

↗ DOMETIC

MARINE

VENTILATION SYSTEMS



EVC2-PT

EN

Shipwide Ventilation Control
Installation and Operation Manual

NORTH AMERICAN ADDRESS INFORMATION

USA & CANADA

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Service Center & Dealer Locations

Refer to "7 Customer support" on page 39.

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Read these instructions carefully. These instructions MUST stay with this product.

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1 EXPLANATION OF SYMBOLS AND SAFETY INSTRUCTIONS

This manual has safety information and instructions to help you eliminate or reduce the risk of accidents and injuries.

1.1 Recognize safety information



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

1.2 Understand signal words

A signal word will identify safety messages and property damage messages, and will indicate the degree or level of hazard seriousness.

indicates a hazardous situation that, if **not** avoided, could result in death or serious injury.

indicates a hazardous situation that, if **not** avoided, could result in minor or moderate injury.

is used to address practices **not** related to physical injury.



indicates additional information that is not related to physical injury.

1.3 Supplemental directives



Read and follow all safety information and instructions to avoid possible injury or death.

Read and understand these instructions before installation or use of this product.

Incorrect installation or operation of this product can lead to serious injury.

The installation **must** comply with all applicable local or national codes, including the latest edition of the following standards:

U.S.A.

- ANSI/NFPA70, National Electrical Code (NEC)
- ABYC guidelines for marine installations

1.4 General safety messages

HEALTH HAZARD. Failure to obey the following warnings could result in death or serious injury:

- This product must be installed and serviced by a qualified service technician.
- Do **not** modify this product in any way. Modification can be extremely hazardous.

2 INTENDED USE

The EVC2 Series controls the ventilation system of a vessel's engine room, with an easy-to-use interface for manual operation, system monitoring, and troubleshooting.

The ventilation system is designed to maintain a specified engine room temperature, pressure, or both. With an optional ambient air temperature (AAT) sensor, the EVC2 can provide complete control of engine room ventilation.

The manufacturer accepts no liability for damage in the following cases:

- Faulty assembly or connection.
- Damage to the product resulting from mechanical influences and excess voltage.
- Alterations to the product without express permission from the manufacturer.
- Use for purposes other than those described in the operating manual.

3 SYSTEM OVERVIEW

The system consists of several major components:

- **Main processor enclosure (MPE):** Houses the processing and interface devices, a small power supply, and the pressure sensor.
- **Operator interface (OI) touchscreen:** Allows system monitoring, troubleshooting, and manual control over the system when needed.
- **Variable frequency drive (VFD):** Custom-programmed industrial motor control units used to vary the speed of the three-phase fans and provide advanced motor protection with soft-start capability. Each fan has its own VFD. The display on the VFD shows the output frequency to the fan in Hertz. The maximum fan speed is typically either 50 Hz or 60 Hz.
- **At least one temperature sensor and/or one atmospheric pressure sensor:**
 - **Engine room temperature (ERT) sensor:** Located inside the engine room. There may be additional sensors outside the engine room to monitor generators or outside air temperature.
 - **Differential atmospheric pressure sensor:** A very low differential pressure transducer located inside the MPE. Two 1/4" (6.35 mm) fittings are connected to the case and then to the outside of the MPE. One measures the engine room pressure and the other one measures the outside atmospheric pressure. The pressure is measured in inches of water (in. W.C.).

4 INSTALLATION

⚠ WARNING FIRE HAZARD. Operation without the fire system interfaced to the EVC2 causes the fans to continue to run during a fire, exhausting the extinguishing agent, and providing air to support combustion. Do **not** operate this system without verifying the proper operation of the fire system shutdown input. Failure to do so could result in death or serious injury.

4.1 Overview

All wire and breaker sizes are approximate. The installation must meet applicable codes. Refer to the "System block diagram" on page 41 for cable runs and sizes, and general equipment involved with the system.

The EVC2 receives information from several different sensors and inputs, including a pressure sensor mounted inside the MPE, and at least one temperature sensor. An optional ambient air temperature sensor can be installed to allow the system to monitor the outside ambient air temperature.

The EVC2 also includes inputs for the fire system, emergency stop (E-stop), emergency bypass, and main engine run signals. These connections can be made using a two-conductor shielded cable.

4.2 Mounting the MPE

- Mount the MPE with the pressure sensing ports facing straight down or straight up, when looking at the front of the enclosure. Avoid mounting the MPE on an angle, to ensure that the pressure sensor works properly.



If the MPE cannot be mounted in this position, contact Dometic Technical Support for alternative mounting options.

4.3 Installing the pressure tubes

The EVC2 controls the intake fan speed based on the pressure difference between the engine room and ambient pressure. To accomplish this, a differential pressure sensor is mounted inside the MPE. There are two 1/8" (3.18 mm) ports on the bottom of the MPE.

- Terminate one tube inside the engine room. If the MPE is mounted inside the engine room and not in a cabinet, this port can be left open.
- Terminate the second tube outside the engine room, in an area that is not affected by any external forces, such as cooling fans or air conditioning.



Do **not** terminate the tube inside any duct, including the engine room air intake duct, due to minor pressure drops across grilles and moisture eliminators. The tube can be terminated inside a cabinet, such as a deck storage box, as long as there is no cooling or exhaust fan present, and the space is not completely airtight.

- Mark the tube so it is not cut off or painted over during finishing work. Do **not** allow the pressure-sensing tube to become crimped, covered, or otherwise restricted, as the system will not function properly without the ambient pressure reference.

4.4 Installing the VFD

NOTICE EQUIPMENT DAMAGE. Ensure that the VFD is properly installed. Improper installation of the VFD can shorten the life of the product and cause malfunctions. Failure to obey this notice could result in damage to the product or property.

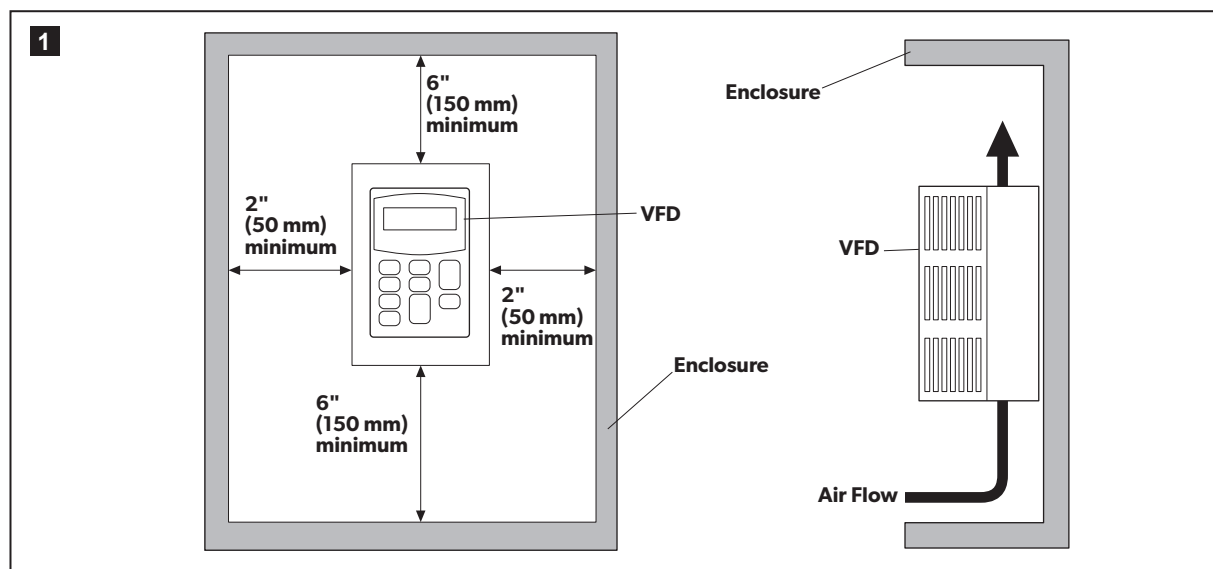
The VFD converts the vessel's power supply to a variable frequency output that controls the speed of the fans, based on commands from the MPE.



If the VFDs are to be mounted inside an enclosure, proper ventilation must be provided to preserve the equipment warranty. The enclosure ventilation motor option should be activated and an inside enclosure temperature sensor should be wired to the specified terminals. Contact Dometic Technical support for the enclosure cooling fan requirements for your system.

Mounting the VFD

- Mount the drive vertically:
 - Do **not** restrict the airflow to the cooling fins.
 - Do **not** mount the VFD directly above heat-radiating devices.
 - Do **not** mount the drive where it will be subject to salt spray, excessive vibration, corrosive gases and liquids, or airborne dust particles.



Connecting the VFD power

- Refer to the following tables for recommended minimum wire sizes.
- Check all recommendations to ensure that they meet applicable codes and regulations. In some cases, the recommended wire sizes are slightly larger than the normal wire size for a given motor HP. This is done to minimize false overcurrent alarms in the VFDs due to the harmonics generated. Following these recommendations will ensure proper operation.



Read before proceeding:

- Because of the harmonics created by all VFDs, a shielded power cable is recommended, but not required.
- On vessels with non-conductive hulls, the harmonics have a tendency to radiate farther and have been known to interfere with certain radios. Shielded power and motor cables are strongly recommend for these types of installations.

220 V – 240 V

Fan Size	Single-Phase Vessel	Three-Phase Vessel	Output to Fan
Up to 2 Hp	14 AWG	14 AWG	14 AWG
3 Hp	10 AWG	12 AWG	12 AWG
5 Hp	8 AWG	10 AWG	10 AWG
7.5 Hp	8 AWG	10 AWG	10 AWG
10 Hp	8 AWG	8 AWG	8 AWG
15 Hp	6 AWG	6 AWG	6 AWG
20 Hp	—	6 AWG	6 AWG
25 Hp	—	4 AWG	4 AWG
30 Hp	—	2 AWG	2 AWG

440 V – 480 V

Fan Size	Single-Phase Vessel	Three-Phase Vessel	Output to Fan
Up to 2 Hp	—	16 AWG	16 AWG
3 Hp	—	16 AWG	16 AWG
5 Hp	—	14 AWG	14 AWG
7.5 Hp	—	12 AWG	12 AWG
10 Hp	—	10 AWG	10 AWG
15 Hp	—	10 AWG	10 AWG
20 Hp	—	8 AWG	8 AWG
25 Hp	—	8 AWG	8 AWG
30 Hp	—	6 AWG	6 AWG

Communication connections

Control of the VFD is through a DH-485 communications network.

- Use the recommended cable and manufacturer's instructions for runs of up to 4,000' (1,219 m). The communications cable run must be done with all components in a straight line, and not a "star" configuration (refer to "Drive network options" on page 42). The MPE can be located at any position along the run.

4.5 Installing the temperature sensor

The EVC2 controls the exhaust fan speed based on engine room temperature.

- Mount the ERT sensor on the overhead, in an area where it can sense the average engine room temperature.
 - Avoid mounting the ERT sensor directly over equipment that generates heat, or very close to the engine room lighting. The heat radiated by the lights causes the system to run continuously in DOCK mode.
 - Avoid mounting the ERT sensor in the intake fan air system. This results in an abnormally low reading, and causes the exhaust fan to run at a slower speed.
- Mount the optional ambient air temperature sensor outside the engine room, in a normally shaded area.
 - Avoid exhaust vents that could cause inaccurate readings.
 - The main air intake trunk (just behind the mist eliminators) is a suitable location for this sensor in many cases. Avoid this placement if the system is reversed in the AUTO-RUN or DOCK mode, as the trunk then becomes the exhaust and the sensor reads higher temperatures, causing improper operation.

4.6 OI installation

The operator interface (OI) provides a means for monitoring and operating the system.

- Mount the OI in the engine room, control room, or on the bridge. In most cases, engine room mounting is preferred to facilitate easy manual control of the fans.
- Secure the OI from the back using the four screw brackets.
- Connect the cables. Refer to the "System block diagram" on page 41.



The unit is powered by 24 VDC supplied by the MPE power supply. There are two cable runs to the OI from the MPE: a three-conductor cable to supply DC power and an eight-wire Ethernet shielded cable for the communications.

4.7 Connecting external switch inputs

The EVC2 requires several external signals for proper operation. These signals come from switches that should run through dedicated dry contacts and should not be grounded to the vessel's main electrical ground. All external switches are provided by the installer. The shield is **not** used on these connections.

External Switch	Description
Emergency stop switch	Normally open switch that shuts the fans down when activated. Some classifications require this switch to be mounted just outside the engine room.
Main engine run switch	This switch is taken from a contact in the engine control units. If a contact is not available, an oil pressure switch or a dry contact tied to the ignition circuit can be used. When multiple engines are used, a switch connection should be made for each engine. If only one main engine is running, the system still reverts to the AUTO-RUN mode to provide cooling and combustion air. This switch is closed when the engines are running.
Fire switch	Normally closed switch that is included in the fire extinguishing system on the vessel. The EVC2 should be wired into this system to enable a fan shutdown in the event of a fire system discharge.
Bypass switch	Optional input that allows the system to operate in a limited mode in the event of a fire or E-stop situation. The normally open switch can be mounted just outside the engine room. In the event of a fire, the switch can be activated to clear the space of smoke after the fire has been extinguished. This function is available from the OI touch screen.

5 OPERATION

5.1 Initial start-up



Refer to "5.3 Operation modes" on page 10 for information on operation modes.

- Before powering the system, ensure that no work is being performed in the area around the fans, and that there are no obstructions or debris in the air trunks.
- Power up the MPE, and ensure that it is operating normally.
- Power up each VFD individually.
- Once all the equipment is powered, and there are no alarms, start the initial system checks:
 - Start the system in STANDBY mode. If the system starts in a mode other than STANDBY, it is likely that an input is wired incorrectly:
 - Press the **Stop** button to return the system to STANDBY mode.
 - From the standby screen, press the **Status** button.
 - Verify that the pressure is at or near 0.000" W.C., and that the temperature readings are correct.
 - Press the **Inputs** button to verify that the external inputs reflect the actual state of the switches. A flashing indicator on this screen indicates that there is a problem.
 - After any external input issues have been resolved, ensure that a hatch in the engine room is open to the outside atmosphere. Place the system in MANUAL mode by pressing the **Manual** button at the bottom of the OI. The fans should start at minimum speed.
 - Ramp each fan up to 50% individually and check for proper rotation.
 - Once proper rotation is determined, ramp each fan up to 100%. The indicators on the VFDs should read 50 Hz or 60 Hz, depending on the fan configuration.
 - Test the pressure sensor by applying very slight pressure on the outside pressure sensing port:
 - Attach a small piece of tubing to the port and blow lightly into the tube. Do **not** use compressed air, as damage to the sensor can occur. The pressure display can be seen on the status screen. It should fluctuate as pressure is applied to the outside sensing tube.

- Once the reading is verified, place the system in AUTO mode and press the **Run Mode** button. The system is now in the AUTO-RUN mode, which is the normal operating mode while the main engines are running.
- Blow into the tube again and watch the fan speed indicator. The system will adjust the intake fan speed in an attempt to maintain $-100''$ W.C. (default pressure setpoint) in the engine room. If the pressure is read as more negative than the setpoint, the intake fan speeds up. As the pressure falls below the setpoint, the fan slows down. The farther away from the setpoint the reading is, the faster the fan reacts.
- Test the temperature sensor(s) and the exhaust fan control:
 - Ensure that the system is in AUTO-RUN mode and check the temperature for accuracy. Verify the setpoint by pressing the **Auto Options** button.
 - Use a heat gun, or other heat source, to warm the sensor slightly. The exhaust fan speed should start to increase slowly as the temperature rises above the setpoint.

The system is now ready for sea trials, or advanced installation option configuration.

5.2 Advanced installation configuration

The EVC2 has several options available to customize the system for various applications.

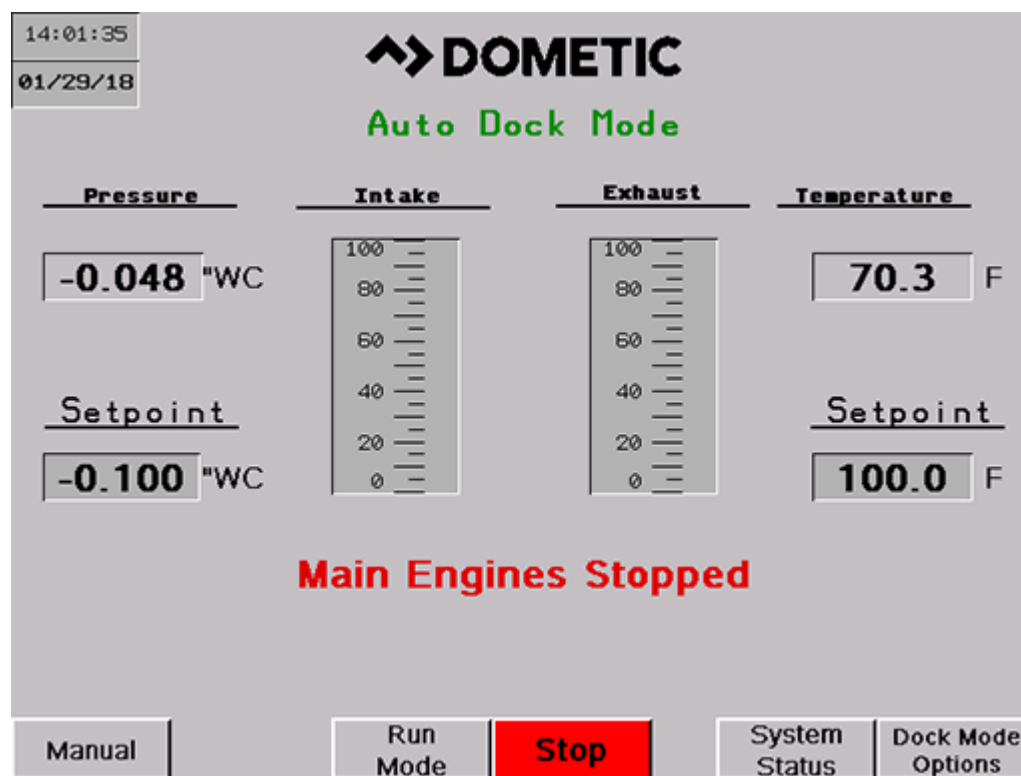


Before starting advanced configurations, verify that the system is functioning properly using the default settings.

- To access the options, log in to the system as a TECH by pressing the **Login** button. A numerical keypad appears. Enter the username and PIN code **3141**.
- Press the **Status**, **Settings**, and **Alarm** buttons on any of the main screens. This displays four different option buttons.
- Press the **Setting Menu** button to display the available setting options.
- Select the option to be configured.

5.3 Operation modes

Mode	Description
AUTO Mode (RUN/DOCK)	In normal day-to-day operation, the system should be left in auto-run or AUTO-DOCK mode. When the main engines are OFF, the system is in AUTO-DOCK mode, which provides ventilation of the space with low noise and electrical loads. When the engines are started, the EVC2 goes into AUTO-RUN mode, and automatically starts the fans to provide ventilation and combustion air. The system continuously manages the fan speeds based on those requirements.
AUTO-DOCK	When the main engines are stopped, the control switches to AUTO-DOCK mode. In this mode, the maximum fan speed can be limited to reduce noise and electrical load, while still ventilating the engine room. AUTO-DOCK mode allows the operator to set a specific temperature in the engine room, and the fans will then operate thermostatically to maintain that setpoint. In this mode, the intake fan speed is based on pressure, so it is normal for the fans to operate at or near minimum speed.



Mode	Description
AUTO-RUN	Once the engines are running, the exhaust and intake fans increase or decrease their speeds to maintain the pressure and temperature setpoints. The intake fan speed is based on the difference in pressure between the engine room and the outside atmosphere. The control has two pressure-sensing tubes, one that terminates inside the engine room, and one that terminates outside. The EVC2 makes constant intake speed adjustments to maintain a very slight negative atmospheric pressure inside the engine room. Maintaining a negative pressure prevents unwanted fumes from being pushed into interior spaces of the vessel. In addition, maintaining the pressure setpoint will ensure the engines have enough air for combustion. The exhaust fan speed is based on the temperature inside the engine room. As the temperature increases due to the heat released by the engines, the exhaust fan speed increases to remove the heat from the room and to maintain the setpoint temperature. As the temperature decreases, the fan speeds decrease. When the vessel is underway, the main engines are consuming a significant volume of air due to combustion, which makes the pressure differential increase, so it is usual for the exhaust fans to operate at lower speeds.

13:59:55

01/29/18

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Auto Run Mode

Pressure

-0.048 "WC

Setpoint

-0.100 "WC

Intake

100

80

60

40

20

0

Exhaust

100

80

60

40

20

0

Temperature

70.3 F

Setpoint

100.0 F

Main Engines Running

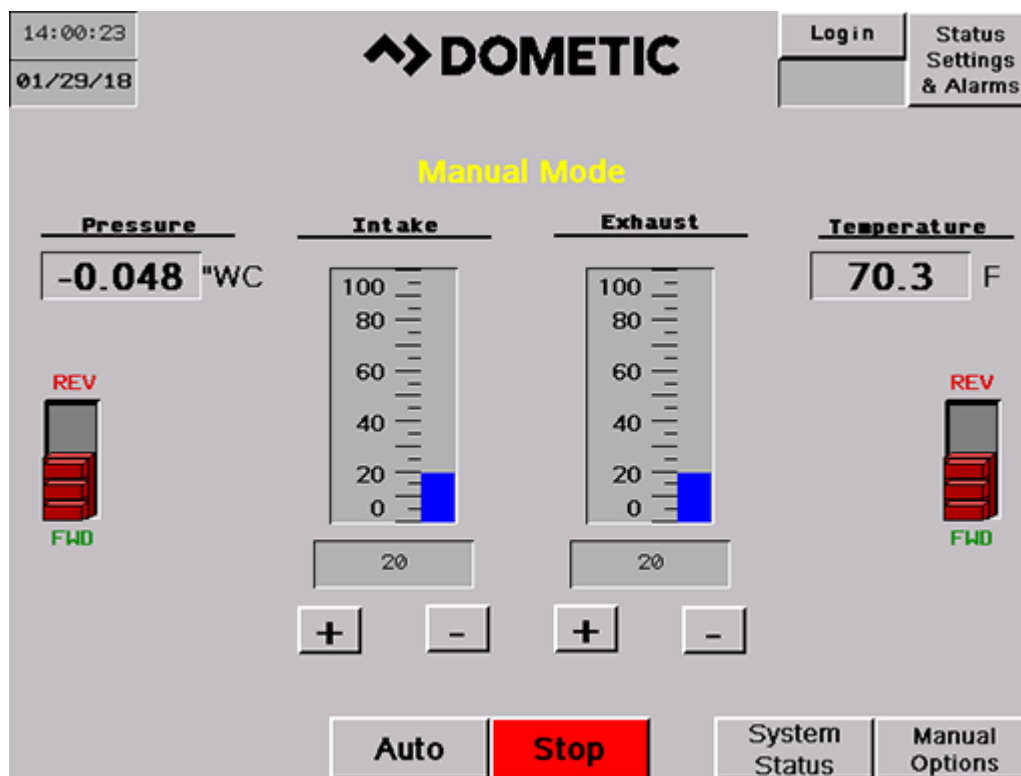
Manual

Stop

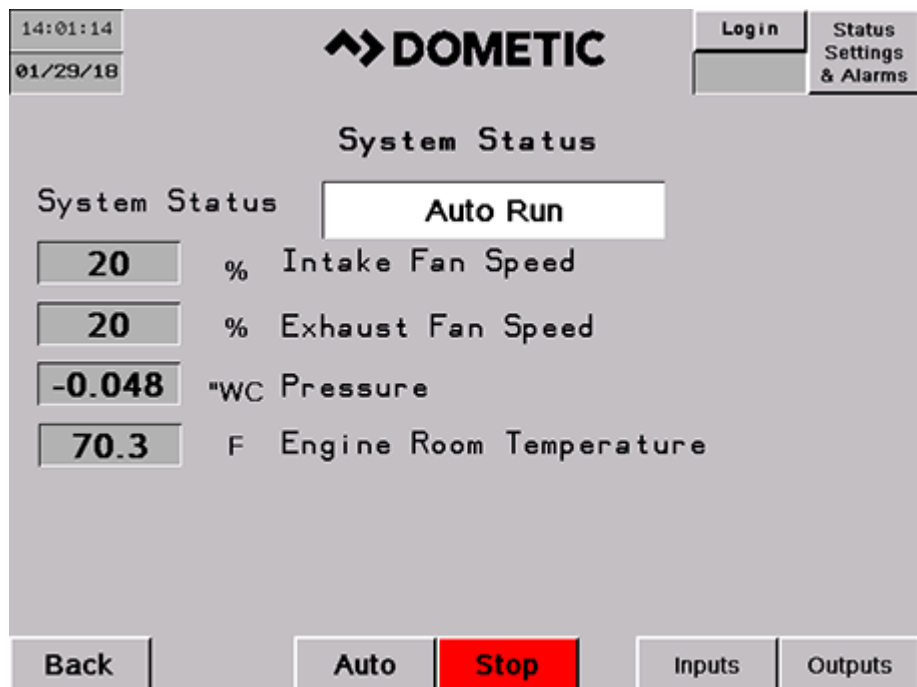
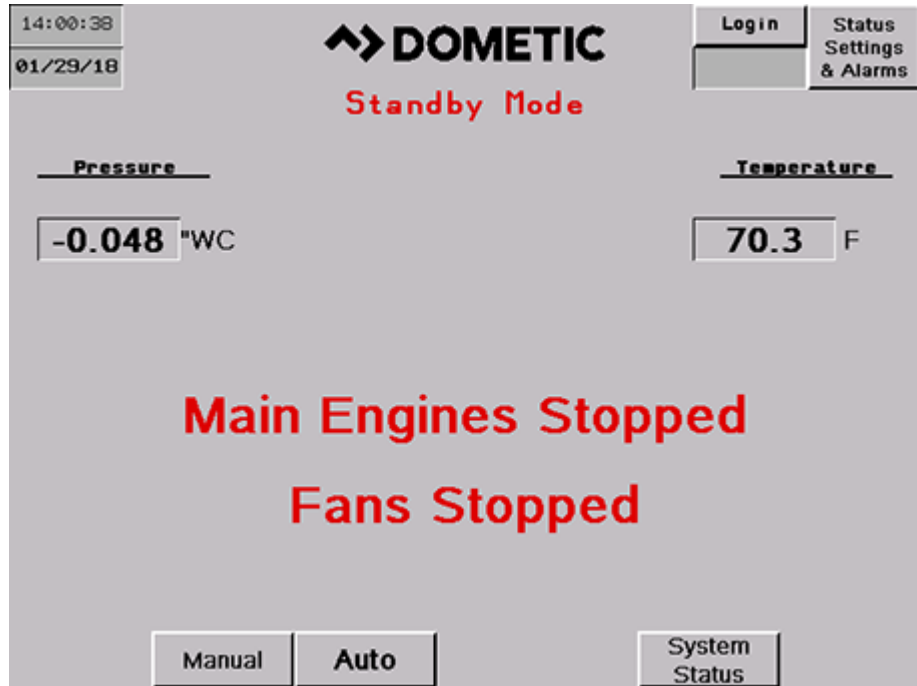
System Status

Run Mode Options

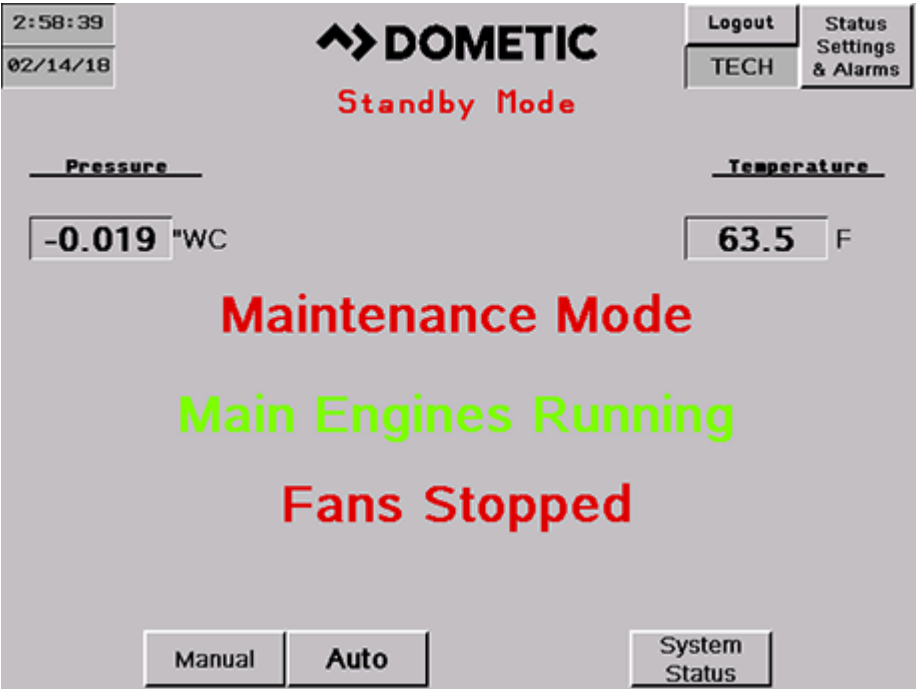
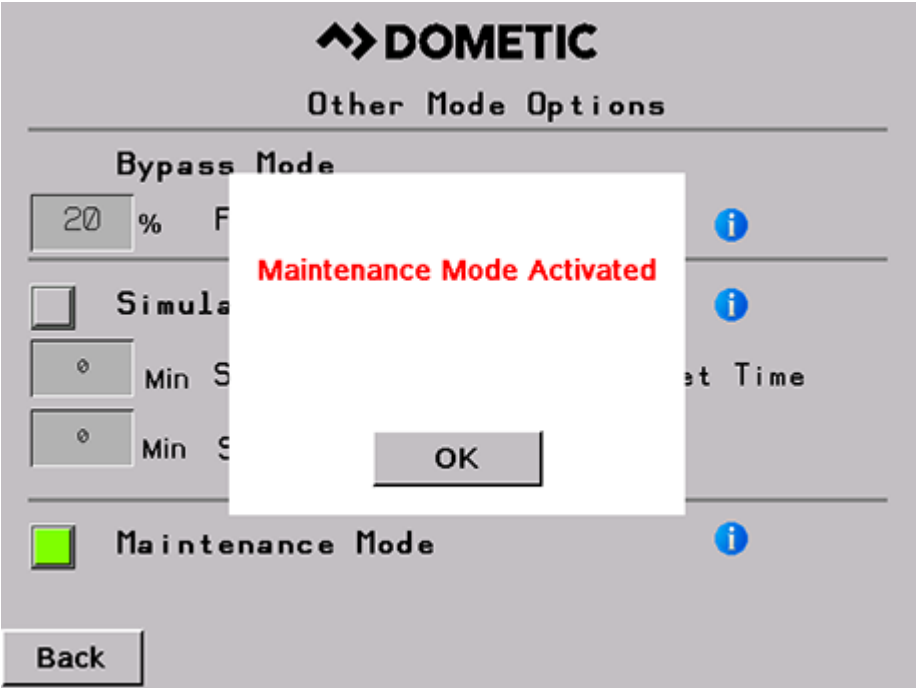
Mode	Description
MANUAL Mode	Enter MANUAL mode at any time by pressing the Manual button on the bottom of the screen. MANUAL mode provides independent control of the speed and direction of both the intake and exhaust fans. Temperature and pressure are displayed for reference on this screen, but no fan speed control is performed by the EVC2. Pressing the + or - button changes the fan speed in 10% increments. The fans can be reversed at any time. They perform a controlled stop before changing direction. This prevents component damage and electrical spikes.  The system will not revert to AUTO mode if left in MANUAL mode. Return the system to AUTO mode or STOP mode after using MANUAL mode, so the system will function properly when the main engines are started.
BYPASS Mode (Alarm Bypass)	The BYPASS mode is intended for limited operation, and is only available in the event of a fire system discharge, or an emergency stop input. This mode can be used for clearing smoke, or providing ventilation during repairs. The system cannot return to normal operation until the situation that caused the alarm is corrected.



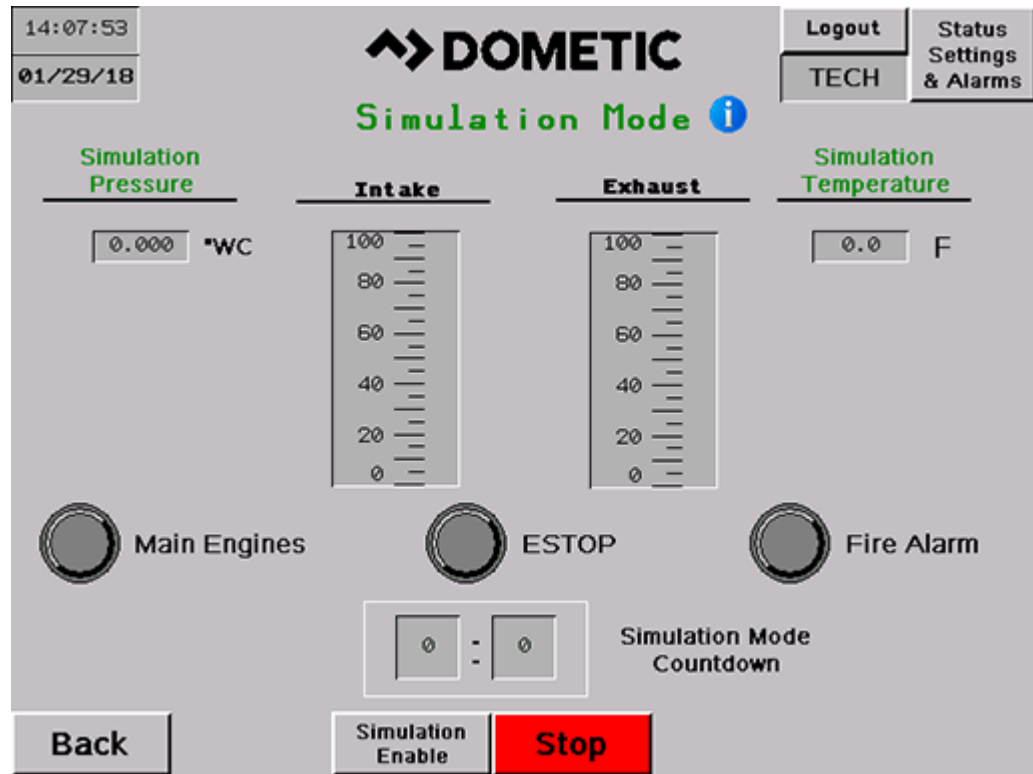
Mode	Description
STOP Mode (STANDBY)	⚠ WARNING CUT HAZARD. STOP mode does not guarantee that the fans will remain OFF. If the main engines are started, the system reverts to AUTO mode and the fans are started again. Before doing any maintenance around the fans, place the system into MAINTENANCE mode and disconnect the main power supply to the variable frequency drives (VFDs) that control each fan. Failure to do so could result in serious injury or death. Enter STOP mode at any time by pressing the Stop button on the touch screen. In this mode, the engine room status is displayed, but the fans are stopped. The fans remain stopped until the main engines are turned OFF, then restarted. The system reverts to AUTO mode to provide cooling and combustion air. In the event that the fans need to remain OFF indefinitely, the system should be placed in MAINTENANCE mode.



Mode	Description
Maintenance Mode	Enter MAINTENANCE mode at any time by accessing the "Other Mode Options" screen and pressing the activation button for the mode. Once activated, the engine room status is displayed, but the fans are stopped. While in this mode, all physical inputs and outputs are disabled. The system does not switch back to AUTO mode even if an engine running signal activates. Place the system back into AUTO mode after completing maintenance.



Mode	Description
SIMULATION Mode	In this mode, the system overwrites the engine running input signal, as well as the pressure and temperature inside the room, so the user can simulate an AUTO-RUN or AUTO-DOCK mode situation when the engines are actually OFF. This is mainly used to tune the PID loops or simulate alarms when setting up a new system. When in this mode, a countdown timer sets the amount of time planned to stay in simulation. After the time has elapsed, the system automatically switches to AUTO mode.



5.4 General options & settings

Option	Description
Auto Start Delay	- If the main engines start while the system is in the STANDBY mode, the system reverts to AUTO-RUN mode automatically after a 15-second delay. - This option allows the installer to change the delay time, or turn it OFF completely.
Power Failure Restart	- This option allows the installer to choose in which mode the system restarts after a momentary power loss. This occurs when switching from dock power, and it is useful to have the system restart in its previous state. - If this presents a safety concern for the installation, the Stopped option should be selected.
Vessel Name	- Turning this option ON allows the installer to enter the name of the vessel or builder, which displays on the OI opening screen and in the STANDBY mode. - To enter text, press the square box next to the options buttons and a text entry keypad will appear.
Emergency Stop Input	This option makes the E-stop button a normally closed switch instead of a default normally open switch.

System general options

Option	Description
Boat Name	Add a boat name to the main screen of the system or screen saver.
Room Type	Select the room in which the ventilation system will be installed.
Power Failure Restart	Select this option to restart the system automatically in the most recent mode set before a power failure occurred. This option allows the installer to choose in which mode the system restarts after a momentary power loss. In many situations, this can occur when switching from dock power and it is useful to have the system restart in its previous state. If this presents a safety concern for the installation, select the Stopped option.
Auto Start Delay	Select this option to add a delay before the system automatically restarts after a power shut down occurs, or when the engine running signal activates. If the main engines start while the system is in STANDBY mode, the system will revert to AUTO-RUN mode automatically after a delay. This option allows the installer to change the delay time, or turn it OFF completely.
Outside Air Temp (OAT) Sensor	Select this option to enable the use of an outside temperature sensor.
Temperature Display	Choose between Celsius and Fahrenheit as the temperature scale to be displayed on all temperature readings.
Fan Speed Display	Choose to display the fan speed as either a bar or a gauge.

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System - General Options ⓘ

Boat Name

Room Type

☒ Engine

☐ Generator

Power Failure Restart

☐ Stopped

☒ Previous Mode

☐ **Auto Start Delay** **Auto Start Delay Time**
Sec

☐ **Outside Air Temp Sensor**

Temperature Display

☒ Degrees F

☐ Degrees C

Backlight

☐ Time Off Min

☐ Screen Saver

Fan Speed Display

☒ Bar Display

☐ Gauge Display

Back **Next**

System general options 2

Option	Description
Display Brightness	Increase or decrease the display brightness.
Set Date Time	Set the date and time in the system.
Emergency Stop Input	Select the type of emergency stop button and wiring to be used as the E-stop button. If no E-stop button is installed, the option should be left disabled (normally open).
Simulation Mode	Select this option to activate and set the duration of the SIMULATION mode.

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System - General Options 2 ⓘ

▲▼ **Display Brightness**

☒ **Date: MM/DD/YYYY**

☐ **Date: DD/MM/YYYY**

☒ **Time: 24:00:00**

☐ **Time: 12:00**

00:00:00

Set Date Time

☒ **Emergency Stop Input NO**

☐ **Emergency Stop Input NC**

☐ **Simulation Mode** **Sec**

☒ **Fire System Input NO**

☐ **Fire System Input NC**

☒ **Pressure Sensor Input AIN 3**

☐ **Pressure Sensor Input AIN 4**

Back **Next**

System general options 3

Option	Description
System Type	Select the type of system to be commissioned. Monitoring of pressure and temperature are the most common systems installed.

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System - General Options 3

System Type

☒ Pressure/Temp

☐ Pressure Only

☐ Temp Only

Reverse Options

Run ☒ **Reverse Options** **Dock** ☒

No

Limited

Full

Pressure Settings

Pressure Setpoint WC

Negative Pressure Alarm WC

Negative Press Delay Sec

Positive Pressure Alarm WC

Positive Press Delay Sec

Temperature Settings

Room Temperature Setpoint F

High Temperature Alarm F

High Temperature Alarm Delay Sec

Back **Next**

Reverse Options

- This option enables reversing of the fans from the AUTO mode screen. In most installations, reversing the fans in RUN mode will not provide the proper amount of cooling or combustion air because the fans are designed for more efficient operation in one direction.
- It is recommended that this option be set to **No** for AUTO-RUN mode.
- Contact Dometic Technical support before enabling this option.
- In DOCK mode, the fans normally operate at reduced speeds and flows, so proper ventilation can be accomplished with the fans running in reverse. On most applications, this setting can be set to **Limited** without reducing the effectiveness of the system.
- When the system is in AUTO-DOCK mode, a **Reverse** button is available. Pressing this button displays a screen warning that the fan flow is limited in reverse, but allows the reversing of the fans. When the system switches to AUTO-RUN mode, the fans return to forward operation.
- The **Full** option should not be selected unless the system has been specifically designed by Dometic to operate as a reversible system.

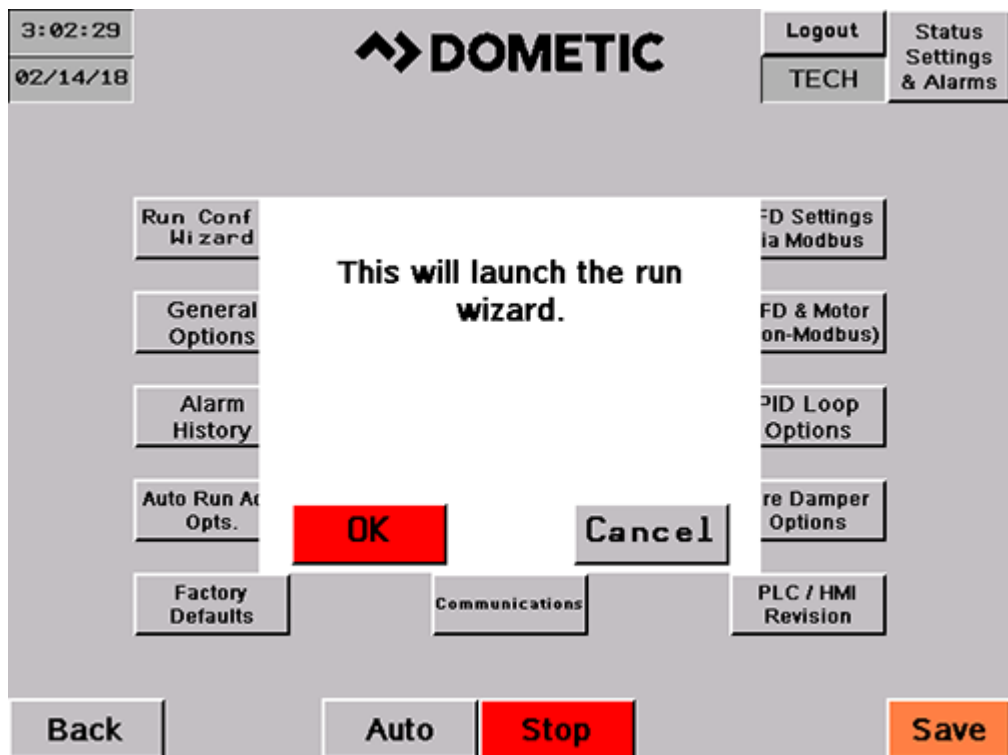
Pressure Setpoint

- The pressure setpoint is placed in the pass code-protected parameters section.
- There are two settings: the setpoint and the alarm level.
 - The setpoint is the target engine room pressure. This setting is normally .100" W.C. This maintains the engine room at a slight negative pressure to prevent fumes from being forced into the interior, while still meeting the operating specifications for major engine manufacturers. Raising this setpoint creates more negative pressure, which may cause issues with engine performance. Lowering the setpoint creates less negative pressure, but may cause erratic operation of the control system. Due to the extremely low pressures being measured, the linearity of the sensor starts to become an issue at settings much below .100" W.C.
 - The alarm level sets the point where the system issues a negative pressure alarm. There is a time delay built into this alarm to allow time for system corrections.

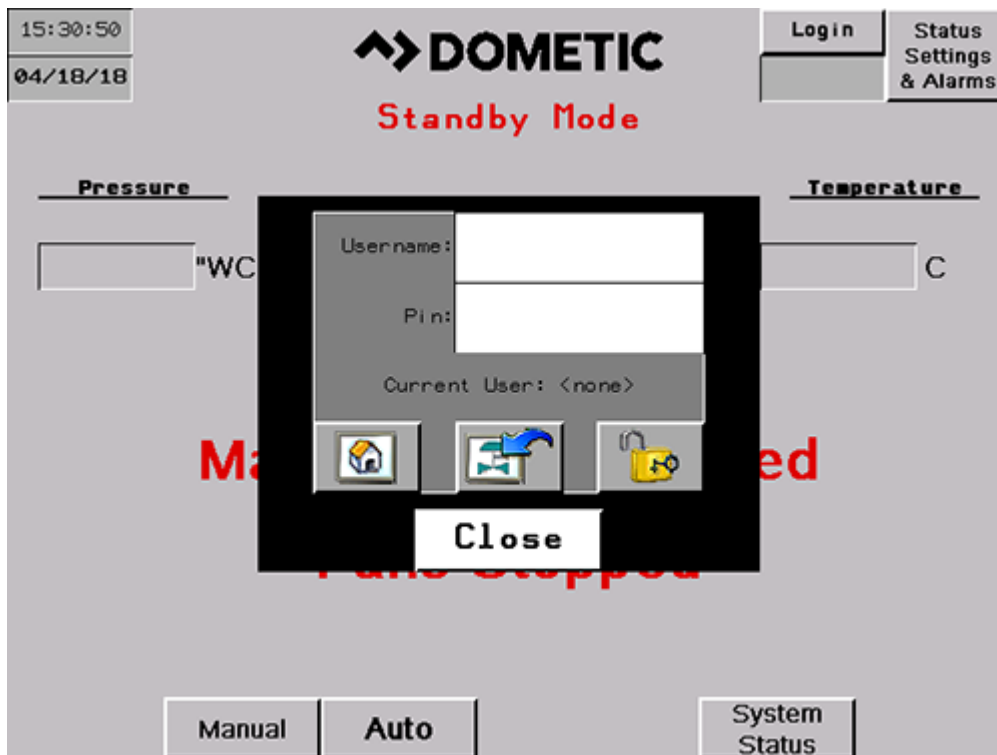
Option	Description
Positive and Negative Pressure Setpoint Alarms	Used to modify the minimum and maximum room atmospheric pressure.
Positive and Negative Pressure Alarm Delays	Used to add a delay before the system generates a pressure alarm.
Temperature Setpoint	Used to modify the room temperature setpoint of the system. This setpoint is the temperature on which the exhaust fan speed is based.
High Temperature Alarm	Used to modify the maximum temperature reached in the engine room before generating an alarm.
High Temperature Alarm Delay	Used to add a time delay before generating an alarm.

Settings set-up screens

Screen	Description
Commisioning Wizard	The commissioning wizard allows the operator or boat engineer to go, step-by-step, through the basic settings required to activate the ventilation system. In this mode, the system stops all outputs and prevents them from restarting until the wizard is completed. The system only switches to AUTO mode once the operator has manually selected it.



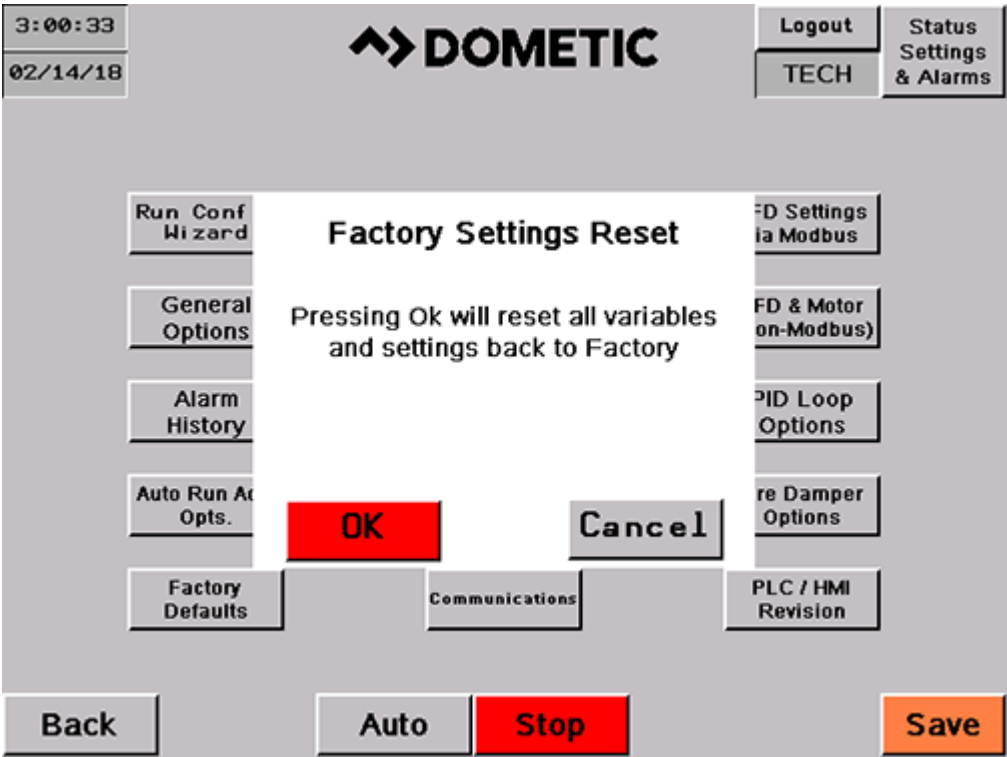
Screen	Description
Security	The security login pop-up allows a user to log into the system using the factory default credentials. Three different security levels are pre-configured: FACTORY: Security Level 20 – Permission to change high-level parameters TECH: Security Level 15 – Permission to change mid-level configurable parameters OPER: Security Level 10 – Permission to change basic-level configurable parameters ➤ Once the credentials are entered, press the Padlock button, and then press the Close button. The system will automatically log out after five minutes of inactivity or when the Logout button is pressed.



Screen	Description
--------	-------------

Factory Reset The system parameters may be changed back to the factory default by an installer, dealer, or end user.

- To restore the original factory default parameters manually, press the **Factory Defaults** button and then press the **OK** button.



Screen	Description
AUTO-RUN Mode Options (Basic)	Pressure setpoint: The target engine room pressure. Positive and negative pressure alarm: Used to modify the minimum and maximum room atmospheric pressure. High temperature alarm: Sets the point at which the system will issue a high-temperature alarm. Room temperature setpoint: The temperature setpoint that the system will try to maintain in the engine room. This option is not available when using a true Delta T mode. High temperature alarm delay: Used to add a time delay before generating an alarm.

DOMETIC

AutoRun Mode Options

Pressure Settings		Temperature Settings	
Pressure Setpoint	-0.100 °WC	Room Temperature Setpoint	100.0 °F
Negative Pressure Alarm	-0.399 °WC	High Temperature Alarm	135.0 °F
Negative Press Delay	Sec	High Temperature Alarm Delay	Sec
Positive Pressure Alarm	0.399 °WC		
Positive Press Delay	Sec		

Back

Screen	Description
AUTO-RUN Mode Options (Advanced)	AUTO-RUN mode options are used to assist the engine with more combustion air in situations like throttling or initial vessel take off. Auto reverse option: (adjustable range 80%–100%) When the engine running signal is active, all fans work as normal. Once the intake fan speed has reached 100%, the exhaust fan stops and reverses direction to assist with the air intake. Once the speed of the intake and exhaust fans have decreased to 50%, the exhaust fan switches back to normal direction. Auto reverse option all-intake speed: Specifies the intake fan speed that triggers switching all fans to air intake. Auto reverse option all-intake delay time: When all fans are running normally, this is used to specify the time delay before the exhaust fans switch to run as intake fans. Auto reverse option back to normal speed: When all fans are running as intake, this is the speed at which the exhaust fans switch back to air exhaust. The adjustable range is 40%–60%. Auto reverse option back to normal delay time: Used to specify the time delay before the exhaust fans switch back to air exhaust when all fans are running as intake fans.

DOMETIC

Auto Run Mode Options ⓘ

☐ Auto Reverse Option

Auto Reverse Option All Intake Speed %

Auto Reverse All Intake Delay Time Sec

Auto Reverse back to Normal Speed %

Auto Reverse back to Normal Delay Time Sec

Back **Next**

Screen	Description
AUTO-DOCK Mode Options	Temperature shutdown: When in AUTO-DOCK mode, the exhaust fans keep running based on the temperature shutdown setpoint. Once the room is below the temperature shutdown setpoint, the exhaust fans stop. This value should always be smaller than the temperature restart value. Temperature restart: When in AUTO-DOCK mode, the exhaust fans start based on the restart temperature setpoint. This value should always be larger than the temperature shutdown value. Minimum intake DOCK mode speed: While in AUTO-DOCK mode, this is the minimum speed at which the exhaust fans run, based on the pressure setpoint of the system. Maximum exhaust DOCK mode speed: While in AUTO-DOCK mode, this is the maximum speed at which the exhaust fans run, based on the pressure setpoint of the system.



Auto Dock Mode Options

95.0

F

Temperature Shutdown

100.0

F

Temperature Restart

0

%

Minimum Intake Dock Mode Speed

45

%

Maximum Exhaust Dock Mode Speed

Back

Next

Screen	Description
Other Mode Options	BYPASS mode: Used to bypass the initial functionality of an E-stop button or fire alarm signal. Once selected, the system cannot return to normal operation until the situation that caused the alarm is corrected. In this mode, the fans run at 20% (default) their maximum speed, independent of the current pressure or temperature values. However, the fan speed can be manually set to higher speeds, if required. Fan-speed bypass mode: Allows the user to change the fan speed when the system is in BYPASS mode. SIMULATION mode: In this mode, the system overwrites the engine running input signal, as well as the pressure and temperature inside the engine room, so the user can simulate an AUTO-RUN or AUTO-DOCK mode situation while the engines are OFF. This is mainly used to tune the PID loops or to simulate alarms when setting up a new system. • Simulation mode countown: Sets the amount of time planned to stay in simulation. After the time has elapsed, the system automatically switches to AUTO mode. MAINTENANCE mode: While in this mode, all physical inputs and outputs are disabled. The system does not switch back to AUTO mode even if an engine running signal activates. Place the system back in AUTO mode after completing maintenance.



Other Mode Options

Bypass Mode

20

% Fan Speed - Bypass Mode

i

☐

Simulation Mode

i

0

Min Simulation Mode Timer - Set Time

0

Min Simulation Mode Countdown

☐

Maintenance Mode

i

Back

Screen	Description
Motor Options (VFDs)	VFD brand & model: Select the brand and model of the VFD (Schneider® 312 or 320, or Allen Bradley® 4 or 4M). Number of VFDs: Set the number of VFDs that are connected via Modbus to the system. Drive: Select between intake and exhaust functionality. By default, intake drives are "odd" and exhaust drives are "even". It is recommended to keep the default settings. ACC/DEC: Select the acceleration or deceleration of the motor specified in the VFD.

ATV312

VFD Brand & Model

2

Number of VFD's

Drive 1

☒ Intake

☐ Exhaust

ACC

10.0

Sec

DEC

8.6

Sec

Drive 2

☐ Intake

☒ Exhaust

ACC

10.0

Sec

DEC

8.6

Sec

Back

Next

27

EN

Screen	Description
Other Motor Options (Non-VFDs)	Inside room circulation fan: Select to enable an air-circulation room fan (PLC DO1). Enclosure ventilation fan: Some control enclosures require cooling and air circulation to avoid overheating the equipment. Select to enable a ventilation electrical enclosure fan (PLC DO2). Enclosure fan temperature ON/OFF: Select to specify the setpoints to turn the enclosure fan ON or OFF. Analog controlled signal type: The controller can provide analog signals to motor drives when Modbus communication is not possible or when analog controlled drives are part of the system. Analog motor signal control type: Used to enable either or both types of analog signals to send to non-Modbus-controlled motors. Signals are either 4–20 mA or 0–10 VDC (PLC AO1 to AO4). Analog motor control status & direction: Used to enable either or both types of digital signals to send to and read from non-Modbus-controlled motor drives (PLC DO5 to DO8).

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Other Motors Options ⓘ

☐ Inside Room Circulation Fan

☐ Enclosure Ventilation Fan

Enclosure Fan ON Temperature 100.0 F

Enclosure Fan Off Temperature 97.0 F

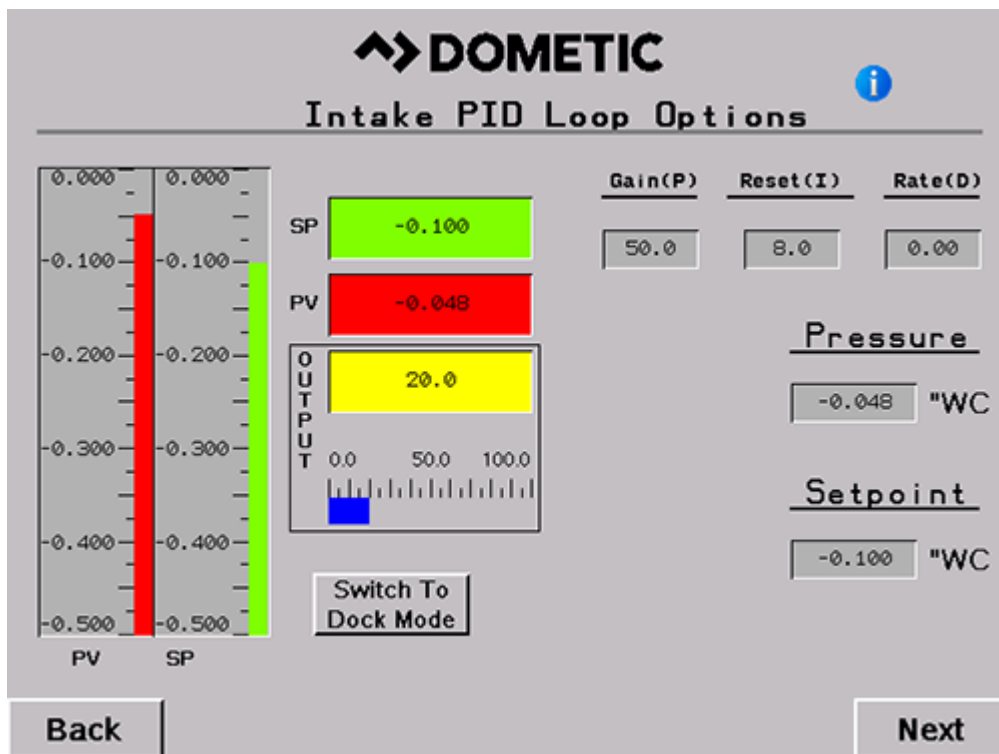
Analog Motor Control Signal Type

☐ Intake A01/Exhaust A02/Motor Control 0-10VDC
 ☐ Intake A03/Exhaust A04/Motor Control 4-20mA

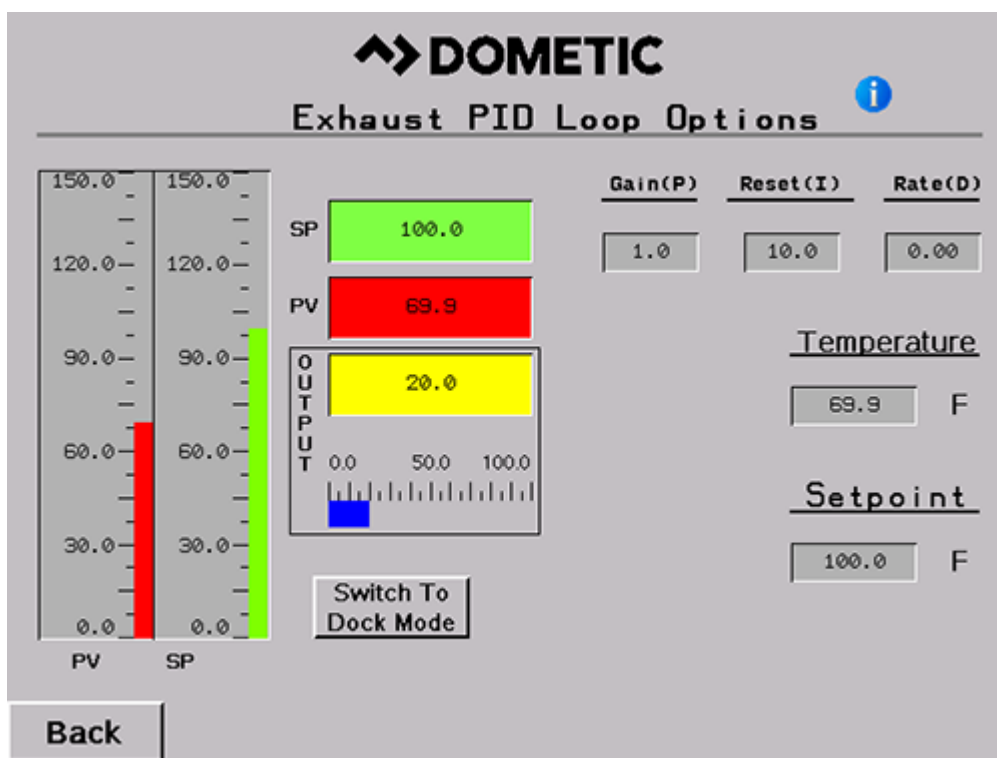
Analog Motor Control Status & Direction

☐ Intake/Exhaust Motor Control Run/Stop (DO8)
 ☐ Intake/Exhaust Motor Control Fw/Rev (DO7)

Screen	Description
Intake PID Loop Options	Default values are optimal for most systems. Gain, reset, and rate: Used to tune the PID loop. Changing these values is generally not required. Pressure: Shows the current pressure reading. Switch to (dock or run) mode: Used to select which PID parameters to change, either for DOCK or RUN mode. Setpoint: Used to modify the room atmospheric pressure setpoint. The intake PID is based on the difference in pressure between the engine room and the outside atmospheric pressure.



Screen	Description
Exhaust PID Loop Options	Default values are optimal for most systems. Gain, reset, and rate: Used to tune the PID loop. Changing these values is generally not required. Temperature: Shows the current temperature reading. Switch to (dock or run) mode: Used to select which mode PID parameters to change, either for DOCK or RUN mode. Setpoint: Used to modify the room temperature setpoint of the system. This setpoint will be the temperature on which the exhaust PID will be based.



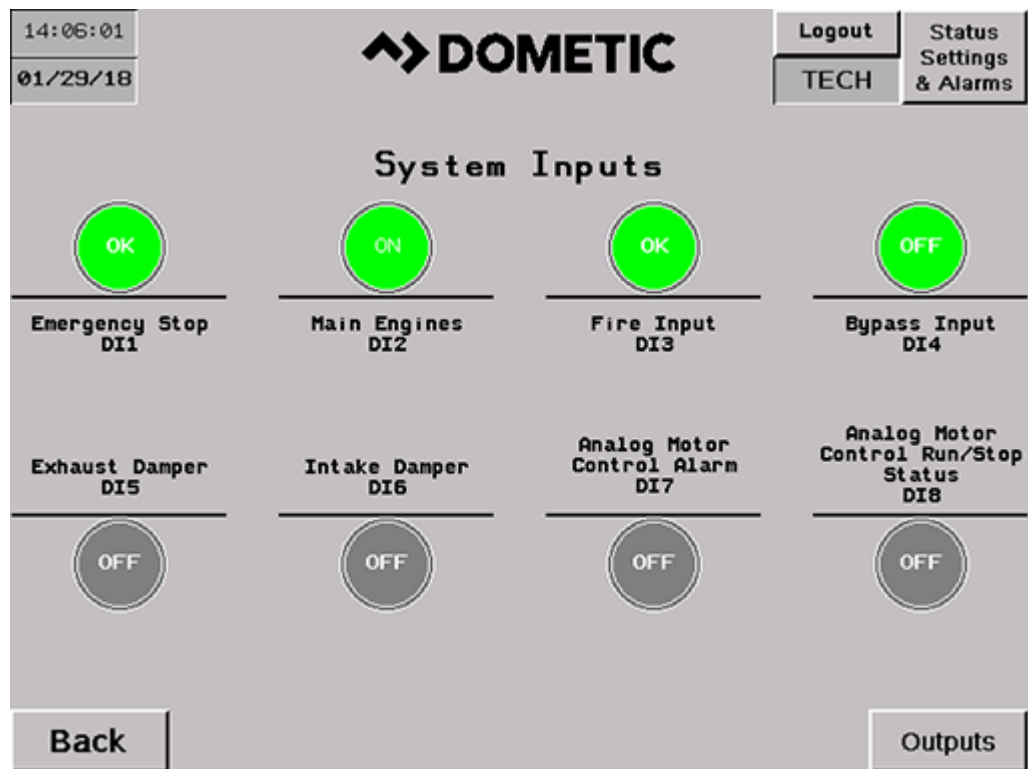
Screen	Description
Fire Dampers	This system can control and monitor fire dampers through the VFD I/O terminal of the specific motor, if the motor is controlled through Modbus communications. Also, if the motors are controlled through the PLC outputs, the dampers can be controlled and monitored through the PLC I/O terminals. Damper option ON/OFF: Activates the control and monitoring of the fire dampers either through VFD or PLC I/O terminals. Fire damper feedback alarm delay: Sets the delay time before activating an alarm when a damper has not closed or opened. Damper status open/close: Checks the input to monitor fire dampers when set to provide status feedback (some dampers do not provide open/close status). Intake and exhaust for analog-controlled VFDs: Enables controls and monitoring of as many dampers as motors are active, using the PLC I/O terminals.

Screen	Description
Security Setup	The security setup pop-up allows the user to set a new user ID, PIN, and security level for accessing the system. The PIN entry is required every time the system enters SLEEP mode or after five minutes of touchscreen inactivity. The PIN entry is also required if the level setting is changed or if the system is AC-power cycled. This pop-up allows the deletion of currently active user IDs. If for any reason all PINs are forgotten, a factory reset or software re-load is required.

Motors, I/Os, and alarms statuses

The EVC2 control has several features that are designed to assist in monitoring and troubleshooting a system malfunction. The system inputs and outputs, and many VFD and other motor operation parameters, can be viewed directly. The system also has an alarm history screen that displays the time and frequency of alarms.

Mode	Description
System Inputs	The system inputs screen shows the status of the input signals that the EVC2 control logic is using to make decisions. If an input is abnormal, the indicator on this screen will be flashing. After the condition has been corrected, it may be necessary to press the Alarm Reset button to clear the system and return it to normal operation. Emergency stop input (DI1): Indicates the state of the optional E-stop button. Main engines (DI2): Indicates the state of the main engine(s). Fire input (DI3): Indicates the state of the fire extinguishing system. Bypass input (DI4): Indicates the state of the optional bypass switch. The following inputs are all relevant to VFDs not using Modbus as the main communications protocol: - Exhaust and intake damper open/close status (DI5 and DI6) - Analog motor control alarm status (DI7) - Analog motor control run/stop status (DI8)



Mode	Description
System Analog Inputs	Inside air temperature sensor: Indicates the state of the optional E-stop button.
	Outside air temperature sensor (opt): Indicates the state of the main engine(s).
	Pressure differential sensor: Indicates the state of the fire extinguishing system.
	Backup pressure differential sensor (opt): Indicates the state of the optional bypass switch.

14:08:03
01/29/18



Logout
TECH

Status
Settings
& Alarms

System Analog Inputs

70.3

F

Inside Air Temperature Sensor

_*_*_*_*_*

F

Outside Air Temperature Sensor (Opt)

-0.048

WC

Pressure Differential Sensor

0.103

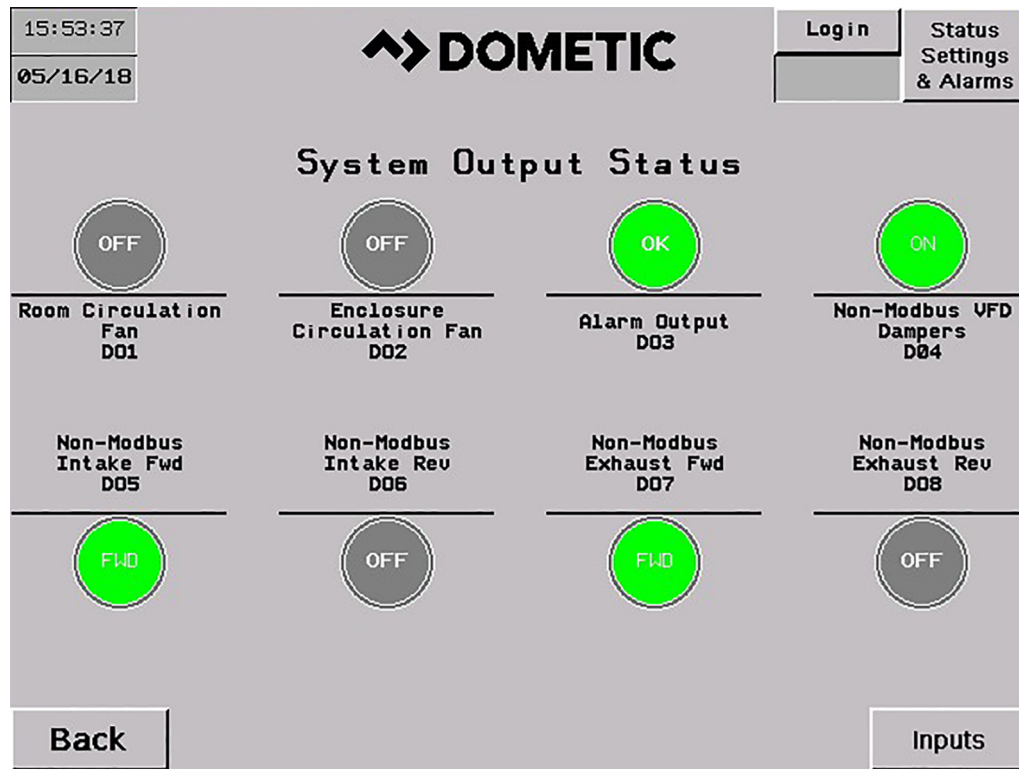
WC

Backup Pressure Differential Sensor (Opt)

Back

Outputs

Mode	Description
System Output Status	The output screen shows the status of the output signals the EVC2 control logic is activating. If an output is abnormal, it will be flashing. In most systems, only one or two of these outputs is utilized, as the majority of the signals are being transferred to the VFDs across the DH-485 communications network. Room circulation fan (DO1): Used to activate the room circulation fan when the option is active and the setpoint has been reached. Enclosure circulation fan (DO2): Used to activate the enclosure circulation fan when the option is active and the setpoint has been reached. Alarm output signal (DO3): Used to signal the vessel's master alarm panel if there is a problem with the ventilation system, or to activate a buzzer or other indicator. The following outputs are all relevant to VFDs not using Modbus as the main communications protocol: • Damper control open/close (DO4) • Intake forward signal (DO5) • Intake reverse signal (DO6) • Exhaust forward signal (DO7) • Exhaust reverse signal (DO8)



Mode	Description
VFD Status	The drive status screen shows the status of the VFDs. The information displayed includes: • VFD drive number: Indicates whether the VFD is assigned to an intake (even number) or an exhaust (odd number). • Motor current: Indicates the current output of the VFD. This number is an average of the three phases. • Output frequency: Indicates the actual output frequency of the VFD. • Damper status: Indicates whether the damper wired to the VFD is physically open or closed. • Damper actuator: Indicates whether the VFD damper actuator is ON or OFF.

14:08:24
01/29/18



Logout
TECH
Status
Settings
& Alarms

Drive 1

Status
STOP

Motor Current
0.0 Amps

Output Frequency
0.0 Hz

Damper
OFF OFF
Status Actuator

Drive 2

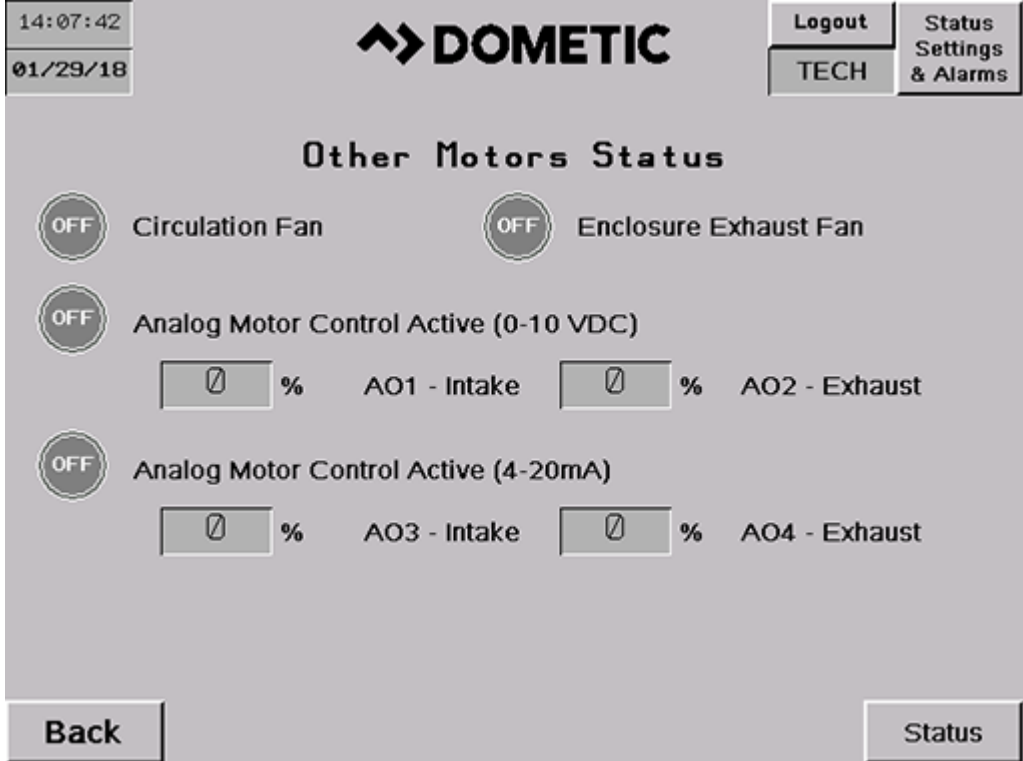
Status
STOP

Motor Current
0.0 Amps

Output Frequency
0.0 Hz

Damper
OFF OFF
Status Actuator

BackStatus

Mode	Description
Other Motors Status (System Analog Outputs)	This screen allows the user to check the status of analog-controlled motors.
	Circulation fan: Indicates when the room circulation fan is ON or OFF.
	Enclosure exhaust fan: Indicates when the enclosure exhaust fan is ON or OFF.
	Analog motor control active (0–10 VDC or 4–20mA): Indicates whether the option is active and the actual analog value present at the PLC output.
	

Alarm History Screen

The alarm history screen displays the time and frequency of any alarms. This screen shows the alarms in historical order. The user can acknowledge active alarms and clear all inactive alarms from this screen.

There are several basic system alarms and warnings. The system alarms are:

- **Over temperature:** Indicates if the over temperature setpoint has been exceeded for several minutes. This can be an indication of high engine room temperatures, or it can be caused by setting the over temperature setpoint too low.
- **Negative pressure:** Indicates if a negative pressure has occurred in the engine room for several minutes. Negative pressure can be caused by a malfunction in the system, but is normally caused by an obstruction in the sensing tubes or the actual intake. A closed damper in the intake path is a common cause of this alarm.
- **Positive pressure:** Indicates if a positive pressure has occurred in the engine room for several minutes. Positive pressure can be caused by a malfunction in the system, but is normally caused by an obstruction in the sensing tubes or the actual intake. This alarm can only occur when the system is set up to maintain a positive, instead of a negative pressure, inside the engine room. A closed damper in the intake path is a common cause of this alarm.
- **VFD faults:** Indicates an abnormal condition in one of the VFDs. The alarm will specify the condition and the specific VFD affected.
- **Fire alarm:** Indicates that the fire system has been discharged, or the fire system switch is open or not connected. The vessel should not be operated until the cause of this alarm is determined and corrected. If the vessel is operated and an actual fire occurs in the engine room, the fans continue to operate and exhaust the extinguishing agent out of the engine room before it has any effect on the fire.
- **E-stop:** Indicates that the E-stop button has been pressed or is not connected properly.
- **Bypass:** This alarm is used to log the activation of the bypass function. The BYPASS mode should not be used under normal circumstances.

The figure displays three sequential screenshots of the Dometic control interface, illustrating the handling of an emergency stop alarm.

Top Screenshot: Alarm History

Message	Date	Time	State
Emergency Stop Active	18/01/23	14:10:17	ACTIVE

Buttons: Back, Alarm Reset

Middle Screenshot: Emergency Stop Dialog

Time: 2:52:11, Date: 02/14/18, Reset It

DOMETIC

Pressure: -0.019 °WC, Intake, Exhaust, Temperature: 63.5 F

Setpoint: -0.100 °WC, Setpoint: 100.0 F

Emergency Stop Active

OK

Manual, Auto, Stop, System Status

Bottom Screenshot: Message Log

Message	Date	Time	State
Emergency Stop Active	18/01/23	14:15:14	UNACK
Emergency Stop Active	18/01/23	14:12:17	RTN
Emergency Stop Active	18/01/23	14:11:23	RTN

Buttons: Back, Alarm Reset

6 DISPOSAL



Place the packaging material in the appropriate recycling waste bins, whenever possible. Consult a local recycling center or specialist dealer for details about how to dispose of the product in accordance with all applicable national and local regulations.

7 CUSTOMER SUPPORT

Use the following information to contact Dometic Marine Customer and Technical Support.

Telephone: +1 954-973-2477

Fax: +1 954-979-4414

Marine Division

Florida

email: MarineSales@dometic.com

24/7 Technical Support

Telephone: +1 800-542-2477

8:00 AM to 5:00 PM Eastern Time

U.S.A. and Canada

+1 888-440-4494

After hours and weekends

email: MarineServiceUS@dometic.com

International Sales and Service

Telephone: +44 (0) 870-330-6101

For all other areas visit our website to find your nearest distributor at www.dometic.com.

8 LIMITED WARRANTY

LIMITED WARRANTY AVAILABLE AT dometic.com/warranty.

IF YOU HAVE QUESTIONS, OR TO OBTAIN A COPY OF THE LIMITED WARRANTY FREE OF CHARGE, CONTACT:

DOMETIC CORPORATION
MARINE CUSTOMER SUPPORT CENTER
2000 North Andrews Ave
Pompano Beach, FL, USA 33069
+1 800-542-2477

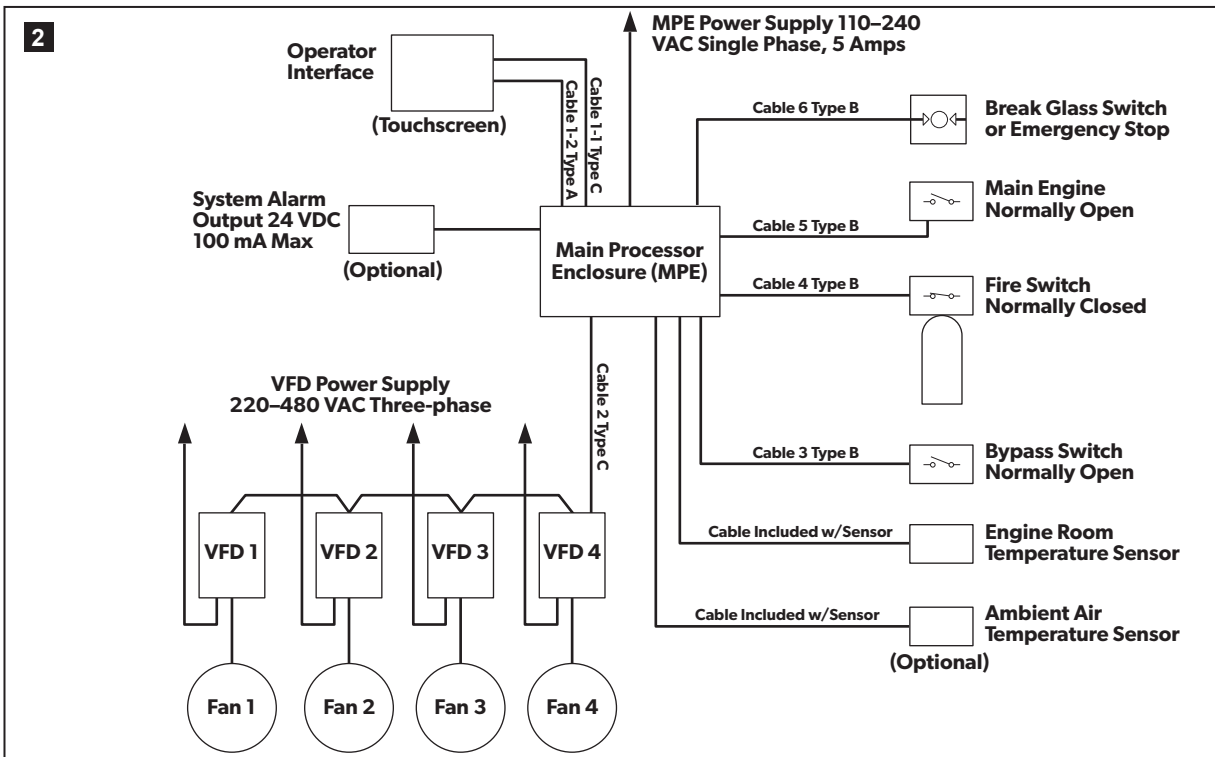
9 APPENDIX

9.1 Alarm descriptions and test methods

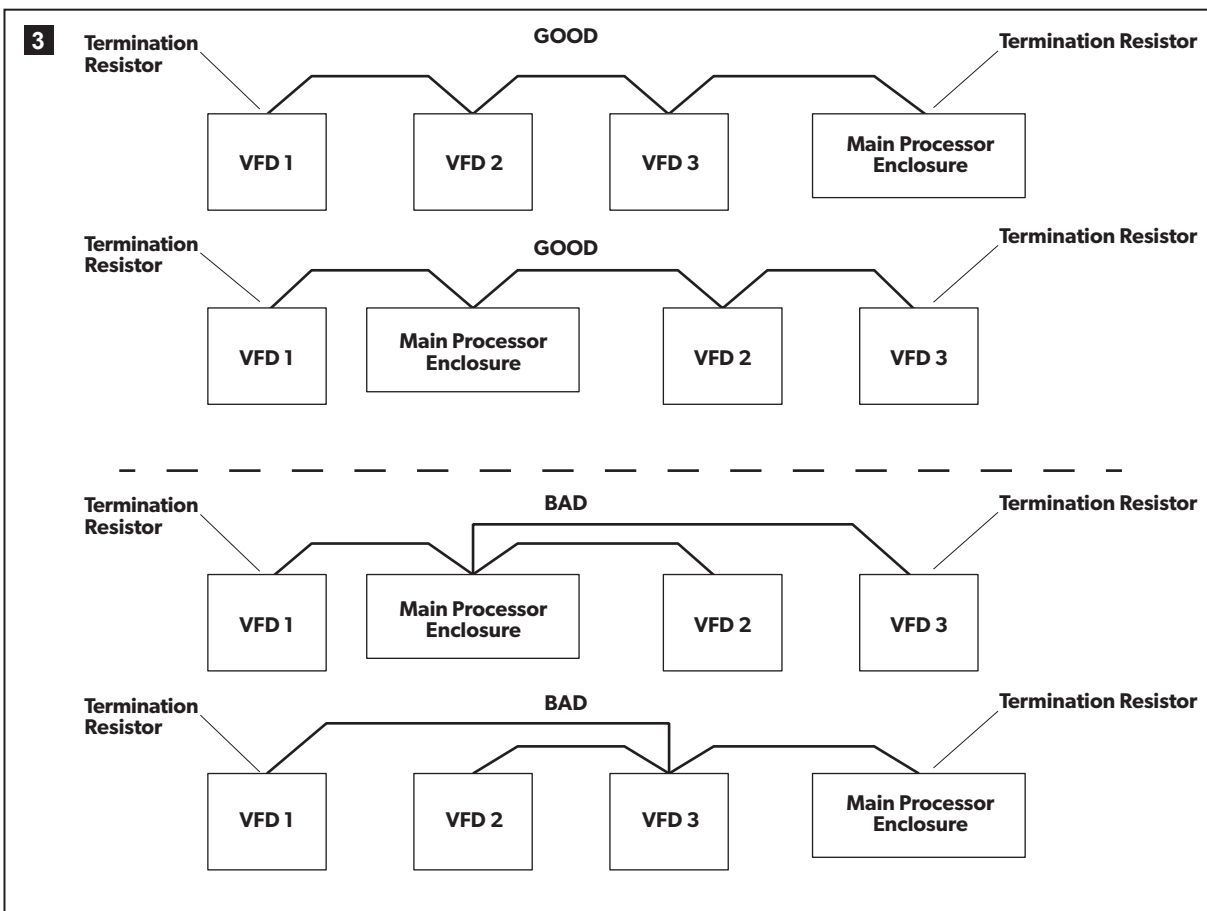
Alarm Type	Description	Test Methods
Negative Pressure	The EVC2 issues a negative pressure alarm when the system detects pressure of .400" W.C. below ambient for more than 100 seconds.	Intake restriction ➤ Turn OFF one of the intake VFDs at the breaker panel. A VFD alarm will sound but can be ignored. ➤ Close the weather cover associated with the VFD that was turned OFF. ➤ Place the system in AUTO mode. ➤ Press the Run Mode button at the bottom of the screen to toggle the system into auto-run mode. The banner at the top of the screen should reflect this mode change from AUTO-DOCK to AUTO-RUN. ➤ Use a heat source such as a worklight or heat gun to heat the temperature probe at least five degrees above the AUTO mode temperature setpoint. This value can be verified by pressing the Auto Settings button at the bottom right of the auto-run screen. This will cause the exhaust fans to ramp up and create negative pressure in the space. Alternatively, if a heat source isn't available, lower the AUTO mode temperature setpoint to a value that is slightly below the current temperature in the space. ➤ Observe the pressure reading on the AUTO mode screen. Once it has passed the .400" W.C. threshold, there will be a time delay of 100 seconds before the alarm is issued. If the pressure drops back below the .400" W.C. value, the time delay will start over.
Fire System Discharge	The EVC2 issues a fire system discharge alarm when the contacts on the fire suppression system are opened. The contact status can be monitored from the touchscreen by going to the status screen and pressing Inputs . A green indicator shows that the contact is closed and normal. Red indicates an open contact, and the operation of the system will be restricted.	Fire system discharge simulation ➤ Using the test methods supplied by the fire suppression system manufacturer, perform a simulated discharge and verify that the EVC2 issues the proper alarm and shuts down all fans.
High Temperature	The EVC2 issues a high-temperature alarm when the temperature of the monitored space exceeds the value of the high-temperature alarm setpoint. The value of the setpoint can be observed by going into AUTO mode, pressing the Run Mode button, and then Settings . The setting can be adjusted from 105 °F–150 °F (41 °C–66 °C).	➤ Place the system into AUTO mode. ➤ Press the Run Mode button at the bottom of the screen to toggle the system into AUTO-RUN mode. The banner at the top of the screen should reflect this mode change from auto-dock to auto-run. ➤ Using a heat source such as a heat gun, raise the temperature of the probe above the setpoint. ➤ Verify that the alarm is issued.
VFD	The EVC2 monitors the status of the VFDs and will issue a general VFD alarm in the event that a fault is generated by the VFD.	➤ Turn OFF the main breaker to any of the VFDs and observe the VFD display until low-voltage fault appears. ➤ Verify that a VFD fault registered on the EVC2 touchscreen.

9.2 Wiring diagrams

System block diagram



Drive network options



A termination resistor is **not** required for all VFD brands. For full details, refer to the VFD installation manual.

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