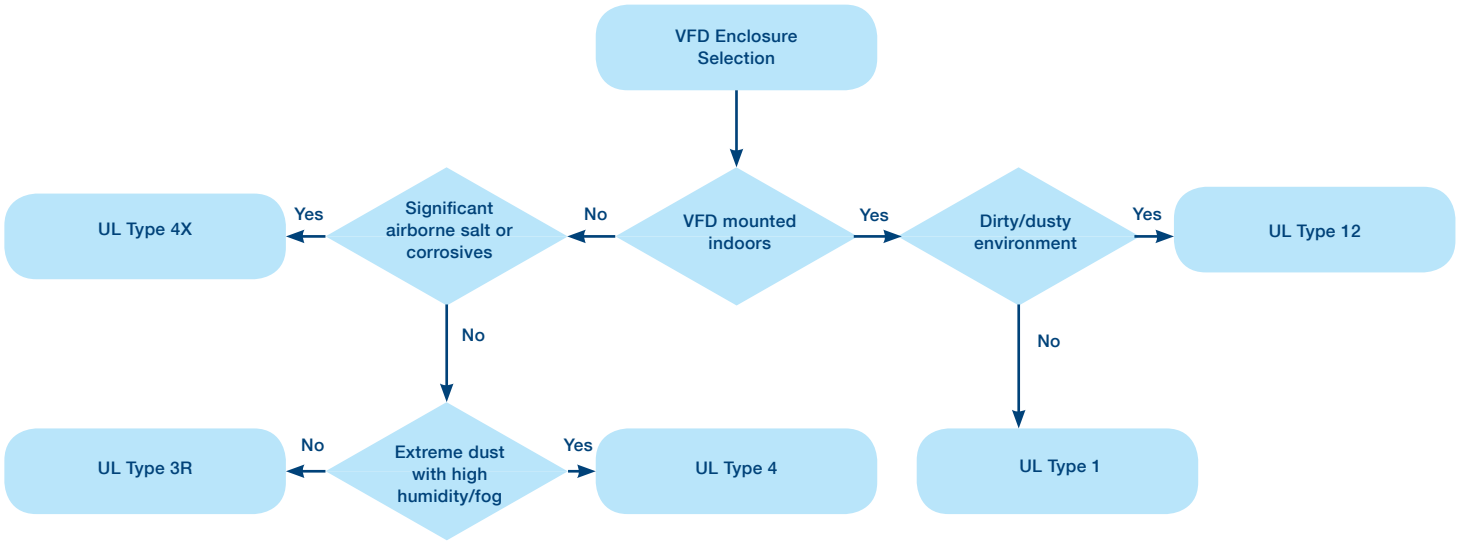
ABB Low Voltage Drives
Variable Frequency Drive Enclosure Selection Quick Guide

The following information is intended to aid in the selection of the proper enclosure type for a VFD. While there are a variety of enclosure styles available, the Type 1, 12, 3R, 3RX, 4, and 4X are specifically used in the HVAC industry for VFDs. Of those enclosure styles, the Type 1, 12, and 3R options are used in over 95% of VFD installations. Type 3RX, 4, and 4X enclosures are available for unusually harsh environments. Whenever practically possible, mount the VFD in a stable environment, such as a mechanical room.

UL Type 1 VFDs – Indoor locations only – Minimal dirt/dust in the air – No exposure to water spray or drips – Most common HVAC VFD enclosure	**UL Type 12 VFDs** – Indoor locations only – Dirty/dusty environment – Possibility to be splashed with water	**UL Type 3R VFDs** – Outdoor location – Minimal salt/corrosives in the air – Maximum ambient temperature ≤122°F
UL Type 4 VFDs[1] – Indoor or outdoor locations[2] – Requirement to wash-down the VFD – Combination of dusty environment with heavy moisture (fog) – Properly sized units may operate >122°F	**UL Type 4X VFDs[1]** – Indoor or outdoor locations[2] – Requirement to wash-down the VFD – Significant salt/corrosives in the air – Properly sized units may operate >122°F	**UL Type 3RX VFDs** – Identical to Type 3R except uses a stainless steel box – A degree of salt/corrosives in the air and enclosure appearance is important

1 Type 4 and 4X may require an air conditioner for proper cooling
2 Outdoor use requires a UV resistant enclosure

The below simplified decision tree will assist in the enclosure selection in the majority of VFD installation locations. Contact your local ABB representative with any questions.



Power and productivity for a better world™

UL Type Enclosure Definitions

Type 1	Enclosures constructed for indoor use to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt).
Type 12	Enclosures constructed (without knockouts) for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing) and to provide a degree of protection against light splashing and seepage of oil and noncorrosive coolants.
Type 3R	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and, that will be undamaged by the external formation of ice on the enclosure.
Type 3RX	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); that will be undamaged by the external formation of ice on the enclosure that provides an increased level of protection against corrosion.
Type 4	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); and, that will be undamaged by the external formation of ice on the enclosure.
Type 4X	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an increased level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.

Table information courtesy of NEMA 250-2014.

ACH550-PHPB04U-EN REVA Effective 08/07/2015 Subject to change without notice.

For more information, please contact

ABB Inc.
Discrete Automation & Motion
Drives and Controls
16250 W. Glendale Drive
New Berlin, WI 53151 USA
Phone: (800) 752-0696

Web: www.abb.com