

INSTALLATION INSTRUCTIONS

Original Issue Date: **4/12**

Model: **6EKOD/5EFKOD, 9EKOZD/7EFKOZD, and 11EKOZD/9EFKOZD**

Market: **Marine**

Subject: **Two-Inch (SmartCraft™) Digital Gauge Kits
GM85174-KP1 and GM85174-KP2**

Introduction

The remote two-inch digital gauge has controls that allow starting, stopping, resetting faults, and monitoring of generator set functions. See Figure 1.

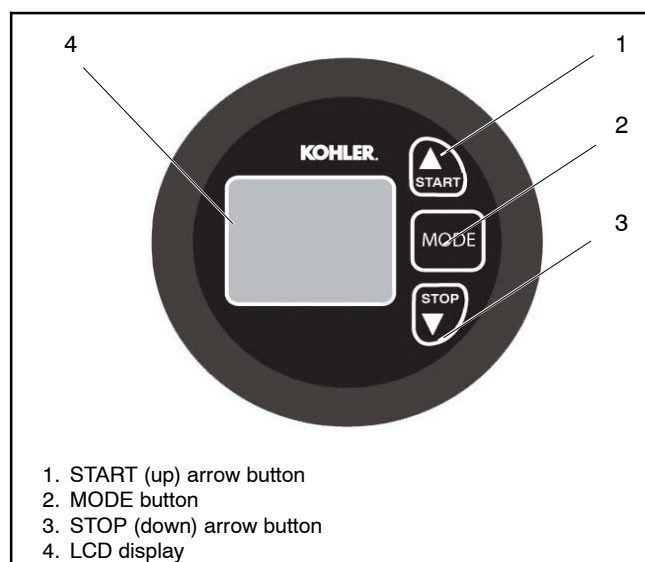


Figure 1 Gauge Pushbuttons

The gauge communicates with the generator set model(s) listed above. A 12-pin customer-interface connector allows connection from the gauge to the generator set.

Note: Read the entire installation procedure including safety precautions before beginning installation. Perform the steps in the order shown.

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Definitions

ADC IId: Controller on the generator set which includes an LCD digital display, power button, engine start/stop button, pushbutton/rotary selector dial, and LED status indicator.

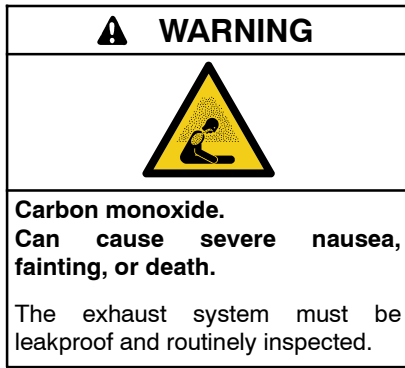
Running: The generator set is considered running at designed voltage or engine speed.

Safety Precautions

Observe the following safety precautions while installing and operating the gauge.

⚠ WARNING		
Accidental starting. Can cause severe injury or death. Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.		

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows: (1) Move the generator set master switch to the OFF position. (2) Disconnect the power to the battery charger. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent starting of the generator set by an automatic transfer switch, remote start/stop switch, or engine start command from a remote computer.

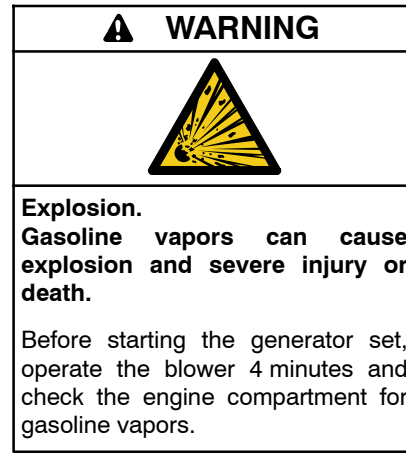


Carbon monoxide symptoms. Carbon monoxide can cause severe nausea, fainting, or death. Carbon monoxide is a poisonous gas present in exhaust gases. Carbon monoxide poisoning symptoms include but are not limited to the following:

- Light-headedness, dizziness
- Physical fatigue, weakness in joints and muscles
- Sleepiness, mental fatigue, inability to concentrate or speak clearly, blurred vision
- Stomachache, vomiting, nausea

If experiencing any of these symptoms and carbon monoxide poisoning is possible, seek fresh air immediately and remain active. Do not sit, lie down, or fall asleep. Alert others to the possibility of carbon monoxide poisoning. Seek medical attention if the condition of affected persons does not improve within minutes of breathing fresh air.

Operating the generator set. Carbon monoxide can cause severe nausea, fainting, or death. Be especially careful if operating the generator set when moored or anchored under calm conditions because gases may accumulate. If operating the generator set dockside, moor the craft so that the exhaust discharges on the lee side (the side sheltered from the wind). Always be aware of others, making sure your exhaust is directed away from other boats and buildings.



Ignition-protected equipment. Explosive fuel vapors can cause severe injury or death. Gasoline vapors can cause an explosion. USCG Regulation 33CFR183 requires that all electrical devices (ship-to-shore transfer switch, remote start panel, etc.) must be ignition protected when used in a gasoline and gaseous-fueled environment.

Parts List

Two-Inch Digital Gauge

Kit: GM85174-KP1		
Qty.	Description	Part Number
1	Decal, warning	GM107370
1	Gauge, digital	GM85173
1	Harness, wiring	GM50821
Kit: GM85174-KP2		
Qty.	Description	Part Number
1	Decal, warning	GM107370
1	Gauge, digital	GM85173

1 Installation Procedure

Note: Read all safety precautions at the beginning of this publication before performing any work on the generator set.

1.1 Remove the Generator Set From Service.

1. Press the start/stop button to stop the generator set. The engine stops.
2. Press the power button to turn off the controller.
3. Disconnect the generator set engine starting battery, negative (-) lead first.

1.2 Install the Remote Digital Gauge.

1. Consider the following when mounting the remote digital gauge:
 - A dry location in the wheelhouse or bridge.
 - The wiring harness length.
 - The mounting depth and overall size.
2. See Figure 2 for the gauge mounting dimensions.

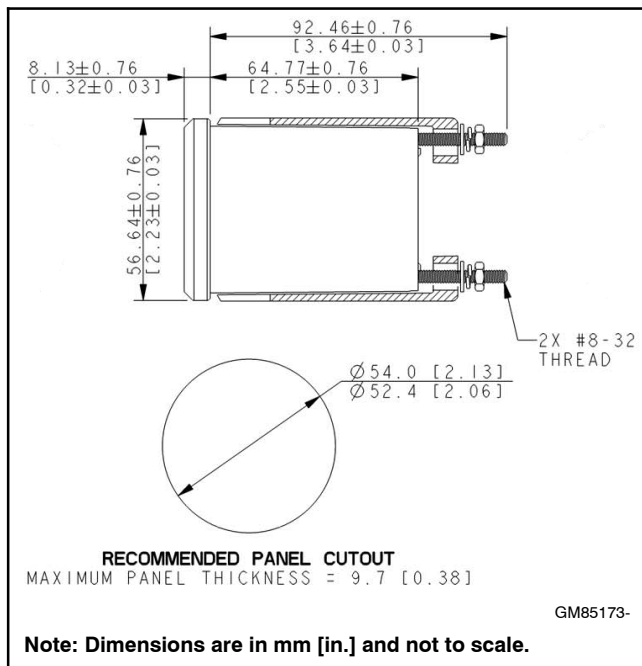


Figure 2 Two-Inch Digital Gauge Mounting Dimensions

3. Connect the 8-pin gauge harness connector to the 8-pin digital gauge connector. See Figure 4.
4. Connect the 12-pin connector end of the connection harness to the generator set's customer-interface 12-pin connector. See Figure 4 and Figure 5. Use a remote extension harness if additional length is required.

Note: Order a remote extension harness kit, if required. DO NOT use more than 3 remote harness kits and DO NOT exceed 22.86 m (75 ft.) in harness length. See Figure 3 for kit selection.

Remote Extension Harness Kit Numbers	Length m (ft.)
GM32333-KP1	4.6 (15)
GM32333-KP2	7.6 (25)

Figure 3 Remote Extension Harness Kits (For Gauge to Generator Set)

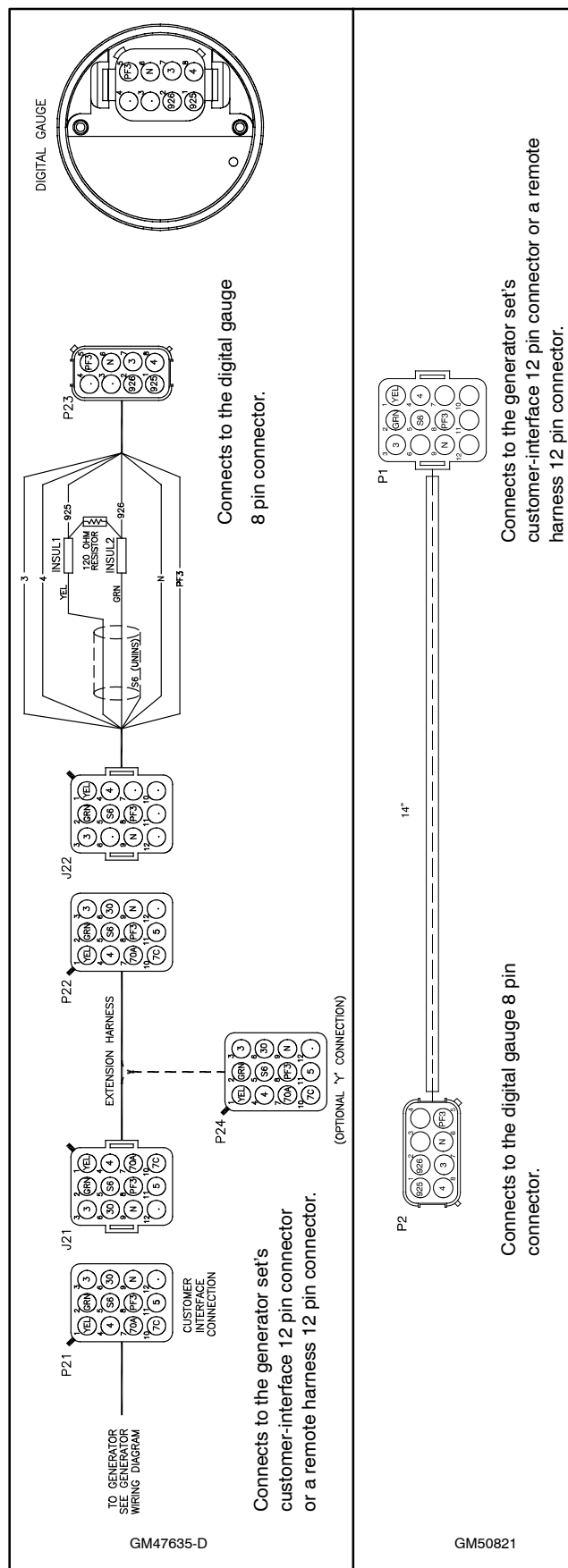


Figure 4 Remote Two-Inch Digital Gauge
Diagram GM47635 and
Connection Harness GM50821

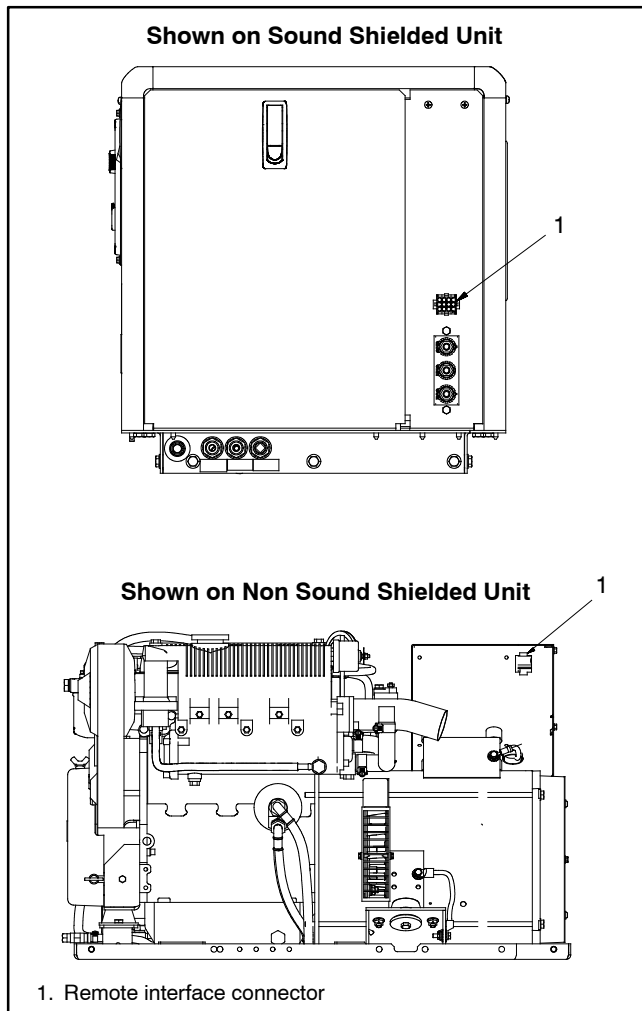


Figure 5 Remote Customer Interface Connector

5. Use rubber grommets and cable ties as necessary to protect and secure the wiring from sharp objects, exhaust system, water, and any moving parts.
6. **For gasoline-powered generator sets**, select a location as near as practical to the generator remote digital gauge for mounting warning decal part number GM107370. See Figure 6. The decal should be visible when starting the generator set from the remote digital gauge. Before applying the decal, ensure that the surface is clean and dry.

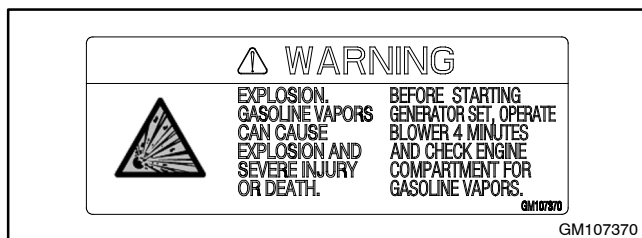


Figure 6 Decal

1.3 Restore the Generator Set to Service

1. Check that the generator set is OFF.
2. Reconnect the generator set engine starting battery, negative (-) lead last.
3. Press the power button to turn the controller on.

1.4 Set the ADC IId Communications Parameter

The ADC IId controller must be configured for communication including gauge operation. Under the Gen Set System menu, set the CAN A parameter to Smartcraft. Consult the generator set operation manual for full instructions to set the CAN A parameter.

Note: After changing the CAN A communication setting, power off and then power on the controller.

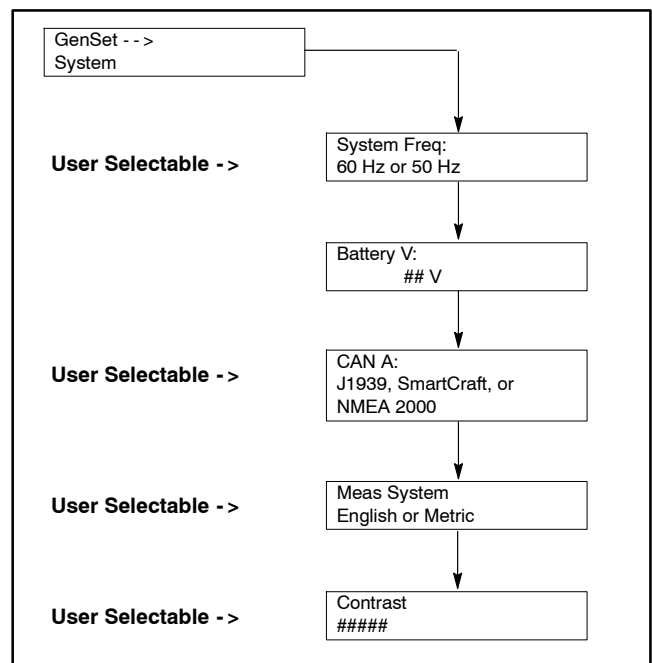


Figure 7 CAN A Communications Settings

1.5 Configuration Mode

The configuration mode can be selected from any other mode by pressing and holding the **MODE** button for 5 seconds. While in the configuration mode, use the **MODE** button to select the desired parameter to change. Currently the gauge supports changing the gauge I.D. and/or units.

Use the arrow (up) button ▲ or arrow (down) button ▼ to set the desired selection.

Gauge I.D. Configuration Procedure

- 1. Press and hold the **MODE** button for 5 seconds to enter the configuration menu. See Figure 8.

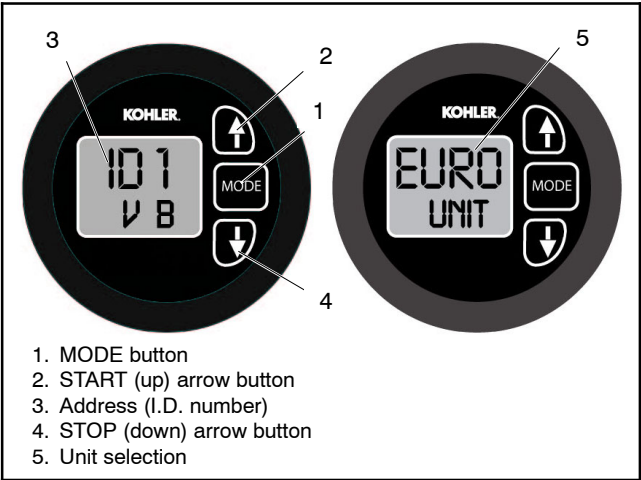


Figure 8 Configuration Menu Displays

- 2. Use the **START** arrow (up) button ▲ or **STOP** arrow (down) button ▼ to select the generator set address 1.

Note: The generator set addresses (I.D. numbers) 2 thru 4 are reserved for future use and currently not available.

Note: The gauge’s software version will be shown on the second line of the I.D. screen, preceded by the character “V”.

- 3. After all selections have been made, wait 30 seconds before pressing the gauge again to save the configuration and to exit from the configuration mode.

Unit Configuration Procedure

- 1. Press and hold the **MODE** button for 5 seconds to enter the configuration menu.
- 2. Press the **MODE** button again to prompt—SAE— for English or —EURO— for Metric unit selection.

Units displayed in English will show temperature in Fahrenheit (°F) and pressure in psi (pounds per square inch). Units displayed in metric will show temperature in Celsius (°C) and pressure in kilopascal (kPa). See Figure 9.

Selection	English Units	Metric Units
Temperature	°F (Fahrenheit)	°C (Celsius)
Pressure	psi (pounds per square inch)	kPa (kilopascal)

Figure 9 Configuration Menu Unit Selections

- 3. Use the **START** arrow (up) button ▲ or **STOP** arrow (down) button ▼ to select English or Metric units. See Figure 8.
- 4. After all selections have been made, press the **MODE** button for five seconds to save the configuration. Afterwards, the gauge will exit the configuration mode.
- 5. After making all selections, wait 30 seconds before pressing the gauge again in order to save the configuration and exit the configuration mode.

1.6 Fault Codes

Refer to Section 3, Fault Codes to see the descriptions of displayed faults.

2 Gauge Operation

2.1 Pushbuttons

Three pushbuttons control the gauge functions. See Figure 10:

- **MODE** button: Used to change the function of the LCD display and access submenus and adjust settings.
- **START** arrow (up) button ▲: Used to move between screens, start the generator, and modify settings.
- **STOP** arrow (down) button ▼: Used to move between screens, stop the generator, and modify settings.

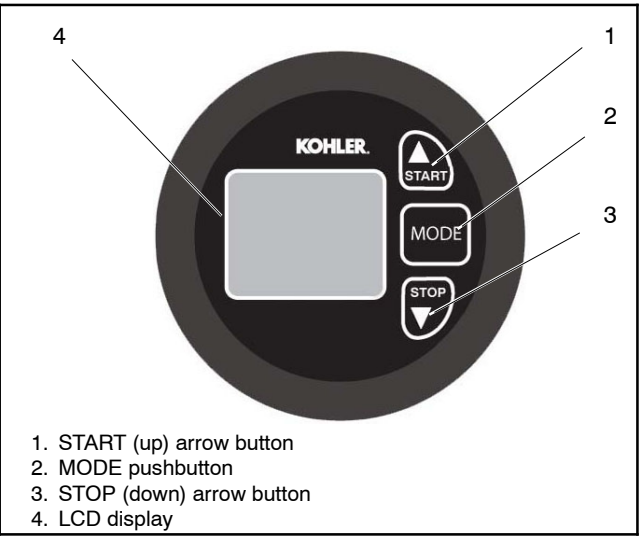


Figure 10 Gauge Pushbuttons

2.2 Operating Mode Description

The gauge receives information from the generator set's ADC IId controller. The gauge is powered through the generator set's starting battery.

See Figure 11 for illustrations of display screens for the various LCD screen modes. The gauge has five operating modes:

- **Wakeup Mode:** Press any pushbutton on the gauge to activate wakeup mode. Once the gauge is activated, the LCD screen will display a KPS code for three seconds. See Figure 11.

Note: If the ADC IId controller power button is OFF, the gauge will not be able to wake the ADC IId controller.

- **Normal Mode:** This mode displays the following generator status parameters when the generator set is running:

- Hours
- Battery Voltage
- AC Frequency
- AC Voltage
- Engine Temperature

The normal mode will display only the following parameters when the generator set is NOT running:

- Hours
- Battery Voltage

Among the status parameters is an indicator shown as an asterisk used to indicate when the generator set is running. This generator running indicator is located on the hours screen and is shown before the characters HRS.

Note: If the generator is running, each asterisk segment will blink on and off in a clockwise direction. If the generator is *not* running, all asterisk segments will remain on and will *not* blink.

- **Start/Stop Mode:** Allows remote starting and stopping of the generator set engine. See Section 2.3, Generator Start/Stop, for operation sequence.
- **Sleep Mode:** After 48 hours of generator set and gauge inactivity, the display turns off.
- **Fault Mode:** Displays the fault and warning codes as shown when a fault or warning condition is detected. To clear the fault code see Section 3, Fault Codes.



Figure 11 Gauge LCD Screen Displays

2.3 Generator Start/Stop

1. Read all equipment decals located on the generator set and safety precautions found in the provided literature before starting the generator set.
2. The operator can access gauge modes, such as Start/Stop Mode, after the generator set has been restored to service and if the ADC IIId is powered ON. See Section 1.3, Restore the Generator Set to Service.
3. See Section 2.1, Pushbuttons, and Section 2.2, Operating Mode Description, before operating the remote digital gauge.

Using the GEN START Function

1. Press the **MODE** button until GEN STRT appears on the LCD screen. See Figure 12.

Note: The GEN STRT code will not appear if:

- the generator set is already running.
- an error fault is existing. To clear the fault code see Section 3, Fault Codes.

Note: If the engine does not start within 60 seconds of the command, an alarm will sound. For all models, the gauge displays an ERR code. See Section 2.4, Alarm Silence/Activate.

2. Press the **START** arrow (up) button ▲ until SEND STRT appears on the LCD screen.

Note: If the **START** arrow (up) button ▲ is pressed and released too fast, the gauge will go back to the normal mode without sending the start command.

If the generator was successfully started, the gauge will go into the normal mode and display the HRS characters (hours screen). Blinking asterisk segments will appear next to these characters on the LCD screen to indicate the generator is running.

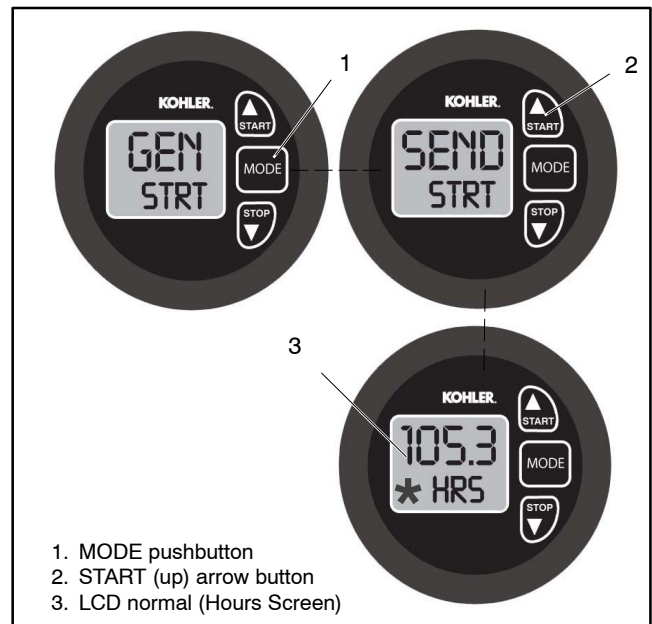


Figure 12 Gen START Gauge Pushbutton Functions

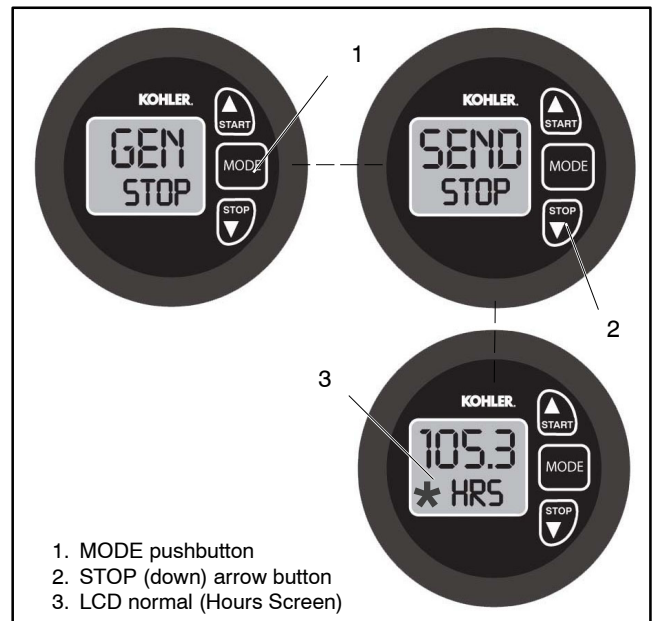


Figure 13 Gen STOP Gauge Pushbutton Functions

Using the GEN STOP Function

1. Press the **MODE** button until GEN STOP appears on the LCD screen. See Figure 13.
2. Press the **STOP** arrow (down) button ▼ until SEND STOP appears on the LCD screen.

If the generator was successfully stopped, the gauge will go into the normal mode and display the HRS characters (hours screen) and *will not* display the blinking asterisk segments; however, the power is still activated and the generator set is now in standby mode.

Note: The GEN STOP code will not appear if the generator set is not running.

Note: If the generator does not stop within 60 seconds of the command, an alarm will sound. For all models, the gauge displays an ERR code. See Section 2.4, Alarm Silence/Activate.

Using the SLEEP function

The ADC IId controller automatically sends a sleep command to the gauge after 48 hours of inactivity. Pressing any button, or turning the knob, or closing contacts 3 and 4 on the ADC IId controller *will not* wake up the gauge. When the ADC IId power button is ON, press any button on the gauge to wake up the gauge and the ADC IId controller.

2.4 Alarm Silence/Activate

Alarm Silence

Press the **STOP** arrow (down) button ▼ to silence the alarm. See Figure 13.

Alarm Activate

Press the **START** arrow (up) button ▲ to activate the alarm. See Figure 12.

3 Fault Codes

There are two types of fault codes; WARN and ERR.

If the gauge displays a WARN fault code, the gauge's screen displays a red flashing background and sounds an alarm. When the warning first occurs, the gauge enters the fault mode and displays the warning code. While the warning is present, the gauge provides an additional mode called a fault mode. The fault mode is located between the normal mode and gen start/stop mode. The ADC IId controller automatically clears the warning when the condition no longer exist. For more information see Section 3.3, ADC IId Controller Fault Codes.

If the gauge displays an ERR fault code, the gauge's screen displays a red flashing background and sounds an alarm. While the error is present, the gauge locks into a fault mode. All other modes are locked out with the exceptions of the configuration mode and the sleep mode.

3.1 Clearing Errors

Note: Always identify and correct the cause of a fault shutdown before resetting the controller. Consult the Operation Manual for guidance and items to check.

To clear the error, press the mode button. If the ADC IId controller successfully clears the error, the gauge returns to the normal mode. However, if the error remains, the gauge remains in the fault mode. After correcting the error, the user must resend the clear fault message to the controller by pressing the mode button. For more information, see Section 3.3, ADC IId Controller Fault Codes.

3.2 GEN START Fault Codes

The normal mode can function if a fault WARN code appears on the gauge; however, it will remain disabled if an ERR code appears. For example, if the gauge does not receive a response from the ADC IId controller, a fault code OC ERR is displayed as shown in Figure 14. To clear an ERR fault code, press the mode button. For more information on ERR and WARN fault codes, see Section 3.3, ADC IId Fault Codes. For more information on AF ERR, see Section 3.3.2, Auxiliary Fault.

Note: If the generator does not start or stop within 60 seconds of the command, an alarm will sound. For all models, the gauge displays an ERR code. See Section 2.4, Alarm Silence/Activate.

3.3 ADC IId Controller Fault Codes

Fault codes are displayed on the gauge when a fault condition is detected by the ADC IId controller and are listed below. See Figure 14.

Note: Fault codes listed in **BOLD** font are errors that will prevent the generator from running. See Figure 14.

3.3.1 Fault Codes

There are a few fault codes displayed on the digital gauge that may refer to multiple shutdown/warning conditions. If a fault code appears on the digital gauge's display, check the ADC IId display to see more detailed information regarding the fault. The ADC IId display contains extended fault text information that doesn't appear on the digital gauge display.

3.3.2 Auxiliary Fault

An “Aux Input Shutdwn” appears on the ADC IId display when an auxiliary fault (such as but not limited to halon, CO, etc.) is transmitted from a user-defined device connected to wire 30 (pin 6 in the generator set’s customer interface 12-pin connector, see Figure 4 and Figure 5). For auxiliary faults, refer to the component manufacturer’s literature for additional fault clearance instructions.

Digital Gauge Display	ADC IId Display	Description
—		No faults
AF ERR †	AC Sens Loss Shutdwn	Aux fault
	AC Sens Loss Warning	Aux fault
	Aux Input Shutdwn	Auxiliary fault input (See Section 3.3.2)
	Exh Temp High Shutdwn	Aux fault
Hb WARN	Battery High Warning	High battery voltage
Lb WARN †	Battery Low Warning	Low battery voltage
	Low Crank Vlt Warning	Low battery voltage
OC ERR †	Locked Rotor Shutdwn	Overcrank (locked rotor)
	Over Crank Shutdwn	Overcrank
OF ERR	Frequency High Shutdwn	Overfrequency
OU ERR	Volts xx-xx High Shutdwn	Overvoltage
UF ERR †	Engine Speed Low Shutdwn	Underfrequency
	Frequency Low Shutdwn	Underfrequency
UU ERR	Volts xx-xx Low Shutdwn	Undervoltage
47 ERR †	Oil Pres Low Shutdwn	Low oil pressure
	Oil Pres Low Warning	Low oil pressure
58 WARN	Coolnt Temp High Warning	Coolant sensor input high
62 ERR	Seawater Pressure Low Shutdwn	Sea pump pressure
64 ERR	Engine Speed High Shutdwn	Engine overspeed
65 ERR	Coolant Temp High Shutdwn	Coolant sensor range high
1000 ERR		Loss of communication with the controller *
1001 ERR		Start fault *
1002 ERR		Stop fault *
* Fault generated by the digital gauge.		
† Check the ADC IId display to see more detailed information regarding the fault. See Section 3.3.1.		

Figure 14 Fault Codes Displayed for ADC IId Faults

Notes

Notes

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