Hazardous location controls and apparatus

CROUSE-HINDS SERIES

Getting you closer

ACE series explosionproof variable frequency drives

Now available with Eaton's PowerXL DG1 drive

EATON

Powering Business Worldwide

An industry first...explosionproof VFDs

Deliver installation savings, conserve energy & improve performance.

The Class I dilemma

Until now, a VFD couldn't be used inside a classified enclosure in Class I, Division 1 or 2 locations. The heat generated by the VFD inside the classified enclosure caused it to fail. To overcome this problem, VFDs had to be stationed in control rooms outside of the hazardous area, resulting in expensive and impractical installation costs.

But what if you could station VFDs exactly where you want them, literally mounting the drives next to motors inside Class I areas? This would provide:

- A significant reduction of construction and installation costs
- The elimination of logistical and engineering problems
- An increase in uptime

Crouse-Hinds has developed such a solution – the ACE series explosionproof variable frequency drive. It is the only explosionproof enclosure to safely and reliably house a VFD. This revolutionary new product features a NEMA 7 enclosure with patent pending active cooling technology, allowing a traditional VFD to be housed inside the classified enclosure without the risk of overheating.

The ACE explosionproof VFD is rated Class I, Divisions 1 and 2 for use in the most extreme hazardous environments, and it is designed to match the high requirements of pumps, compressors, fans, separators and mixers in the following process industries:

- Oil and gas/refineries
- OEM skid builders
- Petrochemical
- Water/waste water
- Pharmaceutical
- Food and beverage manufacturing

The ACE VFD solution

ACE explosionproof VFDs are the optimal choice for motor control in Class I, Division 1 and 2 locations.

- **Simple and cost-effective installations** – ACE explosionproof VFDs can be installed inside hazardous areas right next to the operation, eliminating expensive, complicated installations. There is no need to run long lines of conduit and motor cable, navigate around obstacles and hazards, or build off-site control rooms in non-hazardous areas to house VFD clusters.
- **Reduced energy usage** – ACE explosionproof VFDs allow you to adjust the motor's level of power to exactly what is needed for optimal performance, significantly lowering energy consumption.
- **Reduced downtime** – Built-in diagnostics monitor equipment information and operating conditions, bringing visibility to potential issues before they become problems. Maintenance can be proactively scheduled during non-production hours.
- **Lower maintenance costs** – The ACE explosionproof VFD'ss ability to lower system speeds and loads, as well as its soft start and stop capabilities, helps eliminate water hammer effects, increase life on bearings and seals and reduce stress on the overall electrical system.

Installation and energy savings

Application
An oil refinery utilizes thousands of pumps throughout the facility, many of them in hazardous areas. In an effort to improve their bottom line, the owners would like to control the pumps with VFDs and capture the energy savings they provide.

Problem
There is no space in the non-classified control room for VFDs. Also, the cost to engineer and install conduit and motor cable from the non-classified area to the pumps in the hazardous area is prohibitive.

Solution
Install Crouse-Hinds ACE series explosionproof VFDs right next to the motor and pump, tapping into an existing 480V supply.

Benefit
By using a VFD to optimize pump flow, significant energy savings are realized. Additionally, by installing the VFD next to the pump and motor, installation costs are greatly reduced.

Downtime reduction

Application
A petrochemical plant is experiencing an unacceptable amount of downtime in critical processes, costing the facility tens of thousands of dollars per hour. The plant manager has been tasked with determining the problem and proposing a solution.

Problem
The motors throughout the facility are controlled by basic "across-the-line" motor starters and unexpected motor failure is the biggest reason for unscheduled downtime.

Solution
Installing Crouse-Hinds ACE series explosionproof VFDs throughout the facility will provide access to real-time equipment and process data. Employees can monitor rises in average motor current, accurately predicting imminent bearing failure.

Benefit
Using a VFD to access and analyze real-time equipment data significantly reduces plant downtime, as the plant manager is now able to proactively schedule motor change out maintenance during non-production hours.

Reduced maintenance

Application
A waste water treatment plant wants to reduce maintenance costs by installing VFDs on their pumps to eliminate the effects of water hammer in their pipes, which causes damage to the pipe system and its appendages.

Problem
The cost to run motor cable and conduit, coupled with the added cost of filters to mitigate the effects of Reflected Wave Syndrome (due to long cable lengths), makes installing the VFDs in a non-classified area impractical.

Solution
Install Crouse-Hinds ACE series explosionproof VFDs in the classified area, thereby eliminating costly installations and protecting against the possibility of Reflected Wave Syndrome by keeping motor cable runs short. Additionally, the VFD's soft start and stop capabilities eliminate water hammer.

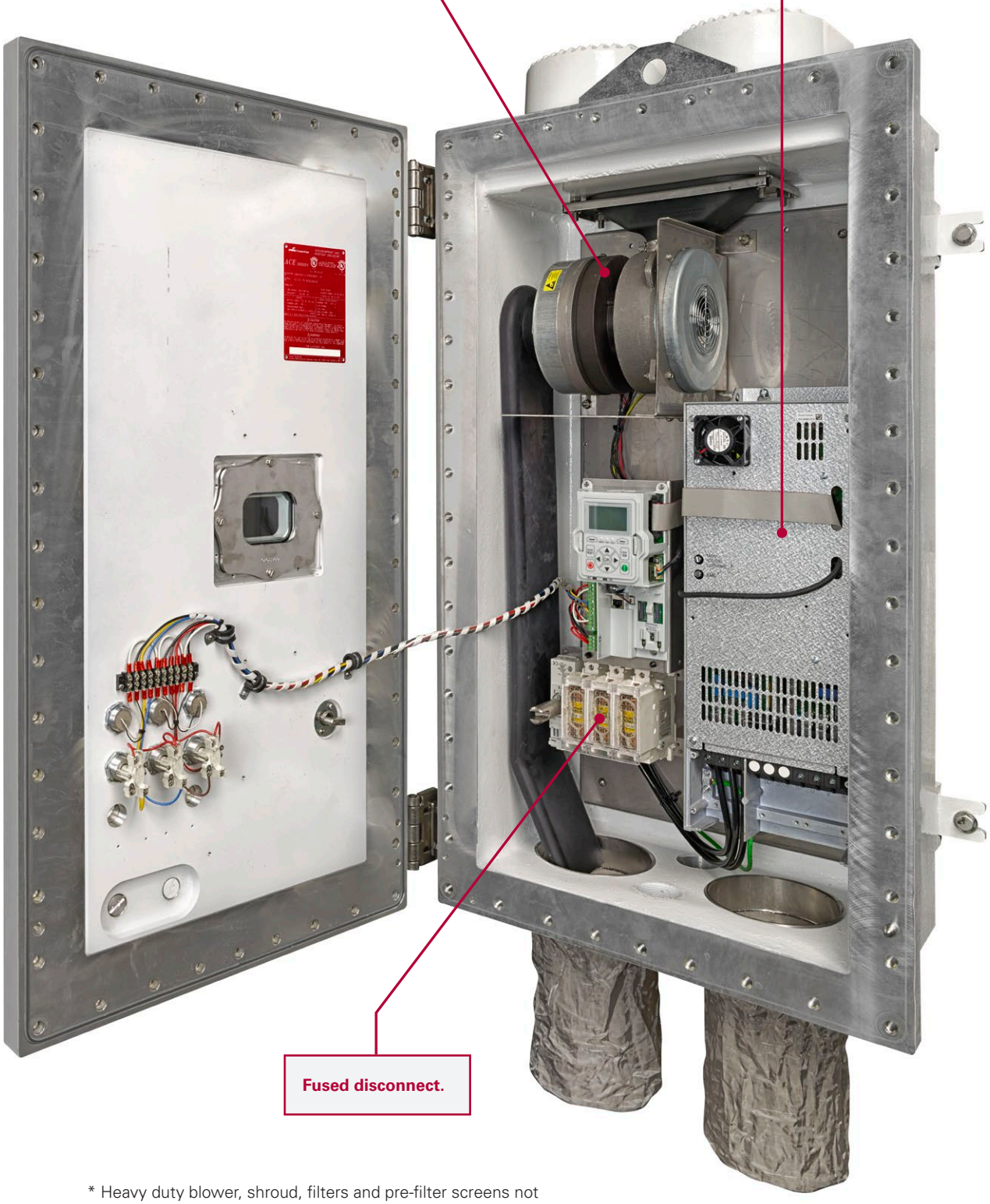
Benefit
Total cost of ownership is reduced by protecting both the piping system and the motor itself with a classified solution that is easy to install.

Enclosure size 1 (1 to 5 horsepower VFDs)

7.5 to 30 HP

Heavy duty blower* creates airflow through the enclosure, allowing VFD to operate in ambient temperatures up to 50ºC.

Variable Frequency Drive (VFD) in explosionproof enclosure allows installation in classified area, providing significant installation savings.



Fused disconnect.

* Heavy duty blower, shroud, filters and pre-filter screens not included with units containing 1 to 5 horsepower VFDs.

Shroud covering top filters allows water to dissipate off enclosure.

Stainless steel, captive, triple lead quick release spring loaded bolts install faster and provide clear indication that the cover bolts are fully retracted from the body.

Stainless steel hinges provide convenient and easy access to enclosure interior.

Enclosure epoxy painted for superior corrosion resistance.

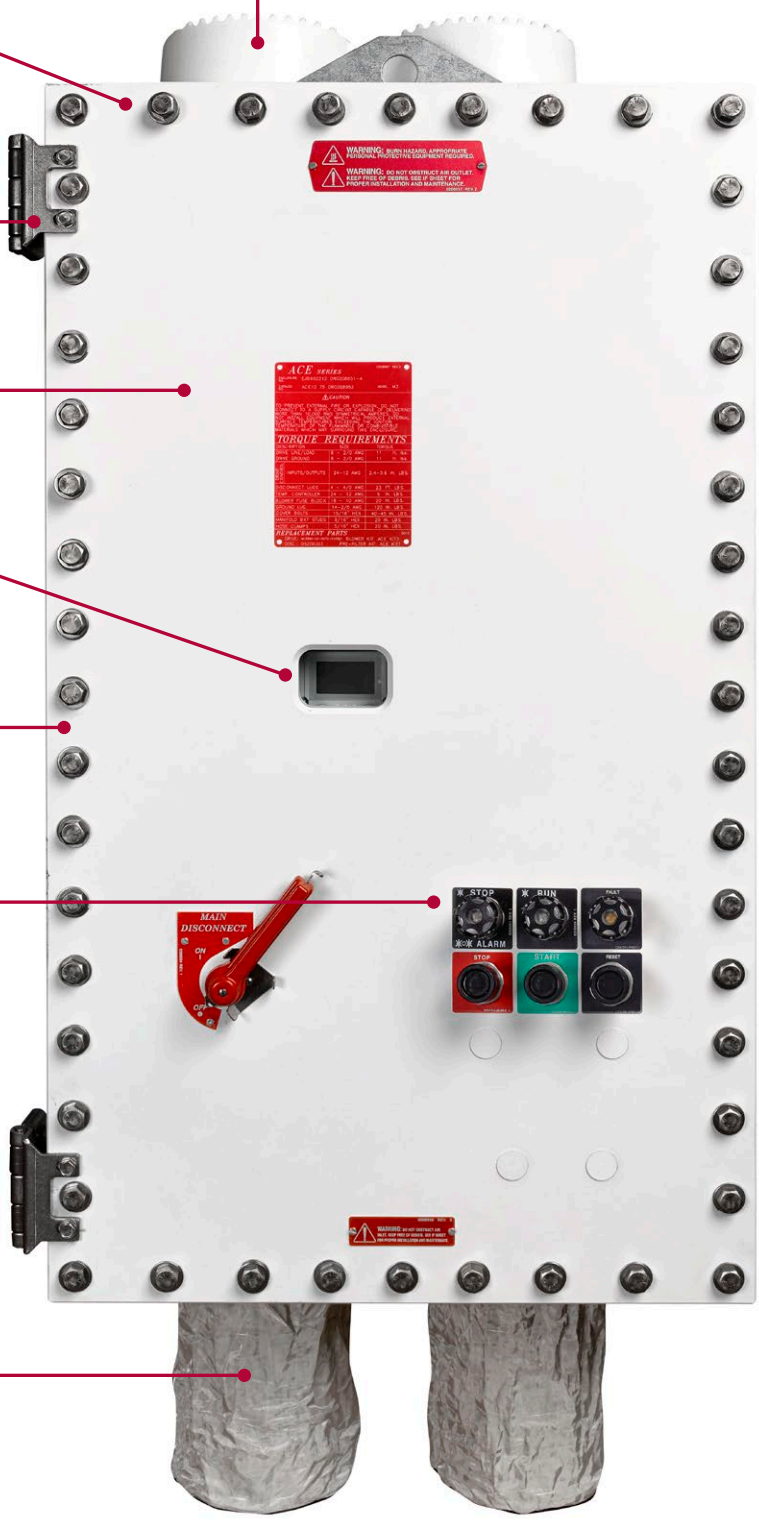
Explosionproof window allows for viewing of the VFD interface module LCD screen.

Internal and external grounding lugs.

Explosionproof pilot lights provide run, stop and alarm indication.

Filters* in top and bottom of enclosure allow airflow into and out of the enclosure, cooling the VFD and eliminating risk of overheating.

Pre-filter screens* (not shown) eliminate clogging of the primary filters, ensuring reliable and consistent airflow. Pre-filter screens can be easily removed and cleaned without shutting down operations.



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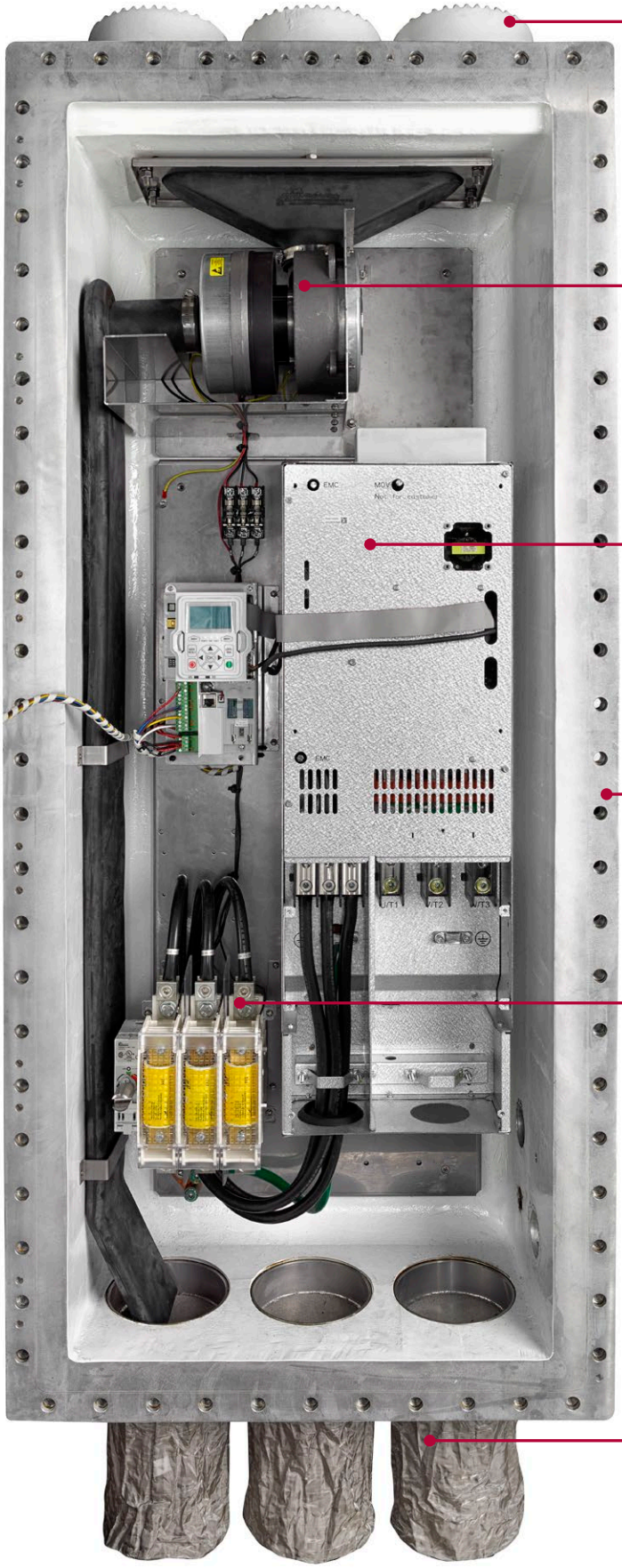
40 to 100 HP



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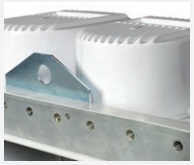

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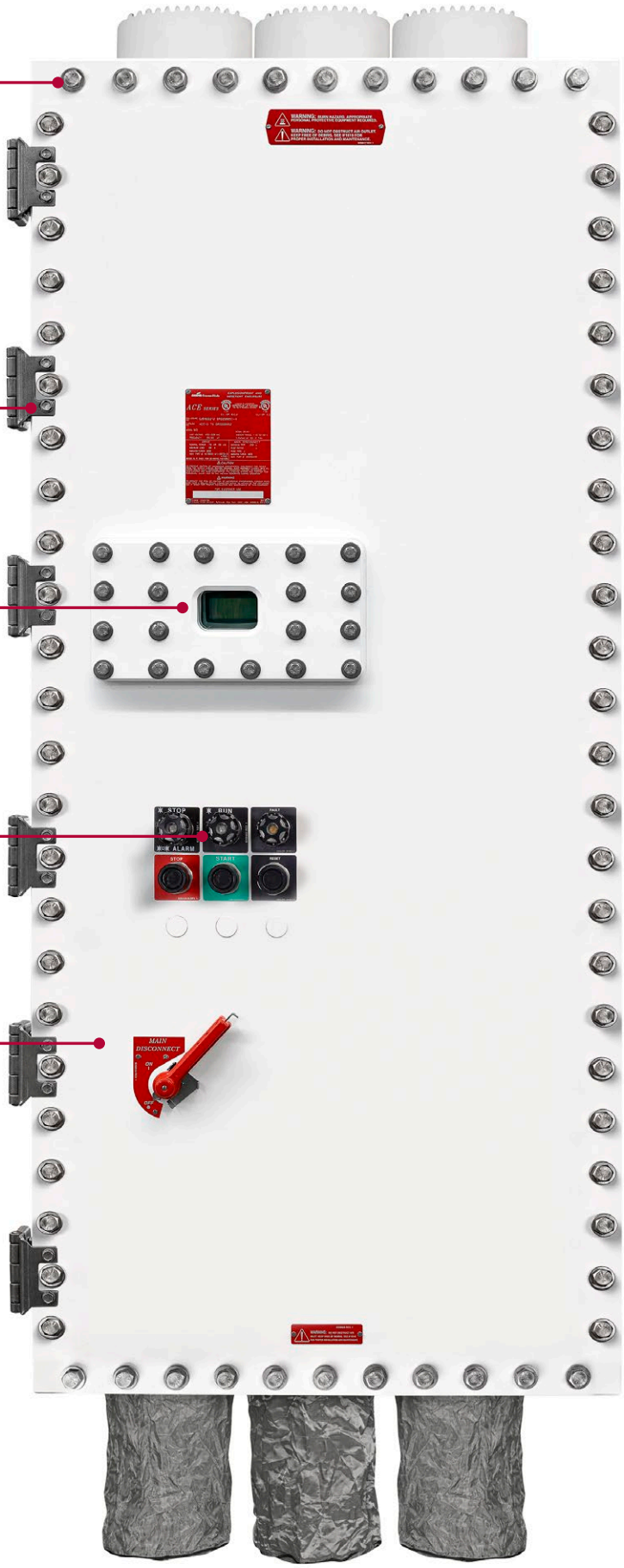
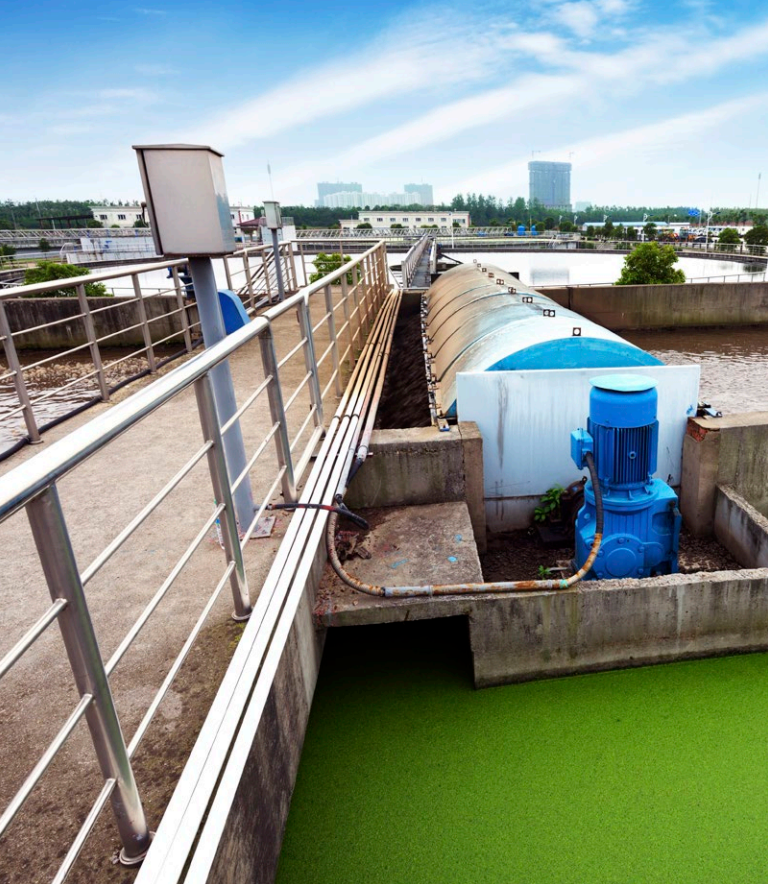


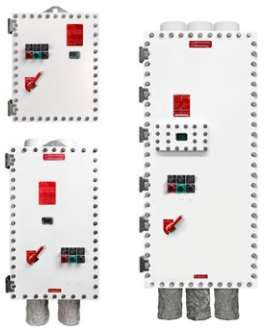
ACE DG1 Series VFD available up to 100 HP!



Specifications

Applications

- For speed control of pumps, compressors, fans, conveyors, separators, mixers and other process equipment.
- Designed to meet the high reliability and safety requirements of process industries such as oil and gas, chemical and mining.



ACE series system benefits

- ACE explosionproof VFDs are installed 'on-machine' inside the hazardous areas, eliminating expensive, complicated installations.
- There is no need to run long lines of conduit and motor cable, dig up roadways and sidewalks, navigate around obstacles and hazards or build off-site control rooms in non-hazardous areas to house VFD clusters.
- Reflected Wave Syndrome is eliminated due to short motor cable runs.

ACE DG1 Series VFD benefits

- Drives available up to 100 HP
- Improved temperature rating:
  -30°C to +50°C (up to 75 HP)
  -30°C to +40°C (100 HP)
- Standard features include:
  - EtherNet/IP
  - Modbus TCP
  - RS-485: Modbus RTU
  - BACnet MS/TP

Standard materials & finishes

- **Body and cover** – copper-free aluminum, epoxy powder coated
- **Operating handle** – copper-free aluminum, epoxy painted
- **Window** – tempered soda lime glass
- **Blower** – aluminum, natural
- **Filters** – stainless steel, natural
- **Pre-filters** – stainless steel, natural
- **Disconnect** – stainless steel, natural
- **Shroud** – copper-free aluminum, epoxy painted
- **Cover hinges, bolts, washers and springs** – stainless steel, natural
- **Internal brackets** – stainless steel, natural
- **Manifold and intake** – EPDM rubber, natural

VFD system specifications

- Eaton PowerXL DG1 general purpose drives

Horsepower ratings

- Available from 1 to 100 HP

Certifications & compliances

UL Classified
- Class I, Divisions 1 and 2, Groups B, C, D

cUL Classified
- Class I, Divisions 1 and 2, Groups B*, C, D

* 5 HP and below listed for Group B.

Standards
- UL1203

Environmental ratings

- NEMA 3, 4X*, 7BCD
- Raintight
- Wet Locations
- Operating temperature range

  1 to 75 HP
  -30°C to +50°C (-22°F to 122°F)

  100 HP
  -30°C to +40°C (-22°F to 104°F)

* Please consult factory.

Part number configuration and replacement parts

Horsepower rating

Base part number	Nominal HP (kW)	Max. disconnect rating (Amps)	Disconnect fuse rating	Enclosure size	460V input ratings (Amps)	Max. output rating (Amps)	Power loss (Watts)	Temperature rating
ACE-DG1-1	1.0 (.75)	30	10	1	2.0	2.2	48	T6
ACE-DG1-2	2.0 (1.5)	30	10	1	3.2	4.3	71	T6
ACE-DG1-3	3.0 (2.2)	30	10	1	4.5	5.6	82	T6
ACE-DG1-5	5.0 (3.0)	30	15	1	7.1	7.6	99	T6
ACE-DG1-7	7.5 (5.5)	30	20	2	10.2	12.0	483	T4A
ACE-DG1-10	10.0 (7.5)	30	30	2	13.0	16.0	539	T4A
ACE-DG1-15	15.0 (11.0)	60	35	2	19.5	23.0	598	T4A
ACE-DG1-20	20.0 (15.0)	60	50	2	25.1	31.0	719	T4A
ACE-DG1-25	25.0 (18.5)	60	60	2	31.6	38.0	764	T4A
ACE-DG1-30	30.0 (22.0)	100	80	2	37.2	46.0	821	T4A
ACE-DG1-40	40.0 (30.0)	100	100	3	48.3	61.0	909	T4A
ACE-DG1-50	50.0 (37.0)	200	110	3	60.4	72.0	1076	T4A
ACE-DG1-60	60.0 (45.0)	200	125	3	71.6	87.0	1222	T4A
ACE-DG1-75	75.0 (55.0)	200	175	3	89.2	105.0	1271	T4A
ACE-DG1-100	100.0 (75.0)	200	175	3	115.3	140.0	1482	T4A

Catalog number example

ACE-DG1-60-CC-PT

Horsepower rating | **Options**

ACE-DG1-60 - **CC** - **PT**

- **ACE-DG1-60**: Eaton PowerXL VFD with 60 HP rating
- **CC**: CAN Open
- **PT**: Potentiometer

Modbus and Ethernet standard on all ACE DG1 models

Options

Communication modules

Part number suffix	Description
CP	Profibus
CD	Devicenet
CC	CAN Open
CS	SmartWire
CL	Lon Works
RO	Relay Output
DI*	6 x DI 240 VAC input option card
DIO	3 x DI, 3 x DO, 24 VDC

*DI option does not denote a 240 VAC supply voltage capability of the VFD. Please contact factory if a 240 VAC VFD is required.

Potentiometer

Part number suffix	Description
PT	AB 800H-UP29

Local/Remote

Part number suffix	Description
LR	Two-position switch

600 VAC option

Part number suffix	Description
600	600 VAC

600 suffix option can only be used for ACE-DG1 units with nominal HP of 5 or less.

Replacement part kits – blower and filters

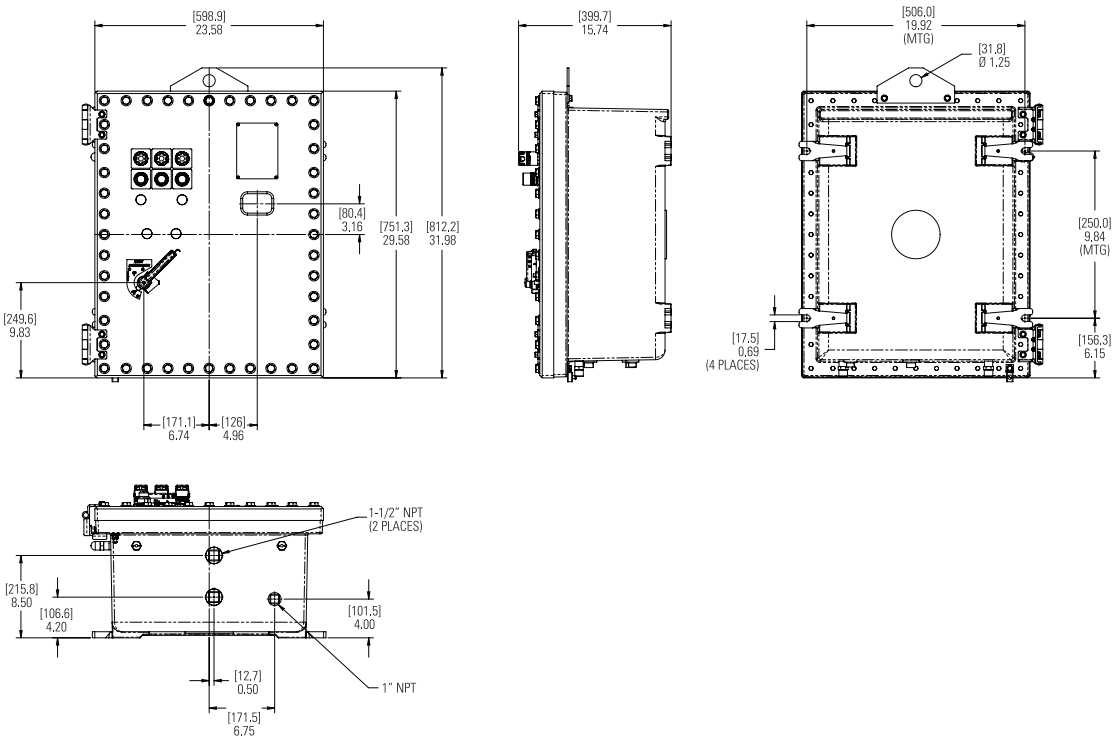
Part number suffix	Description
ACE KIT 1	Pre-filter and hardware (1 piece)
ACE KIT 2	Filter assembly (1 piece)
ACE KIT 3	Blower, manifold and hardware (1 piece)

Replacement part kits – drive fan*

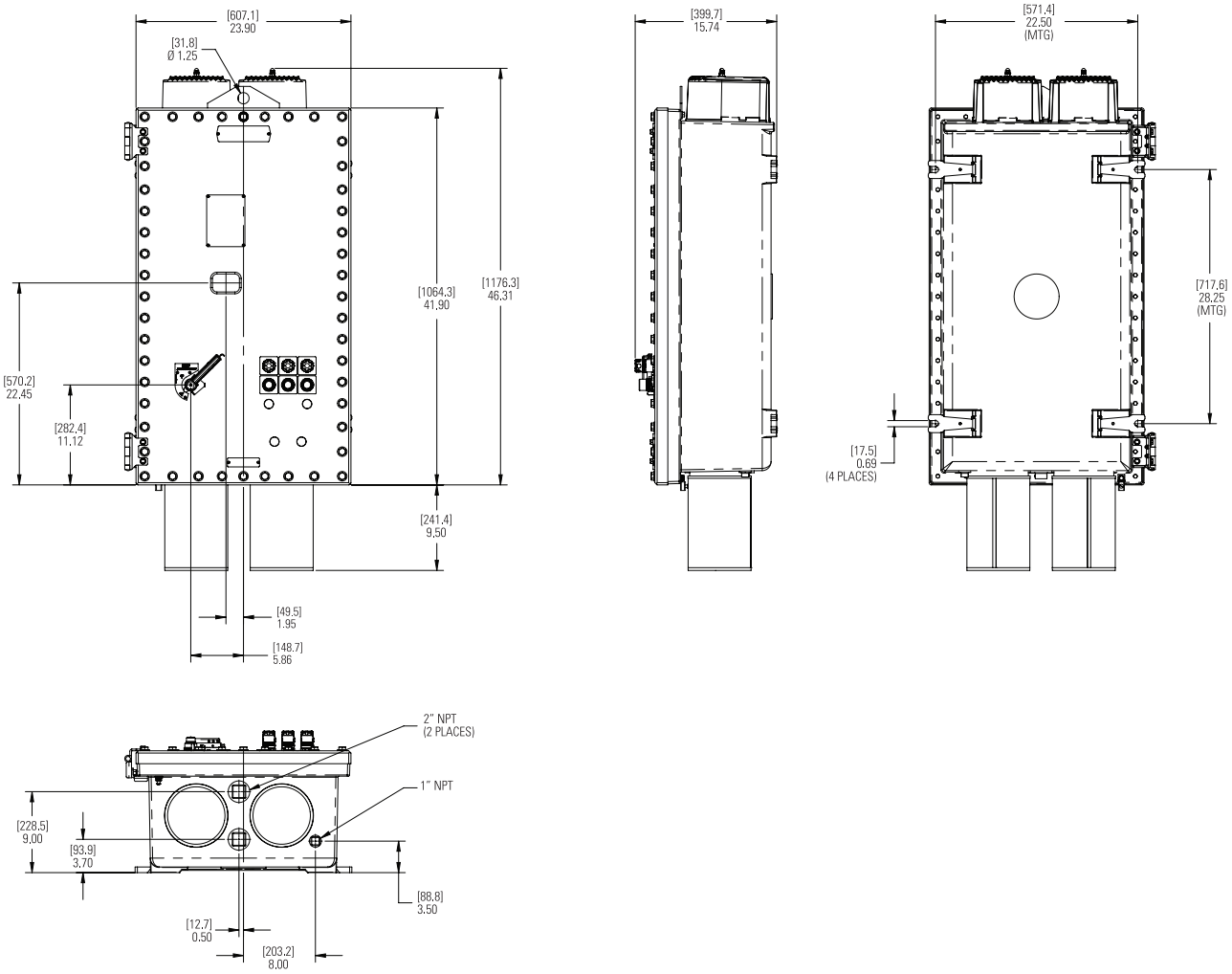
Part number suffix	Description
ACE KIT 11-1	For use with ACE-DG1 1-5HP
ACE KIT 11-2	For use with ACE-DG1 7-15HP
ACE KIT 11-3	For use with ACE-DG1 20-30HP
ACE KIT 11-4	For use with ACE-DG1 40-60HP
ACE KIT 11-5	For use with ACE-DG1 75-100HP

*Note, this fan is not the main blower found inside the enclosure. ACE KIT 3 is the replacement parts kit for the main blower. The ACE-KIT 11 kits are for replacement fans specifically for the VFD drive.

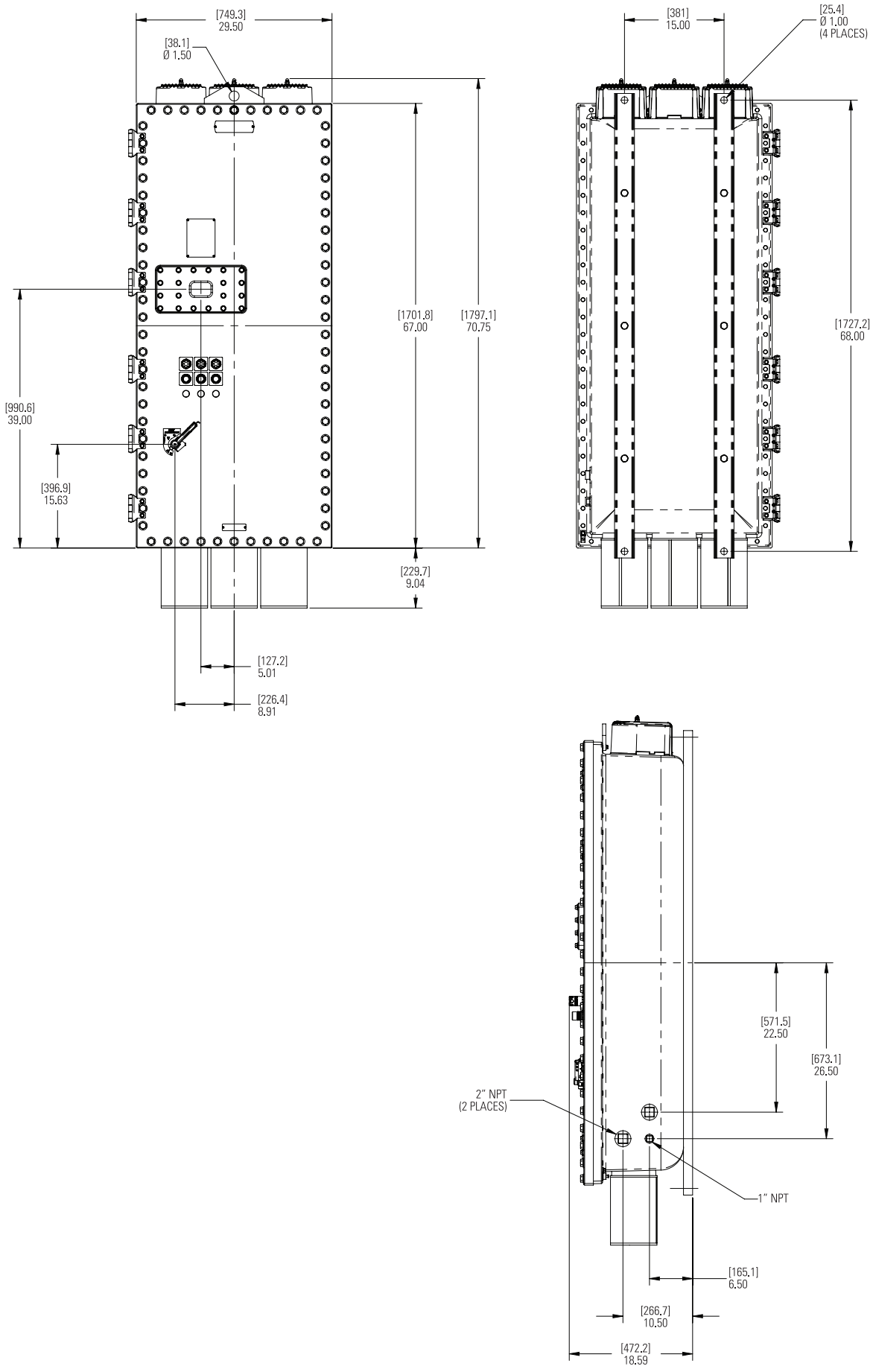
Dimensions – enclosure size 1 (1 to 5 horsepower VFDs)



Dimensions – enclosure size 2 (7.5 to 30 horsepower VFDs)



Dimensions – enclosure size 3 (40 to 100 horsepower VFDs)



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