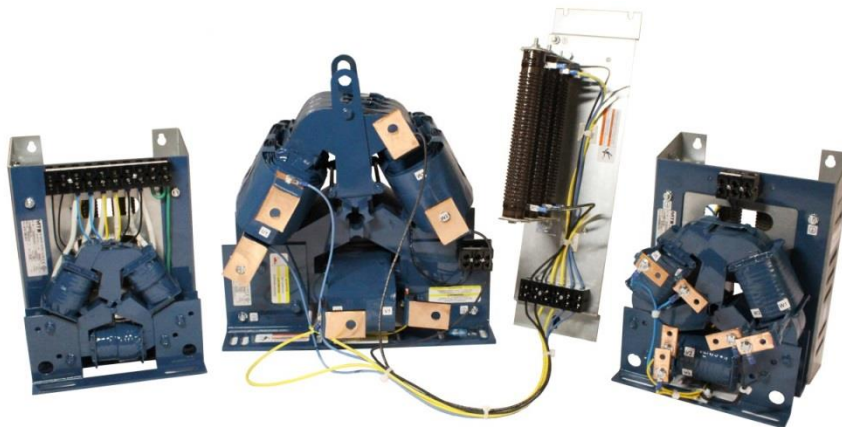


dV Sentry™

380V – 600V

TECHNICAL REFERENCE MANUAL

FORM: DVS-TRM-E
REL. September 2015
REV. 004
© 2015 MTE Corporation



WARNING

High Voltage! Only a qualified electrician can carry out the electrical installation of this filter.

Quick Reference

1	Selection Guide	Pages 7 – 16
2	Installation Guide	Pages 17 – 22
3	Startup/Troubleshooting	Pages 23 – 25
4	Reference Drawings	Pages 28 – 99

TABLE OF CONTENTS

1. WARNINGS	3
WARNINGS AND CAUTIONS.....	3
PRODUCT SAFETY LABELING.....	4
GENERAL SAFETY INSTRUCTIONS.....	4
2. INTRODUCTION	6
RECEIPT & REPAIR STATEMENT	6
3. HOW TO SELECT	7
SELECTION GUIDE	7
MODEL NUMBER CODE SYSTEM:.....	8
PART NUMBER SELECTION TABLES	9
4. PRODUCT SPECIFICATIONS	12
PERFORMANCE SPECIFICATIONS.....	12
ENCLOSURES	13
AGENCY APPROVALS	13
WARRANTY	13
5. DV/DT FILTER PERFORMANCE	14
FILTER EFFICIENCY + WATT LOSS	15
ALTITUDE DERATING.....	16
MOTOR FREQUENCY DERATING	16
6. HOW TO INSTALL	17
INSTALLATION CHECKLIST	17
GROUNDING	18
BASIC SCHEMATIC DIAGRAM	19
INTERCONNECTION DIAGRAM – PANEL (3A-110A) AND ENCLOSED (3A-600A).....	20
INTERCONNECTION DIAGRAM – MODULAR (130A-600A)	21
TORQUE RATINGS.....	22
7. START UP	23
STARTUP CHECKLIST	23
8. TROUBLESHOOTING	25
APPENDIX	27

List of Figures

Figure 6-1: Basic Schematic Diagram	19
Figure 6-2: Open Panel and Enclosed Diagram	20
Figure 6-3: Modular Diagram	21



List of Tables

Table 3-1: Panel Selection Table	9
Table 3-2: Enclosed NEMA 1/2 Selection Table	10
Table 3-3: Enclosed NEMA 3R Selection Table	11
Table 4-1: Performance Specifications	12
Table 5-1: Performance Chart	14
Table 5-2: Filter Efficiency & Watt Loss	15
Table 5-3: Altitude Derating Curve	16
Table 5-4: Current Derating for Drive Output Frequency	16
Table 6-1: Torque Ratings	22
Table 8-1: Troubleshooting Guide	25




1. WARNINGS

Warnings and Cautions

There are two types of warnings in this manual:

 WARNING	WARNING describes situations that can lead to serious faults, physical injuries, or even death.
 Caution	Caution describes situations that can lead to malfunction or possible equipment damage.

The following symbols are used in this manual.

 WARNING	High Voltage Warning: warns of situations that dangerously high voltage is involved. Failure to use proper precautions may lead to serious injury or even death.
 WARNING	General Warning: warns of situations that can result in serious injury or death if proper precautions are not used.
 Caution	General Caution: identifies situations that could lead to malfunction or possible equipment damage.





Product Safety Labeling

The following labels are placed on the DVS product:

	<p>Label notes to installer to refer to instruction manual first before installing.</p>
	<p>High Voltage: surfaces on product can have high voltage which can cause injury.</p>
	<p>Connect Thermal Switch: connecting the thermal switch can reduce risk of damage.</p>
	<p>Hot Surfaces: surfaces of product can be hot at times and cause burns.</p>

General Safety Instructions

<p>WARNING</p>	<p>High Voltage! Only a qualified electrician can carry out the electrical installation of this filter.</p>
<p>WARNING</p>	<p>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.</p>
<p>WARNING</p>	<p>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.</p>
<p>WARNING</p>	<p>An upstream disconnect/protection device must be used as required by the National Electrical Code (NEC) or governing authority.</p>
<p>WARNING</p>	<p>Even if the upstream disconnect/protection device is open, the drive down stream of the filter may feedback high voltage to the filter. The drive safety instructions must be followed. Injury or death may result if safety precautions are not observed.</p>
<p>WARNING</p>	<p>The filter must be grounded with a grounding conductor connected to all grounding terminals. Modular filters must have reactor grounded through a 2"x2" area cleaned of paint and varnish on lower mounting bracket.</p>

 WARNING	Only spare parts obtained from MTE Corporation or an authorized MTE distributor can be used.
 Caution	Loose or improperly secured connections may damage or degrade filter performance. Visually inspect and secure all electrical connections before power is applied to the filter.
 Caution	Wiring should not be routed underneath panel in resistor housing. Doing so could result in fire or damage to the product.
 Caution	Product should not be mounted on wood or any other combustible surface. Doing so could lead to fire or damage to the product.

2. INTRODUCTION

The purpose of the manual is to properly specify, size, install, interconnect and operate the dV/dt filter.

For most current information, please refer to website
<http://www.mtecorp.com/products/dvsentry/>

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.

Receipt & Repair Statement

Upon Receipt of this Filter:

The 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 or dirt has accumulated on the internal components of the filter before applying power.

Repair/Exchange Procedure:

MTE Corporation requires a Return Material Authorization Number and form before we can accept any filters that qualify for return or repair. If problems or questions arise during installation, setup, or operation of the filter, please contact MTE for assistance at:

Toll Free: 1-800-455-4MTE (1-800-455-4683)

International Tel: 262-253-8200

Fax: 262-253-8222

3. HOW TO SELECT

Selection Guide

The dV Sentry Motor Protection Filter is intended for use on inverter duty motors. It will typically be used with lead lengths up to 1,000 feet. The dV Sentry Motor Protection Filter will provide both common mode and differential mode reduction to prevent overvoltage that can occur due to reflected wave phenomena. The differential mode filtering reduces EMI, increases motor life, and reduce cables voltage stress. The added common mode protection will reduce bearing failures, degradation of cable insulation to ground, and further reduce EMI.

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.

*For non-inverter duty motors, please refer to the SineWave Guardian filter.

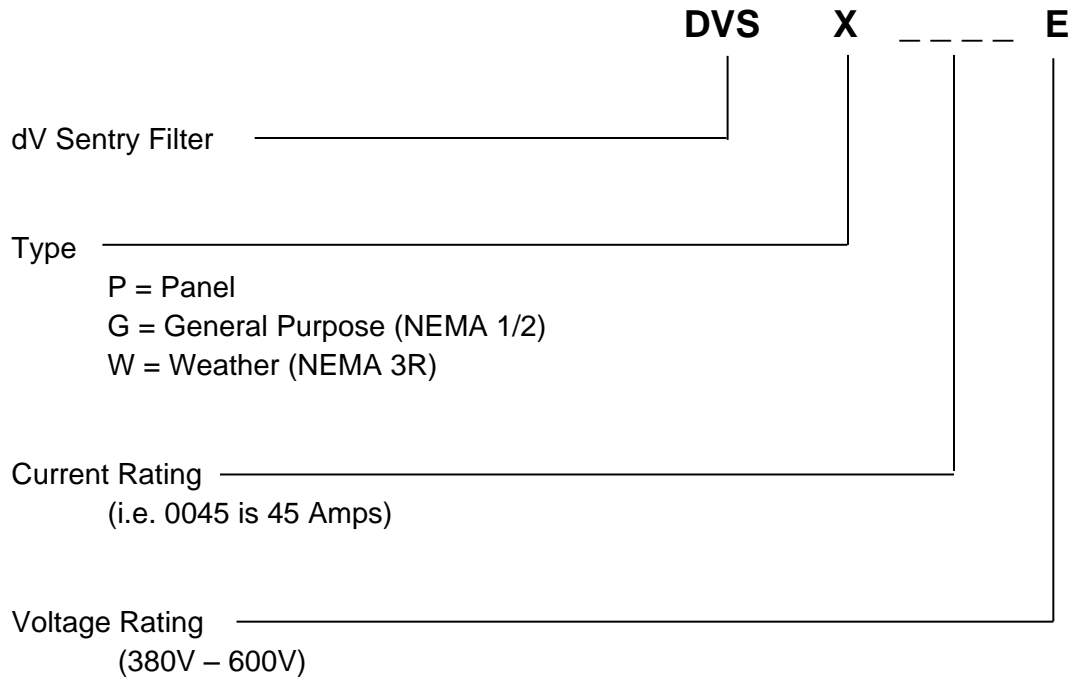
dV Sentry Motor Protection Filters are available in Panel, NEMA 1/2, and 3R mechanical configurations.

Please verify information below for proper selection:

- Lead Length:** This product is suitable for applications with motor leads up to 1,000 ft. Contact MTE Application Engineering for possible longer applications.
 - Voltage:** Input voltage from 380V – 600V. See Table 4-1 (p13) for specification.
 - Current Rating:** Support for 3 Amps – 600 Amps.
 - Switching Frequency:** Support for carrier frequency of 2kHz – 10kHz see Table 4-1 (p13).
 - Drive Output Frequency:** Support for 0Hz to 90Hz without derating, >90Hz to 120Hz with derating. See **Error! Reference source not found.** (p17) for derating curve.
 - Temperature:** Maximum ambient temperature, 60C (open), 50C (enclosed). See Table 4-1 (p13) for specification.
- Altitude:** 3,300 feet above sea level without derating. See
- (p17) for derating curve.
 - Enclosure Type:** Panel, NEMA 1/2 & NEMA 3R, see (p14) for enclosure descriptions.
 - Motor Insulation Class:** Verify motor meets inverter duty standards per NEMA MG1 Section 31.

***Filters cannot be paralleled for higher current ratings.**

Model Number Code System:



Part Number Selection Tables

Table 3-1: Panel Selection Table

380V Motor KW	480V Motor HP	550V-600V Motor HP	Filter Amp Rating	Part Number	App. Wt. (lbs.)	Open Magnetics (in.) (H x W x D)	Ref. Fig.	Watts* Loss	Resistor Panel (in.) (H x W x D)	Ref. Fig.
0.5-1.1	0.5-1.5	0.5-2	3	DVSP0003E	7	9.1 x 6.7 x 7.7	A-1	67	-	-
1.5	2	3	4	DVSP0004E	7	9.1 x 6.7 x 7.7	A-2	67	-	-
2.2-3	3	5	7	DVSP0007E	7	9.1 x 6.7 x 7.7	A-3	67	-	-
4	5	7.5	9	DVSP0009E	7	9.1 x 6.7 x 7.7	A-4	67	-	-
5.5	7.5	10	12	DVSP0012E	7	9.1 x 6.7 x 7.7	A-5	67	-	-
7.5	10	15	17	DVSP0017E	8	9.1 x 6.7 x 7.5	A-6	96	-	-
11	15	20	22	DVSP0022E	11	9.1 x 6.7 x 8.2	A-7	91	-	-
-	20	25	27	DVSP0027E	11	9.1 x 6.7 x 8.2	A-8	92	-	-
15	25	30	35	DVSP0035E	15	12.0 x 9.0 x 7.9	A-9	91	-	-
18.5-22	30	40	45	DVSP0045E	15	12.0 x 9.0 x 7.9	A-10	88	-	-
-	40	50	55	DVSP0055E	22	12.0 x 9.0 x 8.2	A-11	137	-	-
30	50	60	65	DVSP0065E	31	12.0 x 9.0 x 11.0	A-12	166	-	-
37	60	75	80	DVSP0080E	30	12.0 x 9.0 x 11.0	A-13	158	-	-
45-55	75	100	110	DVSP0110E	32	12.0 x 9.0 x 11.0	A-14	175	-	-
-	100	125	130	DVSP0130E	51	13.5 x 13.6 x 7.9	A-15	273	18.4 x 5.0 x 7.0	A-70
75-90	125	150	160	DVSP0160E	69	13.5 x 13.6 x 9.0	A-16	289	18.4 x 5.0 x 7.0	A-70
110	150	200	200	DVSP0200E	69	13.5 x 13.6 x 9.0	A-17	325	18.4 x 5.0 x 7.0	A-70
132	200	250	250	DVSP0250E	89	15.0 x 15.1 x 10.3	A-18	423	18.4 x 5.0 x 7.0	A-71
160	250	300	305	DVSP0305E	94	15.2 x 15.1 x 10.4	A-19	481	18.4 x 5.0 x 7.0	A-71
185-200	300	350	365	DVSP0365E	124	15.1 x 15.1 x 11.8	A-20	564	18.4 x 5.0 x 7.0	A-71
-	350	450	415	DVSP0415E	124	15.1 x 15.1 x 11.8	A-21	795	18.4 x 5.0 x 7.0	A-71
250	400-450	500-550	515	DVSP0515E	157	14.9 x 15.1 x 13.3	A-22	795	18.4 x 5.0 x 7.0	A-72
315	500	600	600	DVSP0600E	164	15.1 x 15.1 x 13.4	A-23	822	18.4 x 5.0 x 7.0	A-72

*Based on a typical 480V, 60Hz output frequency, 1,000 feet of drive cable, 2kHz carrier frequency at full load application.

Part Number Selection Tables

Table 3-2: Enclosed NEMA 1/2 Selection Table

380V Motor KW	380V Motor HP	480V Motor HP	550V- 600V Motor HP	Filter Amp Rating	Part Number	App. Wt. (lbs.)	NEMA 1/2 Enclosure (in.) (H x W x D)	Ref. Fig.
0.5 – 1.1	0.5 – 1.5	0.5 – 1.5	0.5 - 2	3	DVSG0003E	18	13.2 x 13.0 x 13.0	A-24
1.5	2	2	3	4	DVSG0004E	18	13.2 x 13.0 x 13.0	A-25
2.2 - 3	3	3	5	7	DVSG0007E	18	13.2 x 13.0 x 13.0	A-26
4	5.5	5	7.5	9	DVSG0009E	18	13.2 x 13.0 x 13.0	A-27
5.5	7.5	7.5	10	12	DVSG0012E	18	13.2 x 13.0 x 13.0	A-28
7.5	10	10	15	17	DVSG0017E	19	13.2 x 13.0 x 13.0	A-29
11	15	15	20	22	DVSG0022E	22	13.2 x 13.0 x 13.0	A-30
-	-	20	25	27	DVSG0027E	22	13.2 x 13.0 x 13.0	A-31
15	20	25	30	35	DVSG0035E	24	13.2 x 13.0 x 13.0	A-32
18.5 - 22	25 – 30	30	40	45	DVSG0045E	24	13.2 x 13.0 x 13.0	A-33
-	-	40	50	55	DVSG0055E	32	13.2 x 13.0 x 13.0	A-34
30	40	50	60	65	DVSG0065E	40	13.2 x 13.0 x 13.0	A-35
37	50	60	75	80	DVSG0080E	40	13.2 x 13.0 x 13.0	A-36
45 - 55	60 – 75	75	100	110	DVSG0110E	43	13.2 x 13.0 x 13.0	A-37
-	-	100	125	130	DVSG0130E	93	24.0 x 17.1 x 17.1	A-38
75 - 90	100 – 120	125	150	160	DVSG0160E	111	24.0 x 17.1 x 17.1	A-39
110	150	150	200	200	DVSG0200E	111	24.0 x 17.1 x 17.1	A-40
132	175	200	250	250	DVSG0250E	127	33.9 x 18.3 x 20.9	A-41
160	220	250	300	305	DVSG0305E	165	33.9 x 18.3 x 20.9	A-42
185 - 200	250 – 270	300	350	365	DVSG0365E	195	33.9 x 18.3 x 20.9	A-43
-	-	350	450	415	DVSG0415E	195	33.9 x 18.3 x 20.9	A-44
250	340	400 – 450	500 - 550	515	DVSG0515E	317	51.3 x 27.7 x 24.9	A-45
315	430	500	600	600	DVSG0600E	325	51.3 x 27.7 x 24.9	A-46

Part Number Selection Tables

Table 3-3: Enclosed NEMA 3R Selection Table

380V Motor KW	380V Motor HP	480V Motor HP	550V- 600V Motor HP	Filter Amp Rating	Part Number	App. Wt. (lbs.)	NEMA 3R Enclosure (in.) (H x W x D)	Ref. Fig.
0.5 – 1.1	0.5 – 1.5	0.5 – 1.5	0.5 - 2	3	DVSW0003E	24	15.5 x 10.9 x 12.0	A-47
1.5	2	2	3	4	DVSW0004E	24	15.5 x 10.9 x 12.0	A-48
2.2 - 3	3	3	5	7	DVSW0007E	24	15.5 x 10.9 x 12.0	A-49
4	5.5	5	7.5	9	DVSW0009E	24	15.5 x 10.9 x 12.0	A-50
5.5	7.5	7.5	10	12	DVSW0012E	24	15.5 x 10.9 x 12.0	A-51
7.5	10	10	15	17	DVSW0017E	25	15.5 x 10.9 x 12.0	A-52
11	15	15	20	22	DVSW0022E	28	15.5 x 10.9 x 12.0	A-53
-	-	20	25	27	DVSW0027E	28	15.5 x 10.9 x 12.0	A-54
15	20	25	30	35	DVSW0035E	30	15.5 x 10.9 x 12.0	A-55
18.5 - 22	25 – 30	30	40	45	DVSW0045E	30	15.5 x 10.9 x 12.0	A-56
-	-	40	50	55	DVSW0055E	75	24.0 x 12.5 x 22.9	A-57
30	40	50	60	65	DVSW0065E	84	24.0 x 12.5 x 22.9	A-58
37	50	60	75	80	DVSW0080E	84	24.0 x 12.5 x 22.9	A-59
45 - 55	60 – 75	75	100	110	DVSW0110E	85	24.0 x 12.5 x 22.9	A-60
-	-	100	125	130	DVSW0130E	133	33.9 x 18.3 x 26.0	A-61
75 - 90	100 – 120	125	150	160	DVSW0160E	151	33.9 x 18.3 x 26.0	A-62
110	150	150	200	200	DVSW0200E	151	33.9 x 18.3 x 26.0	A-63
132	175	200	250	250	DVSW0250E	167	33.9 x 18.3 x 26.0	A-64
160	220	250	300	305	DVSW0305E	172	33.9 x 18.3 x 26.0	A-65
185 - 200	250 – 270	300	350	365	DVSW0365E	202	33.9 x 18.3 x 26.0	A-66
-	-	350	450	415	DVSW0415E	202	33.9 x 18.3 x 26.0	A-67
250	340	400 – 450	500 - 550	515	DVSW0515E	330	51.3 x 27.7 x 30.0	A-68
315	430	500	600	600	DVSW0600E	338	51.3 x 27.7 x 30.0	A-69

4. PRODUCT SPECIFICATIONS

Performance Specifications

Table 4-1: Performance Specifications

Service Load Condition	Inverter Duty Three Phase Motors
Voltage	380 – 600 VAC +/- 10%, 60Hz
Input Voltage Wave Form	PWM
Inverter Switching Frequency	2kHz – 10kHz (3-110A models) 2kHz – 5kHz (130A-600A models)
Inverter Operating Frequency	0 – 90 Hz without derating
Maximum Ambient Temperature	60C Open filters 50C Enclosed Filter
Insertion Loss (Voltage)	1.7% at 60 Hz, 2.6% at 90 Hz
Efficiency	>99%
Current range	3A – 600A
Available form factors	Panel NEMA 1/2 NEMA 3R
Altitude without derating	1,000 feet above sea level
Maximum Motor Lead Length	1,000 feet
Relative Humidity	0% to 99% non-condensing
Current Rating	100% RMS Continuous 150% for 1 minute 200% for 10 sec *Operating in overload will result in increased proportional voltage drop
Audible Noise	<65db at 1 meter
Rise Time	Less than 0.1 uS
Peak Voltage	150% of DC bus voltage up to 1,000 feet
Common Mode Reduction	50%+ Peak Current Reduction Typical

Enclosures

MTE enclosures are designed to provide a degree of protection for electrical components and prevent incidental personnel contact with the enclosed equipment. Depending on the enclosure selected, these enclosures meet the requirements of NEMA 1/2 or 3R.

An approximate cross reference guide between NEMA, UL, CSA and IEC enclosure follows.

Type 1 NEMA / IEC IP20 Enclosure:

Are designed for indoor use and will provide protection against contact with the enclosed equipment.

Type 2 NEMA / IEC IP20 Enclosure:

Are designed for indoor use and will provide protection against contact with the enclosed equipment and provide a degree of protection against limited amounts of falling water and dirt.

Type 3R NEMA / IEC IP23 Enclosure:

Are designed for outdoor use primarily to provide protection against contact with the enclosed equipment and provide a degree of protection against falling rain sleet and external ice formation.

Agency Approvals

UL and cUL listed to UL508 Type MX and CSA-C22.2 No 14-95
File E180243

CE Marked

Warranty

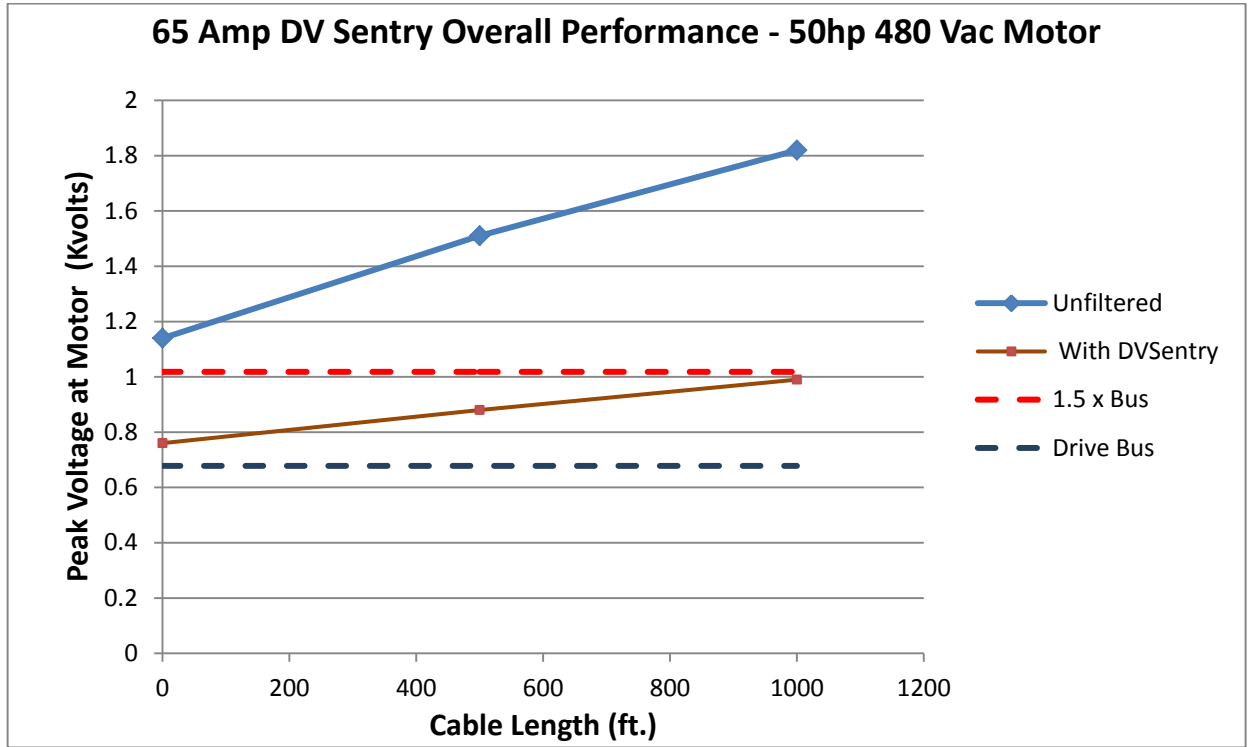
Three years from the date of shipment. See www.mtecorp.com for details.

Over Temperature Interlock

The standard over temperature interlock should 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.

5. dV/dt Filter Performance

Table 5-1: Performance Chart



Filter Efficiency + Watt loss

Table 5-2: Filter Efficiency & Watt Loss

Maximum Output Amps RMS/Filter Current Rating Amps RMS	Efficiency %	Typical Power Dissipation Watts*
3	99.3%	67
4	99.3%	67
7	99.3%	67
9	99.3%	67
12	99.3%	67
17	99.3%	96
22	99.5%	91
27	99.6%	92
35	99.7%	91
45	99.8%	88
55	99.7%	137
65	99.7%	166
80	99.8%	158
110	99.8%	175
130	99.7%	273
160	99.8%	289
200	99.8%	325
250	99.8%	423
305	99.8%	481
365	99.8%	564
415	99.8%	795
515	99.8%	795
600	99.8%	822

*Based on a typical 480V, 60Hz output frequency, 1,000 feet of drive cable, 2kHz carrier frequency at full load application.

Altitude Derating

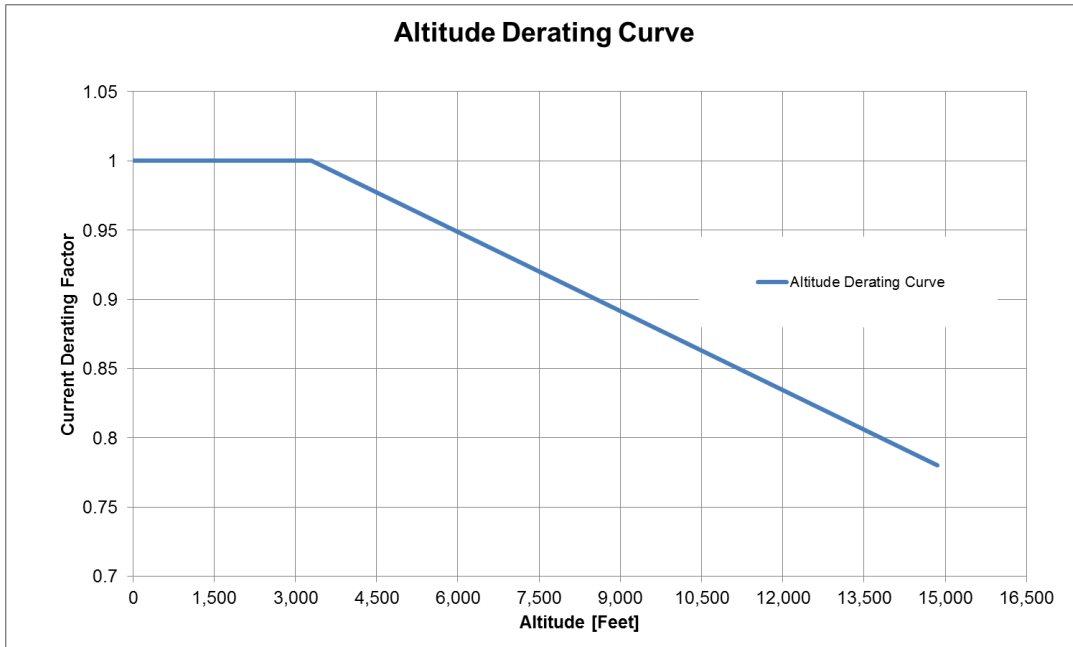


Table 5-3: Altitude Derating Curve

Motor Frequency Derating

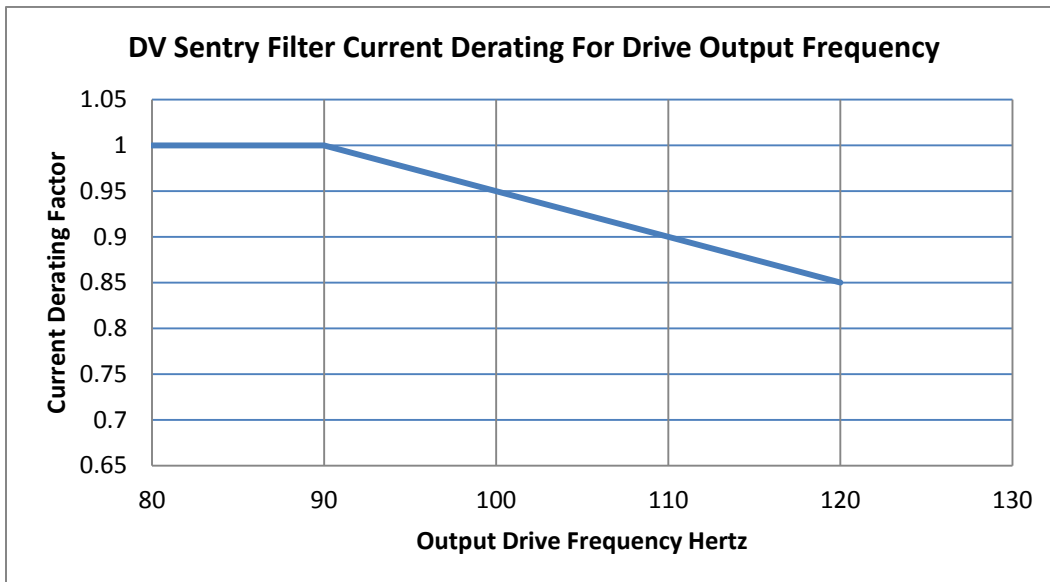





Table 5-4: Current Derating for Drive Output Frequency

6. HOW TO INSTALL

Installation Checklist

 WARNING	<p>Prior to installation, please refer to all general warnings on page 4. Failure to practice this can result in body injury!</p>
 WARNING	<p>Input and output wiring to the filter should be performed by authorized personnel in accordance with NEC and all local electrical codes and regulations.</p>
 WARNING	<p>The filter is designed for use with copper conductors with a minimum temperature rating of 75 degrees C.</p>

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



- Panel mounted assemblies
- Floor mounted general purpose NEMA 1/2 & 3R cabinets

Panel filters are designed for mounting 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. A general guideline is to allow a side clearance of four (4) inches and a vertical clearance of six (6) inches for proper heat dissipation and access within the enclosure. Clearances may be less if proper ventilation exists. Filter components must operate within temperatures specified in this manual or filter operating life will be compromised. Also be aware of minimum electrical clearances as defined by the appropriate system safety standard(s). Open panel dV Sentry Filters generate heat and should be positioned away from heat sensitive components. Avoid locations where the filter would be subjected to excessive vibrations. Locate the filter as close to the inverter as possible.

Figure 6-2 contain panel outline drawings for the various current ratings and show proper panel alignment. For filters above 130 amps refer to Figure 6-3 for the dimensions of the separately mounted filter. Connect the motor and inverter leads to the reactor terminals to complete the filter wiring.

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.

Grounding

 WARNING	The filter must always be grounded with a grounding conductor connected to ground terminals.
 WARNING	For modular units, ensure a 2" X 2" area is cleaned of paint and varnish on lower mounting bracket for ground connection.

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

Basic Schematic Diagram

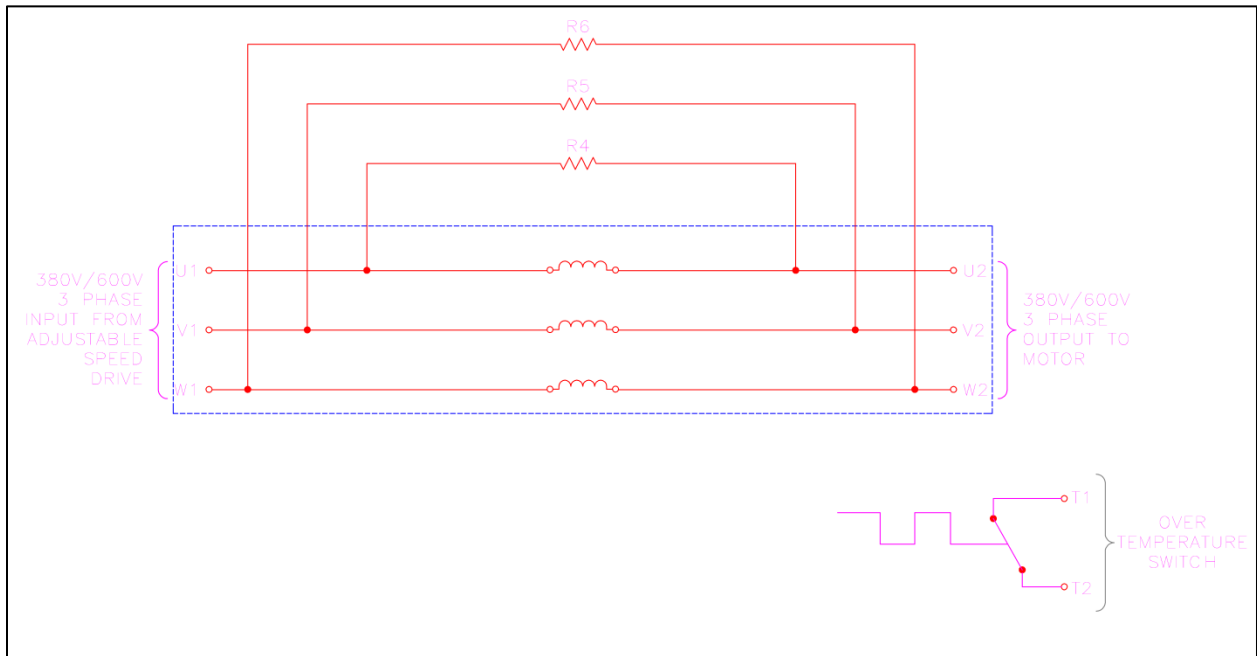


Figure 6-1: Basic Schematic Diagram

Interconnection Diagram – Panel (3A-110A) and Enclosed (3A-600A)

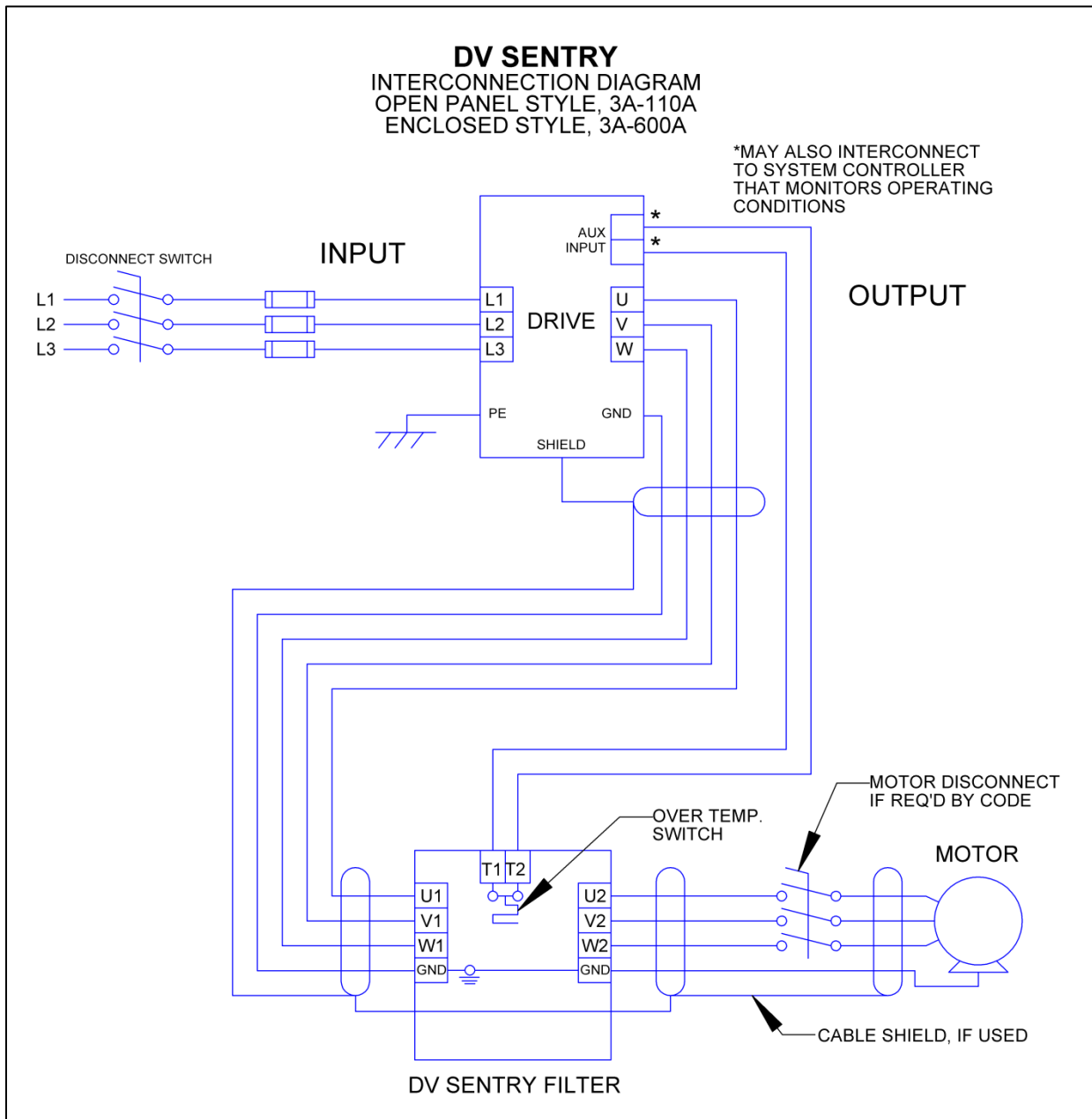


Figure 6-2: Open Panel and Enclosed Diagram

Interconnection Diagram – Modular (130A-600A)

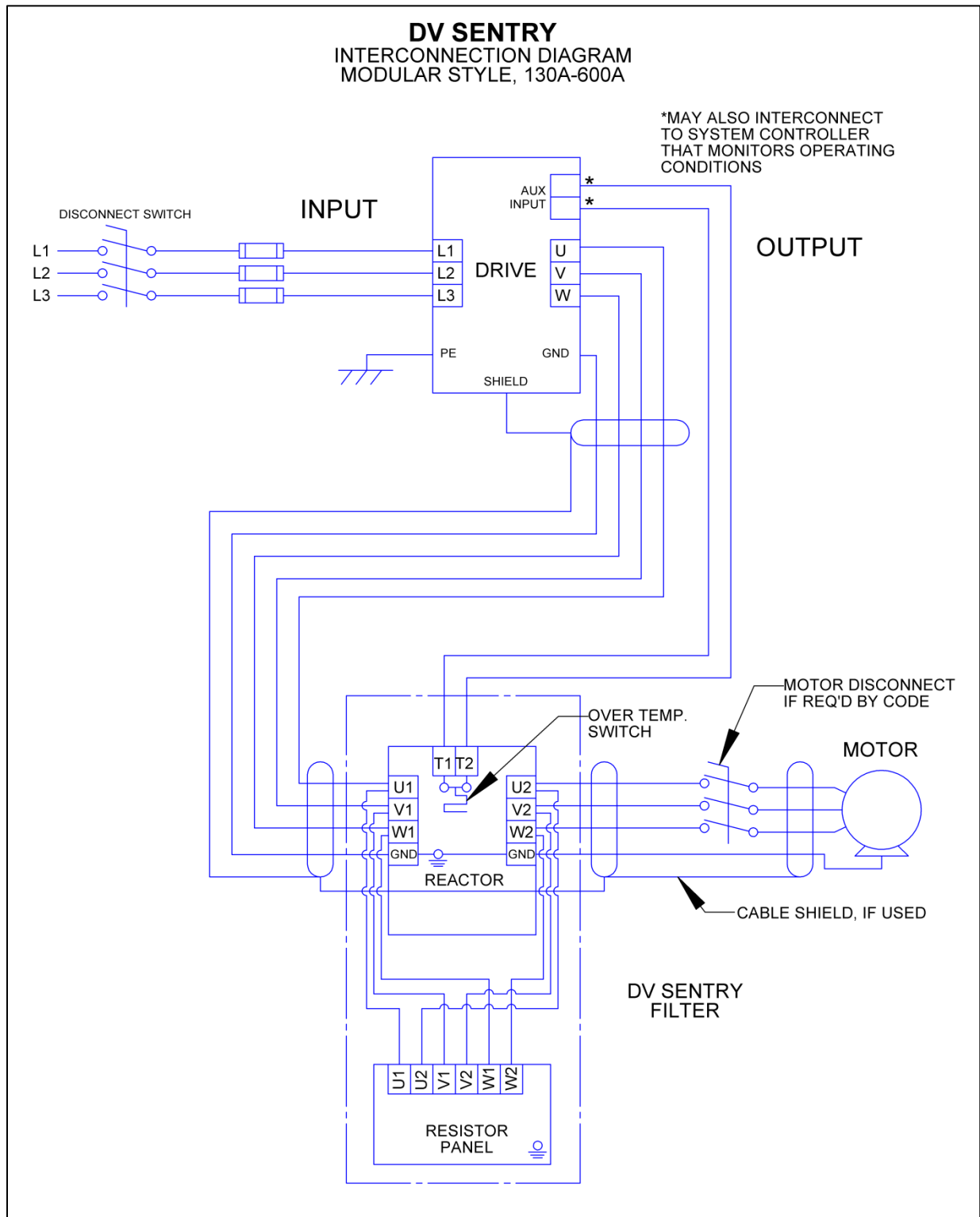


Figure 6-3: Modular Diagram

Torque Ratings

Table 6-1: Torque Ratings

Filter Rating (Amps)	DV SENTRY Terminals				
	Input /Output Power U1-V1-W1 / U2-V2-W2		Resistor Panel Terminals U1-V1-W1 / U2-V2-W2		
	Recommended Minimum Wire Size (AWG)	Terminal Torque (in-lbs.)	Resistor Panel Part Number	Recommended Wire Size (awg)	Terminal Torque (in-lbs.)
3	14	16	N/A	N/A	N/A
5	14	16	N/A	N/A	N/A
7	14	16	N/A	N/A	N/A
9	14	16	N/A	N/A	N/A
12	14	16	N/A	N/A	N/A
17	12	16	N/A	N/A	N/A
22	10	16	N/A	N/A	N/A
27	10	16	N/A	N/A	N/A
35	8	16	N/A	N/A	N/A
45	8	16	N/A	N/A	N/A
55	6	16	N/A	N/A	N/A
65	6	N/A	N/A	N/A	N/A
80	4	N/A	N/A	N/A	N/A
110	2	N/A	N/A	N/A	N/A
130	1	N/A	RESPANEL-012	14	16
160	4(2x) or 2/0	N/A	RESPANEL-012	14	16
200	3(2x) or 3/0	N/A	RESPANEL-012	14	16
250	1 (2x) or 250kcmil	N/A	RESPANEL-013	14	16
305	2/0 (2x)	N/A	RESPANEL-013	14	16
365	3/0 (2x)	N/A	RESPANEL-013	14	16
415	4/0 (2x)	N/A	RESPANEL-013	14	16
515	300kcmil (2x)	N/A	RESPANEL-014	14	16
600	350kcmil(2x)	N/A	RESPANEL-014	14	16

Note: To prevent flexing or bending of the coil windings attached to dV Sentry filter, use appropriate strain relief to prevent stress on terminals. For flat copper terminal tabs, use two wrenches to tighten customer provided cable mounting hardware.





Note: Refer to reference drawings for termination wire ranges.

7. START UP

Startup Checklist

Safety Precautions




Before startup, observe the following warnings and instructions:

 WARNING	<p>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.</p>
 WARNING	<p>Use extreme caution to avoid contact with line voltage when checking for power. INJURY OR DEATH MAY RESULT IF SAFETY PRECAUTIONS ARE NOT OBSERVED.</p>
 WARNING	<p>Damage to equipment or serious injury may occur if the inverter startup procedures are not observed.</p>
 Caution	<p>Damage to the filter may occur if the appropriate output carrier frequency is not observed.</p>

Sequence of Operation

1. Read and follow safety precautions, including those of drive manufacturers.
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 6.
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.
4. Refer to the inverter user manual for the inverter startup procedure. Observe all safety instructions in the inverter user manual.
5. Connect filter temperature safety overload switch into the control circuit so that the drive will shut down in an overload situation.
6. Set the inverter switching frequency to the appropriate setting.

8. TROUBLESHOOTING

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

To aid in troubleshooting, two interconnection diagrams, Modular Unit Interconnection Diagram **Error! Reference source not found.** (p20) and Enclosed Unit Interconnection Diagram **Error! reference source not found.** (p21) are included, and this table below list potential problems and solutions.

Table 8-1: Troubleshooting Guide

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: Solution:	Normal operation, reactor and resistors are > 100 °C Caution parts are very hot and may cause burns. Follow installation guidelines for clearances and check for adequate air flow.
Possible cause: Solution:	Motor coil damage windings shorted Replace motor inspect wiring
Possible cause: Solution:	Heat buildup within enclosure Provide clearance and venting for filter components. Check carrier frequency and overload settings.
Possible cause: Solution:	Multi motor applications create complex loading and resonances with dV/dt filter. Use only one dV/dt filter per drive for a single motor only For multiple line applications, use a sine wave filter.

APPENDIX

Reference Drawings

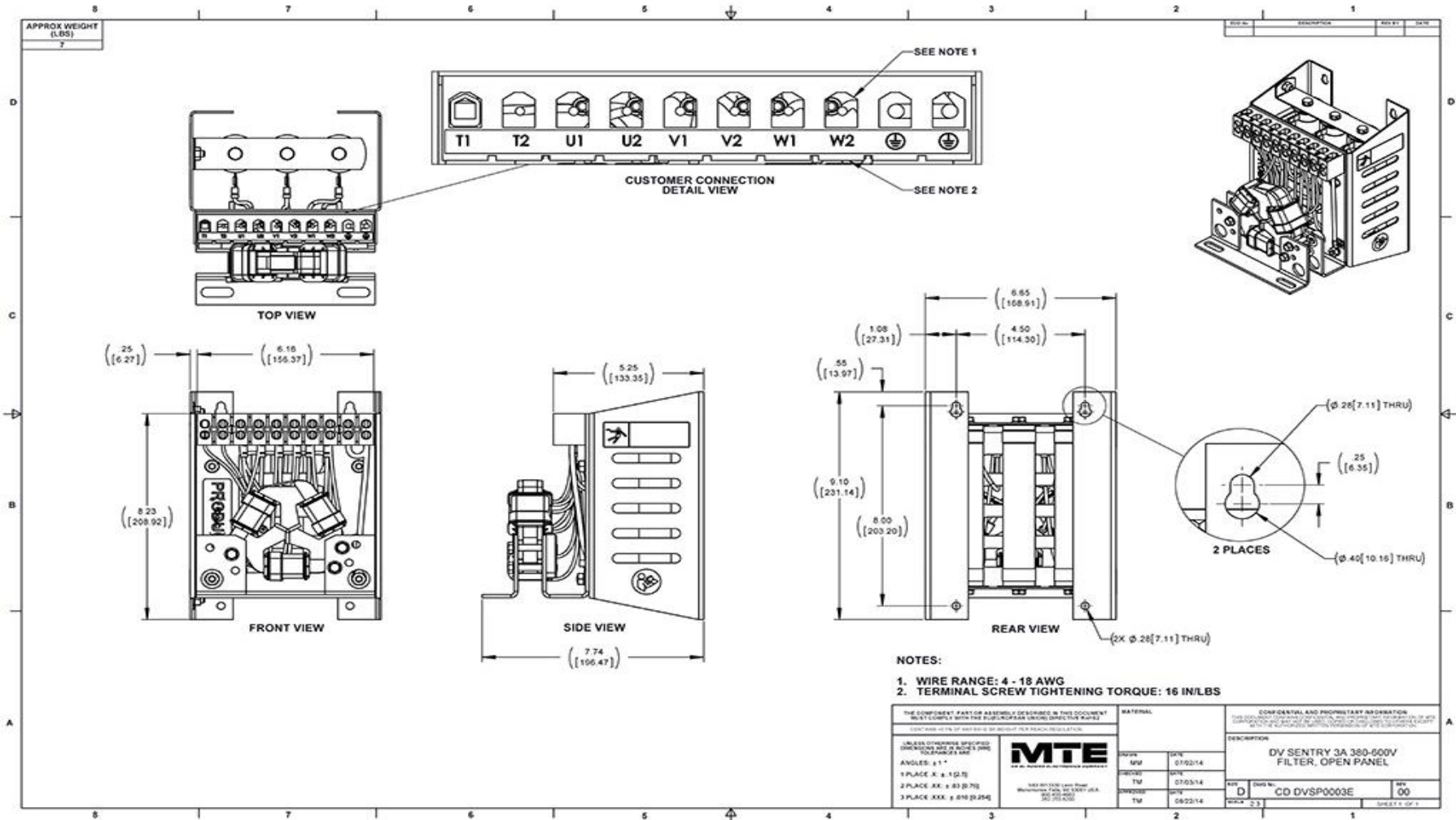


Figure A- 1: DVSP0003E

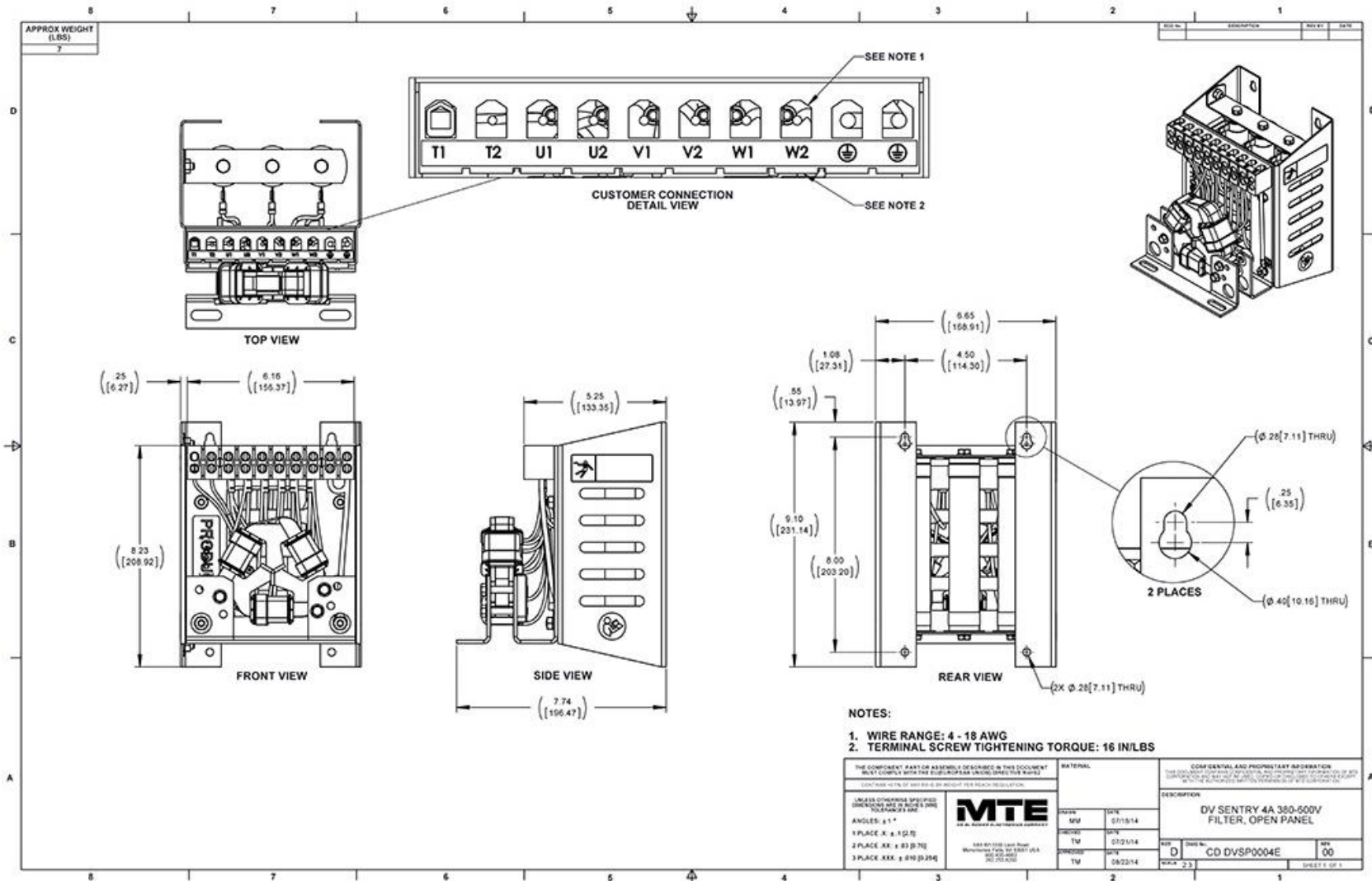


Figure A- 2: DVSP0004E

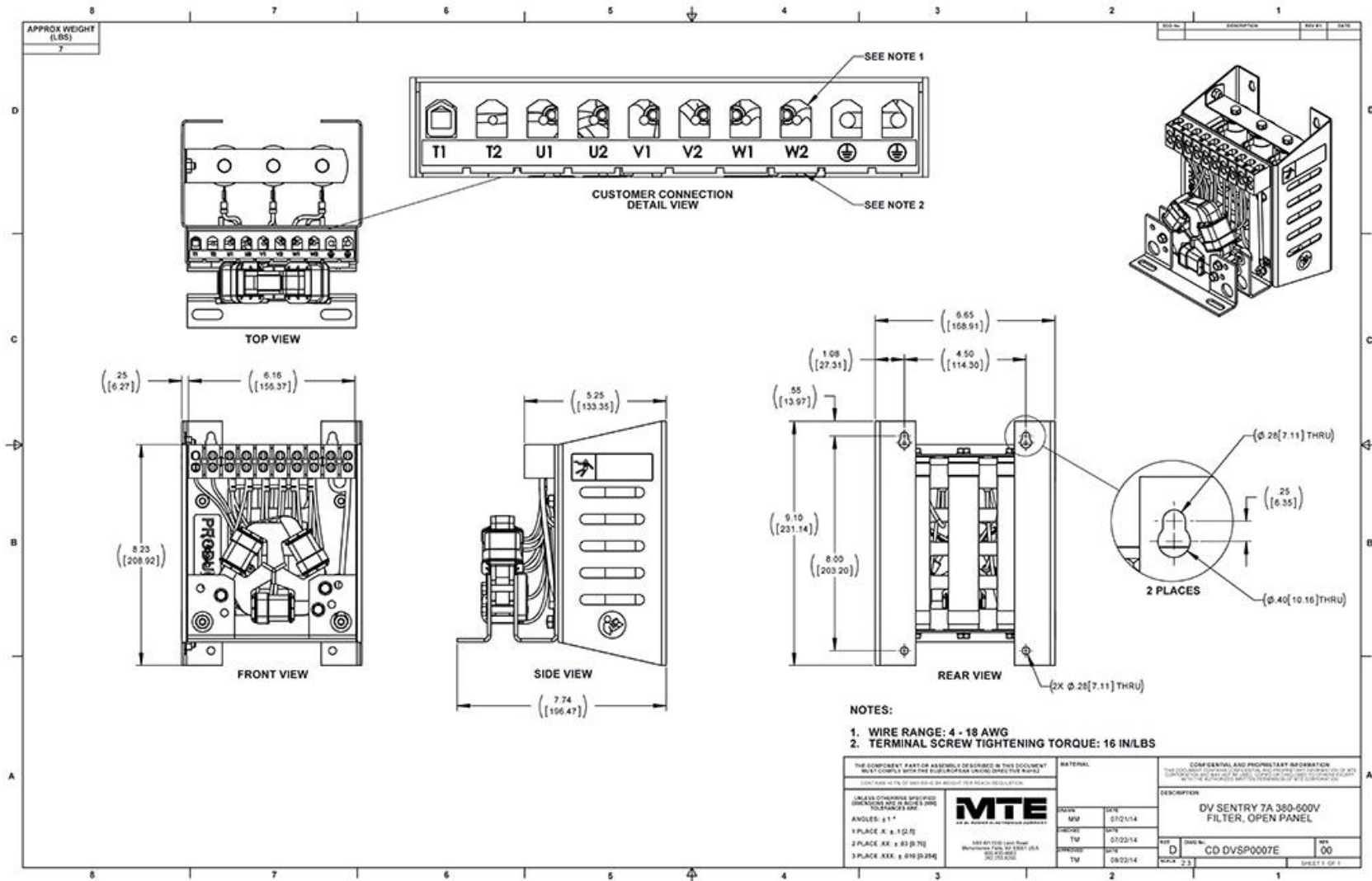


Figure A- 3: DVSP0007E

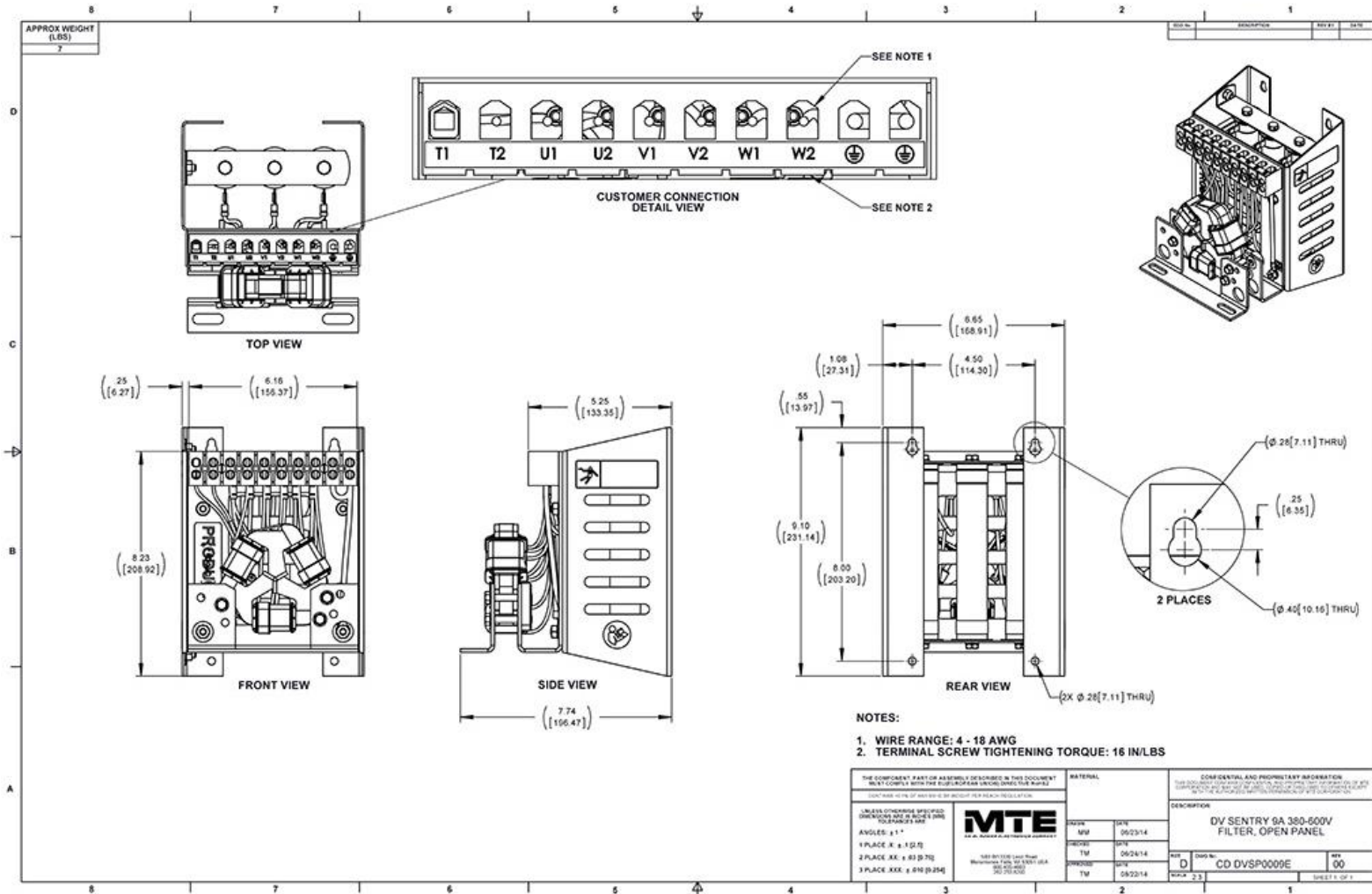


Figure A- 4: DVSP0009E

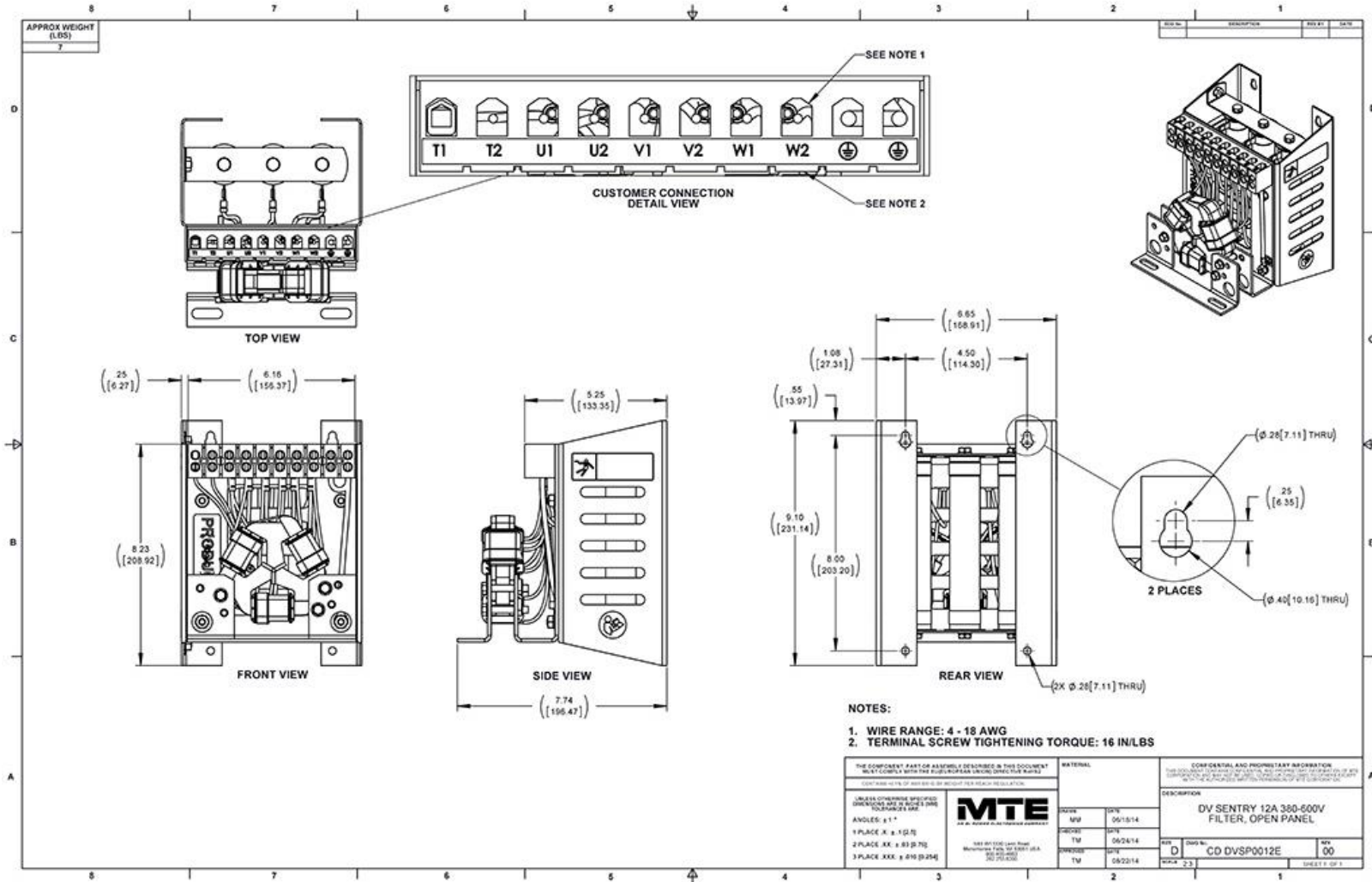


Figure A- 5: DVSP0012E

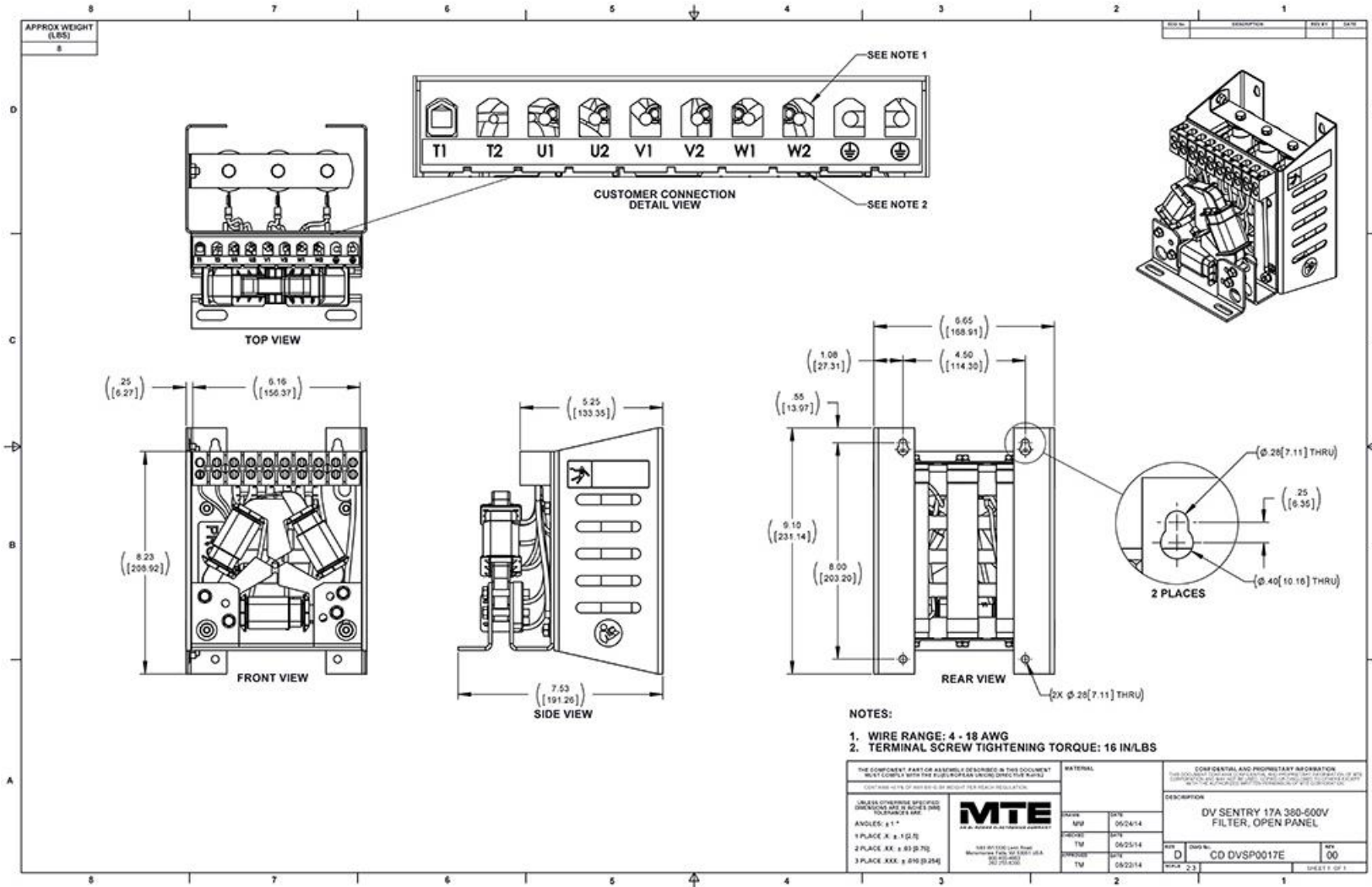


Figure A- 6: DVSP0017E

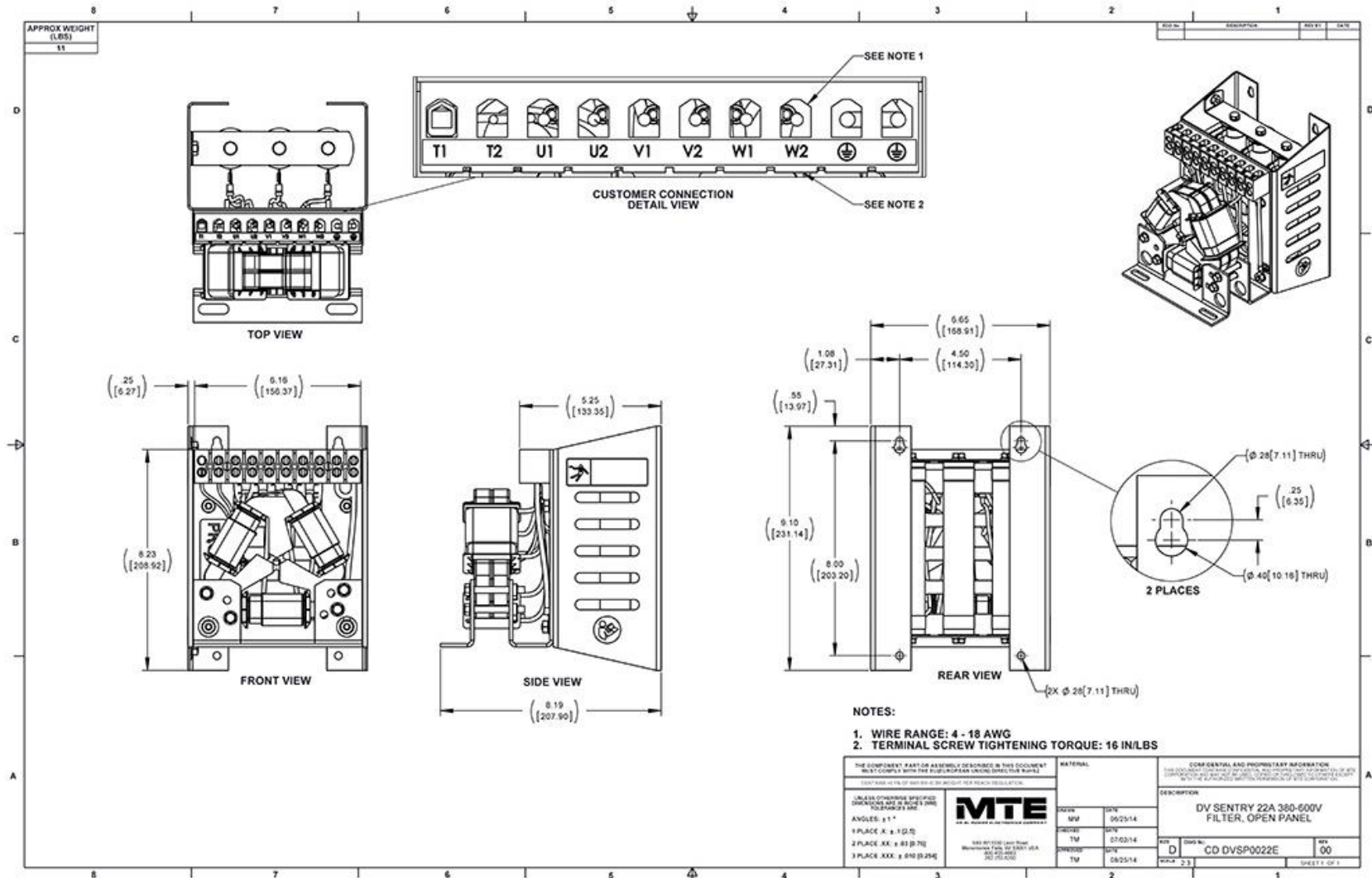


Figure A- 7: DVSP0022E

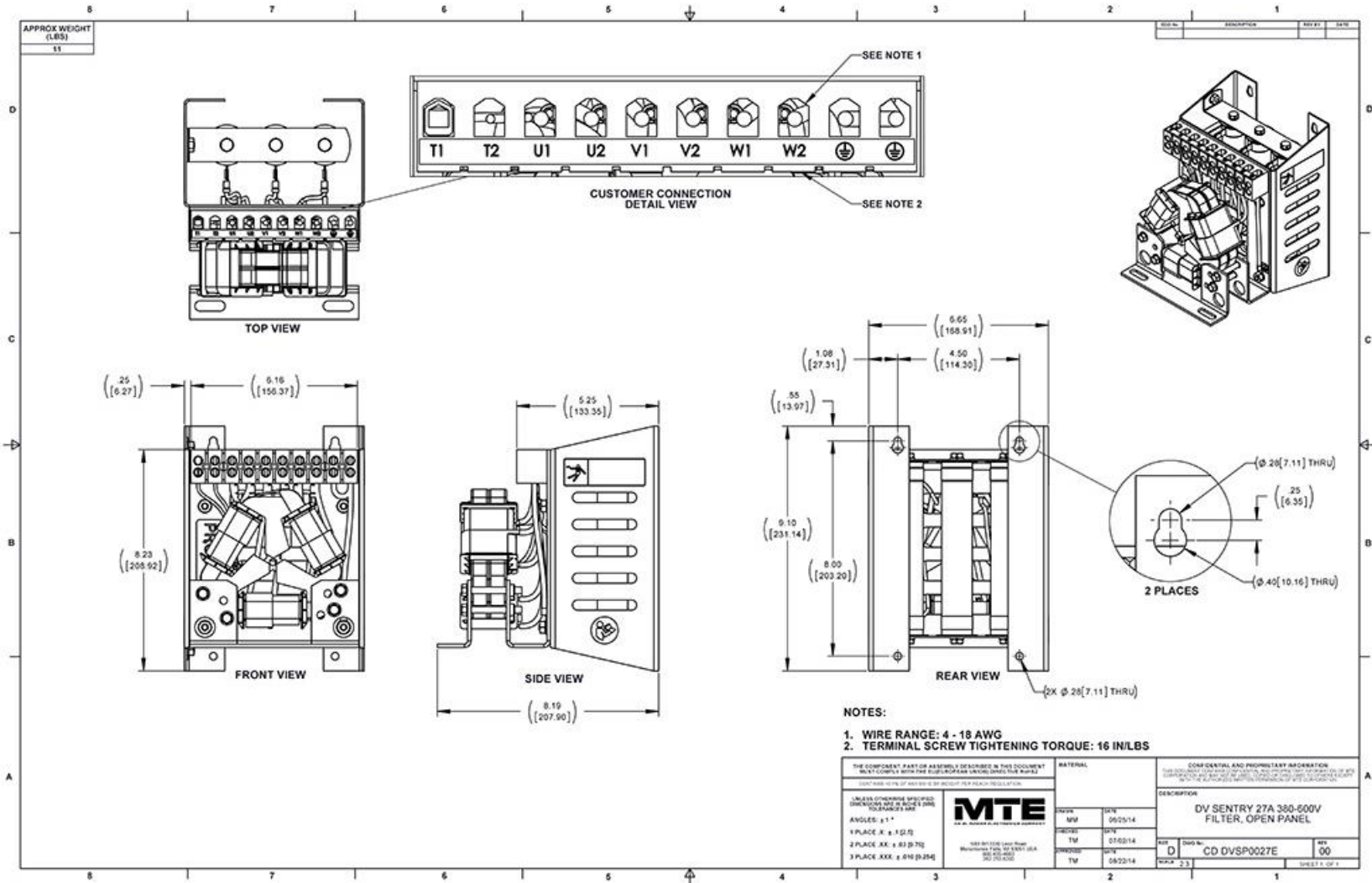


Figure A- 8: DVSP0027E

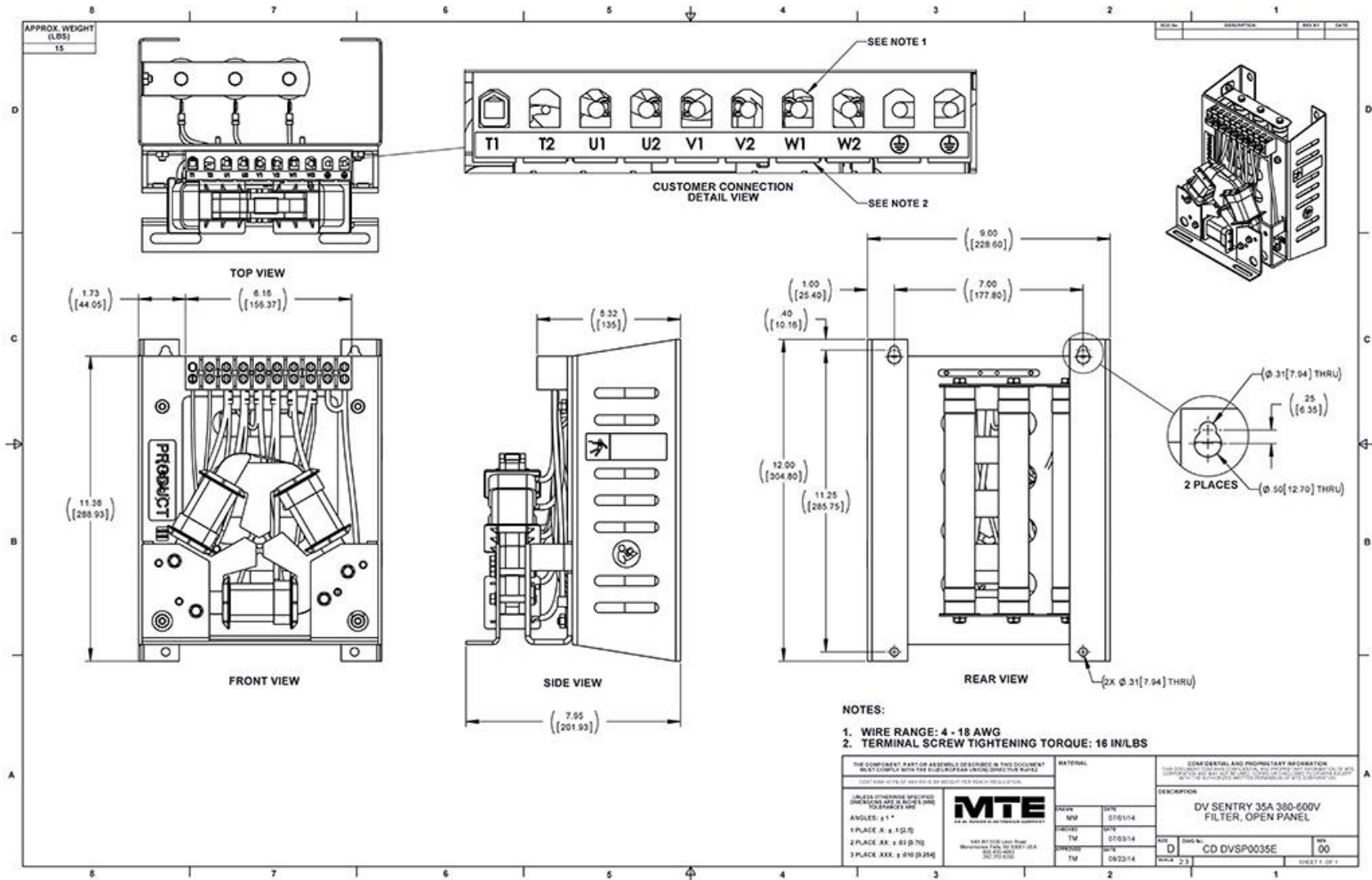


Figure A- 9: DVSP0035E

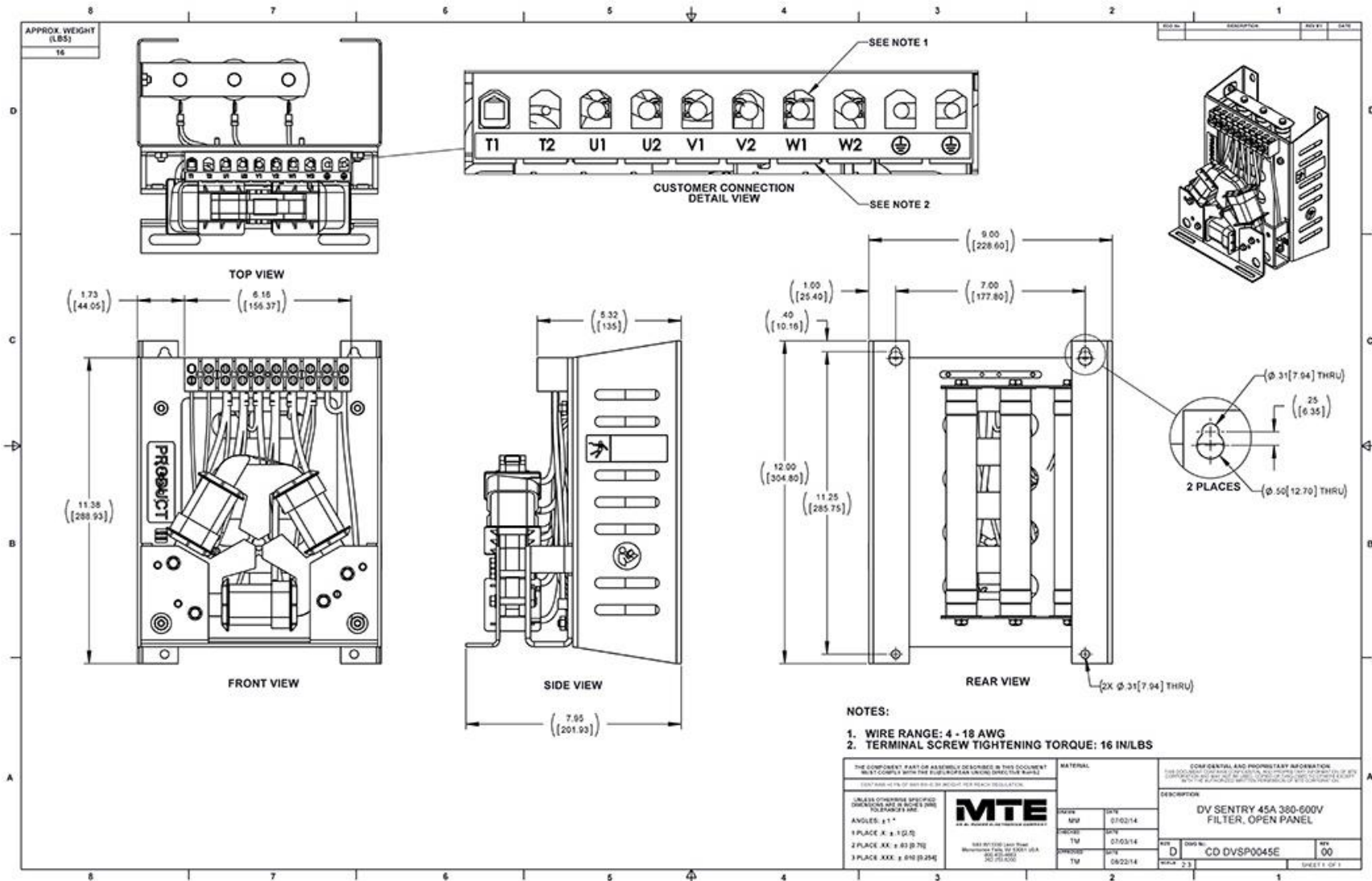


Figure A- 10: DVSP0045E

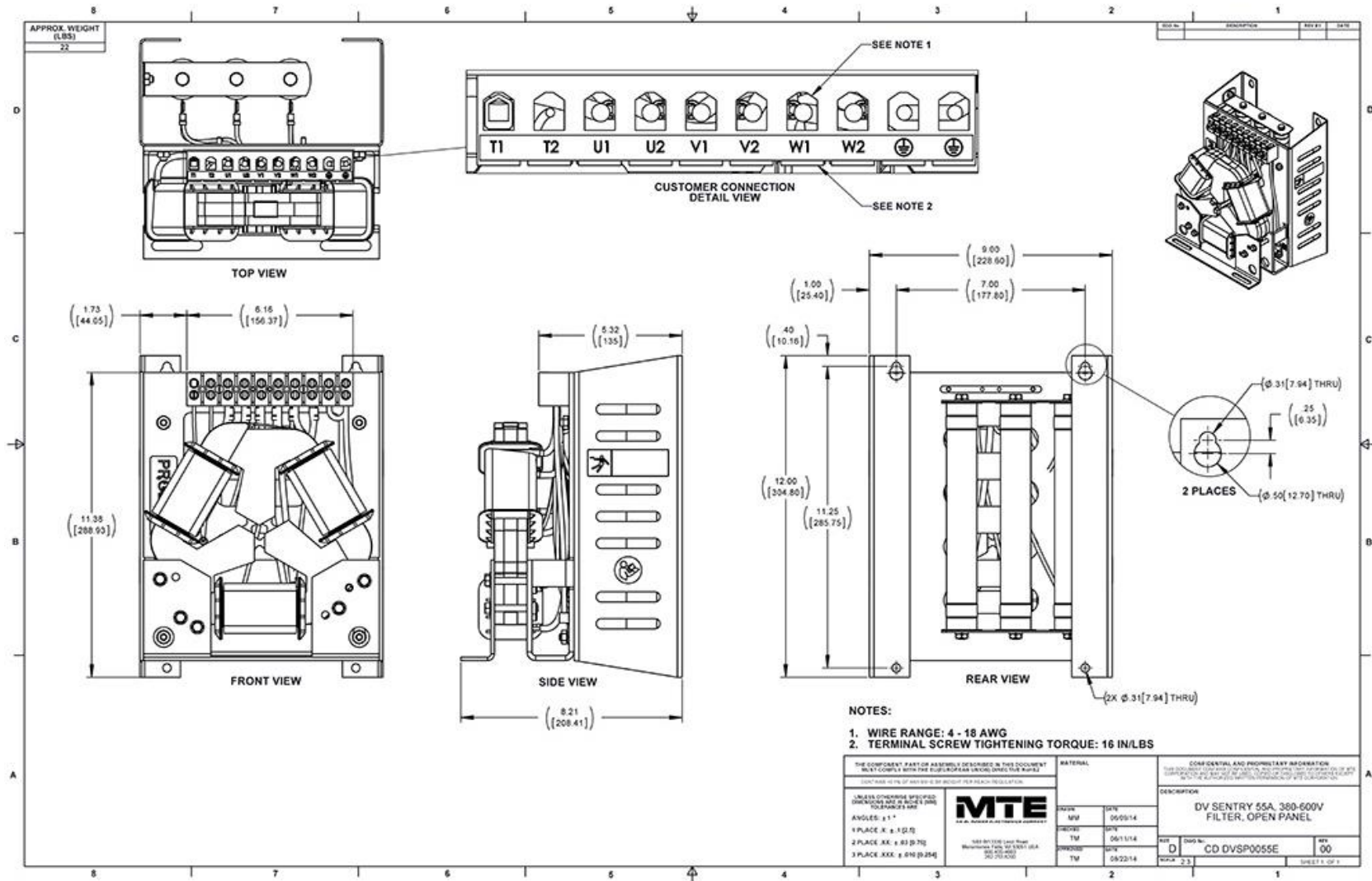


Figure A- 11: DVSP0055E

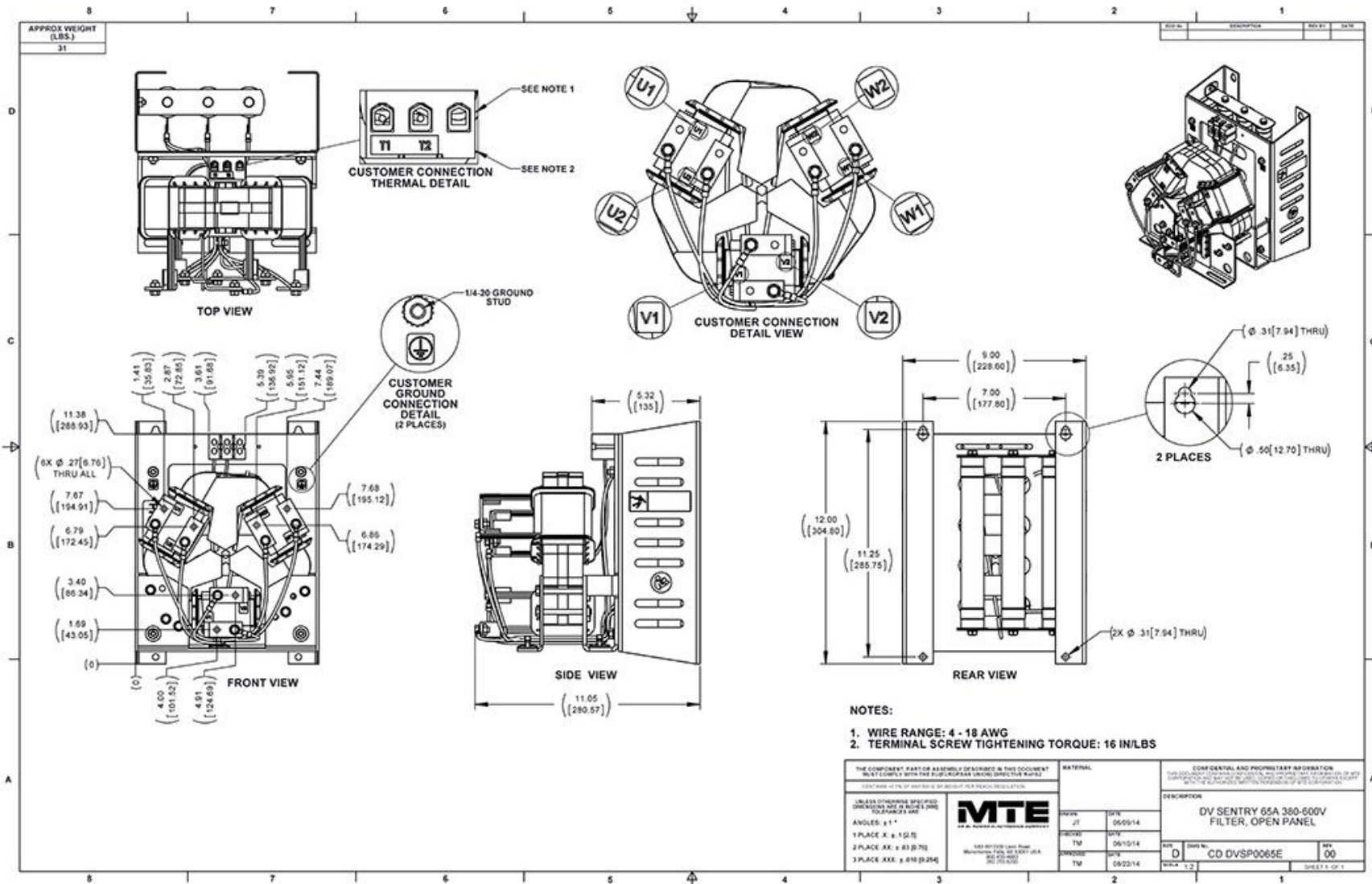


Figure A- 12: DVSP0065E

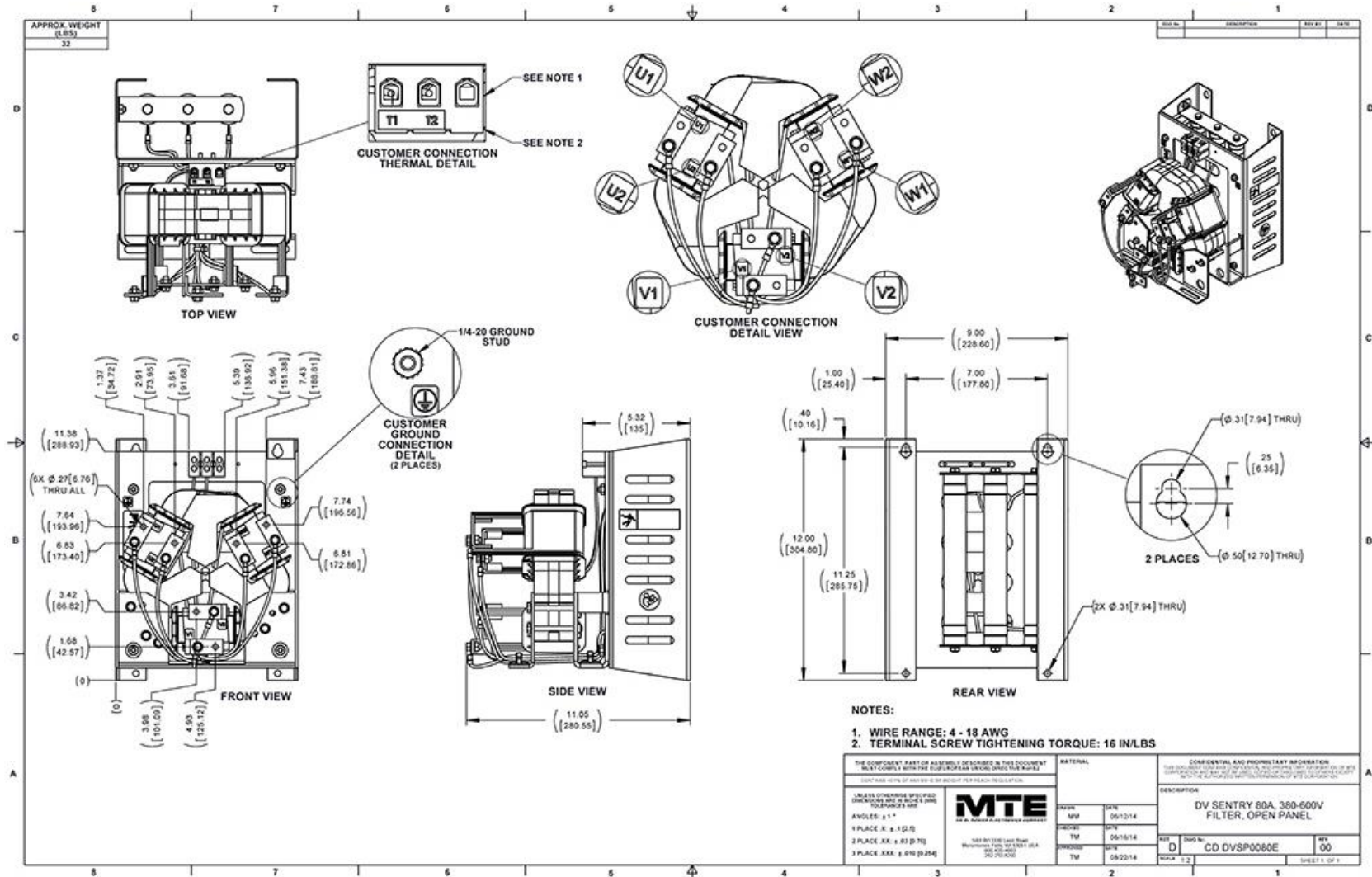


Figure A- 13: DVSP0080E

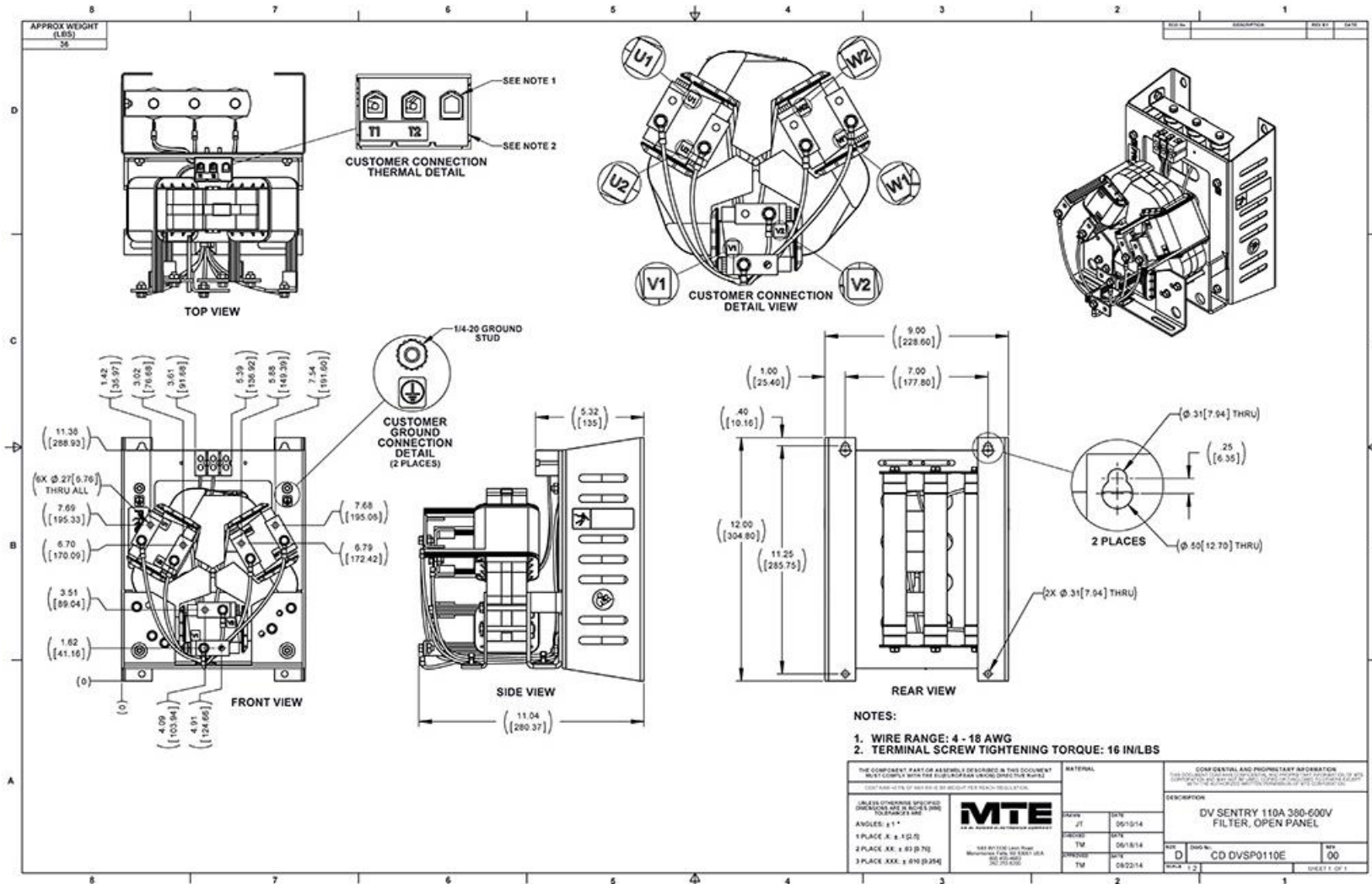


Figure A- 14: DVSP0110E

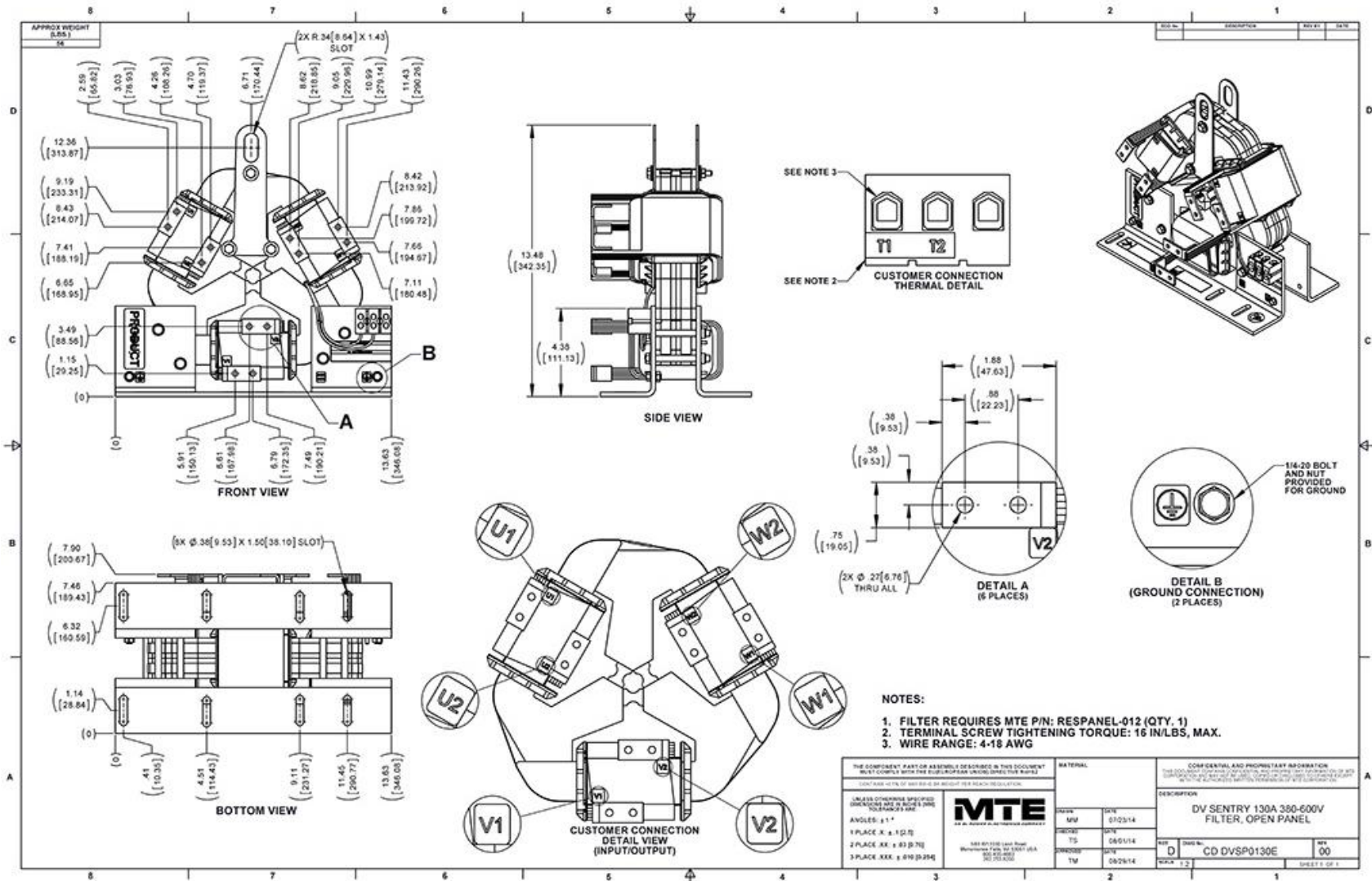


Figure A- 15: DVSP0130E

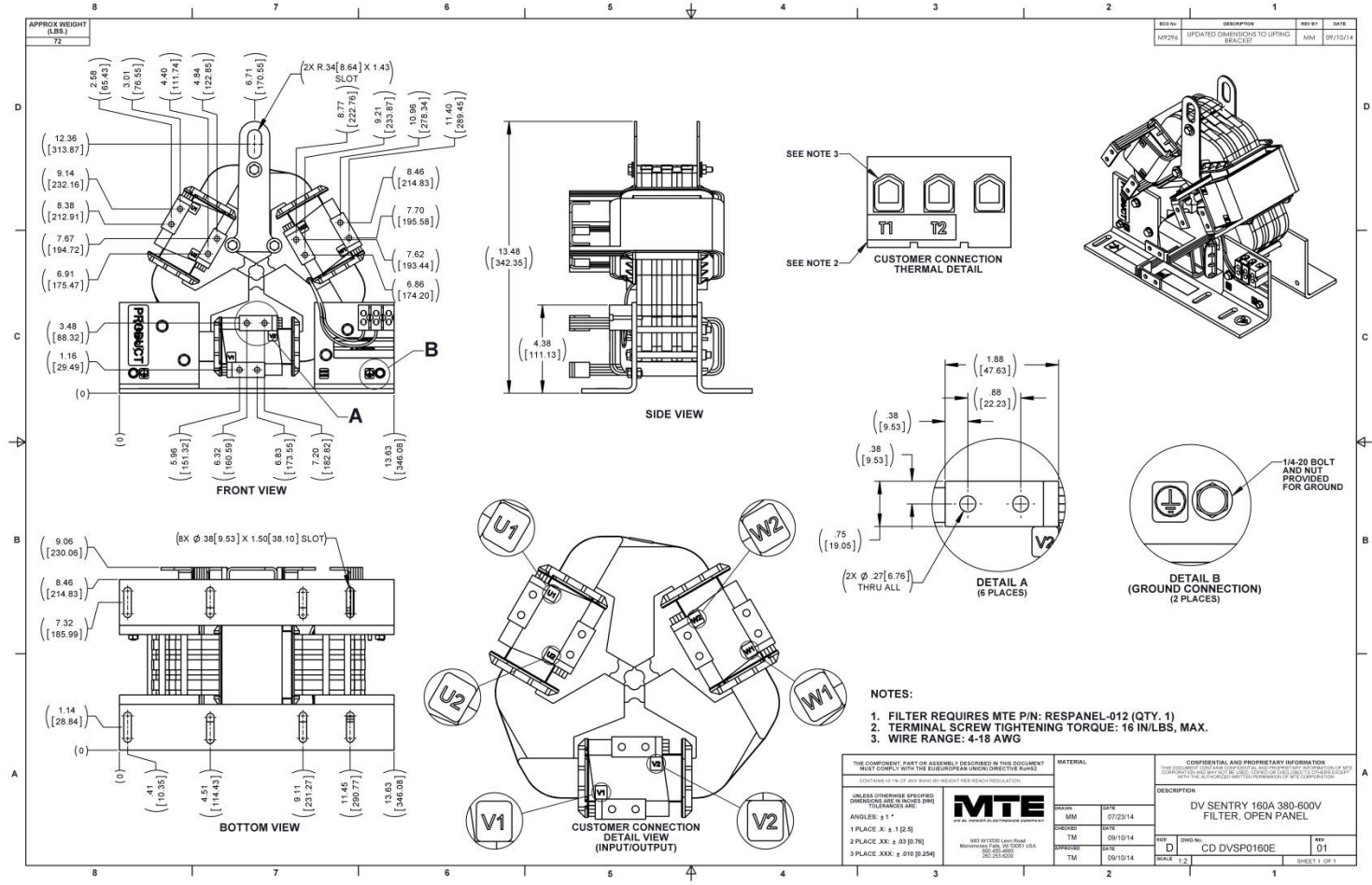


Figure A- 16: DVSP0160E

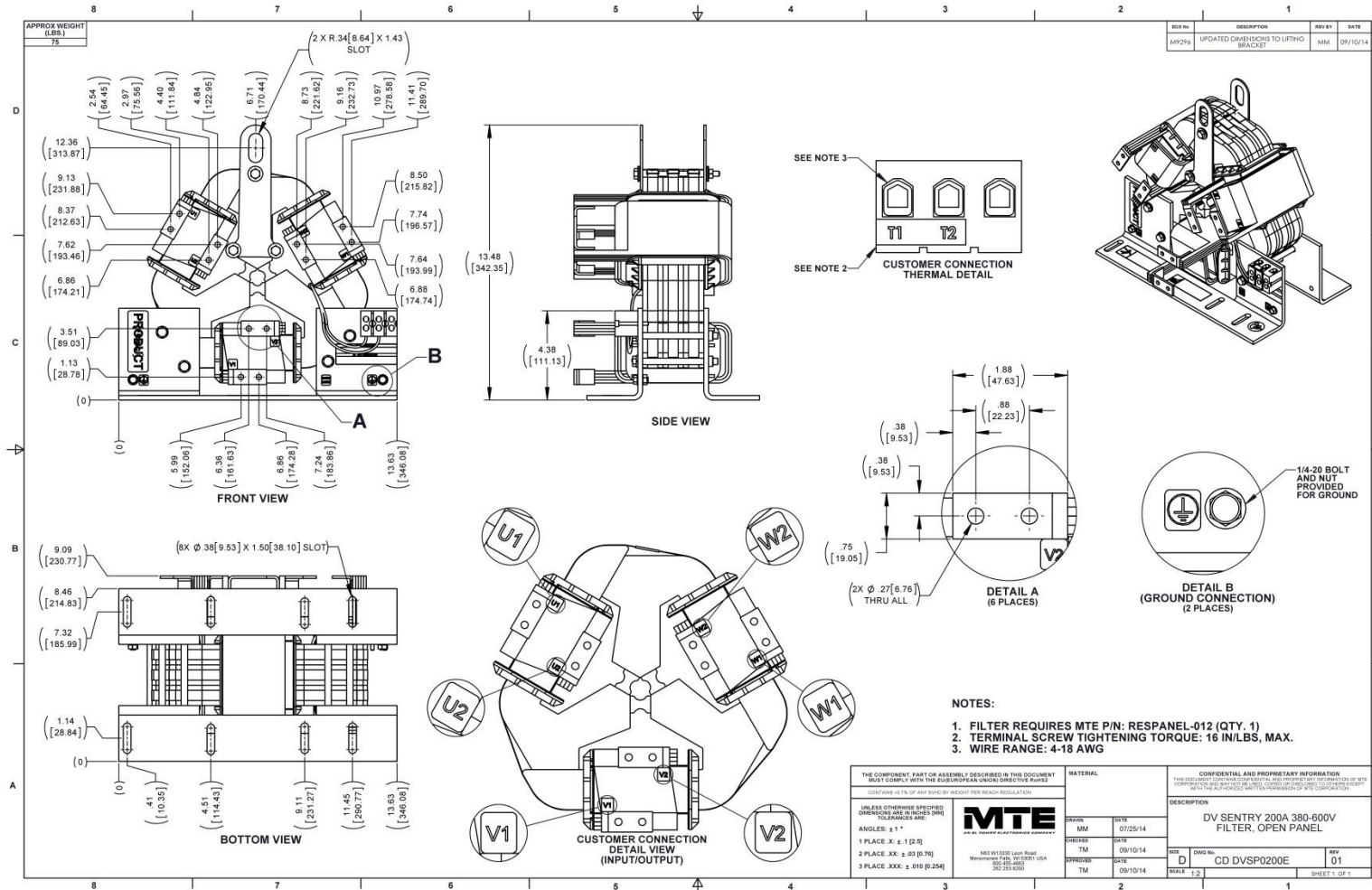


Figure A- 17: DVSP0200E

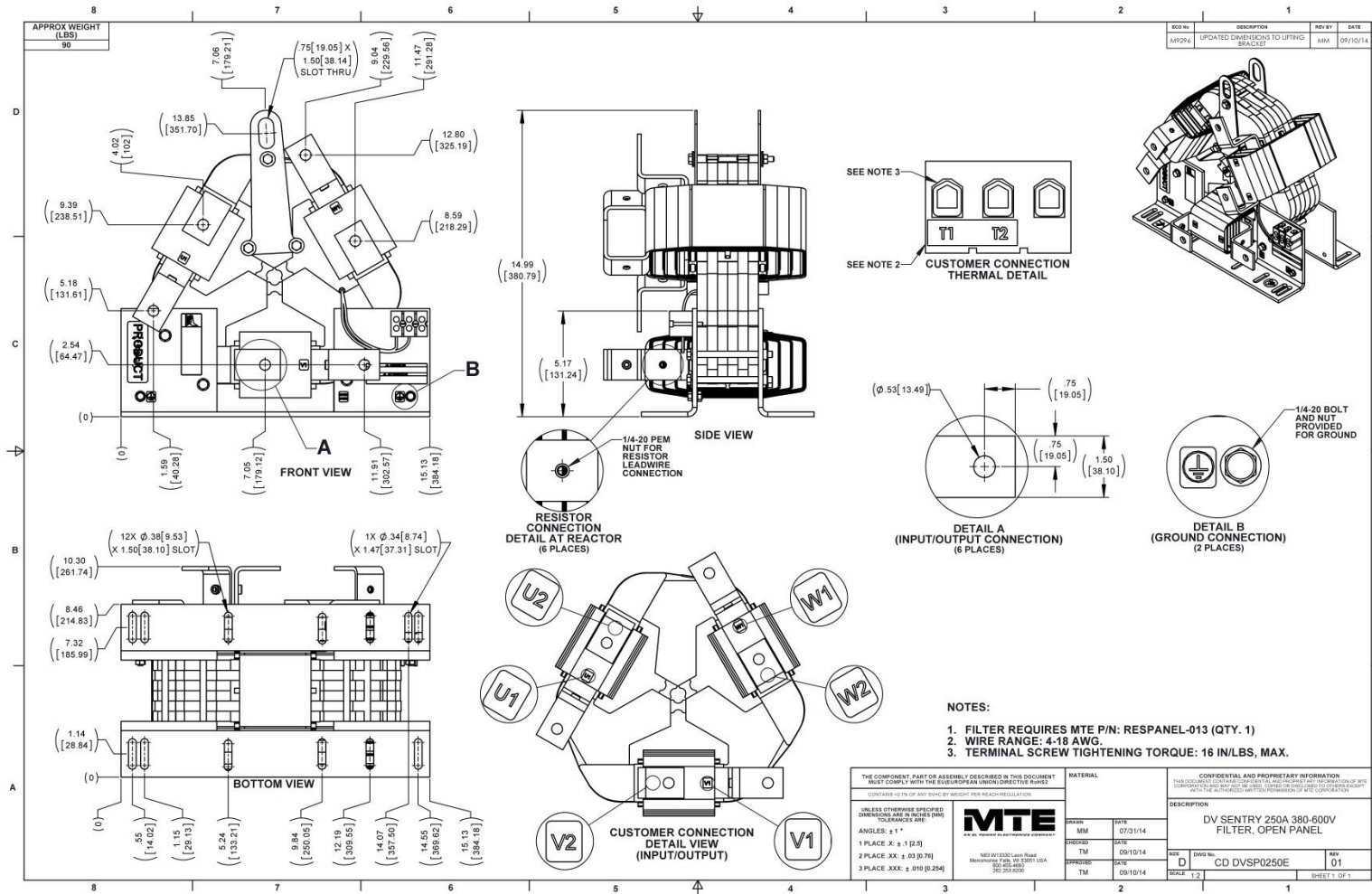


Figure A- 18: DVSP0250E

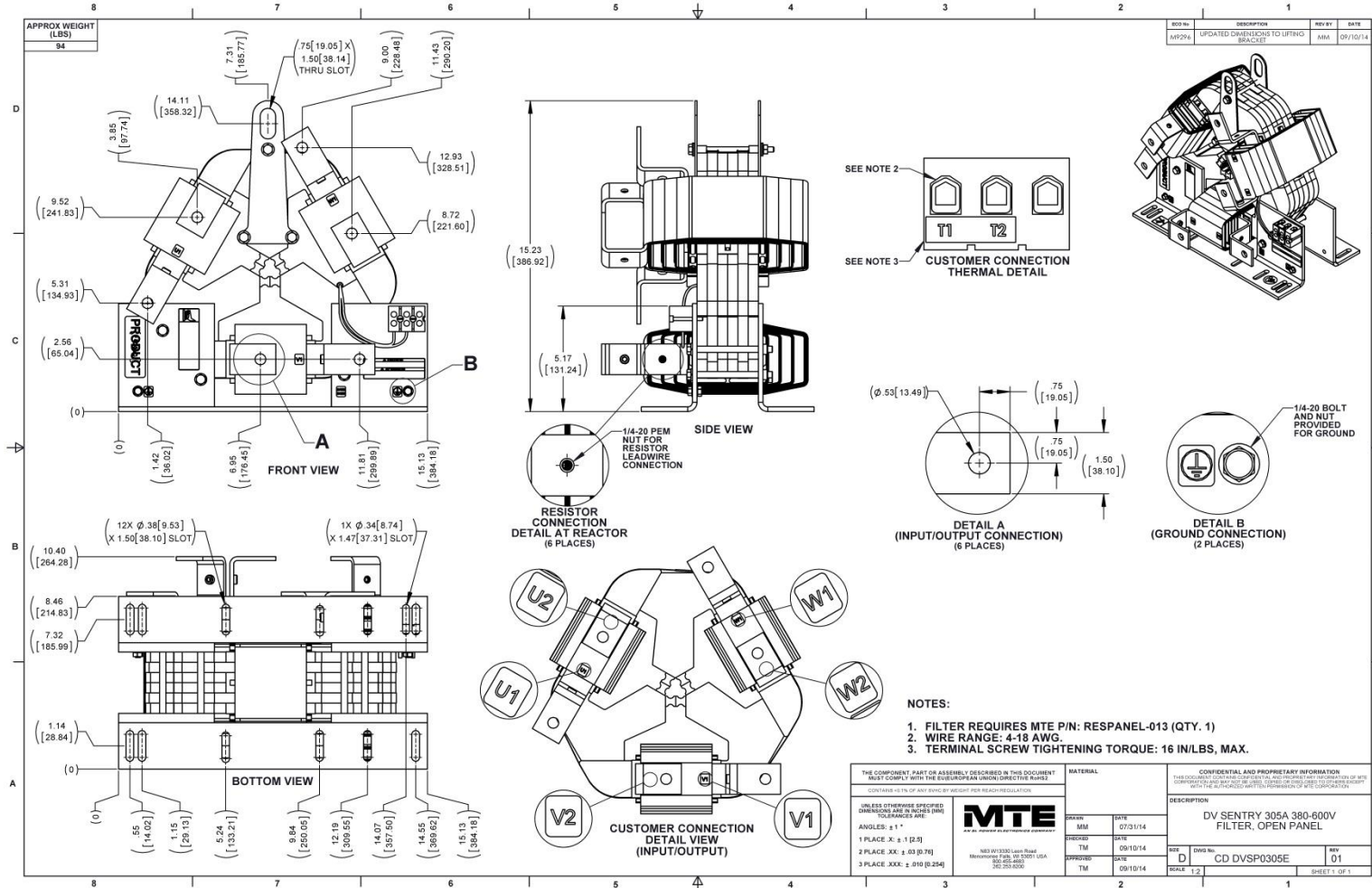


Figure A- 19: DVSP0305E

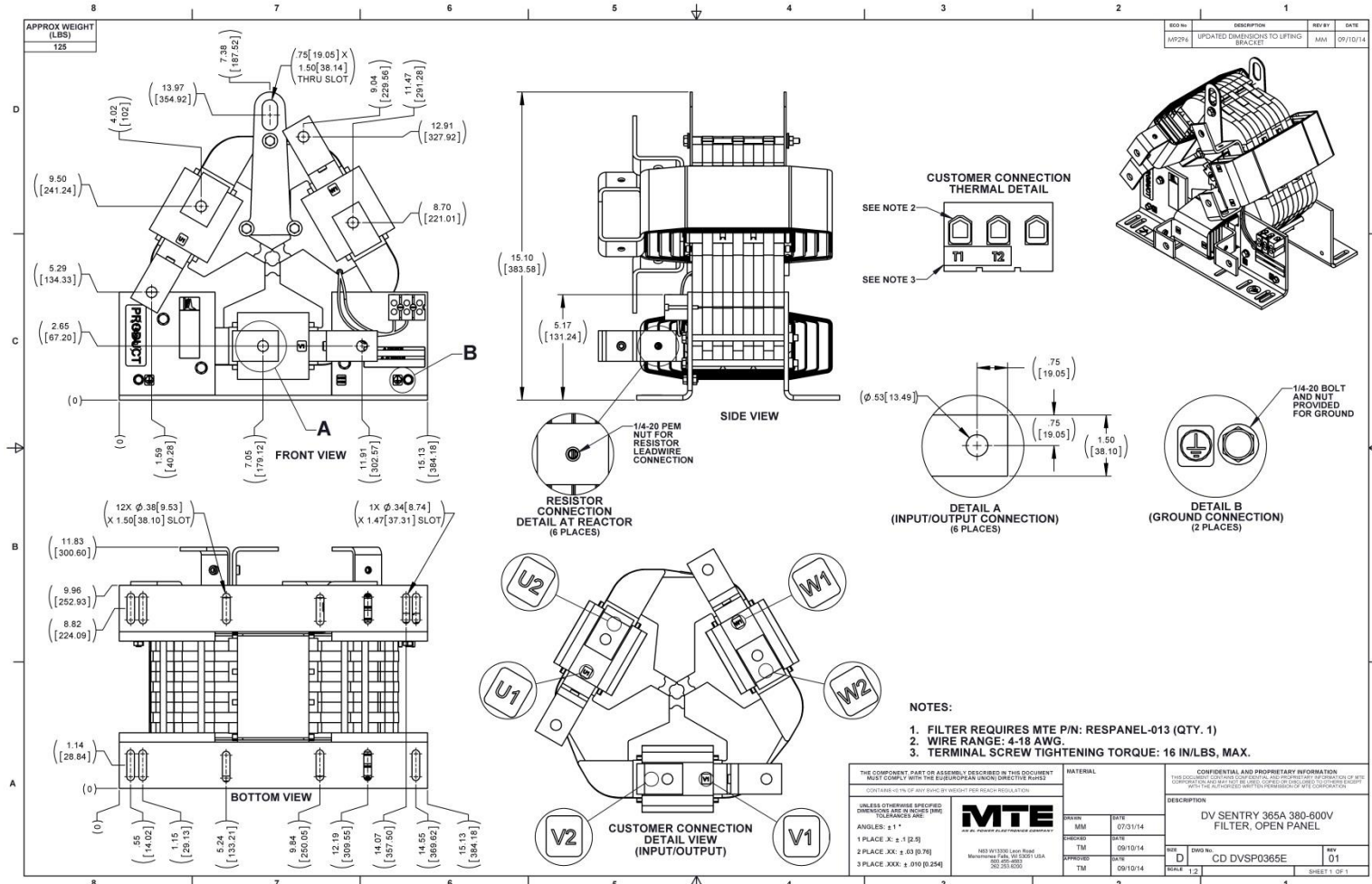


Figure A-20 DVSP0365E

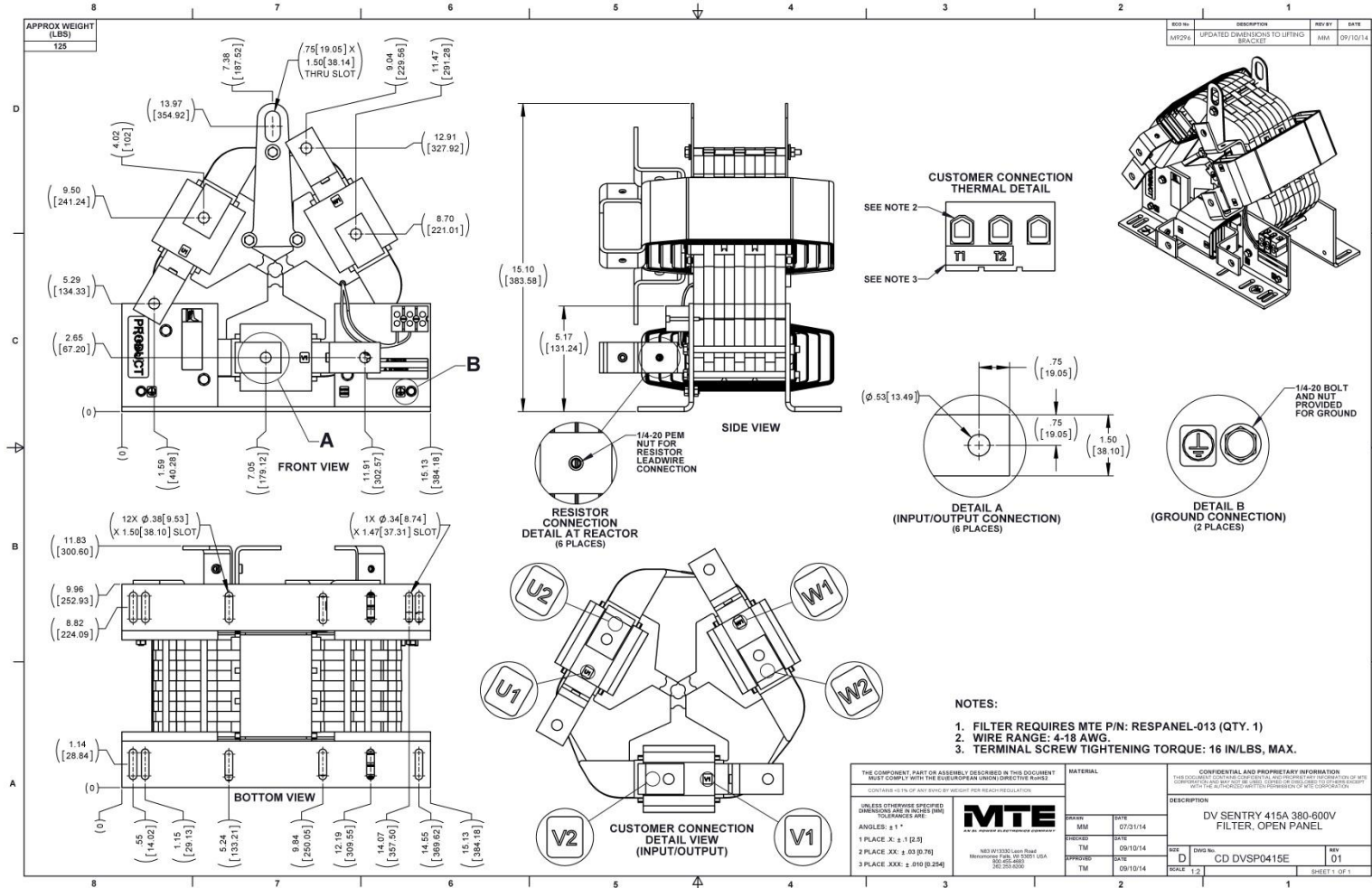


Figure A- 21: DVSP0415E

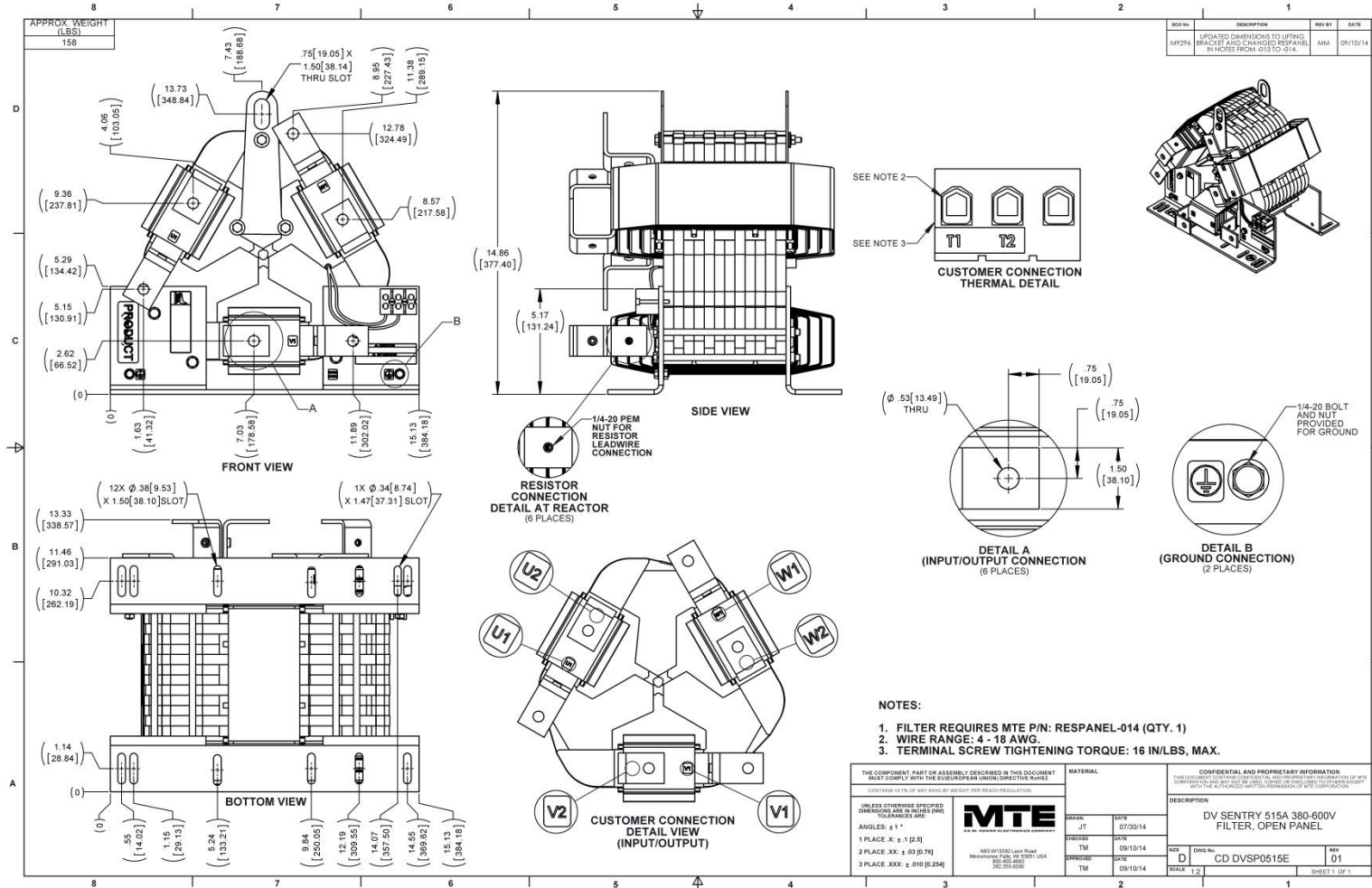


Figure A-22: DSVP0515E

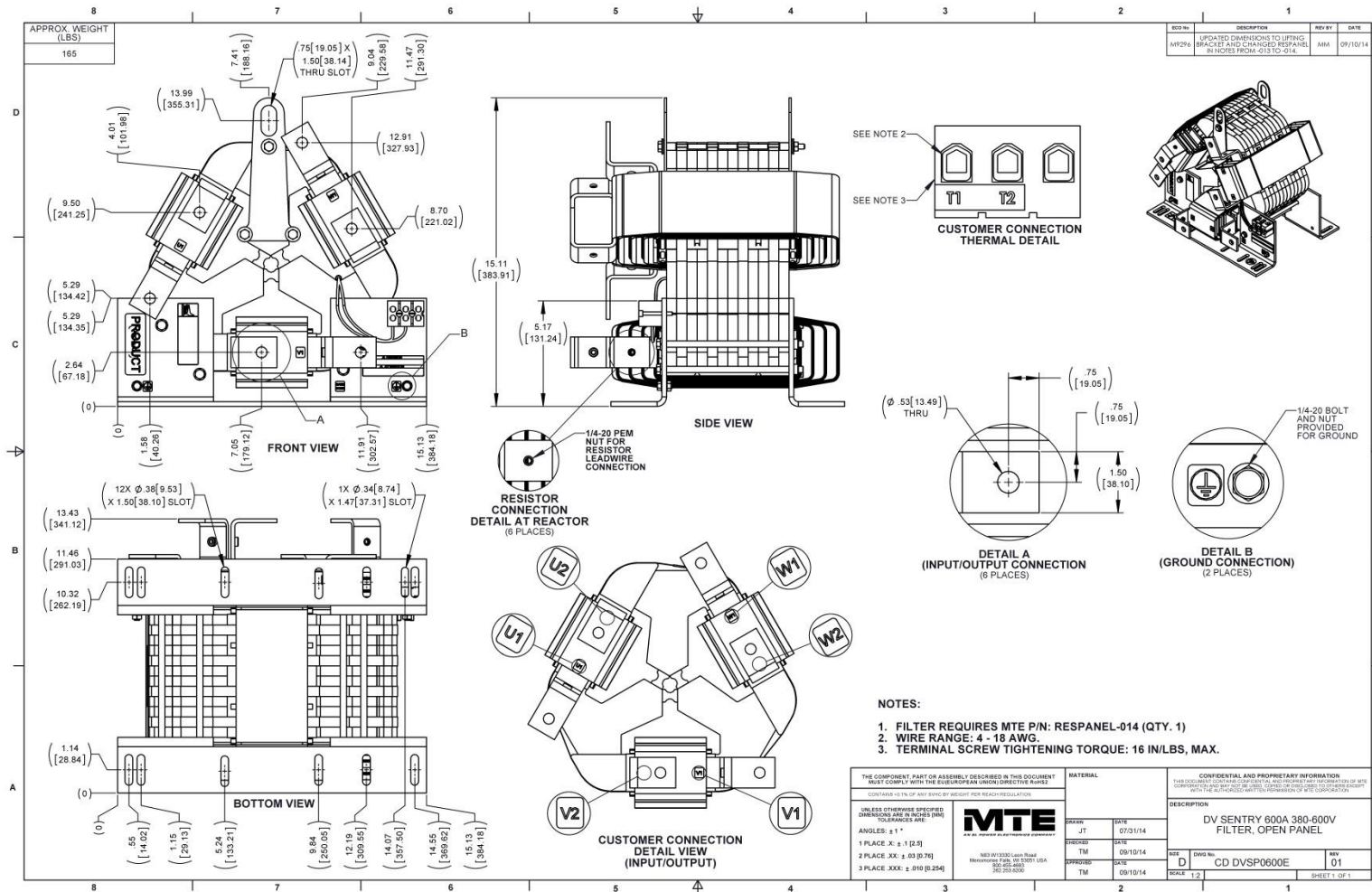


Figure A-23: DVSP0600E

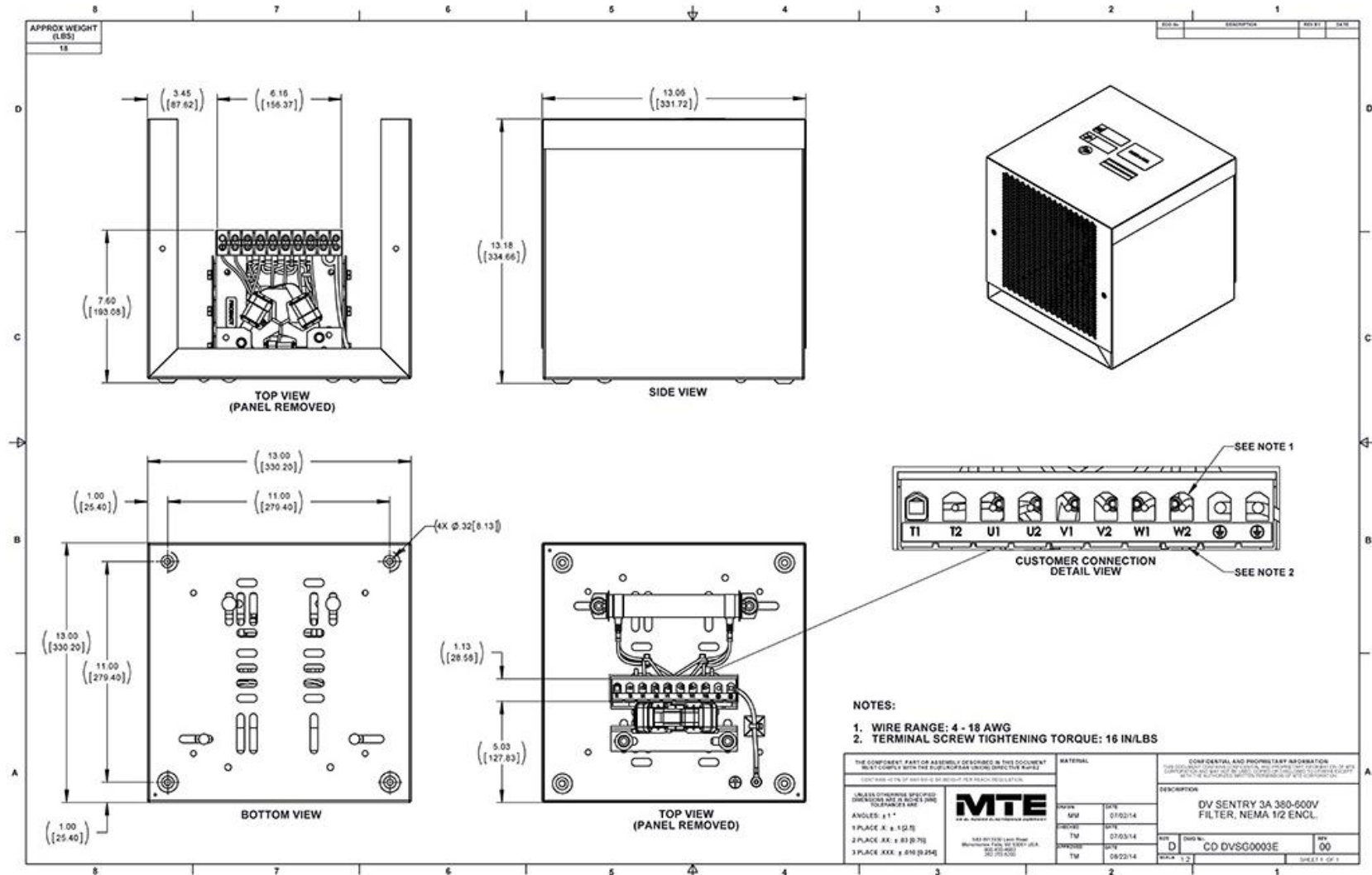


Figure A-24: DVSG0003E

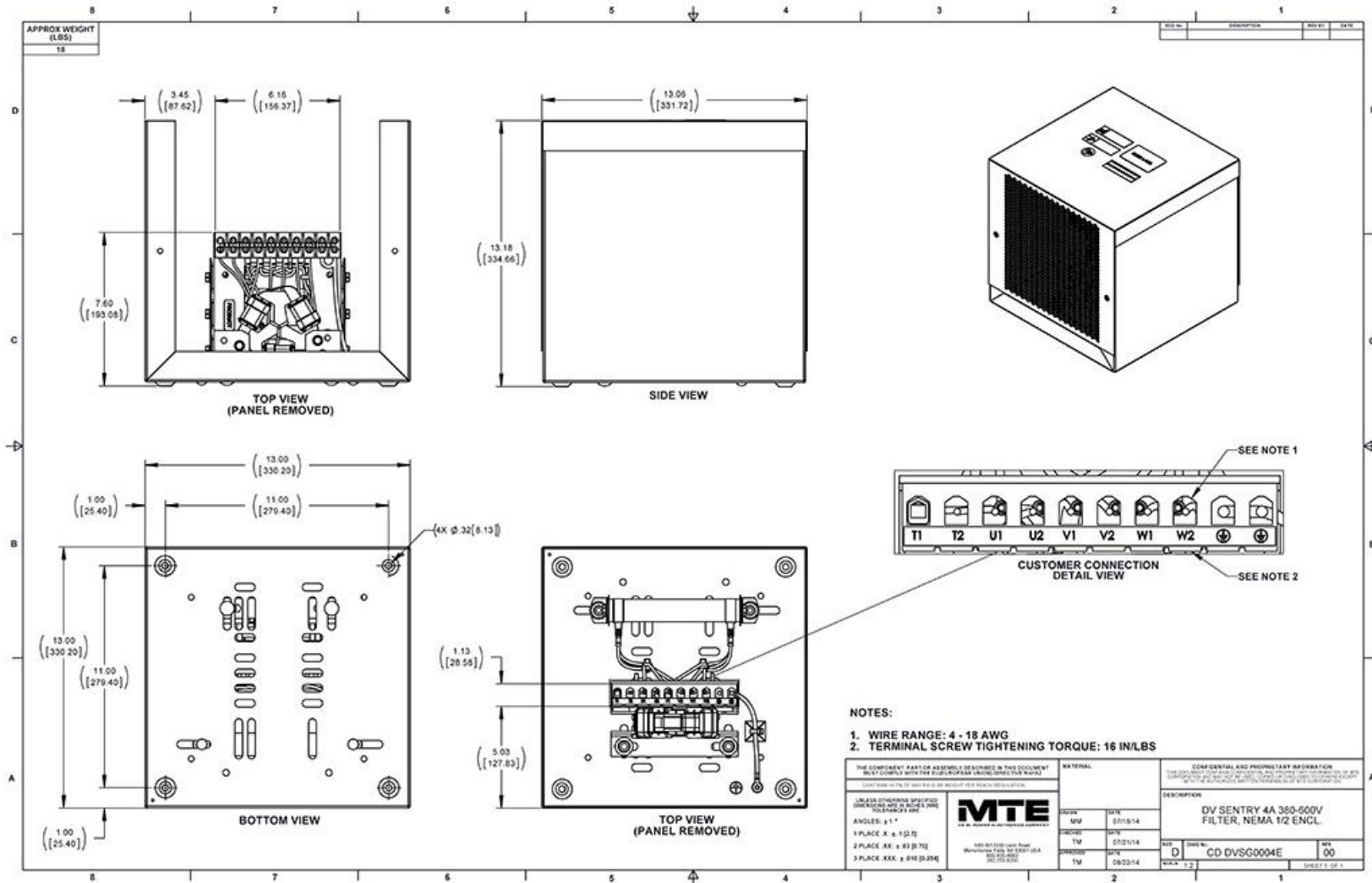


Figure A-25: DVSG0004E

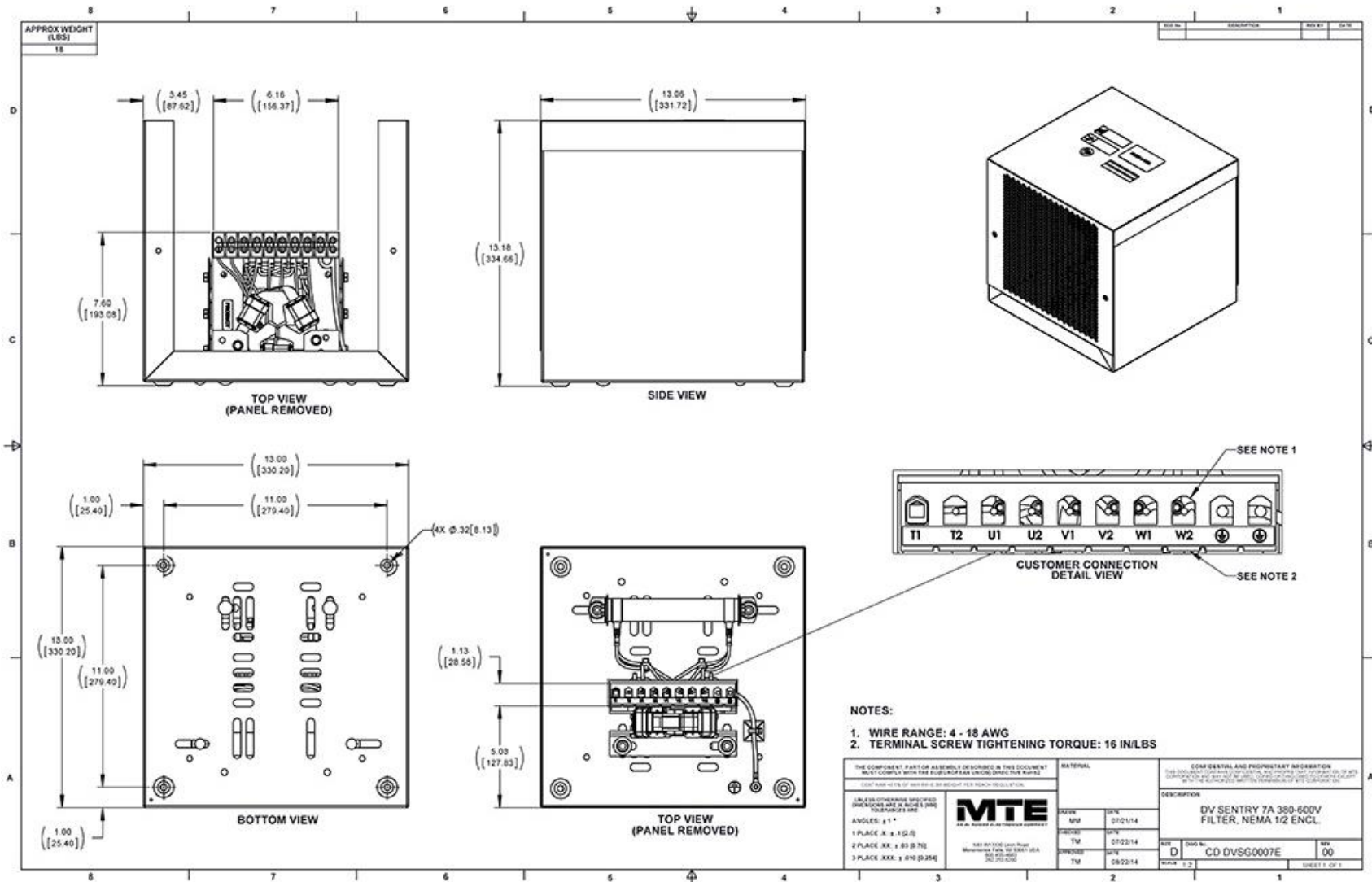


Figure A-26: DVSG0007E

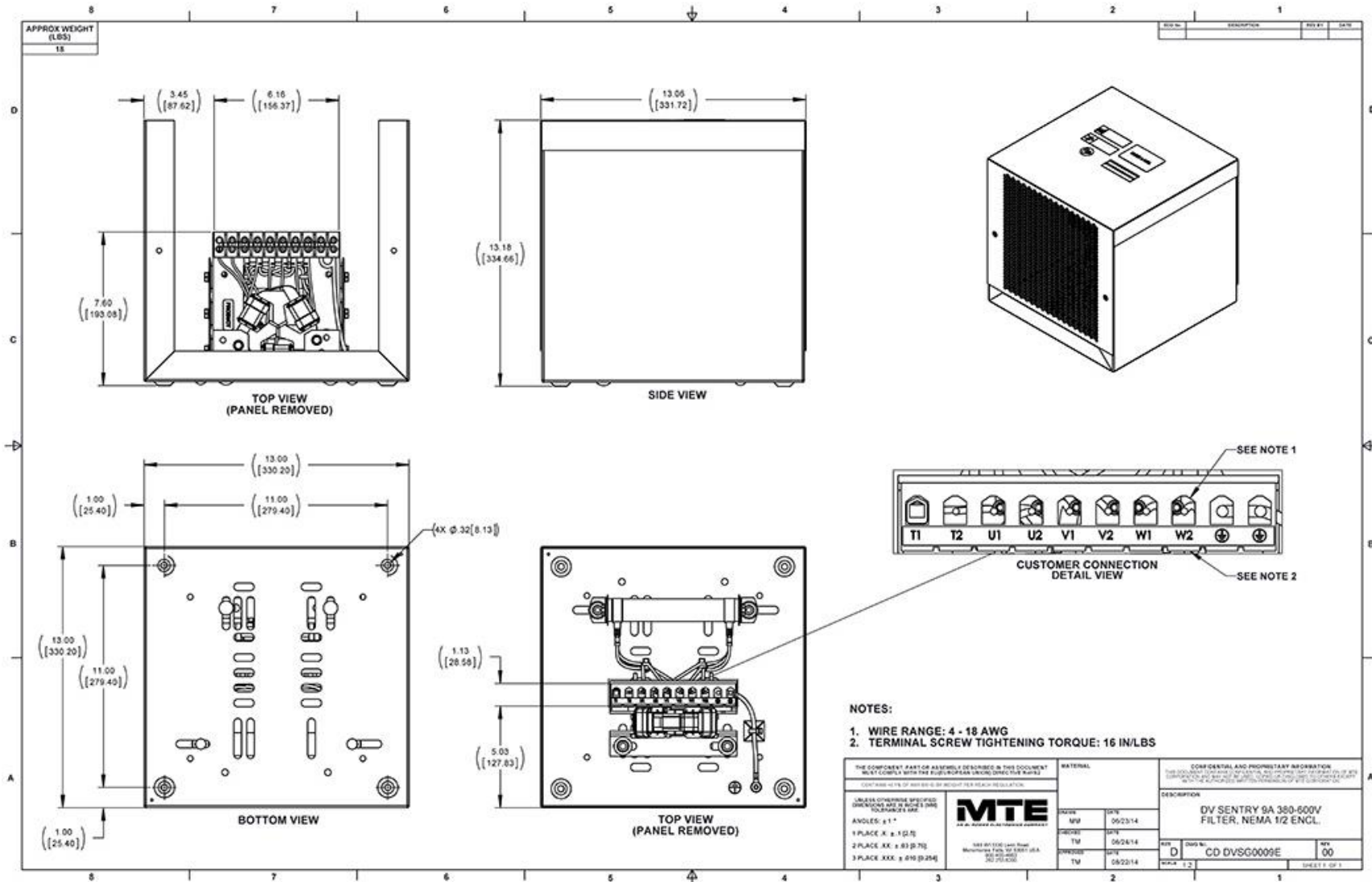


Figure A-27: DVSG0009E

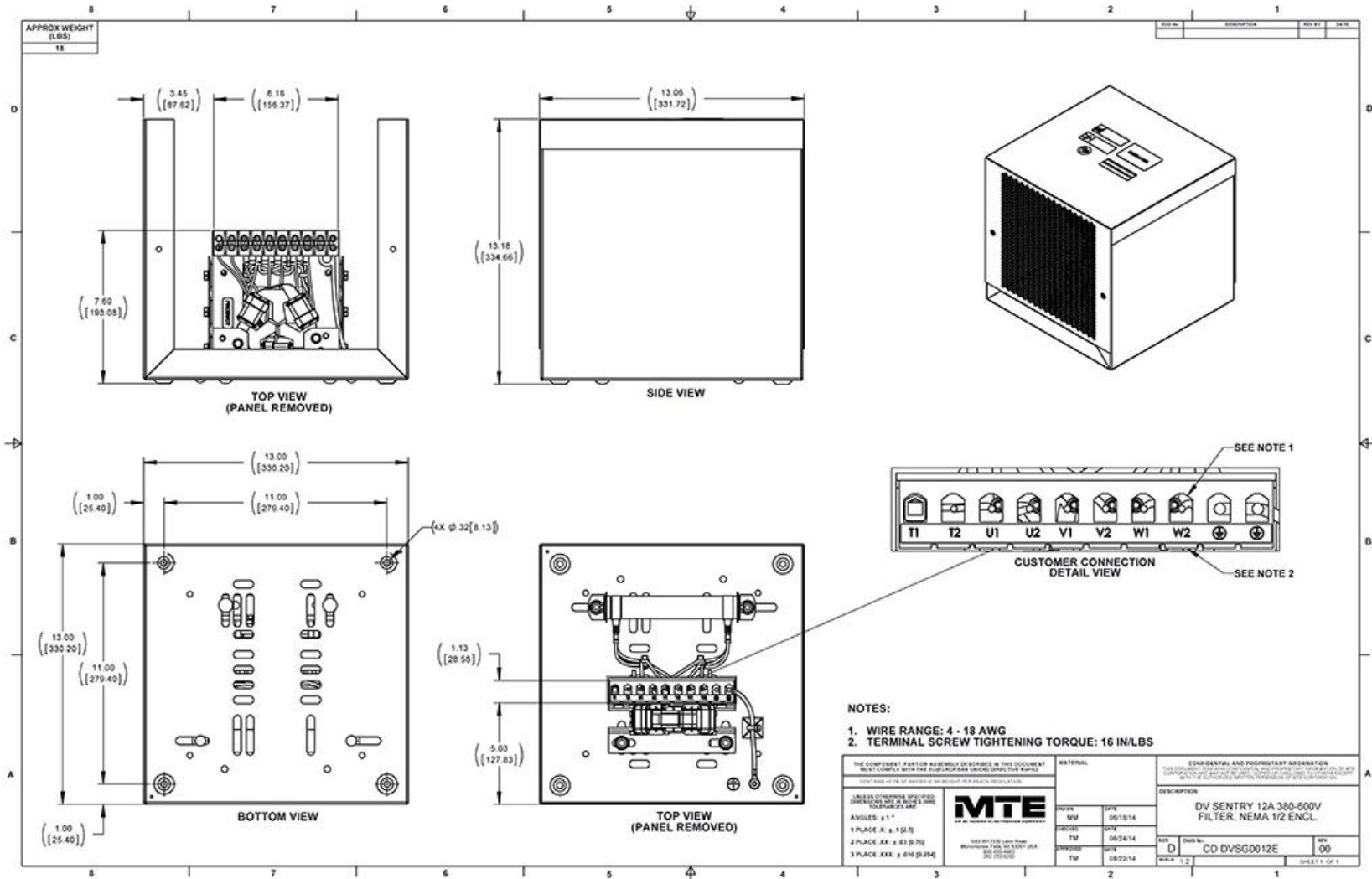


Figure A-28: DVSP0012E

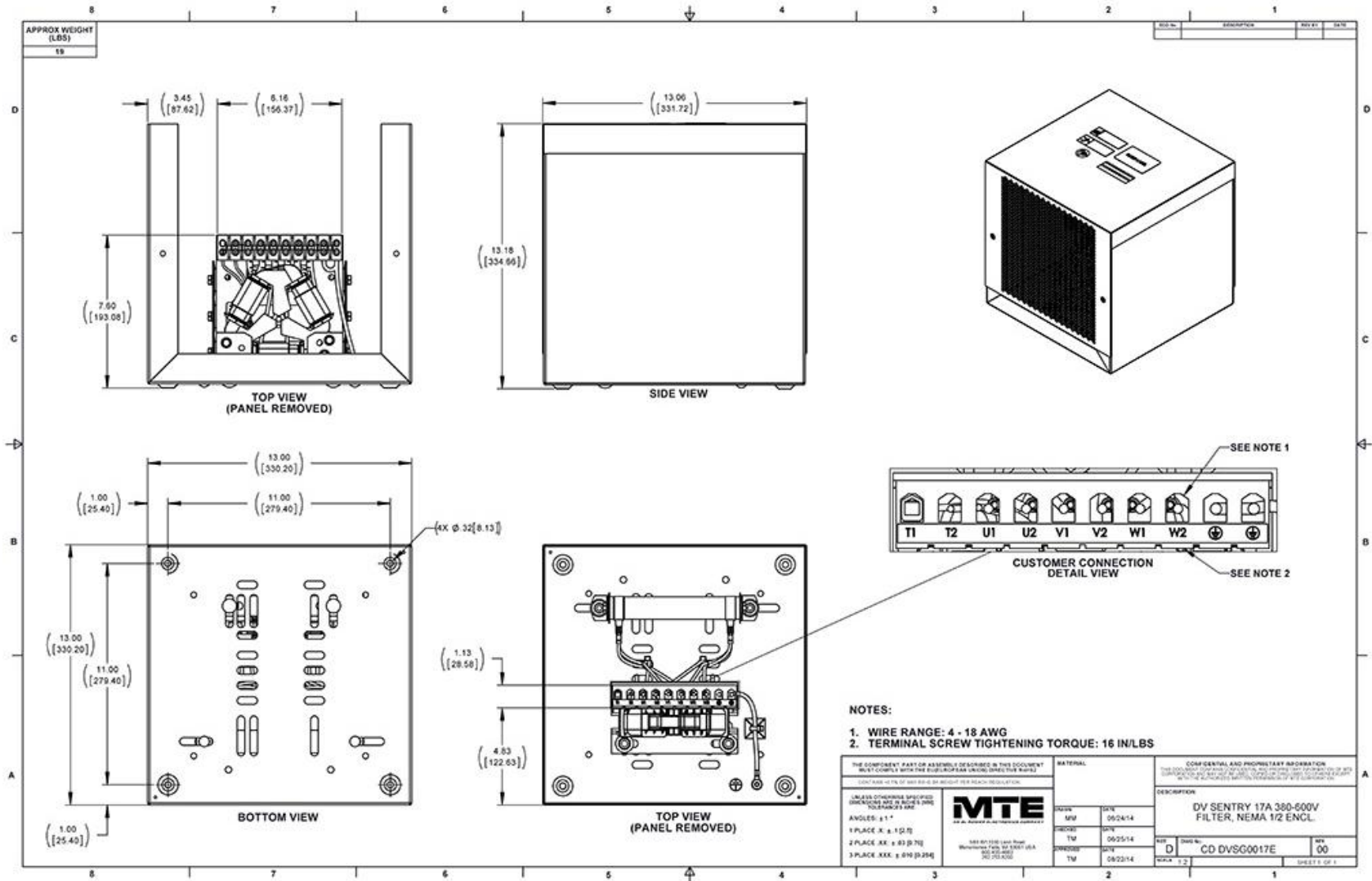


Figure A-29: DVSG0017E

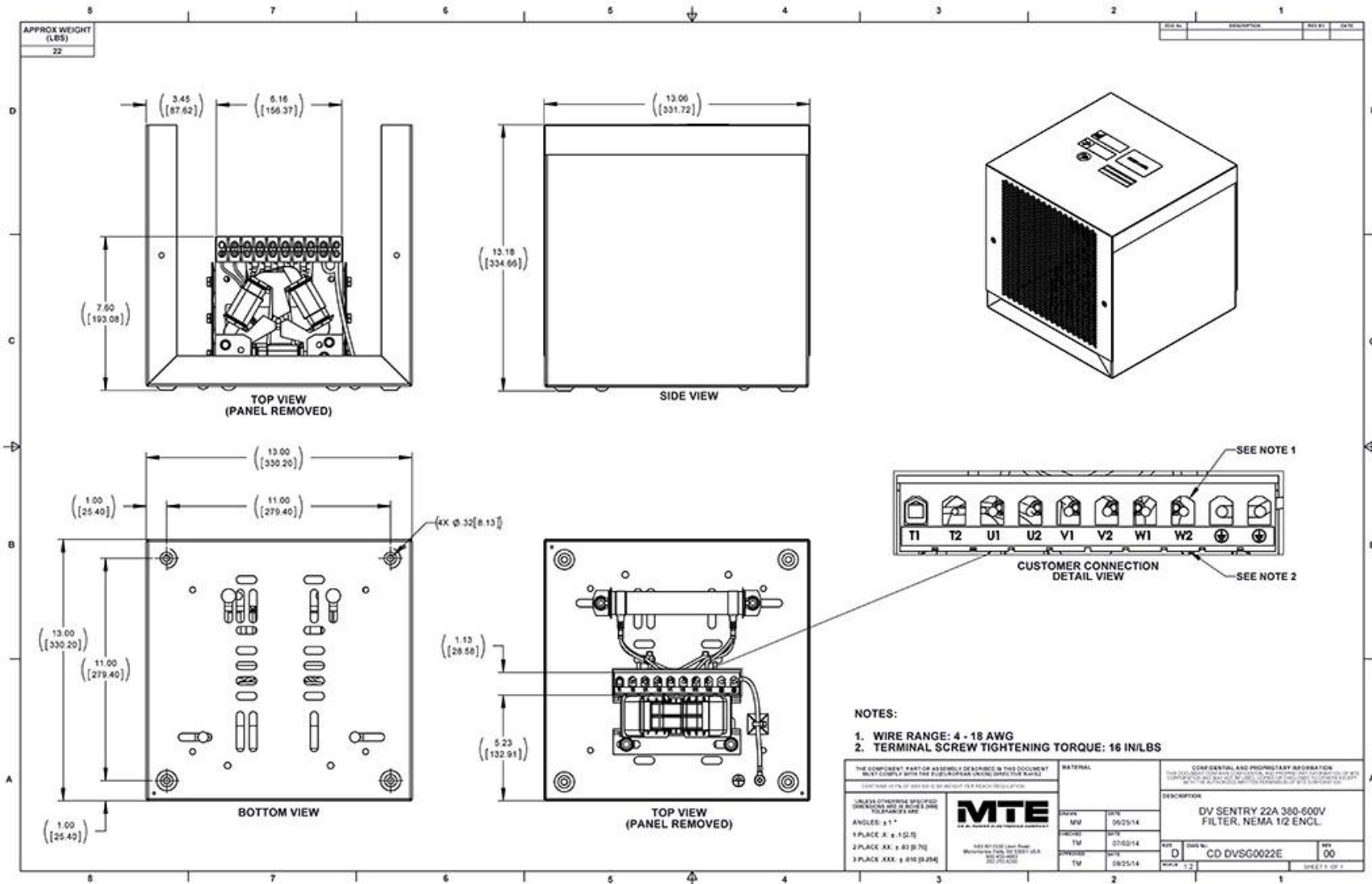


Figure A-30: DVSG0022E

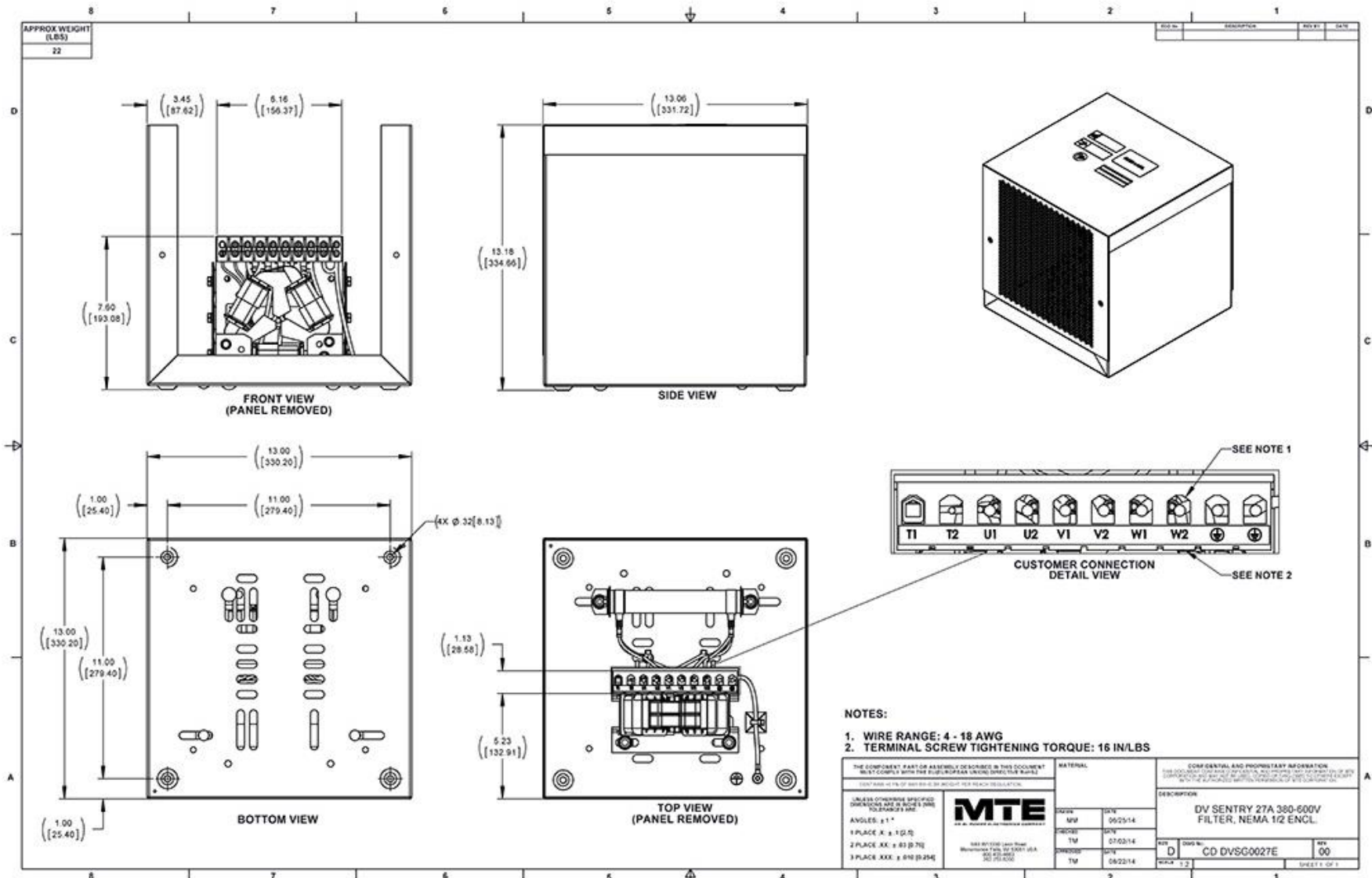


Figure A-31: DVSG0027E

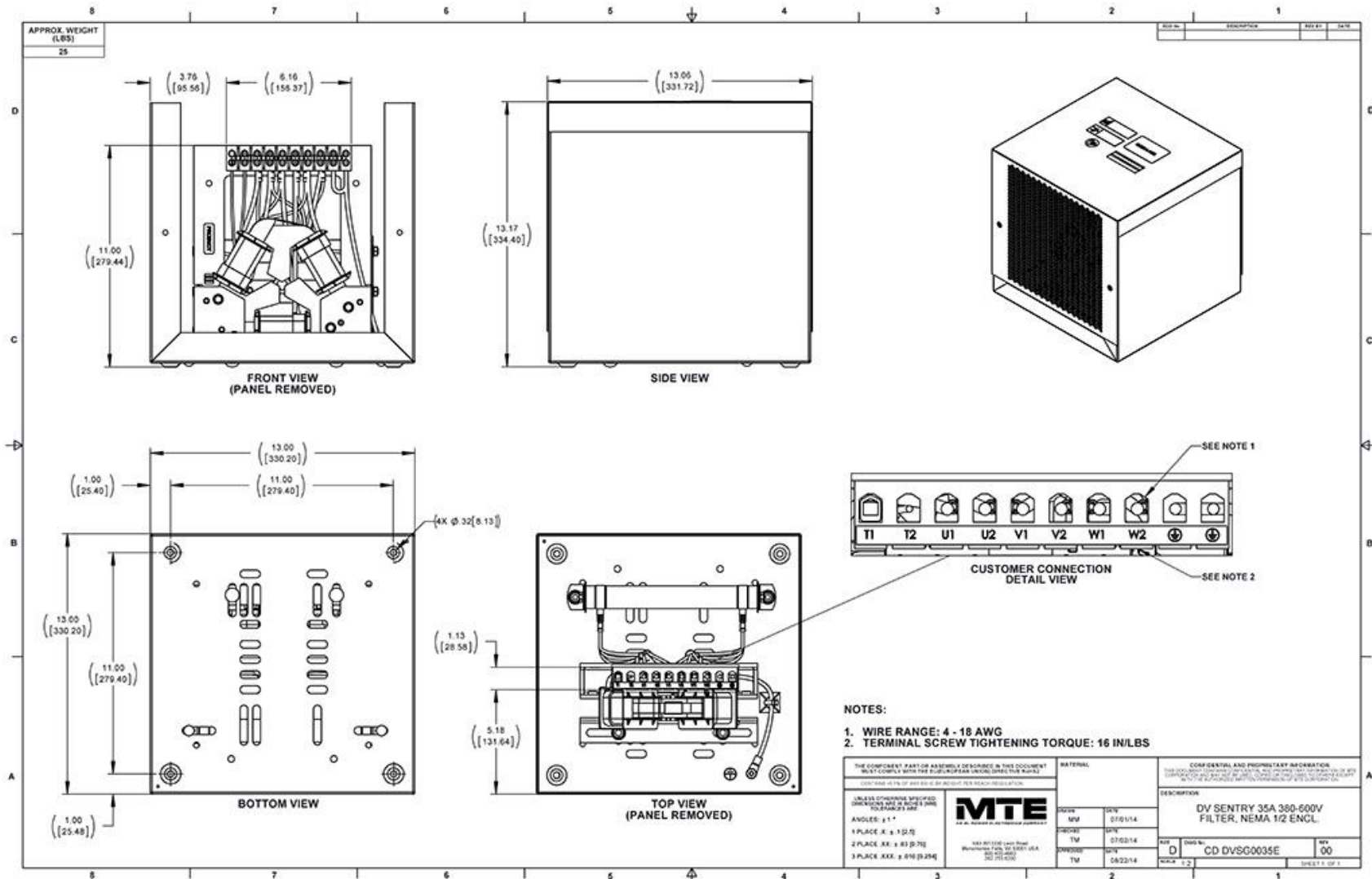


Figure A-32: DVSG0035E

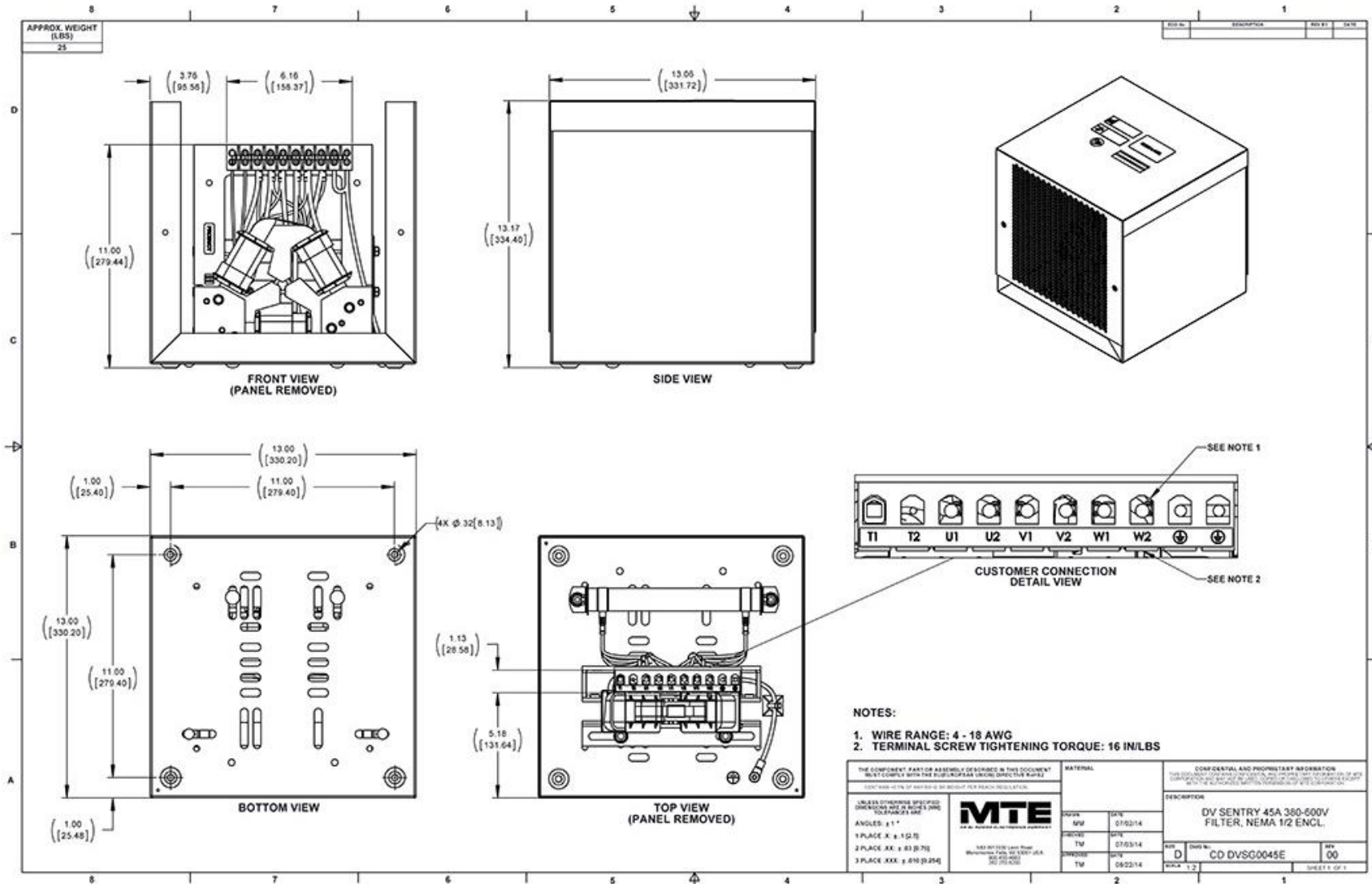


Figure A-33: DVSG0045E

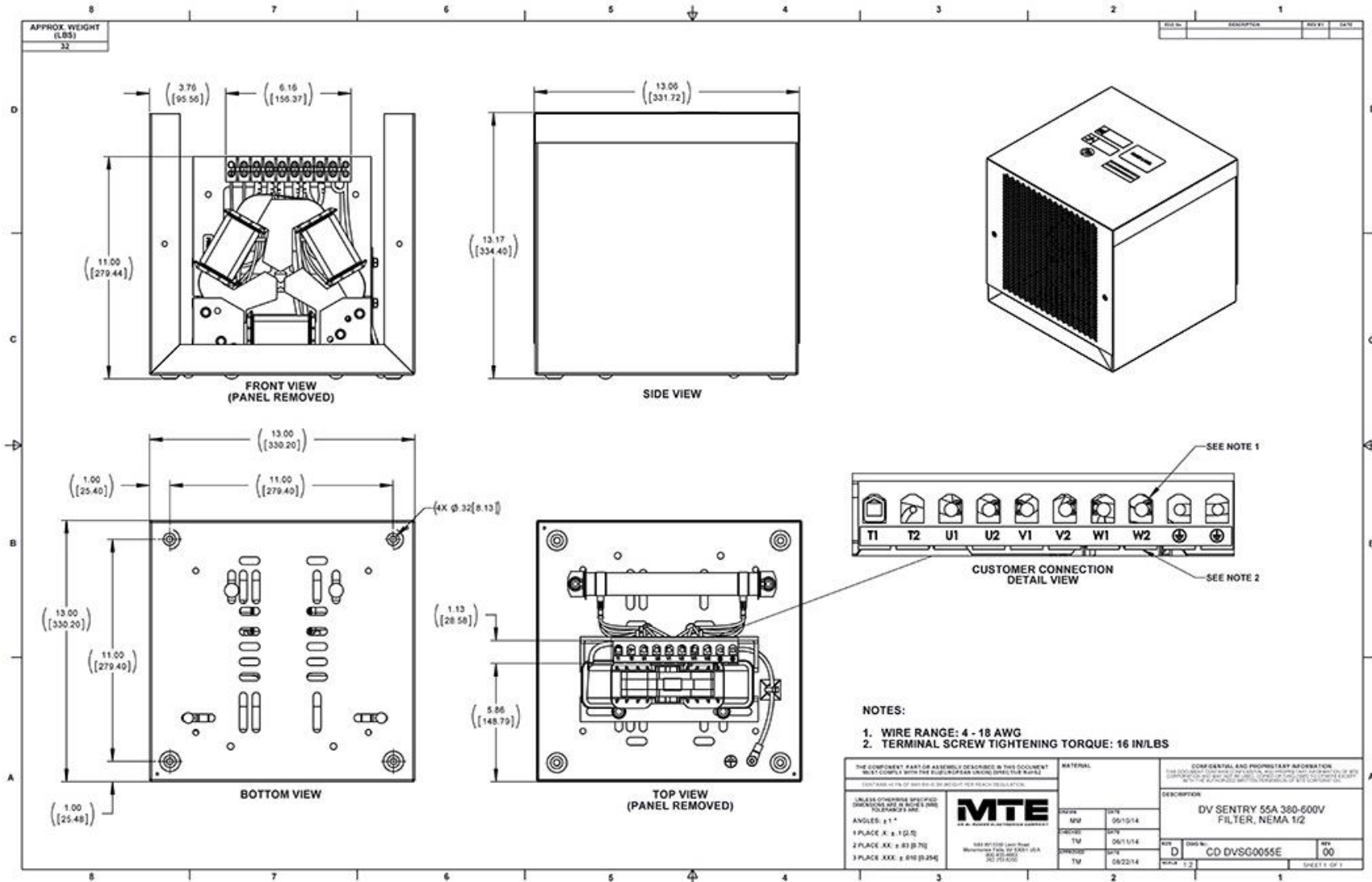


Figure A-34: DVSG0055E

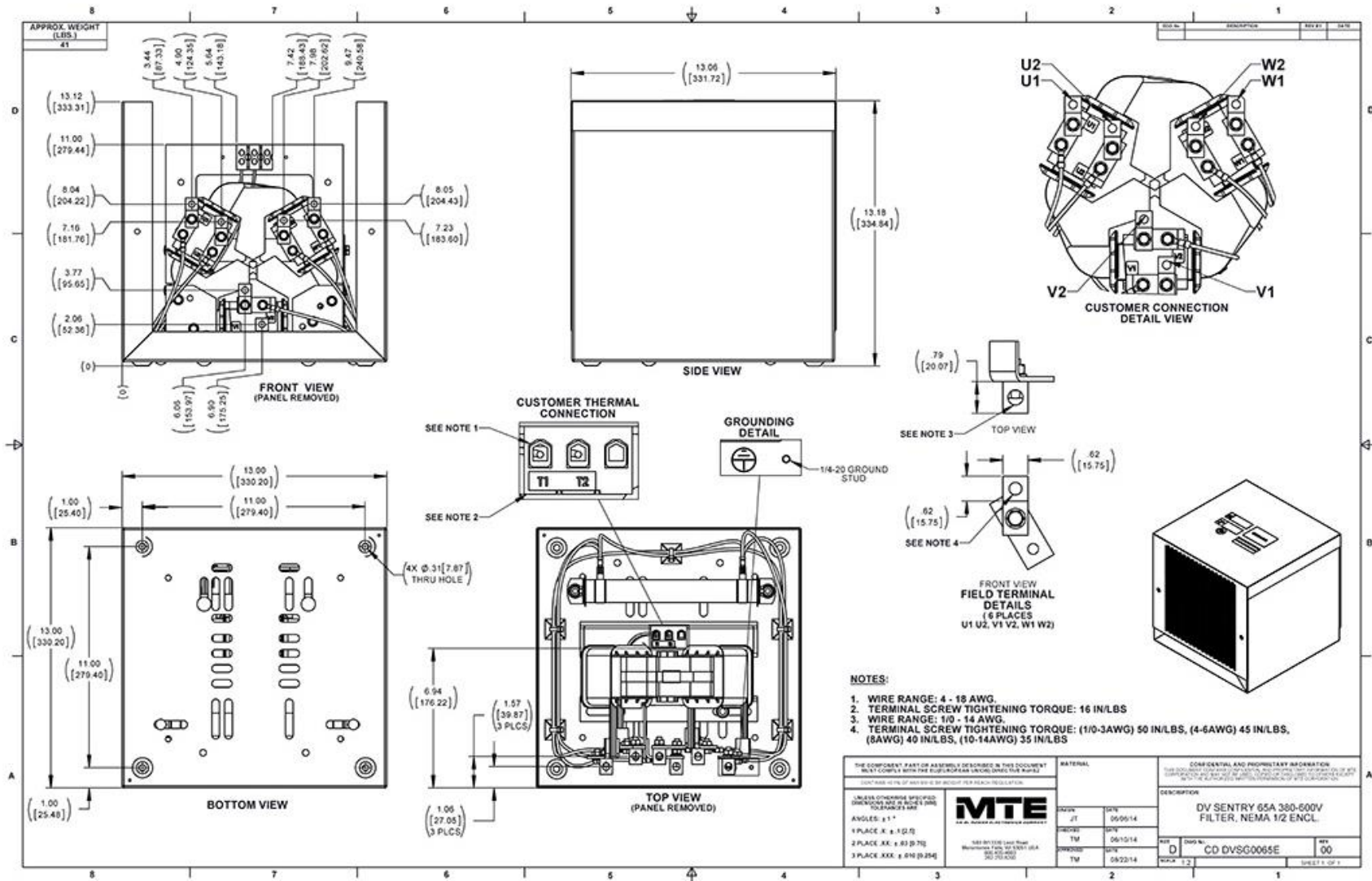


Figure A-35: DVSG0065E

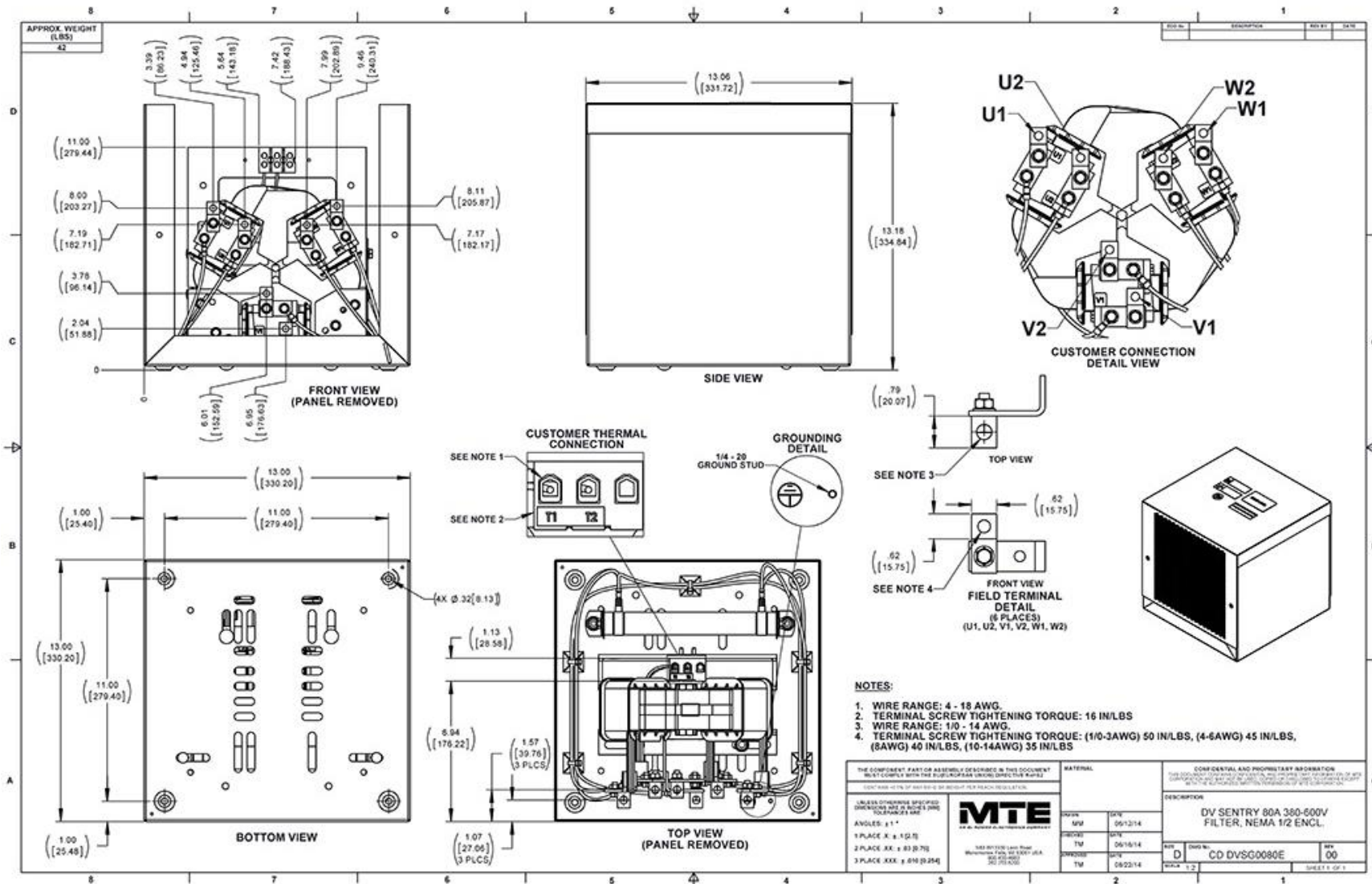


Figure A-36: DVSG0080E

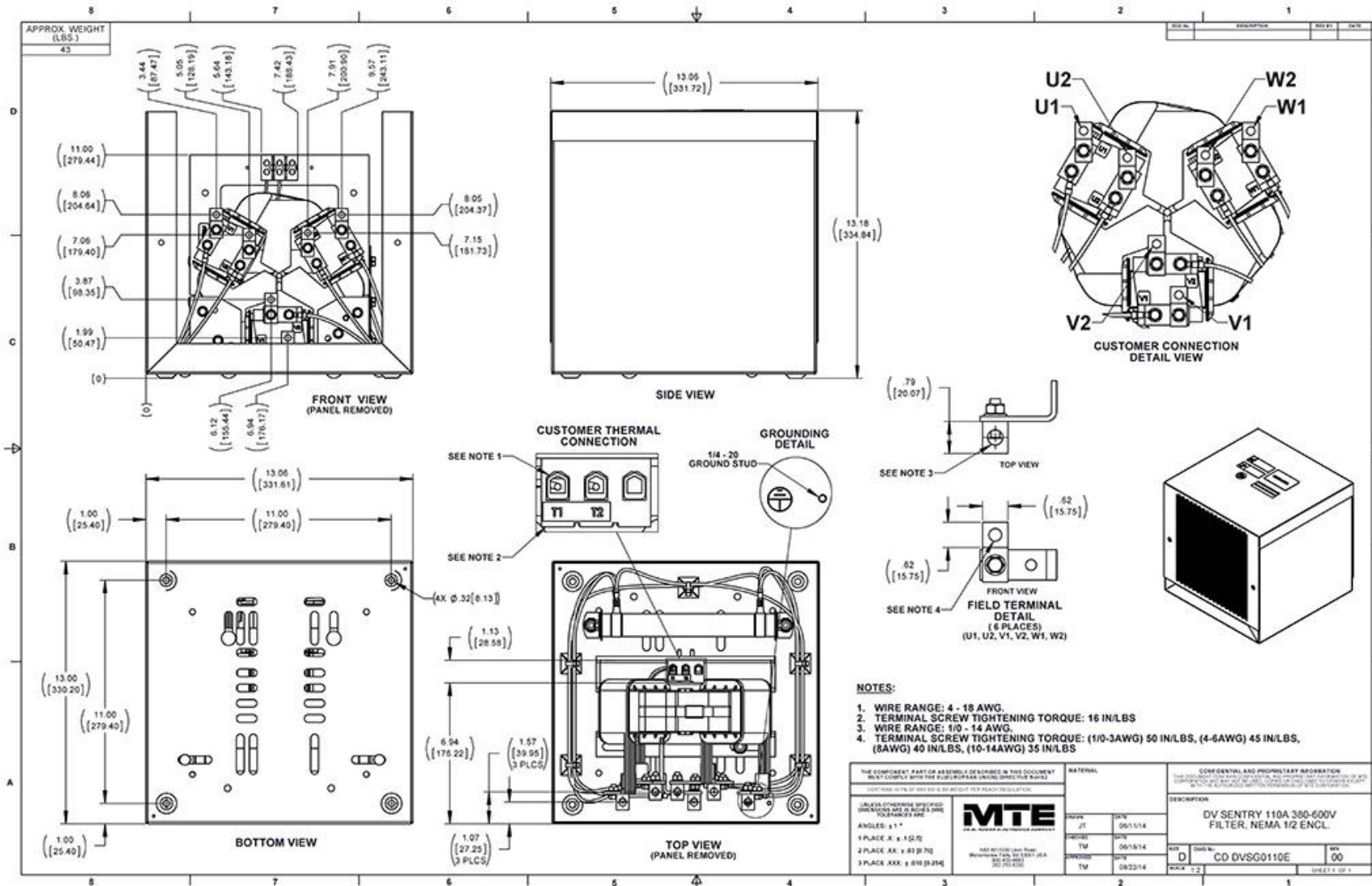


Figure A-37: DVSG0110E

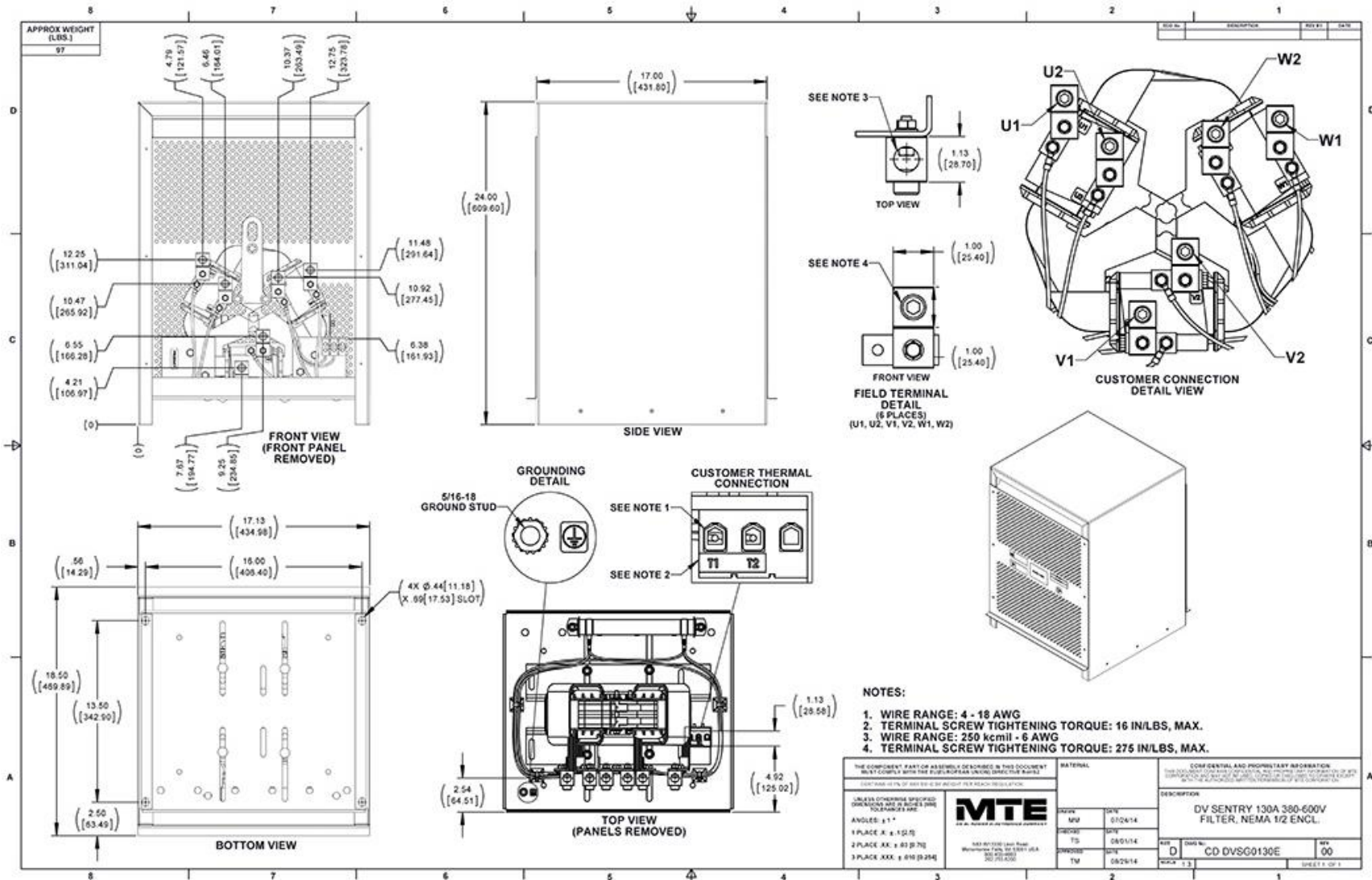


Figure A-38: DVSG0130E

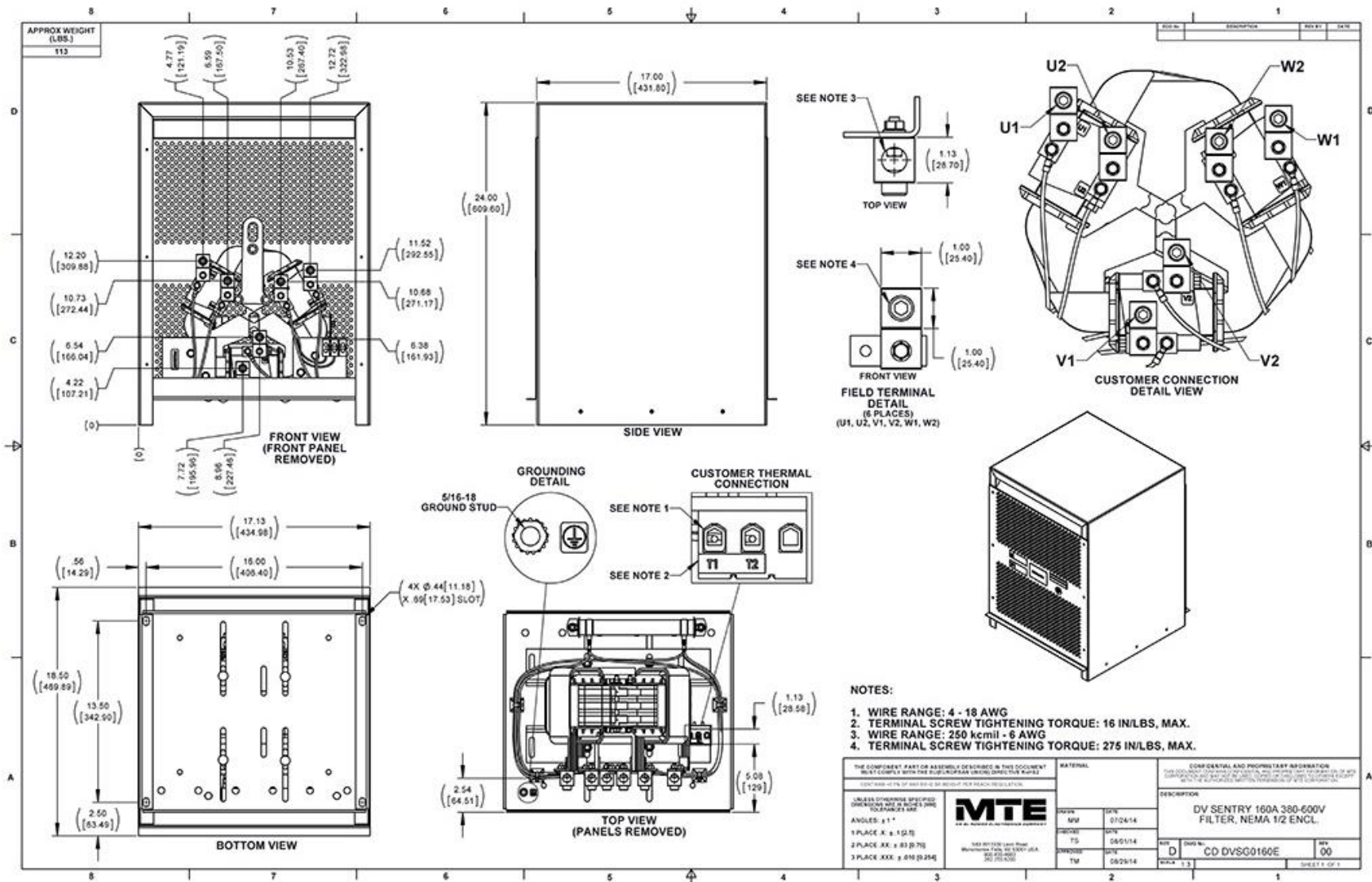


Figure A-39: DVSG0160E

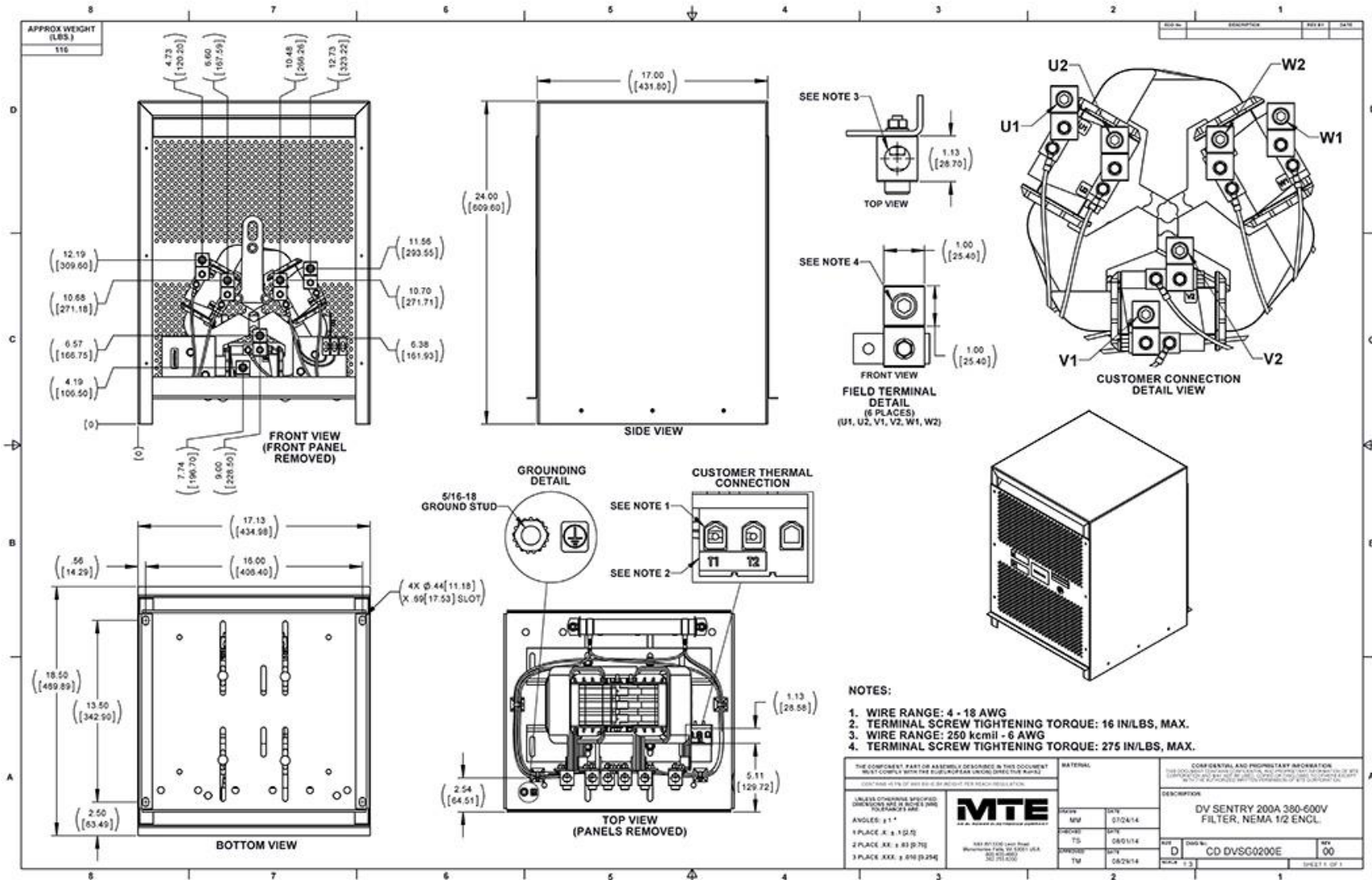


Figure A-40: DVSG0200E

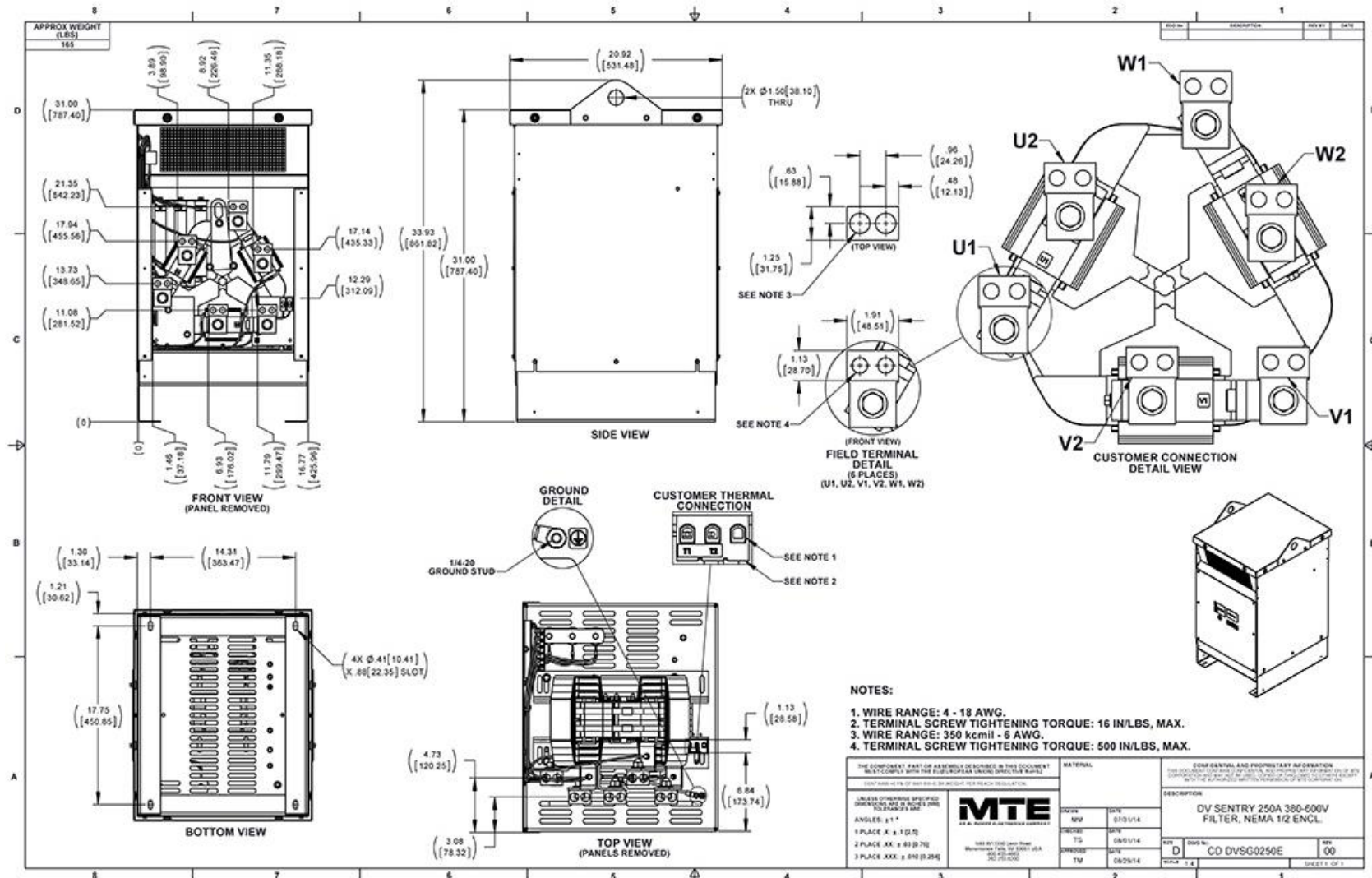


Figure A-41: DVSG0250E

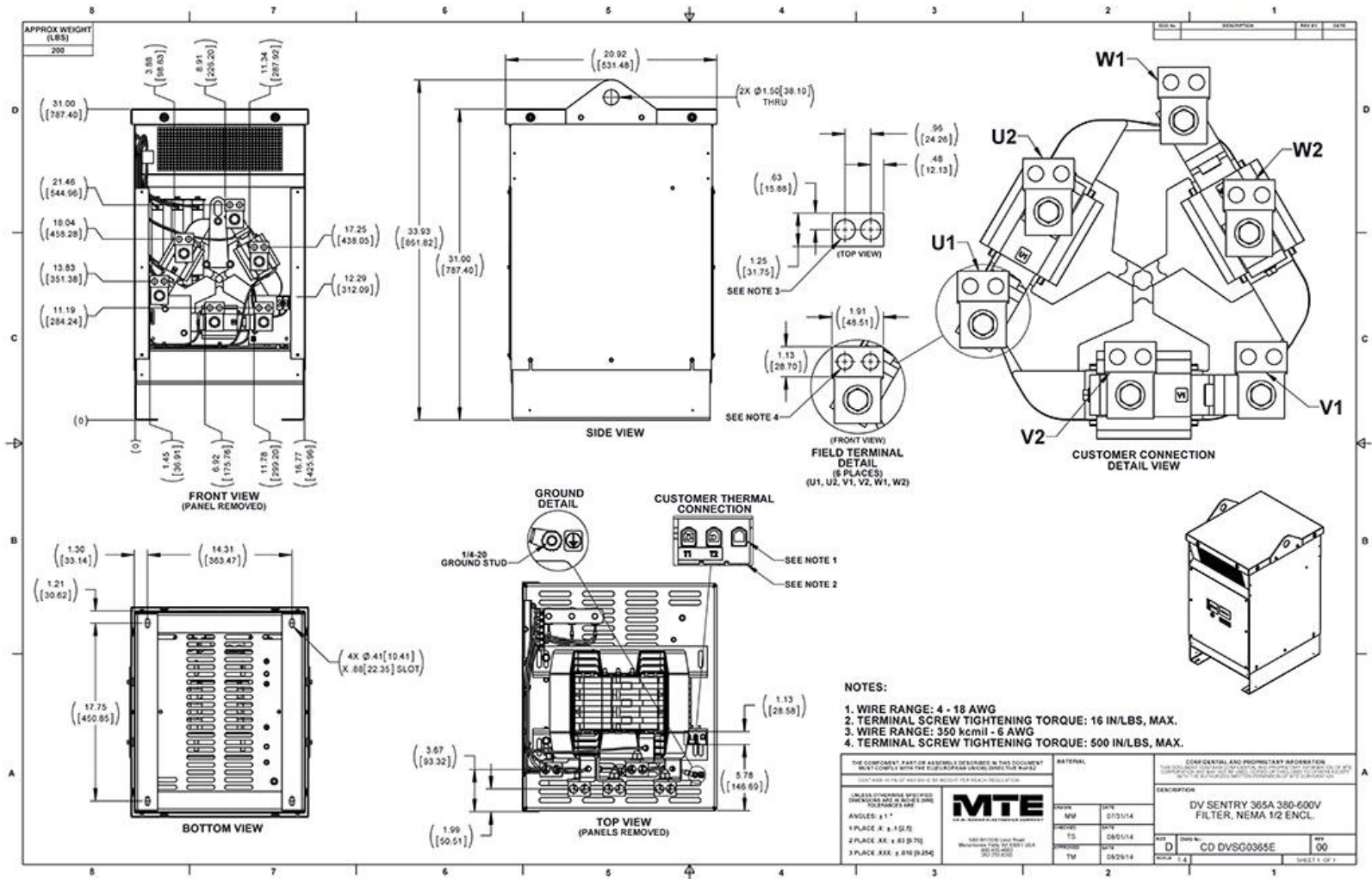


Figure A-43: DVSG0365E

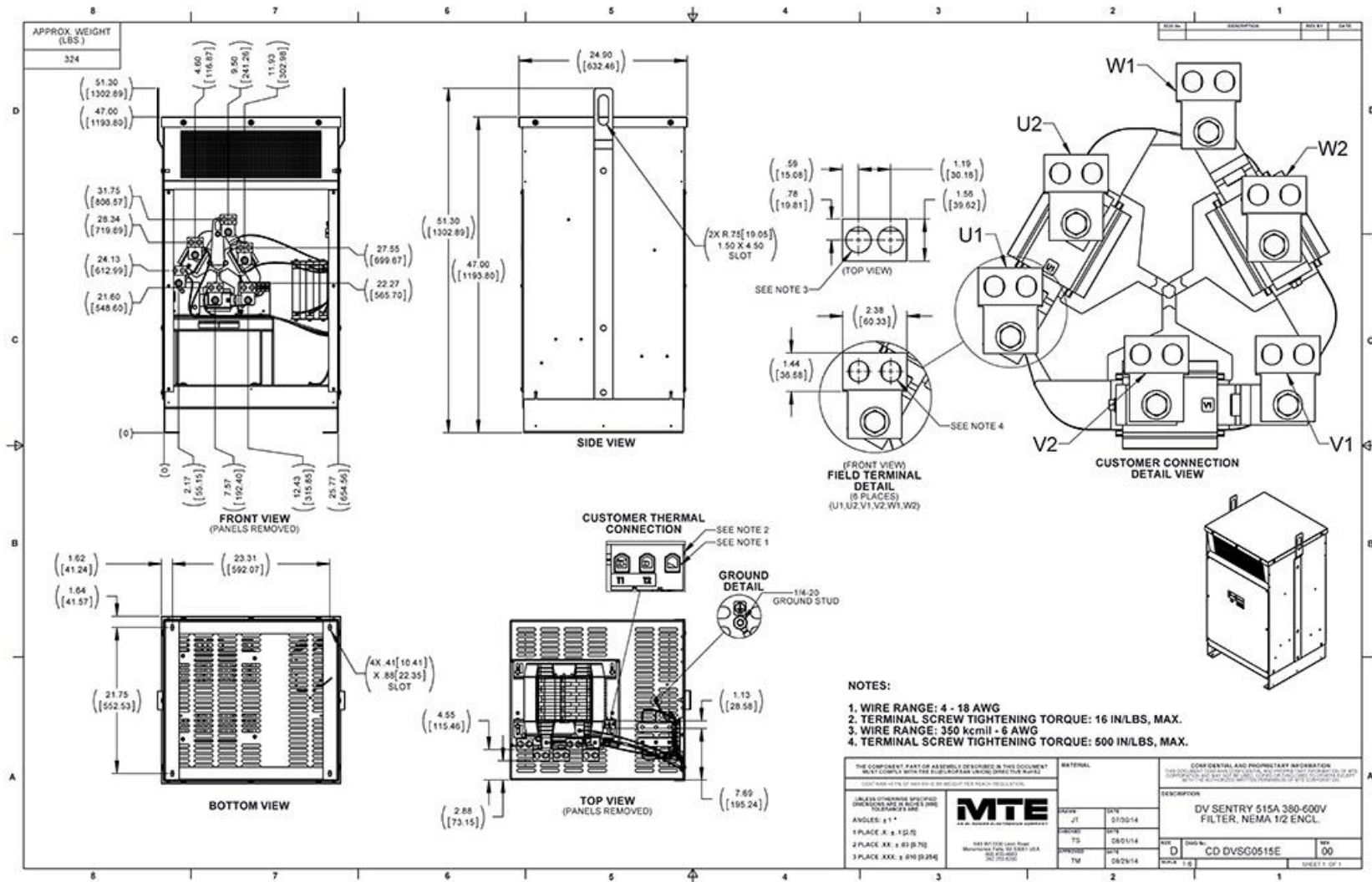


Figure A-45: DVSG0515E

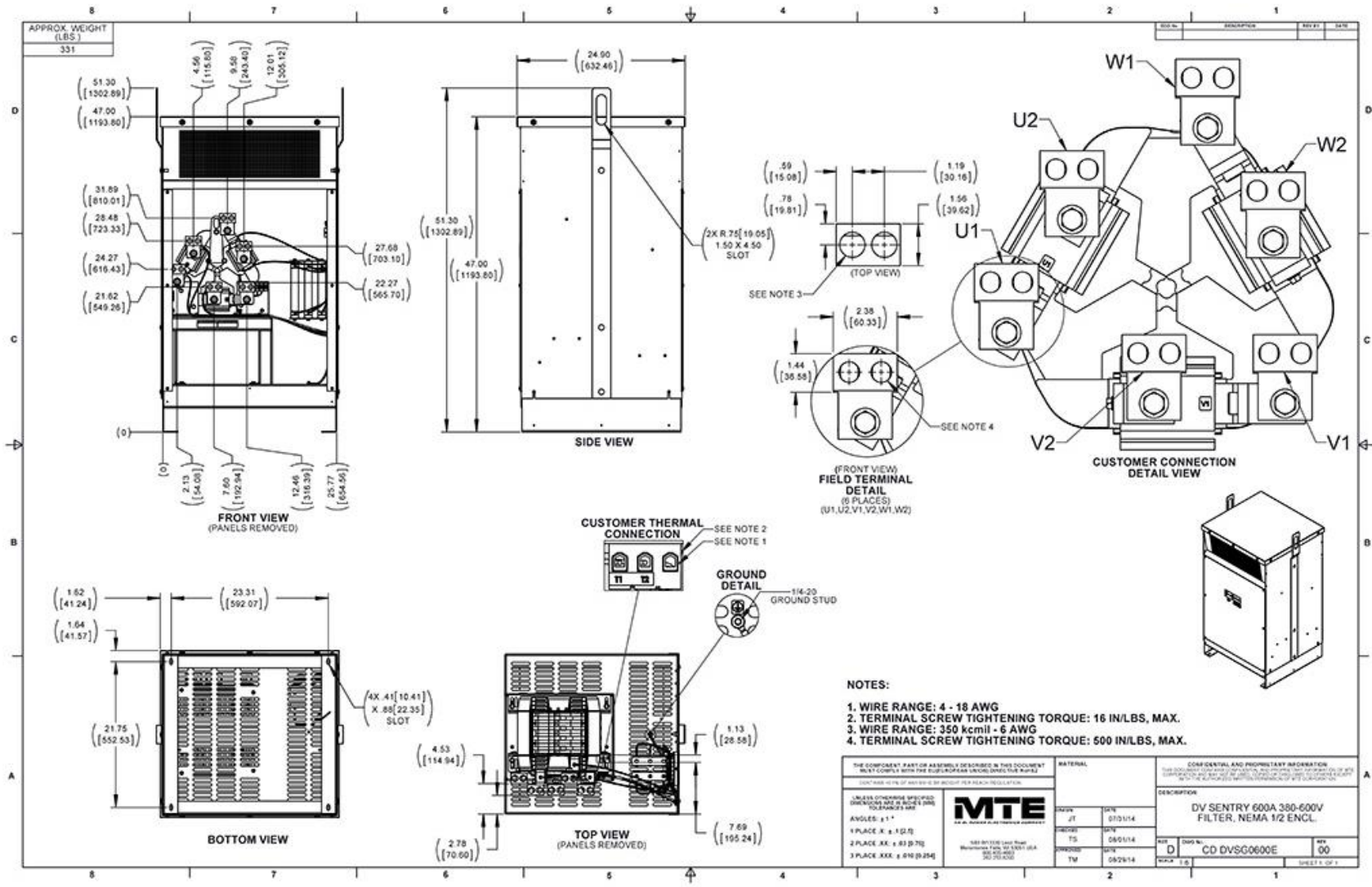


Figure A-46: DVSG0600E

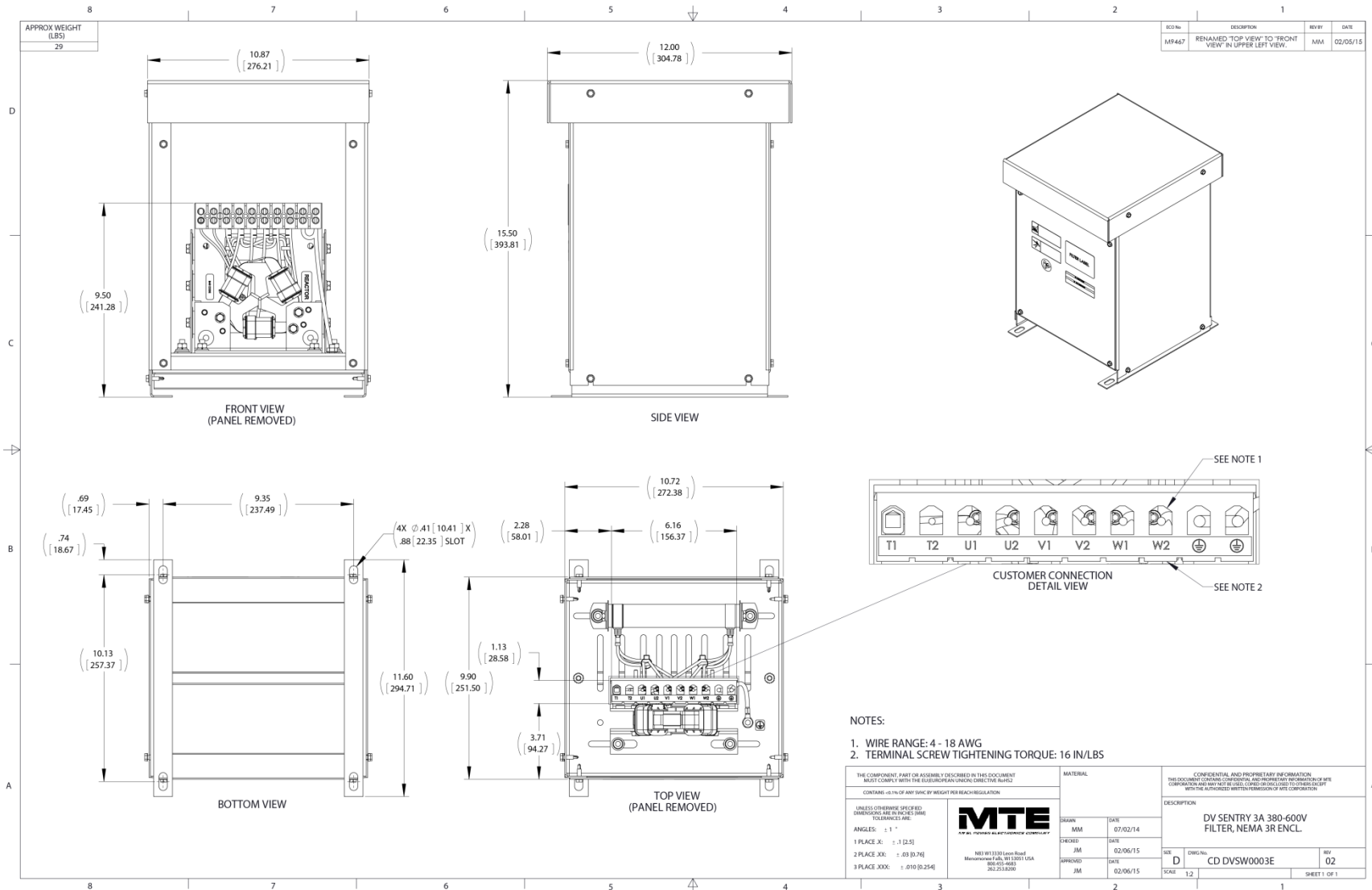


Figure A-47: DVSW0003E

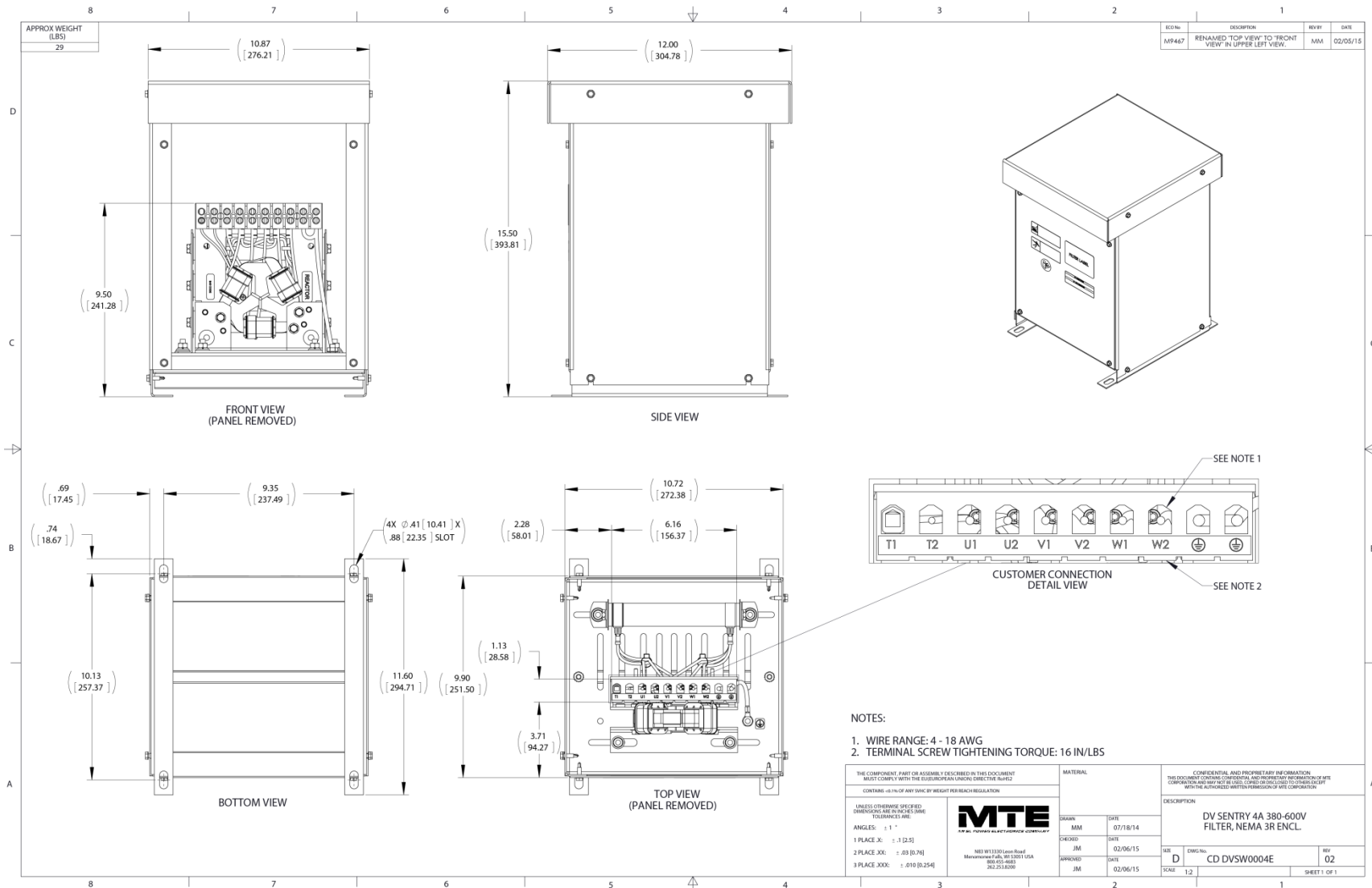


Figure A-48: DVSW0004E

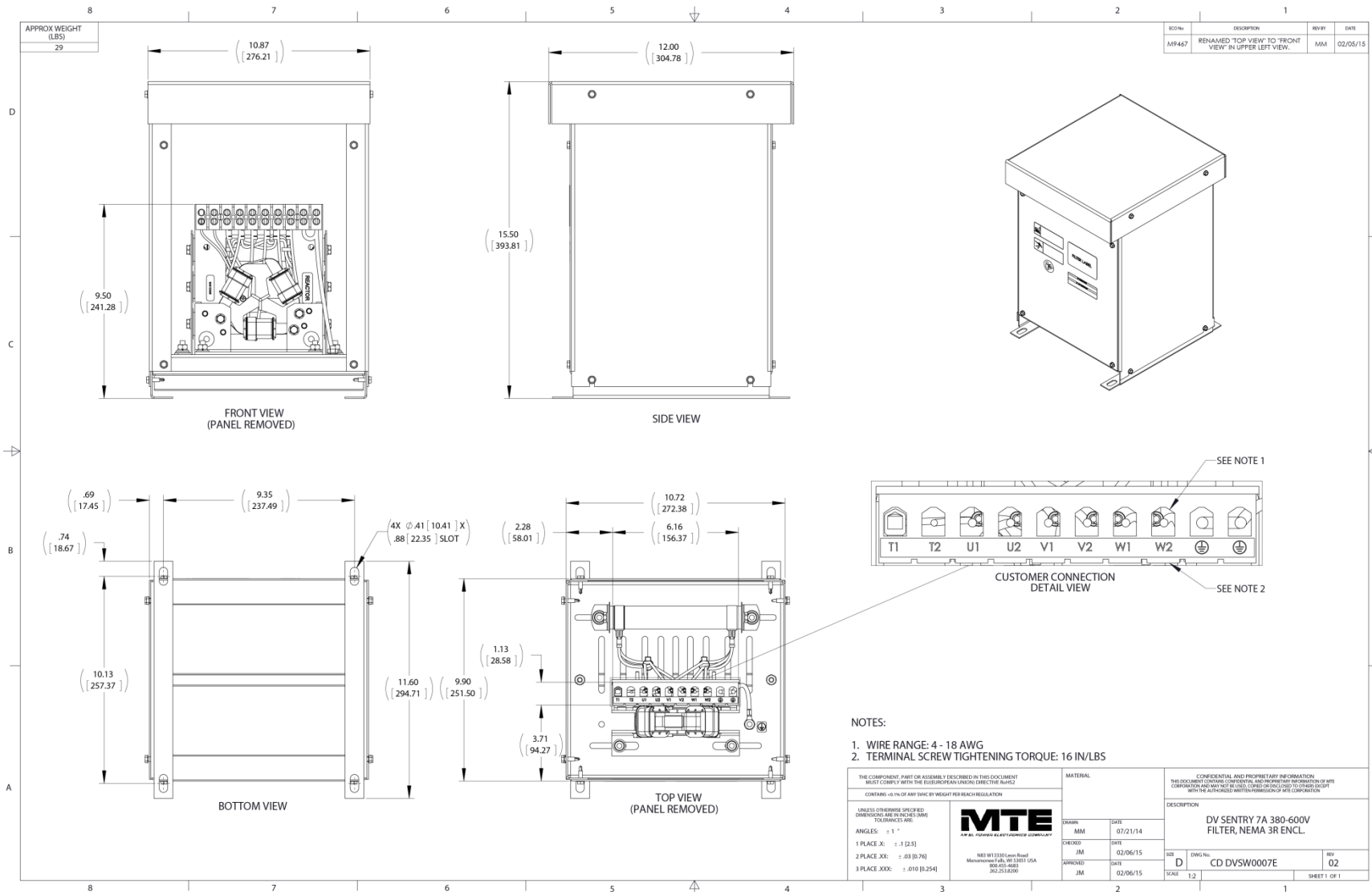


Figure A-49: DVS0007E

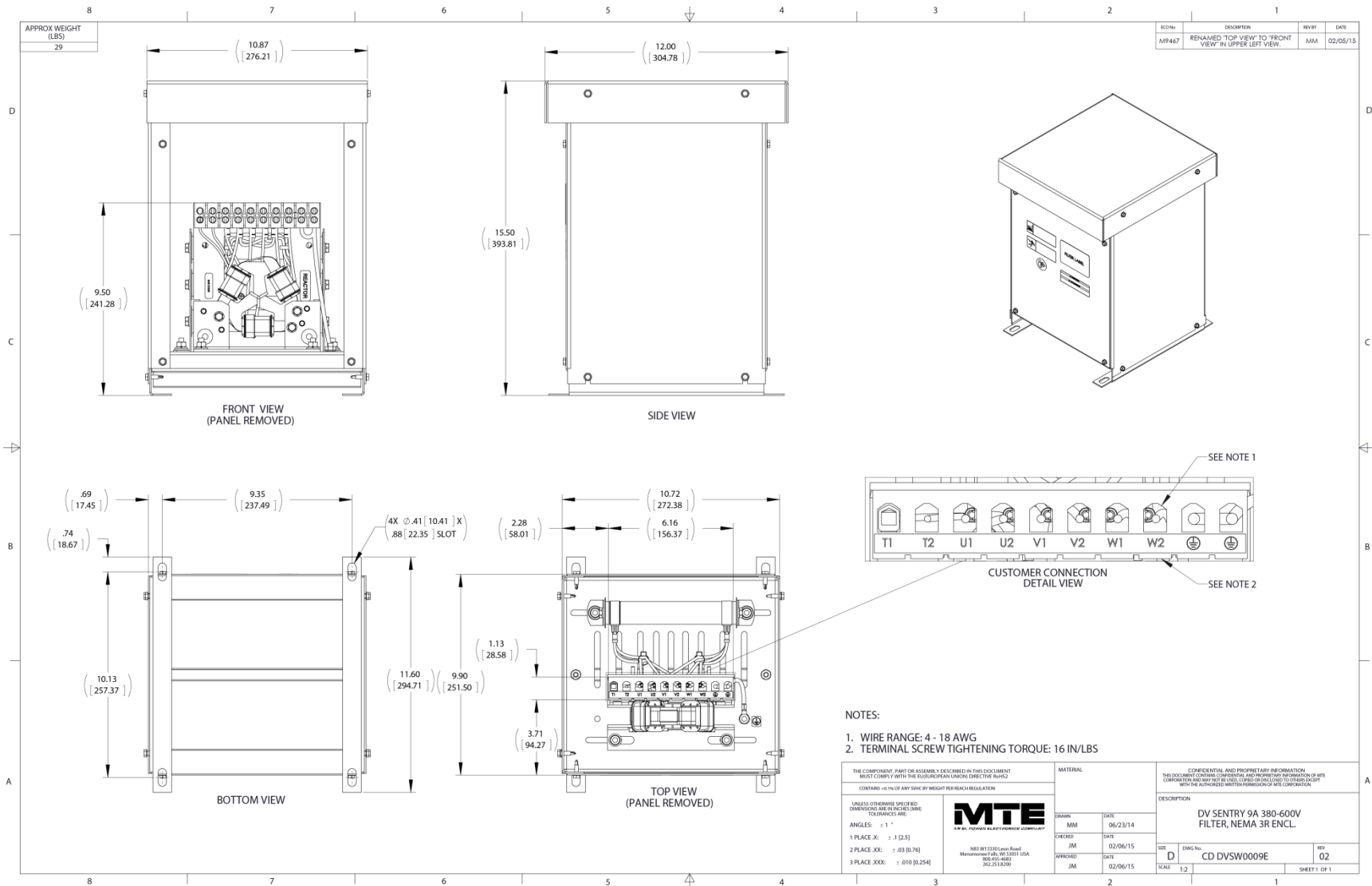


Figure A-50: DVSW0009E

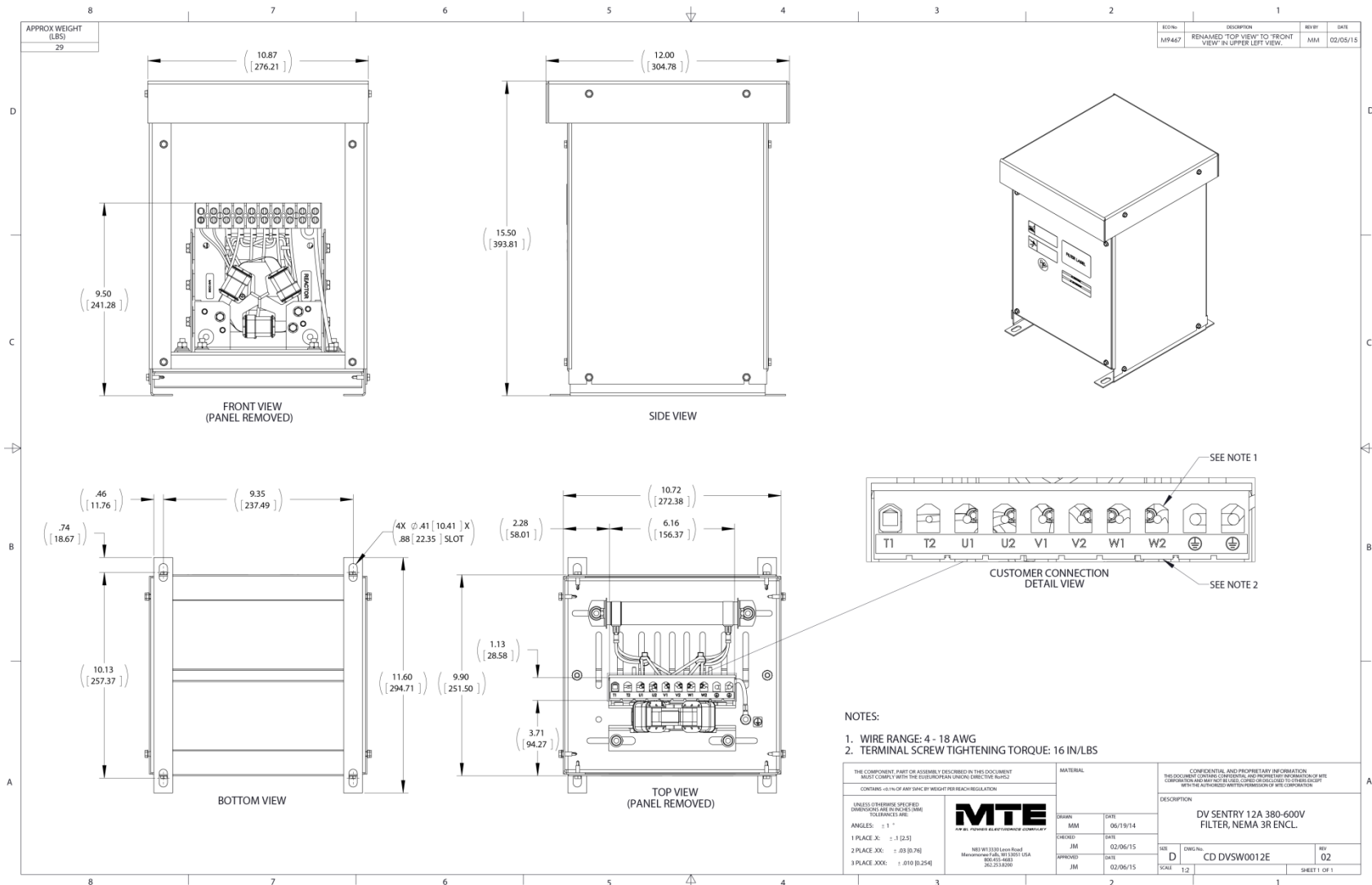


Figure A-51: DVSW0012E

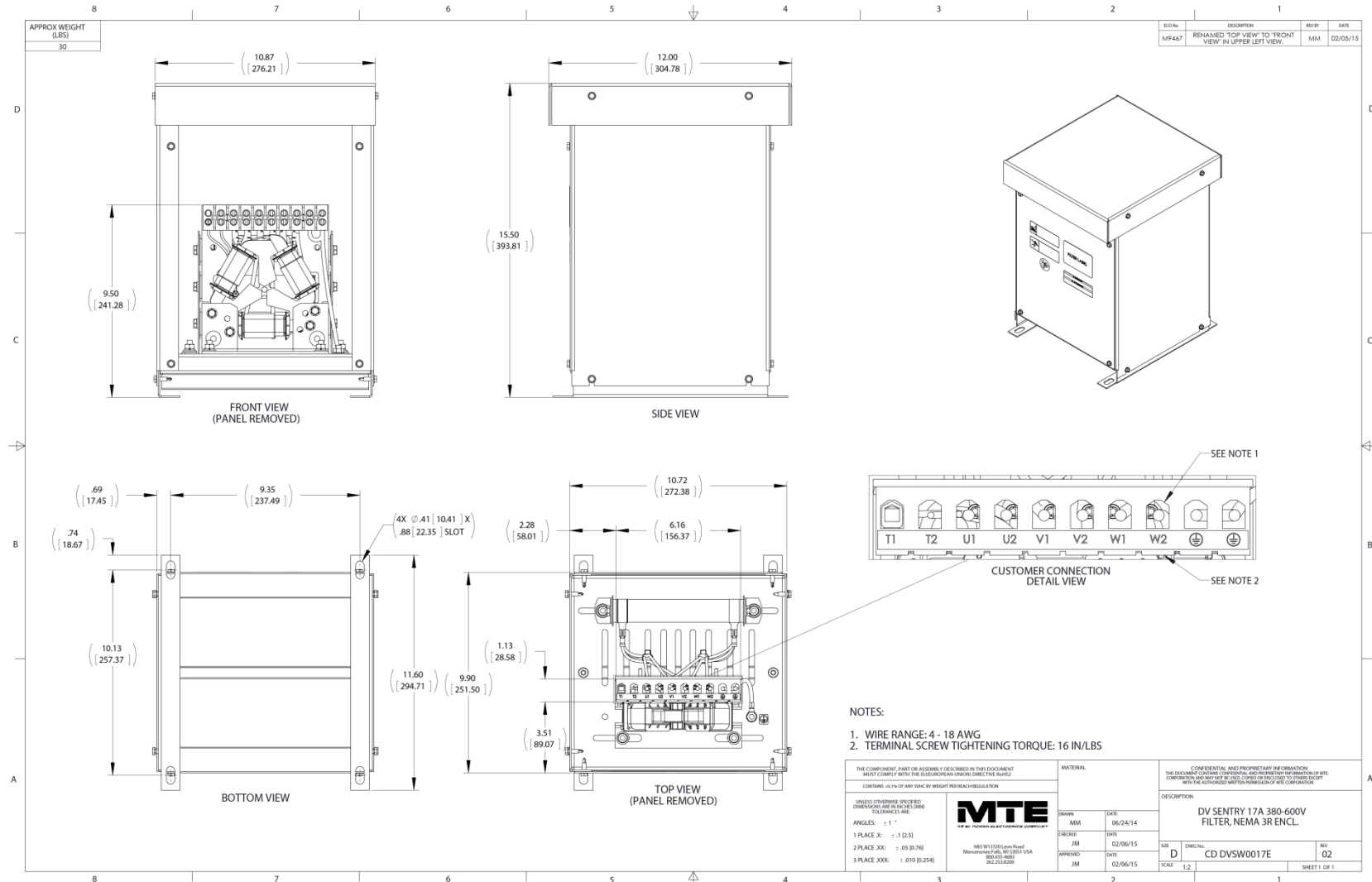


Figure A-52: DVS0017E

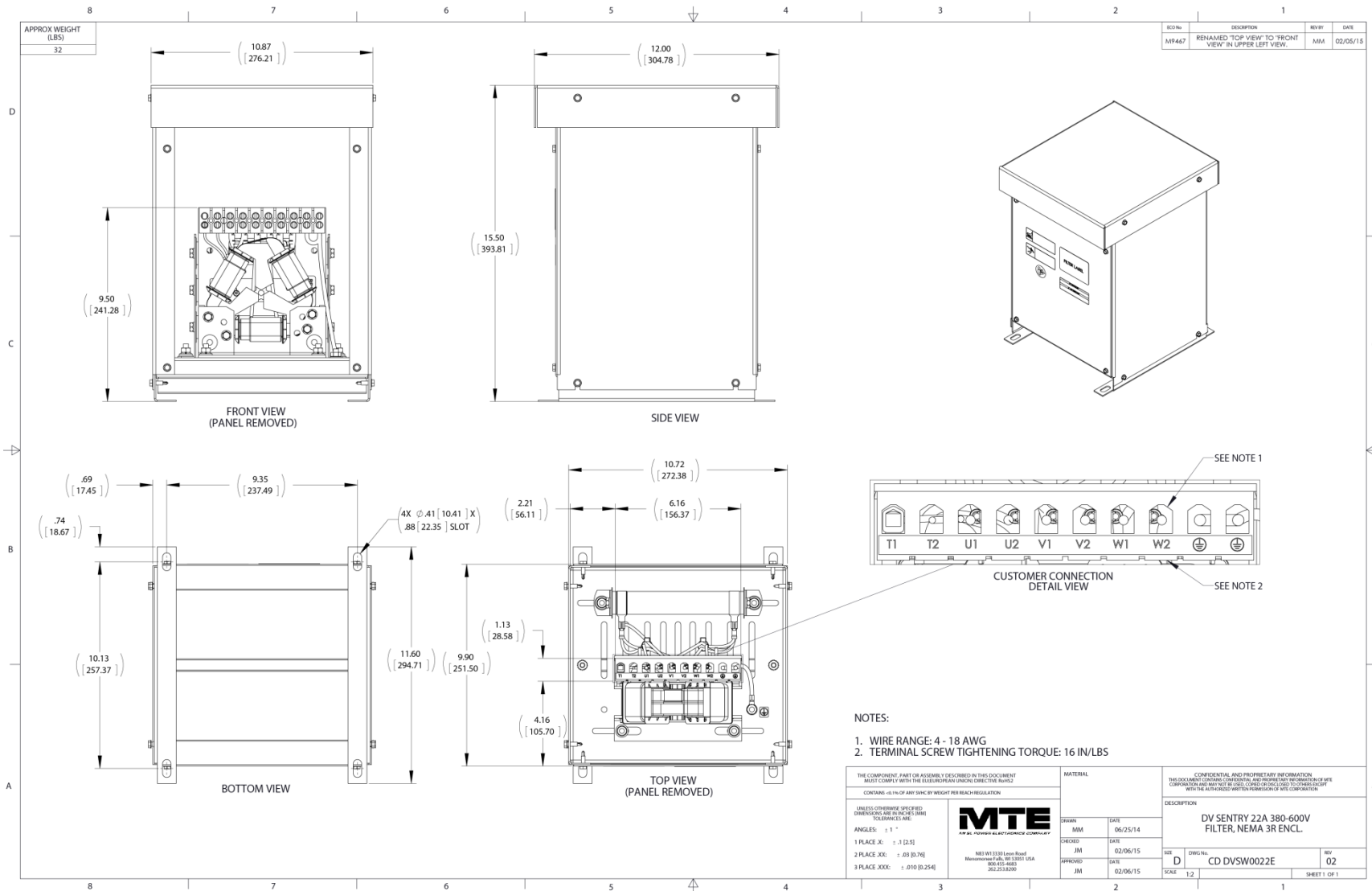


Figure A-53: DVS0022E

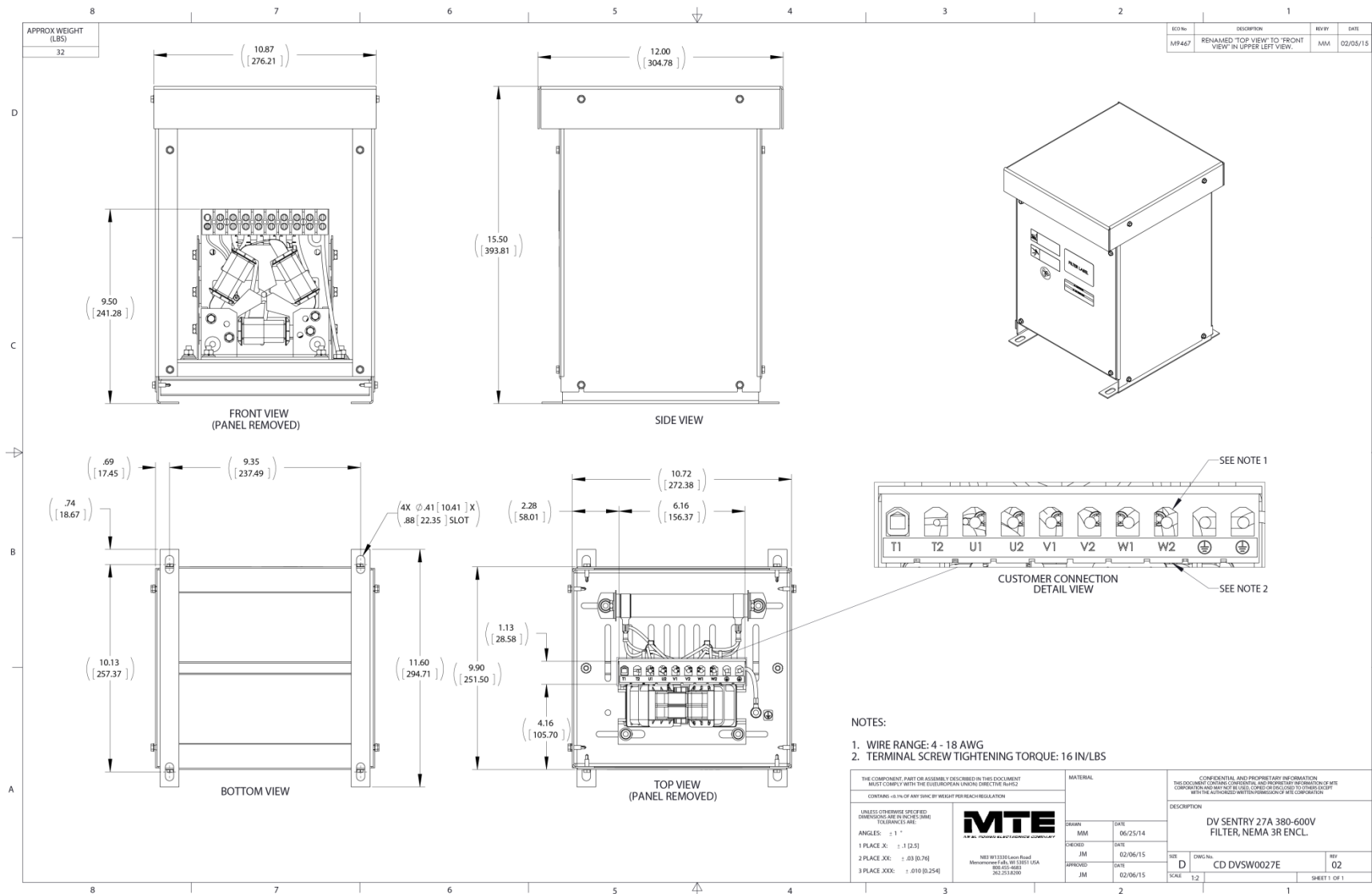


Figure A-54: DVSW0027E

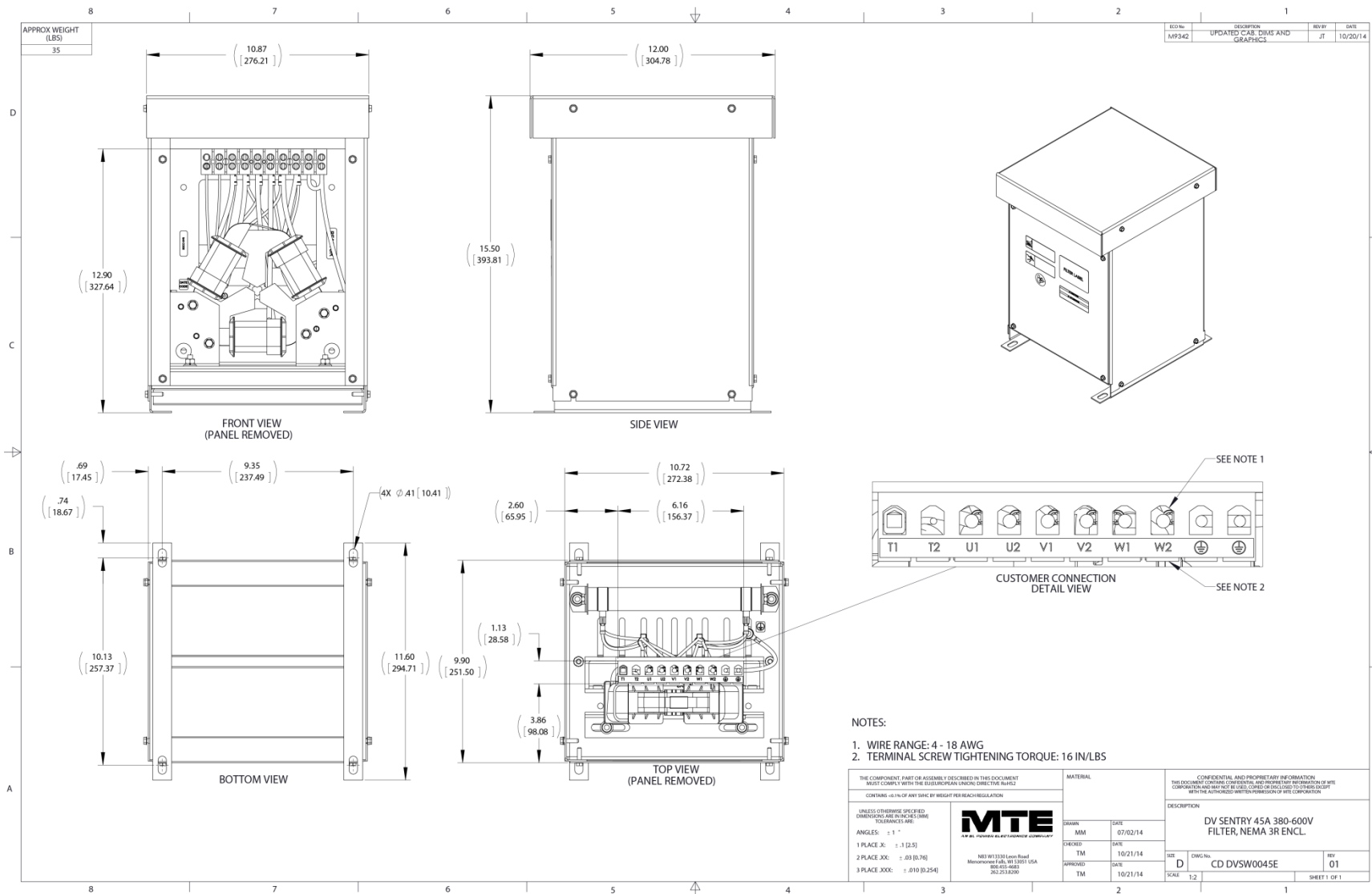


Figure A-56: DVSW0045E

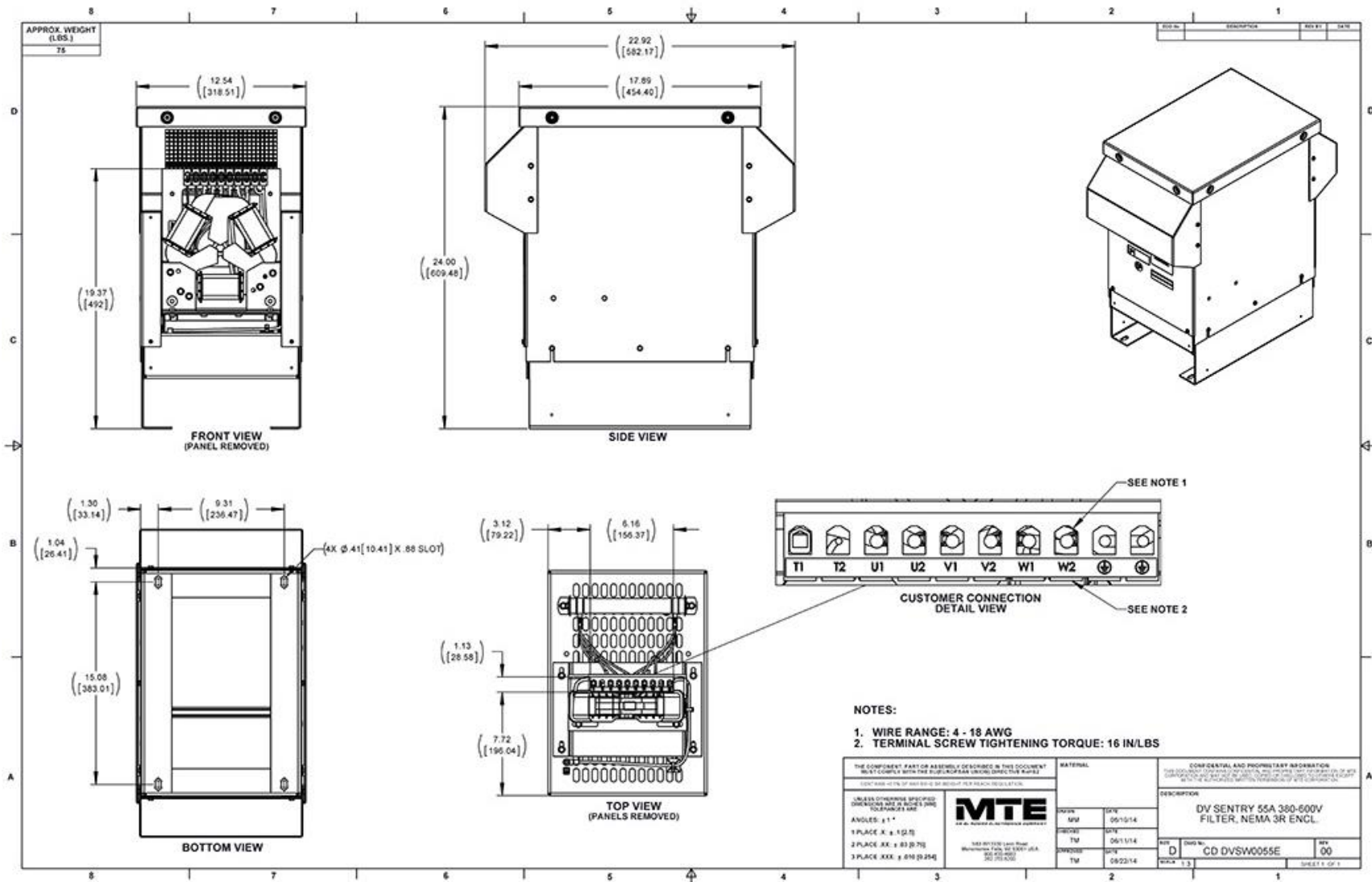


Figure A-57: DVSW0055E

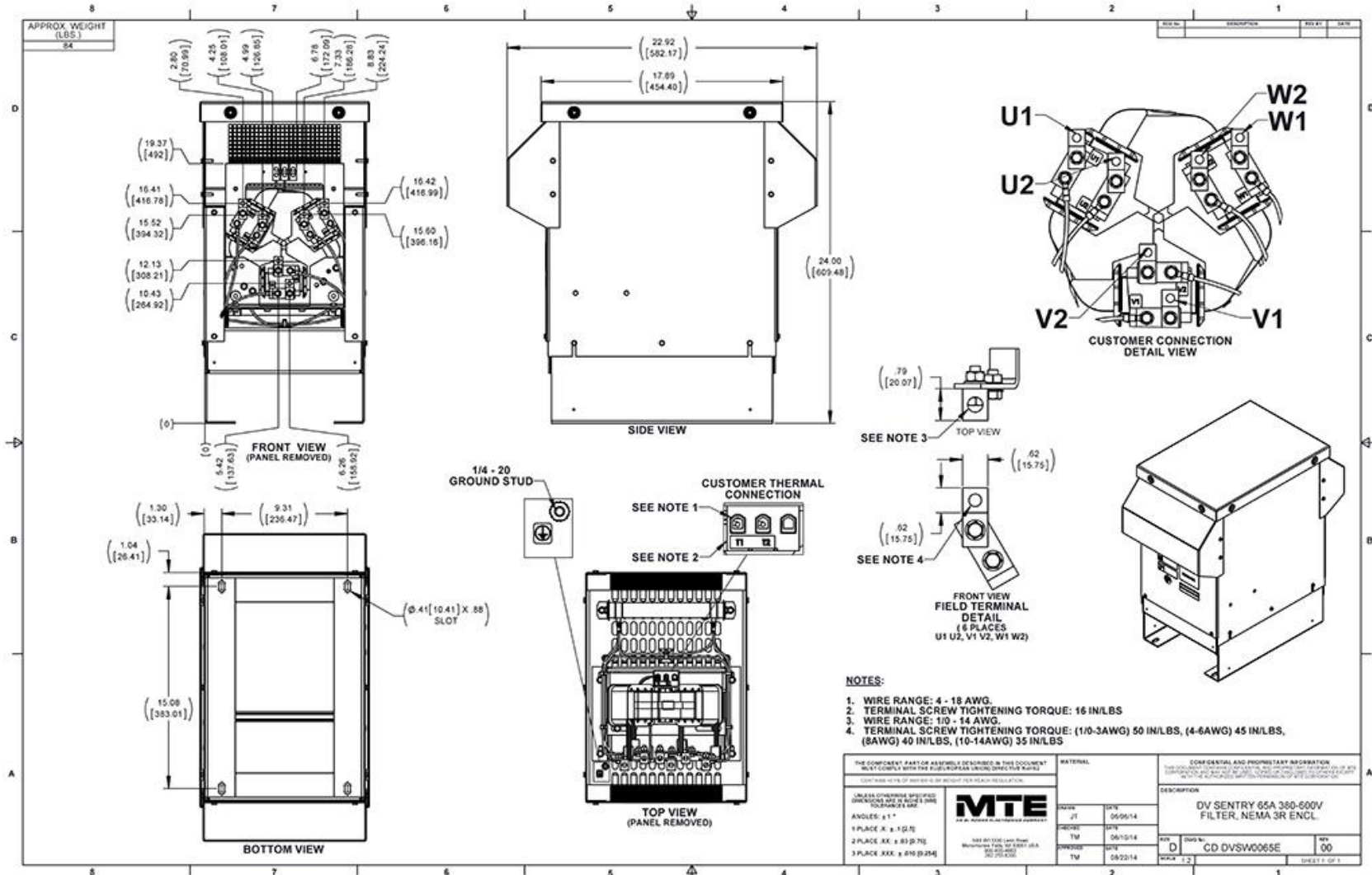


Figure A-58: DVSW0065E

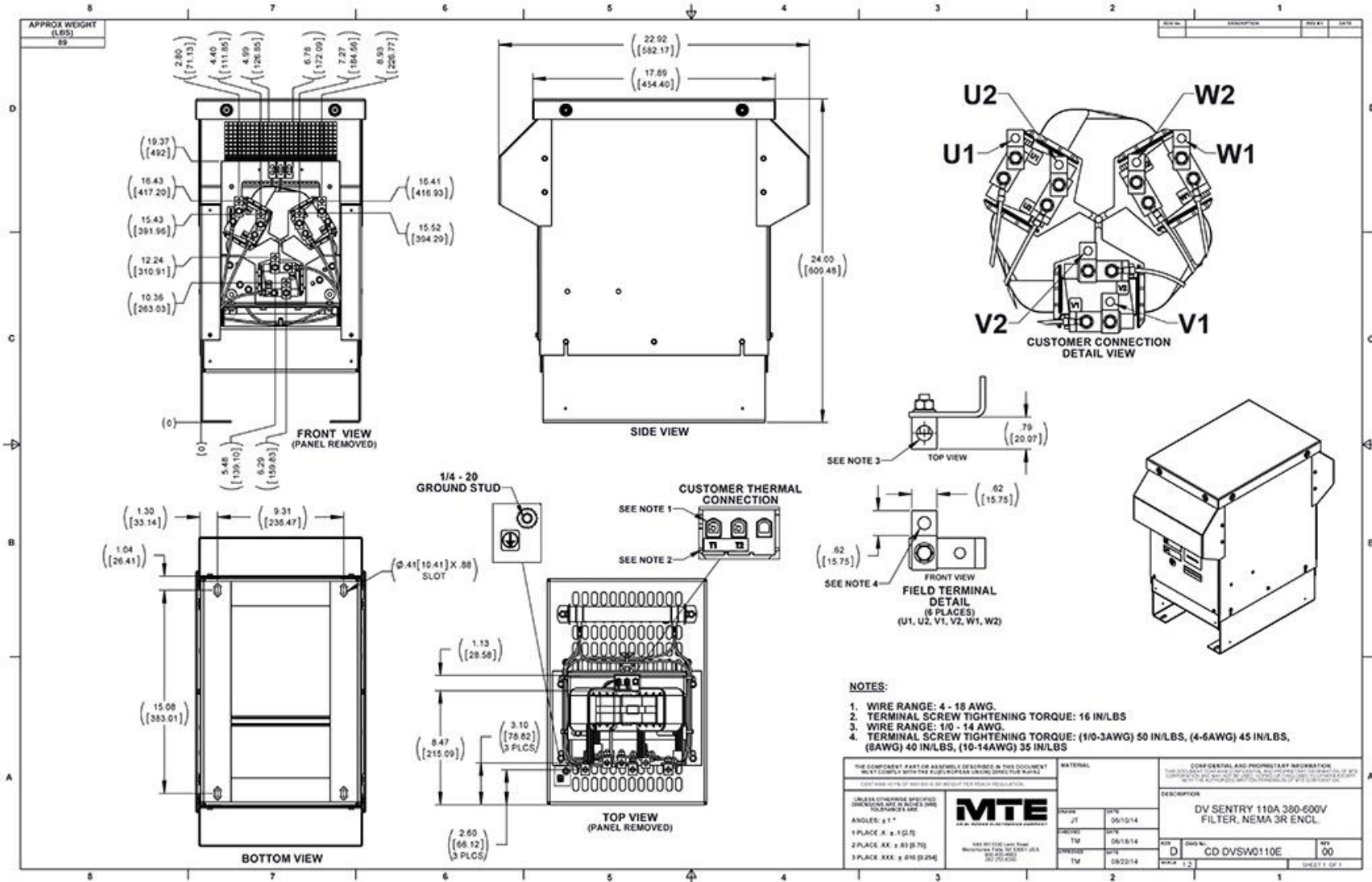


Figure A-60: DVSW0110E

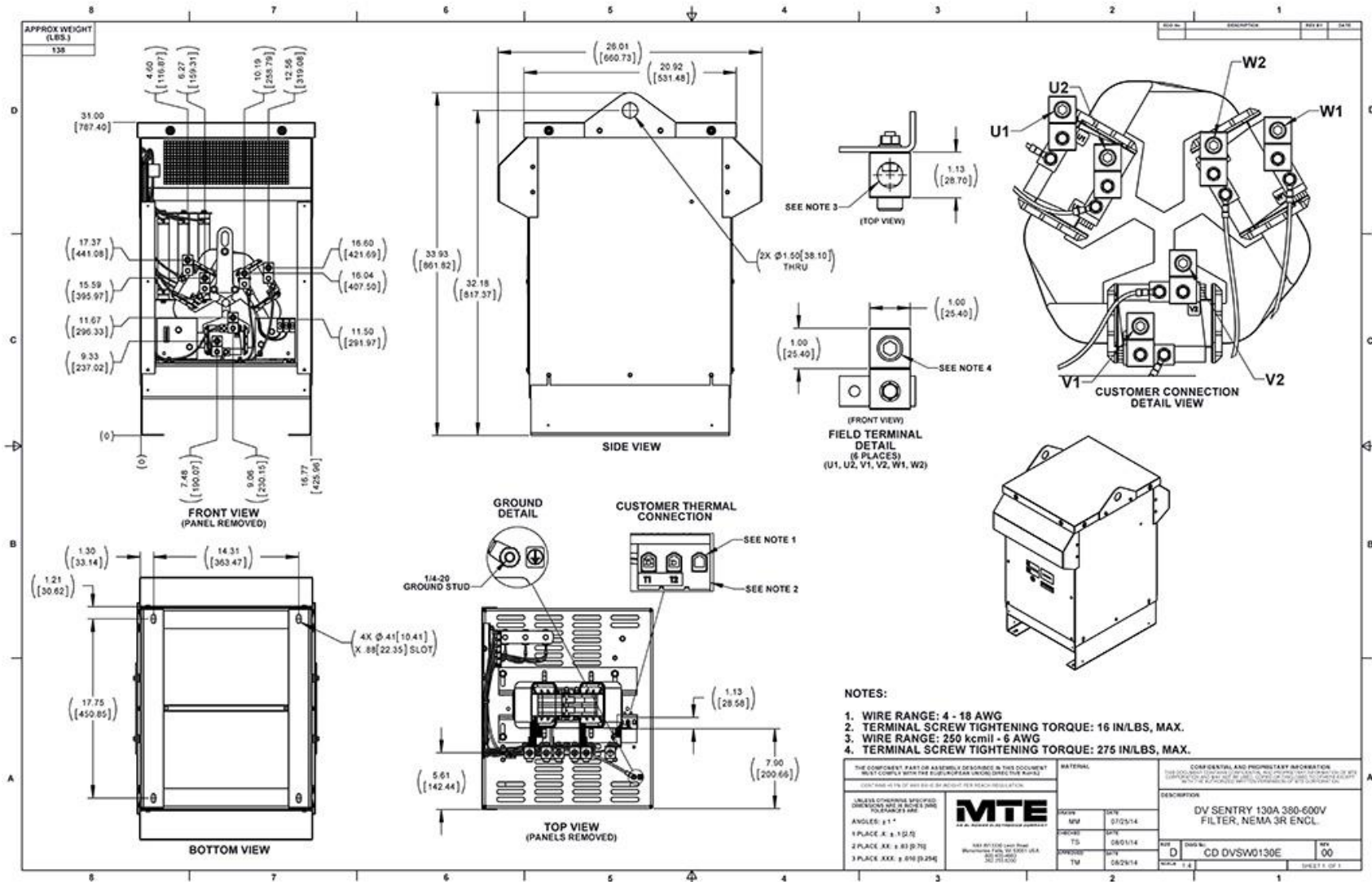


Figure A-61: DVSW0130E

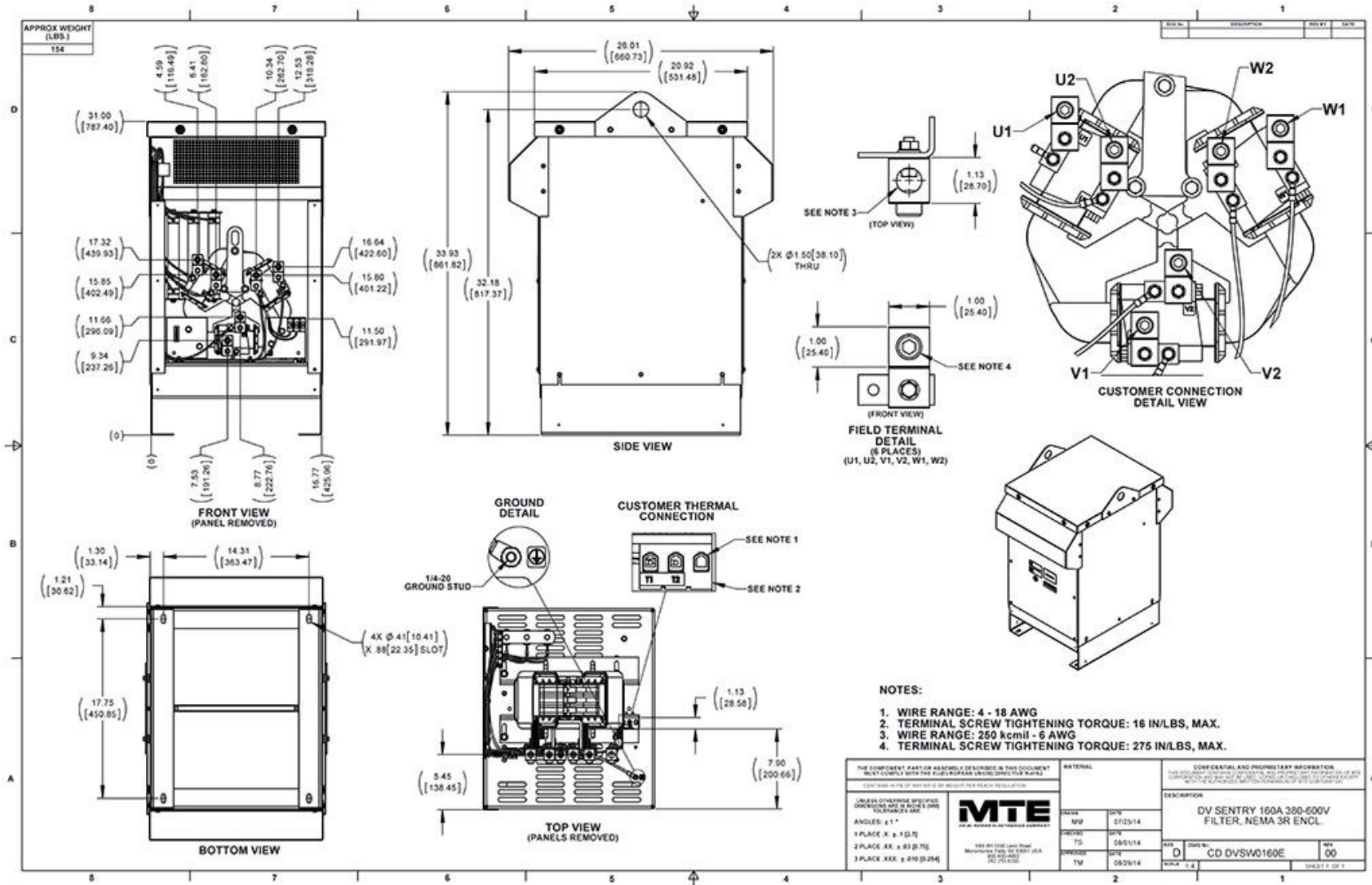


Figure A-62: DVSW0160E

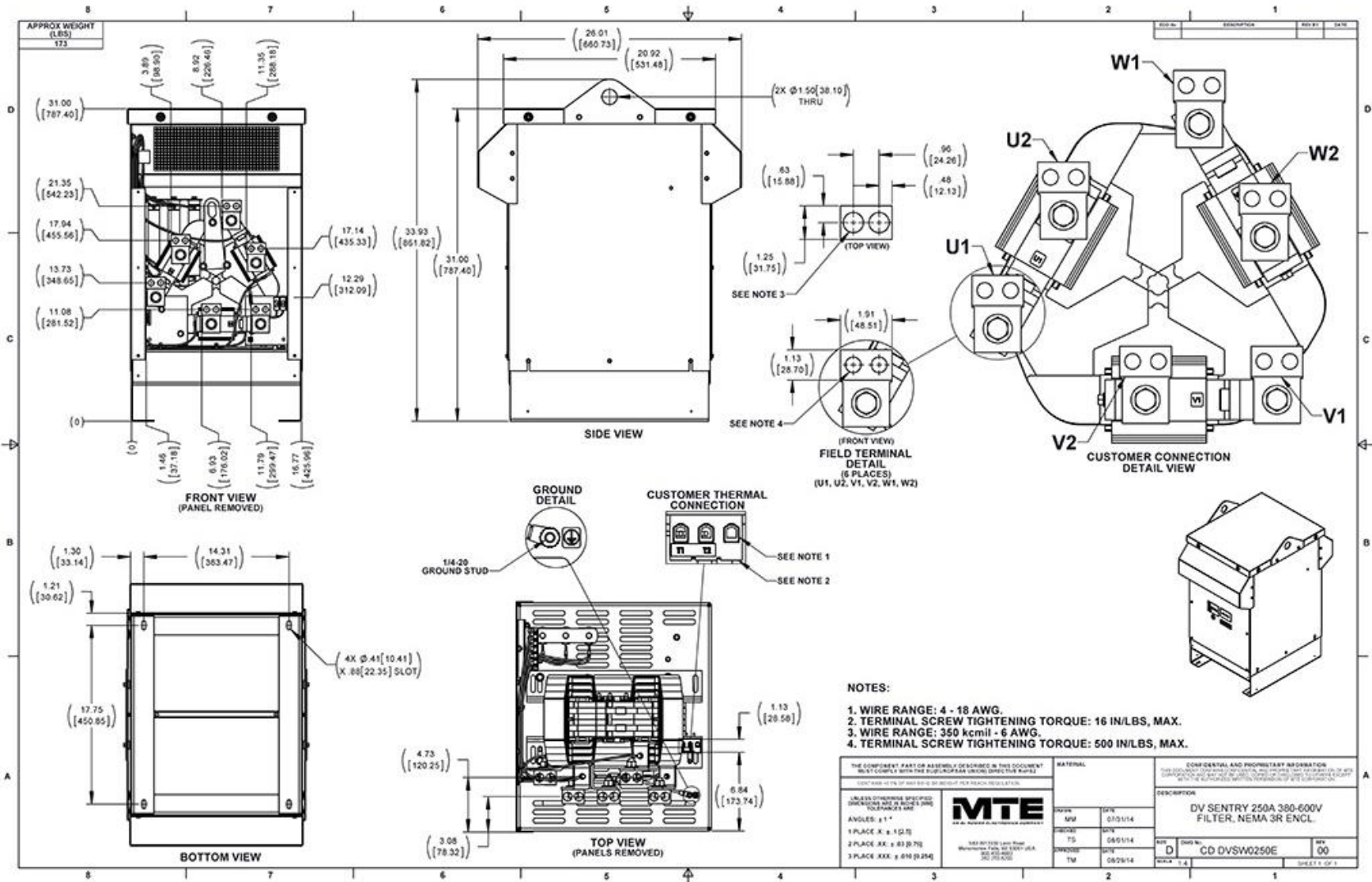


Figure A-64: DVSW0250E

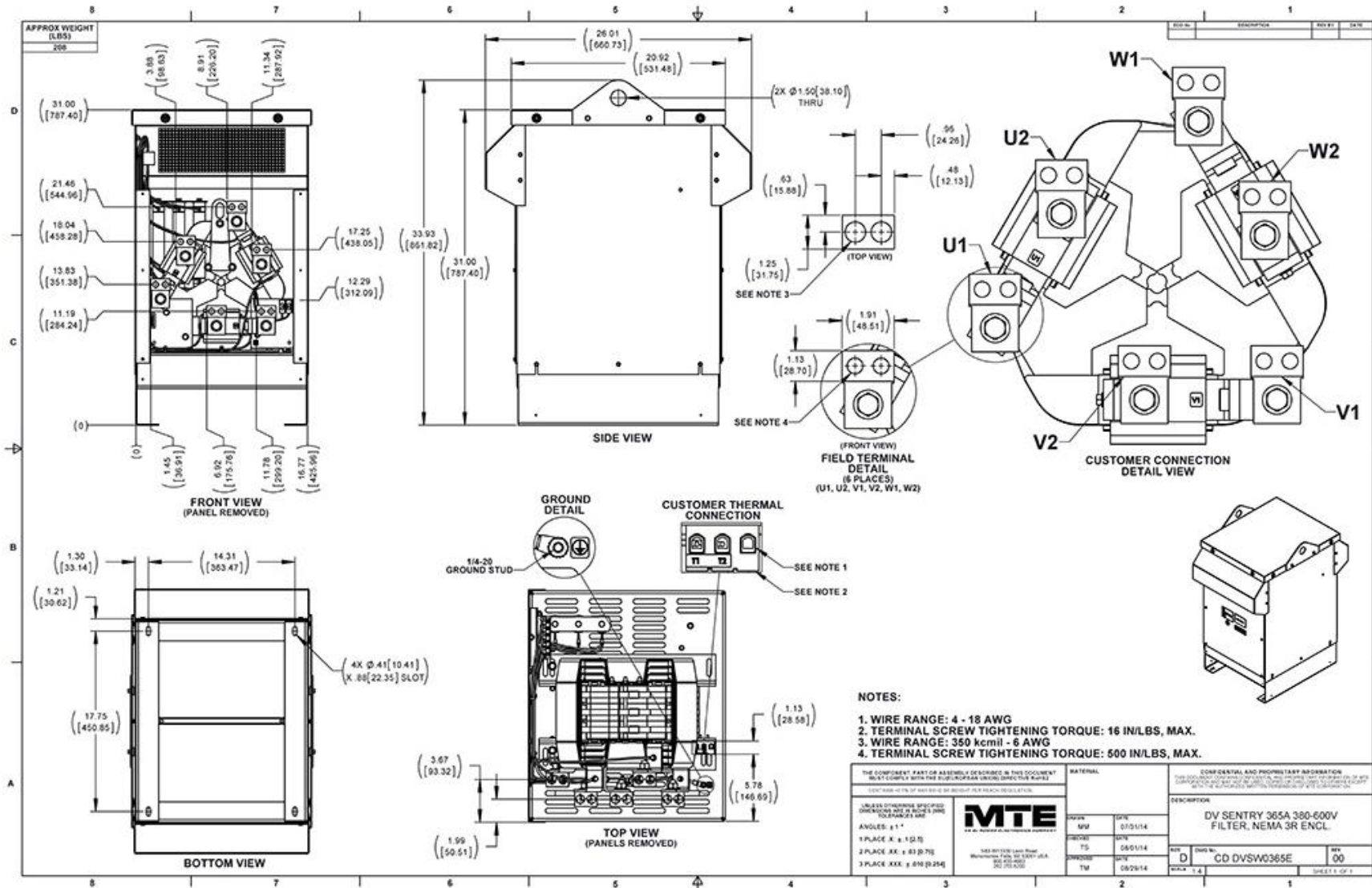


Figure A-66: DVSW0365E

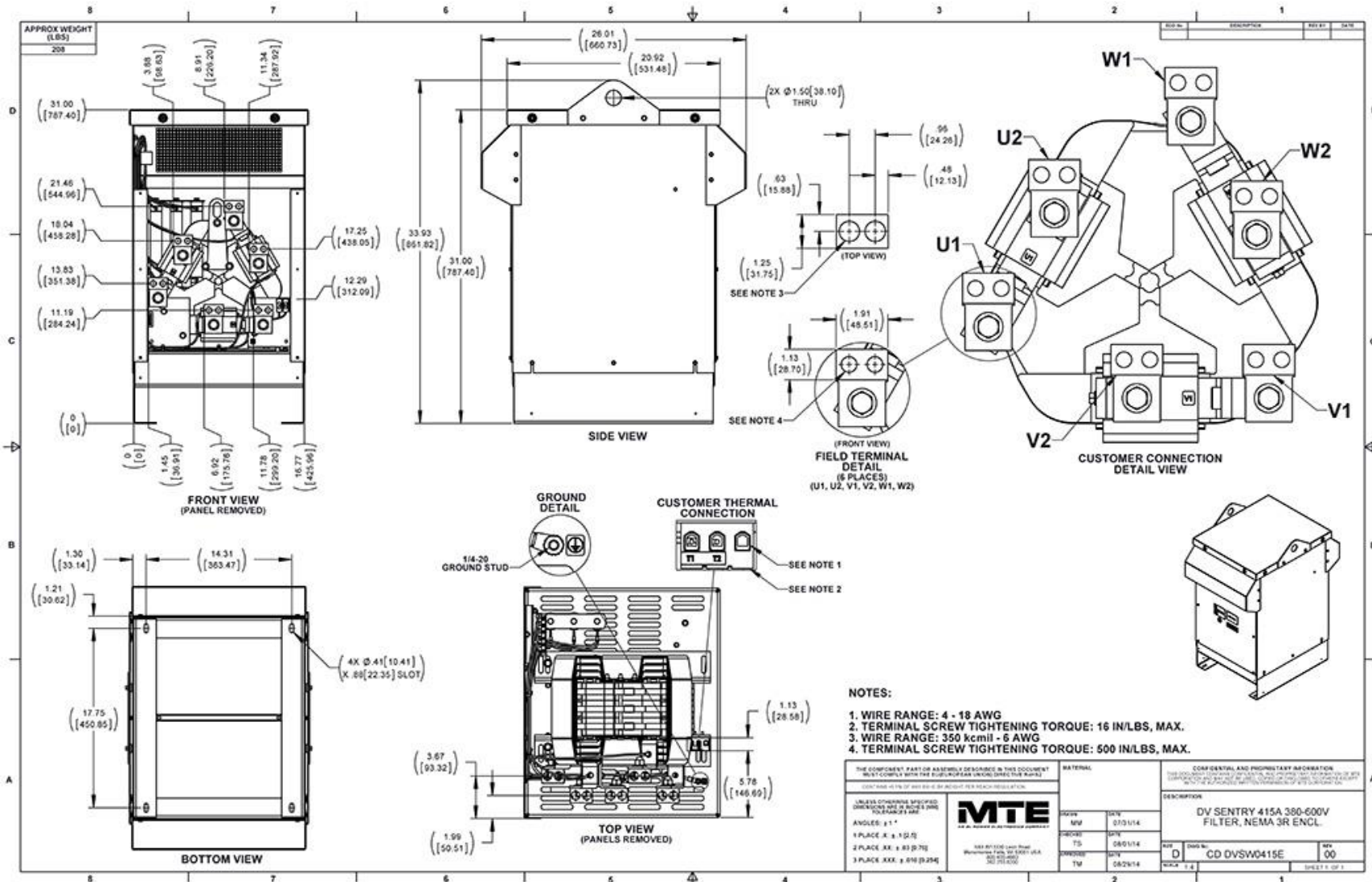


Figure A-67: DVSW0415E

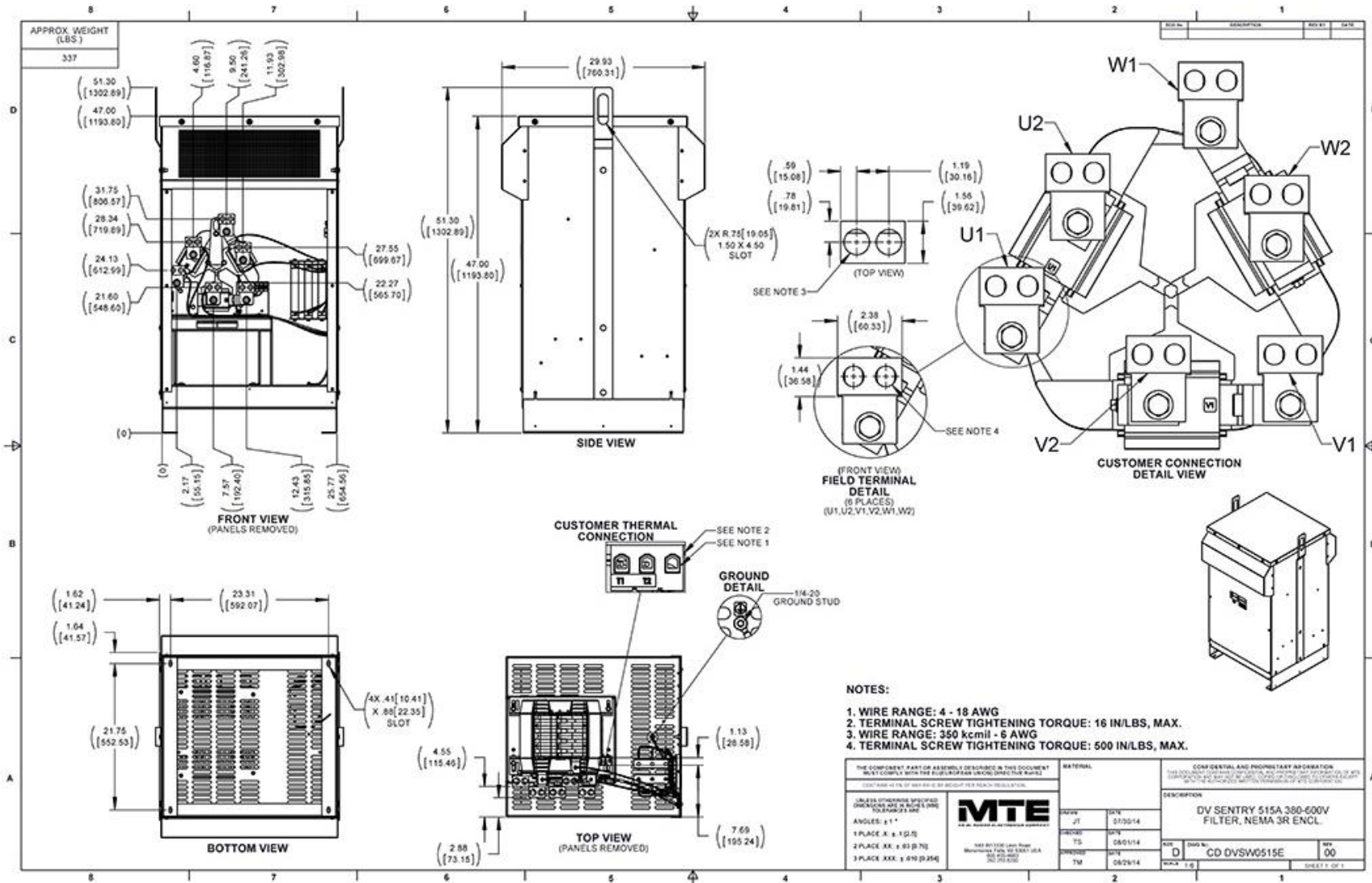


Figure A-68: DVSW0515E

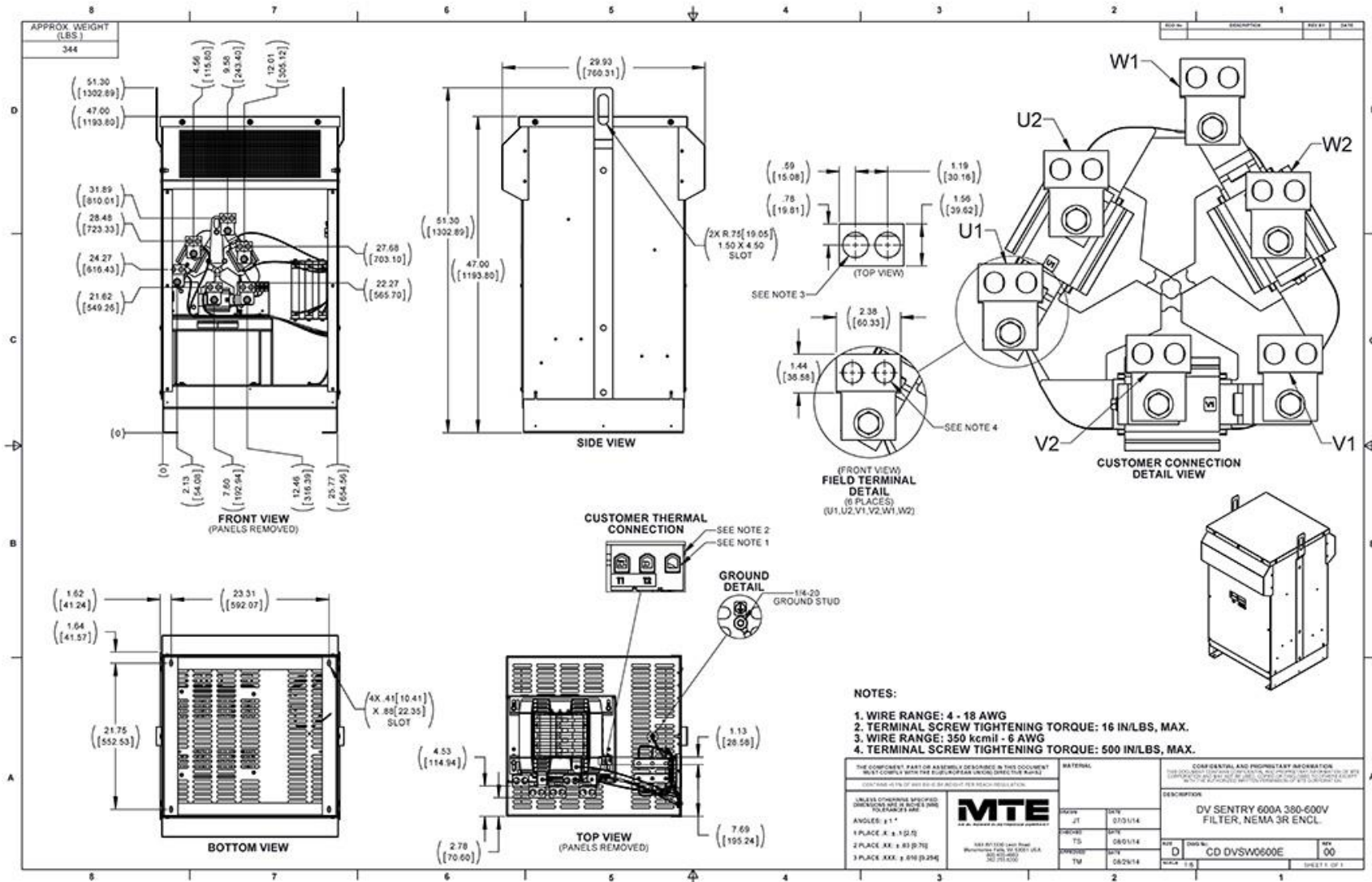


Figure A-69: DVSU0600E

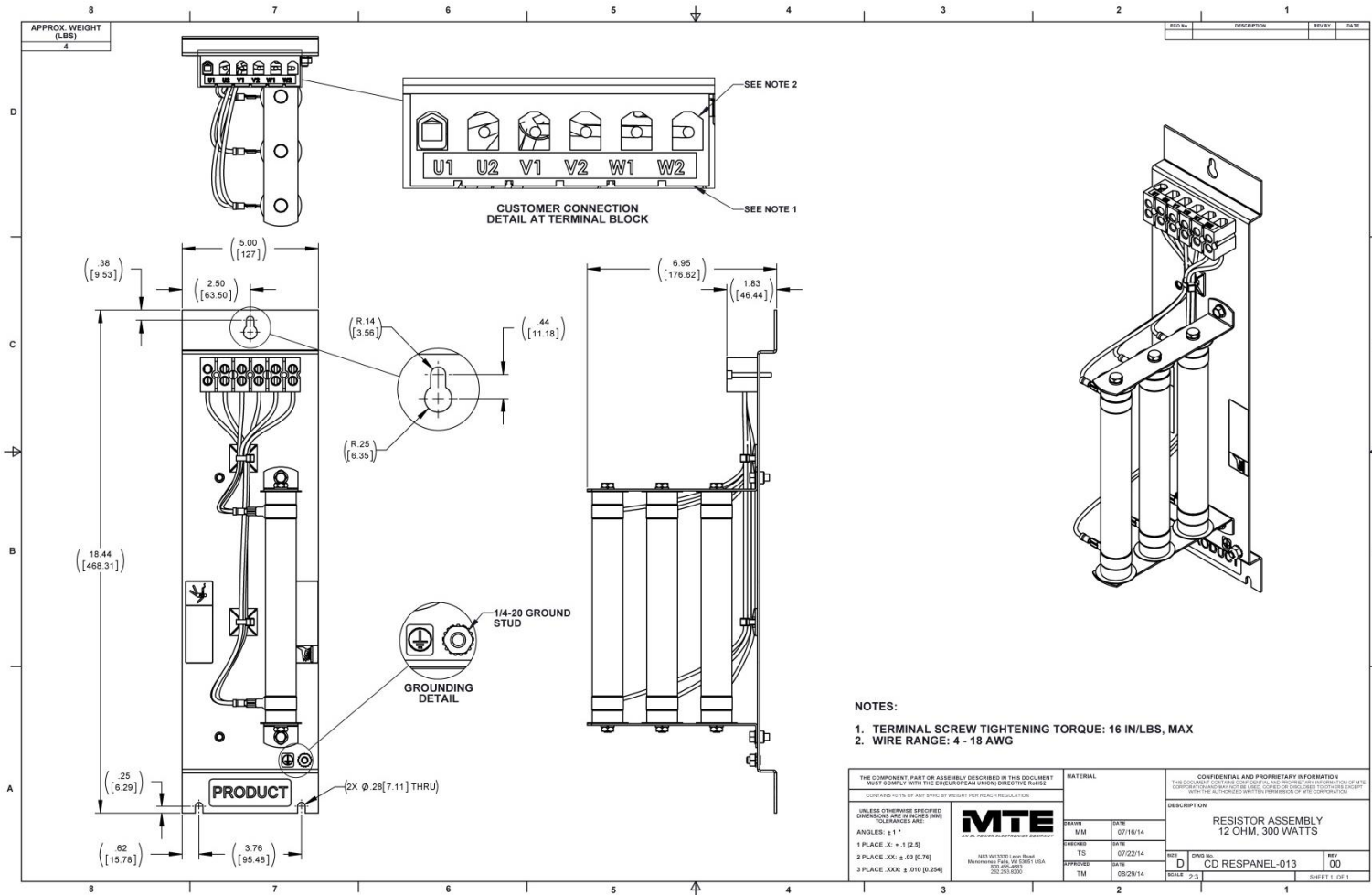


Figure A-71: RESPANEL-013

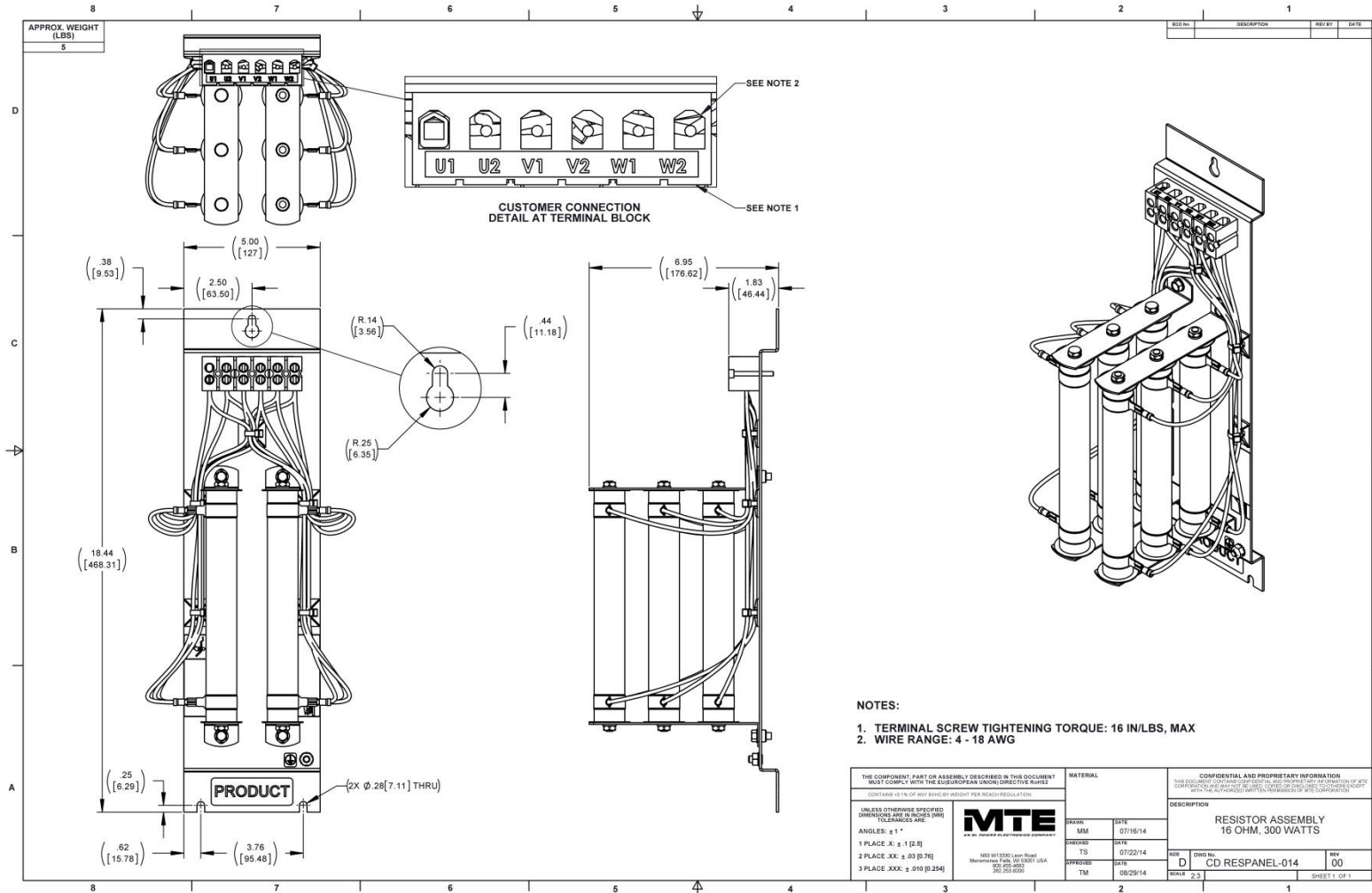


Figure A-72: RESPANEL-014