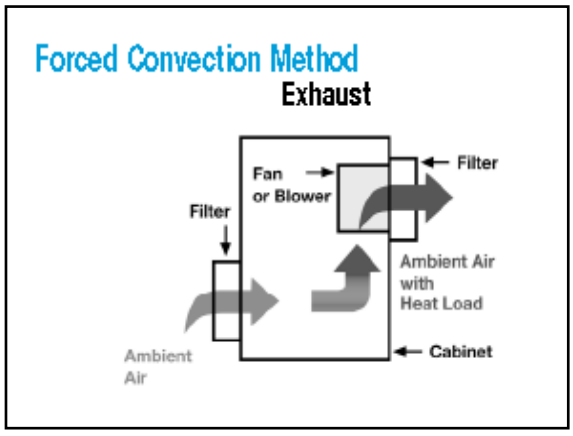
Shop Tech Talk April 2010

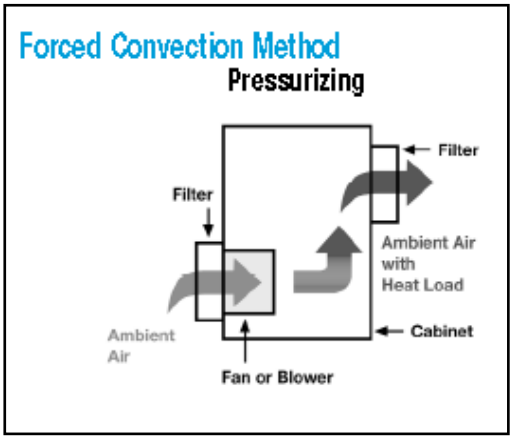
Dealing With Heat Losses in Drive Panels

If we want to mount a 75 HP Drive in an enclosure then you have to make sure that the enclosure is big enough not only for the drive and associated components' physical sizes but also that the panel is large enough to allow the heat loss generated by the drive not to build up and subject the drive to heat beyond its ability to deal with it. Most drives are temperature limited to 40°C, some to 50°C
In the drive's manual it should say what the drive heat loss is, if not you can assume a 3% heat loss based on the drives' rating e.g. If drive is 75 hp, it is then 75 x .746 kW = 55.95 kW, and if we assume a 3% heat loss ie an efficiency of 97% , then 3% of 55.9 kW = 1.68 kW So it would be like having a 1680 watt heater in the enclosure . Things would warm up rapidly and the drive could start tripping on over temperature if we don't do something about it.

Rule of Thumb No. 1
To maintain normal internal enclosure temperatures without ventilation, an enclosure needs 4 times the volume of the normal ventilated enclosure. So if the 75 hp IP20 drive measures 27 in tall, 15 in wide and 13 in deep, then we could comfortably put this drive in a Nema 12 enclosure measuring 36 x 30 x 16 . The volume of this enclosure would be 17,200 cu ins. If we use Rule No. 1 then we need an enclosure of approx. 4 x 17,200 = 69,120 cu ins. This is a big cabinet, measuring 72 x 60 x 16 inches. Often times we will not choose to do it this way because of just the physical size and also the expense and difficulty to find quickly.
The next best choice economics wise is to look at a fan/blower system, and on to rule No. 2

Rule of Thumb No. 2
If you are going to use an exhaust fan to rid you of the heat you can figure 100 to 125 cfm (cubic feet per min) of air flow per kilowatt of heat loss generally. In our case above we would need approximately a 210 cfm fan (1.68 x 125). Also be sure to have filters with the fans in order to keep the drive clean. And, if the enclosure is a Nema 12 then be sure to use fans that are also Nema 12 to keep your Nema 12 enclosure rating, like the Pfannenberg PF series





The Pressurizing Forced Convection Method(on right above) is preferred in that only air filtered by the fan flows into the switch cabinet.

Holland Industrial, 518 West Montgomery Street, Henderson, NC., 27536
Tel: 1-800-232-7541,Fax 1-252-492-2444, E-Mail: sales @ hollandindustrial.com