INSTRUCTIONS
INSTALLATION OF NEMA-3R KIT FOR D3, D4 & E2 FRAME VLT® DRIVES INTO WELDED ENCLOSURES

This instruction sheet is for the installation of NEMA -3R kits available for the VLT® series drives frames D3, D4 and E2. These kits are designed and tested to be used with IP00/Chassis drives in welded box construction enclosures with an environmental rating of NEMA-3R or NEMA-4. The NEMA-3R enclosure is an outdoor enclosure that provides a degree of protection against rain and ice. The NEMA-4 enclosure is an outdoor enclosure that provides a greater degree of protection against weather and hosed water.

This kit has been tested and complies with UL environmental rating Type-3R.

Notes:

1. The current rating of D3 and D4 frame drives are de-rated by 3% when installed in a NEMA-3R enclosure. E2 frame drives require no de-rating when installed in a NEMA-3R enclosure.
2. A doorfan(s) is required on the enclosure to remove the heat losses not contained in the backchannel of the drive. The minimum airflow required (at the maximum rated ambient temperature) for the D3 and D4 frame drives is 391 m^3/h (230 cfm). The minimum airflow required (at the maximum rated ambient temperature) for the E2 frame drive is 782 m^3/h (460 cfm). If additional heat losses are added within the enclosure a calculation must be made to ensure the proper airflow is provided to cool the inside of the enclosure.

Used with: VLT4000, VLT5000, VLT6000, VLT8000, VLT-HVAC, VLT-AQUA, VLT-Automation	
Frame D3 Kit Part No.	176F0296
Frame D4 Kit Part No.	176F0295
Frame E2 Kit Part No.	176F0298

Required Tools

- Metric Socket Set, 7-19mm
- Socket Extensions
- Torx Driver Set T10-T40
- Torque Wrench 6-50 in-lbs (.7-6 N-M)

Kit Contents

- Deflectors and vent covers
- Mounting hardware
- Gasket material

Torque Requirements

1. M5 screws/nuts torque to 20 in-lbs (2.3 N-M)
2. M6 screws/nuts torque to 35 in-lbs (3.9 N-M)
3. T25 Torx screws torque to 20 in-lbs (2.3 N-M)

Attachment

Drawing 175R1069

Kit Components

The kit consists of the following parts:

- Exterior air deflectors, plated and painted RAL 7035.
- Gasket material
- Top vent cover
- Bottom vent cover
- Sealing plates and gaskets (not shown on this page)

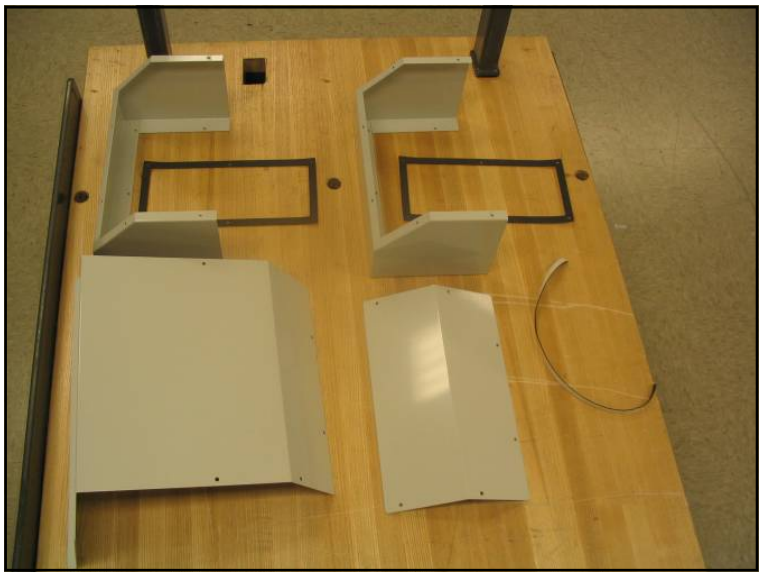


Figure 1. Air deflector components

Figure 2. Top vent cover

Figure 3. Bottom vent cover

Remove 7 torx screws on the top of drive. See Figure 4.

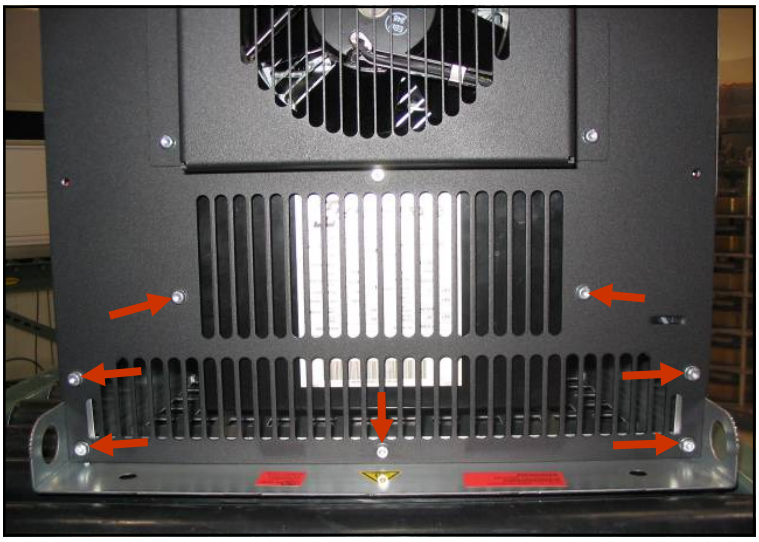


Figure 4. Screws to be removed from top of drive

Install the top duct cover plate as shown in Figure 5 using the new 16mm, M5 torx screws provided with the kit.

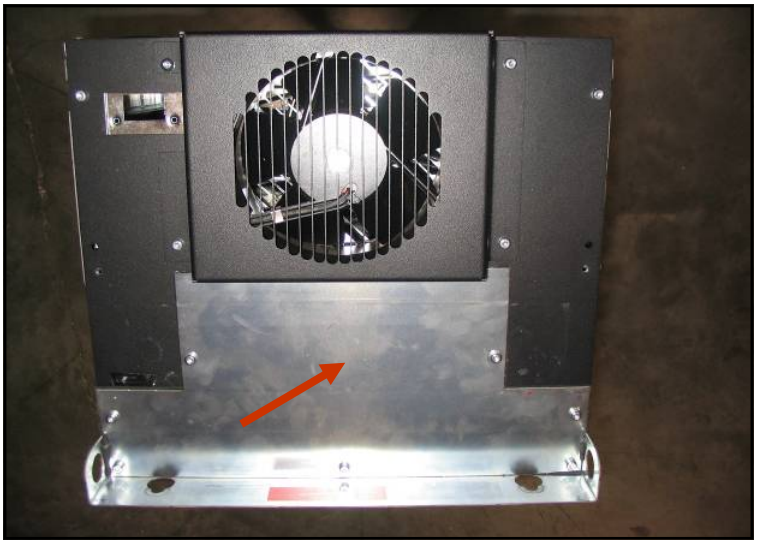


Figure 5. Top cover plate installed

At the bottom of the drive, install two mounting clips. See Figure 6

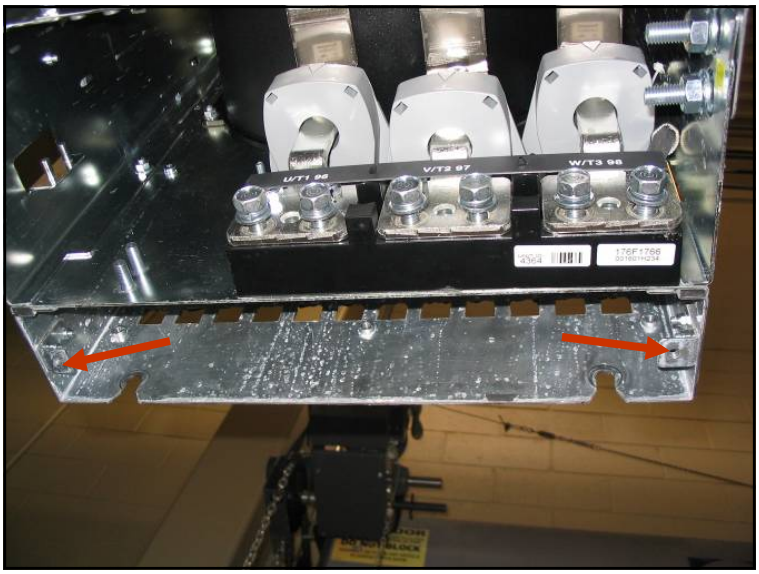


Figure 6. Mounting clips

Mount the drive in the enclosure using UL Type 3R mounting provisions if the UL Listing is to be maintained. The drive mounting hardware is not included in this kit.

Note that D1 and D2 frame drives should be mounted in a welded enclosure with a minimum back wall thickness of 12ga. (2.7mm). E1 frame drives should be mounted in a welded enclosure with a minimum back wall thickness of 10 ga. (3.4mm). Brace the back wall of the enclosure appropriately to support the drive.

Drawings 175R1069 will assist in determining the drive mounting locations, air intake and outlet opening locations, and mounting hole locations on the outside of the enclosure. There are separate pages in the drawing for D1, D2 and E1 frame drives.

After drive attachment points and hole locations are determined, cut all openings and install drive mounting hardware. See Figure 7.

Figure 7. Back interior wall of enclosure with cutouts and hardware

Install gasket material around the vent openings on the inside and outside of the enclosure. See Figure 8.

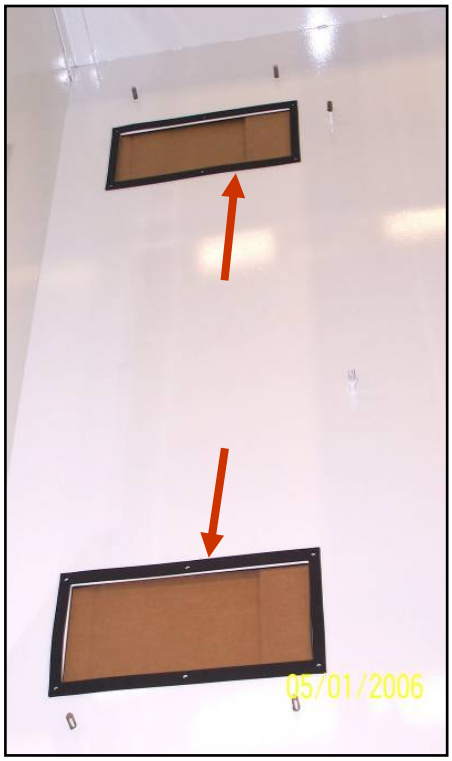


Figure 8. Vent openings with gaskets

Install the drive in the enclosure. This may be accomplished most easily with the cabinet laying on its back. See Figure 9.

Figure 9. Drive installed in enclosure

Two sealing plates and gaskets are provided in the kit. See Figure 10.

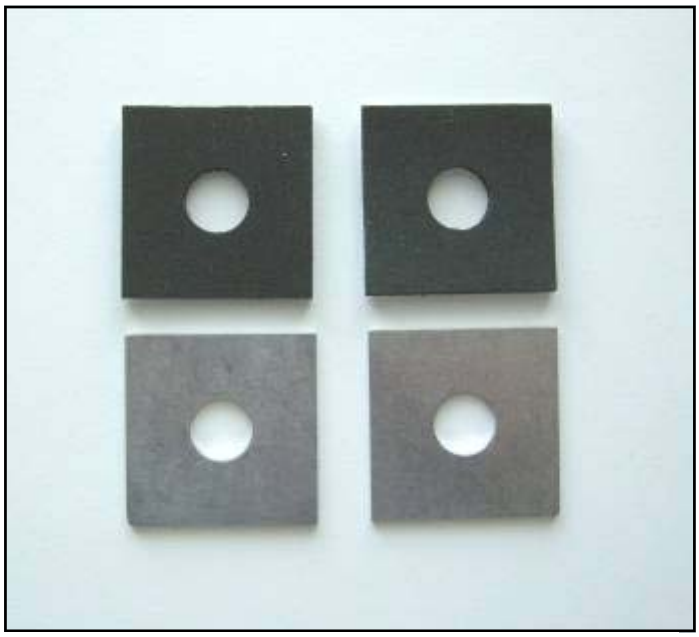


Figure 10. Sealing plates and gaskets

Apply gaskets to the sealing plates as shown in Figure 11.

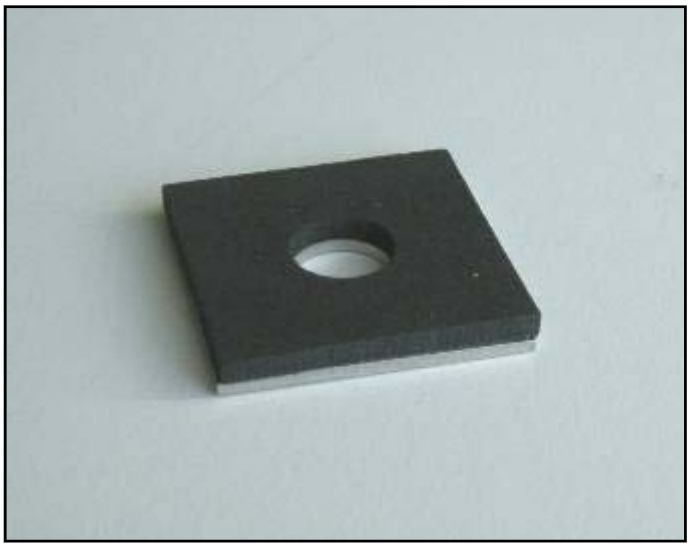


Figure 11. Gasket mounted on sealing plate

Install the sealing plates over the two bottom drive mounting studs and secure with hardware. See Figures 12 and 13.

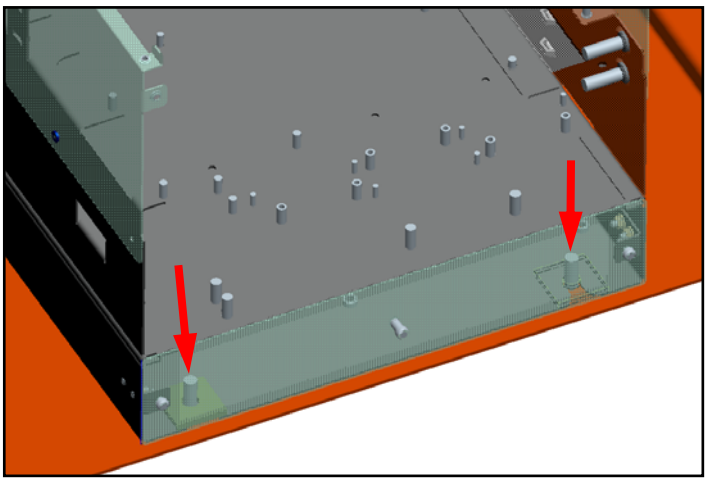


Figure 12. Bottom mounting locations

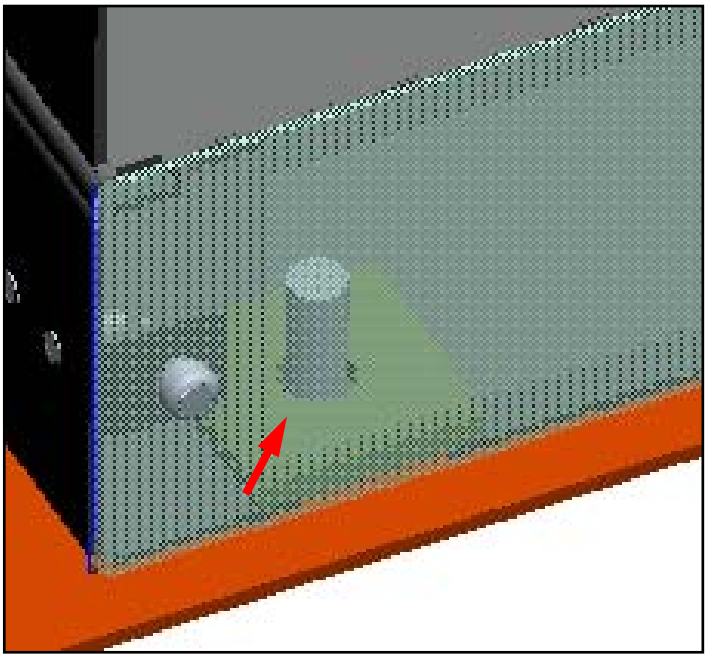


Figure 13. Sealing plate installed over mounting stud

Install the gasket material on the bottom air inlet cover and install using 2-M5 screws as shown in Figure 14.

A drain hose may be attached to the drain plug if there is concern that condensation may accumulate in the bottom of the duct. If not, plug the drain plug with a screw provided with the kit. It is recommended that Teflon tape be used with the screw to seal the drain plug.

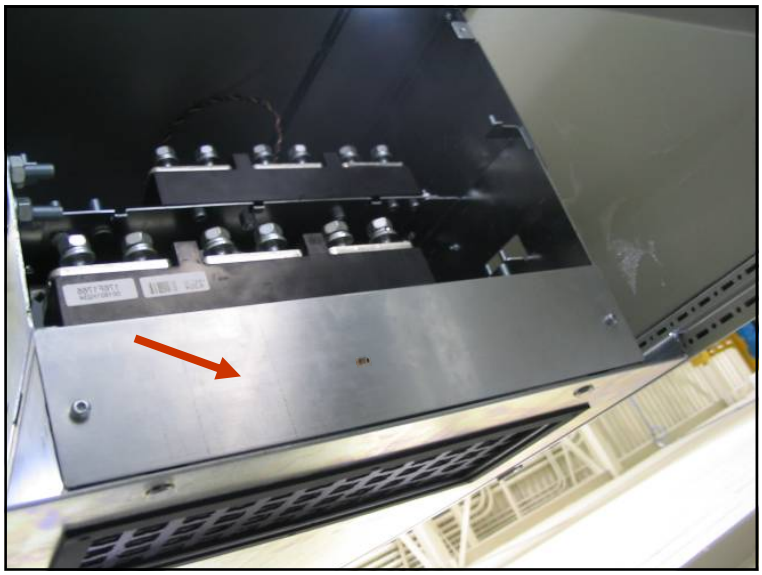


Figure 14. Bottom air inlet cover installed

The upper and lower air deflectors consist of a frame, a cover and gasket material. The frame is the same for both upper and lower openings. The cover is different for the upper and lower openings, the upper cover has a deflector to direct exhaust air to the sides. See Figure 15.

Figure 15. Deflector frames

Install gasket material on the outside of the rear enclosure panel. See Figure 16.

Figure 16. Gasket installed on the outside of the rear panel

Install the deflector frames as shown in Figure 17 using the M5 screws provided. These screws will attach through the gasket and enclosure wall.

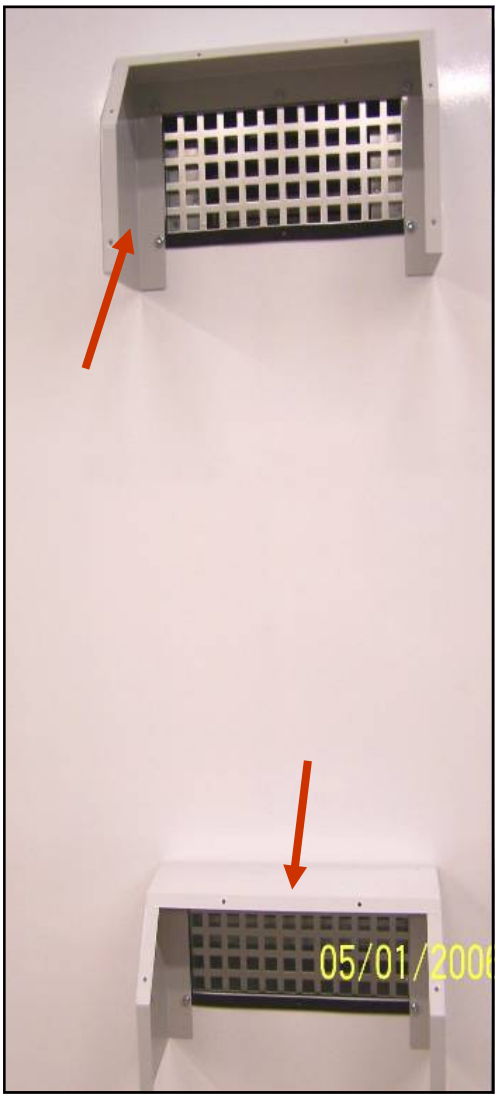


Figure 17. Deflector frames installed in both top and bottom openings

Apply gasket to upper deflector cover. The gasket is applied to the surface of the cover that is in contact with the enclosure rear panel. See Figure 18.

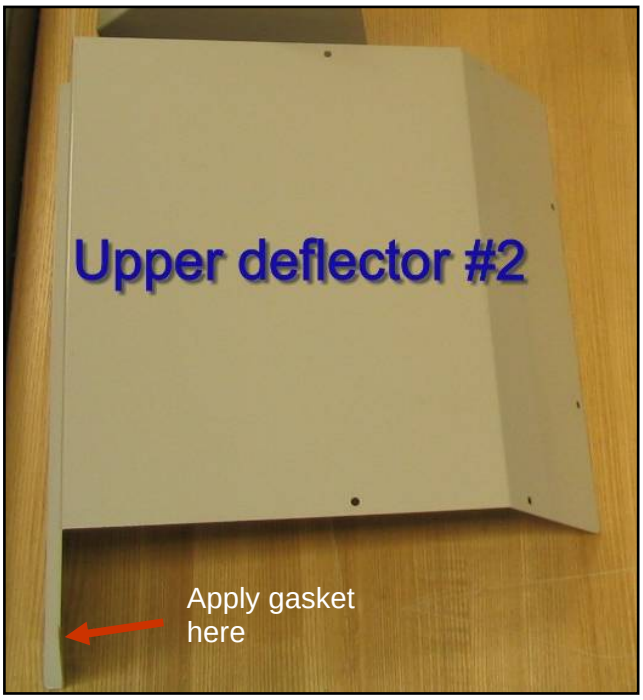


Figure 18. Upper deflector cover

Attach the cover using M5 torx screws. See Figure 19. This completes the upper deflector installation.

Figure 19. Upper deflector assembly installed

The lower deflector cover is shown in Figure 20.

Figure 20. Lower deflector cover

Install the lower deflector cover as shown in Figure 21. This completes the lower deflector installation.

Figure 21. Lower deflector assembly installed

Adequate clearance is required when using NEMA-3R kits due to the redirected flow of exhaust air. If adequate clearance is not provided the recirculation of exhaust air will negatively influence the performance of the drives.

As a result, direct side-by-side installation of NEMA-3R drive enclosures (as shown in Figure 23) must be avoided.

Two walls or obstruction surfaces are allowed close to the drive as shown in Figure 22. One surface on the back and one on either side is permitted.

The minimum distance to these surfaces is 500mm (20 inches) to prevent recirculation of the exhaust air from the drive.

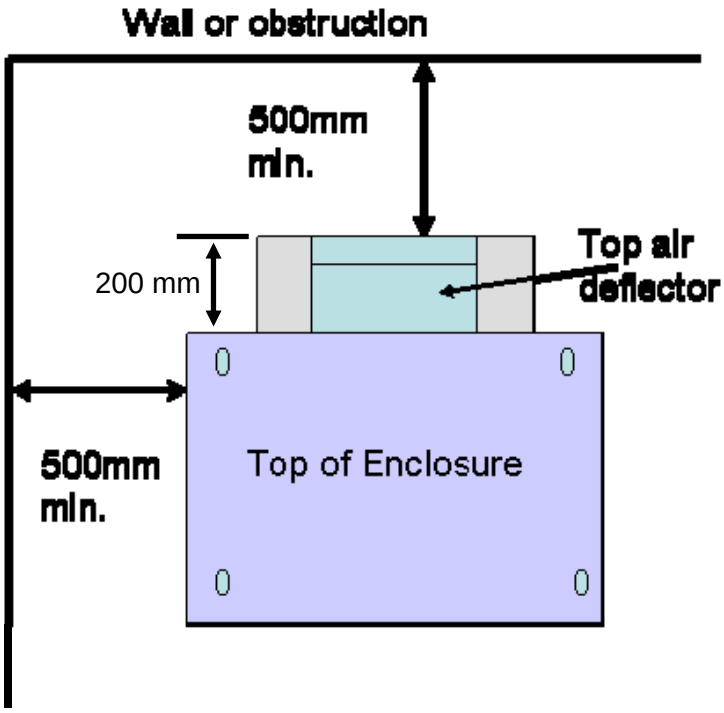


Figure 22. Single drive installation

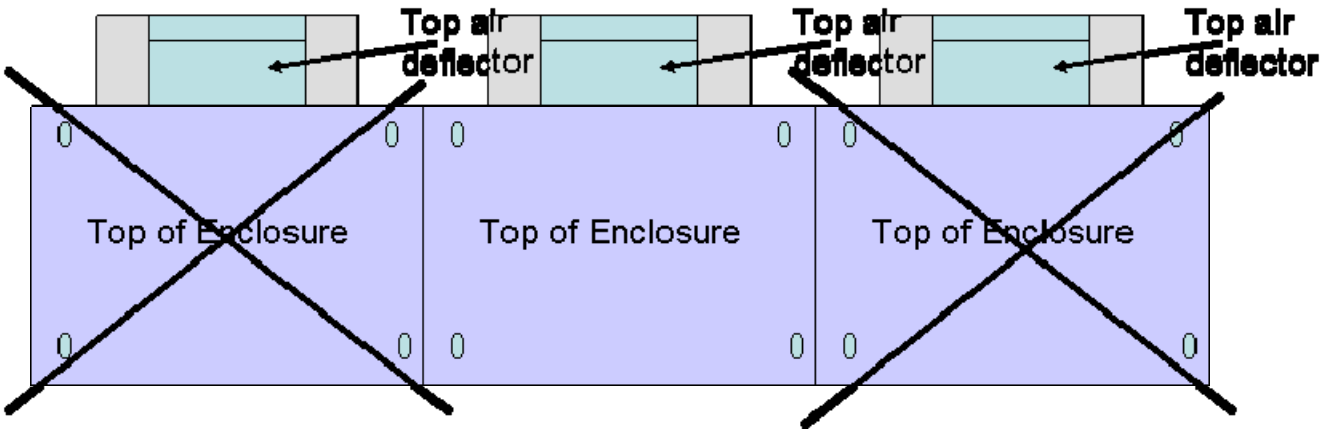
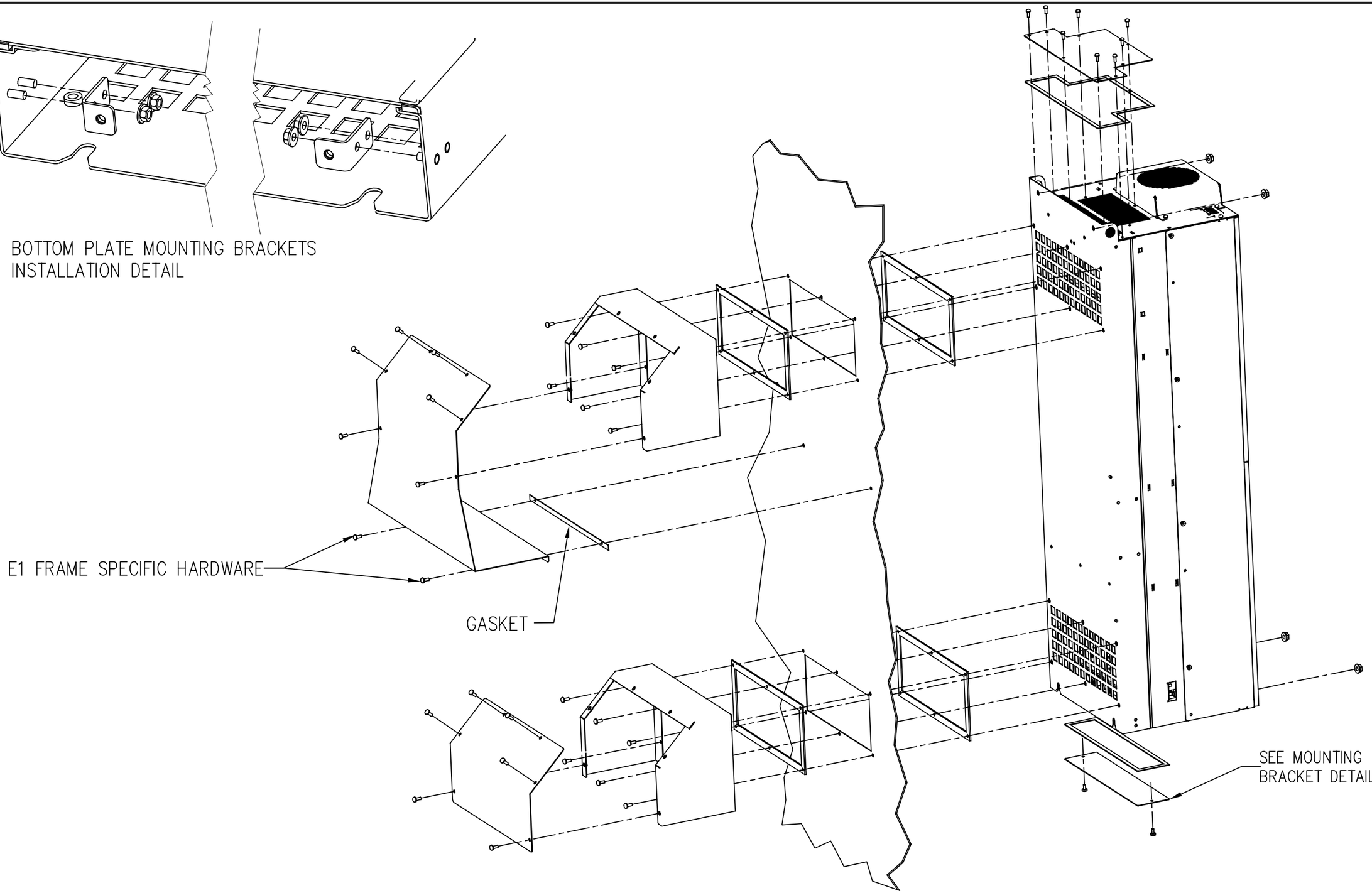


Figure 23. Improper multiple drive installation

BOTTOM PLATE MOUNTING BRACKETS
INSTALLATION DETAIL



G			C			DRN	
F			B				
E			A			APR	
D			DR		5/06		
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TOLERANCE
Unless Otherwise Specified
2 PLC. ±.02
3 PLC. ±.005
SCALE 1:35

NAME INSTALLATION DRAWING, UL TYPE/NEMA 3R KIT, FRAMES D1, D2, & E1

MODEL P407, P408

PAGE 1 OF 1

SIZE B

DWG. NO. 175R1069

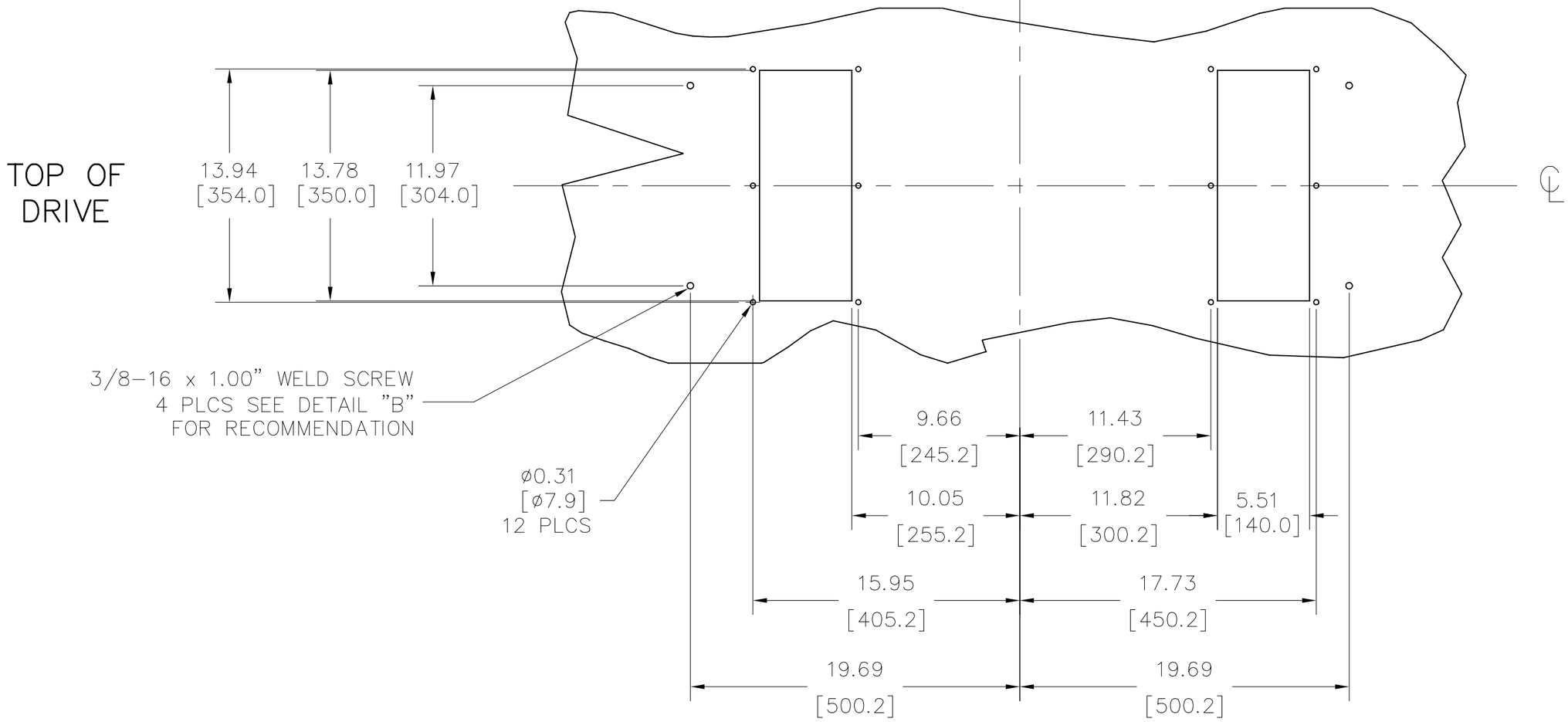
Danfoss Graham
Division of Danfoss Inc.
BOX 245041
8800 W. Bradley Road
Milwaukee, WI 53224 USA

NOTES:

1) MOUNTING PANEL TO BE MINIMUM 12 GA [2.7mm] THICK.
2) ALL DIMENSIONS IN INCHES [mm]
3) ALL DIMENSIONS TYPICAL

(4) 3/8–16 x 1.00" OHIO WELD SCREW TO BE INSERTED THROUGH BACK OF ENCLOSURE AND SEAM WELDED AROUND CIRCUMFERENCE OF HEAD, OR EQUIVALENT UL TYPE 3R RATED MOUNTING PROVISIONS

STUD INSTALLATION DETAIL B



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F			B		
E			A		
D			DR		5/06

DRN

APR

TOLERANCE
Unless Otherwise Specified
2 PLC. ±.02
3 PLC. ±.005

SCALE 1:7

NAME FRAME D1 DRILLING AND CUTOUT DIMENSION DRAWING

MODEL P407

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SIZE B

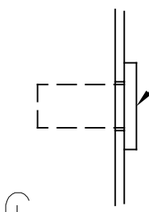
DWG. NO. 175R1069–D1

Danfoss Graham
Division of Danfoss Inc.
BOX 245041
8800 W. Bradley Road
Milwaukee, WI 53224 USA

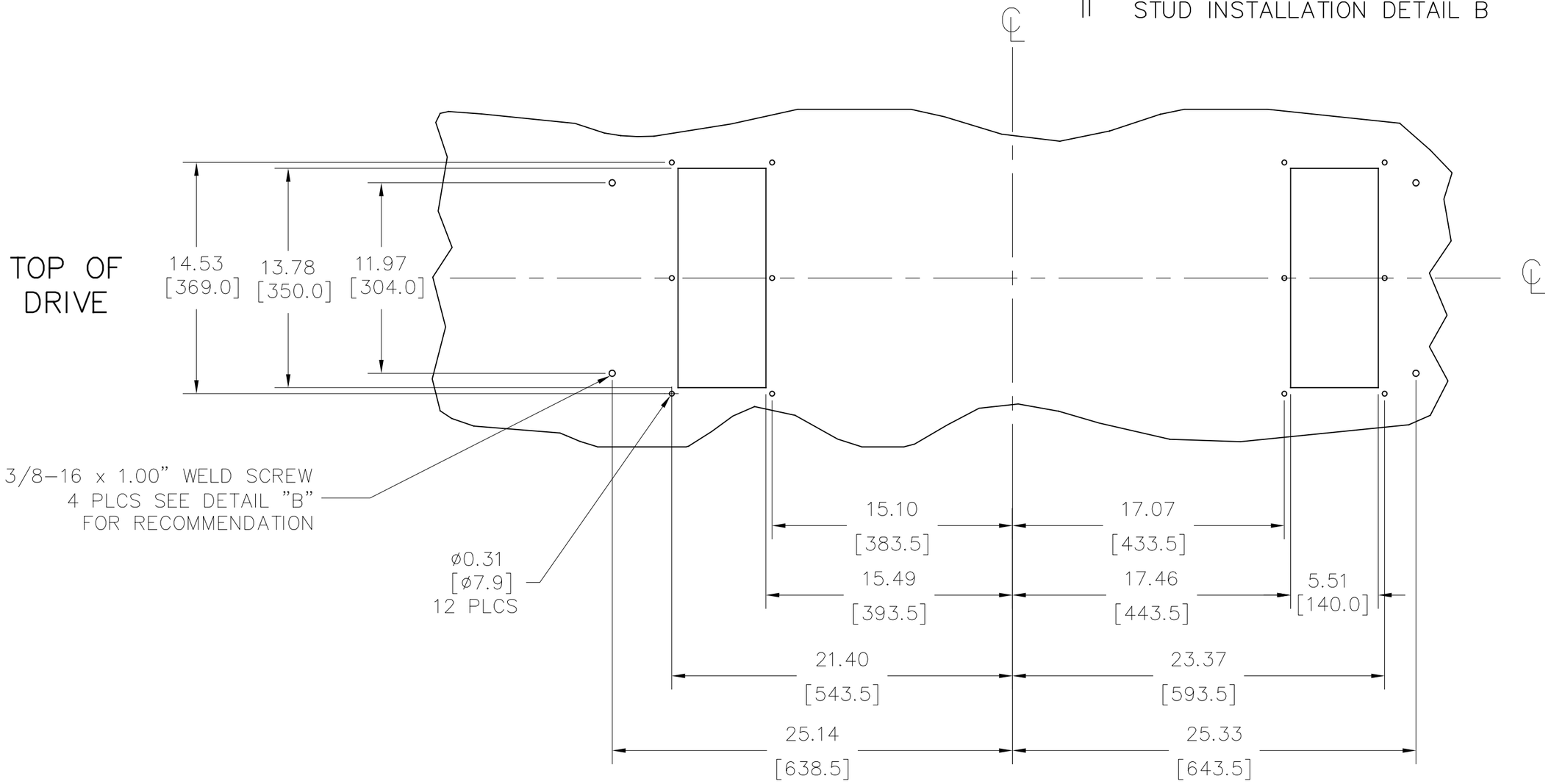
NOTES:

1) MOUNTING PANEL TO BE MINIMUM 12 GA [2.7mm] THICK.
2) ALL DIMENSIONS IN INCHES [mm]
3) ALL DIMENSIONS TYPICAL

(4) 3/8–16 x 1.00" OHIO WELD SCREW TO BE INSERTED THROUGH BACK OF ENCLOSURE AND SEAM WELDED AROUND CIRCUMFERENCE OF HEAD, OR EQUIVALENT UL TYPE 3R RATED MOUNTING PROVISIONS



STUD INSTALLATION DETAIL B



G			C			DRN	TOLERANCE Unless Otherwise Specified 2 PLC. ±.02 3 PLC. ±.005
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E			A				
D			DR		5/06	APR	
REV	ECN	DATE	REV	ECN	DATE		SCALE 1:7

NAME: FRAME D2 DRILLING AND CUTOUT DIMENSION DRAWING

MODEL: P407

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SIZE: B

DWG. NO.: 175R1069–D2

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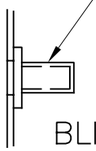
8800 W. Bradley Road
Milwaukee, WI 53224 USA

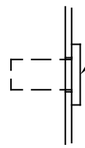
(2) 10–32 x 0.66" OHIO BLIND WELD NUTS TO BE WELDED ON INSIDE OF ENCLOSURE AND SEAM WELDED AROUND CIRCUMFERENCE OF HEAD, OR EQUIVALENT UL TYPE 3R RATED MOUNTING PROVISIONS.



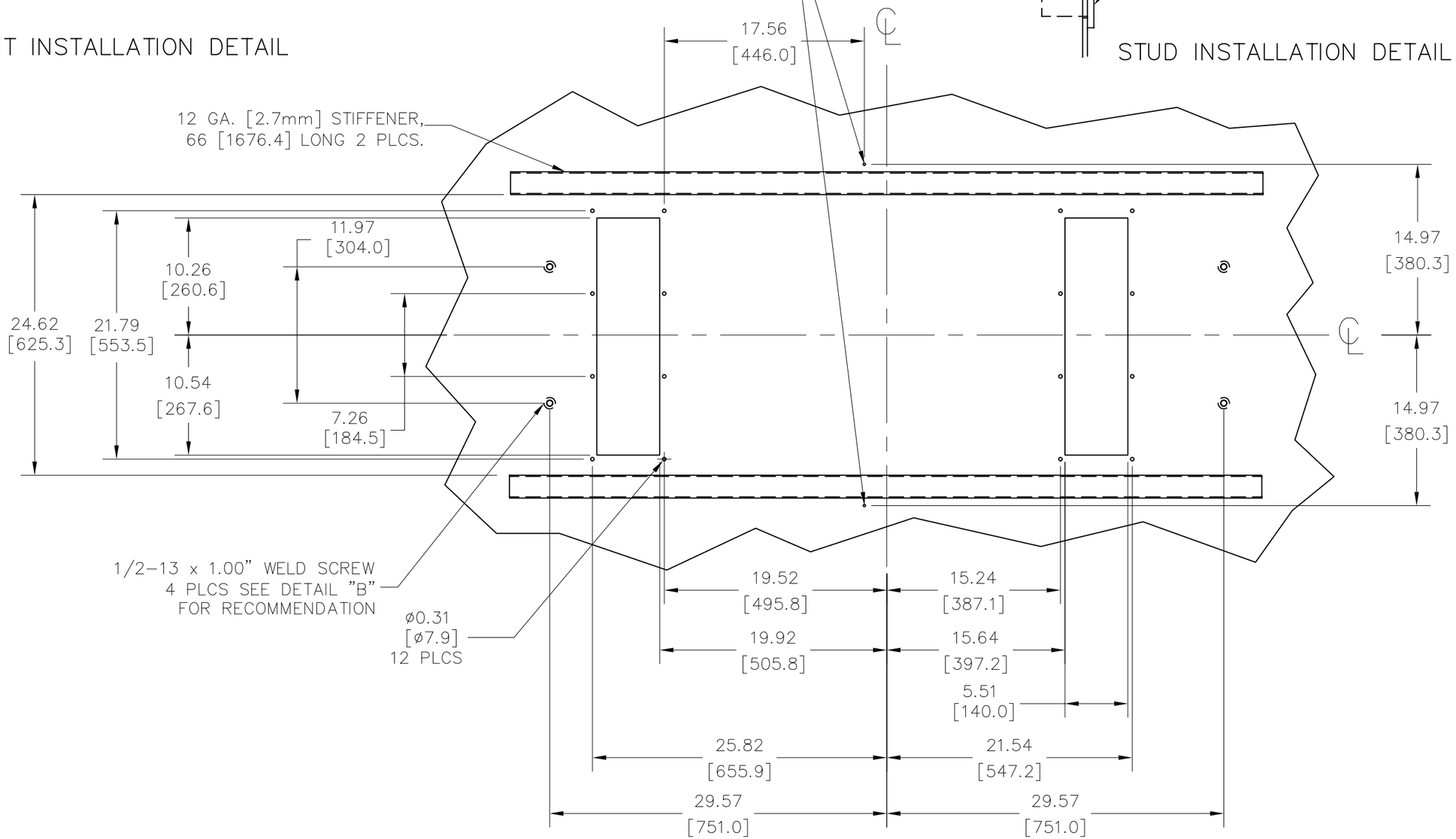
BLIND NUT INSTALLATION DETAIL

(2) BLIND WELD NUTS SEE DETAIL FOR RECOMMENDATION

(4) 1/2–13 x 1.00" OHIO WELD SCREW TO BE INSERTED THROUGH BACK OF ENCLOSURE AND SEAM WELDED AROUND CIRCUMFERENCE OF HEAD, OR EQUIVALENT UL TYPE 3R RATED MOUNTING PROVISIONS



STUD INSTALLATION DETAIL B



NOTES:

1) MOUNTING PANEL TO BE MINIMUM 10 GA [3.4mm] THICK.
2) ALL DIMENSIONS IN INCHES [mm]
3) ALL DIMENSIONS TYPICAL

REV	ECN	DATE	REV	ECN	DATE
G			C		
F			B		
E			A		
D			DR		5/06

DRN

APR

TOLERANCE
Unless Otherwise Specified
2 PLC. ±.02
3 PLC. ±.005

SCALE 1:10

NAME E1 DRILLING AND CUTOUT DIMENSION DRAWING

MODEL P408

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SIZE B

DWG. NO. 175R1069–E1

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