


WIRING FOR SMARTCRAFT GAUGES

Models Covered
All 14-pin MerCruiser, Cummins MerCruiser Diesel, Mercury Marine, and Mercury Racing
NOTICE
After completing installation, place these instructions with the product for the owner's future use.
NOTICE
This document guides our dealers, boatbuilders, and company service personnel in the proper installation or service of our products. If you have not been trained in the recommended servicing or installation procedures for these or similar Mercury Marine products, have the work performed by an authorized Mercury Marine dealer technician. Improper installation or servicing of the Mercury product could result in damage to the product or personal injury to those installing or operating the product.

14-Pin Helm Harness

Installation Requirements

 WARNING
Damaged wires can cause electrical problems, resulting in system failure. In some cases, this can affect boat operation, leading to personal injury. Use conduit, hose clamps, grommets, or other appropriate measures to protect all electrical wires. Do not overtighten clamps and keep harnesses away from heat sources during installation.

- Route the helm harness away from engine ignition components (coils, spark plug leads, and spark plugs), high power VHF coax, or radios. These components may generate electrical interference that could disrupt data transmission.
- Use the appropriate length 14-pin helm and extension harnesses. Avoid using multiple 14-pin extension harnesses to complete the connection to the helm. Actual configurations can be significantly different from one application to another.
- Route wiring harnesses to avoid contact with any sharp edges, hot surfaces, or moving components. Anchor every wiring harness to prevent frictional chafing or cuts.
- Limit the number and length of accessory harness branches as the installation approaches the maximum bus trunk length.
- Limit 14-pin harness trunk length to 40 m (130 ft.) when an application includes several long accessory harness branches or involves numerous junction box installations.

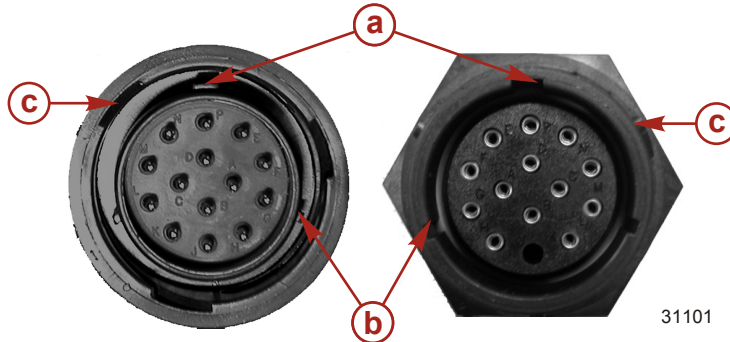
Installation Specifications	
14 pin harness minimum bend radius	7.6 cm (3 in.)
14 pin harness CAN bus trunk length (maximum)	70 m (229 ft.)
Individual accessory harness branch CAN bus length (maximum)	7 m (20 ft.)
Combined length of accessory harness CAN bus branches (maximum)	36 m (118 ft.)

Anchor Requirement	Minimum Placement
14-pin harness	46 cm (18 in.)
14-pin harness connections	25.4 cm (10 in.)
Accessory harness	46 cm (18 in.)
Accessory harness connections	25.4 cm (10 in.)

14-pin Connector Alignment

IMPORTANT: Never force connectors together.

1. Clean all contaminants from the connectors.
2. Align the connector keyways and apply light pressure to fit the connectors together.



Correct connector alignment

- a - Large keyway
- b - Small keyway
- c - Lock

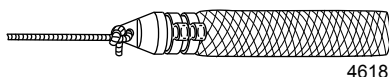
3. Secure the connectors by rotating the locking collar into place.

Pulling the Data Harness

1. Inspect the routing path for any obstruction that could cut, snag, or otherwise damage the harness or impede the pulling procedure.

NOTE: One end of the 14-pin helm harness connector is labeled "ENGINE" to ease identification and correct installation.

2. Position the harness to reduce potential snags during the pulling procedure.
3. Route the loose cord end of the Data Cable Puller from the helm, along the path selected for the 14-pin helm harness, and into the engine compartment.

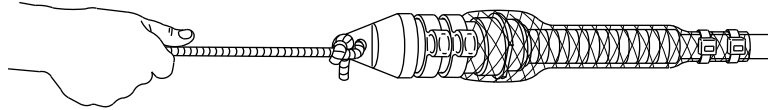
Data Cable Puller	888462A1
	Attaches to the end of the 14-pin helm harness to ease installation and reduce the likelihood of damage when pulling the harness through the boat.

4. Install the Data Cable Puller onto the 14-pin helm harness connector being pulled.

IMPORTANT: Tighten all cable ties attaching the pulling tool to the harness to prevent any slipping of the tool during installation.

5. Secure the Data Cable Puller with two cable ties.

- Carefully draw the cord end of the Data Cable Puller through the hull, pulling the 14-pin helm harness through the vessel.



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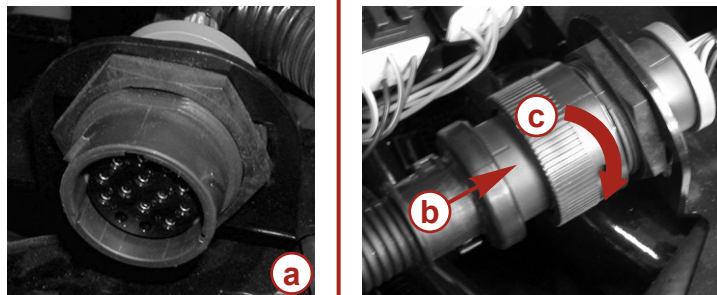
- Inspect the harness insulation for any damage.
- Carefully inspect all connector pins, seals, and connector locking components for damage.
- Secure the 14-pin helm harness according to installation specifications.

Rigging Single Helm Applications

Helm Harness Connections: Single Engine with Single Helm

IMPORTANT: Route wiring harnesses to avoid contact with any sharp edges, hot surfaces, or moving components. Anchor every wiring harness to prevent frictional chafing or cuts.

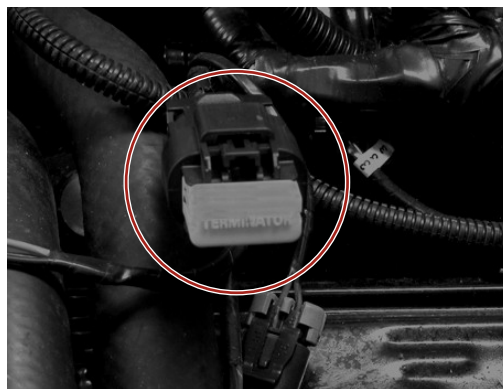
- Follow all data harness pulling and installation instructions.
- Route the 14-pin helm harness through the boat with the 14-pin connector labeled "ENGINE" in the engine compartment.
- Connect and lock the 14-pin helm harness to the 14-pin engine connector.



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- a** - 14-pin engine connector
- b** - 14-pin helm harness
- c** - Turn clockwise to lock

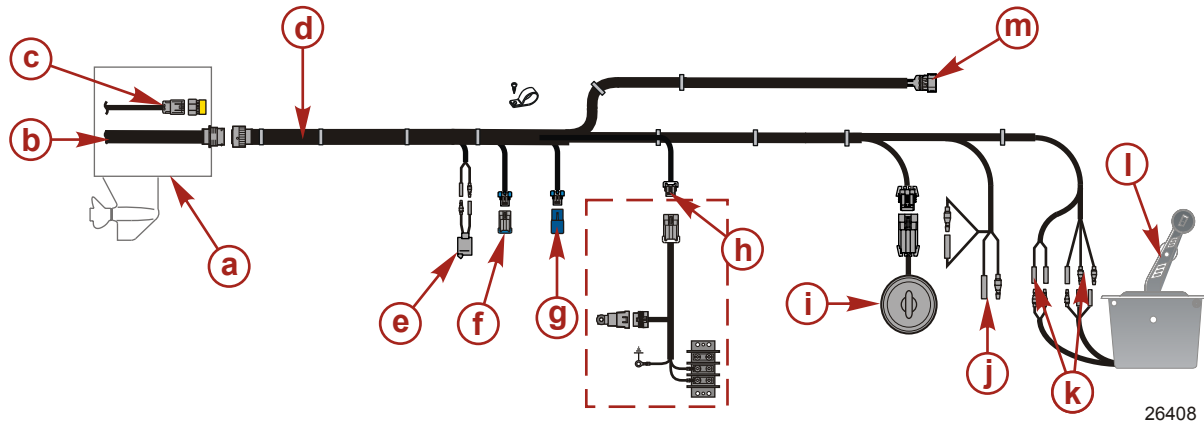
- Confirm the presence of a termination resistor at the engine's 10-pin CAN connector.



31102

Engine-mounted 10-pin CAN termination resistor

- Confirm the presence of a termination resistor at the helm harness's CAN P (1) connector.



Helm harness identification

- | | |
|---|---|
| a - Power package | h - Accessory power connector |
| b - 14-pin connector at engine | i - Key switch connector |
| c - 10-pin CAN connector with termination resistor at engine | j - Lanyard stop switch connectors |
| d - 14-pin data harness | k - Remote control, trim, and neutral start connectors (outboard only) |
| e - Audio warning | l - Remote control |
| f - CAN V (3) (weather capped) | m - 10-pin SmartCraft connector |
| g - CAN P (1) (with termination resistor) | |

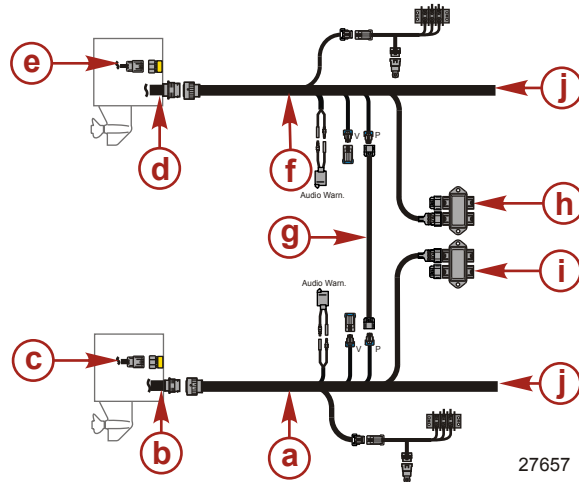
- Check all connectors for correct installation.

Data Harness Connections: Dual Engine with Single Helm

IMPORTANT: Route wiring harnesses to avoid contact with any sharp edges, hot surfaces, or moving components. Anchor every wiring harness to prevent frictional chafing or cuts.

- Follow all data harness pulling and installation instructions.
- Route the 14-pin helm harness through the boat with the 14-pin connector labeled "ENGINE" in the engine compartment.

3. Connect and lock the collars of the starboard engine 14-pin data harness to the starboard 14-pin connector.



Dual engine harness connections

- | | |
|--|--|
| a - STBD Outer engine (engine 1) helm harness | f - PORT Outer engine (engine 2) helm harness |
| b - STBD Outer engine (engine 1) 14-pin connector | g - 2-pin CAN P (1) Link Harness |
| c - STBD Outer engine (engine 1) 10-pin CAN P (1) connector with termination resistor | h - PORT Outer (engine 2) junction box |
| d - PORT Outer engine (engine 2) 14-pin connector | i - STBD Outer (engine 1) junction box |
| e - PORT Outer engine (engine 2) 10-pin CAN P (1) connector with termination resistor | j - To rest of helm harness |

4. Connect and lock the collars of the port engine 14-Pin Helm Harness to the port engine 14-pin connector.
5. Confirm the presence of a CAN P (1) termination resistor at both of the engines' 10-pin CAN P (1) connectors.
6. Install a CAN link harness between the CAN P (1) connectors on the starboard and port helm harnesses.
7. Install weather caps on all unused connectors.
8. Check all connectors for correct installation.

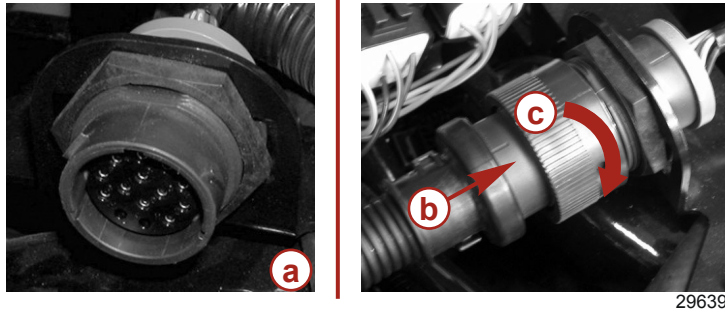
Rigging Dual Helm Applications

Data Harness Connections: Single Engine with Dual Helm

IMPORTANT: Route wiring harnesses to avoid contact with any sharp edges, hot surfaces, or moving components. Anchor every wiring harness to prevent frictional chafing or cuts.

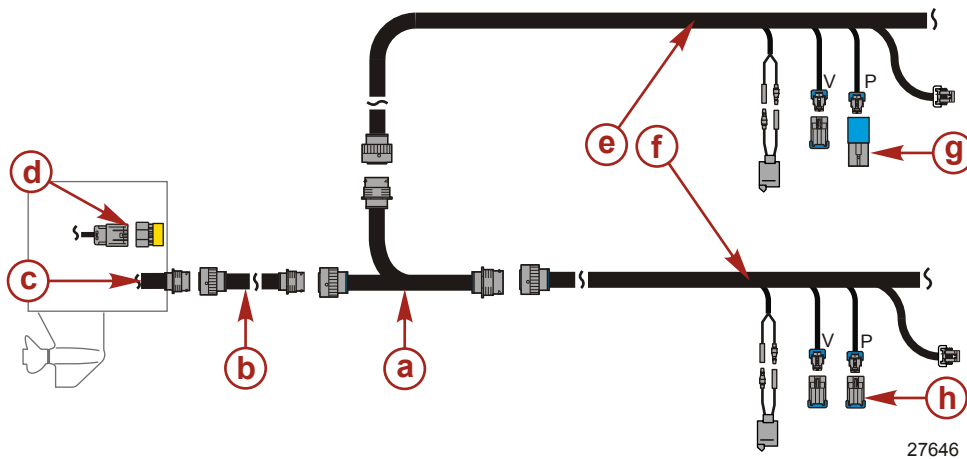
1. Follow all data harness pulling and installation instructions.
2. Route both 14-pin helm harnesses through the boat with the 14-pin connectors labeled "ENGINE" in the engine compartment.

3. Connect and lock the collar of the dual helm adaptor harness to the engine 14-pin connector.



- a - 14-pin engine connector
- b - 14-pin helm harness
- c - Turn clockwise to lock

4. Connect the "ENGINE" connector of the secondary station helm harness to the dual helm adaptor harness connector.



Dual helm adaptor installation

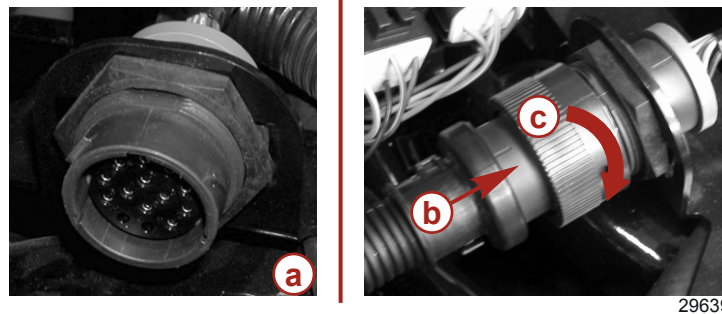
- a - Dual helm adaptor harness
- b - 14-pin data cable
- c - Engine 14-pin connector
- d - Engine 10-pin CAN P connector with termination resistor
- e - Secondary (upper) helm harness
- f - Primary (lower) helm harness
- g - CAN P connector with termination resistor
- h - CAN P connector with weather cap

5. Connect the "ENGINE" connector of the primary station helm harness to the dual helm adaptor harness connector.
6. Secure all harnesses to the boat at least every 46 cm (18 in.) using appropriate fasteners.
7. Confirm the presence of a termination resistor at the engine's 10-pin CAN connector.
8. Confirm the presence of a termination resistor at the upper (secondary) helm harness's CAN P (1) connector.
9. Remove the termination resistor from the lower (primary) helm CAN P connector and install a weather cap.
10. Check all connectors for correct installation.

Data Harness Connections: Dual Engine with Dual Helm

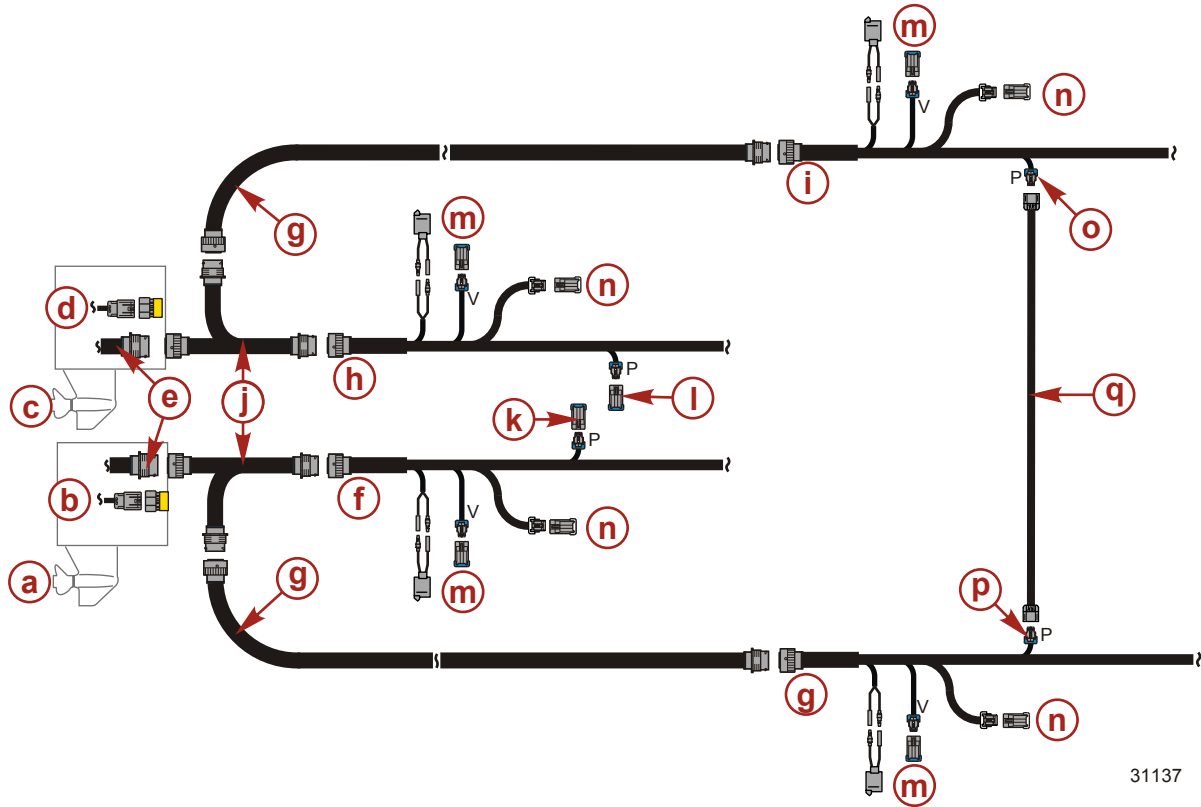
IMPORTANT: Route wiring harnesses to avoid contact with any sharp edges, hot surfaces, or moving components. Anchor every wiring harness to prevent frictional chafing or cuts.

1. Follow all data harness pulling and installation instructions.
2. Route both 14-pin data harnesses for the secondary (upper) helm through the boat.
3. Connect both secondary (upper) helm harnesses to their respective 14-pin data harnesses.
4. Route the primary (lower) 14-pin helm harnesses through the boat.
5. Connect and lock the collars of a dual helm adaptor harness to the 14-pin connectors on both engines.



- a** - 14-pin engine connector
- b** - 14-pin helm harness
- c** - Turn clockwise to lock

- Connect the "ENGINE" connector of each secondary (upper) station 14-pin data harness to their respective dual helm adaptor harness connectors.



Dual Engine, Dual Helm Installation

- | | |
|---|---|
| a - STBD Outer (engine 1) | j - Dual helm adaptor |
| b - STBD Outer (engine 1) 10-pin CAN connector with termination resistor | k - STBD Outer (engine 1) primary (lower) helm harness CAN P (1) connector with weather cap. |
| c - PORT Outer (engine 2) | l - PORT Outer (engine 2) primary (lower) helm harness CAN P (1) connector with weather cap. |
| d - PORT Outer (engine 2) 10-pin CAN connector with termination resistor | m - CAN V (3) connector with weather cap |
| e - Engine 14-pin connector | n - Accessory power connector |
| f - STBD Outer (engine 1) primary (lower) helm harness | o - PORT Outer (engine 2) secondary (upper) helm harness CAN P (1) connector |
| g - STBD Outer (engine 1) secondary (upper) helm harness | p - STBD Outer (engine 1) secondary (upper) helm harness CAN P (1) connector |
| h - PORT Outer (engine 2) primary (lower) helm harness | q - 2-pin CAN link harness |
| i - PORT Outer (engine 2) secondary (upper) helm harness | |

- Connect the "ENGINE" connector of both primary (lower) station helm harnesses to their respective dual helm adaptor harness 14-pin connector.
- Secure all harnesses to the boat at least every 46 cm (18 in.) using appropriate fasteners.
- Confirm the presence of a termination resistor at both engines' 10-pin CAN connector.

10. Install a 2-pin CAN link harness between the CAN P (1) connectors on both secondary (upper) helm harnesses.
11. Remove the termination resistors from both lower (primary) helm CAN P (1) connectors and install weather caps.
12. Check all connectors for correct installation.

SmartCraft Wiring

SmartCraft and CDS Engine Labeling Conventions

Engine Number	Abbreviation	Location
1	STBD	Outer
2	PORT	Outer
3	STBD	Inner
4	PORT	Inner

SmartCraft Overview

The SmartCraft series of products enables the boat builder or instrumentation installer to build an integrated boat communication network between typical on board electronics devices. SmartCraft devices communicate over the Mercury MerCruiser equipped vessel's integrated CAN bus, allowing for a clean, economical installation. Typical SmartCraft products provide the following features:

1. The SmartCraft System Tachometer and Speedometer, System Monitor or Vessel View provide integrated single point engine and drive monitoring in a value driven package that can replace an entire cluster of traditional gauges.
2. The SmartCraft System Tachometer and Speedometer, System Monitor or Vessel View will provide fuel flow, and range calculations.
3. The SmartCraft system also allows for the integration of compatible GPS and depth finder displays within the instrumentation group.
4. A variety of System Link standalone gauges are also available (examples).
 - Tachometer
 - Speedometer
 - Engine oil temperature
 - Engine oil pressure
 - Engine coolant temperature
 - Engine water pressure (outboard)
 - Battery voltage
 - Trim position
 - Steering angle
 - Fuel tank No. 1 level
 - Fuel tank No. 2 level
 - Oil tank level (outboard)
 - Fresh water tank level
 - Waste tank level
 - Fuel flow

The SmartCraft and CAN bus systems enable critical safety and performance data to be prioritized and transmitted to the helm in real-time. SmartCraft products provide:

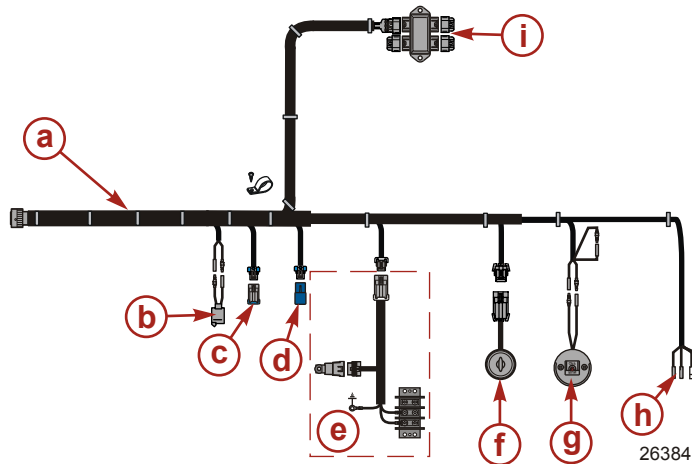
- More information
 - a. Fault code description complimenting the audio warning feature.
 - b. All engine and drive data available through fewer instruments.
- Digital sensors provide greater accuracy.
- Simplified installation of instrumentation
 - a. Quick plug in connections versus multiple individual wires, nuts and eyelets.
 - b. Easily configured for multiple engines and multiple stations.
- Greater reliability.
 - a. Sealed connections.
 - b. Reduced installation complexity.
- Greater flexibility.
 - a. Different instrument sets for different stations.
 - b. Link gauges.

14-Pin Helm Harness Overview

The 14-pin helm harness connects helm station gauges and controls to the 14-pin data connector on the engine. The Control Area Network (CAN) component of the 14-pin helm harness lets you configure and manage multiple engine and helm combinations. One helm harness is used for each engine and helm pairing.

The CAN bus carries data and control information allowing it to be shared between all compatible devices connected to the network. See your Mercury MerCruiser parts and accessory or rigging guides for additional information.

The CAN P (1) circuit (blue & white wires) connect the engine to the helm stations and gauges. CAN P (1) transmits engine data, such as temperatures, pressures, depth, speed, tank levels, and RPM to the gauges at the helm. Each installation contains a single continuous CAN P (1) bus, regardless of the number of engines or helms. The CAN V (3) circuit is used to transmit SmartCraft-network-compliant vessel accessory and equipment data to the helm station.



14-Pin Helm Harness (Non-DTS)

- a - 14-pin Helm Harness
- b - Audio warning
- c - CAN V (3) connector with weather cap
- d - CAN P (1) connector with termination resistor
- e - Accessory power harness connector (optional)
- f - Key switch connector
- g - Lanyard or start stop switch connectors
- h - Remote control wiring (trim control and neutral switch)
- i - Gauge or junction box connection

14-pin Helm Harness

The 14-pin helm harness is available in various lengths to accommodate different running length requirements and the several possible engine and helm configurations. The harness connectors are labeled.

Audio Warning (buzzer attached)

The horn connector serves as a power package warning horn or buzzer. The PCM powers the circuit when certain power package fault codes are generated. The failure conditions that activate the warning horn can vary, depending on the MerCruiser, Mercury, or Cummins MerCruiser power package used.

CAN V (3)

A weather cap protects the helm harness CAN V (3) connector. CAN V (3) devices connect to a separate CAN bus architecture. A wide range of SmartCraft compatible boat accessories is available for use with the Vessel View or System View systems. See www.smartcraftnetworked.com for additional information.

CAN P (1)

The CAN P (1) connector provides access to the power package CAN bus, which carries engine and drive data to SmartCraft compatible instrument displays.

Accessory Power Harness

The accessory power harness is optional and available separately. It provides an additional key-switch-controlled auxiliary power supply and carries up to a 40 amp load. The 10-pin connector provides a maximum of 15 amps of switched accessory power on its own.

IMPORTANT: If electrical loads exceed this limit, the 15 amp fuse will fail and the engine will not operate.

Key Switch Connectors

The key switch connector attaches to either a three or four position key switch

Lanyard Stop Switch Connectors

The lanyard stop switch bullet terminals accommodate both Mercury outboard and MerCruiser applications. For Mercury outboard applications the leads labeled "Lanyard MerCruiser" are connected together and the leads labeled "Lanyard Outboard" are connected to the switch. For MerCruiser applications the leads labeled "Lanyard Outboard" are left disconnected and protected with weather caps and the leads labeled "Lanyard MerCruiser" are connected to the switch.

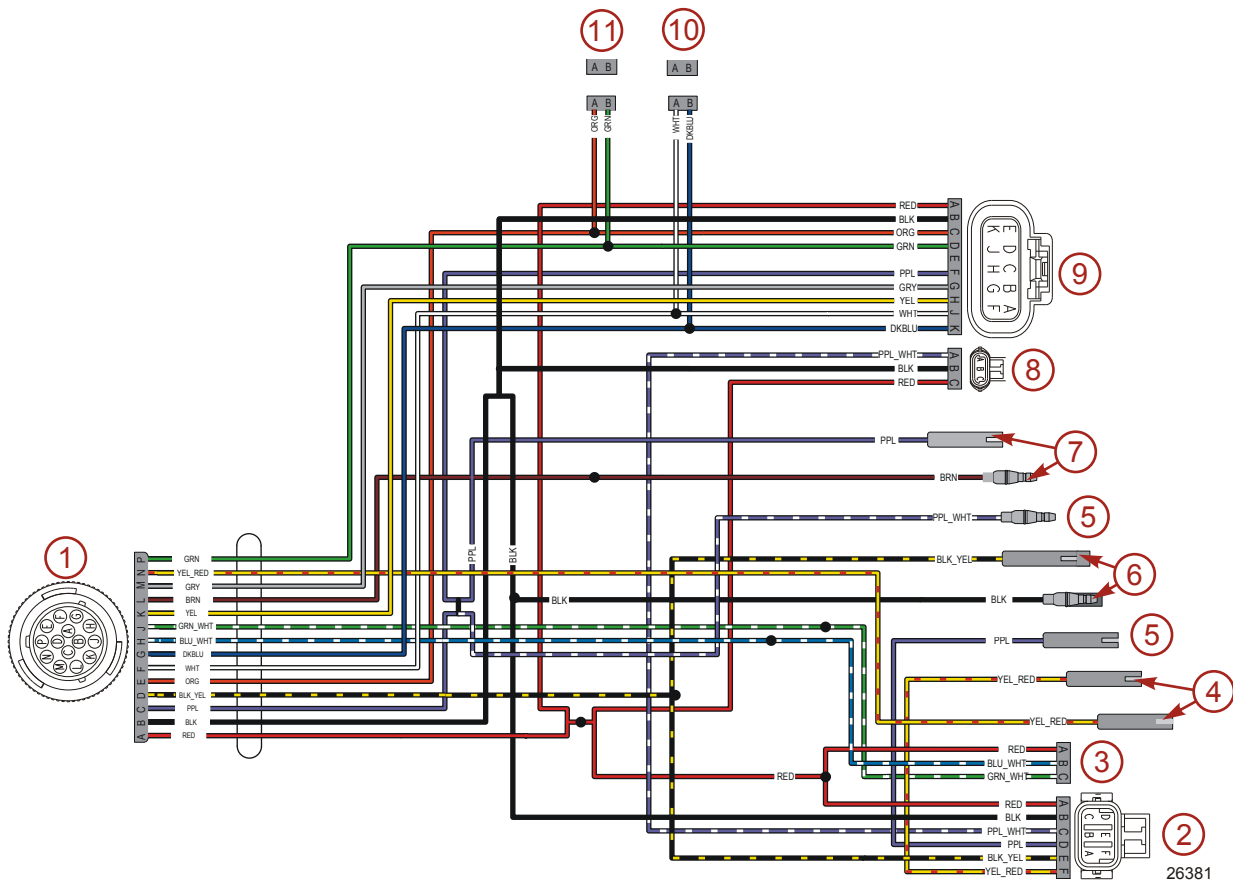
Remote Control Wiring

This wiring provides electrical connections for the remote control's trim and neutral start circuits through the 14-pin data harness.

Gauge or Junction Box Connection

This 10-pin connector connects SmartCraft compatible instruments and multiple-instrument and gauge wiring harnesses directly or through a SmartCraft junction box.

Each of the 14-pin harness component packages incorporate consistent wire color coding for each circuit.



14-pin helm harness diagram (non-DTS)

- | | |
|---|--|
| 1 - 14-pin connector | 7 - Audio warning |
| 2 - Key switch connector | 8 - Accessory relay connection |
| 3 - Trim switch (outboard only) | 9 - SmartCraft component connector |
| 4 - Neutral switch | 10 - CAN P (1) with termination resistor |
| 5 - Lanyard switch (sterndrive) or key switch positive (+) connection | 11 - CAN V (3) with weather cap |
| 6 - lanyard switch (outboard) or E-stop connection | |

IMPORTANT: The lanyard stop switch is normally closed and opens the circuit to remove power from the PCM, stopping the engine. Therefore the PPL and PPL/WHT wires must remain connected if a lanyard stop switch is not used or when installing an E-stop switch.

NOTE: The E-stop switch is normally open and grounds the circuit to the PCM, stopping the engine. Therefore, the BLK and BLK/YEL wires must remain disconnected unless they are connected to an E-Stop switch.

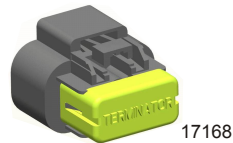
SmartCraft System Rules

1. Each CAN bus must include two termination resistors.
2. Termination resistors are installed at opposite ends of the CAN bus circuit.
3. The total CAN bus length cannot exceed 70 m (230 ft.).
4. Only one engine can supply power to each CAN bus.

5. Install weather caps on all unused junction box and electrical harness connectors.

Termination Resistors

Termination resistors are CAN line signal conditioners. The resistor places a known load on the CAN line to ensure proper system communication. All CAN bus termination resistors are 120 Ohms. Each CAN bus has two termination resistors installed, one at each of the furthest ends of the bus' running length. Resistance between the two data communication wires of the CAN bus should be approximately 60 Ohms. An incorrect number of termination resistors causes CAN bus communication errors.



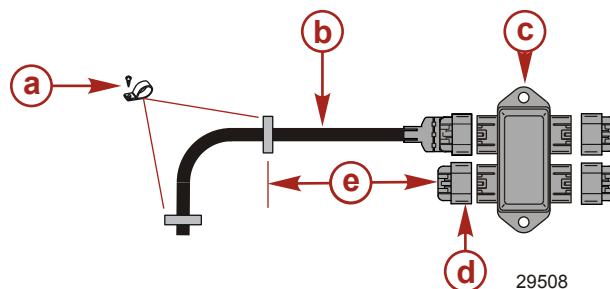
Yellow 10-pin termination resistor



Blue 2-pin termination resistor

Junction Box Installation (If Equipped)

1. Follow all wiring harness installation specifications and guidelines.
2. Confirm that all applicable wiring reaches the mounting location.
3. Mount the junction box in a location that minimizes exposure to moisture.
4. Mount the junction box so the connectors run horizontally.
5. Mount the junction box in a location that is accessible for service.
6. Securely attach the junction box using the screw holes provided and fasteners appropriate to the boats construction.
7. Anchor all wiring harnesses within 25.4 cm (10 in.) of the junction box connectors.
8. Protect all unused connectors with weather caps.



Typical junction box installation

- a** - Harness anchor
- b** - Helm harness junction box connector
- c** - Junction box
- d** - Weather cap
- e** - Harness anchor, 25.4 cm (10 in.)

Connecting SmartCraft Components

Install all SmartCraft equipment and accessories according to the instructions provided with each component.

Due to the variety of SmartCraft configurations, this manual cannot describe installation procedures for all configuration possibilities. Follow these general guidelines:

- Use two termination resistors in the system. You can order harnesses with or without in-line resistors.

- If using a component harness with an in-line resistor, do not use a termination resistor at that end of the helm harness.
- If using junction boxes, place one box (4, 6, or 8 port as needed) at the helm for each engine.
- If making only one 10-pin SmartCraft connection at the helm use a 10-pin female-to-female adaptor in place of a junction box.
- Locate the CAN P (1) termination resistors at opposite ends of the CAN bus:
 - For single engine applications, use termination resistors at the engine and at the furthest helm.
 - For dual engine applications, use termination resistors at both engines.
 - For triple engine applications, use termination resistors at the STBD Outer (1) engine and at the furthest helm.
 - For quad engine applications, use termination resistors at the STBD Outer (1) engine and the PORT Outer (2) engine.
- We recommend leaving at least one port free on each junction box for diagnostic work and future system modifications. Protect any unused junction box ports with weather caps.
- System Tachometer and Speedometer harness connectors are labeled. If a connector labels become unreadable, identify the connectors by their relative location on the harness:
 - The System Tachometer (used for the System Monitor as well) gauge connector is located on the end of the harness that includes the 3-pin link gauge connector.
 - The System Speedometer gauge connector is located on the end of the harness that includes the two wire NMEA connections.

IMPORTANT: The female 10-pin connectors on the System Tachometer and Speedometer harnesses are not interchangeable. Install the System Tachometer and Speedometer with the correct harness for the type of gauge used.

- Configure each System Tachometer, System Monitor, and Vessel View instrument with their own unique engine and helm station identity when setting up the gauge.

NOTE: Refer to the *Mercury Precision Parts and Accessories Guide* or the *SmartCraft Product Guide* for help ordering the appropriate SmartCraft equipment.

SmartCraft Compatibility

Mercury MerCruiser and Mercury Outboard share a common SmartCraft architecture. While each product line does have some minor differences, the essential operational requirements and function of the SmartCraft and CAN bus systems are the same for both product families. Refer to the specific instruction sheets provided with your product for details regarding your specific application.

- CAN Data Bus wiring rules are the same for all Mercury SmartCraft-compatible products.
 - Use two termination resistors for each CAN bus
 - Limit the overall CAN bus trunk length to 70 m (230 ft.) (cable length)
 - Limit each accessory harness branch CAN bus length to 7 m (20 ft.)
 - Limit the total number of CAN bus devices to 20
- All "System" series instruments are compatible with Mercury MerCruiser and Mercury Outboard products.
 - Vessel View
 - SC1000 System Monitor

- SC1000 System Tach and Speed
- SC100 System Link Gauges
- External sensors are common to all Mercury product lines.
 - Paddle wheel speed sensors
 - Depth transducers
 - Fuel Level Senders
- A few external components are specific to MerCruiser applications.
 - Certain steering and pitot speed sensors
 - MCM V8 Small-Block and V6 application transom harness

Termination Resistor Installation

Terminator Resistor Placement

The 14-Pin harness CAN bus terminator resistor is used as a CAN line signal conditioner. The resistor places a known load (120 ohms each) on the CAN line to ensure proper communication between components on the CAN bus and the PCM.

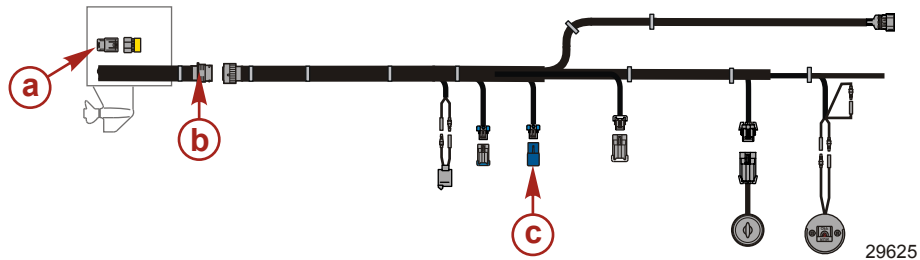
There will be only one CAN P (1) network, regardless of the number of engines or the number of helms.

Engine and Helm Configuration	Termination Resistor Placement	Link Harness Installation
Single engine/single helm	Engine 10-pin CAN connector	Not used
	Helm harness 2-pin CAN P (1) connector	
Single engine/dual helms	Engine 10-pin CAN connector	Not used
	Second station (station 2) helm harness 2-pin CAN P (1) connector	
Dual engines/single helm	Starboard OUT (engine 1) engine 10-pin CAN connector	2-pin CAN Link Harness between the Starboard OUT and Port OUT helm harness 2-pin CAN P (1) connectors
	Port OUT (engine 2) engine 10-pin CAN connector	
Dual engines/dual helms	Starboard OUT (engine 1) engine 10-pin CAN connector	2-pin CAN Link Harness between the Starboard OUT and Port OUT helm harness 2-pin CAN P (1) connectors at the secondary helm station
	Port OUT (engine 2) engine 10-pin CAN connector	
Triple engines/single helm	Starboard OUT (engine 1) engine 10-pin CAN connector	2-pin CAN Link Harness between the Starboard OUT and Port IN helm harness 2-pin CAN P (1) connectors
	Port OUT (engine 2) helm harness 2-pin CAN P (1) connector	10-pin CAN Link Harness between the Port IN and Port OUT engine 10-pin CAN connectors
Triple engines/dual helms	Starboard OUT (engine 1) engine 10-pin CAN connector	2-pin CAN Link Harness between the secondary station Starboard OUT and Port IN helm harness 2-pin CAN P (1) connectors
	Port OUT (engine 2) secondary station helm harness 2-pin CAN P (1) connector	10-pin CAN Link Harness between the Port IN and Port OUT engine 10-pin CAN connectors

Engine and Helm Configuration	Termination Resistor Placement	Link Harness Installation
Quad engines/single helm	Starboard OUT (engine 1) engine 10-pin CAN connector	2-pin CAN Link Harness between the Starboard OUT and Starboard IN helm harness 2-pin CAN P (1) connectors
	Port OUT (engine 2) engine 10-pin CAN connector	2-pin CAN Link Harness between the Port OUT and Port IN helm harness 2-pin CAN P (1) connectors
		10-pin CAN Link Harness between the Starboard IN and Port IN engine 10-pin CAN connectors
Quad engines/dual helms	Starboard OUT (engine 1) engine 10-pin CAN connector	2-pin CAN Link Harness between the secondary station Starboard OUT and Starboard IN helm harness 2-pin CAN P (1) connectors
	Port OUT (engine 2) engine 10-pin CAN connector	2-pin CAN Link Harness between the secondary station Port OUT and Port IN helm harness 2-pin CAN P (1) connectors
		10-pin CAN Link Harness between the Starboard IN (engine 3) and Port IN engine 10-pin CAN connectors

Single Engine/Single Helm

1. Confirm the presence of a termination resistor on the engine's 10-pin CAN connector.
2. Confirm the presence of a termination resistor on the helm harness 2-pin CAN P (1) connector.
3. Protect all unused connectors with weather caps.

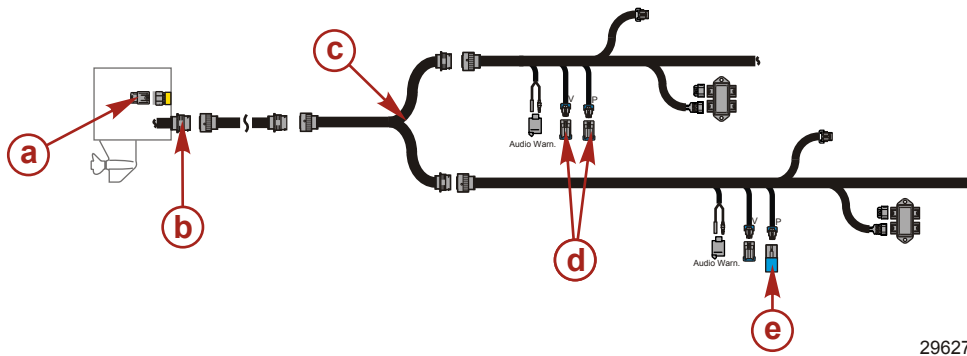


- a** - Engine 10-pin CAN with termination resistor
- b** - Engine 14-pin data connector
- c** - Boat harness 2-pin CAN connector with termination resistor

Single Engine/Dual Helm

1. Confirm the presence of a termination resistor on the engine's 10-pin CAN connector.
2. Install a weather cap on the 2-pin CAN P (1) connector of the helm harness that has an electrical run the shortest distance from the engine. This is generally at the primary helm. Do not use a termination resistor at this location.
3. Confirm the presence of a termination resistor on the 2-pin CAN connector of the helm harness that has an electrical run furthest from the engine. This is generally at the secondary helm.

4. Protect all unused connectors with weather caps.

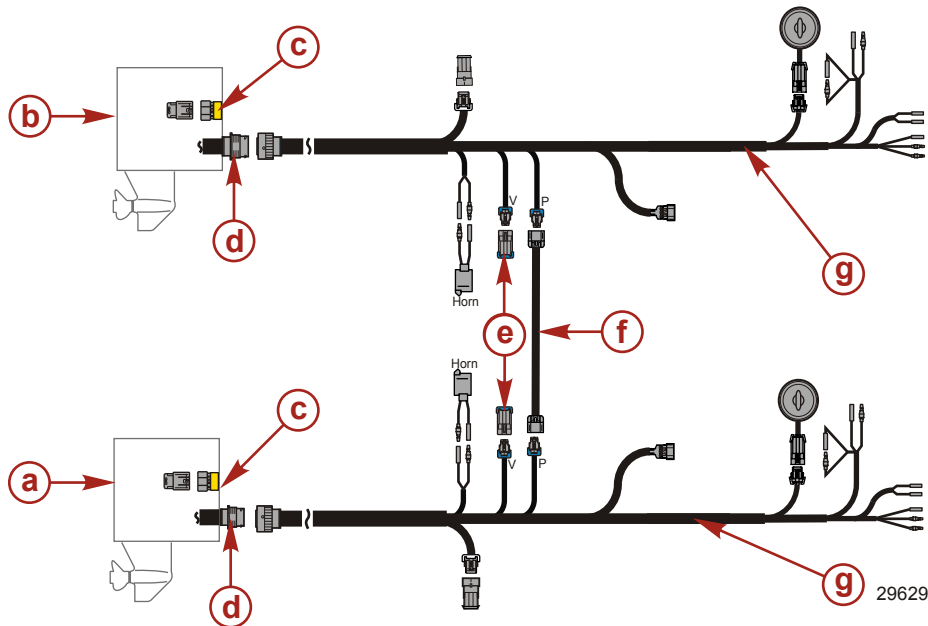


29627

- a** - Engine 10-pin CAN with termination resistor
- b** - Engine 14-pin data connector
- c** - Dual helm adaptor harness
- d** - Closest helm (primary helm [station 1]) harness 2-pin CAN P (1) and V (3) connectors with weather caps
- e** - Furthest helm (primary helm [station 1]) harness 2-pin CAN connector with termination resistor

Dual Engine/Single Helm

1. Confirm the presence of a termination resistor on both engines' 10-pin CAN connectors.
2. Install a CAN P (1) Link Harness between both engines' helm harness 2-pin CAN connectors. Do not use termination resistors at these locations.
3. Protect all unused connectors with weather caps.

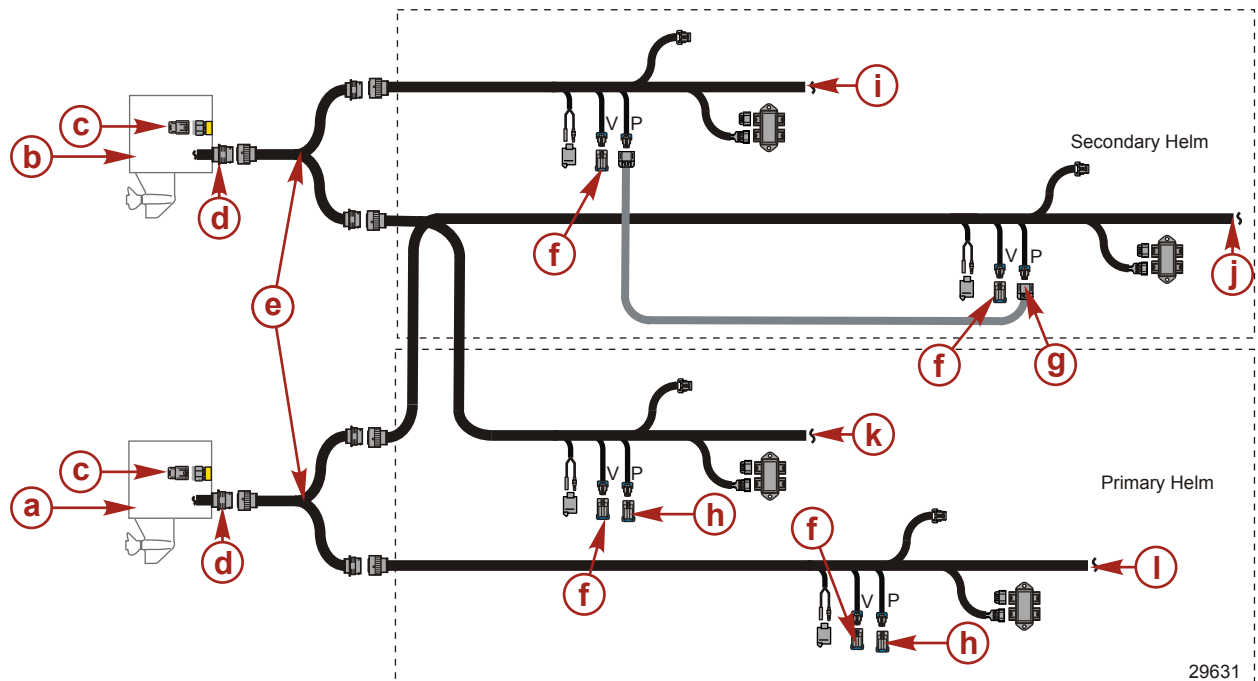


29629

- a** - STBD Outer (engine 1)
- b** - PORT Outer (engine 2)
- c** - Engine 10-pin CAN with termination resistor
- d** - Engine 14-pin data connector
- e** - CAN V (3) connector with weather cap
- f** - CAN P (1) Link Harness
- g** - To helm

Dual Engine/Dual Helm

1. Confirm the presence of a termination resistor on both engines' 10-pin CAN connectors.
2. Confirm the presence of termination resistors on the 2-pin CAN connectors of the helm harnesses that have an electrical run furthest from each engine . This is generally at the secondary helm.
3. Install weather caps on the 2-pin CAN P (1) connectors of the helm harnesses that have an electrical run the shortest distance from each engine. This is generally at the primary helm. Do not use termination resistors at these locations.
4. Protect all unused connectors with weather caps.

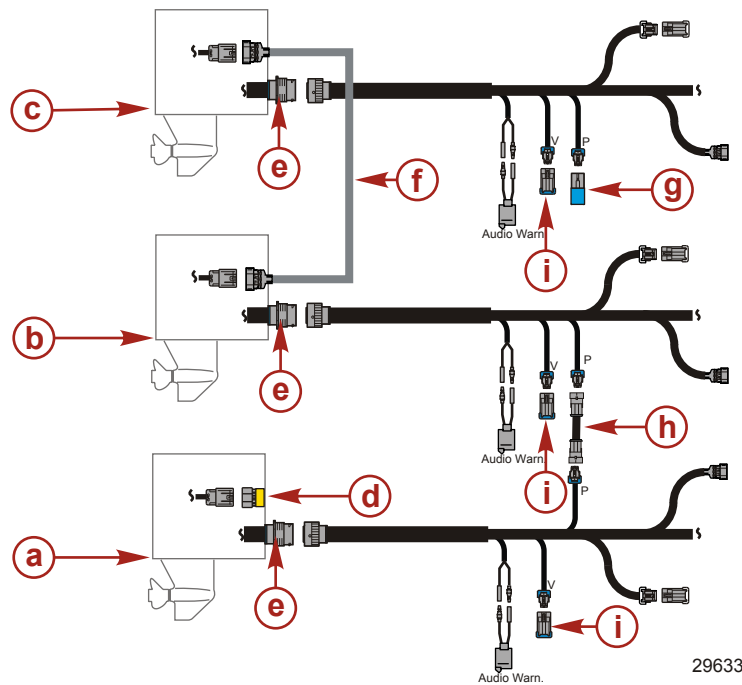


- | | |
|--|--|
| a - STBD Outer (engine 1) | g - CAN P (1) Link Harness |
| b - PORT Outer (engine 2) | h - CAN P (1) weather cap |
| c - Engine 10-pin CAN with termination resistor | i - PORT Outer (engine 2), secondary (upper) helm harness |
| d - Engine 14-pin data connector | j - STBD Outer (engine 1), secondary (upper) helm harness |
| e - Dual helm adaptor harness | k - PORT Outer (engine 2), primary (lower) helm harness |
| f - CAN V (3) weather cap | l - STBD Outer (engine 1), primary (lower) helm harness |

Triple Engine/Single Helm

1. Confirm the presence of a termination resistor on the STBD Outer (engine 1) 10-pin CAN connector.
2. Confirm the presence of a termination resistor on the PORT Outer (engine 2) helm harness 2-pin CAN P (1) connector.
3. Install a 2-pin CAN P (1) Link Harness between the STBD Outer (engine 1) helm harness CAN P (1) connector and the STBD Inner (engine 3) helm harness CAN P (1) connector.

4. Install a 10-pin CAN P (1) Link Harness between the PORT Outer (engine 2) 10-pin CAN P (1) connector and the STBD Inner (engine 3) 10-pin CAN P (1) connector.
5. Protect all unused connectors with weather caps.

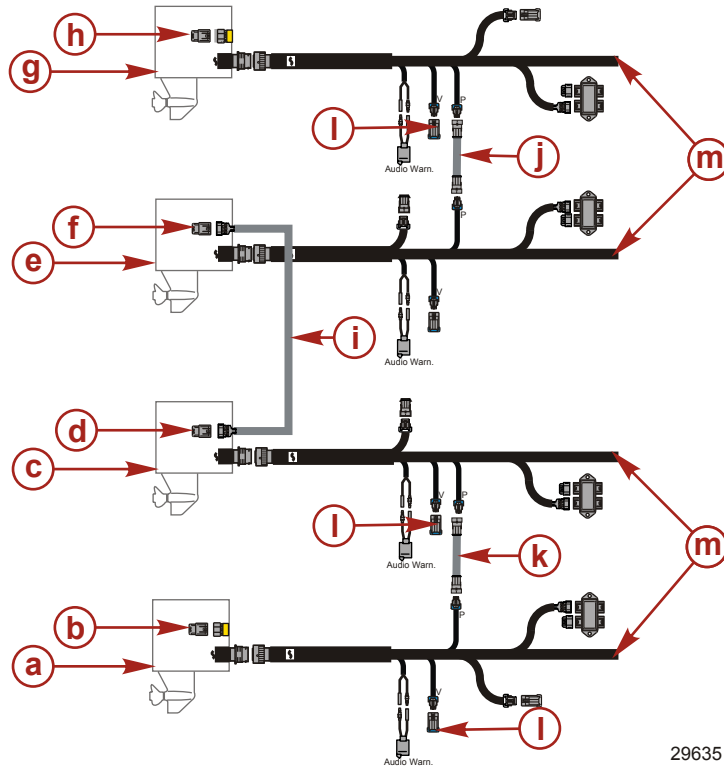


- | | |
|--|---|
| a - STBD Outer (engine 1) | f - 10-pin CAN P (1) Link Harness |
| b - STBD Inner (engine 3) | g - Boat harness 2-pin CAN with termination resistor |
| c - PORT Outer (engine 2) | h - 2-pin CAN P (1) Link Harness |
| d - Engine 10-pin CAN with termination resistor | i - Weather cap |
| e - Engine 14-pin data connector | |

Quad Engine/Single Helm

1. Confirm the presence of a 10-pin termination resistor on the STBD Outer (engine 1) 10-pin CAN connector.
2. Confirm the presence of a 10-pin termination resistor on the PORT Outer (engine 2) 10-pin CAN connector.
3. Install a 2-pin CAN P (1) Link Harness between the STBD Outer (engine 1) and STBD Inner (engine 3) helm harnesses.
4. Install a 10-pin CAN P (1) Link Harness between the STBD Inner (engine 3) and PORT Inner (engine 4) 10-pin CAN connectors.
5. Install a 2-pin CAN P (1) Link Harness between the PORT Outer (engine 2) and PORT Inner (engine 4) helm harnesses.

6. Protect all unused connectors with weather caps.

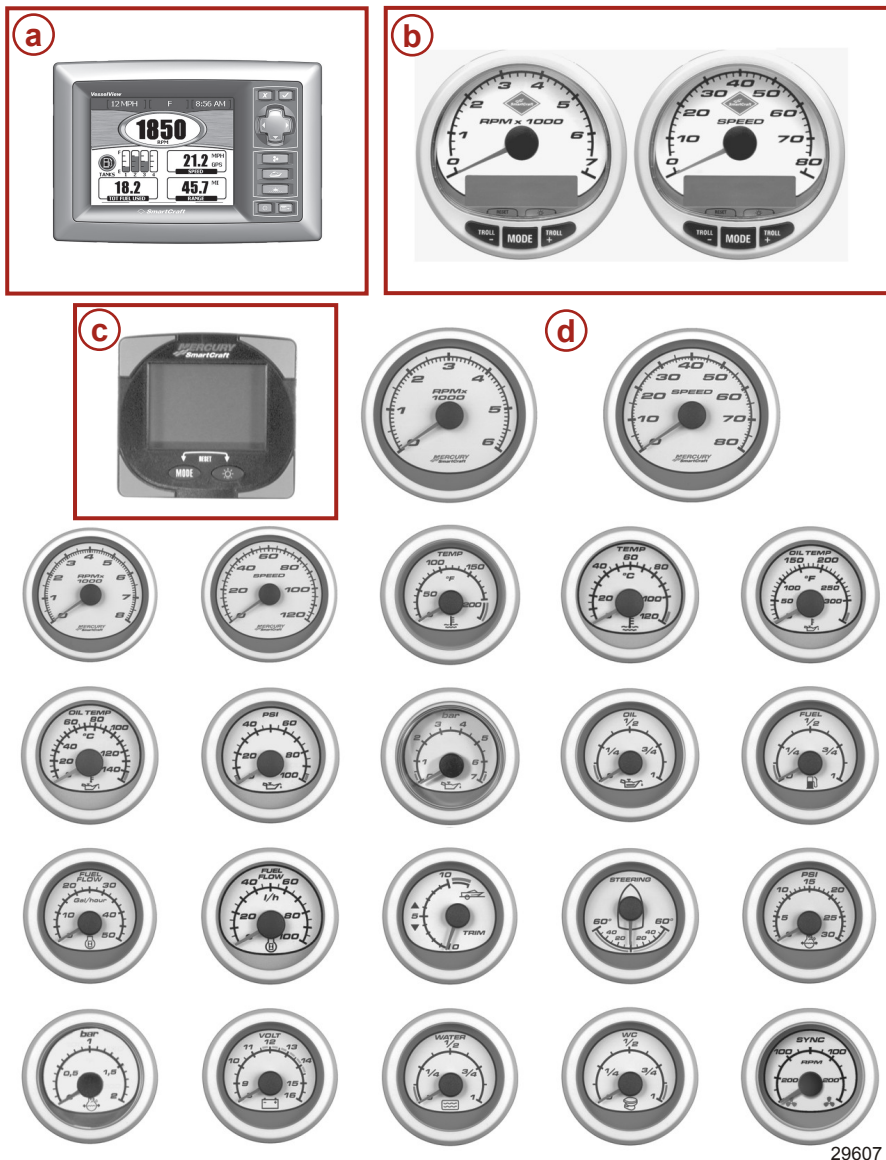


29635

- a** - STBD Outer (engine 1)
- b** - STBD Outer (engine 1) 10-pin CAN with termination resistor
- c** - Starboard IN (engine 3)
- d** - Starboard IN (engine 3) 10-pin CAN connector
- e** - Port IN (engine 4)
- f** - Port IN (engine 4) 10-pin CAN connector
- g** - PORT Outer (engine 2)
- h** - PORT Outer (engine 2) 10-pin CAN with termination resistor
- i** - 10-pin CAN P (1) Link Harness
- j** - Port 2-pin CAN P (1) Link Harness
- k** - Starboard 2-pin CAN P (1) Link Harness
- l** - Weather cap
- m** - To rest of helm harness

Instrumentation

SmartCraft System Gauges

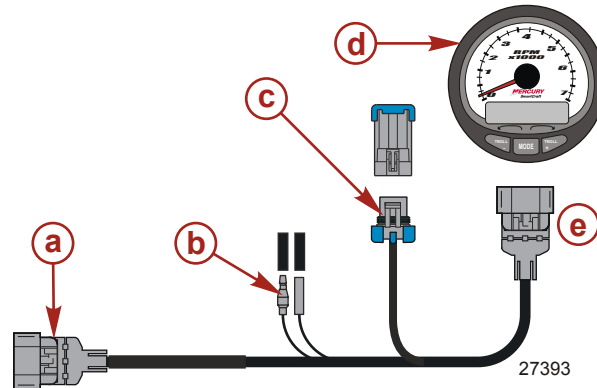


29607

- a** - Vessel View
- b** - SC1000 System Tach and Speed
- c** - SC1000 System Monitor
- d** - SC100 System Link gauges

System Tachometer Harness

The System Tachometer receives its signal from the 14-pin helm harness CAN P (1) bus and connects to either a junction box or 10-pin male-to-male adaptor connected to the helm harness 10-pin SmartCraft connector. Each helm station with System Tachometer instrumentation requires one System Tachometer for each engine.

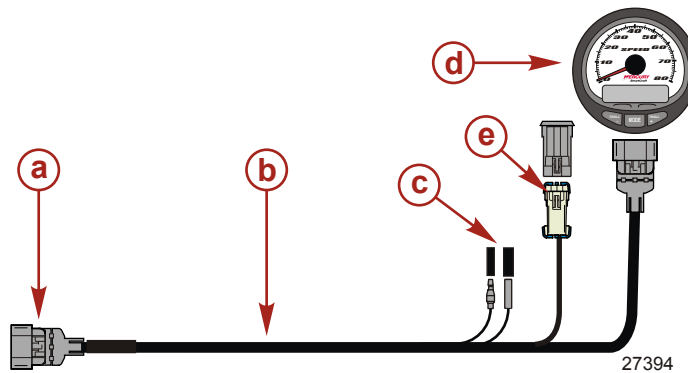


System tachometer harness

- a** - 10-pin junction box connector
- b** - Audio warning (weather cap)
- c** - Smart Link connector (weather cap)
- d** - System Tachometer
- e** - Gauge connector

System Speedometer Harness

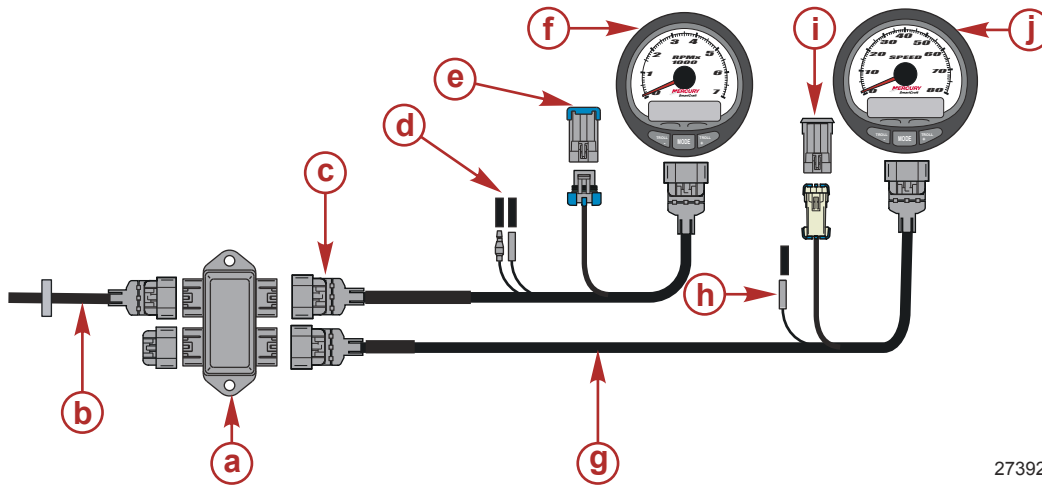
The System Speedometer receives its signal from the 14-pin helm harness CAN P (1) bus. In single engine applications, it connects to either a junction box or a 10-pin male-to-male adaptor connected to the helm harness 10-pin SmartCraft connector. For multiple engine applications, the System Speedometer connects to a junction box networked to each engine through the multiple helm harnesses and the appropriate multi-engine adaptor harness. You can install one System Speedometer at each helm .



- a** - 10-pin junction box connector
- b** - System speedometer harness
- c** - NMEA connectors (weather cap)
- d** - System speedometer
- e** - Temperature sensor connector

SC1000 System Tachometer and Speedometer Installation (Single Engine)

In single engine applications the System Tachometer and Speedometer share a junction box connected to the helm harness. In single engine, dual helm applications, the System Tachometer and Speedometer connect through a junction box connected to each stations' helm harness.



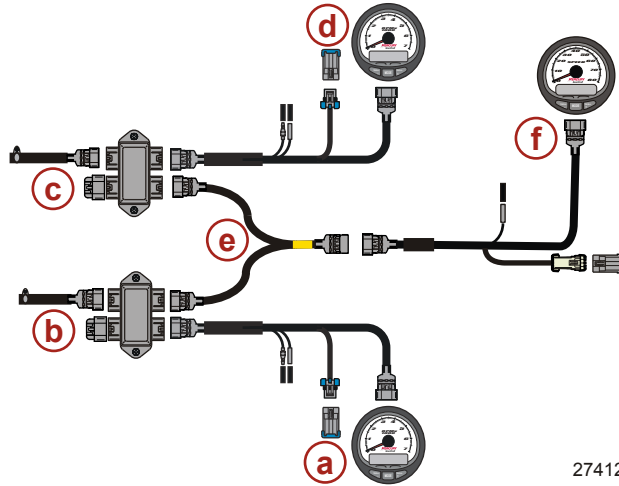
27392

Single engine installation

- | | |
|--|---|
| a - Junction box | f - System Tachometer |
| b - 10-pin SmartCraft connector from helm harness | g - System Speedometer harness |
| c - System tachometer harness | h - NMEA connector |
| d - Audio Warning | i - Air temperature sensor connector |
| e - System Link Connector | j - System Speedometer |

SC1000 System Tachometer and Speedometer Installation (Dual Engine)

Dual engine applications require a System Tachometer for each engine connected to a junction box that is attached to each engine's helm harness. The System Speedometer connects to both helm harnesses through a dual helm adaptor which connects to each engine's junction box. Repeat this basic installation for dual engine, dual helm applications at the secondary helm .



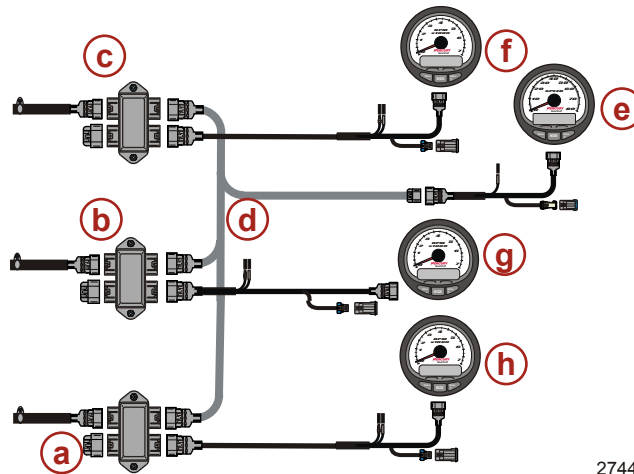
27412

Dual engine installation

- a** - Starboard engine tachometer and harness connection to junction box
- b** - Starboard engine helm harness connection to junction box
- c** - Port engine helm harness connection to junction box
- d** - Port engine tachometer and harness connection to junction box
- e** - Dual engine instrument adaptor harness
- f** - System Speedometer and harness

SC1000 System Tachometer and Speedometer Installation (Triple Engine)

Triple engine applications require a System Tachometer each engine connected to a junction box that is attached to each engine's helm harness. The System Speedometer connects to all three helm harnesses through a triple helm adaptor harness, which connects to each engine's junction box. Repeat this installation for triple engine, dual helm applications at the secondary helm.



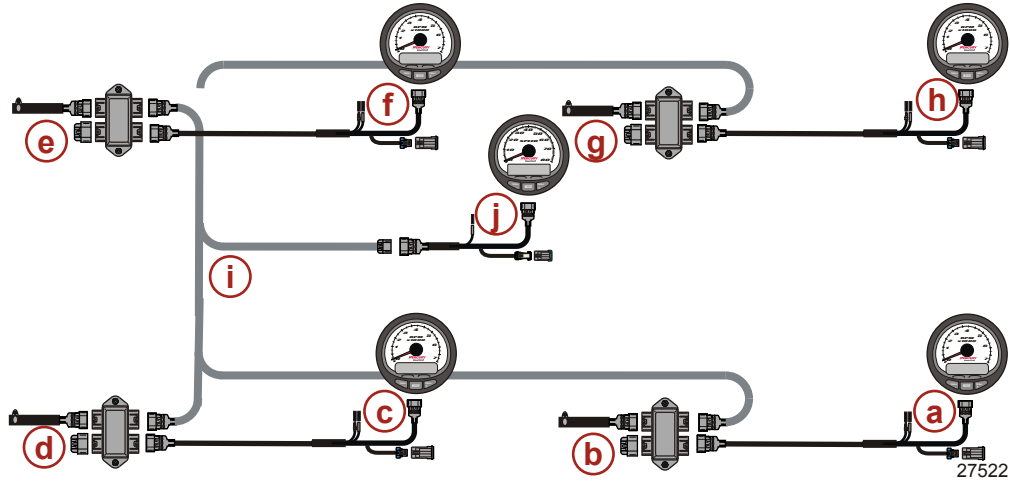
27449

Triple engine, single helm

- | | |
|---|--|
| a - Starboard OUT (one) helm harness to junction box | e - System Speedometer and harness |
| b - Starboard IN (two) helm harness to junction box | f - Port OUT (one) System Tach and harness |
| c - Port OUT (one) helm harness to junction box | g - Starboard IN (two) System Tach and harness |
| d - Triple engine instrument adaptor harness | h - Starboard OUT (one) System Tach and harness |

SC1000 System Tachometer and Speedometer Installation (Quad Engine)

Quad engine applications require a System Tachometer for each engine, connected to the junction box attached to each engine's helm harness. The System Speedometer connects to all four helm harnesses through a quad helm adaptor harness connected to each engine's junction box. Repeat this installation for quad engine, dual helm applications at the secondary helm.



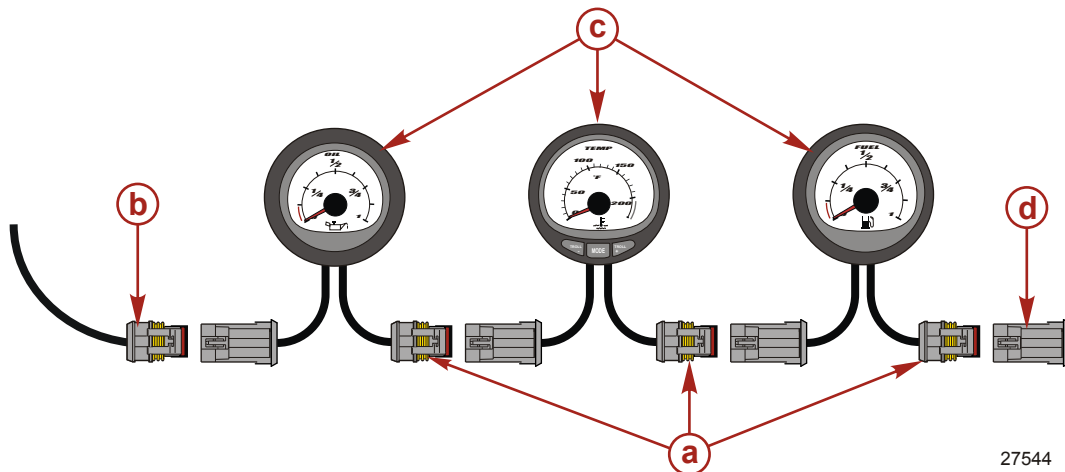
Quad engine single helm installation

- | | |
|--|---|
| a - Starboard OUT (one) System Tachometer | f - Port IN (two) System Tachometer |
| b - Starboard OUT (one) junction box | g - Starboard IN (two) junction box |
| c - Port OUT (one) System Tachometer | h - Starboard IN (two) System Tachometer |
| d - Port OUT (one) junction box | i - Quad engine instrument adaptor harness |
| e - Port IN (two) junction box | j - System Speedometer |

System Link Gauges

System Link Gauge Connections

System Link gauges receive their data signal from a master gauge, which can be a System Monitor, System Tachometer, VesselView, or System Link adaptor harness. This enables the use of System Link gauges in a variety of situations and configurations. System Link gauges connect in series. Protect the System Link connector of the final gauge in a series with a weather cap.



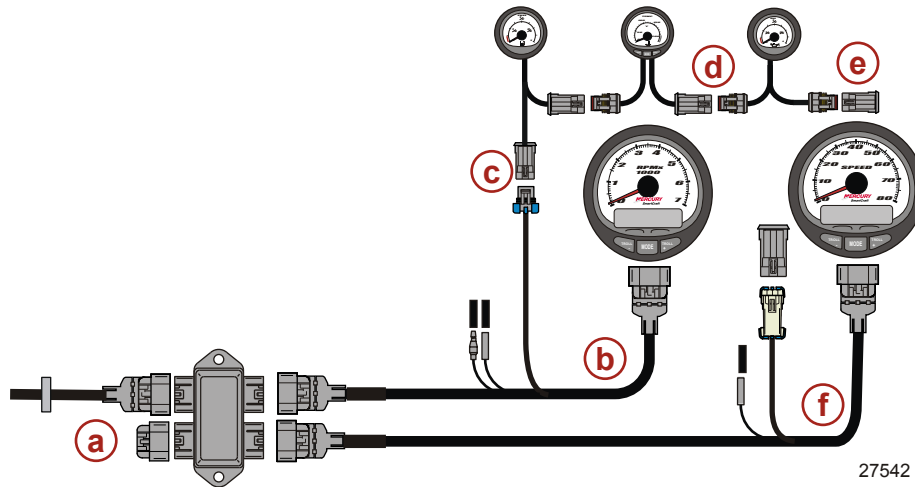
27544

Example of System Link gauge setup

- a** - System Link connectors in series
- b** - System Link connector to master gauge
- c** - System Link gauges
- d** - Weather cap

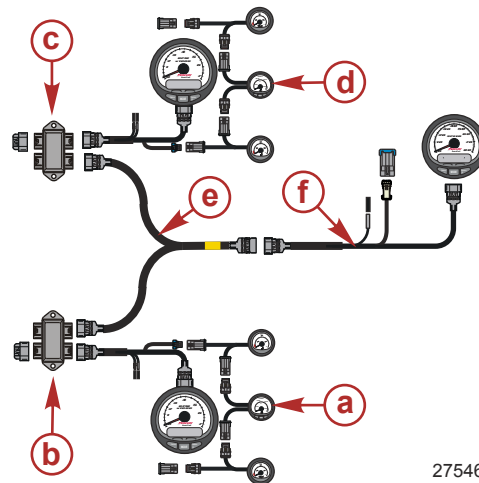
Each set of System Link gauges monitor one engine. In multiple engine applications, install a System Link gauge set for each engine. In all cases, the System Link gauges connect to a master gauge or System Link adaptor harness, which is connected to each engine's helm harness. For multiple helm applications, the secondary helm instrumentation connects to the secondary helm harness in the same manner.

System Link Gauges with System Tachometer



Single helm installation

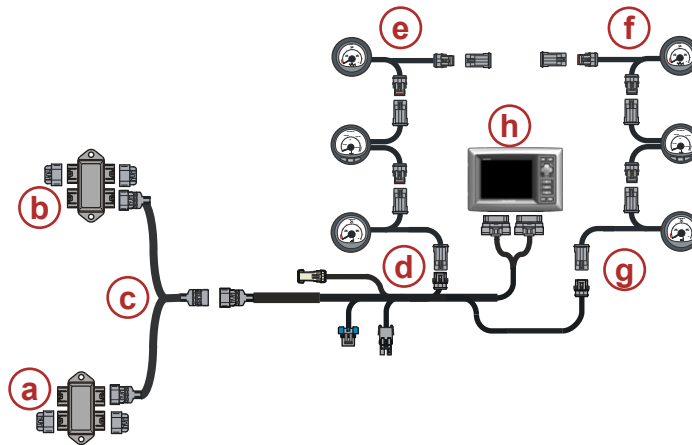
- a** - Junction box
- b** - System Tachometer harness
- c** - System Link connector
- d** - System Link gauges (typical)
- e** - Weather cap
- f** - System Speedometer and harness



Dual helm installation

- a** - Starboard System Link gauges
- b** - Starboard engine junction box
- c** - Port engine junction box
- d** - Port System Link gauges
- e** - Dual instrument adaptor harness
- f** - System Speedometer and harness

System Link Gauges with VesselView



27586

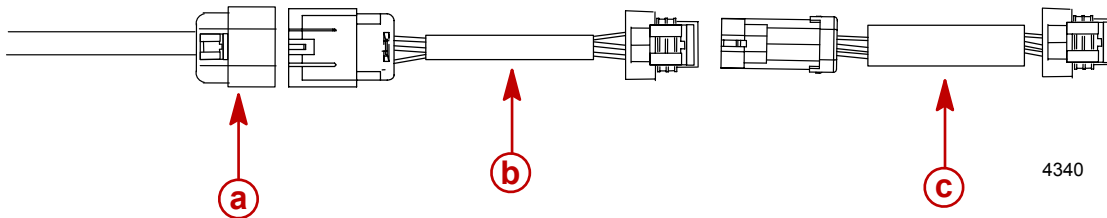
Dual engine Vessel View with System Link gauges

- a** - Starboard engine junction box
- b** - Port engine junction box
- c** - Dual instrument adaptor harness
- d** - Port System Link connector
- e** - Port System Link gauges
- f** - Starboard System Link gauges
- g** - Starboard System Link connector

System Link Adaptor Harness

You can connect System Link gauges without using a master SmartCraft gauge by installing a System Link adaptor harness. The System Link adaptor harness connects directly to the helm harnesses 10-pin SmartCraft connector. The System Link adaptor harness will also connect to a junction box by using a 10-pin female-to-female adaptor.

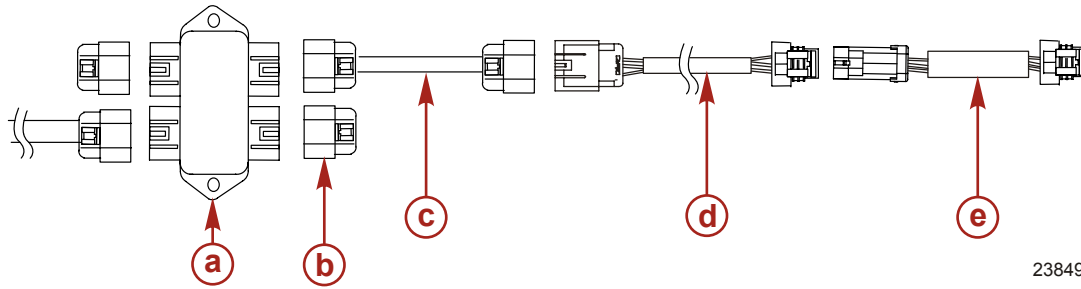
IMPORTANT: For System Link gauges to operate properly when used in conjunction with the System Link adaptor harness, reset the engine propulsion control module (PCM) or the electronic control module (ECM) tachometer default configuration from analog to digital mode. You must use the Computer Diagnostic System (CDS) to configure the PCM/ECM tachometer output.



4340

System Link connections to the helm harness

- a** - Helm harness 10-pin SmartCraft connector
- b** - System Link adaptor harness
- c** - System Link reset module



23849

System Link connections to a junction box

- a** - Junction box
- b** - Weather cap
- c** - 10-pin female-to-female adaptor
- d** - System Link adaptor harness
- e** - System Link reset module

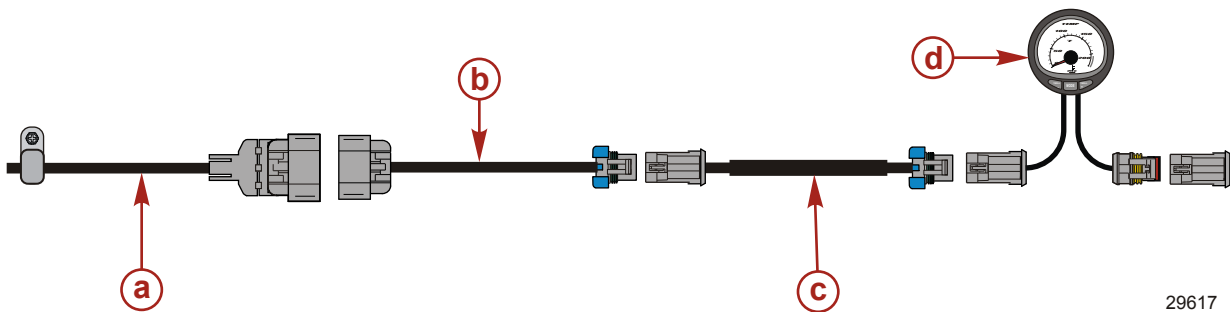
IMPORTANT: We recommend using a System Link reset module when using the System Link adaptor harness. The System Link reset module resets the gauges allowing them to re-acquire engine data should one or more engines unexpectedly shut down while the ignition is on. The gauges may lock up without the use of a System Link reset module.

System Link Gauge Installation

Helm Harness Connection

IMPORTANT: We recommend using a System Link reset module when using the System Link adaptor harness. The System Link reset module resets the gauges allowing them to re-acquire engine data should one or more engines unexpectedly shut down while the ignition is on. The gauges may lock up without the use of a System Link reset module.

1. Follow all mounting instructions provided with your product.
2. Disconnect both battery cables from the battery.
3. Connect the System Link adaptor harness to the helm harness 10-pin SmartCraft connector.



29617

- a** - Helm harness
- b** - System Link adaptor
- c** - Reset module (optional)
- d** - System Link gauge

4. Connect a System Link reset module to the System Link adaptor harness (optional).
5. Connect the lead System Link gauge connector to the System Link adaptor harness or the reset module connector if used.
6. Link any remaining System Link gauges in series with the lead gauge.

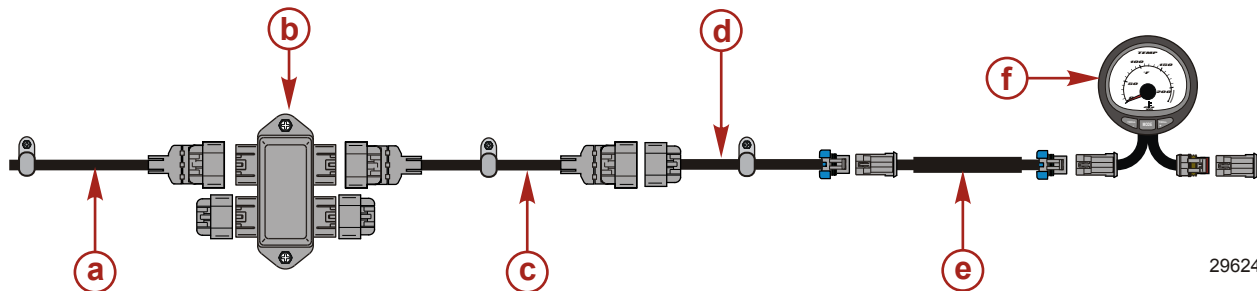
7. Protect any unused connectors with weather caps.

Junction Box Connection

IMPORTANT: We recommend using a System Link reset module when using the System Link adaptor harness. The System Link reset module resets the gauges allowing them to re-acquire engine data should one or more engines unexpectedly shut down while the ignition is on. The gauges may lock up without the use of a System Link reset module.

NOTE: When connecting System Link gauges through a junction box, install a System Link adaptor harness and a 10-pin female-to-female adaptor.

1. Follow all mounting instructions provided with your product.
2. Disconnect both battery cables from the battery.
3. Connect the 10-pin female-to-female adaptor to the junction box.

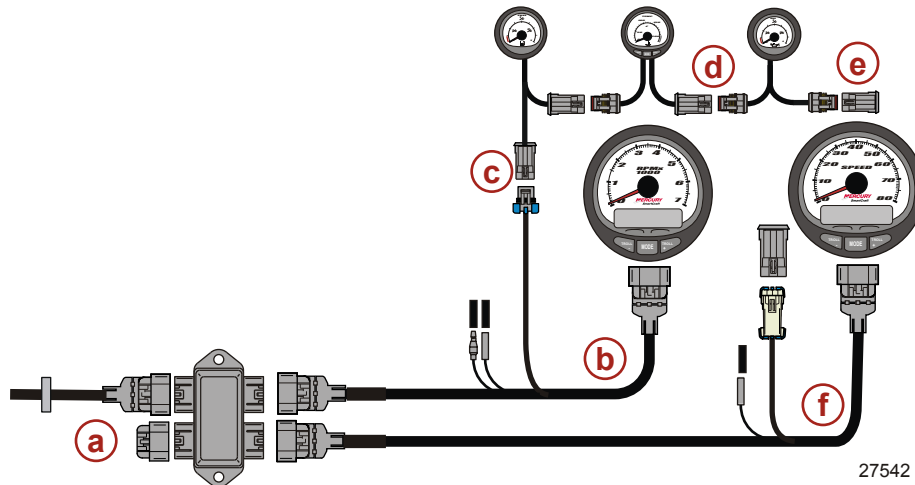


- | | |
|--|--|
| a - Helm harness | d - System link adaptor harness |
| b - Junction box | e - Reset module (optional) |
| c - Female to female jumper harness | f - System Link gauge |

4. Connect the System Link adaptor harness to the 10-pin female-to-female adaptor.
5. Connect a System Link reset module to the System Link adaptor harness (optional).
6. Connect the lead System Link gauge connector to the System Link adaptor harness or the reset module connector if used.
7. Link any remaining System Link gauges in series with the lead gauge.
8. Protect any unused connectors with weather caps.

Instrumentation Harness Connection Diagram

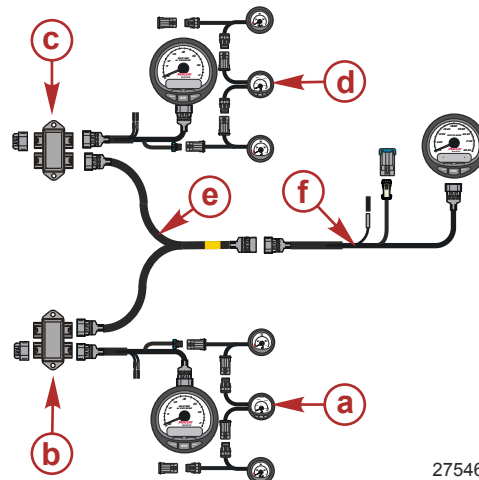
NOTE: You can connect System Link gauges to any SmartCraft instrumentation harness that provides a System Link connector.



System Link gauges with System Tachometer and System Speedometer (typical)

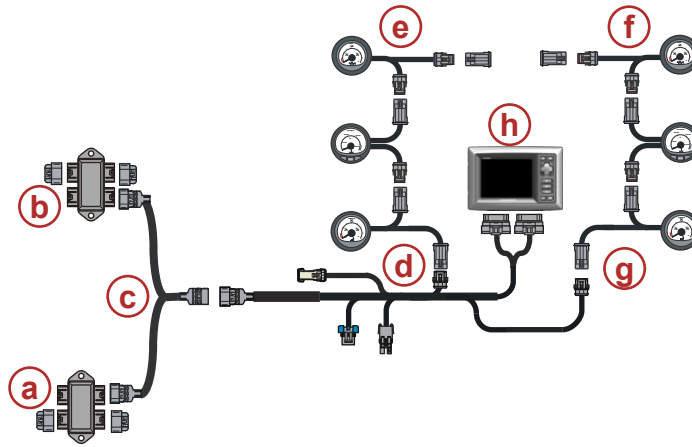
- a** - System Speedometer
- b** - System Speedometer harness
- c** - Junction box connected to helm harness
- d** - System Tachometer harness
- e** - System Tachometer
- f** - System Link gauges harness

Typical Dual Engine Installation Diagrams



Dual helm installation (typical)

- a** - Starboard System Link gauge set
- b** - Starboard helm harness junction box
- c** - Port helm harness junction box
- d** - Port System Link gauge set
- e** - Dual engine instrument adaptor harness
- f** - System Speedometer



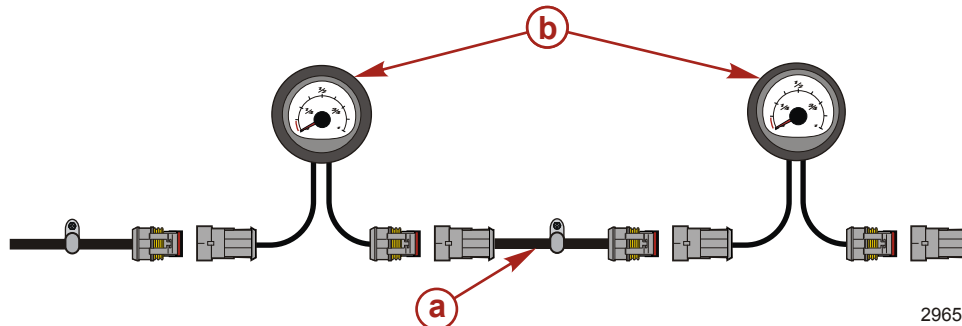
27586

Dual engine Vessel View with SmartCraft gauges

- a** - Starboard engine junction box
- b** - Port engine junction box
- c** - Dual engine instrument harness
- d** - Port System Link connector
- e** - Port System Link gauges
- f** - Starboard System Link gauges
- g** - Starboard System Link connector
- h** - Vessel View and harness

System Link Gauge Extension Harness Installation

The System Link Gauge Extension Harness comes in five lengths, ranging from 153 mm to 9.1 m (6 in. to 30 ft.). Install an extension harness anywhere in the System Link gauge series if you require additional gauge spacing or an alternative gauge mounting location. SmartCraft technology supports a System Link gauge series that does not exceed 9.1 m (30 feet) in overall length. SmartCraft supports one- and two-helm installations with up to ten gauges per helm.



29659

- a** - System Link gauge extension harness
- b** - System Link gauge