

## APPLICATION REPORT

### PLENUM RATING AND YASKAWA DRIVES

#### What Is a Plenum?

In HVAC systems, a plenum is a chamber associated with an airhandling apparatus, for distributing the processed air from the apparatus (supply air plenum) to the outlet ducts, or for receiving air to be processed by the apparatus (return air plenum). In office buildings, if the area above a suspended ceiling is used for return air flow, then the entire area above the ceiling is considered a return plenum.

Keep in mind that other industries and products such as communication cable use similar terminology but may have a different definition of “plenum”.

#### What Is a Plenum Rating?

For HVAC purposes, “Plenum Rating” describes permissible mounting locations for products that comprise a HVAC system. A product that is considered by UL to be safe for mounting in the conditioned air stream of a heating or cooling system is “plenum rated”.

The mounting of “plenum rated” products is not limited to plenums however. Through common usage, the term has come to mean “suitable for mounting anywhere in the conditioned air stream”.

#### What Are The UL Requirements For Plenum Rated Drives?

The UL safety issue regarding plenum rated drives centers around flame spread and smoke generation within the HVAC system. With proper selection of the construction materials, the plenum rated drive will neither support combustion nor contribute excessively to smoke and pollution if exposed to flame and very high temperatures.

The applicable UL standards are UL 508C, Section 70 and UL 1995, Paragraph 18.2 and 18.3. These standards establish the criteria and testing methods for determining suitability for plenum rating. UL uses terminology such as “pollution degree 1, 2 or 3” with pollution degree 3 being the most severe.

#### Are Yaskawa AC Drives Plenum Rated?

**YES!** Yaskawa drives with NEMA type 1 or better enclosures (see included listing) may be located inside air handling ducts and plenums. Yaskawa drives are designed to handle conditions existing in pollution degree 1 and 2 plenums. This excludes wet locations where surfaces may become conductive due to moisture and contaminant loading.

### What do I Need to Know?

- Many Yaskawa drives are plenum rated as listed below.
- Yaskawa drives meet Pollution Degree 1 and Pollution Degree 2 specifications (relatively dry, non-conducting surfaces).
- Yaskawa drives do not meet Pollution Degree 3 specifications (possibly wet, conducting surfaces).

### What Must be Verified Before Locating a Yaskawa Drive in a Plenum?

1. Verify the drive is plenum rated per the list below.
2. Verify that the drive's degree of pollution (2) meets or exceeds the degree of pollution for the selected plenum location.
3. Verify the Yaskawa drive has an enclosure rating of NEMA Type 1 or better.

### Yaskawa Plenum Rated Drives

- P5 600V Models, NEMA Type 1 (or better)
- G5 600V Models, NEMA Type 1 (or better)
- V7 Models, NEMA Type 1 (or better)
- E7, F7, G7, and P7 Models, NEMA Type 1 (or better)
- V1000 Models, NEMA Type 1 (or better)
- A1000 Models, NEMA Type 1 (or better)
- P1000 Models, NEMA Type 1 (or better)
- Z1000 Models, NEMA Type 1 (or better)

### Where Can Drives Be Located in a Plenum?

- Locate the drive in the conditioned air stream to provide for drive protection, ease of maintenance and service.
- Do not locate the drive in an area where it will be exposed to unfiltered, high velocity return air where dust loading will accumulate quickly.
- Do not locate the drive in supply air just downstream of cooling coils, where the relative humidity may exceed 95% and condensation is possible.