

# INSTRUCTIONS

## INSTALLATION OF NEMA-3R KIT FOR 43, 44 & 52 FRAME AF-6 DRIVES INTO WELDED ENCLOSURES

This instruction sheet is for the installation of NEMA -3R kits available for the AF-6 series drives frames 43, 44 and 52. 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.

Using these kits as described removes 85% of the losses via the back channel using the drive's main heat sink fan. The remaining 15% must be removed via the door of the enclosure. (Refer to Note 2 for air flow requirements.)

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

**Notes:**

1. The current rating of 43 and 44 frame drives are de-rated by 3% when installed in a NEMA-3R enclosure. 52 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 43 and 44 frame drives is 391 m<sup>3</sup>/h (230 cfm). The minimum airflow required (at the maximum rated ambient temperature) for the 52 frame drive is 782 m<sup>3</sup>/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: AF-600FP & AF-650GP	
Frame 43 Kit Part No.	OPCDUCT433R
Frame 44 Kit Part No.	OPCDUCT443R
Frame 52 Kit Part No.	OPCDUCT523R

**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 177R0107

## 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)

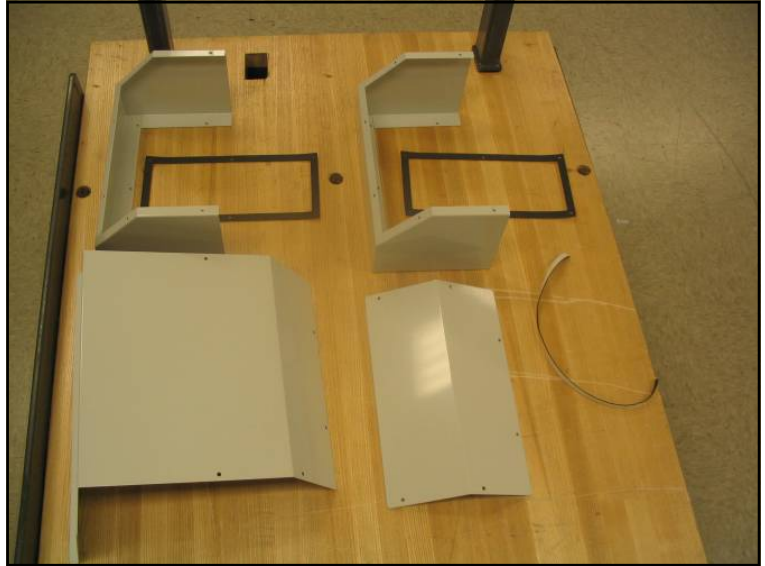


Figure 1. Air deflector components



Figure 2. Top vent cover



Figure 3. Bottom vent cover

## Preparation of the Drive for Installation

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.

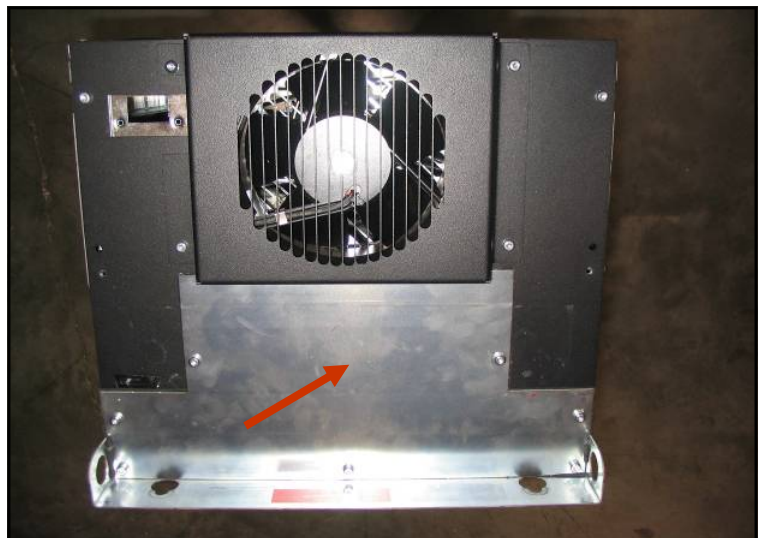


Figure 5. Top cover plate installed

## Preparation of the Drive for Installation

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



Figure 6. Mounting clips

## Installation of the Drive in the Enclosure

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 41 and 42 frame drives should be mounted in a welded enclosure with a minimum back wall thickness of 12ga. (2.7mm). 51 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 41, 42 and 51 frame drives.

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

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



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

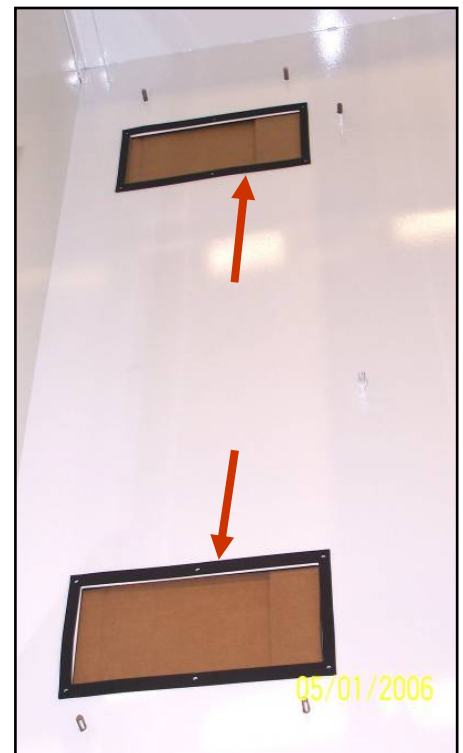


Figure 8. Vent openings with gaskets

## Installation of the Drive in the Enclosure

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

## Installation of the Drive in the Enclosure

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

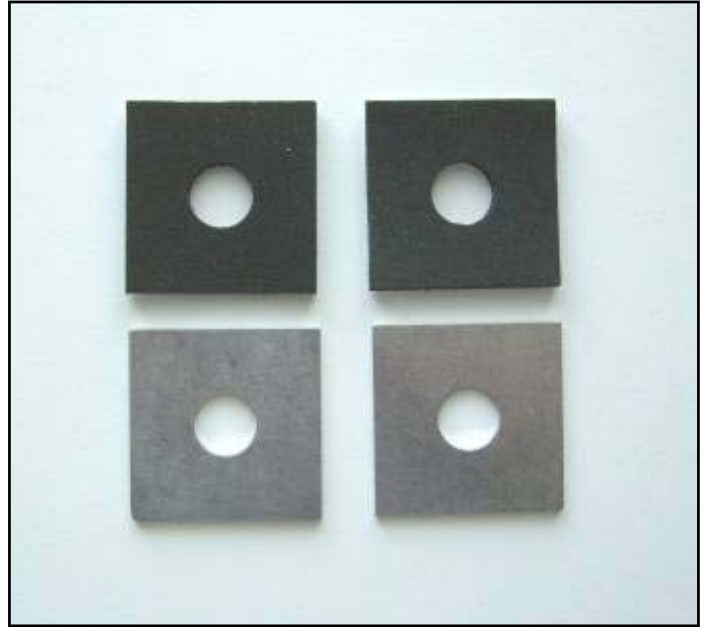


Figure 10. Sealing plates and gaskets

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

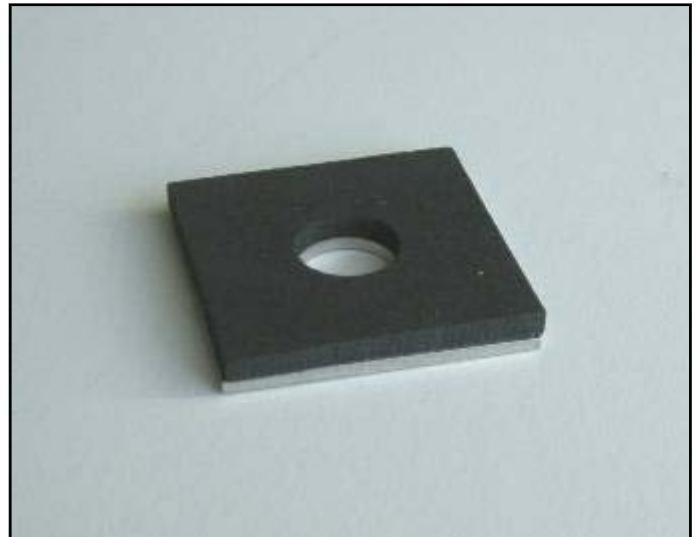


Figure 11. Gasket mounted on sealing plate



## Installation of the Drive in the Enclosure

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

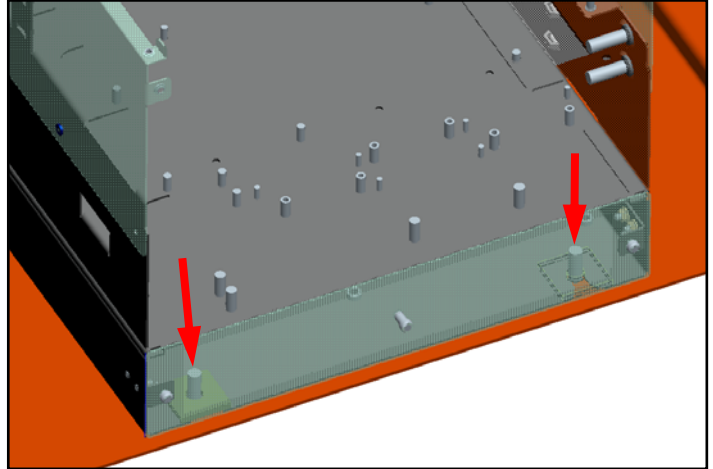


Figure 12. Bottom mounting locations

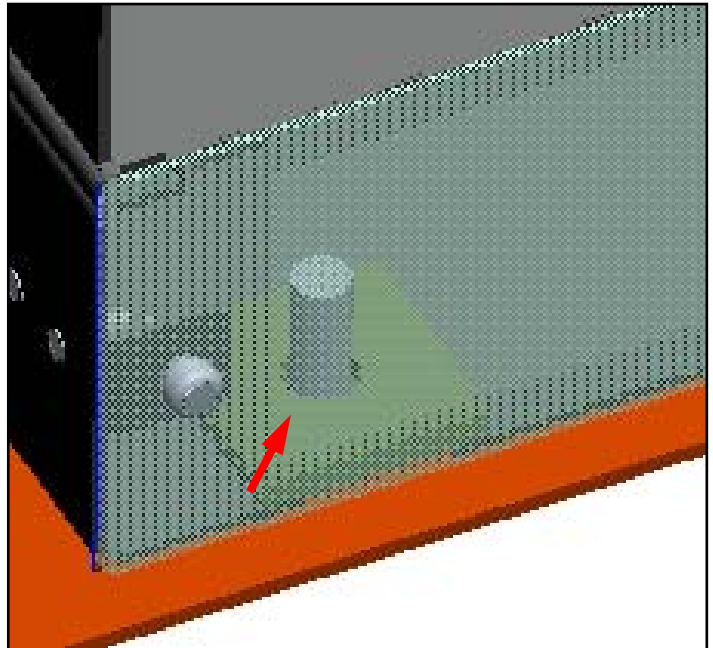


Figure 13. Sealing plate installed over mounting stud



## Installation of the Drive in the Enclosure

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.

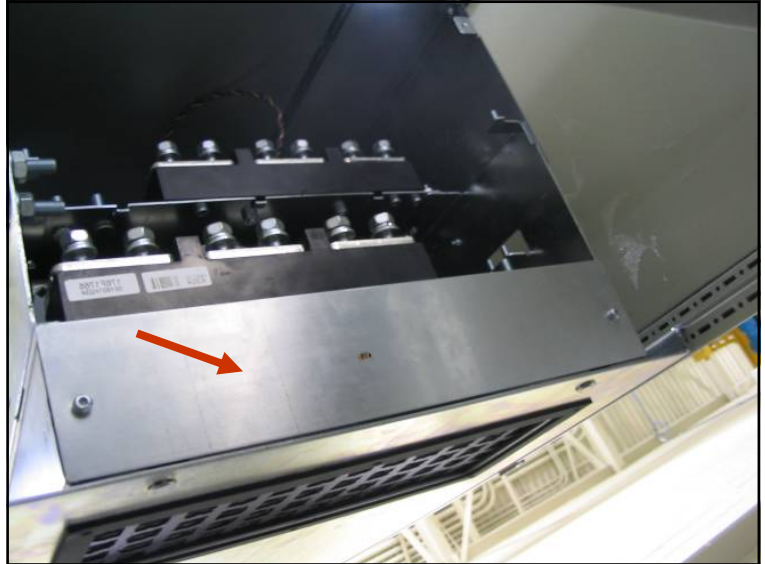


Figure 14. Bottom air inlet cover installed

## Installation of Air Deflectors

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.

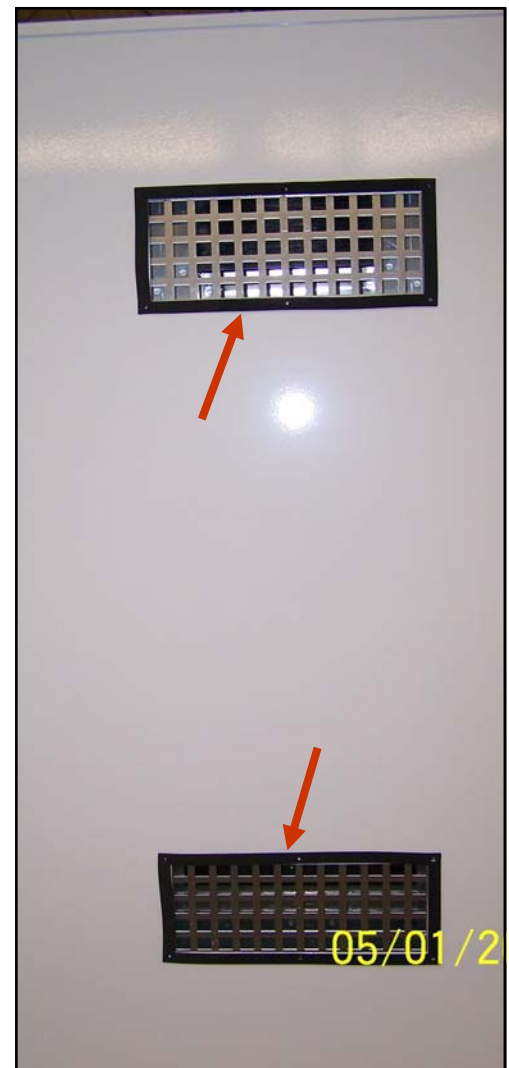


Figure 16. Gasket installed on the outside of the rear panel

## Installation of Air Deflectors

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

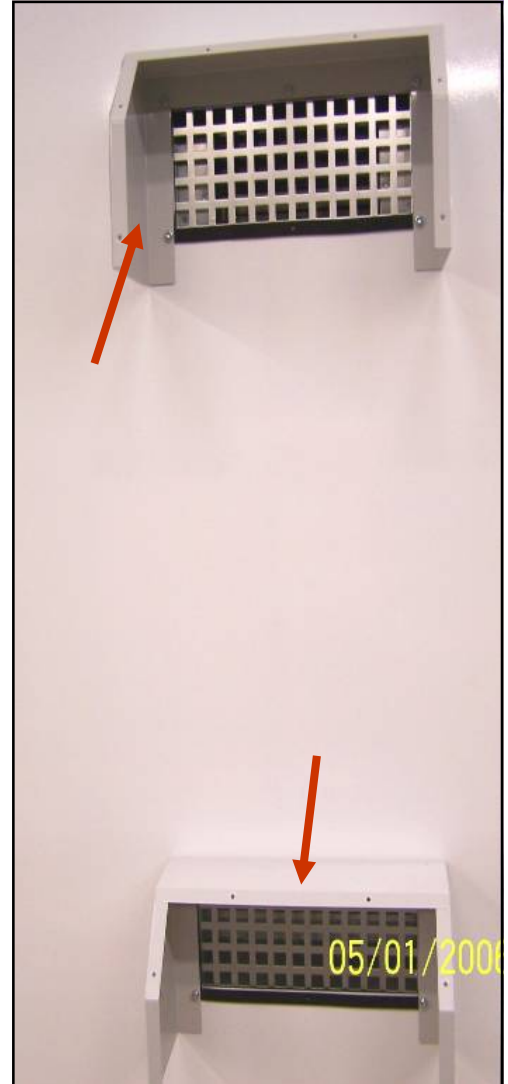


Figure 17. Deflector frames installed in both top and bottom openings

## Installation of Air Deflectors

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

## Installation of Air Deflectors

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

## Field Installation Guidelines

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.

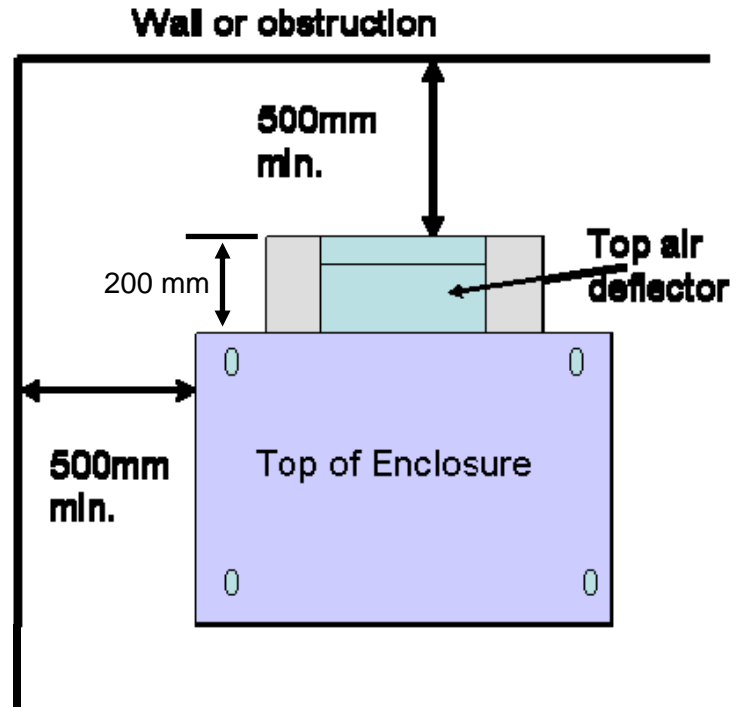


Figure 22. Single drive installation

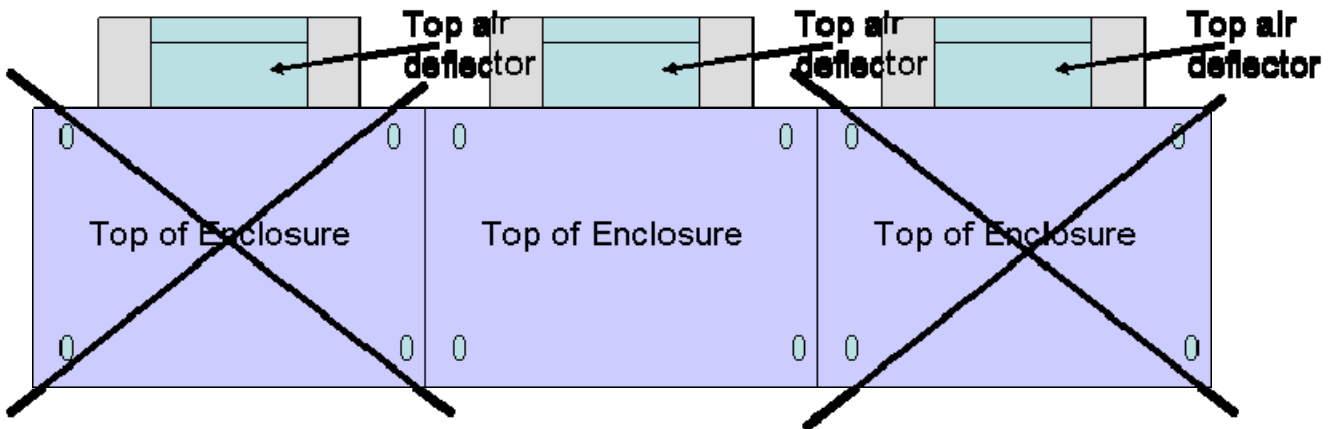


Figure 23. Improper multiple drive installation