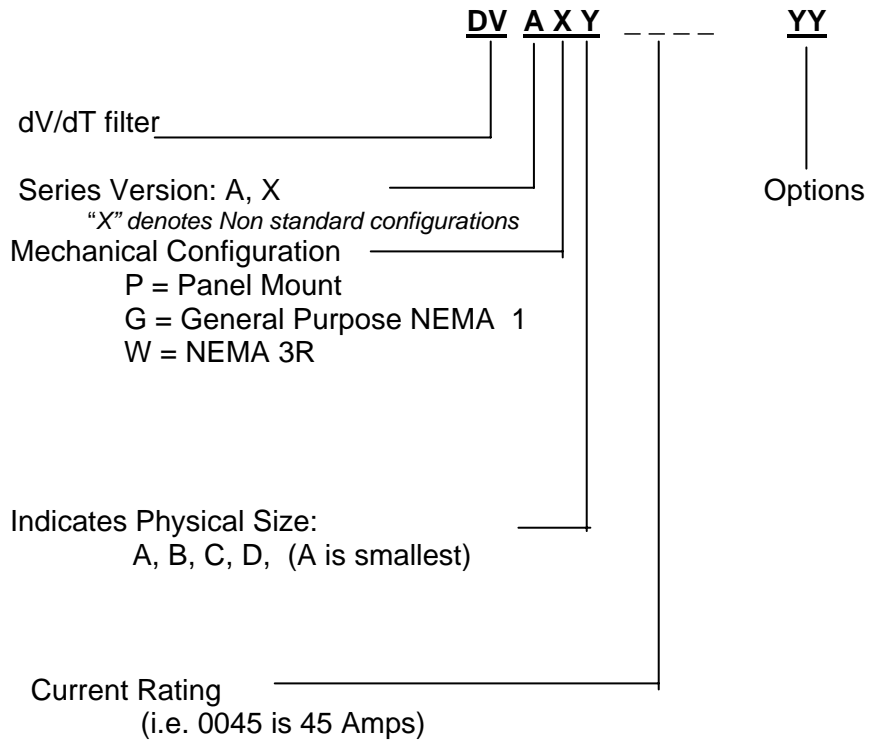
FAX: 262-253-8222

Quick view:

1. **Specification details: pg 4**
2. **Interconnection diagram: pg 24**
3. **Panel installations: pg 10 - 16**
4. **Enclosed installations: pg 17 - 23**
5. **Filter schematic / wiring: pg 30**
6. **Problem solutions: pg 32.**

3. MODEL NUMBER CODES

Model Number Code System:



4. SPECIFICATIONS

SPECIFICATIONS

Ratings

Table 1

Filter	380 - 600 VAC, 60 Hz Filter Ratings	
	Maximum Output Amps RMS	Efficiency (Typical) (%)
3	88.47	313
4	91.20	309
7	94.52	325
9	95.57	334
12	96.53	345
17	97.46	354
22	97.95	369
27	98.13	411
35	98.47	436
45	98.90	402
55	99.03	429
65	99.19	423
80	99.32	440
110	99.46	476
130	99.47	554
160	99.55	574
200	99.63	593
250	99.69	623
305	99.71	703
365	99.68	947
415	99.71	972
515	99.76	985
600	99.80	977

Service Conditions for the above:

Full load 3 phase motor
2000 Hertz switching frequency
60 Hertz output frequency
1000 ft motor cable
25 °C

4. SPECIFICATIONS

Series A dV/dT Filters

Service Conditions

Input voltage: 380 – 600 VAC +/- 10%, 60Hz

Input voltage wave form: PWM

Switching Frequency: 900 Hz – 8 kHz

Operating frequency: 6 – 60 Hz without de-rating

Ambient Temperature: 50 °C Open filters, 40 °C Enclosed filters

Altitude without de-rating: 1000 meters

Relative Humidity: 0 to 99% Non- condensing

Agency Approvals

UL and cUL listed to UL508 Type MX and CSA-C22.2 No 14-95
File E180243 (3 – 1000 HP, 120VAC through 600 VAC
50. 50/60, 60 Hz Three Phase

Note: Short Circuit rating not required under Exception No.1 of UL508A SB4.2.1 effective 4/25/06

Current Rating

Continuous current rating: 100% RMS

Intermittent current ratings: 150 % for 1 minute, 200 % for 10 sec.

Loading: Conventional 3 phase motors
"No load" continuous operation

Maximum motor lead length: 1000 feet

Insertion loss: 3% of rated voltage maximum

Audible noise level at two meters: 65 DB-A

Performance:

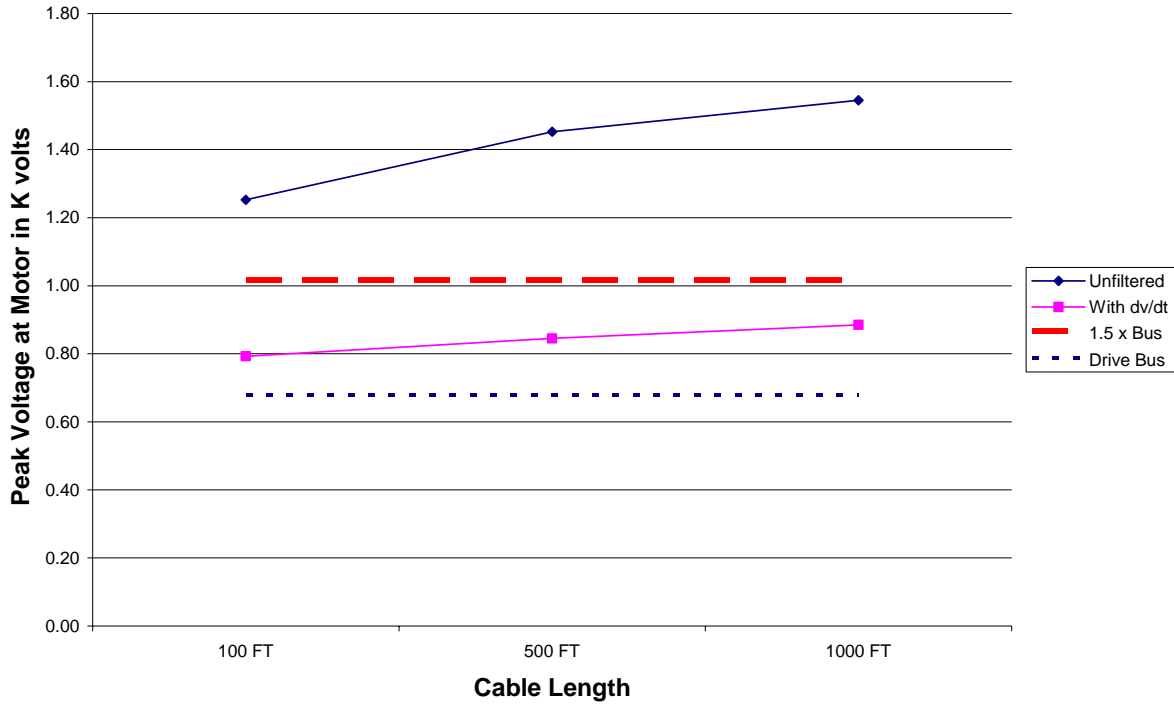
Maximum peak motor terminal voltage with 1000 ft cable 150% of bus voltage

Maximum dV/dT: 200 volts per microsecond

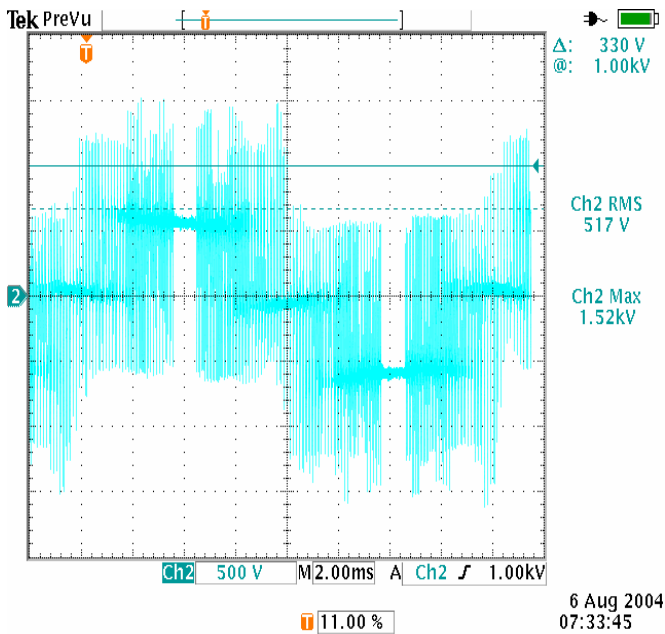
4. SPECIFICATIONS

dV/dT Filter Performance Chart 1

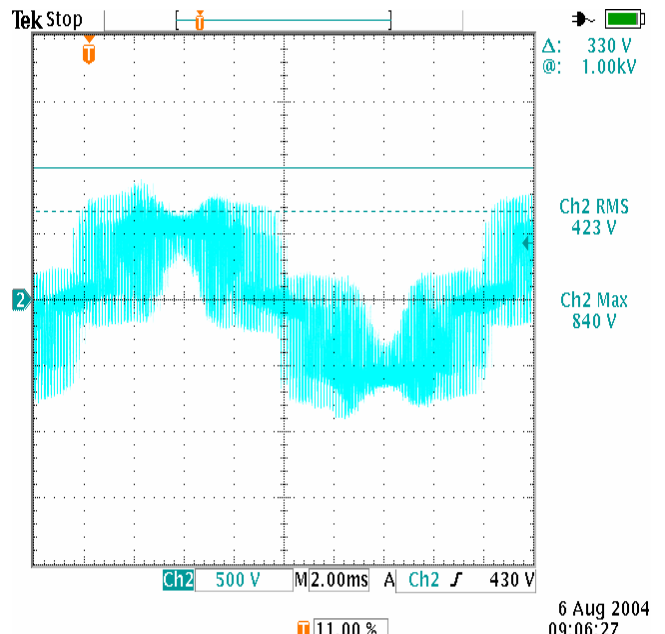
22 Amp dV/dt Overall Performance 30hp 480 Vac Motor



1000 FT Full Load 8K Switching Unfiltered shielded Cable



1000 Ft Full Load 8K Switching dV/dT Filtered shielded Cable



4. SPECIFICATIONS

Chart 2

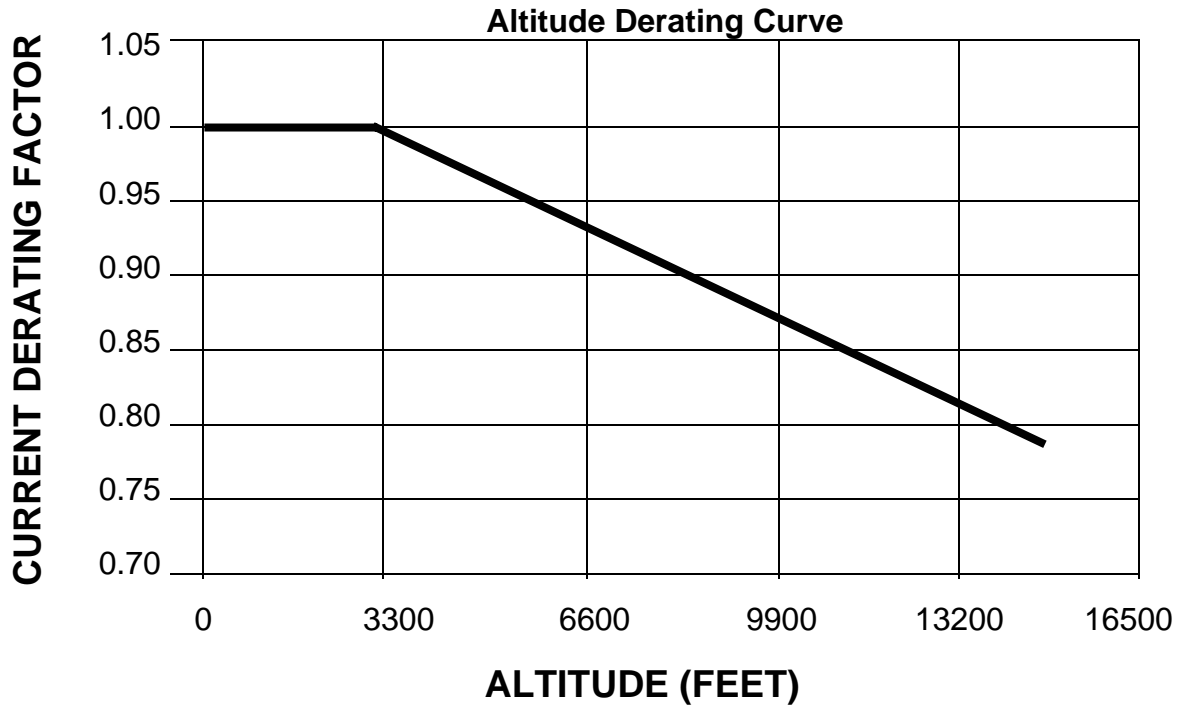
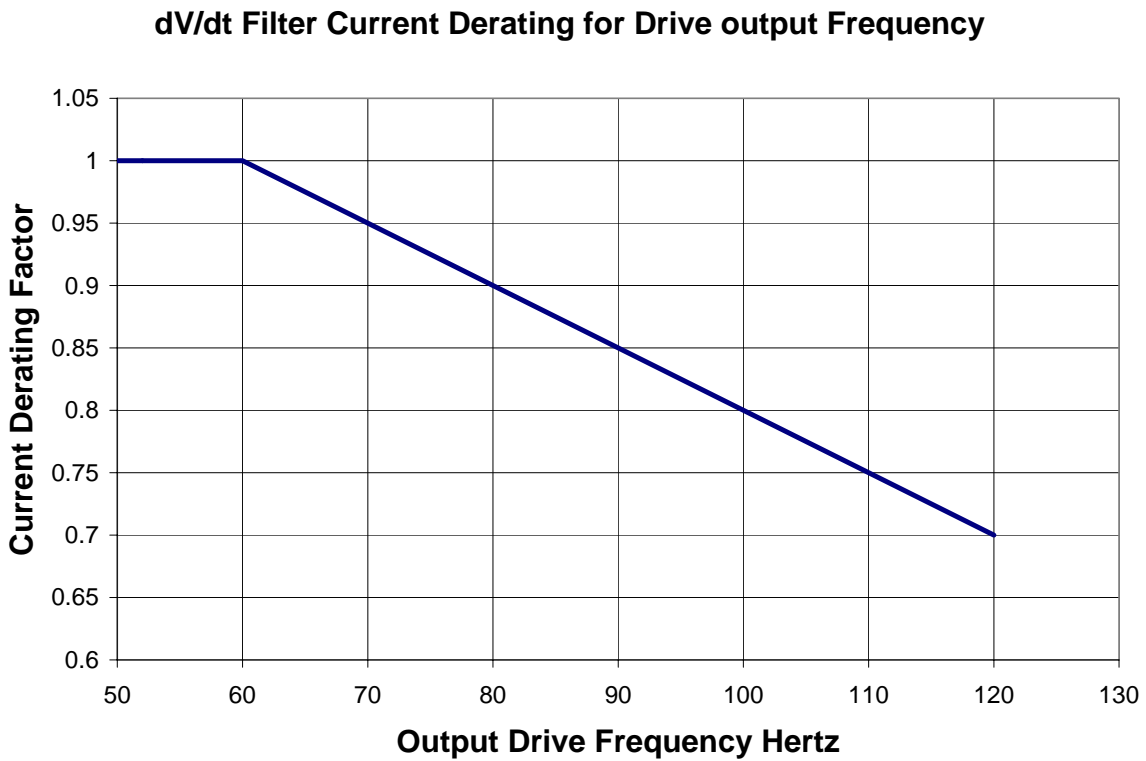


Chart 3



4. SPECIFICATIONS

Unit weights

Table 2

Filter Amps	Open			NEMA 1			NEMA 3R		
	Cat PN.	WT Lbs	Fig.	Cat PN.	WT Lbs	Fig.	Cat PN.	WT Lbs	Fig.
3	DVAP0003	13	1	DVAGA0003	31	7	DVAWA0003	75	8
4	DVAP0004	13	1	DVAGA0004	31	7	DVAWA0004	75	8
7	DVAP0007	14	1	DVAGA0007	32	7	DVAWA0007	76	8
9	DVAP0009	14	1	DVAGA0009	32	7	DVAWA0009	76	8
12	DVAP0012	14	1	DVAGA0012	32	7	DVAWA0012	76	8
17	DVAP0017	18	1	DVAGA0017	36	7	DVAWA0017	80	8
22	DVAP0022	19	1	DVAGA0022	37	7	DVAWA0022	81	8
27	DVAP0027	22	2	DVAGB0027	68	9	DVAWB0027	108	10
35	DVAP0035	26	2	DVAGB0035	72	9	DVAWB0035	112	10
45	DVAP0045	32	2	DVAGB0045	78	9	DVAWB0045	118	10
55	DVAP0055	33	2	DVAGB0055	79	9	DVAWB0055	119	10
65	DVAP0065	39	2	DVAGB0065	85	9	DVAWB0065	125	10
80	DVAP0080	52	3	DVAGB0080	143	9	DVAWC0080	137	10
110	DVAP0110	51	3	DVAGB0110	142	9	DVAWC0110	142	10
130	DVAP0130	64	4	DVAGC0130	229	11	DVAWC0130	235	11
160	DVAP0160	73	4	DVAGC0160	238	11	DVAWC0160	244	11
200	DVAP0200	82	4	DVAGC0200	247	11	DVAWC0200	253	11
250	DVAP0250	101	4	DVAGC0250	266	11	DVAWC0250	272	11
305	DVAP0305	106	4	DVAGD0305	271	11	DVAWD0305	277	11
365	DVAP0365	97	A1&B	DVAGD0365	263	11	DVAWD0365	269	11
415	DVAP0415	119	A2&B	DVAGD0415	285	11	DVAWD0415	291	11
515	DVAP0515	122	A3&B	DVAGD0515	288	11	DVAWD0515	294	11
600	DVAP0600	111	A4&B	DVAGD0600	277	11	DVAWD0600	283	11

5. INSTALLATION INSTRUCTIONS

Filter Installation

dV/dT filters are supplied in the following mechanical configurations:

- Panel mounted assemblies

- Floor mounted general purpose NEMA 1 & 3R cabinets

Panel mounted filters are designed for mounting in the vertical plane in the customer's enclosure. Include the power dissipation of the filter along with all the other components located in the panel to determine the internal temperature rise and cooling requirements of the enclosure. An option NC temperature switch opens if the reactor exceeds 180 °C. Allow a minimum side clearance of four (4) inches and a vertical clearance of six (6) inches for proper heat dissipation and access within the enclosure. Panel mounted dV/dT filters generate heat and should be positioned away from heat sensitive components. Ensure that proper panel orientation is maintained keeping the capacitors away from reactor heat flow. Avoid locations where the filter would be subjected to excessive vibrations.

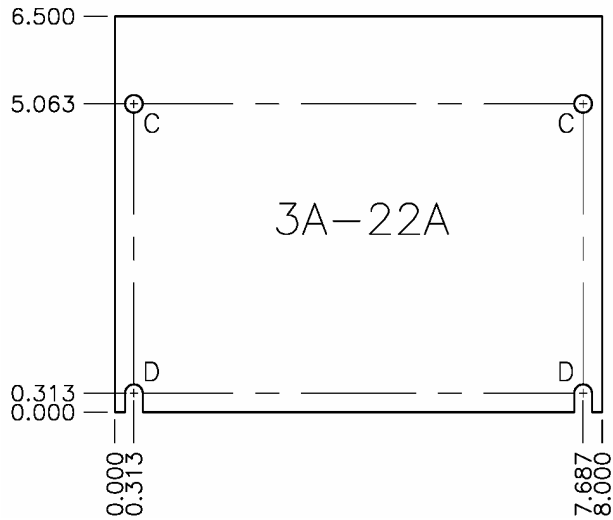
Figures 1 – 4 contain open panel outline drawings for the various current ratings and show proper panel alignment. For filters above 305 amps refer to table 5 and Figure A & B for the dimensions of the separately mounted reactor and the PCB resistor assembly. A pre-wired cable harness with connector is supplied with these units. The PCB resistor assembly should be located a minimum of 4 inches away from the reactor in the lowest temperature regions of the enclosure – generally toward the bottom. Connect the motor and inverter leads to the reactor terminals to complete the filter wiring. See figure 13 page 24.

General purpose NEMA 1,2 and 3R enclosed filters are designed for floor mounting in an environment suitable for the enclosure type. Do not install in or near a corrosive environment. Avoid locations where the filter would be subjected to excessive vibrations. Allow a minimum side and back clearance of eight (8) inches and front clearance of thirty-six (32 inches for proper heat dissipation and access. Page 17 will direct you to the appropriate outline drawings shown in fig. 5 through fig 10.

5. INSTALLATION INSTRUCTIONS

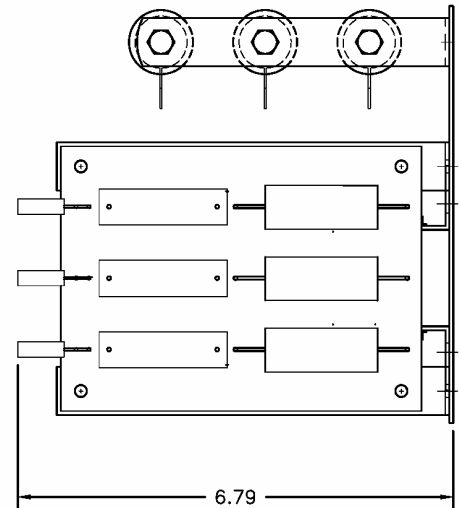
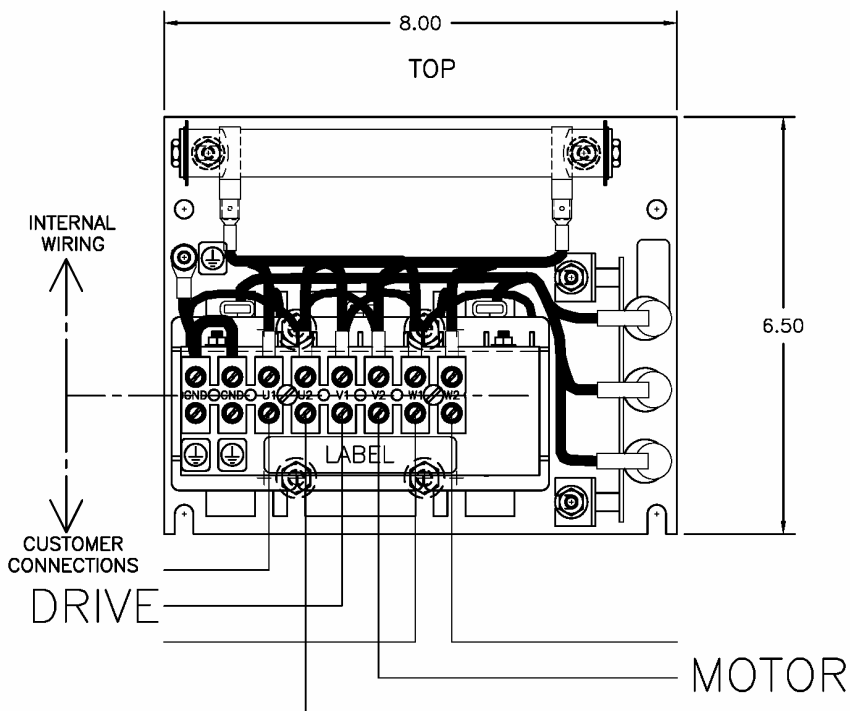
Panel installations Open Panel 3 – 22 Amps

Fig. 1



HOLE	DIA.	QTY.	BOLT SIZE
C	0.290	2	1/4-20

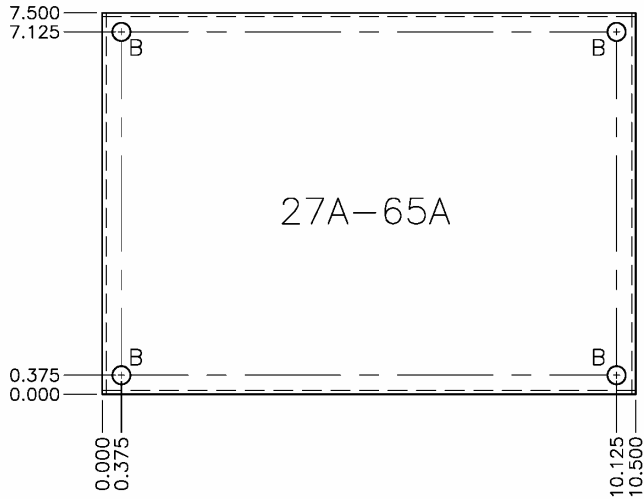
SLOT	Ø0.290 x	QTY.	BOLT SIZE
D	0.458 LG.	2	1/4-20



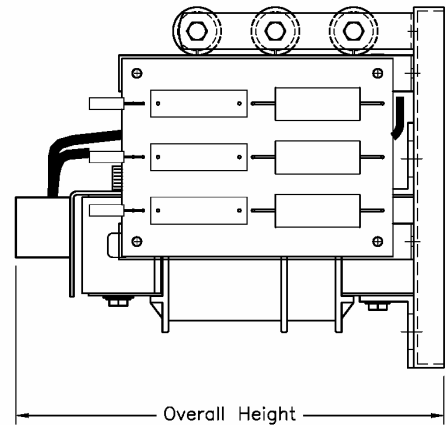
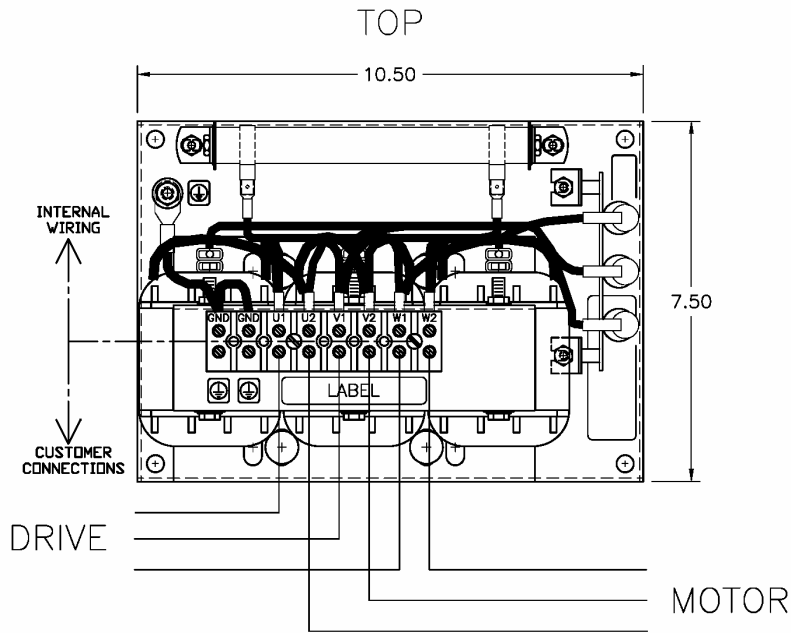
5. INSTALLATION INSTRUCTIONS

Mechanical installation Open Panel 27 – 65 Amps

Fig. 2



HOLE	DIA.	QTY.	BOLT SIZE
B	0.358	4	5/16-18



27 & 35 Amp	7.4"
45 & 55 Amp	8.9"
65 Amp	10.0"

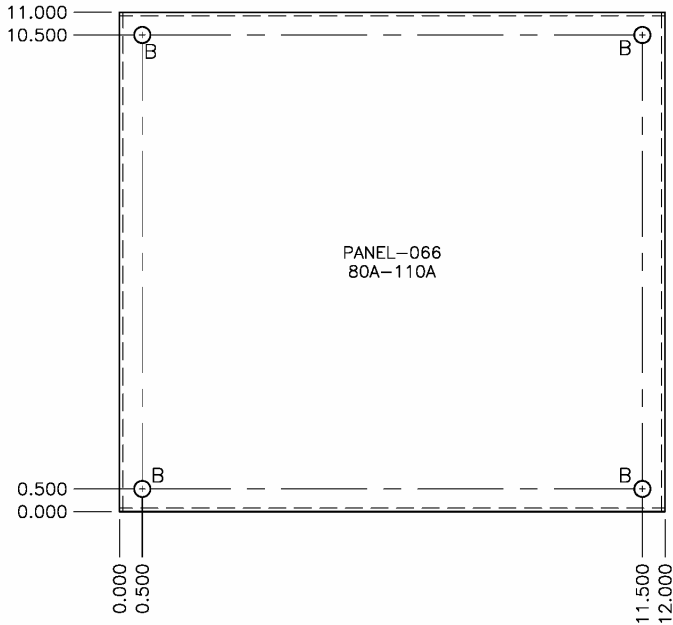
65 Amp shown

5. INSTALLATION INSTRUCTIONS

Mechanical installation

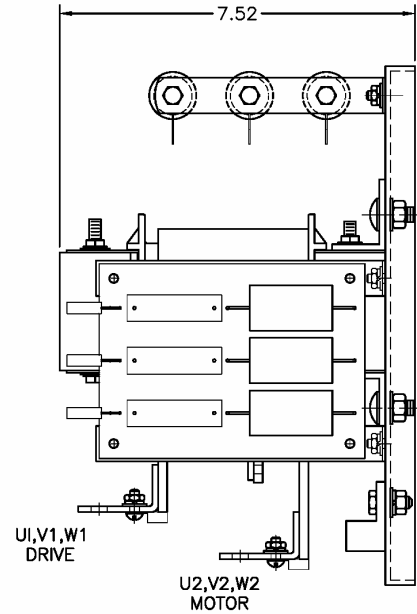
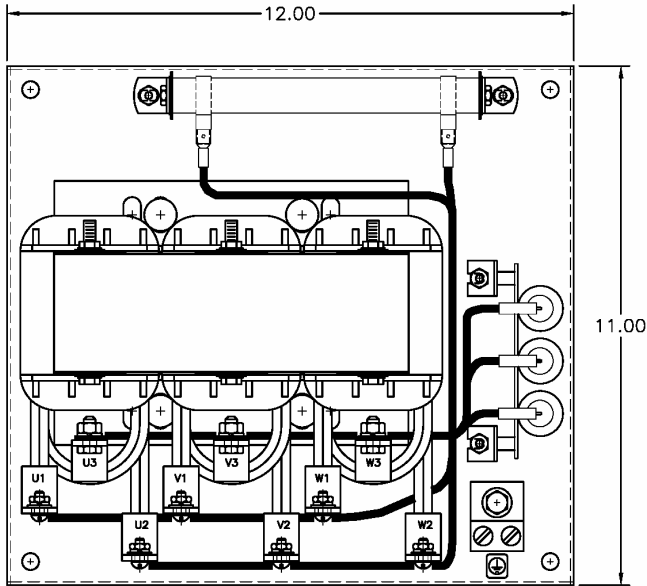
Open Panel 80 – 110 Amps

Fig. 3



HOLE	DIA.	QTY.	BOLT SIZE
A	0.413	4	3/8-16
B	0.358	8	5/16-18
C	0.290	2	1/4-20

TOP



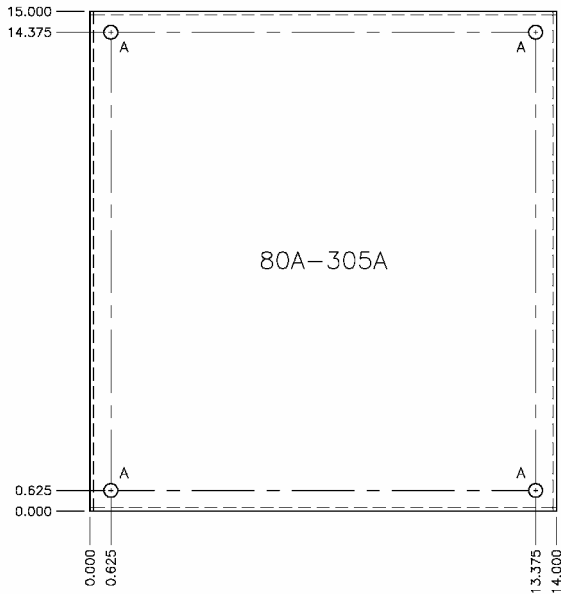
110 Amp Shown

5. INSTALLATION INSTRUCTIONS

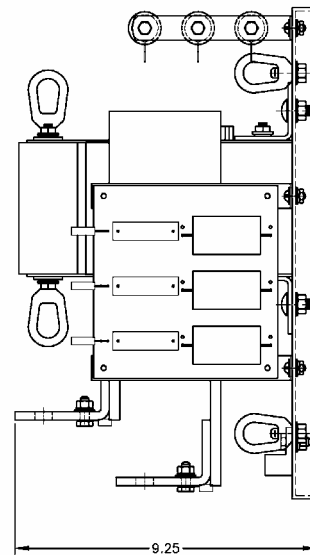
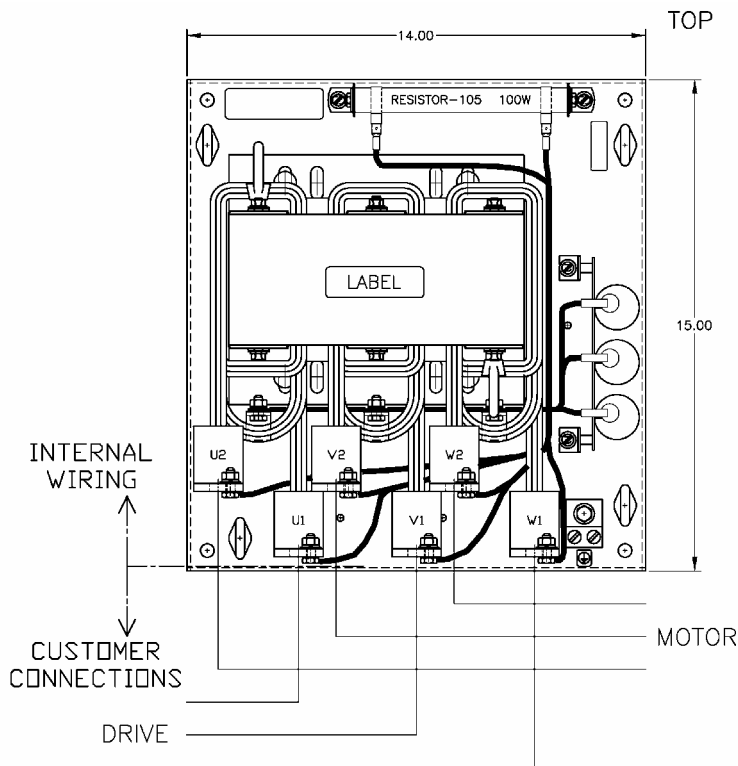
Mechanical installation

Open Panel 130 - 305 Amps

Fig. 4



HOLE	DIA.	QTY.	BOLT SIZE
A	0.413	4	3/8-16



305 Amp shown

5. INSTALLATION INSTRUCTIONS

High current components

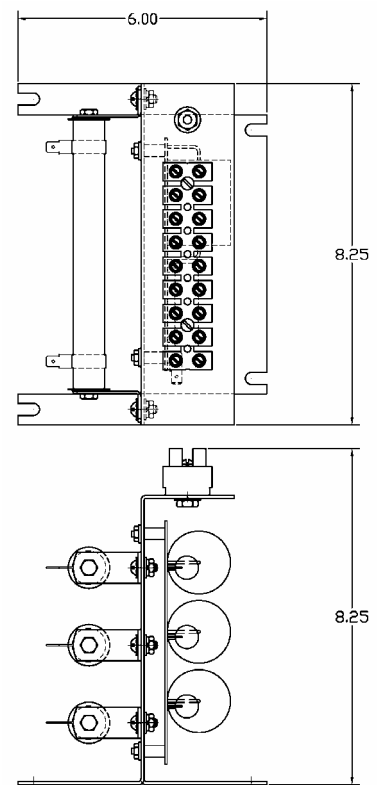
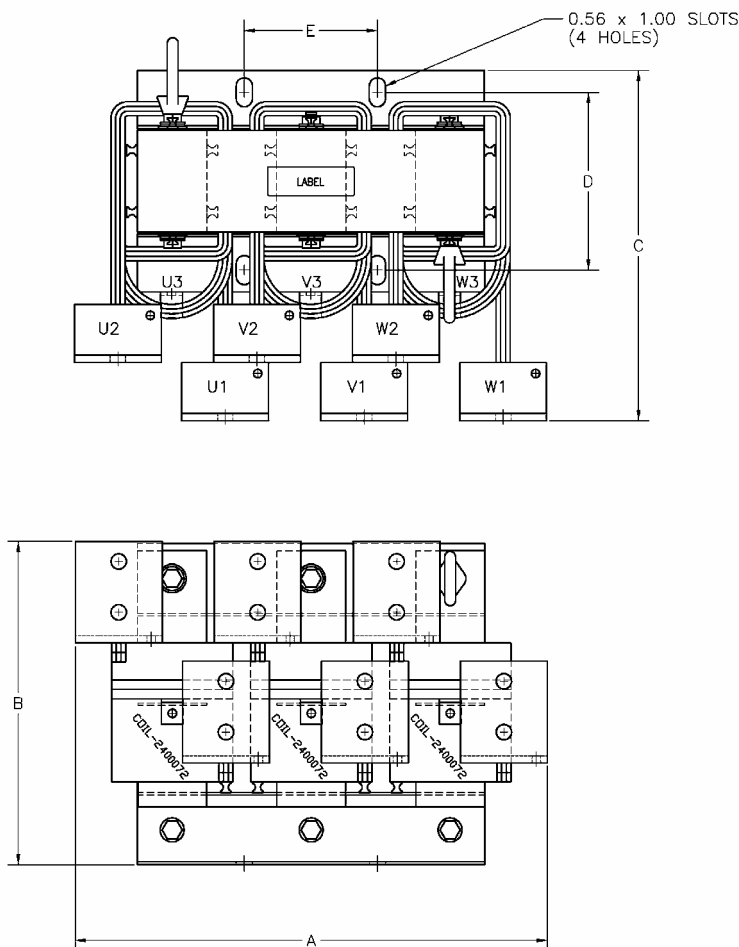
dV/dT Filters rated 365 amps through 600 amps are constructed from a reactor and a PCB resistor assembly connected by a (supplied) 48 inch wire harness. These components are designed to be mounted vertically within an appropriate enclosure. The reactor generates heat and should be mounted away from components affected by heat and aligned to allow cooling air to flow through it. A filter showing correct reactor alignment and cooling is shown in figure 5. The PCB assembly should be located at least 4 inches from the reactor and in the lowest temperature regions of the enclosure – generally toward the bottom. An MCC wiring example is shown in figure 6.

Table 5

Filter Amps	Figure	DIMENSIONS Inches				
		A	B	C	D	E
365	A1	16.5	11.75	10.50	4.85	4.6
415	A2	16.5	12.00	11.25	5.12	4.6
515	A3	16.5	11.50	11.75	5.62	4.6
600	A4	16.5	11.25	12.25	6.12	4.6

FIG.A

FIG. B

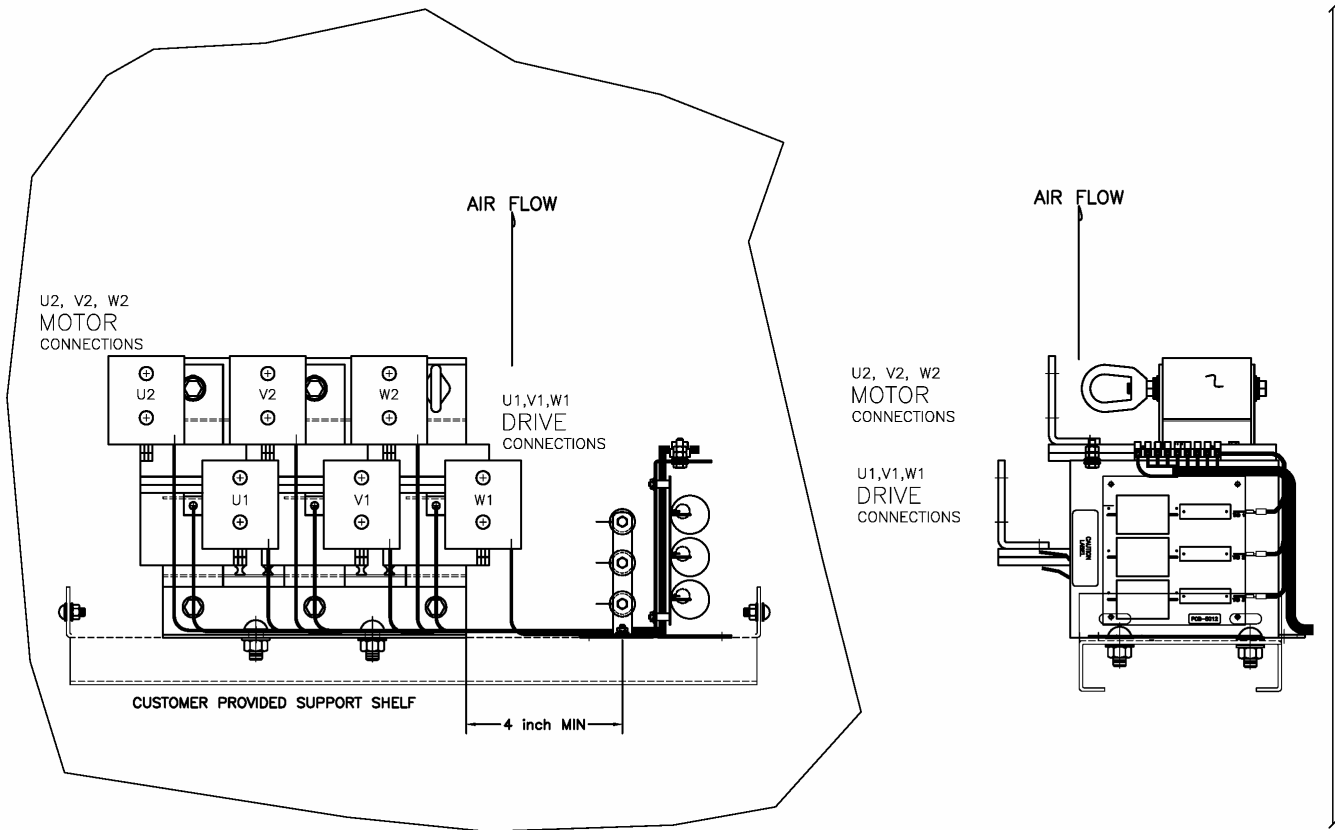


5. INSTALLATION INSTRUCTIONS

Fig. 5

Mounting Examples

OPEN REACTOR & PCB ASSEMBLY



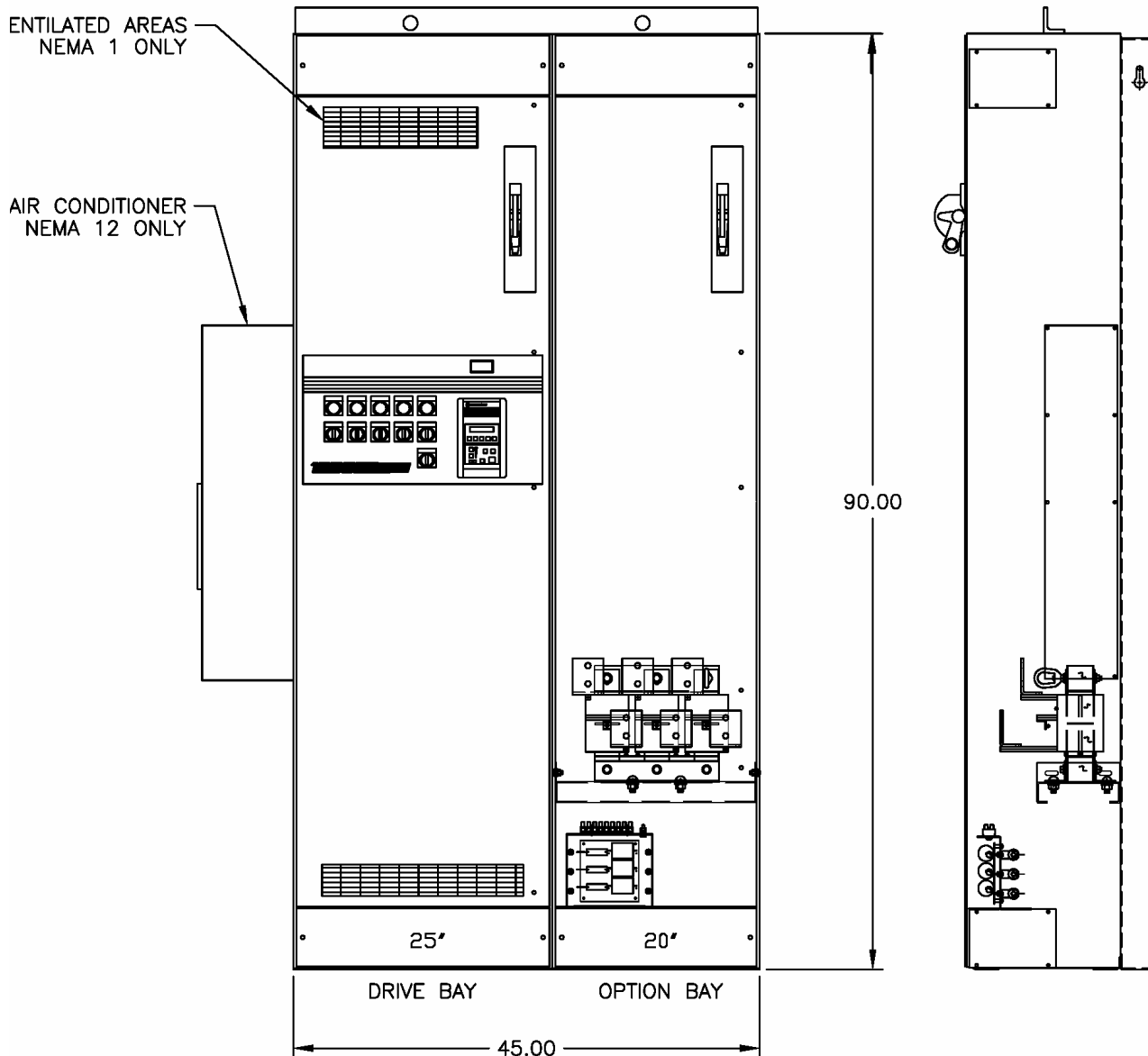
600 amp open reactor & PCB filter shown in customer provided enclosure.

NOTE: Maintain orientation as shown for proper component cooling.

5. INSTALLATION INSTRUCTIONS

Fig. 6

350Hp MCC using optional bay for dv/dt installation



Note: The above dv/dt filter example is shown with customer provided support hardware. Other installation variations are at the customer's discretion as long as thermal guidelines are followed.

5. INSTALLATION INSTRUCTIONS

Enclosed Units

Table 6

Enclosure Indicator	Width	Height	Depth	Cab Part No.	NEMA Type	Figure
GA	13	13	13	Cab 13V	NEMA 1	7
GB	17	24	18	Cab 17V	NEMA 1	9
GC	26.5	47	25	Cab 26C	NEMA 1 -2	11
GD	26.5	47	25	Cab 26C	NEMA 1 -2	11
WA	12.5	24	18*	Cab 12C	NEMA 3R	8
WB	17.5	31	21*	Cab 17C	NEMA 3R	10
WC	26.5	47	25*	Cab 26C	NEMA 3R	11
WD	26.5	47	25*	Cab 26C	NEMA 3R	11

See table 2 on page 8 for enclosed weights

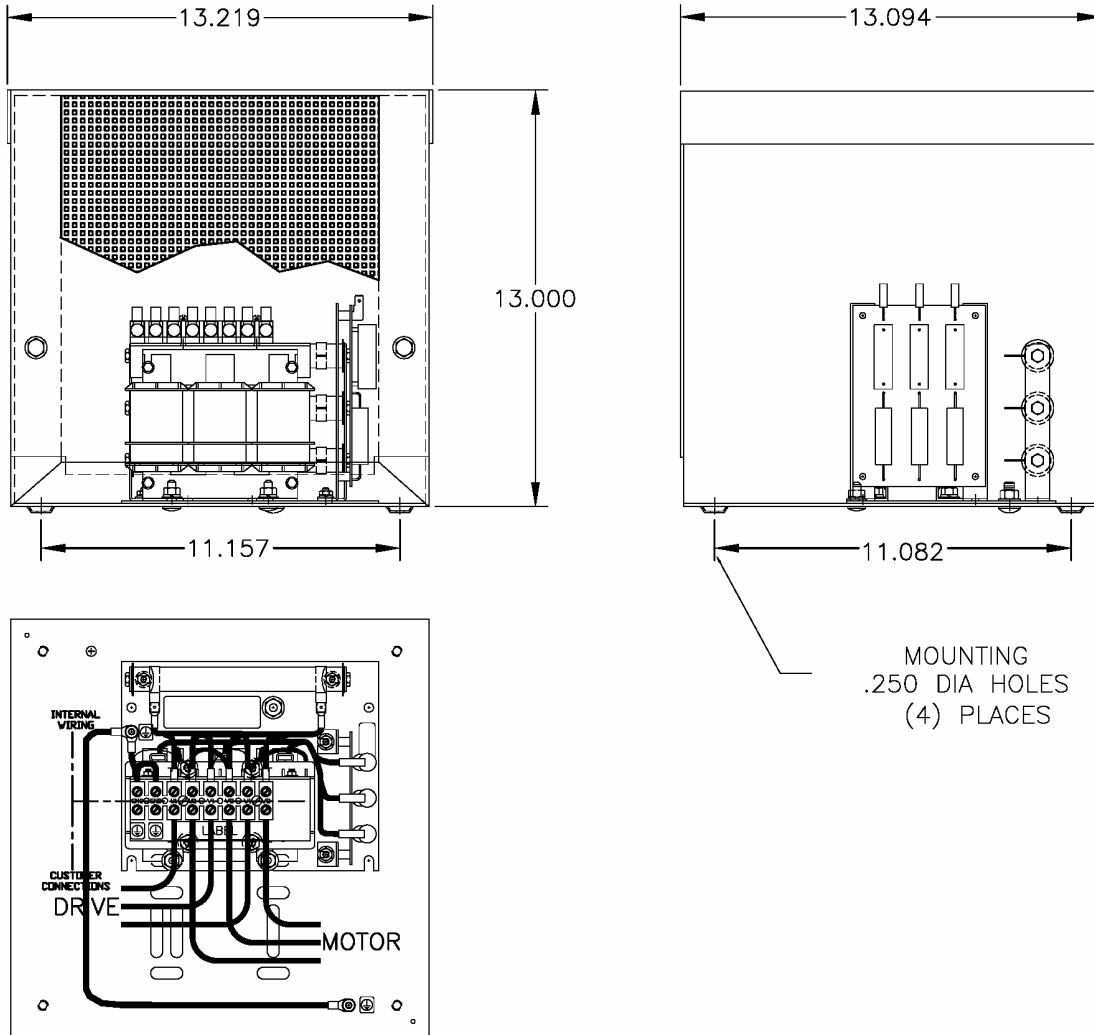
Table 7

Filter Current Rating	General Purpose Cabinets 380 – 480 VAC	
	NEMA 1	NEMA 3R
3	CAB-13V	CAB-12C
4	CAB-13V	CAB-12C
7	CAB-13V	CAB-12C
9	CAB-13V	CAB-12C
12	CAB-13V	CAB-12C
17	CAB-13V	CAB-12C
22	CAB-13V	CAB-12C
27	CAB-17V	CAB-17C
35	CAB-17V	CAB-17C
45	CAB-17V	CAB-17C
55	CAB-17V	CAB-17C
65	CAB-17V	CAB-17C
80	CAB-17V	CAB-17C
110	CAB-17V	CAB-17C
130	CAB-26C	CAB-26C
160	CAB-26C	CAB-26C
200	CAB-26C	CAB-26C
250	CAB-26C	CAB-26C
305	CAB-26C	CAB-26C
365	CAB-26C	CAB-26C
415	CAB-26C	CAB-26C
515	CAB-26C	CAB-26C
600	CAB-26C	CAB-26C

Mounting dimensions and outline drawings for filters mounted in NEMA 1, 3R Enclosures follow

5. INSTALLATION INSTRUCTIONS

Enclosed NEMA 1 units 3 – 22 Amps
Fig. 7 Cab 13V

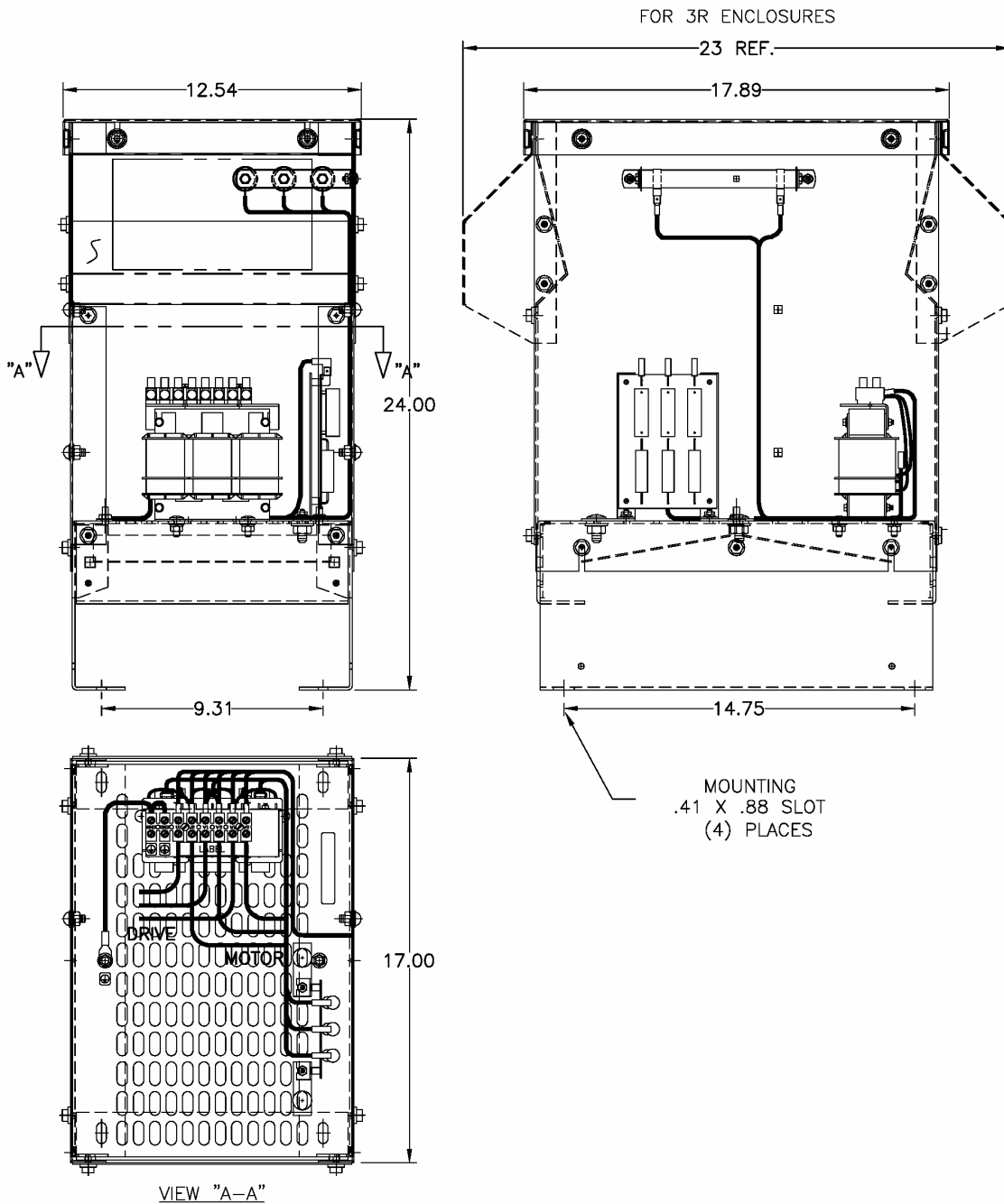


22 Amp Shown

5. INSTALLATION INSTRUCTIONS

Enclosed 3R units 3 – 22 Amps

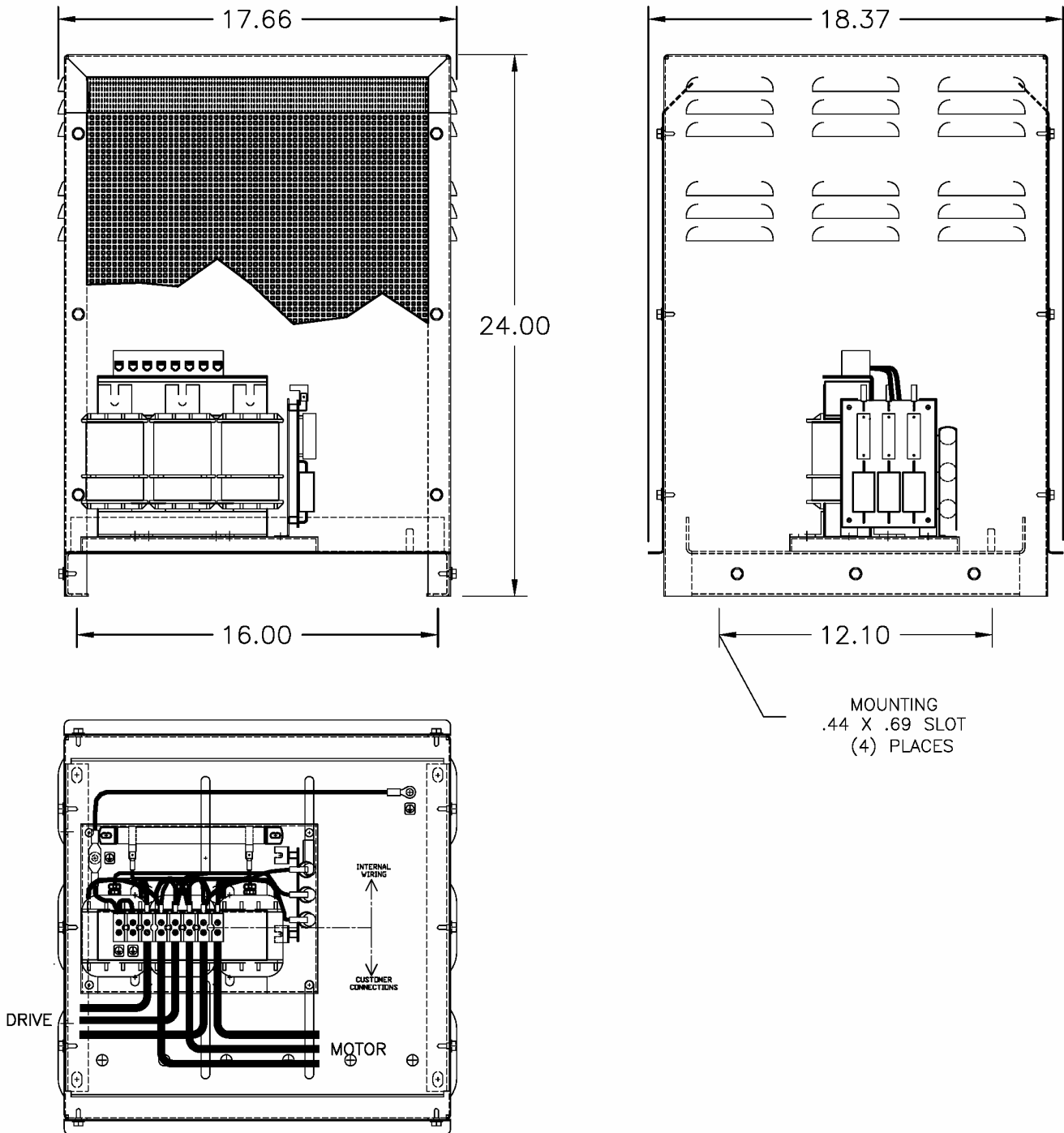
Fig. 8 Cab 12C



22 Amp Shown

5. INSTALLATION INSTRUCTIONS

Enclosed NEMA 1 units 27 – 110 Amps
Fig. 9 Cab 17V

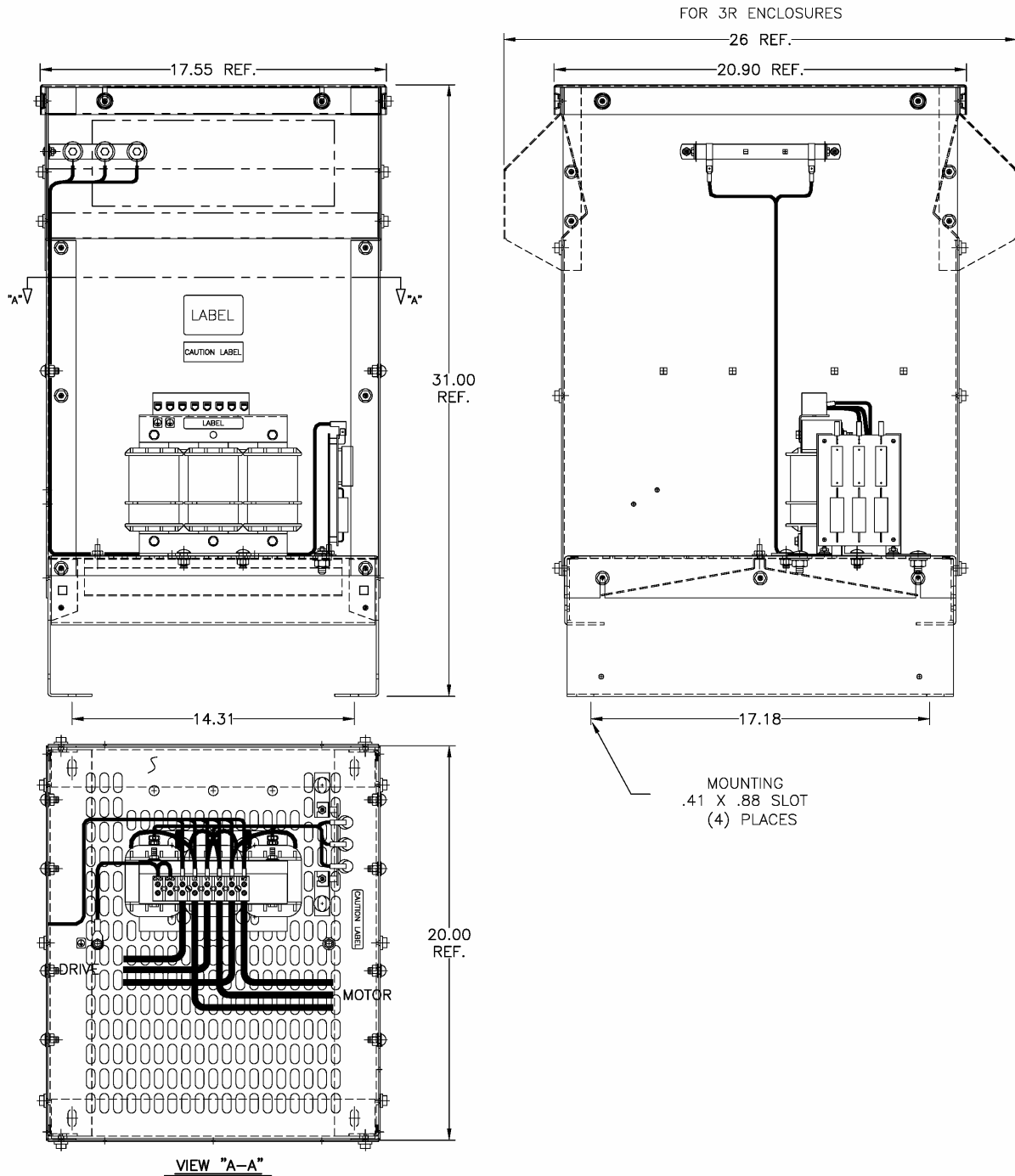


65 Amp Shown

5. INSTALLATION INSTRUCTIONS

Enclosed 3R units 27 – 110 Amps

Fig. 10 Cab 17C

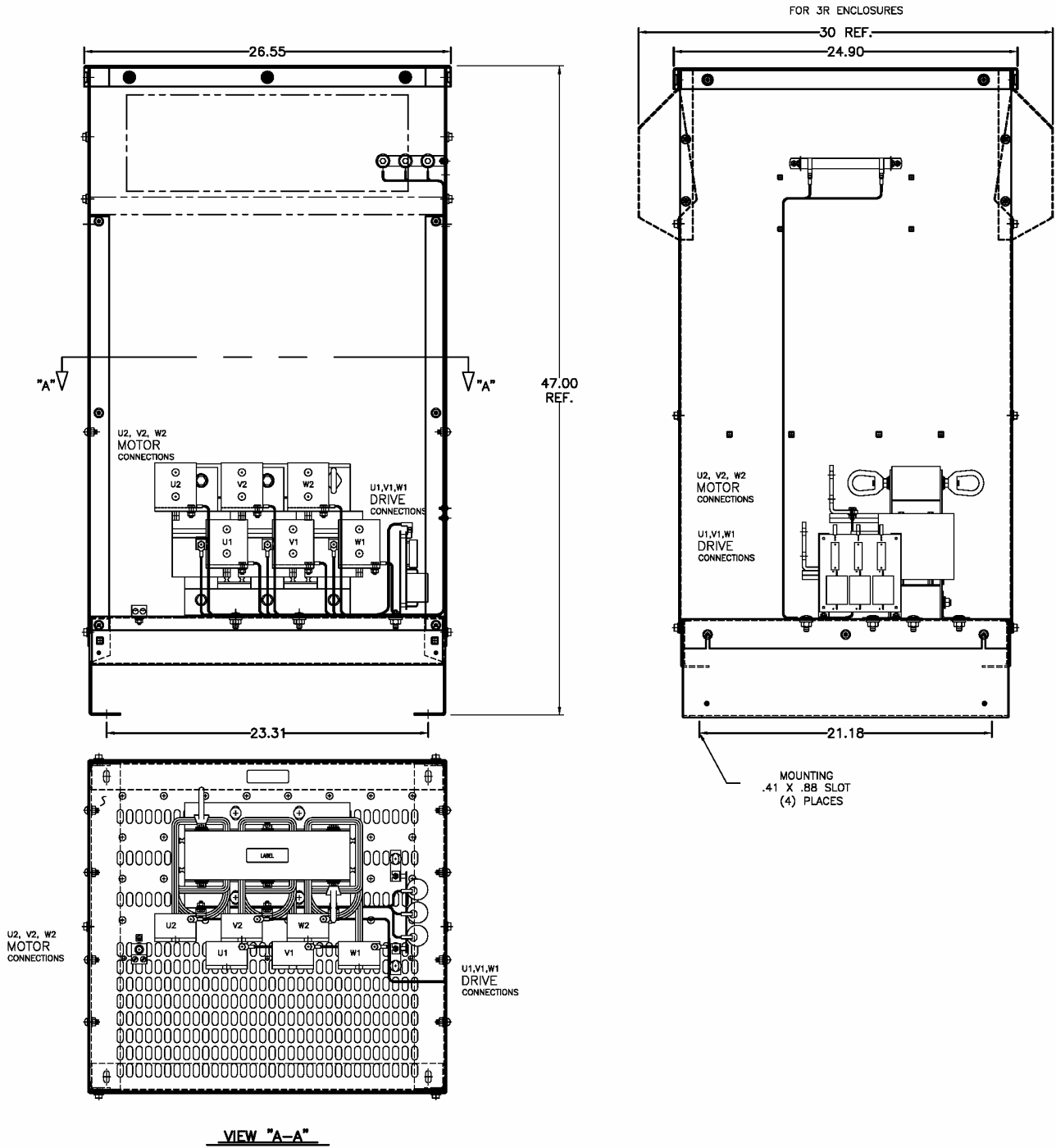


65 Amp Shown

5. INSTALLATION INSTRUCTIONS

NEMA 1-2 & 3R units 130-600 Amps

Fig. 11 Cab 26C



600 Amp Shown

5. INSTALLATION INSTRUCTIONS

Wiring Connections

WARNING

Input and output wiring to the filter should be performed by authorized personnel in accordance with NEC and all local electrical codes and regulations.

Verify that the rating of the inverter is compatible with the inverter to which it is to be connected. Follow all detailed inverter manufacturer installation and safety instructions. Inverter and motor Cable selection / placement should be in accordance with the requirements of the NEC and all local electrical codes and regulations

Typical filter interconnection diagrams that follow show wiring between the inverter, filter and motor. Refer to the inverter user manual for instructions on interconnecting the inverter and motor and the correct start-up procedures for the inverter.

The optional over temperature switch wiring is also shown on figure 13. The temperature switch is normally closed and will open when an internal reactor temperature of 180 °C is reached.

The filter is designed for use with copper conductors with a minimum temperature rating of 75 degrees C. Table 8 lists the wire range and terminal torque requirements for the power input and output connections by horsepower rating.

For panel mounted filters rated 365 amperes or more, the filter reactor is supplied un-mounted and capacitors and resistors are supplied as a pre-wired PCB assembly. A connector allows reactors and PCB to be separated for installation. Refer to figure 13 for the interconnection diagram.

The PCB assembly should be located in the lowest temperature regions of the enclosure - generally toward the bottom – the reactor assembly may be located in any region where the ambient temperature does not exceed 50 degrees C

Use the cable recommended by the inverter manufacturer to connect the inverter to the filter and the filter to the motor. Make certain, that the selected cable size conforms to the requirements of the National Electric Code and all local codes.

For open filters refer to Figures 1 through 4 for the location of Input, output, and ground connections. For enclosed filters, ground terminals will be clearly marked. Power wiring terminations are clearly marked on the reactor.

Grounding

The filter must always be grounded with a grounding conductor connected to ground terminals.

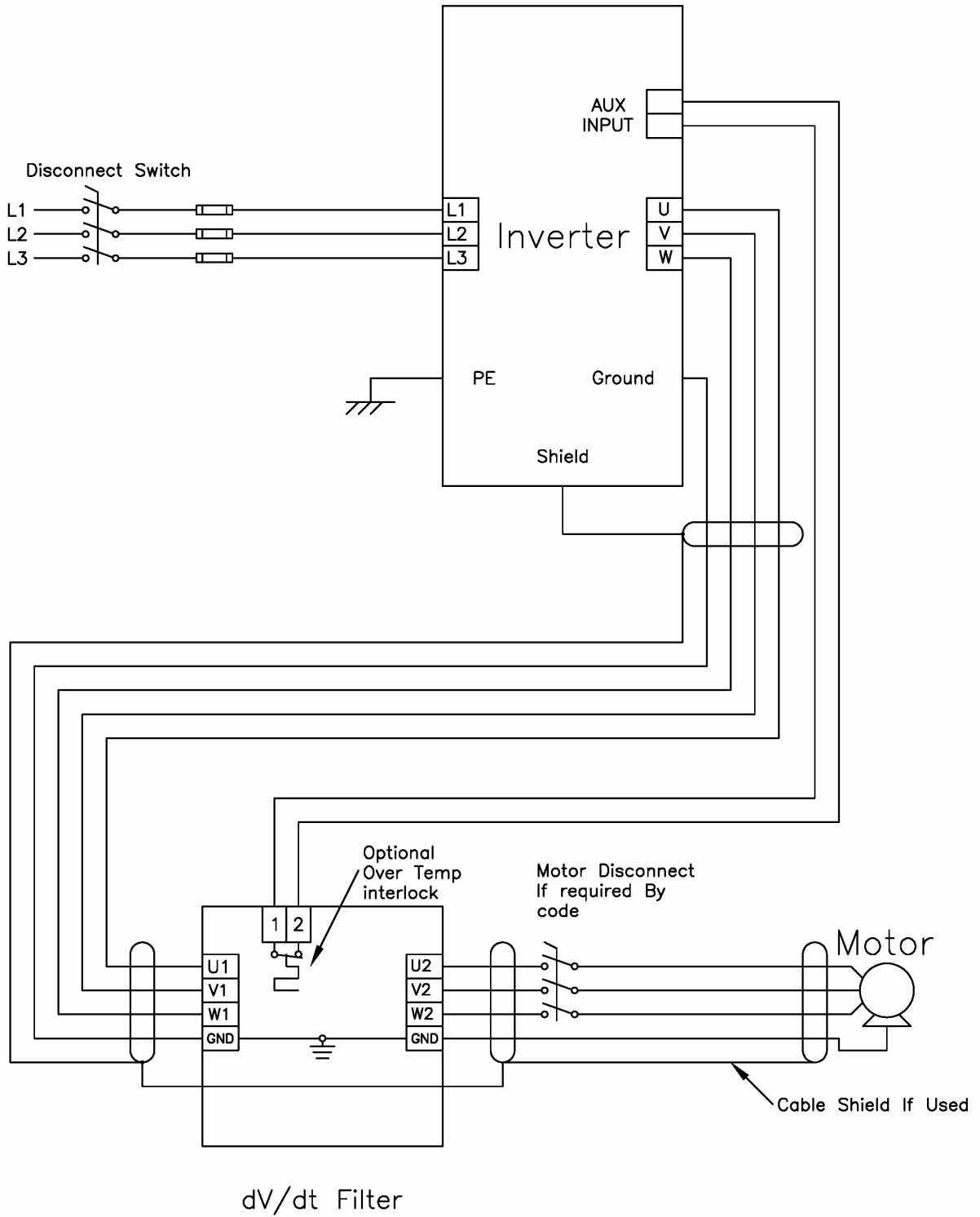
For cable shield grounding follow the inverter manufactures recommendations. Fig 13 shows a typical shield ground connection.

Optional Over Temperature Interlock

The optional over temperature interlock can be used to turn off the inverter in the event it is setup to operate with a switching frequency outside of the range of the filter or an inverter malfunction. The interlock is a normally closed contact. Refer to table 9 for contact rating information and to the inverter user manual for interconnection information.

5. INSTALLATION INSTRUCTIONS

Interconnection Diagram Fig. 13



5. INSTALLATION INSTRUCTIONS

Terminal Wiring Specifications

Table 8

Filter Rating(Amps)	Terminals	
	Wire Range (AWG)	Terminal Torque (in-lbs)
3	22-14	16
4	22-14	16
7	22-14	16
9	22-14	16
12	22-5	16
17	22-5	16
22	22-5	16
27	22-5	16
35	22-5	16
45	18-4	20
55	18-4	20
65	18-4	20
80	6-0	50
110	3/0 75C	250
130	4/0 75C	250
160	3/0 90C	250
200	4/0 90C 250MCM 75C	325
250	400MCM 90C	375
305	600MCM 4/0 2X 90C	375
365	300MCM 2X 90C	375
415	350MCM 2X 90C	375
515	600MCM 2X 90C 300MCM 3X 90C	375
600	500MCM 3X 90C	375

5. INSTALLATION INSTRUCTIONS

Thermal switch

OPTIONAL OVER TEMPERATURE INTERLOCK CONTACT RATINGS

Table 9

TYPE	BI – METAL THERMAL SWITCH
CONTACT	(NC) NORMALLY CLOSED
RATINGS	6A 120 VAC RESISTIVE 3A 240 VAC RESISTIVE 5A 120 VAC INDUCTIVE 2.5A 240 VAC INDUCTIVE
TEMPERATURE CONTACTS OPEN	180°C

6. FILTER DESCRIPTION

Description

MTE Series A dV/dT filters are designed to protect AC motors from the damaging effects of long cable runs between the inverter and motor. Depending on the turn-on time of the power semiconductors used in an inverter and the size of the motor, cable lengths greater than eight feet can result in motor peak voltages that exceed the rating of the motor's insulation system. (See: Effects of Cable Length section. Chart 4 and table 9.)

Typical applications include submersible pumps, HVAC equipment and process automation lines. Motors rated 100 HP and below and standard NEMA B motors are prone to failure as a result of high voltage spikes and will benefit from dV/dT filtering.

The dV/dT filter is a passive fourth order device that reduces transmission line effects of motor cables. It accomplishes this by dampening the rate of voltage increase and minimizes the peak voltage that occurs at the motor terminals. See performance chart 1 pg. 5 to view actual results.

Series A dV/dT filters are designed for use with inverters operated at switching frequencies between 900 Hz and 8 kHz. The filter is **guaranteed** to reduce the maximum peak motor voltage (150% of inverter bus voltage) with 1,000 feet of cable between the filter and the motor. In specific applications, the filter has provided excellent performance with cable runs up to 3,000 feet. The dV/dT filter has a 3% insertion impedance which ensures

motor torque is not affected by added voltage drops from the filter.

Series A dV/dT filters are available as open panel mount and with enclosed ratings including NEMA 1 ,2 and NEMA 3R.

These filters have been designed to meet motor current requirements based on NEC motor current ratings. For application using motors that exceed NEC current ratings use the next larger filter. Apply the appropriate altitude current de-rating curves shown on chart 2.

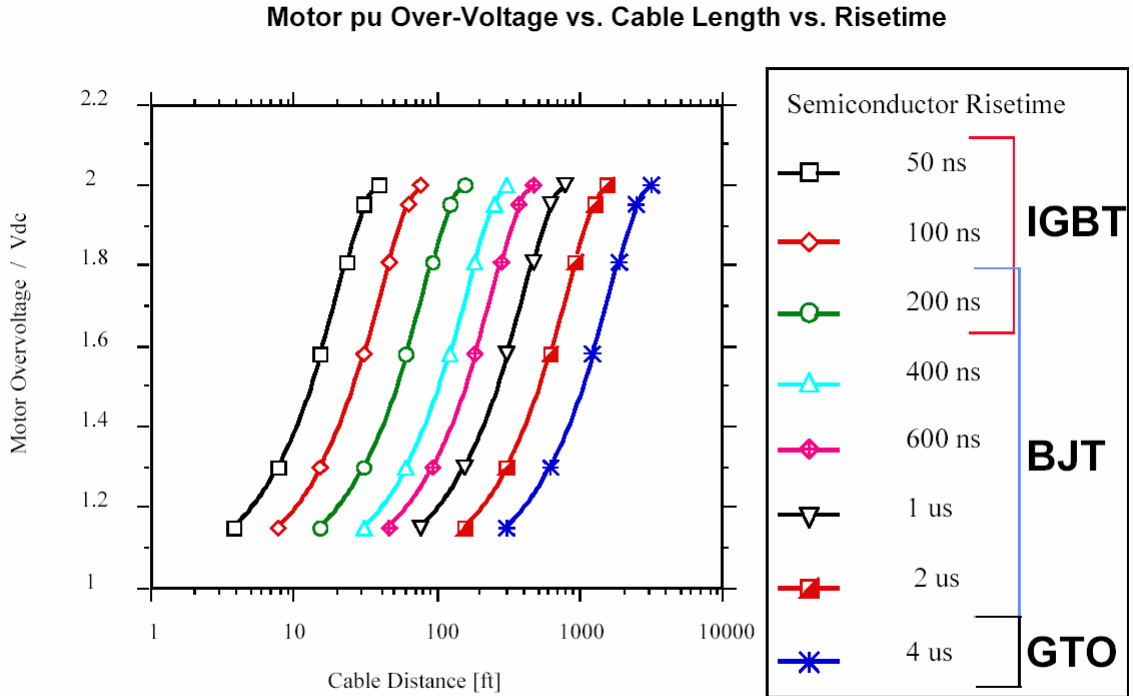
Filters for motors that will be operated above 60 Hz should be selected based on the chart 3 inverter frequency current de-rating curve shown on page 6.

Systems with multiple motors powered from a single inverter form a complex inverter load. The dV/dT filter works best when applied to each cable / motor. For multi motor applications consider using a single MTE **sine wave** filter for all motors. In this case the filter should be sized for the total motor load. Consult MTE applications for help in determining the best solution.

The dV/dT filter is designed to protect a single cable/ motor load. Do not connect other high current electrical devices to the output of the dV/dT filter.

6. FILTER DESCRIPTION

Effects of Cable Length Chart 4



Effect of Transients on the Motor

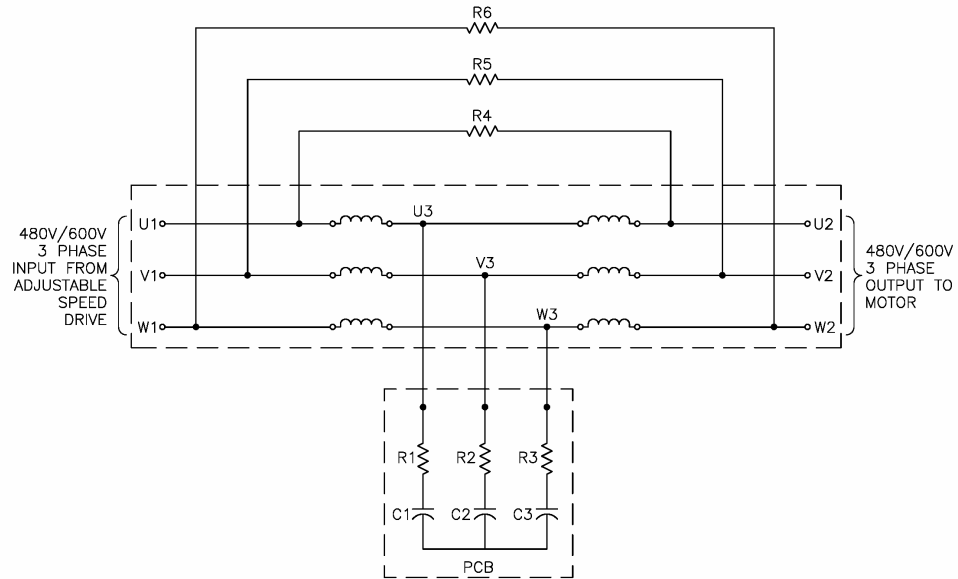
When to add dV/dT protection

Table 9

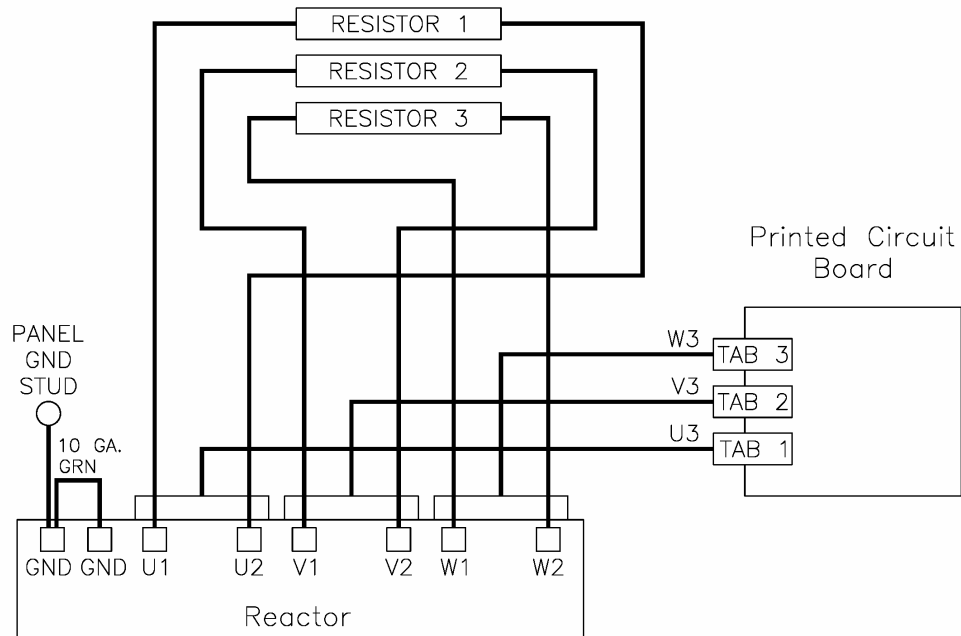
Rise Time (microseconds)	Critical Lead Length (meters)	Critical Lead Length (feet)
2.00	100	328
1.0	50	164
0.50	25	82
0.10	5	16
0.05	2.5	8

6. FILTER DESCRIPTION

Wiring Typical filter Schematic Diagram Fig. 14



Typical internal filter wiring Fig. 15



7. START - UP

Startup Safety Precautions

Before startup, observe the following warnings and instructions:

WARNING

Internal components of the filter are at line potential when the filter is connected to the drive. This voltage is extremely dangerous and may cause death or severe injury if you come in contact with it.

WARNING

After disconnecting the utility power, wait at least 5 minutes before doing any work on the filter connections. After removing power, allow at least five minutes to elapse and verify that the capacitors have discharged to a safe level before contacting internal components. Connect a DC voltmeter across the capacitor terminals. Start with the meter on the highest scale and progressively switch to a lower scale as the indicated voltage falls below the maximum value of the scale used.

Sequence of Operation

1. Read and follow safety precautions. Including those of drive manufactures.
2. After installation, ensure that:
 - All filter ground terminals are connected to ground.
 - Power wiring to the utility, inverter, filter and motor is in accordance with the installation and connection instructions in Chapter 5.
3. Check that moisture has not condensed on the filter components. If moisture is present, do not proceed with startup until the moisture has been removed.

WARNING

Use extreme caution to avoid contact with line voltage when checking for power.

INJURY OR DEATH MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED.

4. Refer to the inverter user manual for the inverter startup procedure. Observe all safety instructions in the inverter user manual.
5. Disconnect filter output terminals from the motor.
6. Set the inverter switching frequency between 2 kHz and 8 kHz. Refer to the inverter user manual.

CAUTION

Damage to the filter may occur if the inverter frequency is not set between 2 kHz and 8 KHz.

7. Turn the inverter ON
8. Confirm that inverter voltage is present at the input terminals (U1, V1, W1) of the filter.
9. Confirm that inverter voltage is present at the output terminals (U2, V2, W2) of the filter.
10. Disconnect the inverter from the AC Line and wait 5 minutes.
11. Connect the filter output to the motor.
12. Refer to the inverter user manual for the motor startup procedure.

WARNING

INJURY OR DEATH MAY RESULT IF THE INVERTER SAFETY PRECAUTIONS ARE NOT OBSERVED

CAUTION

Damage to equipment or serious injury may occur if the inverter startup procedures are not observed..

8. TROUBLESHOOTING

WARNING

Troubleshooting

When properly installed, this equipment has been designed to provide maximum safety for operating personnel. However, hazardous voltages and elevated temperatures exist within the confines of the enclosure. Servicing should therefore be performed by qualified personnel only and in accordance with OSHA Regulations.

To aid in troubleshooting use the diagrams is shown on [page 29](#). A list of potential problems and solutions are listed below.

WARNING

High voltage is used in the operation of this filter. Use Extreme caution to avoid contact with high voltage when operating, installing or repairing this filter. **INJURY OR DEATH MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED.**

After removing power, allow at least five minutes to elapse and verify that the capacitors have discharged to a safe level before contacting internal components. Connect a DC voltmeter across the capacitor terminals or terminals U1, V1 or, W1. Start with the meter on the highest scale and progressively switch to a lower scale as the indicated voltage falls below the maximum value of the scale used.

8. TROUBLESHOOTING

PROBLEM:	Voltage is not present at the filter Input terminals.
Possible cause:	Power to the inverter is turned off or shut down.
Solution:	Turn power on, check inverter errors.
Possible cause:	One or more external line fuses are blown.
Solution:	Verify the continuity of line fuses in all phases. Replace as necessary.
Possible cause:	Damage to inverter - dV/dT interconnect cables
Solution:	Replace damaged cable.
Possible cause:	Inverter setup parameters are incorrect
Solution:	Verify motor current, voltage and shutdown parameters are valid

PROBLEM:	dV/dT filter runs Hot
Possible cause:	Normal operation, reactor and resistors are > 100 °C You may see resistors smoke as manufacturing wax burns off
Solution:	Caution parts are very hot and may cause burns. Follow installation guidelines for clearances and check for adequate air flow. Allow 15 minutes to burn off resistor residue.
Possible cause:	Motor coil damage windings shorted
Solution:	Replace motor inspect wiring
Possible cause:	Heat buildup within enclosure
Solution:	Provide clearance and venting for filter components
Possible cause:	Drive set to auto tune sends excessive current to filter
Solution:	Only run linear motor velocity profiles with DVDT filters. Set drive for operation with filters.
Possible cause:	Multi motor applications create complex loading and resonances with DVDT filter
Solution:	Use only one dv/dt filter per drive for a single motor only.

8. TROUBLESHOOTING

9. Revision History

dV/dT Filter Series A 440-600 VAC User Manual		INSTR-019
Responsibility: Product Lines Manager Approved By: Wayne Walcott ISO Section: 7.2.3		
Revision	Date	Revision History
---	11/19/04	New document written by Wayne Walcott
001	4/21/05	Revised by Wayne Walcott
002	7/12/07	Revised by Wayne Walcott – Cab-20 is obsolete.
003	12/14/07	By WRW Expanded operation 380 – 600 vac, PDF linked index ECN
004	10/09/09	By WRW fixed table 8 (65 amp terminal changed to show 18-4 AWG)