

Series A dV/dT Filter

440—600 VAC

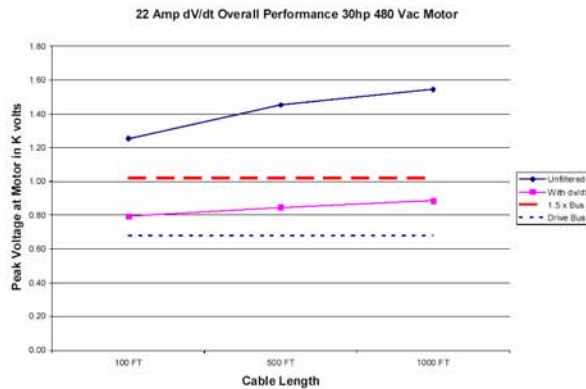
MTE Series A dV/dT filters are designed to protect AC motors from the destructive effects of peak voltages facilitated by long cable runs between the inverter and motor. Depending on the switching time of the power semiconductor used in the inverter and the size of the motor, cable lengths as short as eight feet can result in motor peak voltages that exceed the rating of the motor's insulation system. However, the longer the cable the greater the problem.

The MTE dV/dT filter is **guaranteed** to meet its maximum peak motor voltage specification (150% of bus voltage) with up to 1,000 feet of cable between the filter and the motor. It is also rated for a maximum dV/dT of 200 volts per microsecond. However, 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. The MTE dV/dT filter is a passive fourth order device that reduces transmission line effects of motor cables by dampening the rate of voltage increase and minimizes the peak voltage that occurs at the motor terminals. MTE Series A dV/dT filters are designed for use with inverters operated at switching frequencies between 900 Hz and 8 kHz.

The dV/dT filter has a continuous current rating of 100% RMS and intermittent current of 150% for 1 minute and 200% for 10 seconds. Available as panel-mount or in NEMA 1, 2 and 3R enclosures the new dV/dT filter is rated for use in temperatures up to 50° C as panel mount or 40° C with enclosed cabinets. Typical applications include submersible pumps, HVAC equipment and process automation lines. Motors rated 100 hp and below and standard NEMA B motors, MG1 Part 30, are prone to failure as a result of high voltage spikes and will benefit from dV/dT filtering.



dV/dT Filter Performance



dV/dT Filters

Service Conditions:

Maximum ambient temperature: 50° C open filters
40° C enclosed filters

Altitude without de-rating: 1000 meters

Performance

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

Maximum dV/dT: 200 volts per microsecond

Frequency

Inverter switching frequency: Minimum – 900 Hz , Maximum - 8 kHz

Drive operating frequency: Nominal: 60 Hz, Minimum: 6 Hz, Maximum with de-rating: 120 Hz

Current Rating

Continuous current rating: 100% RMS

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

Output compatibility

Loading: 3 phase induction motors
"No load / open circuit " continuous operation

Insertion Loss

Insertion loss: 3% of rated voltage maximum

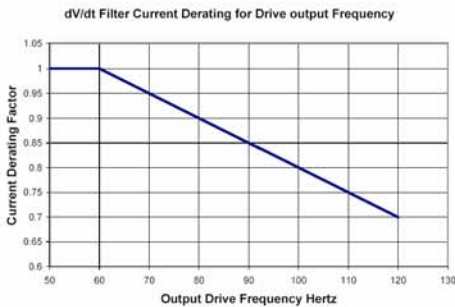
Agency Approvals

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

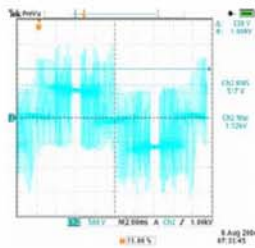
Noise:

Maximum audible noise level at two meters:
76 dB-A

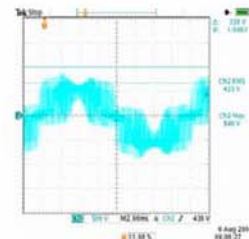
Data subject to change without notice.



1000 ft Full Load 8K
Switching
Unfiltered shielded Cable



1000 ft Full Load 8K
Switching
dV/dT Filtered



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MOTOR PROTECTION FILTERS

dV/dt Series A Filters

Table of Contents

TABLE OF CONTENTS.....	1
SELECTION & APPLICATION GUIDE.....	2
440 - 480 VOLTS.....	3
550 - 600 VOLTS.....	4
OPTIONS SELECTION	5
PRODUCT SPECIFICATION.....	6
MODEL CODE PART NUMBER CONFIGURATION	7
MECHANICAL DATA	8
OUTLINE DRAWINGS.....	9
OPEN UNITS.....	9
OPEN KIT DRAWINGS	13
ENCLOSED OUTLINE DRAWINGS.....	14
Fig. 6 Cab 12C	15
Fig. 7 Cab 17V	16
Fig. 8 Cab 17C	17
Fig. 9 Cab 20B	18
Fig. 10 Cab 26C	19

MOTOR PROTECTION FILTERS

Selection & Application Guide

Series A dV/dt Filters

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.

Typical applications include submersible pumps, HVAC equipment and process automation lines. Motors rated 100 HP and below and standard NEMA B motors, MG1Part 30, are prone to failure as a result of high voltage spikes and will benefit from dV/dt filtering.

Select filters based on the horsepower rating of the motor for both variable torque and constant torque applications. 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. Series A dV/dt filters are available as open panel mount and with enclosed ratings including NEMA 1 and NEMA 3R.

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 meet its maximum peak motor voltage specification 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.

For PWM inverter applications feeding motors located up to 15,000 feet from the inverter, or feeding standard transformers, or that require an output sine wave voltage wave form compliant with the requirements of IEEE 519 use MTE Sine Wave Filters.

[<Table of Contents>](#)

MOTOR PROTECTION FILTERS

Selection and Power dissipation

dV/dt Series A Filters

440 - 480 Volts

Motor HP	NEC Motor Current AMPS	dV/dt filter				Typical Power Dissipation Watts
		Current Rating	Open Cat. No.	NEMA 1 Cat. No.	NEMA 3R Cat. No.	
.5	1.1	3	DVAP0003	DVAGA0003	DVAWA0003	313
.75	1.6					
1	2.1					
1.5	3					
2	3.4	4	DVAP0004	DVAGA0004	DVAWA0004	309
3	4.8	7	DVAP0007	DVAGA0007	DVAWA0007	325
5	7.6	9	DVAP0009	DVAGA0009	DVAWA0009	334
7.5	11	12	DVAP0012	DVAGA0012	DVAWA0012	345
10	14	17	DVAP0017	DVAGA0017	DVAWA0017	354
15	21	22	DVAP0022	DVAGA0022	DVAWA0022	369
20	27	27	DVAP0027	DVAGB0027	DVAWB0027	411
25	34	35	DVAP0035	DVAGB0035	DVAWB0035	436
30	40	45	DVAP0045	DVAGB0045	DVAWB0045	402
40	52	55	DVAP0055	DVAGB0055	DVAWB0055	429
50	65	65	DVAP0065	DVAGB0065	DVAWB0065	423
60	77	80	DVAP0080	DVAGB0080	DVAWB0080	440
75	96	110	DVAP0110	DVAGB0110	DVAWC0110	476
100	124	130	DVAP0130	DVAGC0130	DVAWC0130	554
125	156	160	DVAP0160	DVAGC0160	DVAWC0160	574
150	180	200	DVAP0200	DVAGC0200	DVAWC0200	593
200	240	250	DVAP0250	DVAGC0250	DVAWC0250	623
250	302	305	DVAP0305	DVAGD0305	DVAWD0305	703
300	361	365	DVAP0365	DVAGD0365	DVAWD0365	947
350	414	415	DVAP0415	DVAGD0415	DVAWD0415	972
400	477	515	DVAP0515	DVAGD0515	DVAWD0515	985
450	515	515	DVAP0515	DVAGD0515	DVAWD0515	985
500	590	600	DVAP0600	DVAGD0600	DVAWD0600	977

[To Mechanical Data](#)

[<Table of Contents>](#)

MOTOR PROTECTION FILTERS

Selection and Power dissipation

dV/dt Series A Filters

550 - 600 Volts

Motor HP	NEC Motor Current AMPS	dV/dt filter				Typical Power Dissipation Watts
		Current Rating	Open Cat. No.	NEMA 1 Cat. No.	NEMA 3R Cat. No.	
.5	.9	3	DVAP0003	DVAGA0003	DVAWA0003	313
.75	1.3					
1	1.7					
1.5	2.4					
2	2.7					
3	3.9	4	DVAP0004	DVAGA0004	DVAWA0004	309
5	6.1	7	DVAP0007	DVAGA0007	DVAWA0007	325
7.5	9.0	9	DVAP0009	DVAGA0009	DVAWA0009	334
10	11	12	DVAP0012	DVAGA0012	DVAWA0012	345
15	17	17	DVAP0017	DVAGA0017	DVAWA0017	354
20	22	22	DVAP0022	DVAGA0022	DVAWA0022	369
25	27	27	DVAP0027	DVAGB0027	DVAWB0027	411
30	32	35	DVAP0035	DVAGB0035	DVAWB0035	436
40	41	45	DVAP0045	DVAGB0045	DVAWB0045	402
50	52	55	DVAP0055	DVAGB0055	DVAWB0055	429
60	62	65	DVAP0065	DVAGB0065	DVAWB0065	423
75	77	80	DVAP0080	DVAGB0080	DVAWB0080	440
100	99	110	DVAP0110	DVAGB0110	DVAWC0110	476
125	125	130	DVAP0130	DVAGC0130	DVAWC0130	554
150	144	160	DVAP0160	DVAGC0160	DVAWC0160	574
200	192	200	DVAP0200	DVAGC0200	DVAWC0200	593
250	242	250	DVAP0250	DVAGC0250	DVAWC0250	623
300	189	305	DVAP0305	DVAGD0305	DVAWD0305	703
350	336	365	DVAP0365	DVAGD0365	DVAWD0365	947
400	382	415	DVAP0415	DVAGD0415	DVAWD0415	972
450	412	515	DVAP0515	DVAGD0515	DVAWD0515	985
500	472	515	DVAP0515	DVAGD0515	DVAWD0515	985
600	600	600	DVAP0600	DVAGD0600	DVAWD0600	977

[To Mechanical Data](#)

[<Table of Contents>](#)

MOTOR PROTECTION

dV/dt Series A Filter

Options Selection

440-600 VAC

Option 01

A single contact normally closed (NC) thermal switch connected to a customer terminal block for system integration.

To incorporate this option add -01 suffix to the dv/dt filter part number. The list price of this option will be added to the list price of the filter.

[<Table of contents >](#)

PRODUCT SPECIFICATION

dV/dt Series A Filters

Service Conditions

Maximum ambient temperature: 50 degrees C open filters
40 degrees C enclosed filters

Altitude without de-rating: 1000 meters

Performance

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

Maximum dV/dT: 200 volts per microsecond

Frequency

Inverter switching frequency: Minimum – 900 Hz , Maximum - 8 kHz

Drive operating frequency: Nominal: 60Hz, Minimum: 6 Hz

Current Rating

Continuous current rating: 100% RMS

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

Output compatibility

Loading: Conventional 3 phase motors
“No load” continuous operation

Insertion Loss

Insertion loss: 3% of rated voltage maximum

Agency Approvals

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

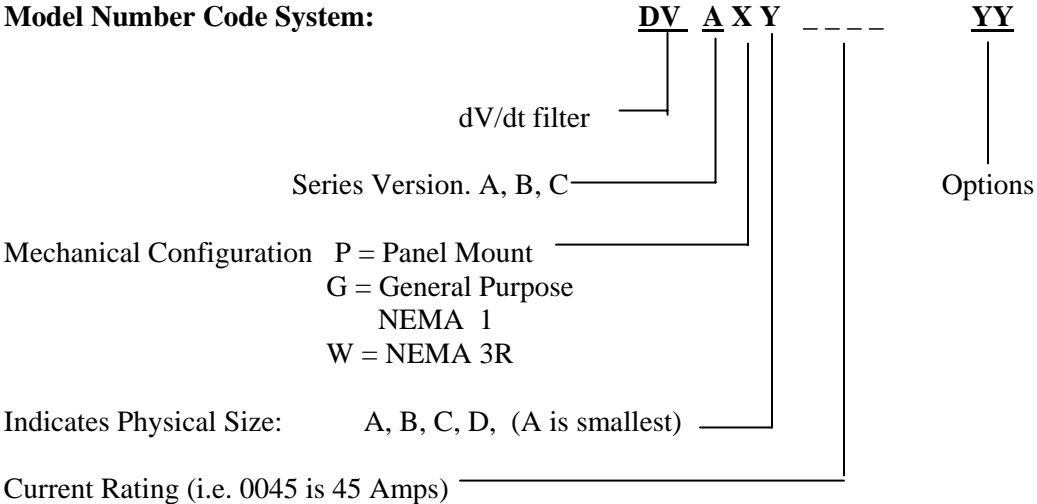
Noise:

Maximum audible noise level at two meters: 76 DB-A

[<Table of Contents>](#)

Model Code Part Number Configuration

Model Number Code System:



[<Table of Contents>](#)

dV/dt Series A Filters

Mechanical Data

Filter Amps	Terminal Wiring AWG	Terminal Torque In-Lbs Max	Open			NEMA 1			NEMA 3R		
			Cat PN.	WT Lbs	Fig.	Cat PN.	WT Lbs	Fig.	Cat PN.	WT Lbs	Fig.
3	22-14	16	DVAP0003	13	1	DVAGA0003	28	5	DVAWA0003	75	6
4	22-14	16	DVAP0004	13	1	DVAGA0004	28	5	DVAWA0004	75	6
7	22-14	16	DVAP0007	14	1	DVAGA0007	29	5	DVAWA0007	76	6
9	22-14	16	DVAP0009	14	1	DVAGA0009	29	5	DVAWA0009	76	6
12	22-5	16	DVAP0012	14	1	DVAGA0012	29	5	DVAWA0012	76	6
17	22-5	16	DVAP0017	18	1	DVAGA0017	33	5	DVAWA0017	80	6
22	22-5	16	DVAP0022	19	1	DVAGA0022	34	5	DVAWA0022	81	6
27	22-5	16	DVAP0027	22	2	DVAGB0027	64	7	DVAWB0027	108	8
35	22-5	16	DVAP0035	26	2	DVAGB0035	68	7	DVAWB0035	112	8
45	18-4	20	DVAP0045	32	2	DVAGB0045	74	7	DVAWB0045	118	8
55	18-4	20	DVAP0055	33	2	DVAGB0055	75	7	DVAWB0055	119	8
65	6-0	20	DVAP0065	39	2	DVAGB0065	81	7	DVAWB0065	125	8
80	6-0	45	DVAP0080	52	3	DVAGB0080	93	7	DVAWB0080	137	9
110	3/0 75C	45	DVAP0110	51	3	DVAGB0110	142	7	DVAWC0110	142	9
130	4/0 75C	250	DVAP0130	64	4	DVAGC0130	155	9	DVAWC0130	155	9
160	3/0 90C	250	DVAP0160	73	4	DVAGC0160	164	9	DVAWC0160	164	9
200	4/0 90C 250MCM 75C	325	DVAP0200	82	4	DVAGC0200	173	9	DVAWC0200	173	9
250	400MCM 90C	375	DVAP0250	101	4	DVAGC0250	192	9	DVAWC0250	192	9
305	600MCM 4/0 2X 90C	375	DVAP0305	106	4	DVAGD0305	271	10	DVAWD0305	271	10
365	300MCM 2X 90C	375	DVAP0365	97	A1&B	DVAGD0365	263	10	DVAWD0365	263	10
415	350MCM 2X 90C	375	DVAP0415	119	A2&B	DVAGD0415	285	10	DVAWD0415	285	10
515	600MCM 2X 90C 300MCM 3X 90C	375	DVAP0515	122	A3&B	DVAGD0515	288	10	DVAWD0515	288	10
600	500MCM 3X 90C	375	DVAP0600	111	A4&B	DVAGD0600	277	10	DVAWD0600	277	10

For (80 amp – 600 amp) filters torque ground lug to 50 in-lb max.

[<Table of Contents>](#)

Outline Drawings Open dV/dt Series A Filters

Open Units
3 – 22 Amps

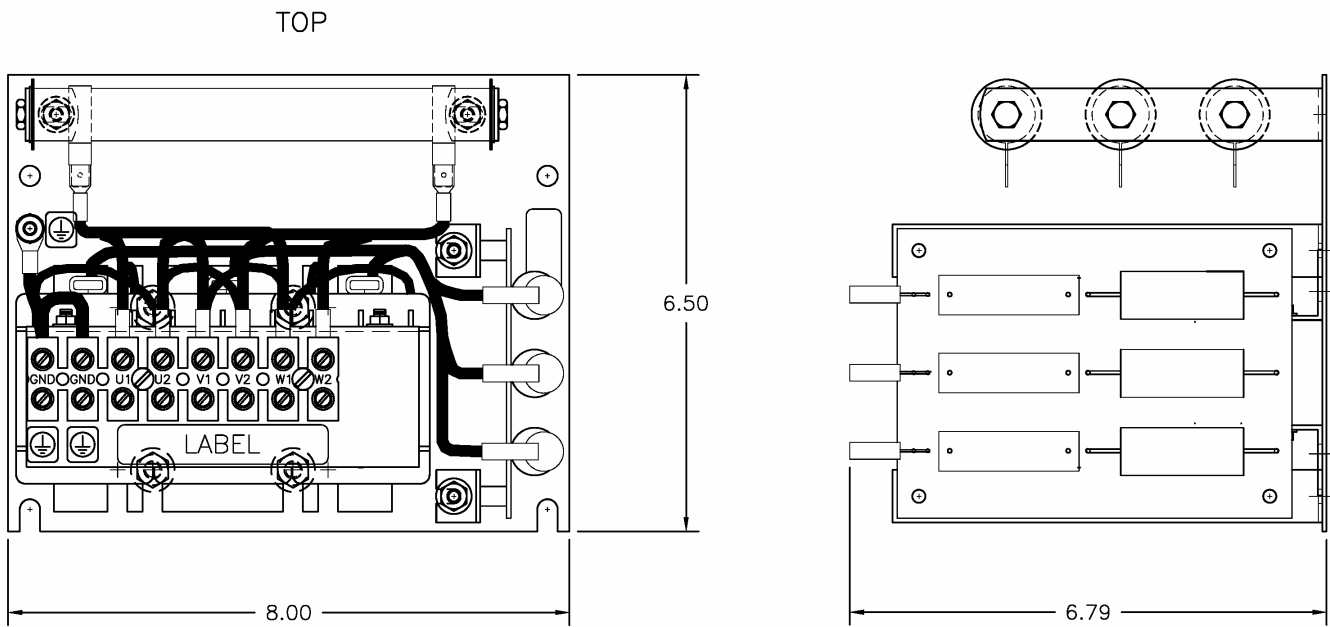


Fig 1

22 Amps Shown

[<Back to Mechanical>](#)

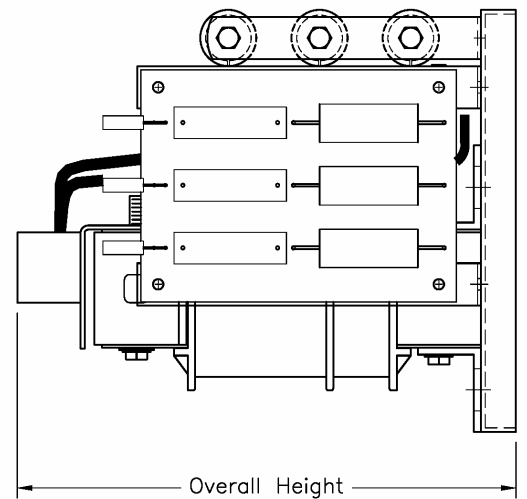
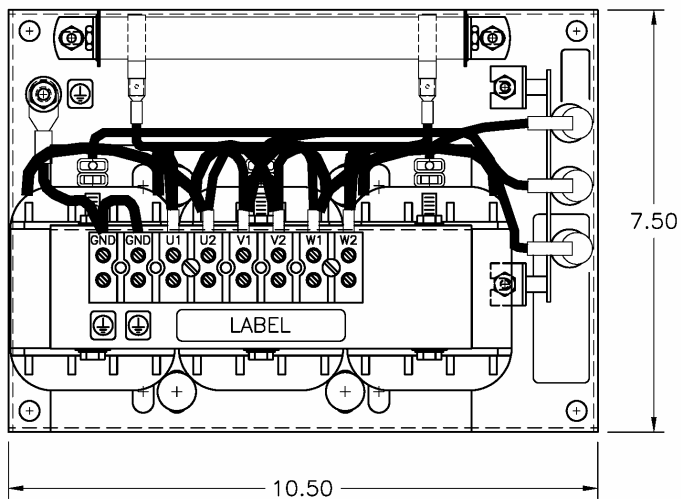
[<Table of Contents>](#)

Outline Drawings

Open dV/dt Series A Filters

Open Units 27 – 65 Amps

TOP



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

Fig 2.

65 Amps Shown

[<Back to Mechanical>](#)

[<Table of Contents>](#)

Outline Drawings

Open dV/dt Series A Filters

Open Units units 80 -110 Amps

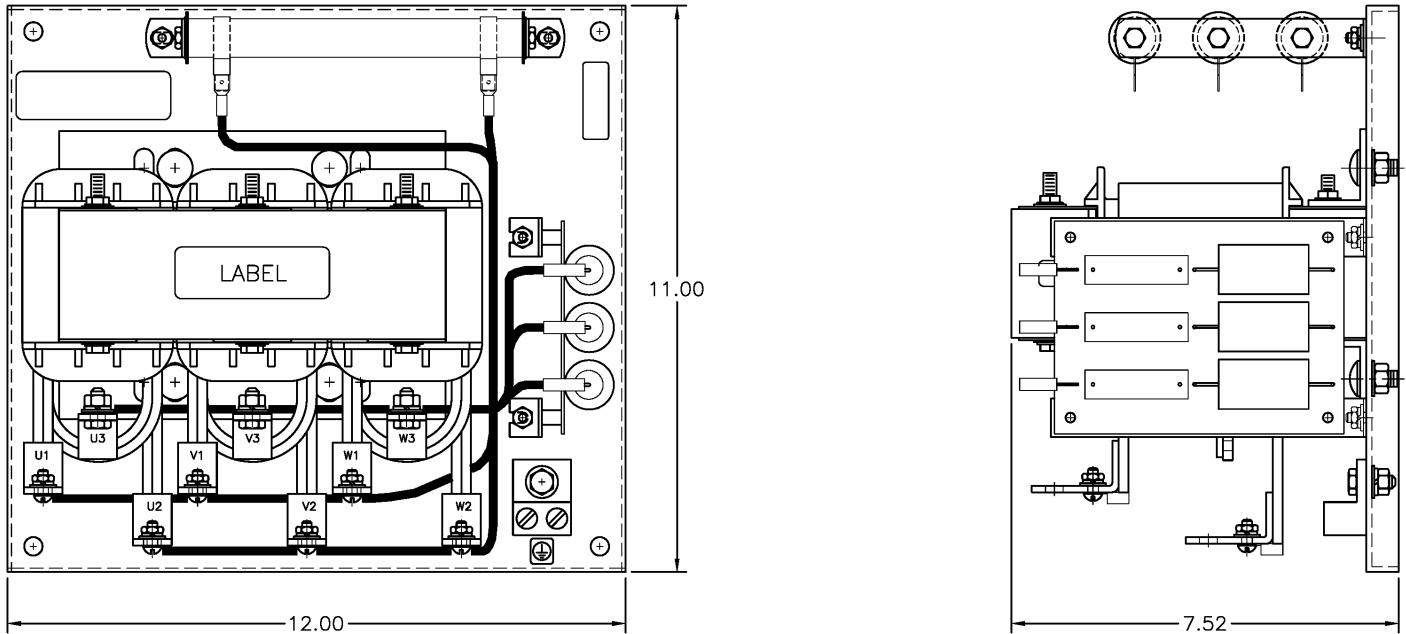


Fig. 3

110 Amps Shown

[<Back to Mechanical>](#)

[<Table of Contents>](#)

Outline Drawings

Open dV/dt Series A Filters

Open Units 130 - 305 Amps

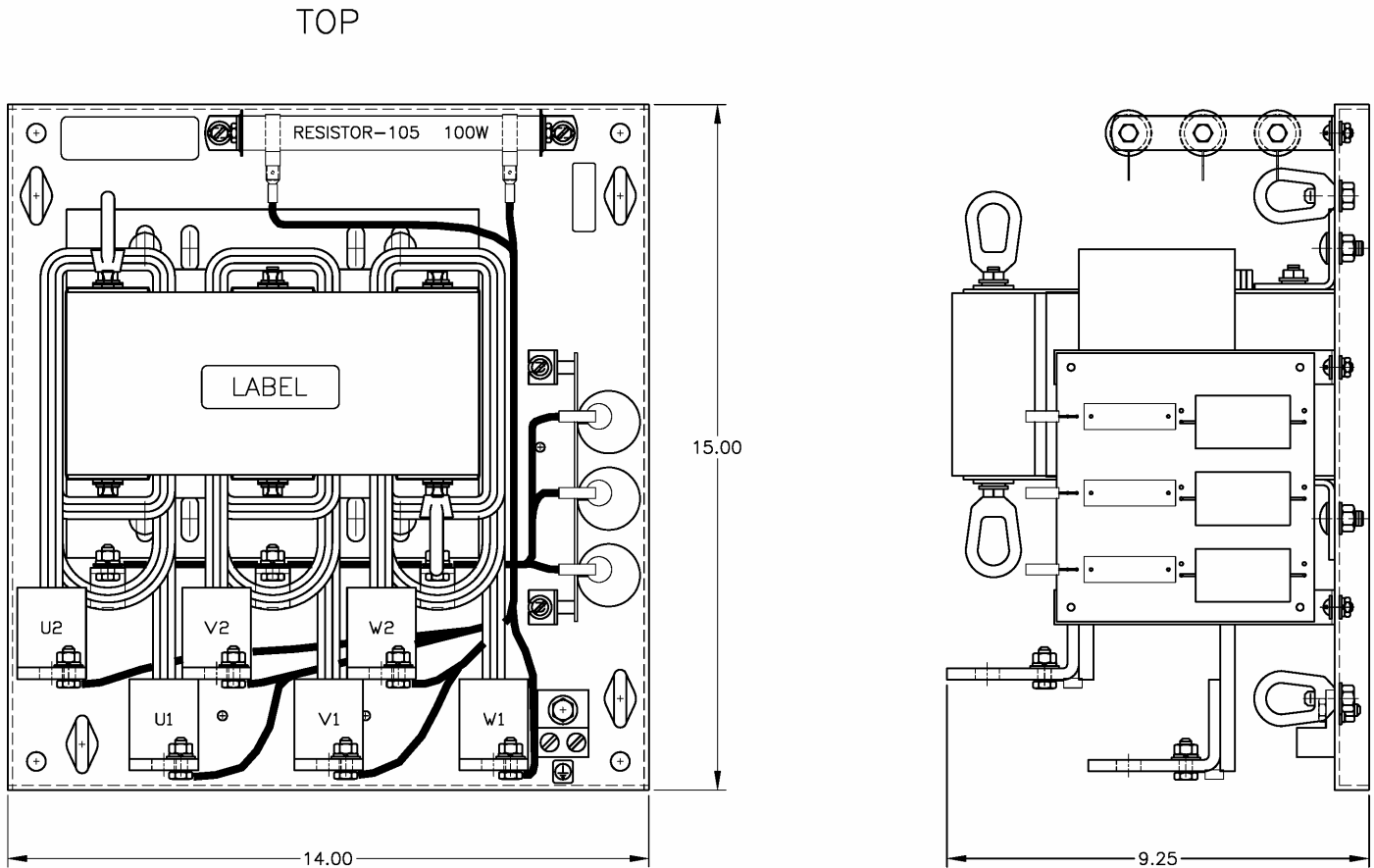


Fig. 4

305 Amps shown

[<Back to Mechanical>](#)

[<Table of Contents>](#)

dV/dt Series A Filters

Open Kit Drawings 365 – 600 Amps

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

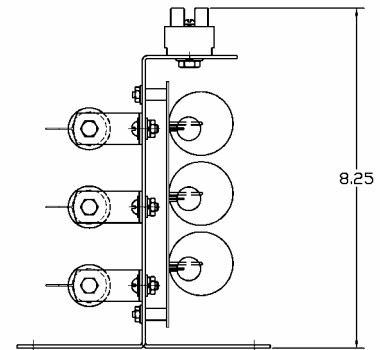
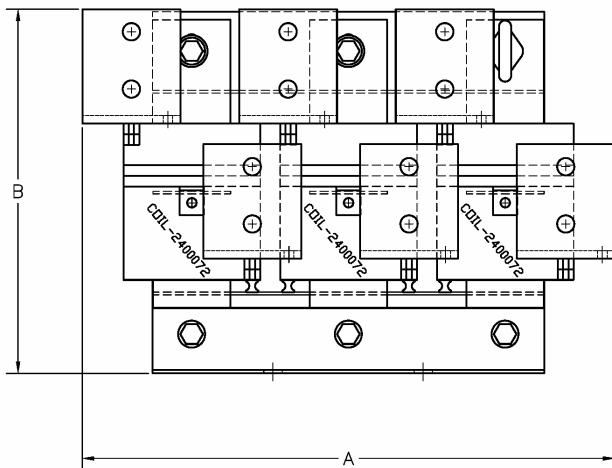
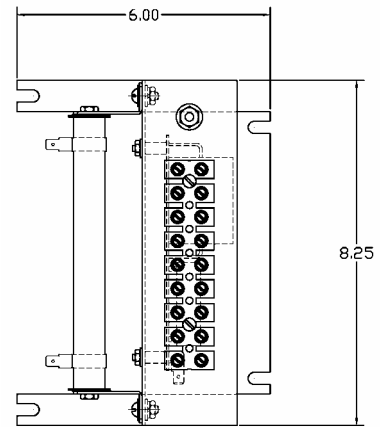
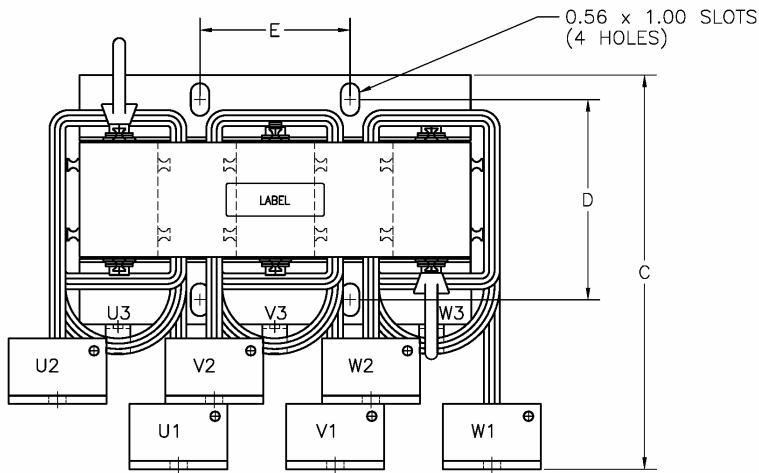


Figure A

Figure B

[<Back to Mechanical>](#)

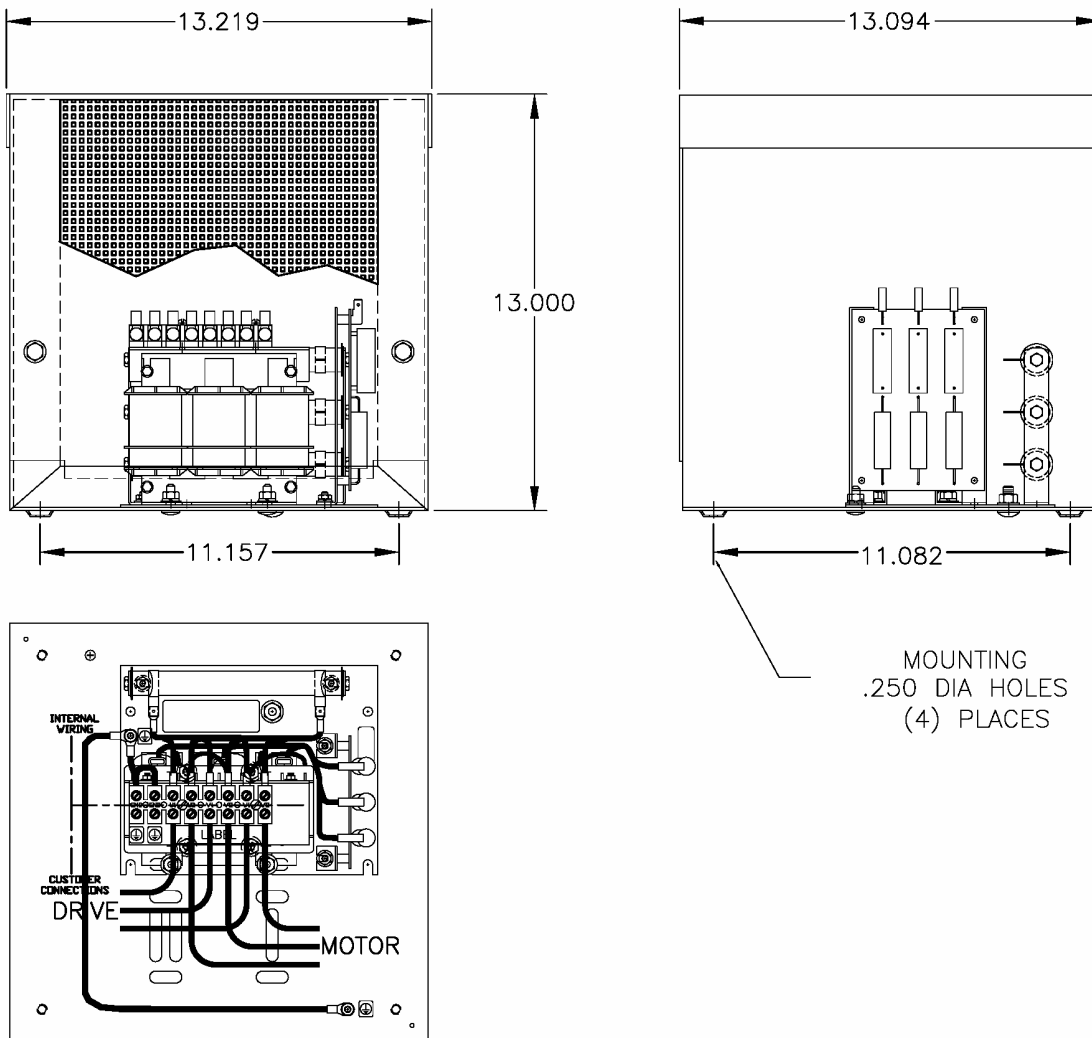
[<Table of Contents>](#)

dV/dt Series A Filters

Enclosed Outline Drawings Enclosed NEMA 1 units 3 – 22 Amps

Enclosure Indicator	Width	Height	Depth	Cab Part No.	NEMA Type	Figure
GA	13	13	13	Cab 13	NEMA 1	5

Fig. 5 Cab 13



22 Amp Shown

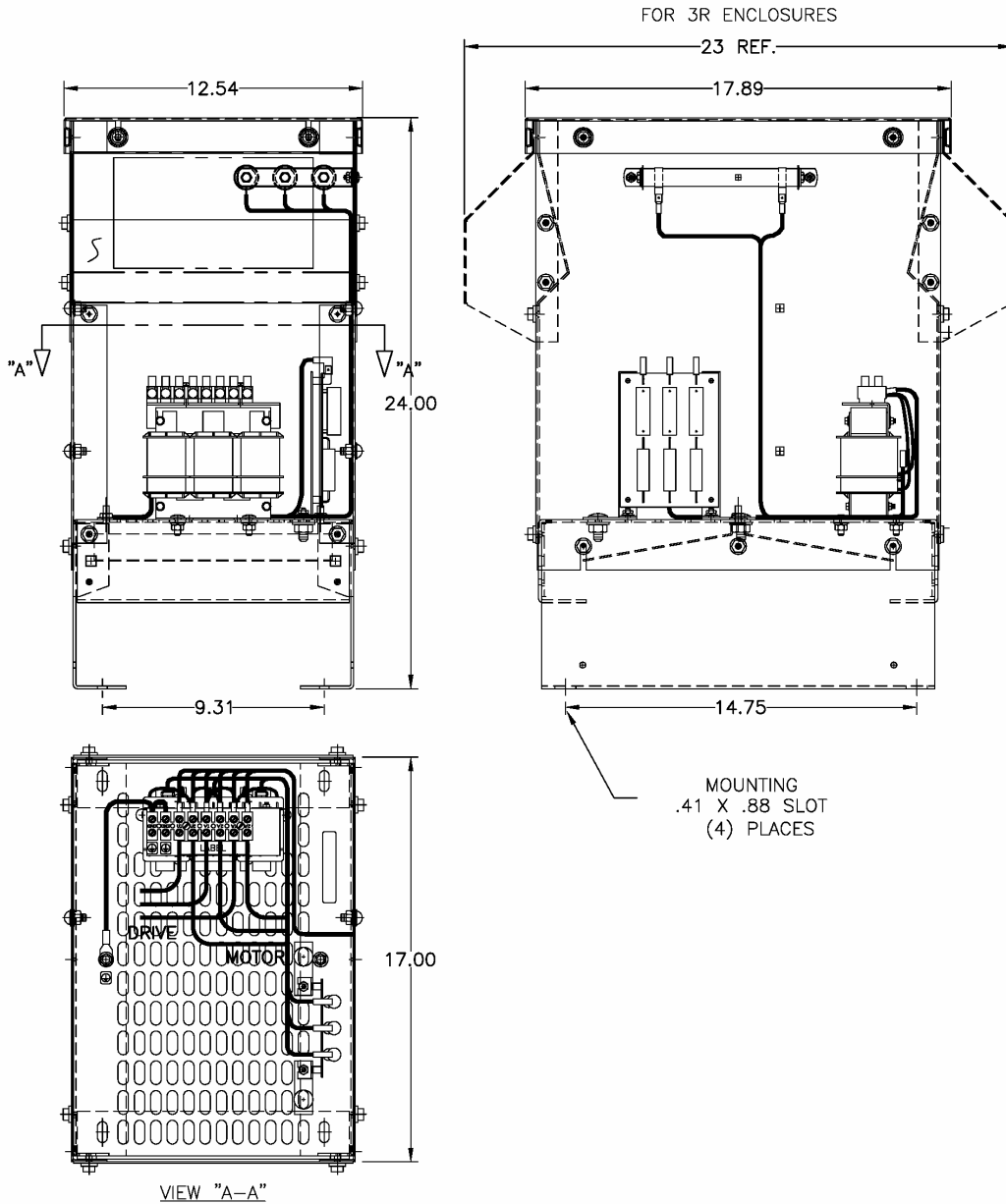
[<Back to Mechanical>](#)

[<Table of Contents>](#)

Enclosed NEMA 3R Units 3 - 22 Amps

Enclosure Indicator	Width	Height	Depth	Cab Part No.	NEMA Type	Figure
WA	12.5	24	18	Cab 12C	NEMA 3R	6

Fig. 6 Cab 12C



22 Amp Shown

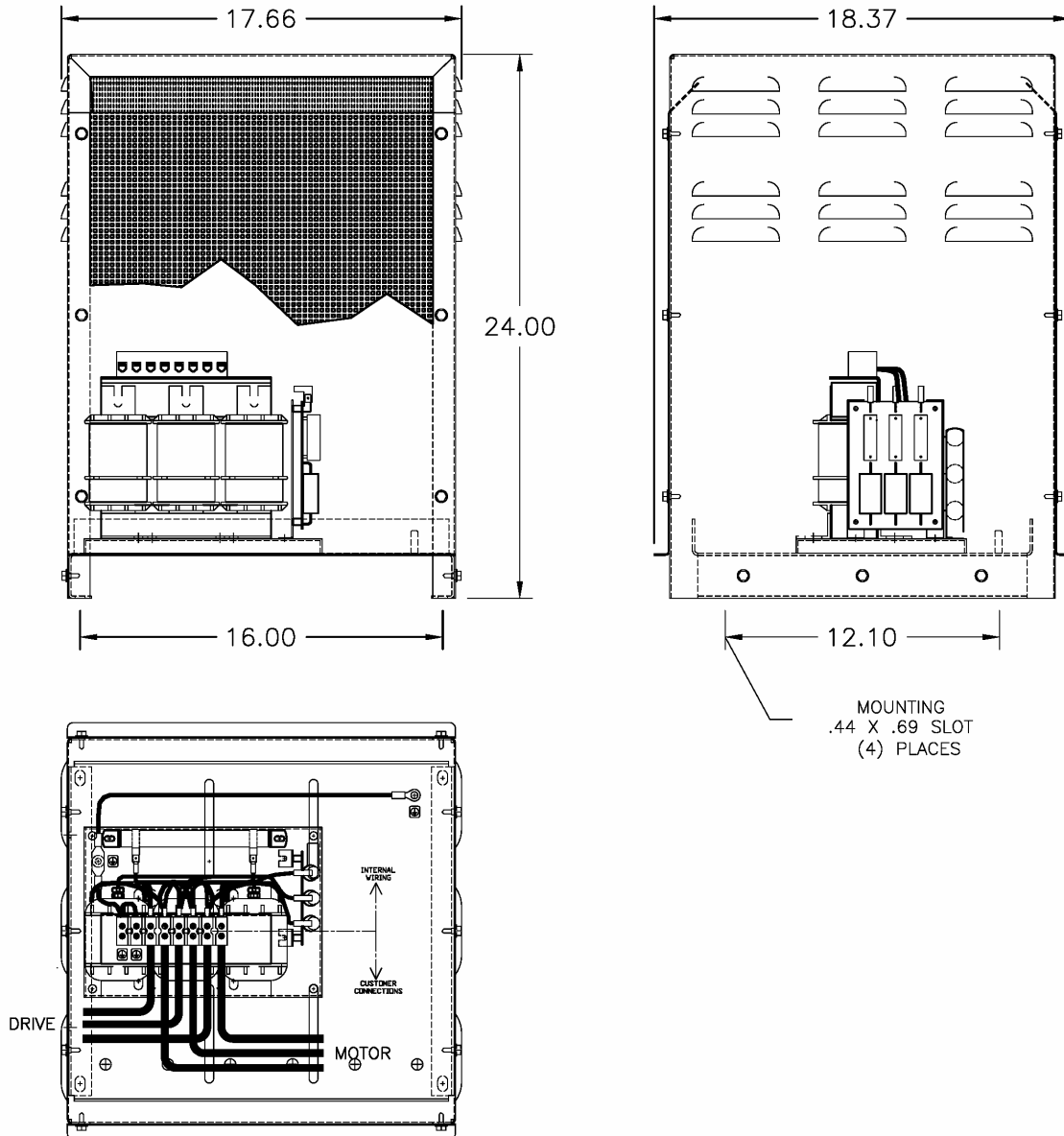
[<Back to Mechanical>](#)

[<Table of Contents>](#)

Enclosed NEMA 1 units 27 – 110 Amps

Enclosure Indicator	Width	Height	Depth	Cab Part No.	NEMA Type	Figure
GB	17	24	18	Cab 17V	NEMA 1	7

Fig. 7 Cab 17V



65 Amp Shown

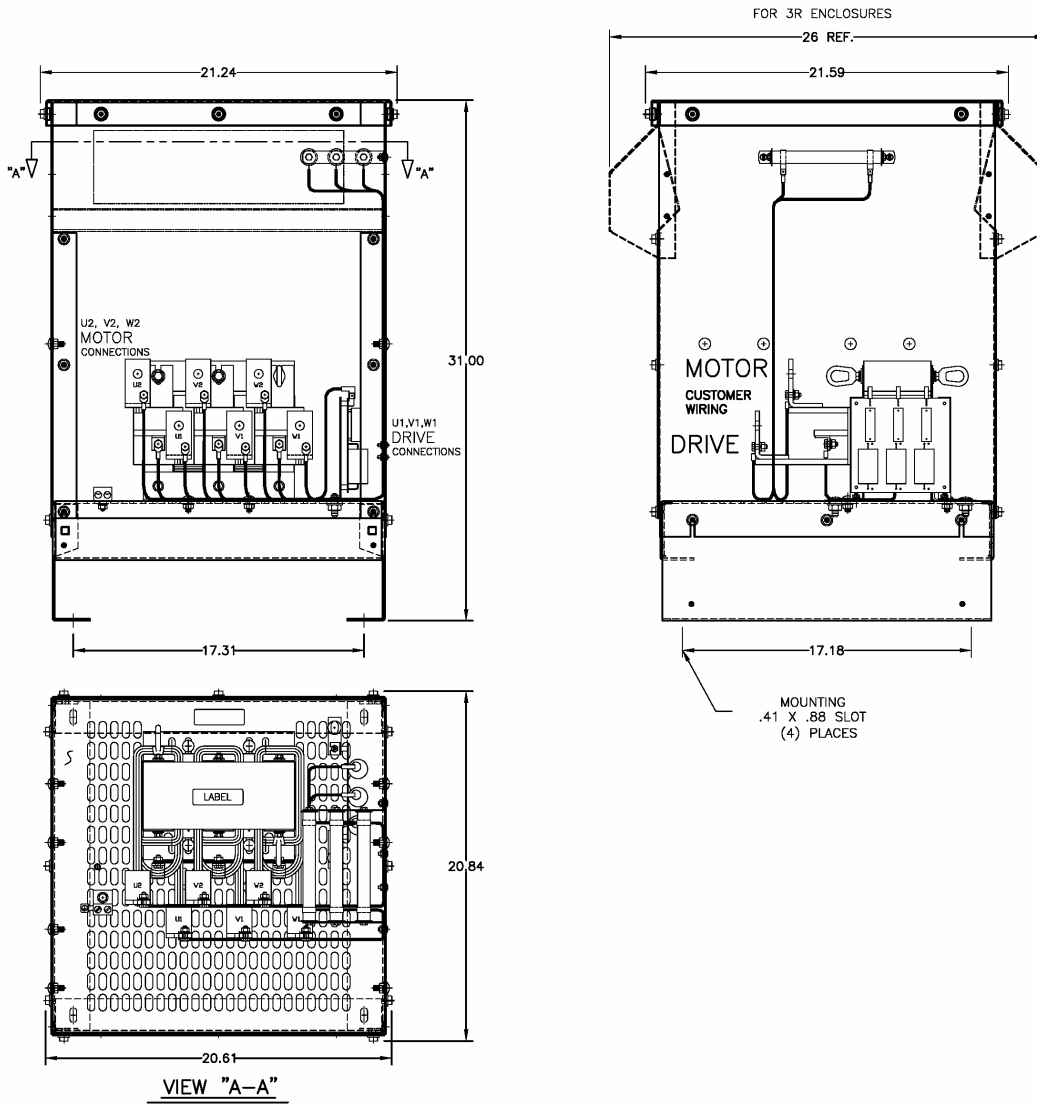
[<Back to Mechanical>](#)

[<Table of Contents>](#)

NEMA 1-2 & 3R units 130 – 250 Amps

Enclosure Indicator	Width	Height	Depth	Cab Part No.	NEMA Type	Figure
GC	24	30	24	Cab 20B	NEMA 1 -2	9
WC	20.5	31	21*	Cab 20B	NEMA 3R	

Fig. 9 Cab 20B



250 Amp Shown

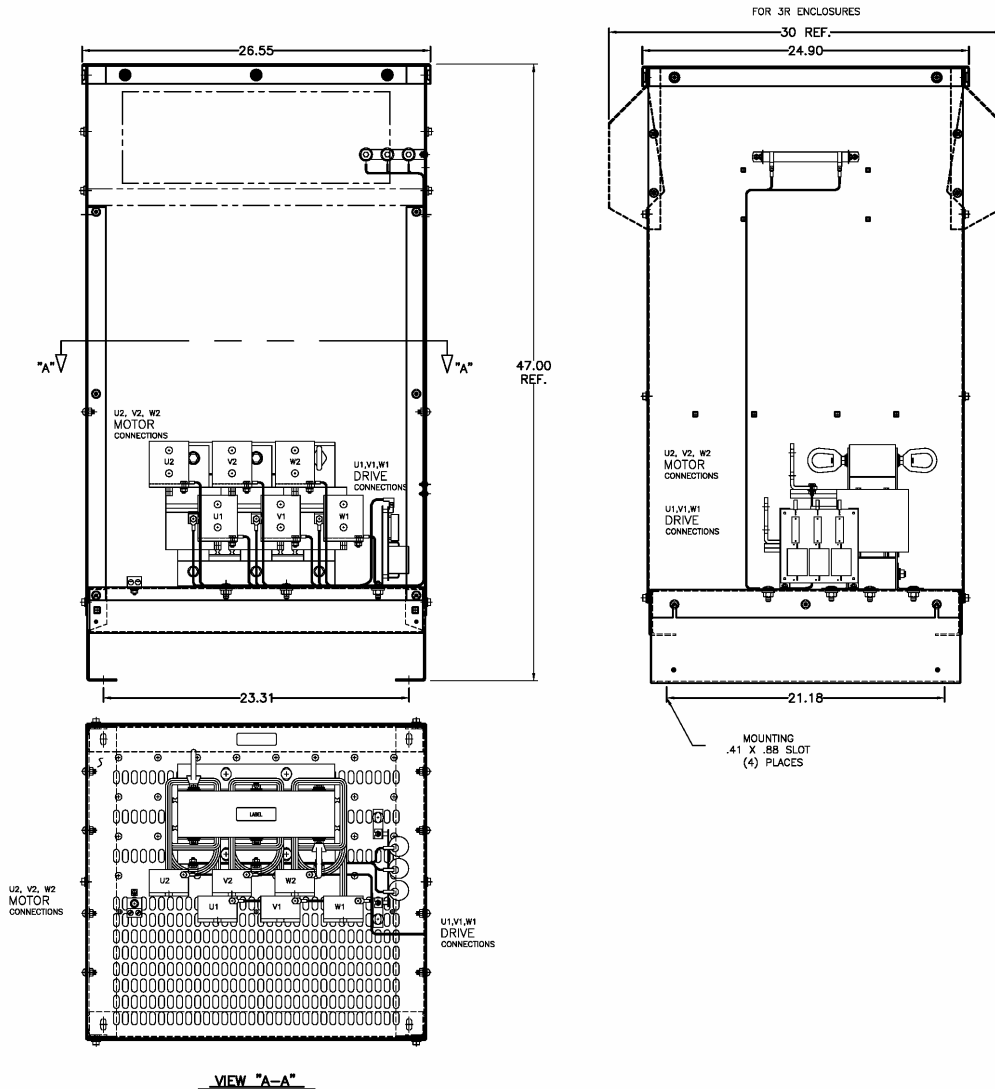
[<Back to Mechanical>](#)

[<Table of Contents>](#)

NEMA 1-2 & 3R units 305-600 Amps

Enclosure Indicator	Width	Height	Depth	Cab Part No.	NEMA Type	Figure
GD	26.5	47	25	Cab 26C	NEMA 1 -2	10
WD	26.5	47	25*	Cab 26C	NEMA 3R	

Fig. 10 Cab 26C



600 Amp Shown

[<Back to Mechanical>](#)

[<Table of Contents>](#)

ISO 7.2.3	Technical Reference Motor Protection dV/dT Series A Filters	TR-1700
Responsibility:	Engineering	
Approved by:	Karl Hink	
File Location:	J:\Public\Controlled Documents\Sales\Literature	
Revision	Date	Revision History
---	12/22/04	New document written by Wayne Walcott
001	04/21/05	Revised by WRW : cab 17V used through 110 amps
002	08/25/05	Revised by WRW added tags and hyper links for PDF
Includes Form 1213 as first two pages.		