

2023



2023 Helm Master EX 6X9 Digital Electronic Control Rigging Guide


**6X9-28197-14 ●
LIT-18616-04-39**

Preface

This manual has been prepared by Yamaha primarily for use by Yamaha dealers and their trained technicians to provide necessary information for setting up the 6X9 system on the boat.

Important Information

Particularly important information is distinguished in this manual by the following notations:

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

WARNING

A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

A NOTICE indicates special precautions that must be taken to avoid damage to the outboard motor or other property.

TIP:

A TIP provides key information to make procedures easier or clearer.

The following abbreviations are used in this rigging guide.

SCU: Steering Control Unit	ST: Station
BCU: Boat Control Unit	SW: Switch
EKS: Electronic Key Switch	LPS: Lever Position Sensor
AWG: American Wire Gauge	BC: Boat Control
CCA: Cold Cranking Ampere	ECM: Electronic Control Module
ABYC: American Boat and Yacht Council	WOT: Wide Open Throttle
DEC: Digital Electronic Control	ISO: International Organization for Standardization
DES: Digital Electric Steering	SAE: Society of Automotive Engineers
GPS: Global Positioning System	PORT: Port side
AP: Auto Pilot	STBD: Starboard side
RC: Remote Control	MFD: Multi-Function Display
R/C: Remote Control	

**2023 Helm Master EX
6X9 Digital Electronic Control
Rigging Guide
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2nd Edition, August 2023
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Important information

NOTICE

When remounting an engine, etc., always reset recognition of the remote controls. A variety of errors occur if DEC recognition cannot be done. Steering sensor calibration also cannot be done. If DEC recognition has not been done, the active lamp on the remote control does not light, the autopilot is not displayed on the gauge, and steering errors and other symptoms occur.

Observe the installation procedures and precautions described in this manual. If the equipment is not installed correctly, the system may not function properly. After the installation is complete, make sure to carry out adjustments and calibrations. Otherwise, the system may not function properly.

Precautions on Helm Master EX control installation

- Allow sufficient space to prevent the bottom of the remote control from coming into contact with any other parts.
- Install the multi-hub connectors facing downward, keeping the multi-hub level.
- Do not install the multi-hub, BCU, Gateway, MFD Interface and heading sensor in a location where they may easily be stepped on or where they may become obstacles.
- Install the Helm Master EX control system 30 cm (1 ft) or more away from the two-way radios, antenna cables, and generators.
- Be careful not to bind the wiring harness of this system and the antenna cable together.
- Make sure to cover all multi-hub connectors not in use with a waterproof cap.
- Do not bend the water-resistant heat-shrinkable tube of the main bus wire or the pigtail bus wire any more than 45°.
- Install the wiring harnesses so that they do not come into contact with any edges or moving parts that may cause shearing. Do not apply excessive force when pulling on the wiring harnesses to lay them out.
- Fix the wiring harnesses in place without pulling them unduly.
- Always check that the locking mechanism between male and female connectors locks with a click. This guarantees correct water-tight closure.
- A BPS scan must be implemented for each Helm Master EX system prior to the boat leaving the boat builder and dealers to ensure all components are compatible and component serial numbers are recorded. Please see “Predelivery checks” (page 196) of this manual and corresponding YDIS instruction manual for the detailed BPS scan procedure.

Read labels and related manuals

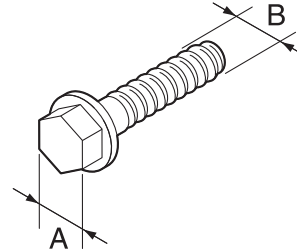
Before operating [installing] or working on this system:

- Read all labels carefully on the Helm Master EX control system components.
- Read this manual thoroughly and see other related manuals for outboard motors, MFD, and boats for their basic operations.

General tightening torque

This chart indicates the tightening torques for standard fasteners with a standard ISO thread pitch.

Width across flats (A)	Screw size (B)	General torque specifications		
		N·m	kgf·m	lb·ft
8 mm	M5	5	0.5	3.7
10 mm	M6	8	0.8	5.9
12 mm	M8	18	1.8	13.3
14 mm	M10	36	3.6	26.6
17 mm	M12	52	5.2	38.4



General information

Applicable models

Model name		Approved model code	Starting serial No.
USA, CAN, EUR, AUS, and NZL	Worldwide		
F150CA	F150G	6HP	1000001-
LF150CA	FL150G	6HR	1000001-
F150SA	F150H	6LM	1000001-
LF150SA	FL150H	6LN	1000001-
F150CB	—	6LU	1000001-
LF150CB	—	6LV	1000001-
F150C	F150L	6MA	1000001-
LF150C	FL150L	6MB	1000001-
F175CA	F175C	6HS	1000001-
LF175CA	FL175C	6HT	1000001-
F175SA	—	6LK	1000001-
LF175SA	—	6LL	1000001-
F175CB	—	6LS	1000001-
LF175CB	—	6LT	1000001-
F175B	F175G	6LY	1000001-
F200CA	F200G	6DV	1000001-
LF200CA	FL200G	6DW	1000001-
F200SA	F200N	6LH	1000001-
LF200SA	FL200N	6LJ	1000001-
F200CB	F200P	6LP	1000001-
LF200CB	FL200P	6LR	1000001-
F200C	F200Q	6LW	1000001-
LF200C	FL200Q	6LX	1000001-
F225CA	F225F	6CL	1000001-
LF225CA	FL225F	6CM	1000001-
F225CB	F225J	6KK	1000001-
—	FL225J	6KL	1000001-
F250CA	F250D	6CG	1000001-
LF250CA	FL250D	6CH	1000001-
F250CB	F250P	6KH	1000001-
LF250CB	FL250P	6KJ	1000001-
F250SB	F250N	6KD	1000001-

Applicable models

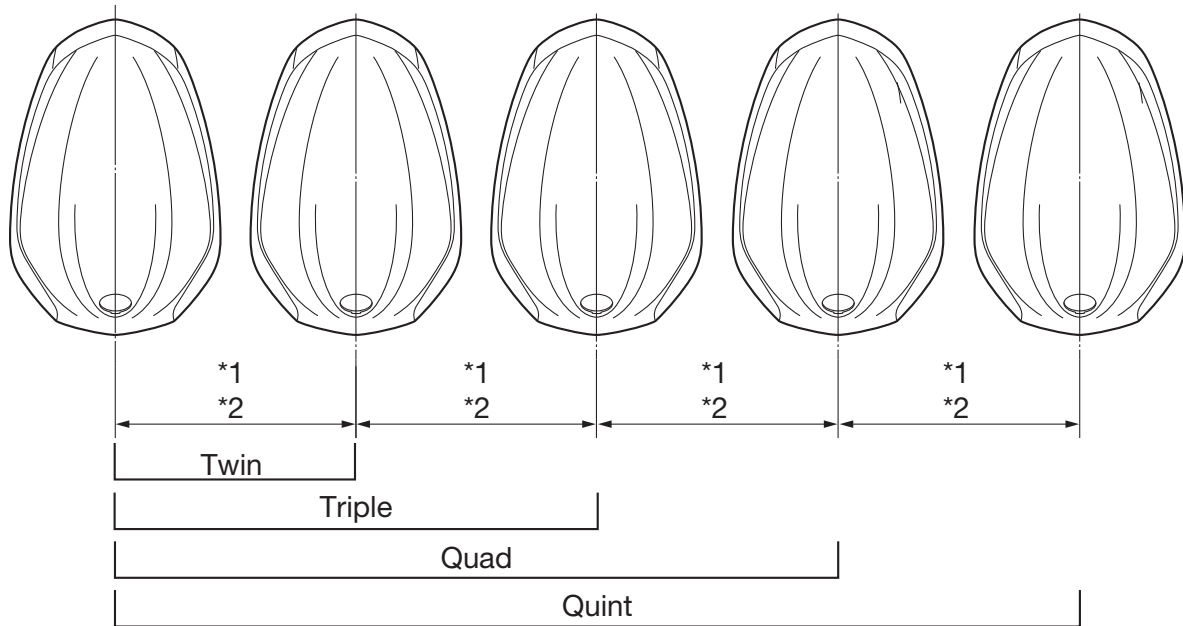
Model name		Approved model code	Starting serial No.
USA, CAN, EUR, AUS, and NZL	Worldwide		
LF250SB	FL250N	6KE	1000001-
F300CA	F300B	6CE	1000001-
LF300CA	FL300B	6CF	1000001-
–	F300D	6JD	1000001-
–	FL300D	6JE	1000001-
F300SB	F300F	6KA	1000001-
LF300SB	FL300F	6KB	1000001-
F300CB	F300G	6KF	1000001-
LF300CB	FL300G	6KG	1000001-
F350CA/B/C	F350A	6AW	1004795-
LF350CA/B/C	FL350A	6AX	1002906-
XF375SA	F375A	6GT	1000001-
LXF375SA	FL375A	6GU	1000001-
XF400SA	F400A	6LB	1000001-
LXF400SA	FL400A	6LC	1000001-
XF425SA	F425A	6GR *1	1000001-
XF425SB			1000001-
LXF425SA	FL425A	6GS *1	1000001-
LXF425SB			1000001-
XF450SA	F450A	6KN	1000001-
LXF450SA	FL450A	6KP	1000001-

*1: For serial numbers prior to 6GR-1003189, 6GS-1000042, and 6GT-1000016, the SCU software must be updated by YDIS.

Engine installation

Engine installation is a major factor in optimizing the performance of the Helm Master EX system. Having the right combination of engines and engine horsepower, along with the right spacing, will further guarantee the customer's overall satisfaction with their Helm Master EX equipped boat.

- As shown in the image below, more engines, more horsepower, and more spacing is the most optimum, however, this is not always possible depending on the boat. Even when using lower horsepower, spacing the engines as wide as possible will work best in most applications.
- Minimum clearance for the engines when using the Helm Master EX is still 724 mm (28.5 in) for V6/V8 engines and 660 mm (26.0 in) for L4 engines.

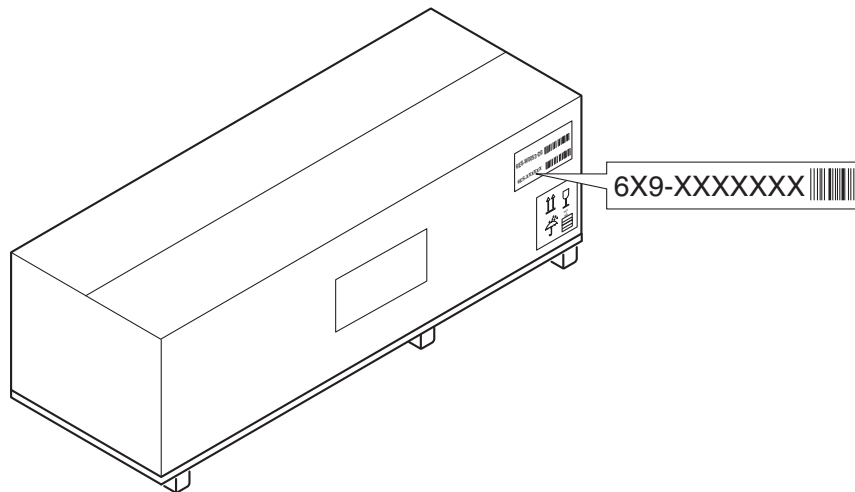


*1: V6, V8 engines → 724 mm (28.5 in)

*2: L4 engines → 660 mm (26.0 in)

Rigging kit component

A serial number is provided for each rigging kit of the Helm Master EX system. Serial numbers are printed on each package box.



The following table shows the combination of the rigging kit and the corresponding serial number range. For the rigging kit contents, see page 11.

Rigging kit name	Rigging kit No.	Serial No.
Autopilot/Joystick full upgrade kit (single)	6X9-762J0-0*	6X90-*****
Autopilot/Joystick full upgrade kit (twin)	6X9-762J0-1*	6X90-*****
Autopilot/Joystick full upgrade kit (triple)	6X9-762J0-2*	6X90-*****
Autopilot/Joystick full upgrade kit (quad)	6X9-762J0-3*	6X90-*****
Autopilot/Joystick full upgrade kit (quint)	6X9-762J0-**	6X90-*****
Joystick add-on kit (single, boat mounted lights)	6X9-762J0-4*	6X91-*****
Joystick add-on kit (single, engine mounted lights)	6X9-762J0-C*	6X91-*****
Joystick add-on kit (twin, boat mounted lights)	6X9-762J0-5*	6X91-*****
Joystick add-on kit (twin, engine mounted lights)	6X9-762J0-D*	6X91-*****
Joystick add-on kit (triple, boat mounted lights)	6X9-762J0-5*	6X91-*****
Joystick add-on kit (triple, engine mounted lights)	6X9-762J0-E*	6X91-*****
Joystick add-on kit (quad, boat mounted lights)	6X9-762J0-7*	6X91-*****
Joystick add-on kit (quad, engine mounted lights)	6X9-762J0-F*	6X91-*****
Joystick add-on kit (quint)	6X9-762J0-**	6X91-*****
Autopilot kit (Main station)	6X9-762P0-0*	6X92-*****
Autopilot kit (2nd station)	6X9-762P0-1*	6X92-*****
Bolt-on DES kit	6X9-762S0-0*	6X93-*****
MFD Interface kit (DEC) with Remote control	6YM-762G0-5*	6YM0-*****
CL5 Display kit (DEC) without sensor module	6YM-762G0-0*	6YM1-*****
CL5 Display kit (DEC) with sensor module	6YM-762G0-1*	6YM1-*****

Helm Master EX Single Part Serial Number

Rigging kit name	Rigging kit No.	Serial No.
CL5 Display kit (Mechanical control, single) without sensor module	6YM-762G0-2*	6YM2-*****
CL5 Display kit (Mechanical control, single) with sensor module	6YM-762G0-3*	6YM2-*****
MFD Interface kit (DEC) without Remote control	6YM-762G0-4*	6YM3-*****
CL5 Display kit (Mechanical control, twin) without sensor module	6YM-762R0-0*	6YM4-*****
CL5 Display kit (Mechanical control, twin) with sensor module	6YM-762R0-1*	6YM4-*****

Helm Master EX Single Part Serial Number

Parts No.	Parts name	Starting serial No.	Remarks
6X9-48205-2*	6X9 single DEC (main station)	6X9A-1000001-	Common serial
6X9-48205-3*	6X9 single DEC (2nd station)		
6X9-48206-2*	6X9 Flush mount DEC (main station)	6X9C-1000001-	Common serial
6X9-48206-1*	6X9 Flush mount DEC (2nd station)		
6X9-48207-2*	6X9 twin DEC (main station)	6X9B-1000001-	Common serial
6X9-48208-1*	6X9 triple DEC (main station)		
6X9-48209-1*	6X9 quad DEC (main station)		
6X9-48210-1*	6X9 quint DEC (main station)		
6X9-48207-3*	6X9 twin/triple/quad/quint DEC (2nd station)		
6X9-8591T-**	BCU	6X9D-1000001-	Autopilot Kit and Joystick Kit, with common serial
6X9-482A0-0*	Joystick	6X9E-1000001-	
6X9-482A0-1*			
6X9-42401-1*	Steering actuator	6X9F-1000001-	
6YM-83710-1*	CL5 Display	6YMA-1000001-	
6YM-8A201-0*	MFD Interface Type-2 unit set	6YMB-1000001-	Except for Garmin
6YM-8A2D0-0*	MFD Interface Type-2		
6YM-8A2D0-1*	MFD Interface Type-1		

Requirements

Battery requirements

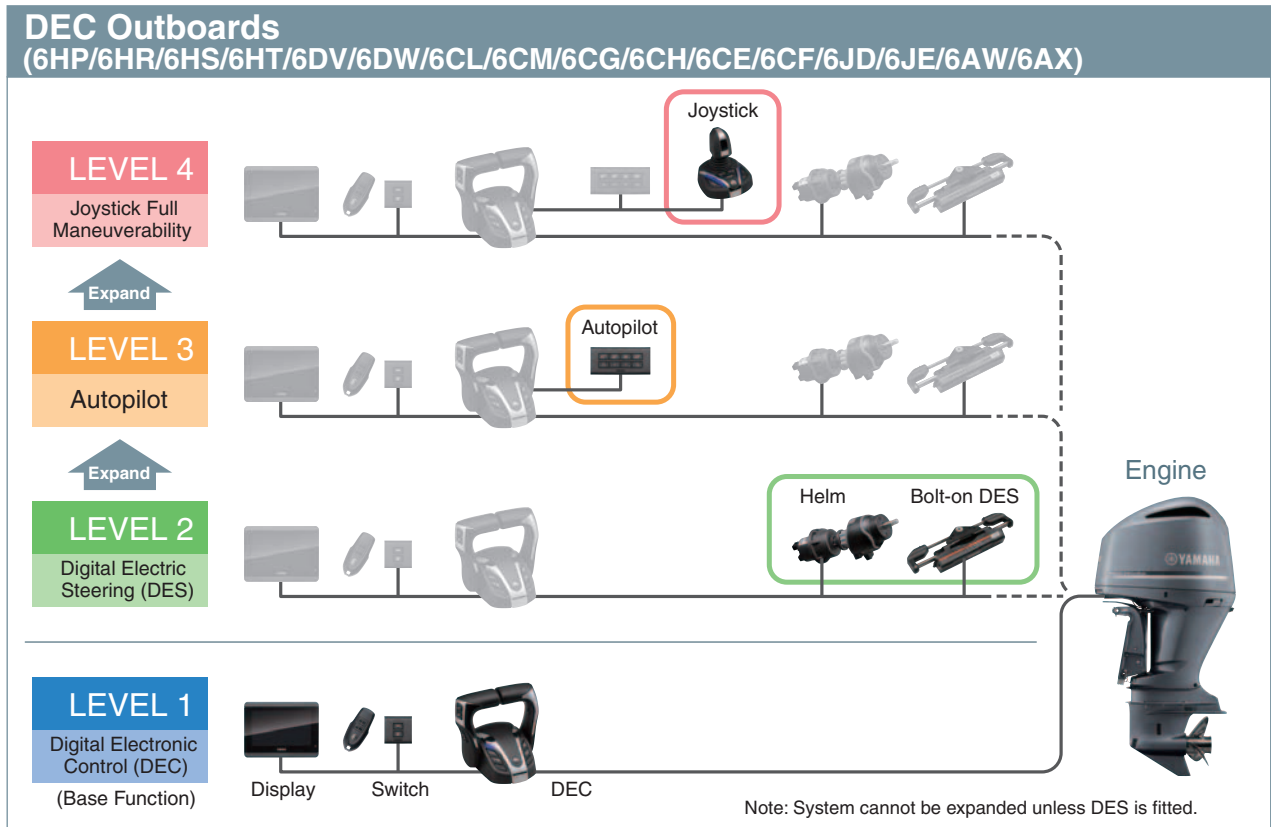
For the Helm Master EX system, a minimum battery capacity is required as below.

Model	Minimum battery rating				
	CCA/SAE	MCA/ABYC	RC/SAE	CCA/EN	20HR/IEC
L4 2.8L, V6 4.2L	680 A	770 A	160 min	640 A	80 Ah
V8 5.3L/5.6L	700 A	900 A	170 min	670 A	110 Ah

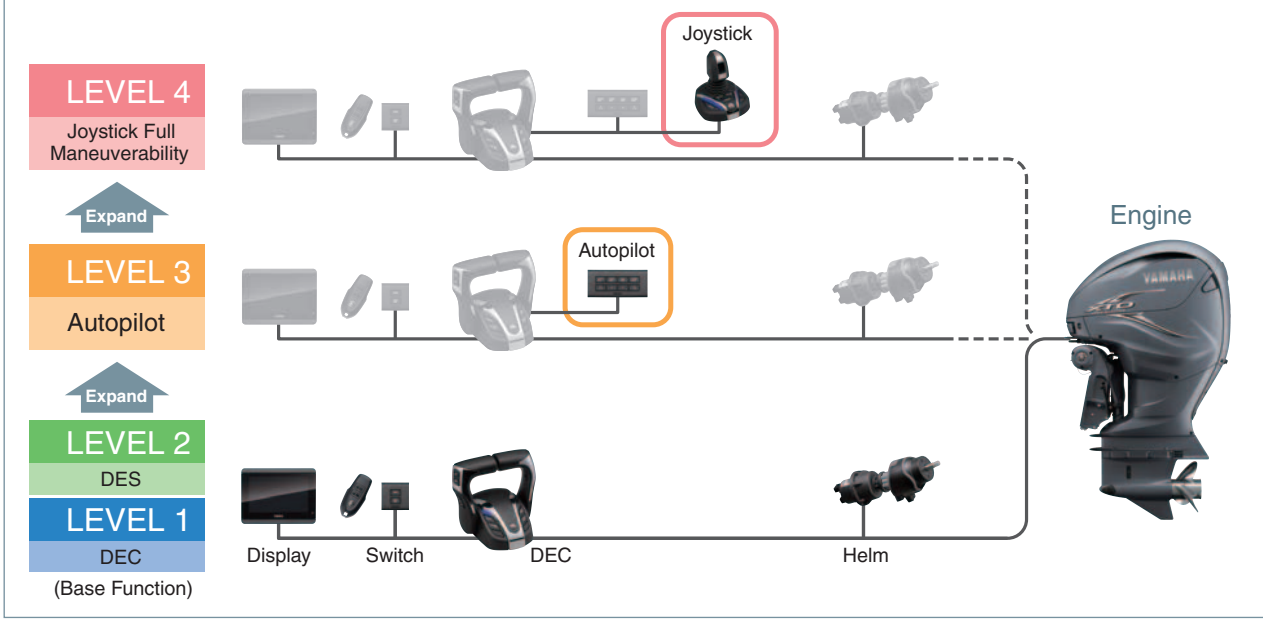
How it Works

Helm Master EX consists of four primary levels, each with varying options. This allows the dealer to offer their consumers different levels of benefits at different price points.

Regardless of which levels are selected, a significant time savings and less inventory management than previous Yamaha and competitive systems will be noticed.



Built-in DES Outboards (6KD/6KE/6KA/6KB/6GR/6GT/6GS)



Feature table

Function	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Component Package	Digital Electronic Control (DEC)	Digital Electric Steering (DES)	Autopilot	Joystick Full Maneuverability
Variable Troll RPM Switch (VTS)	●	●	●	●
Single Lever	●	●	●	●
Speed Control	●	●	●	●
Pattern Shift	●	●	●	●
Trim Assist	●	●	●	●
Center Engine	●	●	●	●
Neutral Hold	●	●	●	●
Electronic Key Switch (EKS) with Y-COP®	●	●	●	●
CL5 Display	●	●	●	●
MFD Interfaces	●	●	●	●
Adjustable/Variable Lock to Lock	—	●	●	●
Adjustable/Variable Steering Friction	—	●	●	●
Heading Hold	—	—	●	●
Course Hold	—	—	●	●
Pattern Steer	—	—	●	●
Track Point	—	—	●	●
Bow thruster integration	—	—	●	●
Autopilotwith Joystick Adjustability	—	—	—	●
Joystick Maneuverability(incl. Single Engine)	—	—	—	●
SetPoint™ Suite Features(incl. Single Engine)	—	—	—	●
Track Point with SetPoint™ Final Stop	—	—	—	●

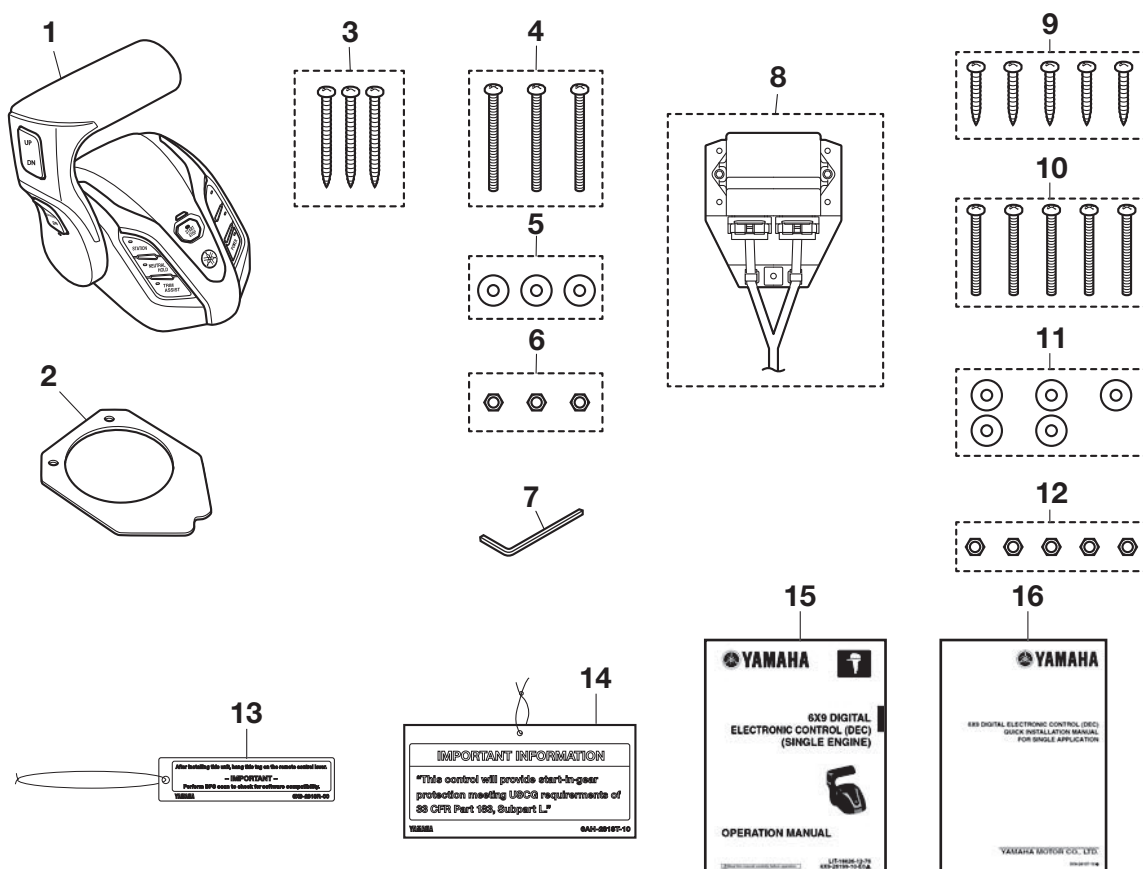
Rigging kit contents

DEC

TIP:

The DEC for the single, twin, triple, quad, and quint engine applications is packaged together with the operation manual and installation manual up to the full kit. The other kits are packaged together with the quick start guide and installation manual.

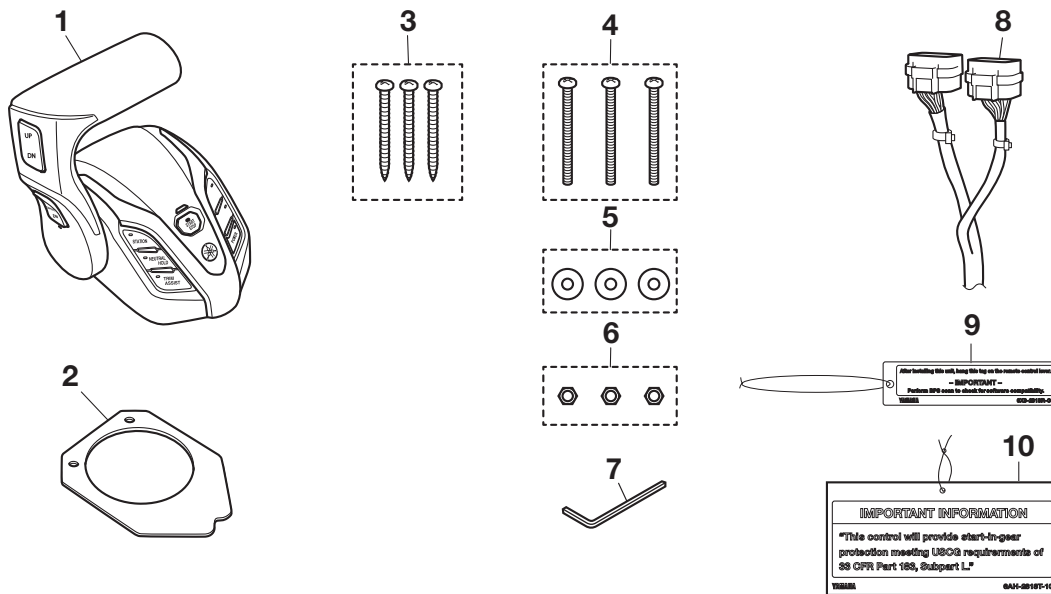
6X9 single DEC Kit (Main station/6X9-48205-20)



No.	Part name	Q'ty	Part No.	Remarks
1	6X9 single DEC	1	6X9-48205-20	
2	Gasket	1		
3	Self-tapping screw	3		
4	Screw	3		
5	Washer	3		
6	Nut	3		
7	Hexagon wrench	1		
8	Wire harness with ECM	1	6X9-4820B-10	
9	Self-tapping screw	5	6X9-48128-00	
10	Screw	5	90157-06M13	

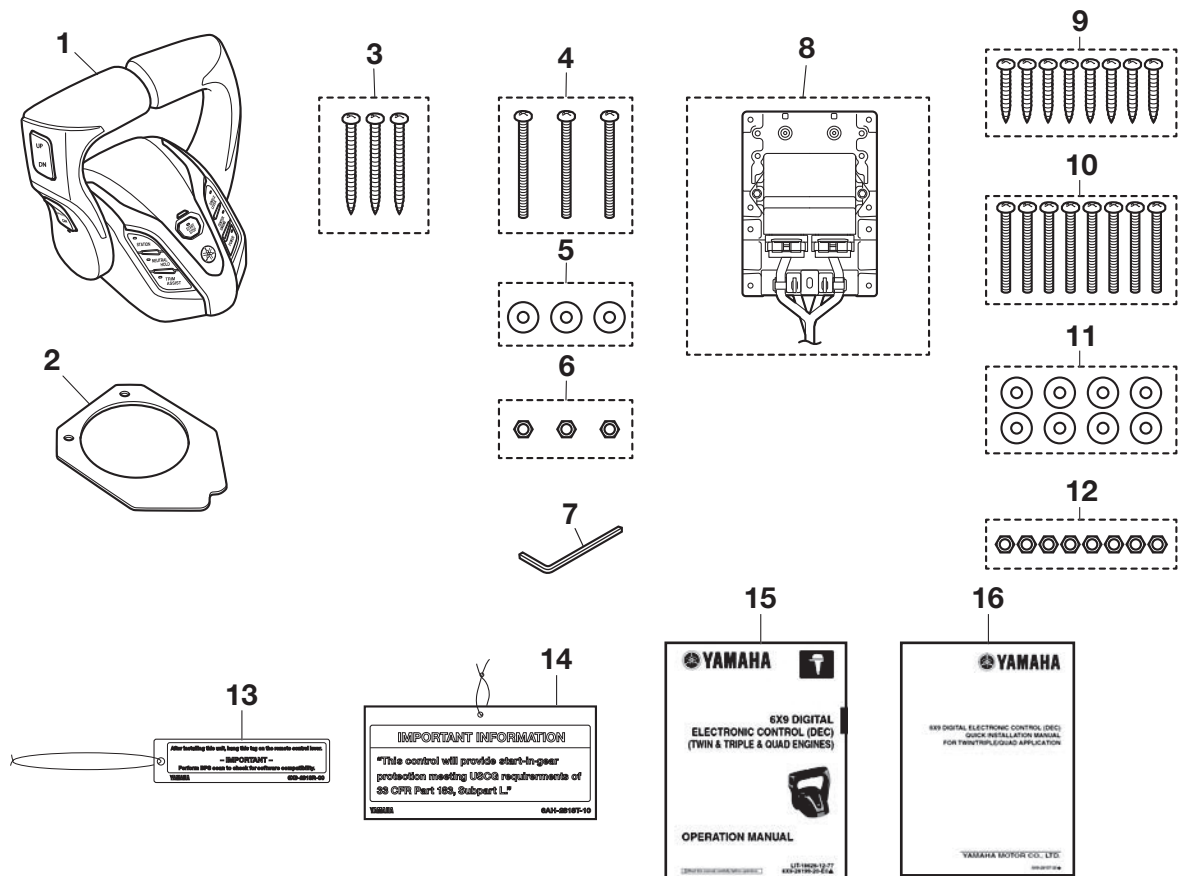
No.	Part name	Q'ty	Part No.	Remarks
11	Washer	5	90201-065F1	
12	Nut	5	95780-06300	
13	Tag CAUTION	1	6X9-2818R-00	
14	Tag Information	1	6AH-2818T-10	
15	Operation manual	1	6X9-28199-A0	
16	Quick installation manual	1	6X9-28107-B0	

6X9 single DEC Kit (2nd station/6X9-48205-30)



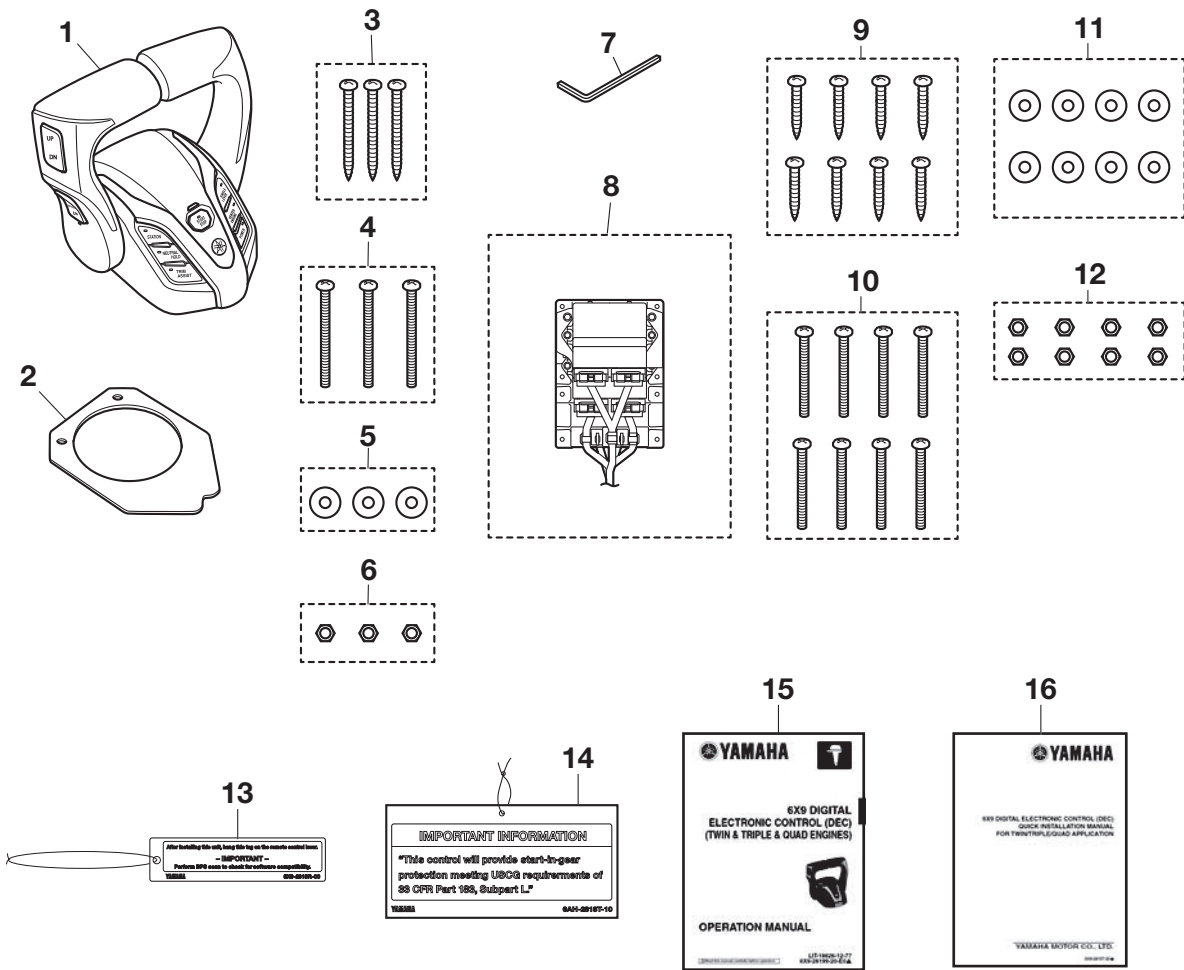
No.	Part name	Q'ty	Part No.	Remarks
1	6X9 single DEC	1	6X9-48205-30	
2	Gasket	1		
3	Self-tapping screw	3		
4	Screw	3		
5	Washer	3		
6	Nut	3		
7	Hexagon wrench	1		
8	Wire harness	1	6X9-82580-J0	
9	Tag CAUTION	1	6X9-2818R-00	
10	Tag Information	1	6AH-2818T-10	

6X9 twin DEC Kit (Main station/6X9-48207-20)



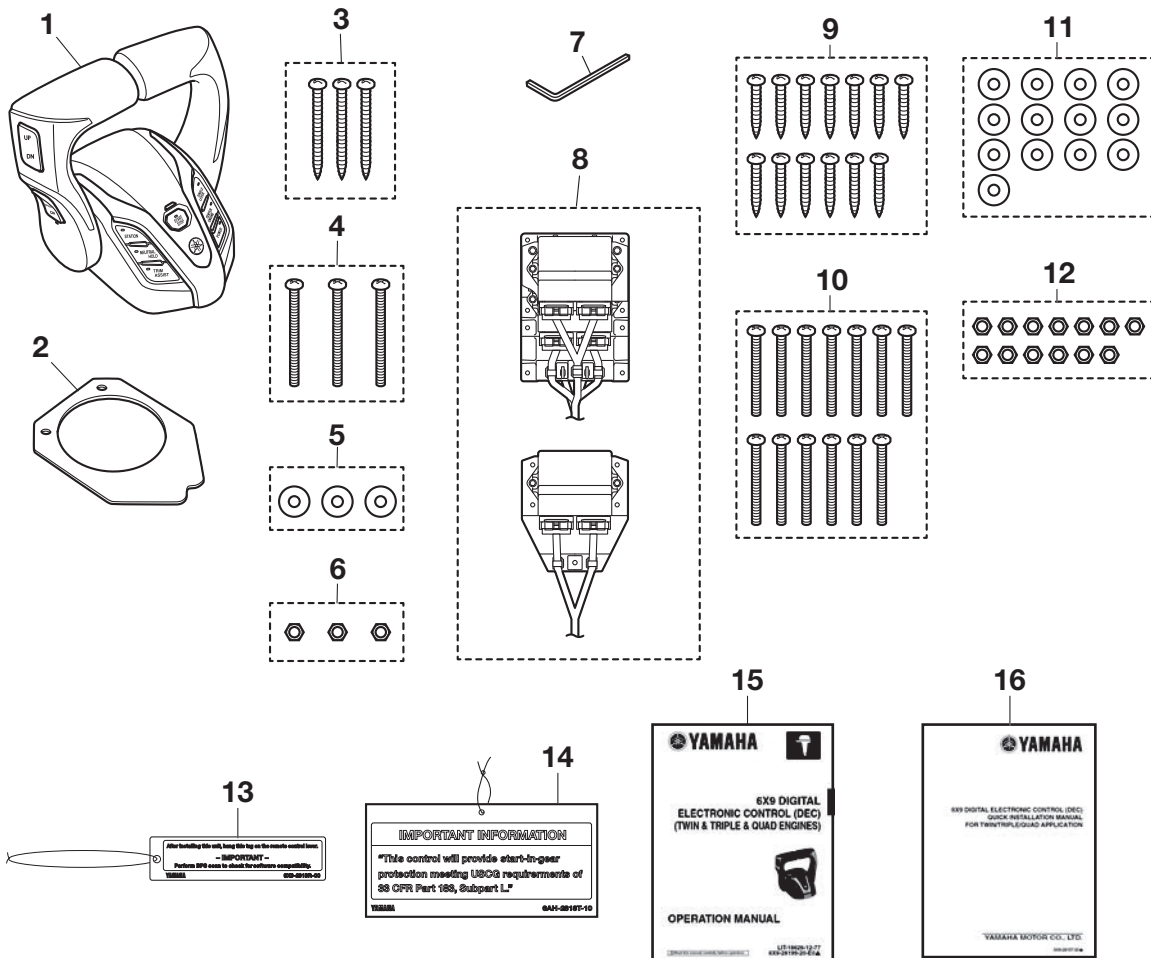
No.	Part name	Q'ty	Part No.	Remarks
1	6X9 twin DEC	1	6X9-48207-20	
2	Gasket	1		
3	Self-tapping screw	3		
4	Screw	3		
5	Washer	3		
6	Nut	3		
7	Hexagon wrench	1		
8	Wire harness with ECM	1	6X9-4820C-10	
9	Self-tapping screw	8	6X9-48128-00	
10	Screw	8	90157-06M13	
11	Washer	8	90201-065F1	
12	Nut	8	95780-06300	
13	Tag CAUTION	1	6X9-2818R-00	
14	Tag Information	1	6AH-2818T-10	
15	Operation manual	1	6X9-28199-H0	
16	Quick installation manual	1	6X9-28107-K0	

6X9 triple DEC Kit (Main station/6X9-48208-10)



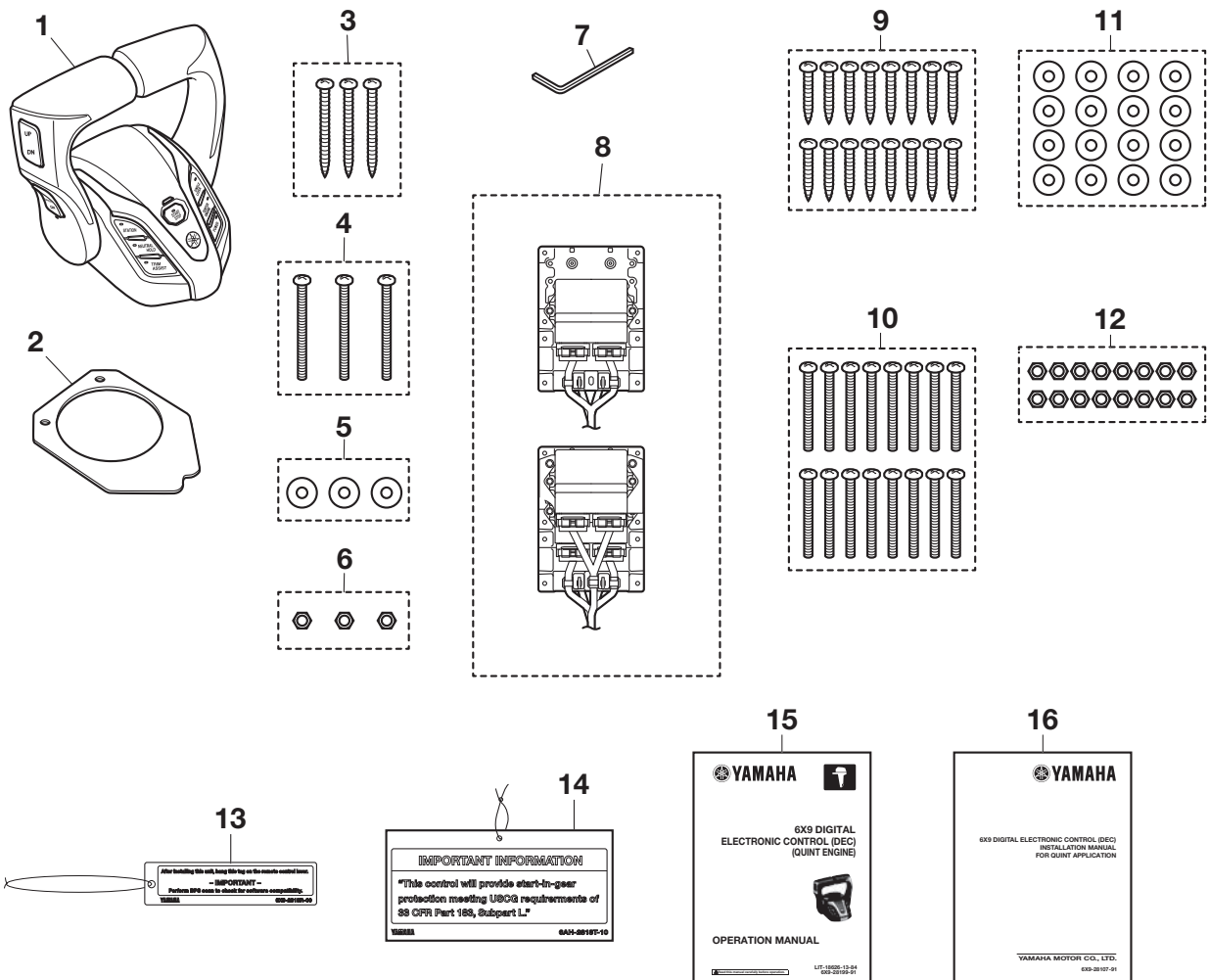
No.	Part name	Q'ty	Part No.	Remarks
1	6X9 triple DEC	1	6X9-48208-10	
2	Gasket	1		
3	Self-tapping screw	3		
4	Screw	3		
5	Washer	3		
6	Nut	3		
7	Hexagon wrench	1		
8	Wire harness with ECM	1	6X9-4820D-10	
9	Self-tapping screw	8	6X9-48128-00	
10	Screw	8	90157-06M13	
11	Washer	8	90201-065F1	
12	Nut	8	95780-06300	
13	Tag CAUTION	1	6X9-2818R-00	
14	Tag Information	1	6AH-2818T-10	
15	Operation manual	1	6X9-28199-H0	
16	Quick installation manual	1	6X9-28107-K0	

6X9 quad DEC Kit (Main station/6X9-48209-10)



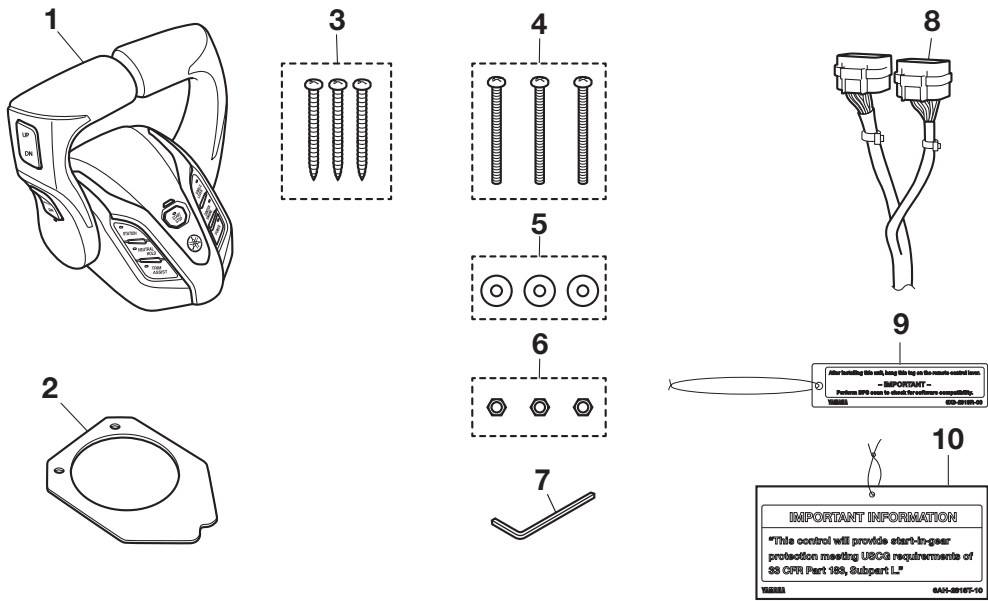
No.	Part name	Q'ty	Part No.	Remarks
1	6X9 Quad DEC	1	6X9-48209-10	
2	Gasket	1		
3	Self-tapping screw	3		
4	Screw	3		
5	Washer	3		
6	Nut	3		
7	Hexagon wrench	1		
8	Wire harness with ECM	1	6X9-4820E-10	
9	Self-tapping screw	13	6X9-48128-00	
10	Screw	13	90157-06M13	
11	Washer	13	90201-065F1	
12	Nut	13	95780-06300	
13	Tag CAUTION	1	6X9-2818R-00	
14	Tag Information	1	6AH-2818T-10	
15	Operation manual	1	6X9-28199-H0	
16	Quick installation manual	1	6X9-28107-K0	

6X9 quint DEC Kit (Main station/6X9-48210-10)



No.	Part name	Q'ty	Part No.	Remarks
1	6X9 Quint DEC	1	6X9-48210-10	
2	Gasket	1		
3	Self-tapping screw	3		
4	Screw	3		
5	Washer	3		
6	Nut	3		
7	Hexagon wrench	1		
8	Wire harness with ECM	1	6X9-4820H-10	
9	Self-tapping screw	16	6X9-48128-00	
10	Screw	16	90157-06M13	
11	Washer	16	90201-065F1	
12	Nut	16	95780-06300	
13	Tag CAUTION	1	6X9-2818R-00	
14	Tag Information	1	6AH-2818T-10	
15	Operation manual	1	6X9-28199-L0	
16	Installation manual	1	6X9-28107-M0	

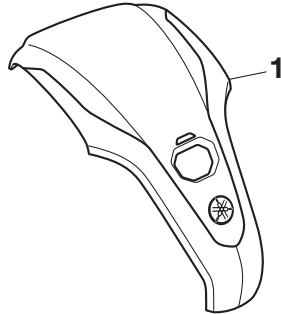
6X9 twin, triple, quad, quint DEC Kit (2nd station/6X9-48207-30)



No.	Part name	Q'ty	Part No.	Remarks
1	6X9 DEC (twin, triple, quad, quint)	1	6X9-48207-30	
2	Gasket	1		
3	Self-tapping screw	3		
4	Screw	3		
5	Washer	3		
6	Nut	3		
7	Hexagon wrench	1		
8	Wire harness	1	6X9-82580-K0	
9	Tag CAUTION	1	6X9-2818R-00	
10	Tag Information	1	6AH-2818T-10	

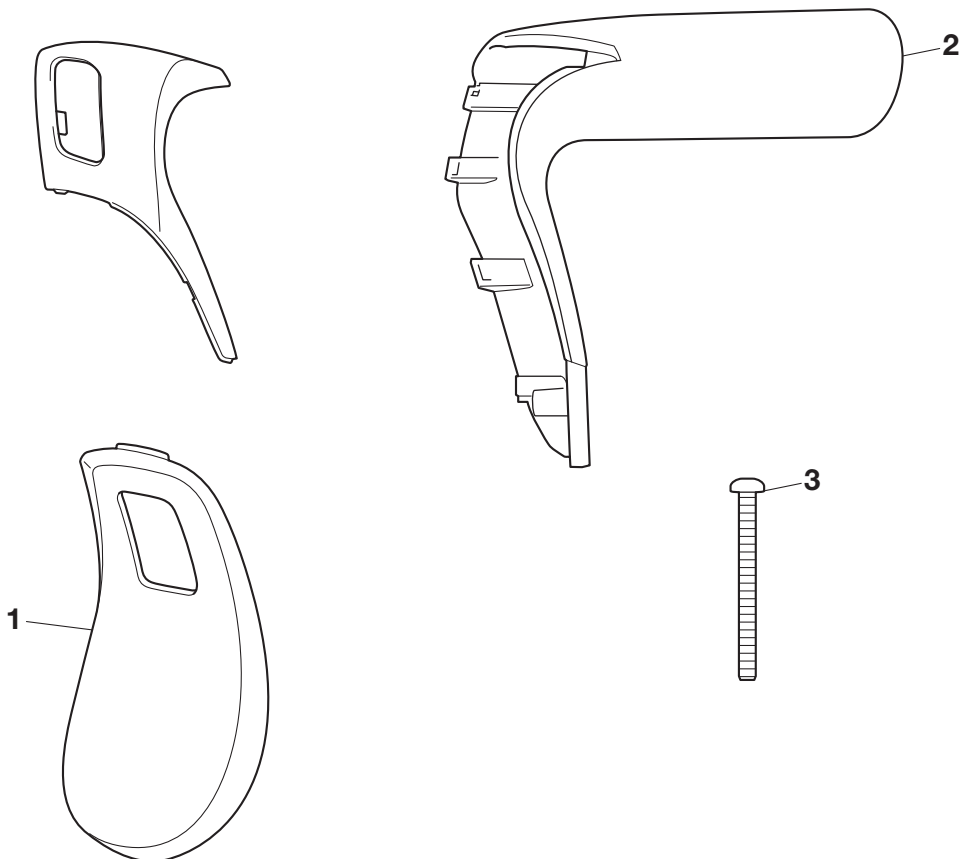
Remote control lever cover kit (optional parts)

Top cover (6X9-48400-20)



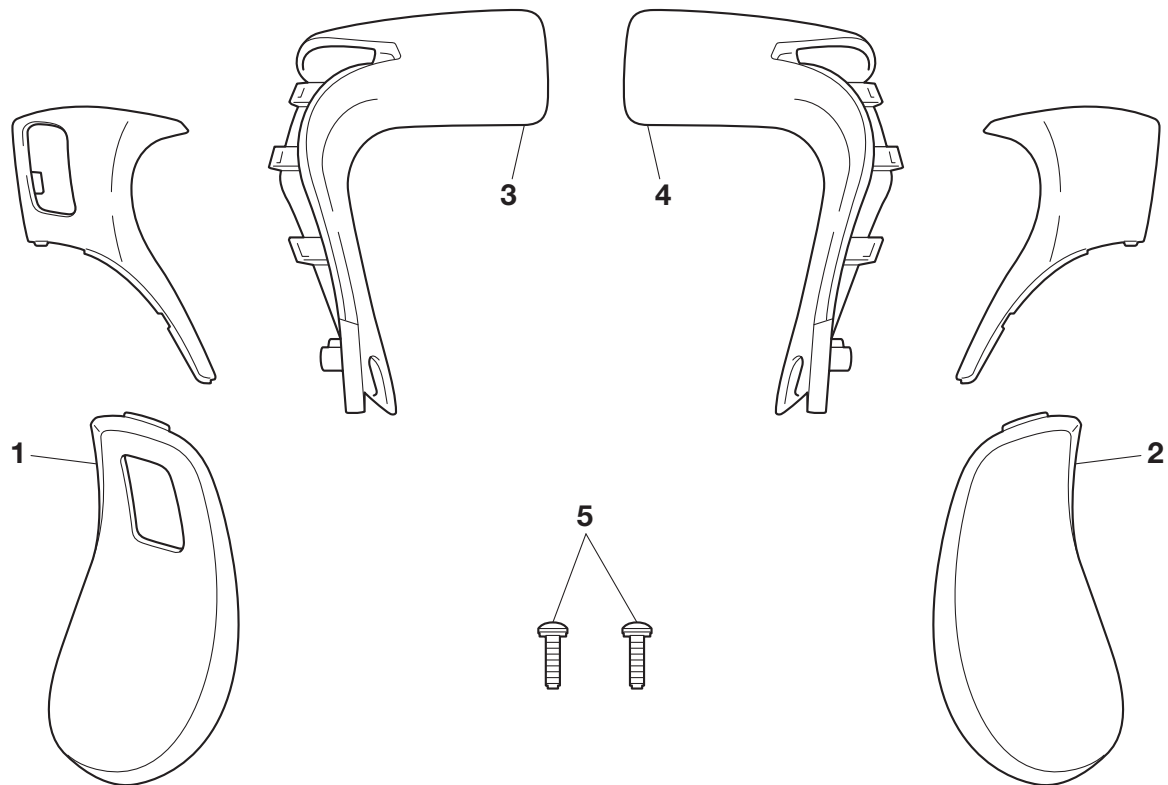
No.	Part name	Q'ty	Part No.	Remarks
1	Top cover	1		

Lever cover (single lever) (6X9-46130-00)



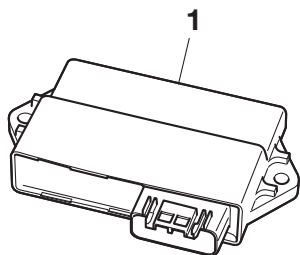
No.	Part name	Q'ty	Part No.	Remarks
1	Remote control lever cover	1	6X9-48225-00	
2	Remote control lever grip	1	6X9-4822A-10	
3	Screw	1	6X9-48127-20	

Lever cover (multi lever) (6X9-46130-10)



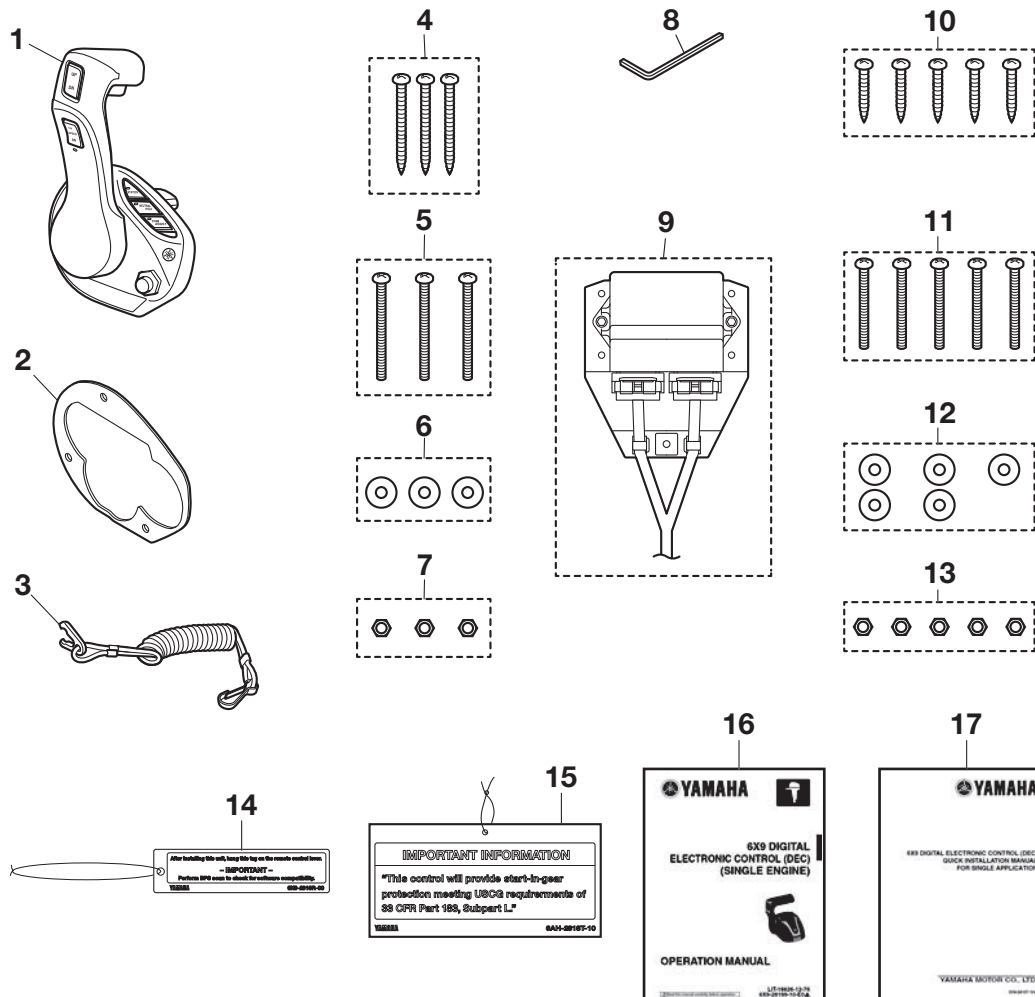
No.	Part name	Q'ty	Part No.	Remarks
1	Remote control lever cover	1	6X9-48225-00	
2	Remote control lever cover	1	6X9-48225-10	
3	Remote control lever grip	1	6X9-4822B-10	
4	Remote control lever grip	1	6X9-48222-10	
5	Screw	2	6X9-48127-10	

6X9 quint (Optional parts)



No.	Part name	Q'ty	Part No.	Remarks
1	BCU	1	6X9-8591T-14	

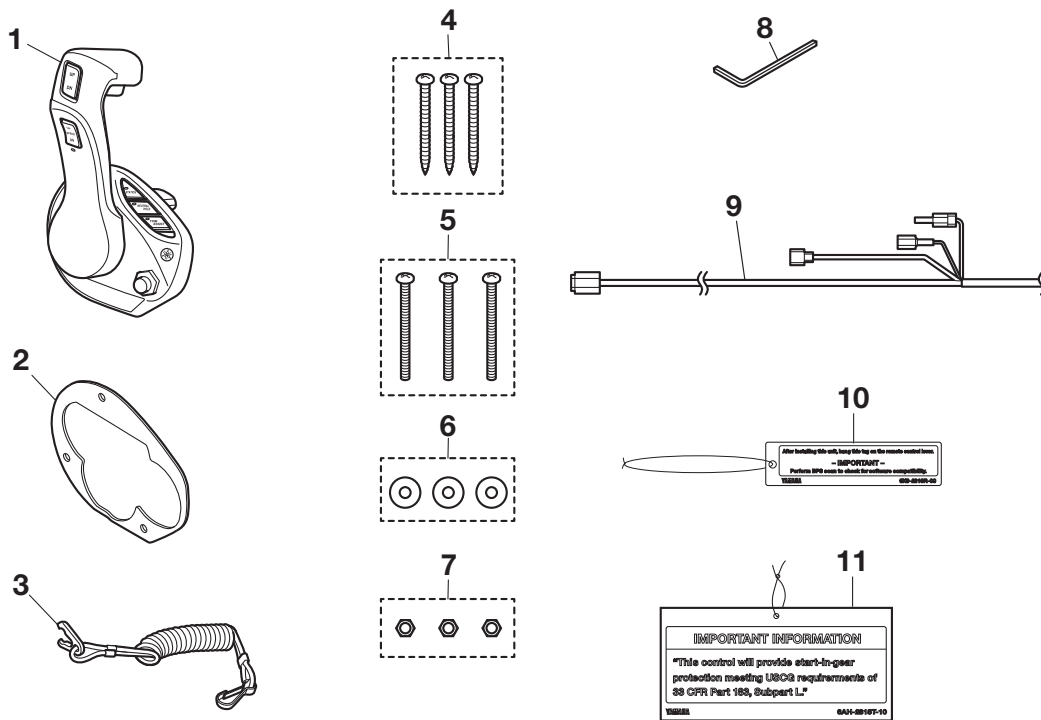
6X9 Flush side mount DEC kit (Main station/6X9-48206-20)



No.	Part name	Q'ty	Part No.	Remarks
1	6X9 single DEC	1	6X9-48206-20	
2	Gasket	1		
3	Engine shut-off cord	1		
4	Self-tapping screw	3		
5	Screw	3		
6	Washer	3		
7	Nut	3		
8	Hexagon wrench	1		
9	Wire harness with ECM	1	6X9-4820J-10	
10	Self-tapping screw	5	6X9-48128-00	
11	Screw	5	90157-06M13	
12	Washer	5	90201-065F1	
13	Nut	5	95780-06300	

No.	Part name	Q'ty	Part No.	Remarks
14	Tag CAUTION	1	6X9-2818R-00	
15	Tag Information	1	6AH-2818T-10	
16	Operation manual	1	6X9-28199-F0	
17	Quick installation manual	1	6X9-28107-G0	

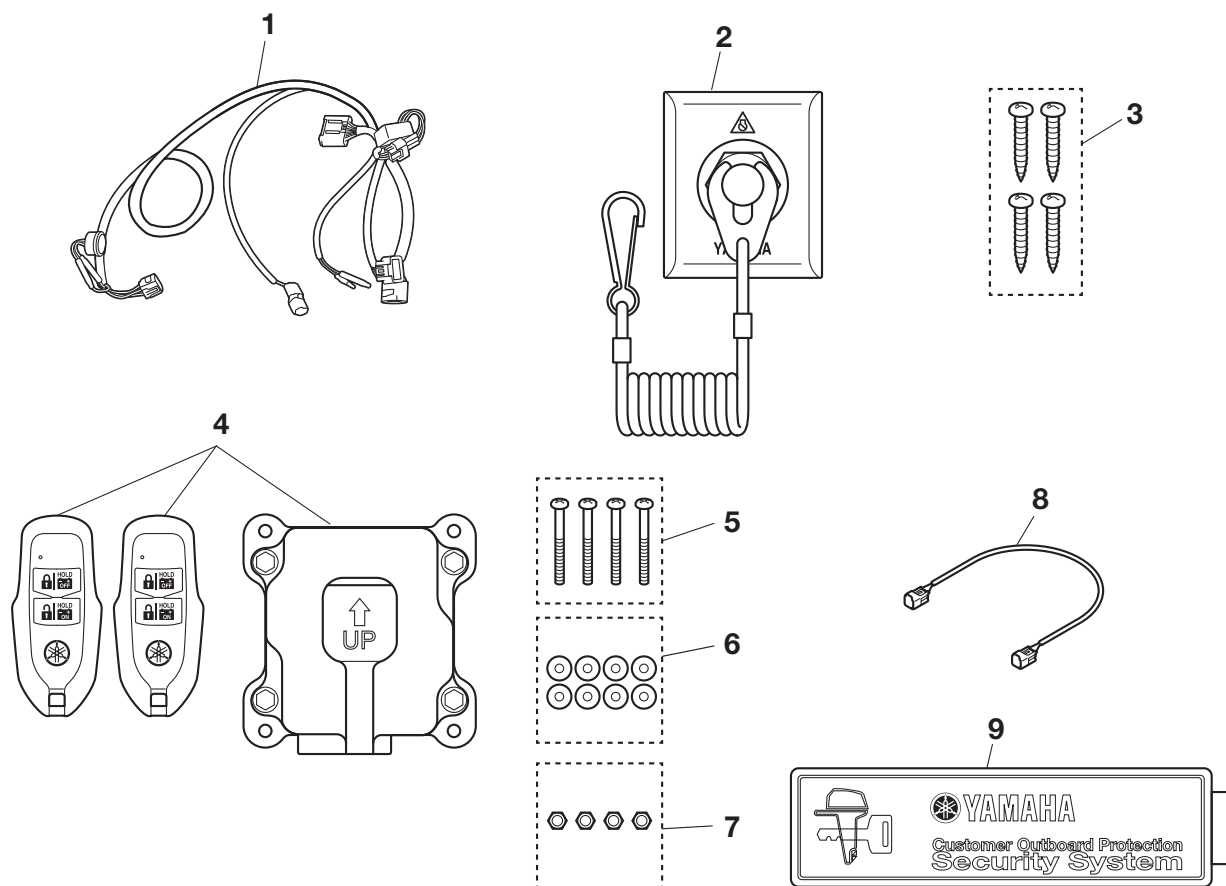
6X9 Flush side mount DEC kit (2nd station/6X9-48206-11)



No.	Part name	Q'ty	Part No.	Remarks
1	6X9 single DEC	1	6X9-48206-11	
2	Gasket	1		
3	Engine shut-off cord	1		
4	Self-tapping screw	3		
5	Screw	3		
6	Washer	3		
7	Nut	3		
8	Hexagon wrench	1		
9	Wire harness	1	6X9-82580-30	
10	Tag CAUTION	1	6X9-2818R-00	
11	Tag Information	1	6AH-2818T-10	

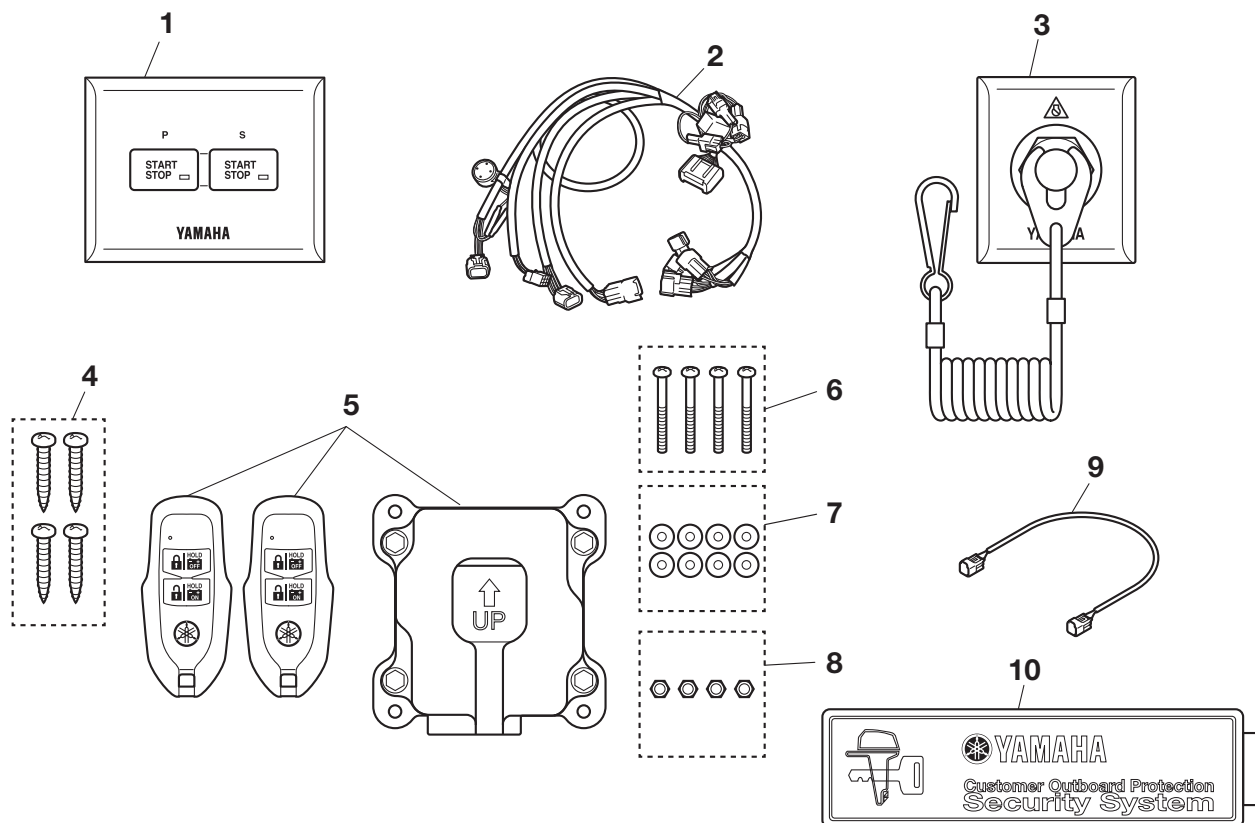
EKS

EKS Kit (Single engine/Main station/6X9-762E0-00) 433MHz



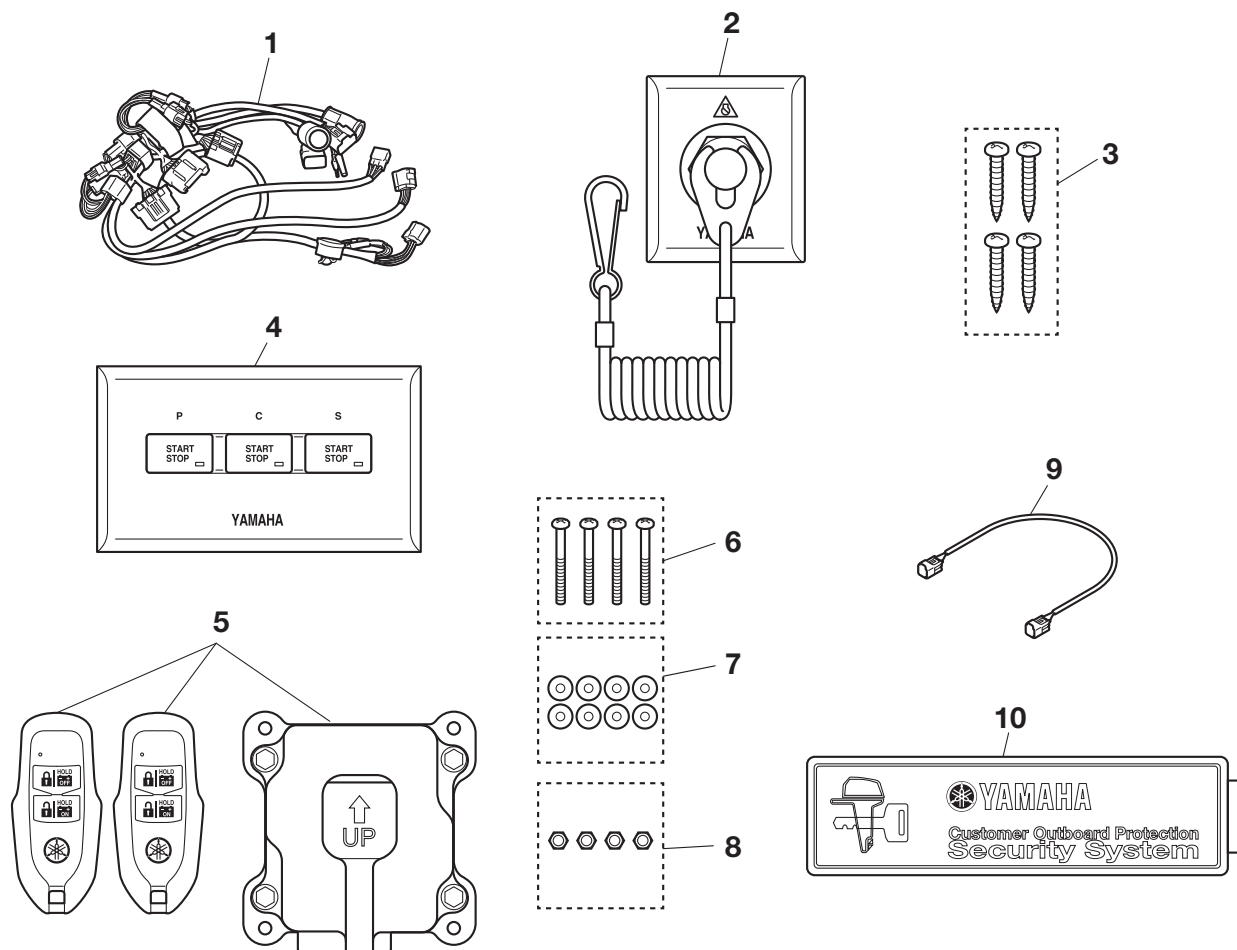
No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-21	
2	Engine shut-off switch	1	6X9-82570-70	
3	Screw	4	90167-06M00	
4	Key fob and receiver assy	1	6X9-86254-04	6X9-86261-01 (433 MHz), Key fob: 2 pcs
5	Screw	4	97880-06035	
6	Washer	8	90201-06M30	
7	Nut	4	95780-06300	
8	2 ft pigtail bus	1	6Y8-82521-11	
9	Sticker	1	6Y8-48277-00	

EKS Kit (Twin engine/Main station/6X9-762E0-10) 433MHz



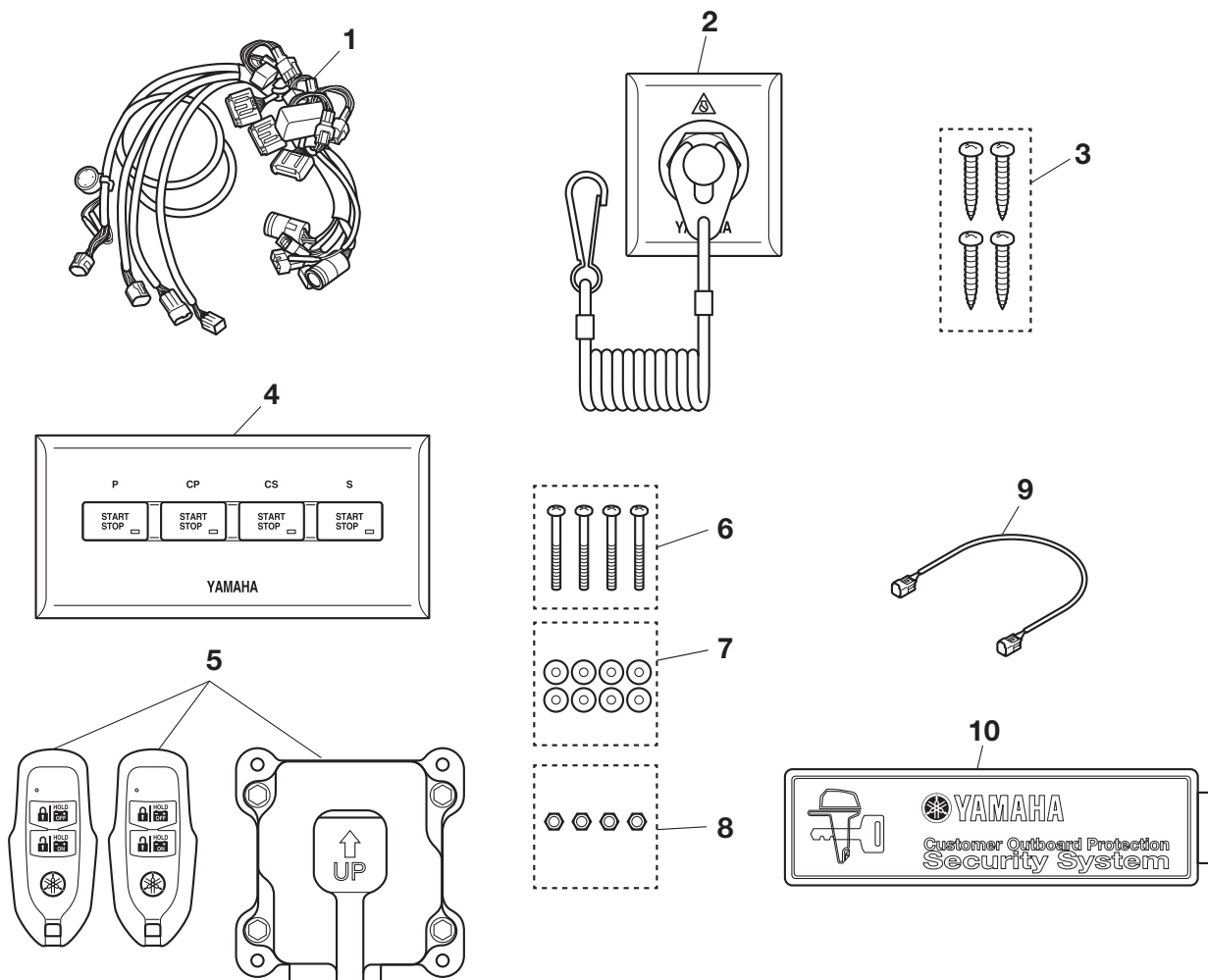
No.	Part name	Q'ty	Part No.	Remarks
1	START/STOP switch	1	6X9-82570-31	
2	EKS harness	1	6X9-82716-50	
3	Engine shut-off switch	1	6X9-82570-80	
4	Screw	4	90167-06M00	
5	Key fob and receiver assy	1	6X9-86254-04	6X9-86261-01 (433 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

EKS Kit (Triple engine/Main station/6X9-762E0-20) 433MHz

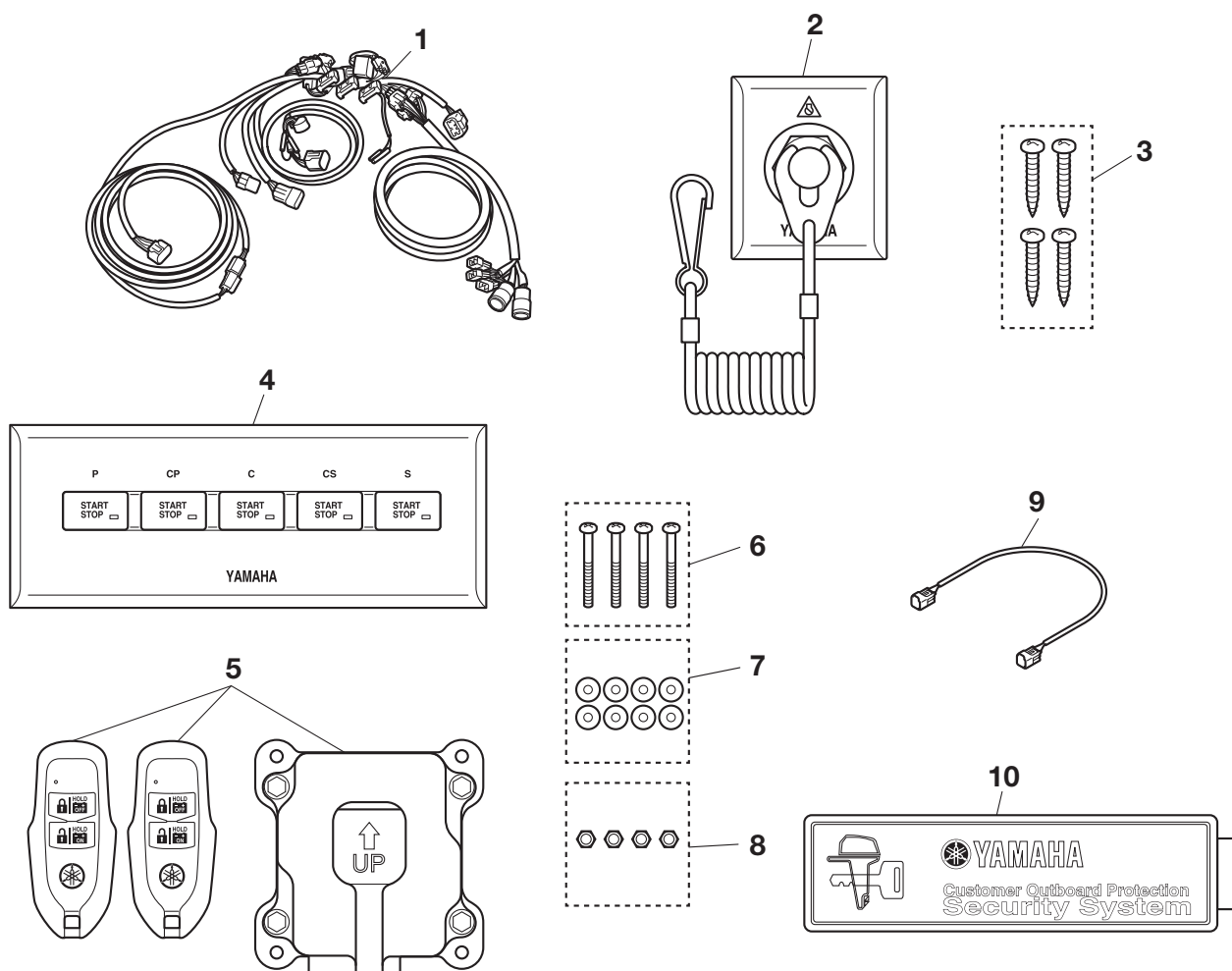


No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-41	
2	Engine shut-off switch	1	6X9-82570-C0	
3	Screw	4	90167-06M00	
4	START/STOP switch	1	6X9-82570-41	
5	Key fob and receiver assy	1	6X9-86254-04	6X9-86261-01 (433 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

EKS Kit (Quad engine/Main station/6X9-762E0-30) 433MHz

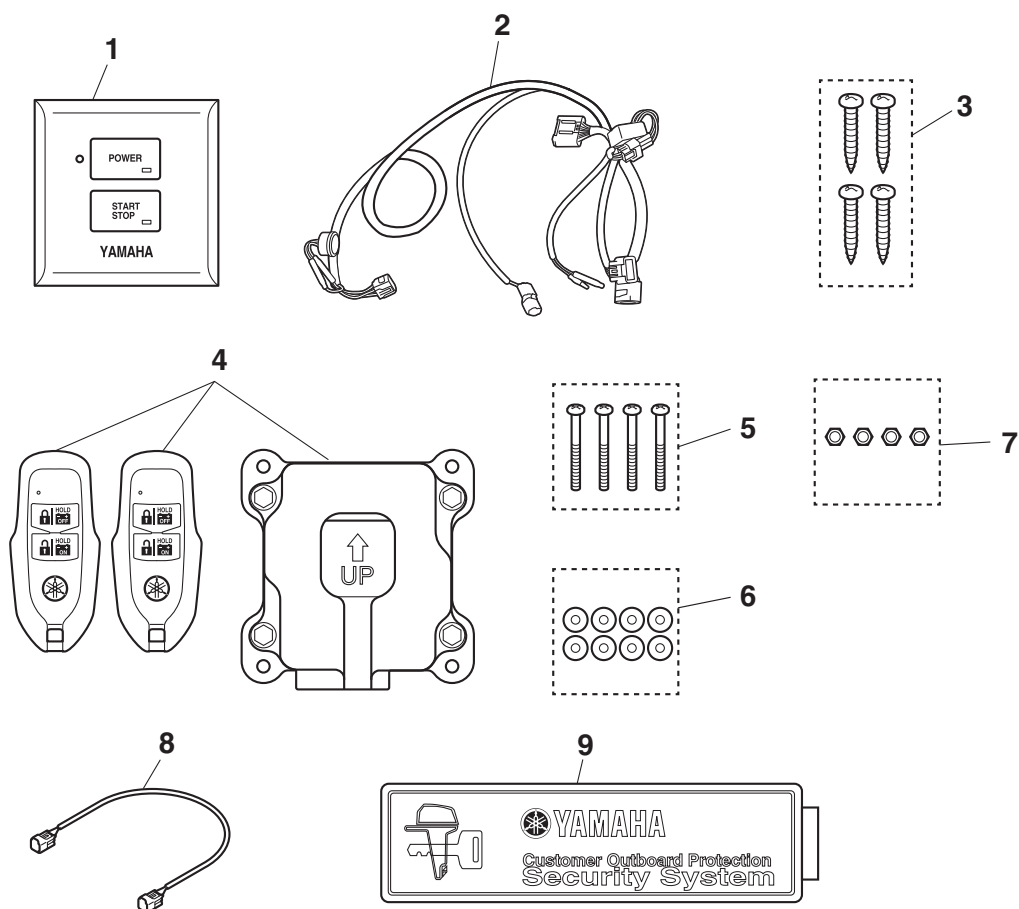


No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-91	
2	Engine shut-off switch	1	6X9-82570-D0	
3	Screw	4	90167-06M00	
4	START/STOP switch	1	6X9-82570-51	
5	Key fob and receiver assy	1	6X9-86254-04	6X9-86261-01 (433 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

EKS Kit (Quint engine/Main station/6X9-762E0-C0) 433MHz


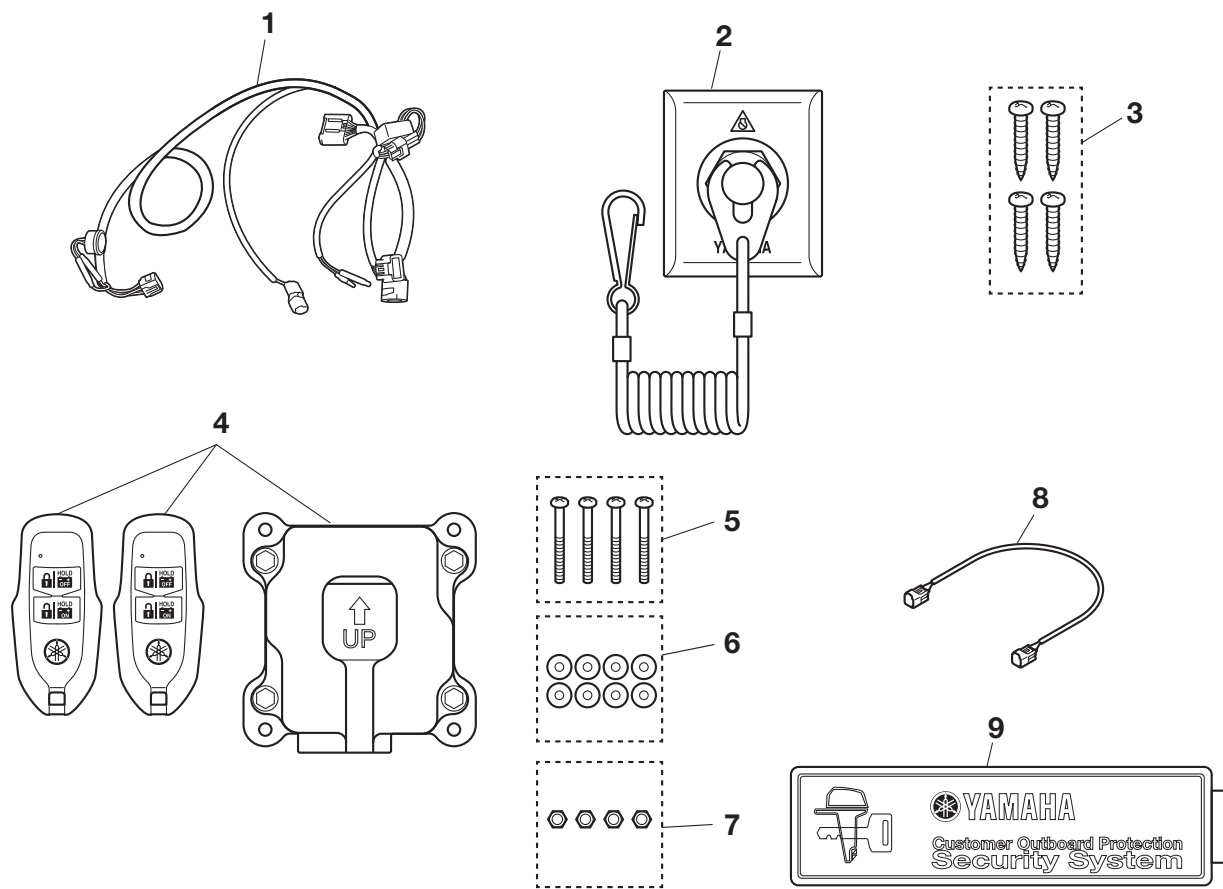
No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-B0	
2	Engine shut-off switch	1	6X9-82570-D0	
3	Screw	4	90167-06M00	
4	START/STOP switch	1	6X9-82570-61	
5	Key fob and receiver assy	1	6X9-86254-04	6X9-86261-01 (433 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

EKS Kit (Single engine/Main station/6X9-762B0-C3) 433MHz



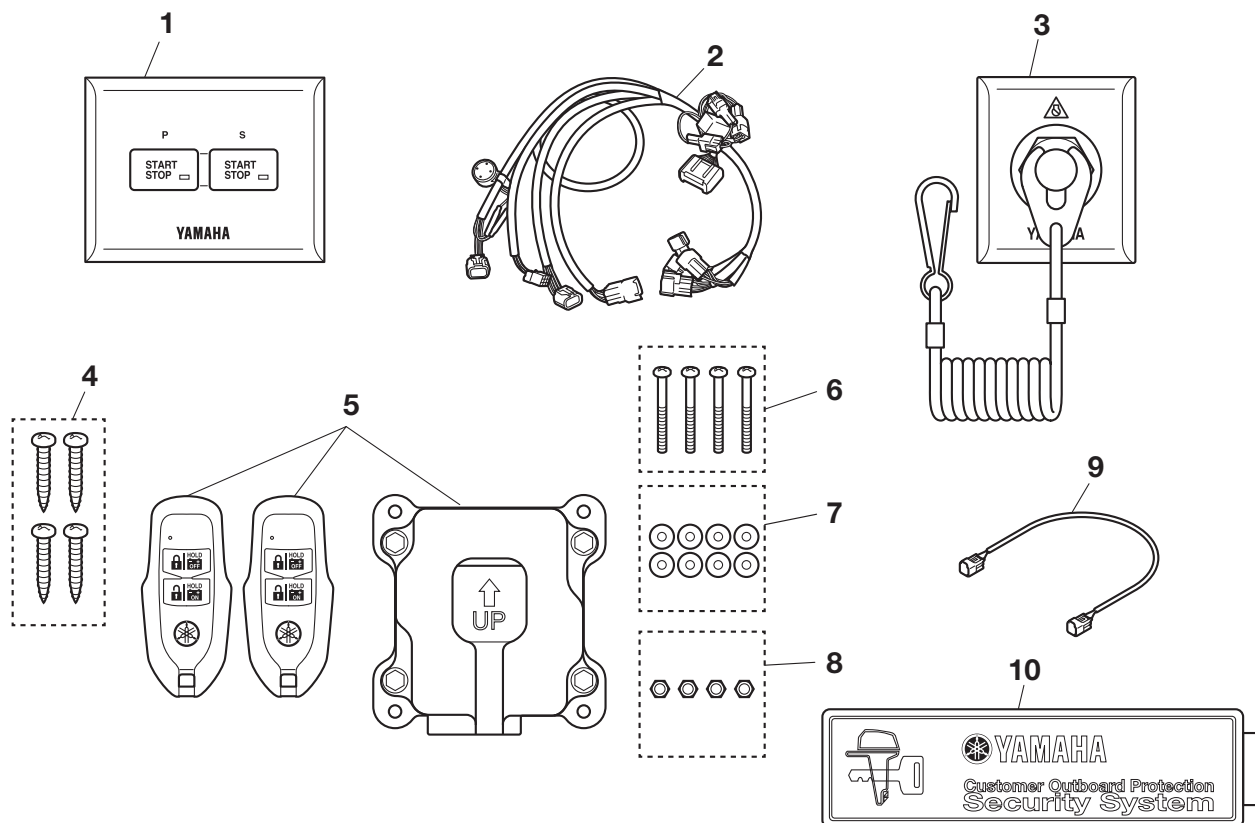
No.	Part name	Q'ty	Part No.	Remarks
1	POWER switch	1	6X9-82570-01	
2	EKS harness	1	6X9-82716-21	
3	Screw	4	90167-06M00	
4	Key fob and receiver assy	1	6X9-86254-04	6X9-86261-01 (433 MHz), Key fob: 2 pcs
5	Screw	4	97880-06035	
6	Washer	8	90201-06M30	
7	Nut	4	95780-06300	
8	2 ft pigtail bus	1	6Y8-82521-11	
9	Sticker	1	6Y8-48277-00	

EKS Kit (Single engine/Main station/6X9-762E0-40) 315MHz



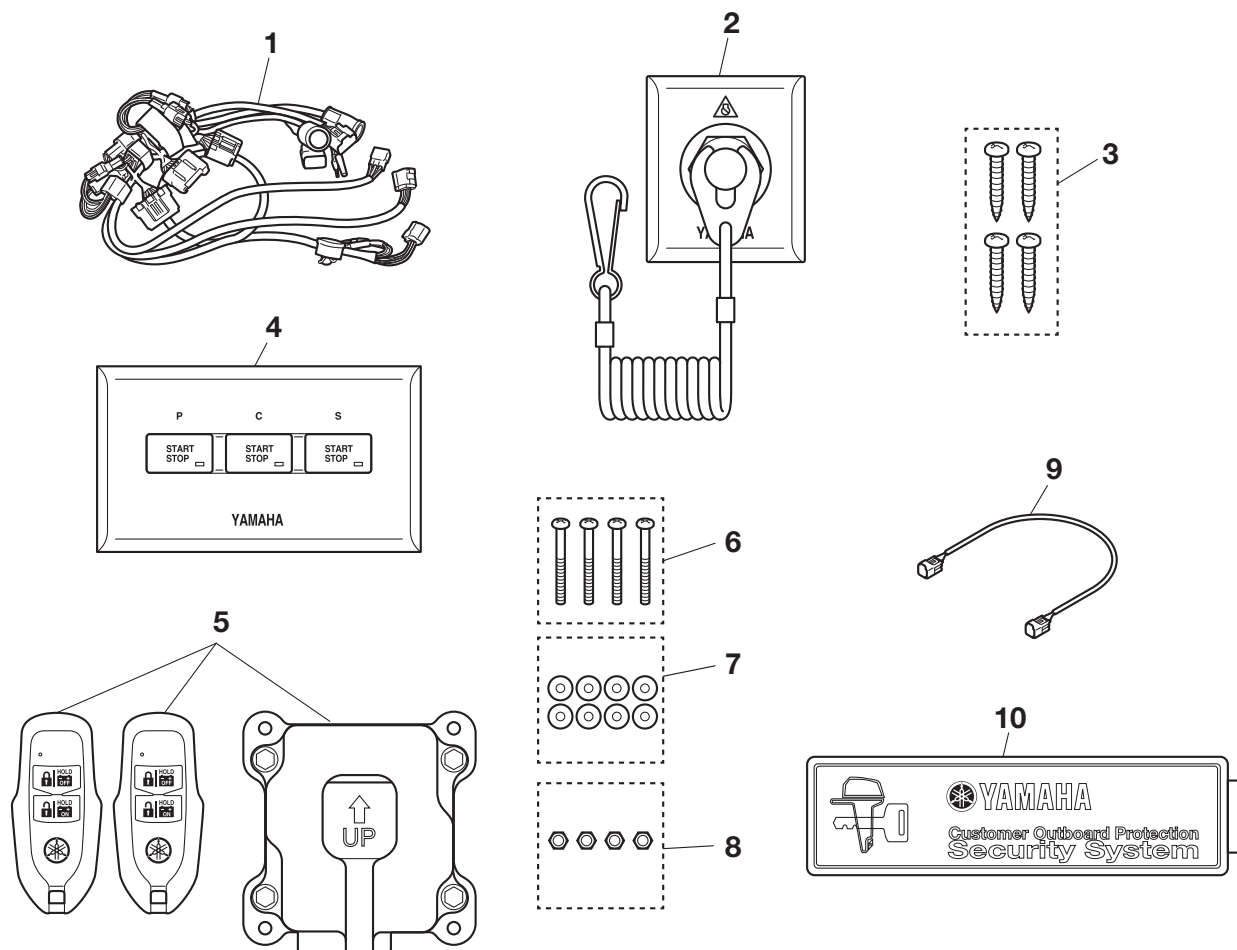
No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-21	
2	Engine shut-off switch	1	6X9-82570-70	
3	Screw	4	90167-06M00	
4	Key fob and receiver assy	1	6X9-86254-14	6X9-86261-11 (315 MHz), Key fob: 2 pcs
5	Screw	4	97880-06035	
6	Washer	8	90201-06M30	
7	Nut	4	95780-06300	
8	2 ft pigtail bus	1	6Y8-82521-11	
9	Sticker	1	6Y8-48277-00	

EKS Kit (Twin engine/Main station/6X9-762E0-50) 315MHz



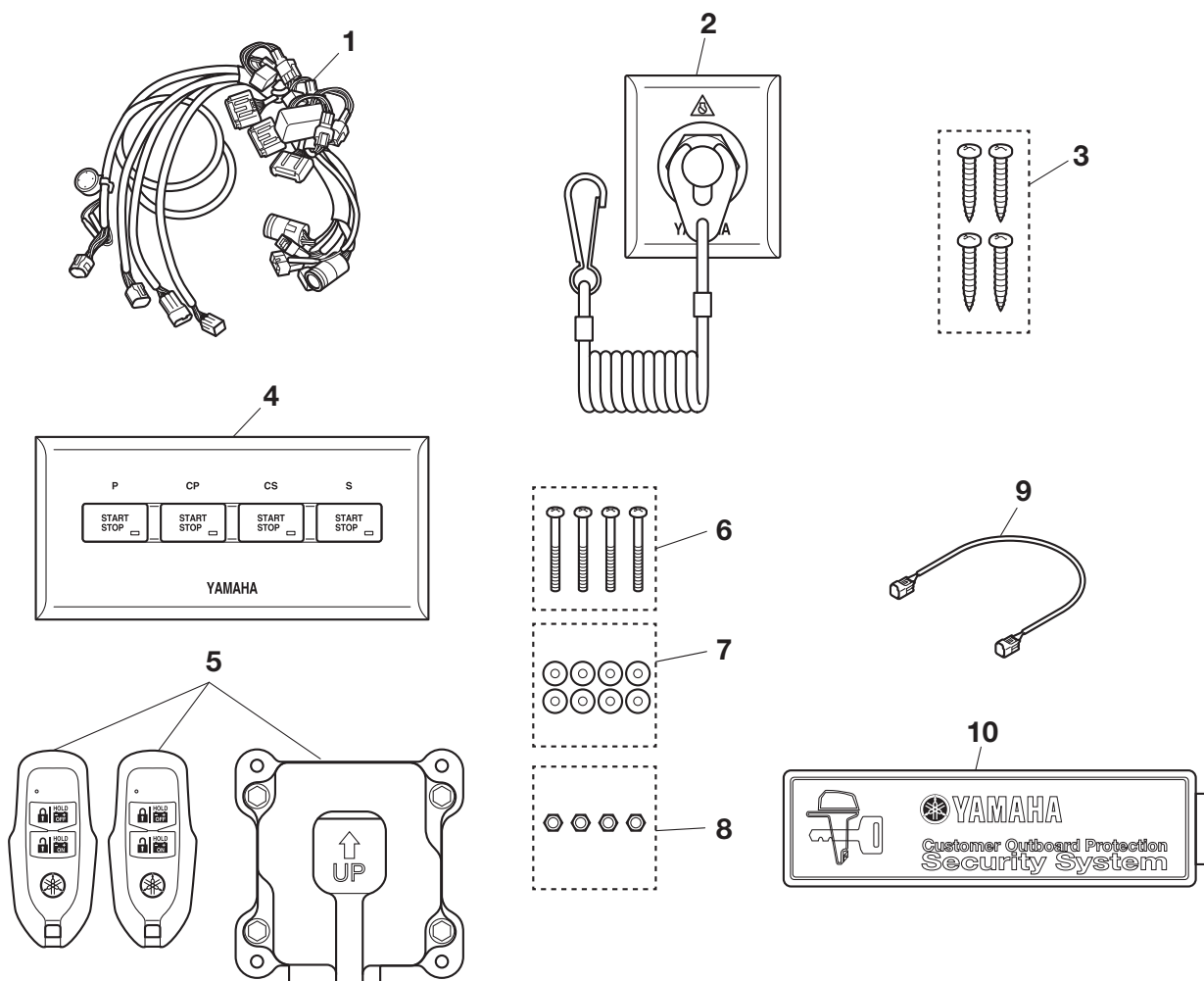
No.	Part name	Q'ty	Part No.	Remarks
1	START/STOP switch	1	6X9-82570-31	
2	EKS harness	1	6X9-82716-50	
3	Engine shut-off switch	1	6X9-82570-80	
4	Screw	4	90167-06M00	
5	Key fob and receiver assy	1	6X9-86254-14	6X9-86261-11 (315 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

EKS Kit (Triple engine/Main station/6X9-762E0-60) 315MHz



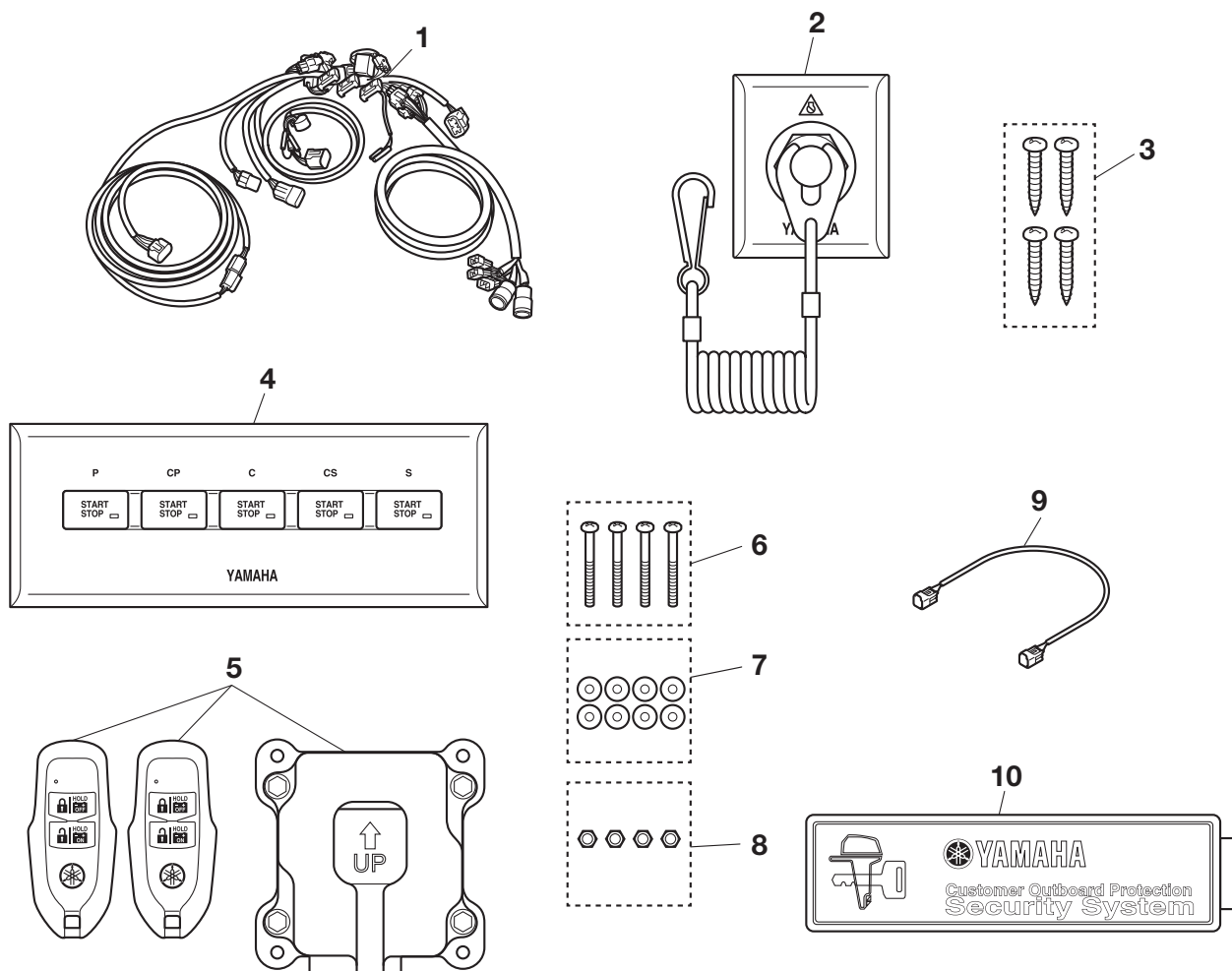
No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-41	
2	Engine shut-off switch	1	6X9-82570-C0	
3	Screw	4	90167-06M00	
4	START/STOP switch	1	6X9-82570-41	
5	Key fob and receiver assy	1	6X9-86254-14	6X9-86261-11 (315 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

EKS Kit (Quad engine/Main station/6X9-762E0-70) 315MHz

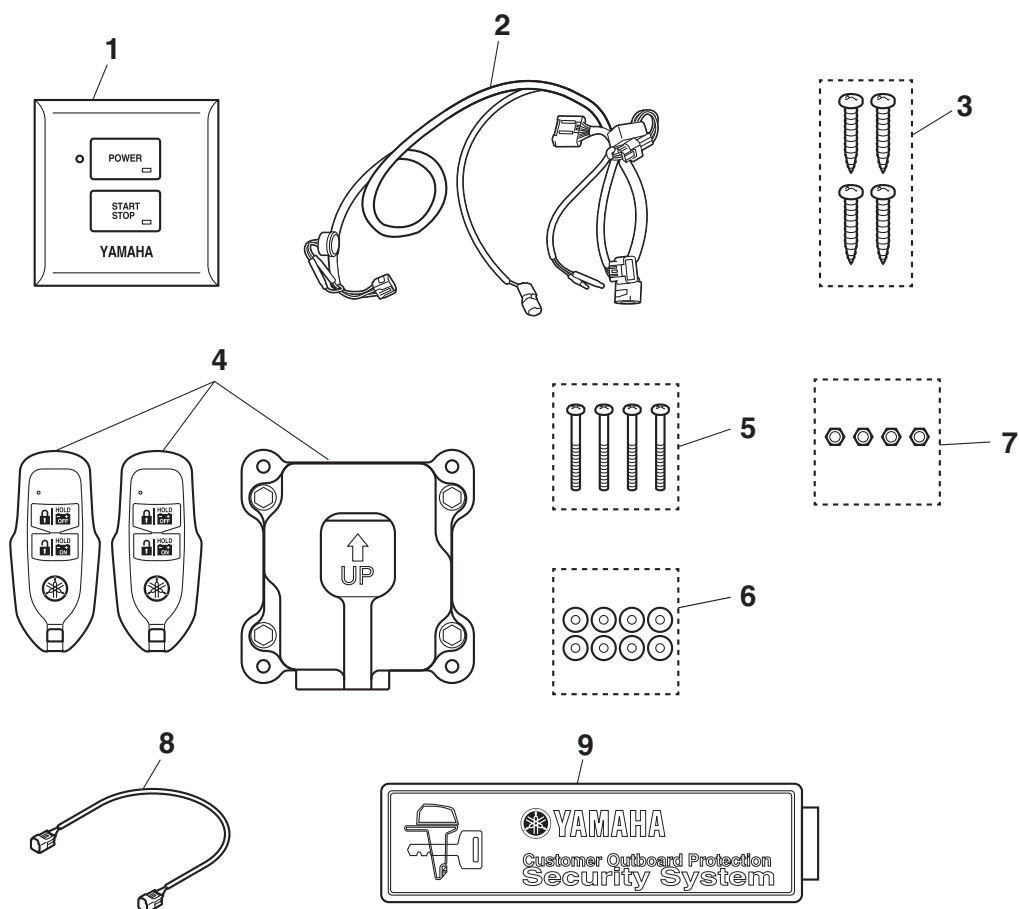


No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-91	
2	Engine shut-off switch	1	6X9-82570-D0	
3	Screw	4	90167-06M00	
4	START/STOP switch	1	6X9-82570-51	
5	Key fob and receiver assy	1	6X9-86254-14	6X9-86261-11 (315 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

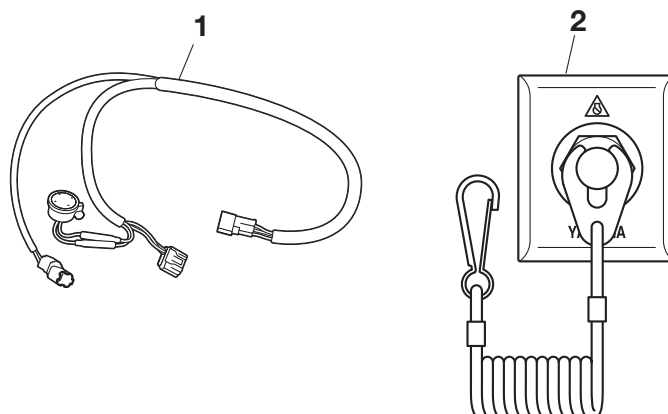
EKS Kit (Quint engine/Main station/6X9-762E0-D0) 315MHz



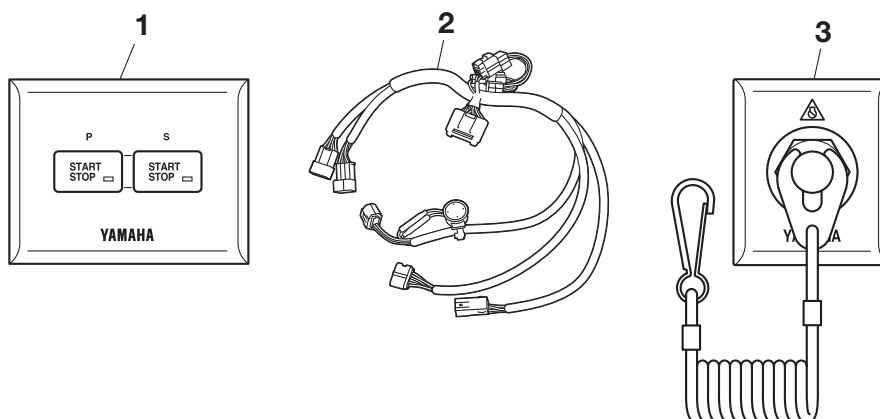
No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-B0	
2	Engine shut-off switch	1	6X9-82570-D0	
3	Screw	4	90167-06M00	
4	START/STOP switch	1	6X9-82570-61	
5	Key fob and receiver assy	1	6X9-86254-14	6X9-86261-11 (315 MHz), Key fob: 2 pcs
6	Screw	4	97880-06035	
7	Washer	8	90201-06M30	
8	Nut	4	95780-06300	
9	2 ft pigtail bus	1	6Y8-82521-11	
10	Sticker	1	6Y8-48277-00	

EKS Kit (Single engine/Main station/6X9-762B0-D4) 315MHz


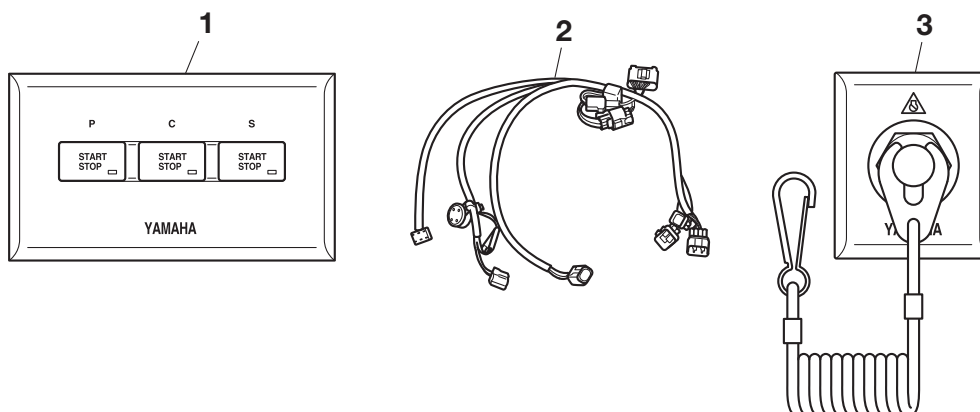
No.	Part name	Q'ty	Part No.	Remarks
1	POWER switch	1	6X9-82570-01	
2	EKS harness	1	6X9-82716-21	
3	Screw	4	90167-06M00	
4	Key fob and receiver assy	1	6X9-86254-14	6X9-86261-11 (315 MHz), Key fob: 2 pcs
5	Screw	4	97880-06035	
6	Washer	8	90201-06M30	
7	Nut	4	95780-06300	
8	2 ft pigtail bus	1	6Y8-82521-11	
9	Sticker	1	6Y8-48277-00	

EKS Kit (Single engine/2nd station/6X9-762E0-80)

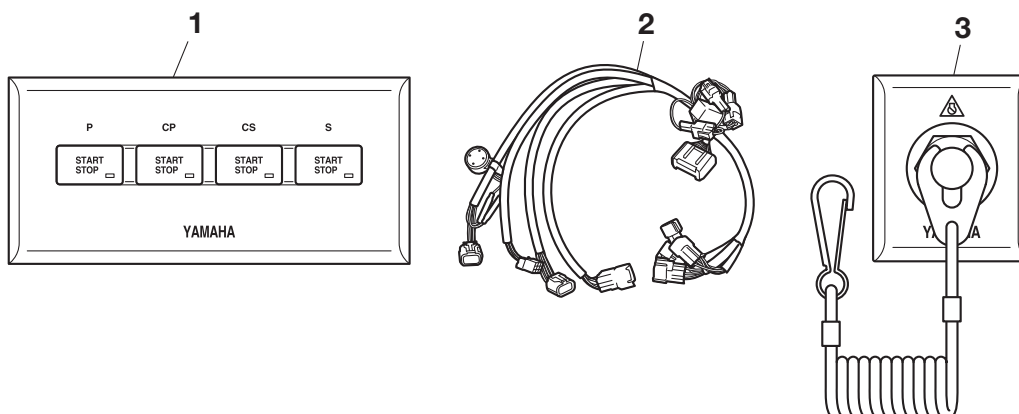
No.	Part name	Q'ty	Part No.	Remarks
1	EKS harness	1	6X9-82716-60	
2	Engine shut-off switch	1	6X9-82570-70	

EKS Kit (Twin engine/2nd station/6X9-762E0-90)

No.	Part name	Q'ty	Part No.	Remarks
1	START/STOP switch	1	6X9-82570-31	
2	EKS harness	1	6X9-82716-71	
3	Engine shut-off switch	1	6X9-82570-80	

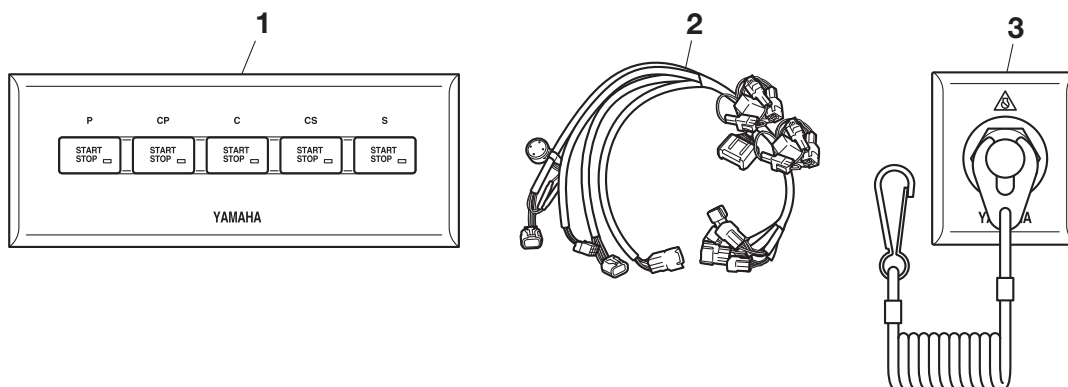
EKS Kit (Triple engine/2nd station/6X9-762E0-A0)

No.	Part name	Q'ty	Part No.	Remarks
1	START/STOP switch	1	6X9-82570-41	
2	EKS harness	1	6X9-82716-80	
3	Engine shut-off switch	1	6X9-82570-C0	

EKS Kit (Quad engine/2nd station/6X9-762E0-B0)

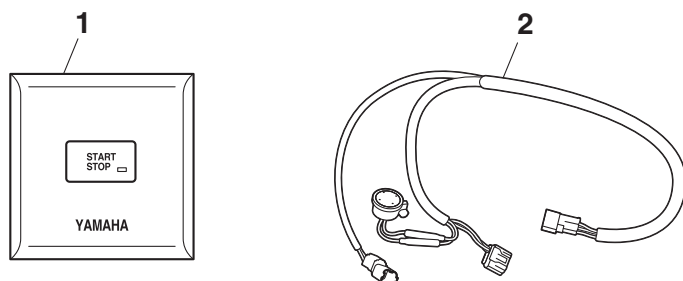
No.	Part name	Q'ty	Part No.	Remarks
1	START/STOP switch	1	6X9-82570-51	
2	EKS harness	1	6X9-82716-A0	
3	Engine shut-off switch	1	6X9-82570-D0	

EKS Kit (Quint engine/2nd station/6X9-762E0-E0)



No.	Part name	Q'ty	Part No.	Remarks
1	START/STOP switch	1	6X9-82570-61	
2	EKS harness	1	6X9-82716-C0	
3	Engine shut-off switch	1	6X9-82570-D0	

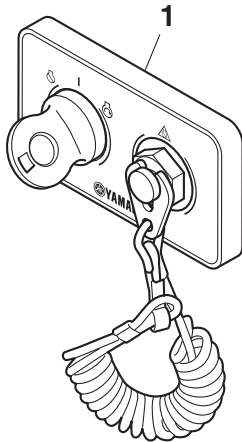
EKS Kit (Single engine/2nd station/6X9-762B0-G1)



No.	Part name	Q'ty	Part No.	Remarks
1	START/STOP switch	1	6X9-82570-B1	
2	EKS harness	1	6X9-82716-60	

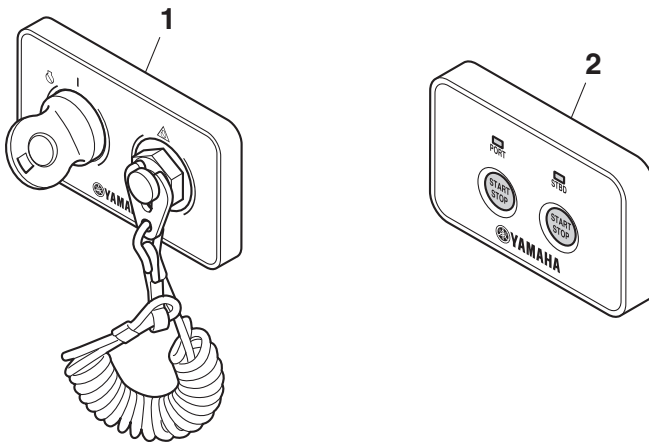
Switch

Switch (Single) (6X6-82570-34)



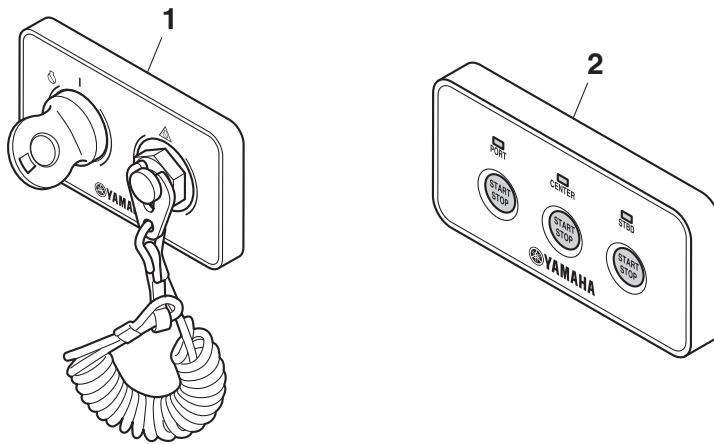
No.	Part name	Q'ty	Part No.	Remarks
1	Main switch	1	6X6-82570-34	

Switch Kit (Twin) (6X6-762B0-01)



No.	Part name	Q'ty	Part No.	Remarks
1	Main switch	1	6X6-82570-41	
2	Twin start/stop switch	1	6X6-82570-60	

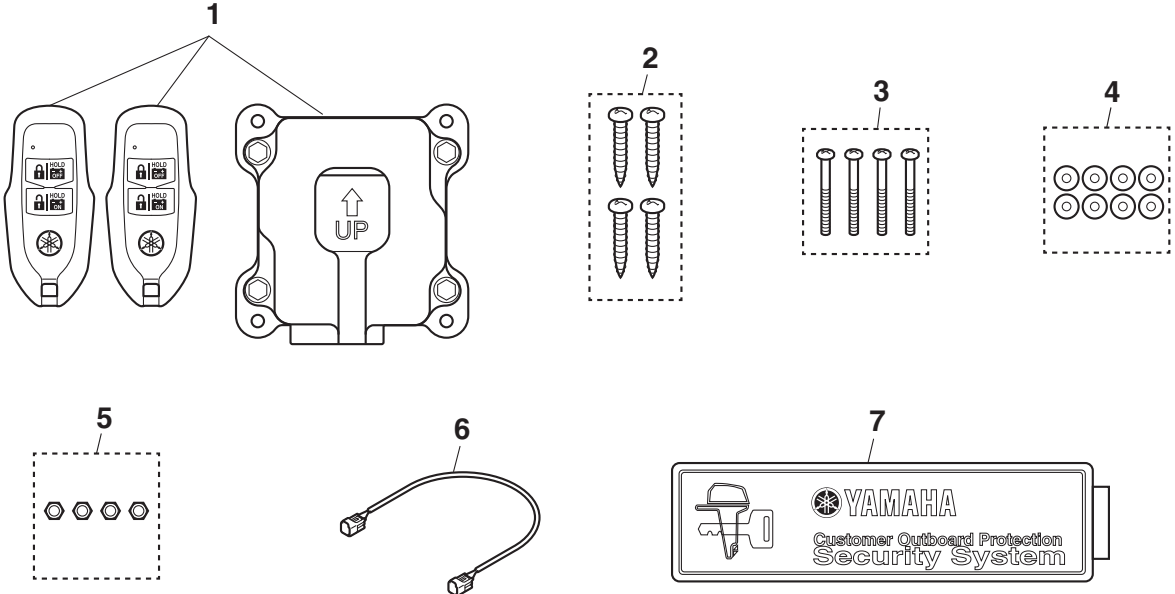
Switch Kit (Triple) (6X6-762B0-11)



No.	Part name	Q'ty	Part No.	Remarks
1	Main switch	1	6X6-82570-51	
2	Triple start/stop switch	1	6X6-82570-70	

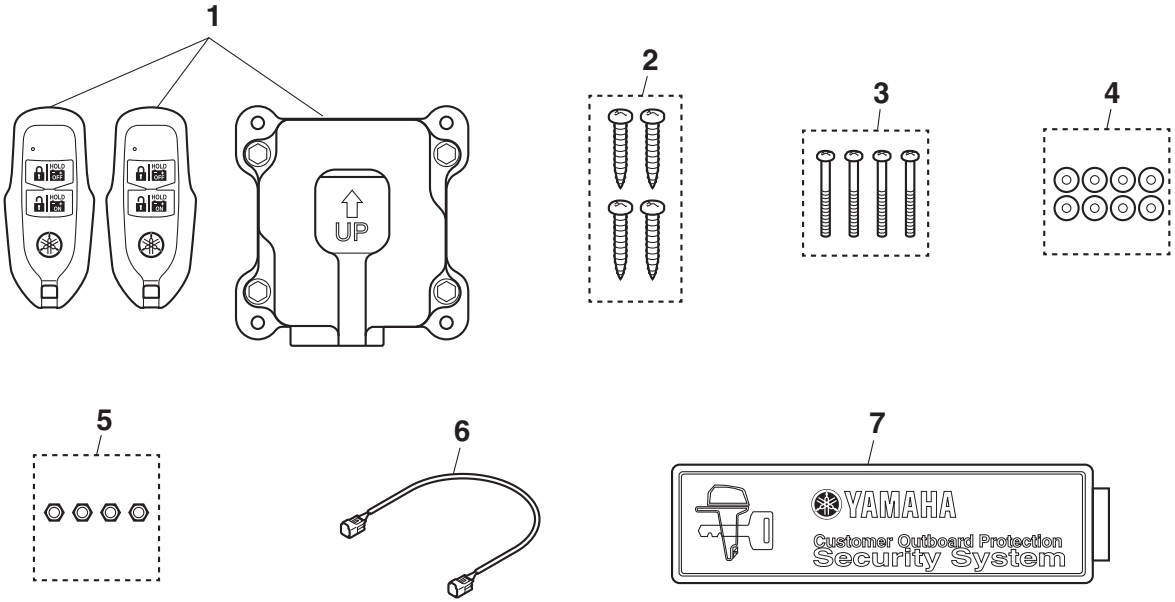
Y-COP

Y-COP Kit (6X9-762D0-03 (433 MHz))



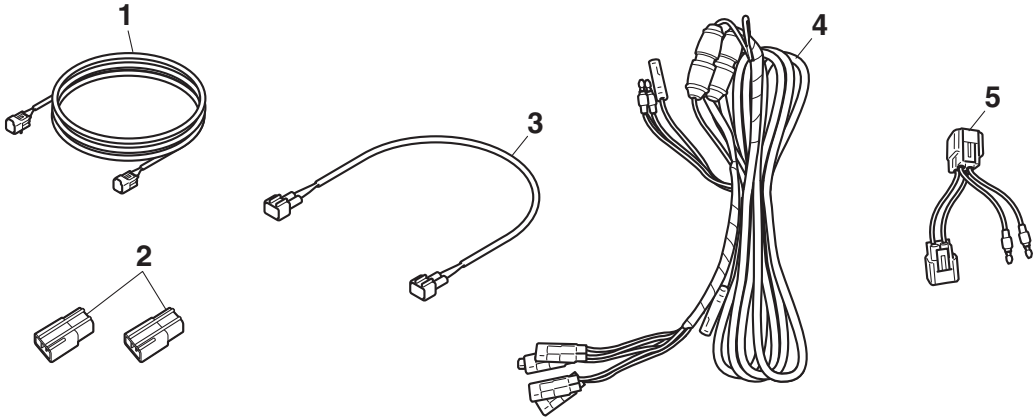
No.	Part name	Q'ty	Part No.	Remarks
1	Key fob and receiver assy	1	6X9-86254-23	6X9-86261-01 (433 MHz), Key fob: 2 pcs
2	Self-tapping screw	4	90167-06M00	
3	Screw	4	97880-06035	
4	Washer	8	90201-06M30	
5	Nut	4	95780-06300	
6	2 ft pigtail bus	1	6Y8-82521-11	
7	Sticker	1	6Y8-48277-00	

Y-COP Kit (6X9-762D0-12 (315 MHz))



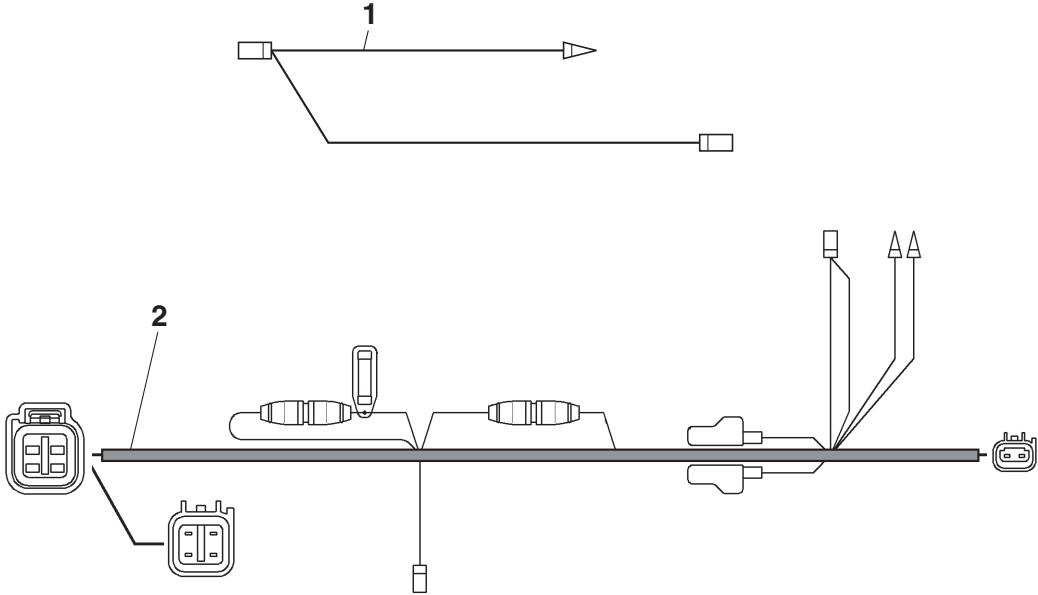
No.	Part name	Q'ty	Part No.	Remarks
1	Key fob and receiver assy	1	6X9-86254-33	6X9-86261-11 (315 MHz), Key fob: 2 pcs
2	Self-tapping screw	4	90167-06M00	
3	Screw	4	97880-06035	
4	Washer	8	90201-06M30	
5	Nut	4	95780-06300	
6	2 ft pigtail bus	1	6Y8-82521-11	
7	Sticker	1	6Y8-48277-00	

Y-COP Attachment Kit (6X4 multi-function tiller handle/6Y8-762A0-01)



No.	Part name	Q'ty	Part No.	Remarks
1	Pigtail bus wire	1	6Y8-82521-51	3.6 m (12 ft)
2	Single hub	2	6Y8-81920-11	
3	Main bus wire	1	6Y8-82553-01	0.3 m (1 ft)
4	Wire lead	1	6Y5-83553-M1	2.5 m (8 ft) with 10amp twin-fuse
5	Pigtail bus wire with power lead	1	6Y8-82117-00	

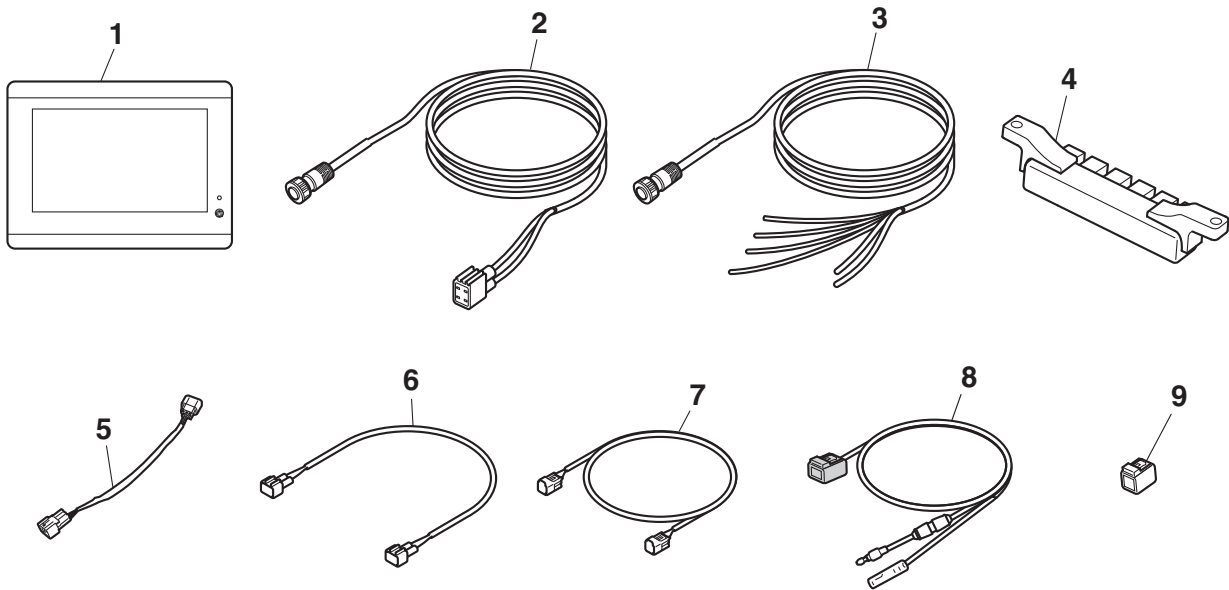
Use below harness together with Y-COP kit in case of twin or triple engine application



No.	Part name	Q'ty	Part No.	Remarks
1	Adaptor harness	1	6H5-81315-00	For fuel injection (FI), Mechanical remote control outboards
2	Adaptor harness	1	6Y8-81315-02	For DEC outboards

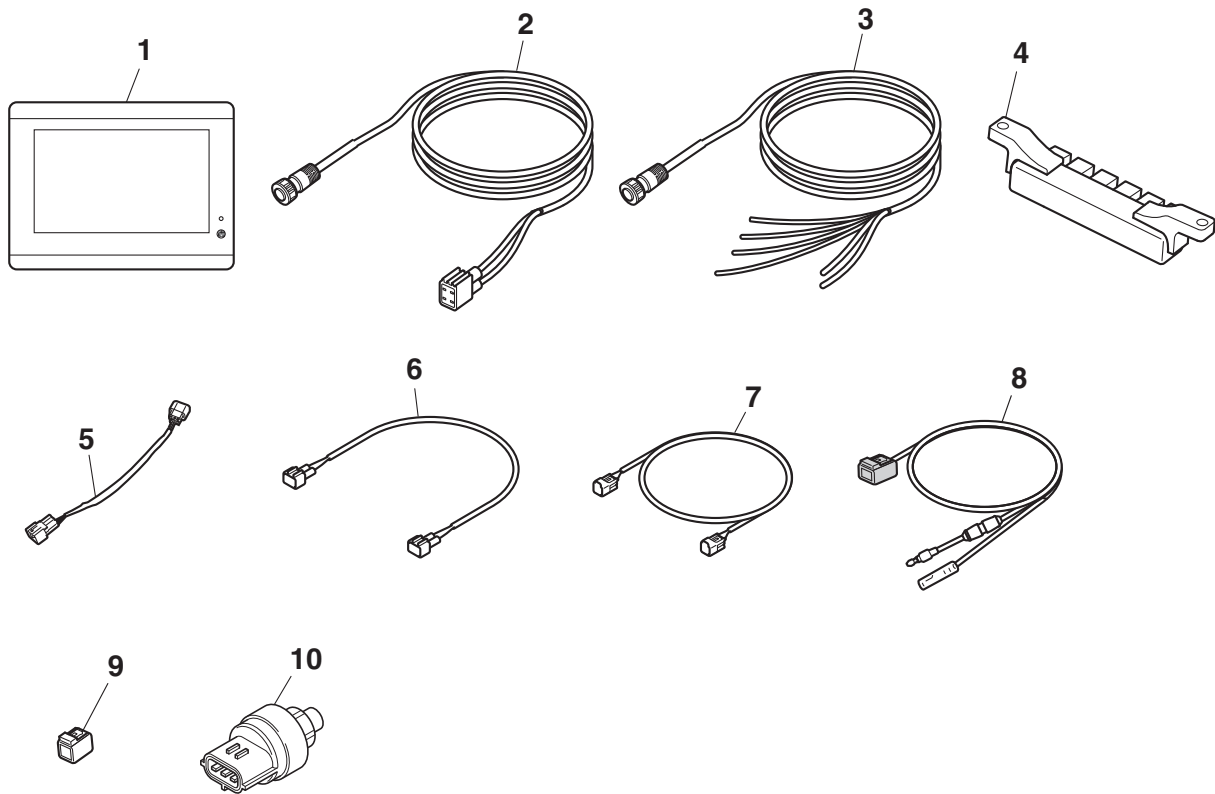
Display

CL5 Display Kit (DEC/6YM-762G0-07)



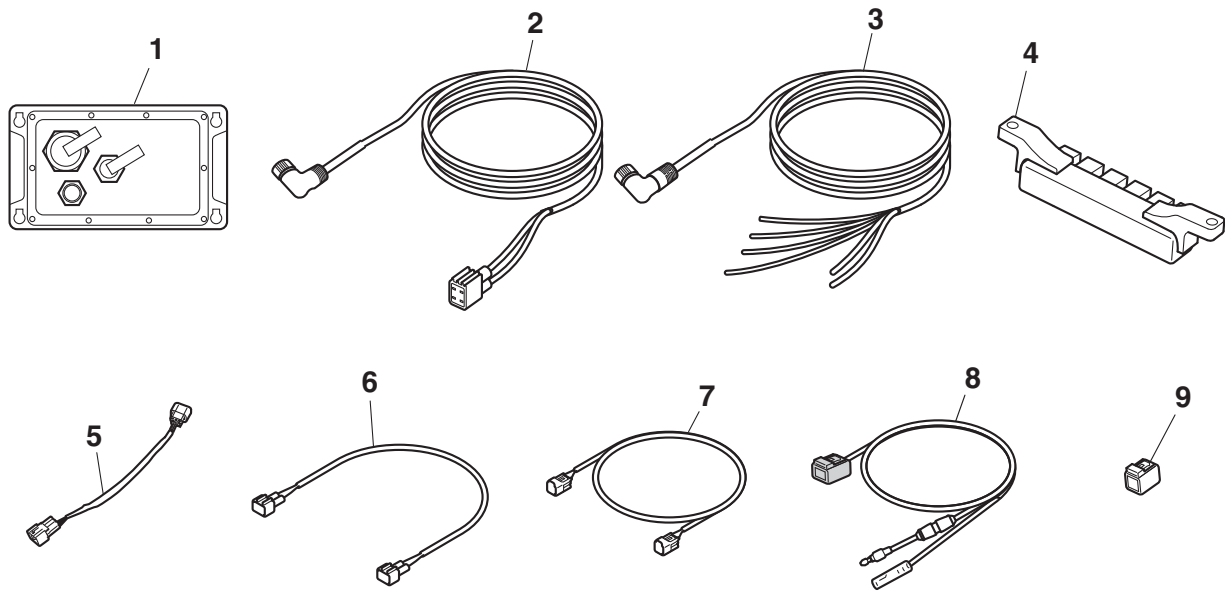
No.	Part name	Q'ty	Part No.	Remarks
1	CL5 Display	1	6YM-83710-16	
2	Conversion harness	1	6YM-83553-00	
3	Wire lead	1	6YD-8356N-00	
4	Multi-hub	1	6Y8-81920-01	
5	Conversion harness	1	6Y9-83553-00	
6	Main bus wire 1 ft	1	6Y8-82553-01	
7	6 ft pigtail bus	1	6Y8-82521-31	
8	Wire lead	1	6Y8-83553-02	
9	4-pin waterproof cap	2	6Y8-82582-11	

CL5 Display Kit (DEC/6YM-762G0-1A)



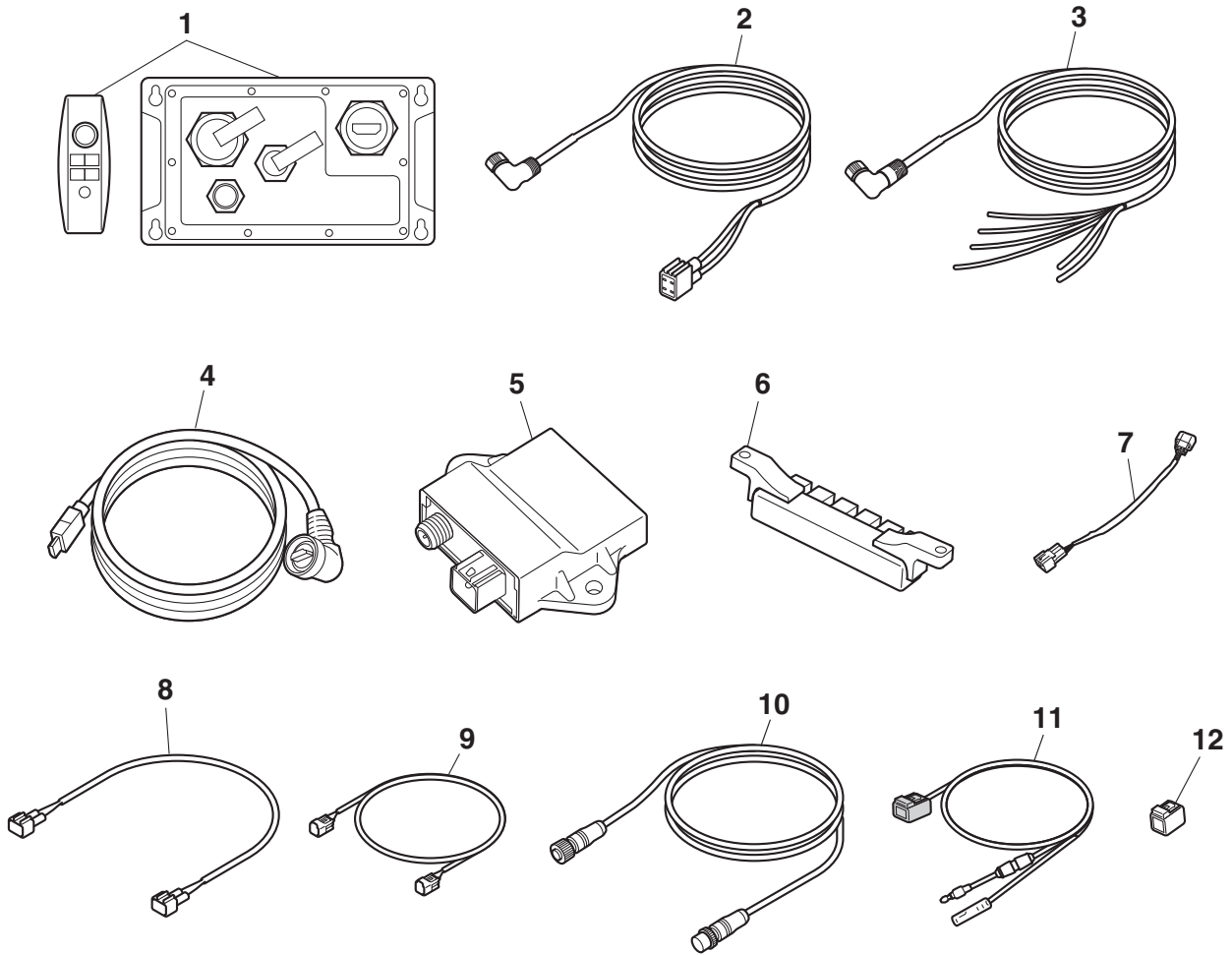
No.	Part name	Q'ty	Part No.	Remarks
1	CL5 Display	1	6YM-83710-16	
2	Conversion harness	1	6YM-83553-00	
3	Wire lead	1	6YD-8356N-00	
4	Multi-hub	1	6Y8-81920-01	
5	Conversion harness	1	6Y9-83553-00	
6	Main bus wire 1 ft	1	6Y8-82553-01	
7	6 ft pigtail bus	1	6Y8-82521-31	
8	Wire lead	1	6Y8-83553-02	
9	4-pin waterproof cap	2	6Y8-82582-11	
10	Speed sensor	1	60V-8A4L1-1B	

MFD Interface Type-1 Kit (DEC/6YM-762G0-42)



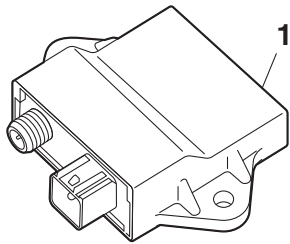
No.	Part name	Q'ty	Part No.	Remarks
1	MFD Interface Type-1	1	6YM-8A2D0-11	
2	Conversion harness	1	6YM-83553-10	
3	Wire lead	1	6YM-8356N-00	
4	Multi-hub	1	6Y8-81920-01	
5	Wire lead	1	6Y9-83553-00	
6	Main bus wire 1 ft	1	6Y8-82553-01	
7	6 ft pigtail bus	2	6Y8-82521-31	
8	Wire lead	1	6Y8-83553-02	
9	4-pin waterproof cap	1	6Y8-82582-11	

MFD Interface Type-2 Kit (DEC/6YM-762G0-55)



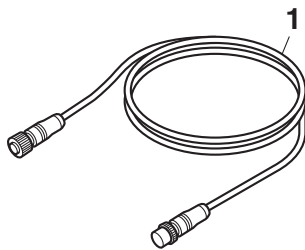
No.	Part name	Q'ty	Part No.	Remarks
1	MFD Interface Type-2 unit set	1	6YM-8A201-04	Pairing is complete
2	Conversion harness	1	6YM-83553-10	
3	Wire lead	1	6YM-8356N-00	
4	HDMI cable	1	6YM-8533A-00	
5	Gateway	1	6YG-8A2D0-13	
6	Multi-hub	1	6Y8-81920-01	
7	Wire lead	1	6Y9-83553-00	
8	Main bus wire 1 ft	1	6Y8-82553-01	
9	6 ft pigtail bus	2	6Y8-82521-31	
10	NMEA harness	1	6YG-82521-00	
11	Wire lead	1	6Y8-83553-02	
12	4-pin waterproof cap	1	6Y8-82582-11	

NMEA2000Gateway (6YG)



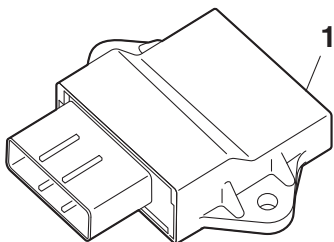
No.	Part name	Q'ty	Part No.	Remarks
1	NMEA2000Gateway (6YG)	1	6YG-8A2D0-13	

NMEA harness



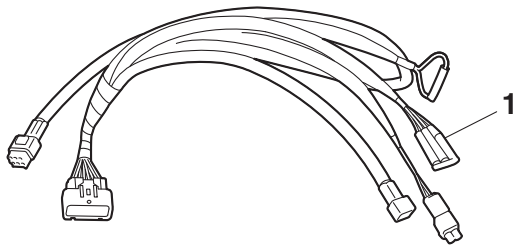
No.	Part name	Q'ty	Part No.	Remarks
1	NMEA harness	1	6YG-82521-00	

Analog Gauge Interface



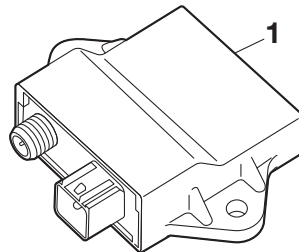
No.	Part name	Q'ty	Part No.	Remarks
1	Analog Gauge Interface	1	6YH-8A2D0-01	

AGI harness



No.	Part name	Q'ty	Part No.	Remarks
1	AGI harness	1	6YH-82521-00	

Thruster Driver



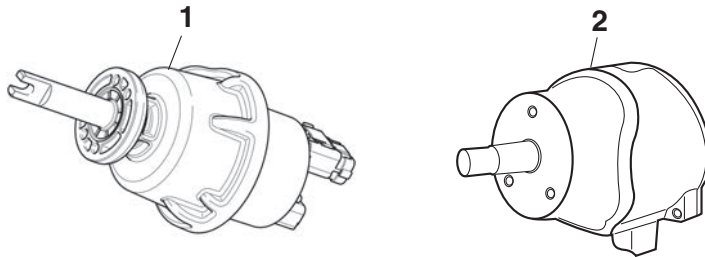
No.	Part name	Q'ty	Part No.	Remarks
1	Thruster driver	1	6X9-86500-00	

Helm

TIP: _____

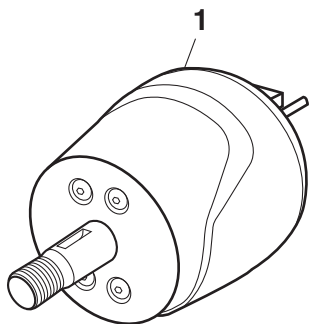
F/FL150H, F/FL200N, F/LF150SA, F/LF175SA and F/LF200SA models only can be used for 6GR-762H0-10 and 6X9-762H0-10. And above mentioned models support single to twin application.

Helm and tilt Kit (6GR-762H0-10)



No.	Part name	Q'ty	Part No.	Remarks
1	Helm unit assembly	1	6GR-615A0-10	
2	Tilt helm unit	1	6GR-6154A-00	

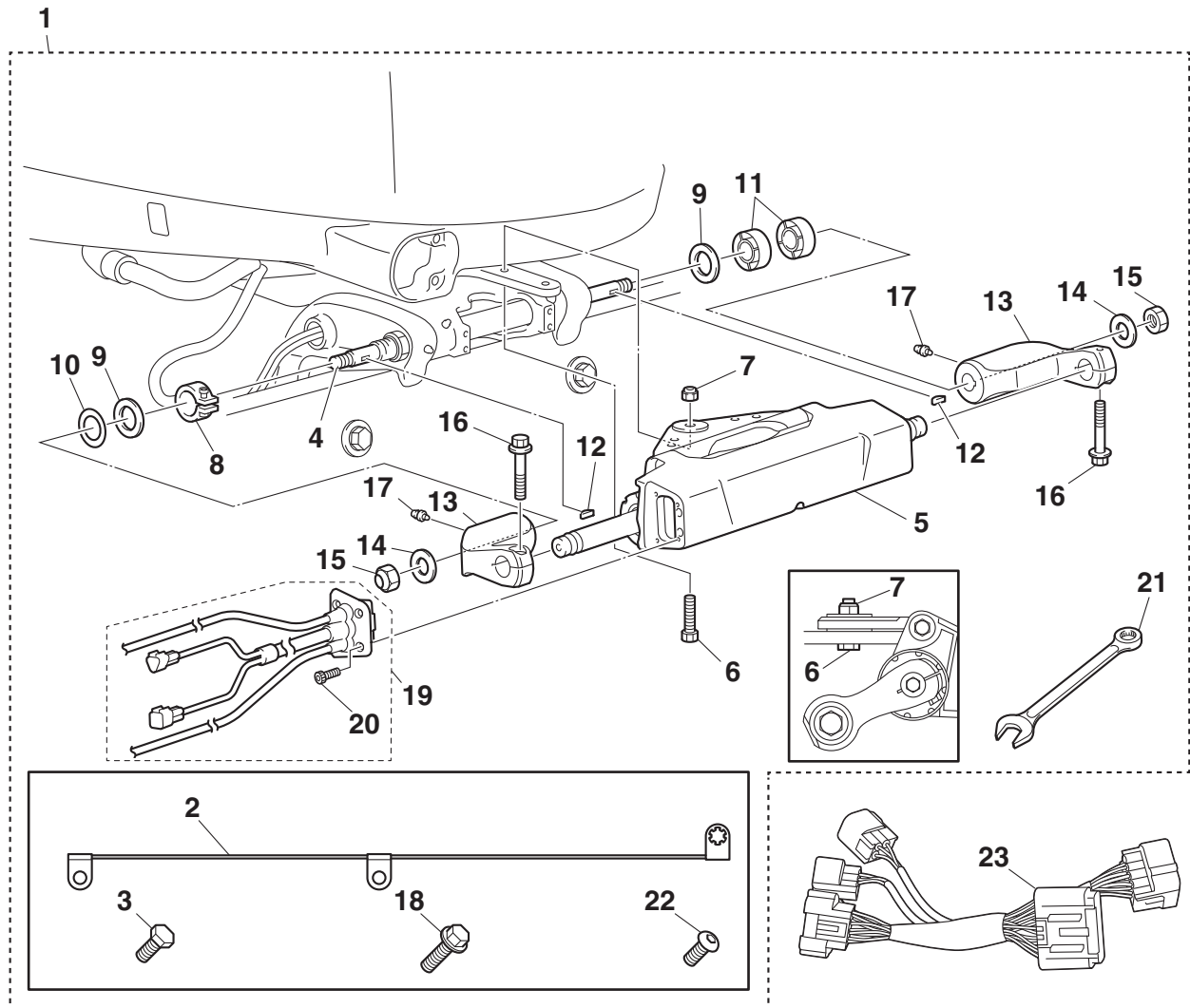
Helm unit assembly (6X9-762H0-10)



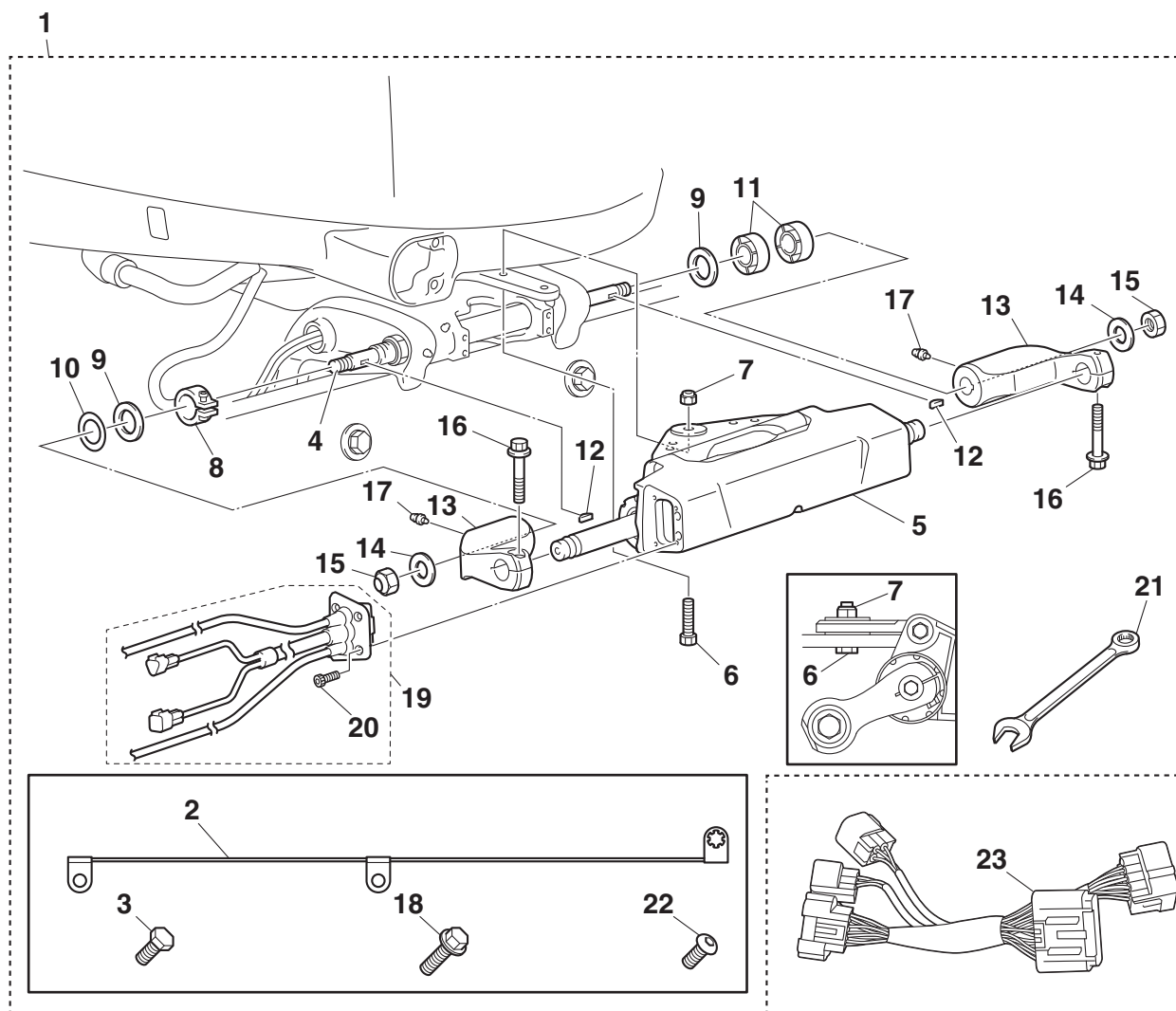
No.	Part name	Q'ty	Part No.	Remarks
1	Helm unit assembly	1	6X9-615A0-10	

DES

Bolt-on DES Kit (6X9-762S0-03)

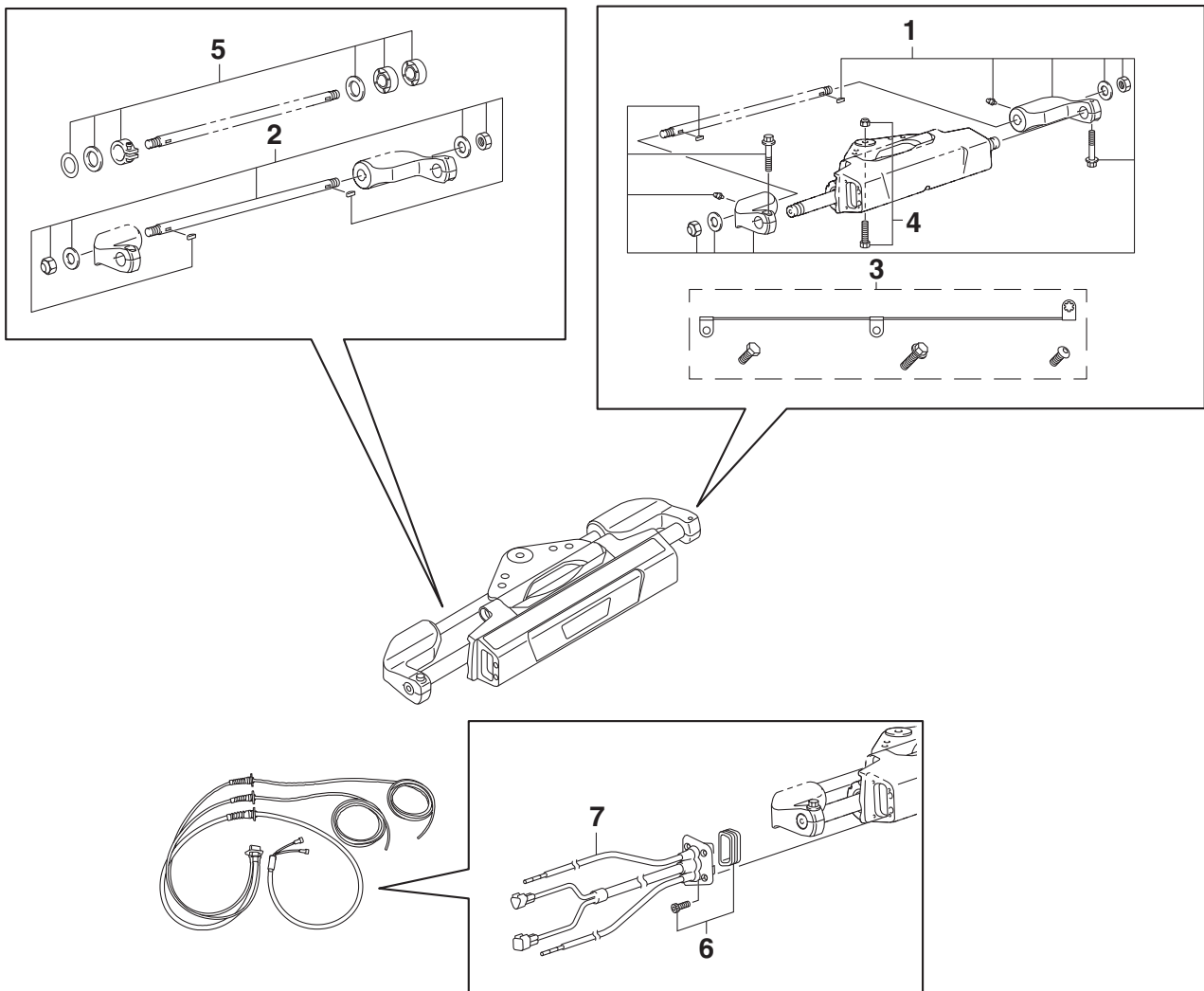


No.	Part name	Q'ty	Part No.	Remarks
1	Steering actuator	1	6X9-42401-11	
2	Ground wire	1		
3	Bolt M6 × 12 mm	1		10 mm
4	Support rod	1		
5	DES cylinder	1		
6	Bolt 3/8 × 1.35"	1		9/16 in
7	Self-locking nut	1		9/16 in
8	Adjuster nut	1		5/32 in
9	Washer	2		Stainless
10	Spacer	1		Plastic, thin
11	Spacer	2		Plastic, thicker
12	Woodruff key	2		
13	Support bracket	2		
14	Washer	2		
15	Self-locking nut	2		3/4 in



No.	Part name	Q'ty	Part No.	Remarks
16	Bolt 5/16 × 1.25"	2		3/8 in
17	Grease nipple	2		
18	Bolt 1/4-20"	1		3/8 in
19	DES wire harness	1	6X9-438A0-xx	Not included in kit (Optional kit)
20	Bolt 8-32 × 7/16"	4		9/64 in
21	Combination wrench	1		3/8 in
22	Bolt	1		Not to be used
23	SCU split harness	1	6X9-8258A-90	

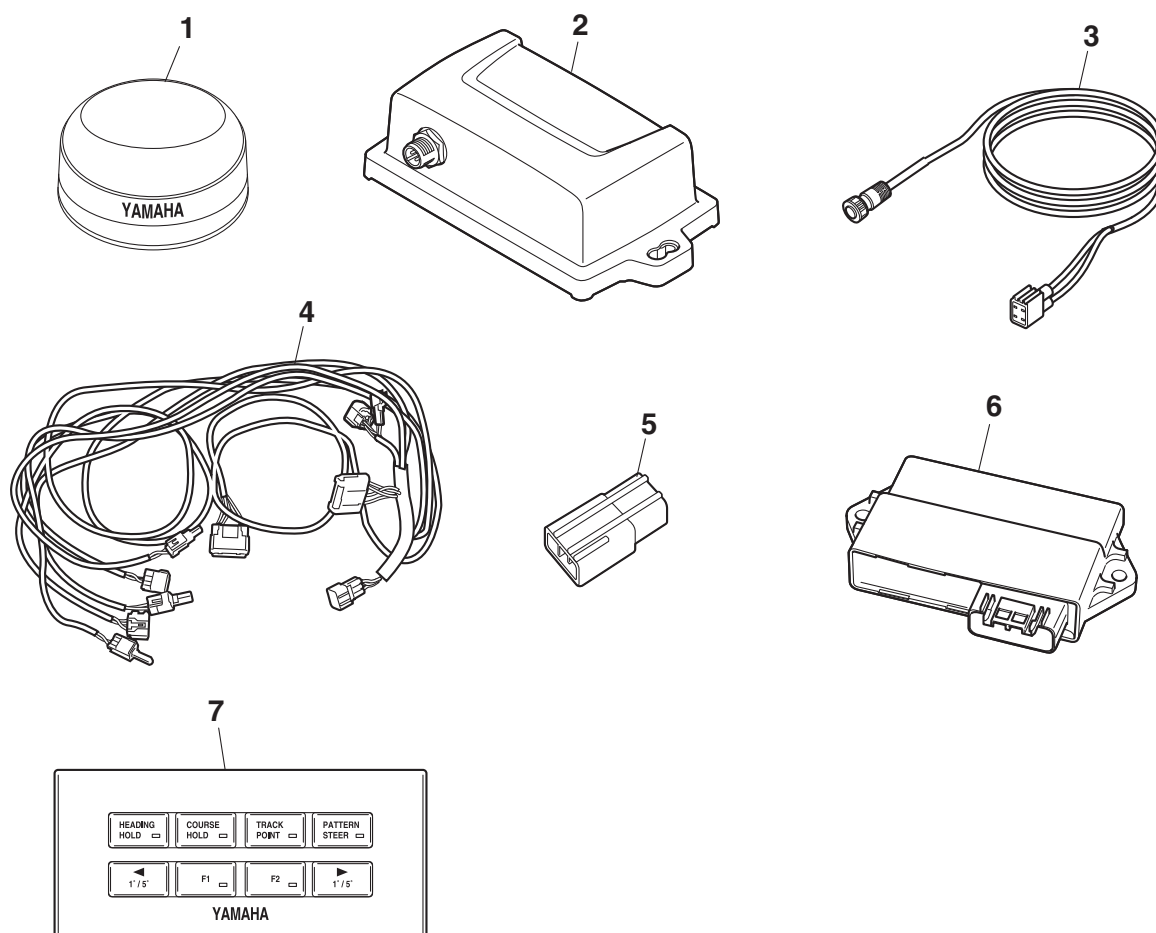
Bolt-on DES repair Kit



	6X9-42401-11	Steering actuator
1	6X9-42402-00	Repair kit 1
2	6X9-42403-00	Repair kit 2
3	6X9-42404-00	Repair kit 3
4	6X9-42405-00	Repair kit 4
5	6X9-42406-00	Repair kit 5
	6X9-438A0-00, 6X9-438A0-10	DEC wire harness
6	6X9-42407-00	Repair kit6
7	6X9-42408-00	Repair kit 7

Autopilot

Autopilot Kit (Main station/6X9-762P0-07)

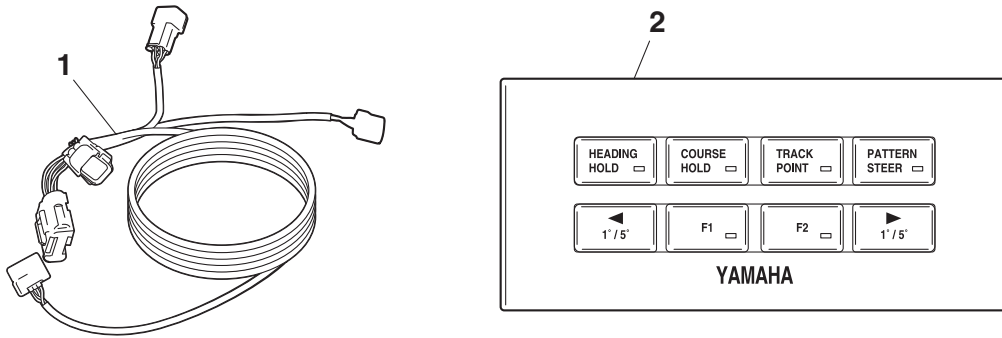


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	Main station
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-14	Autopilot and single engine joystick
7	Autopilot panel	1	6X9-8253V-01	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

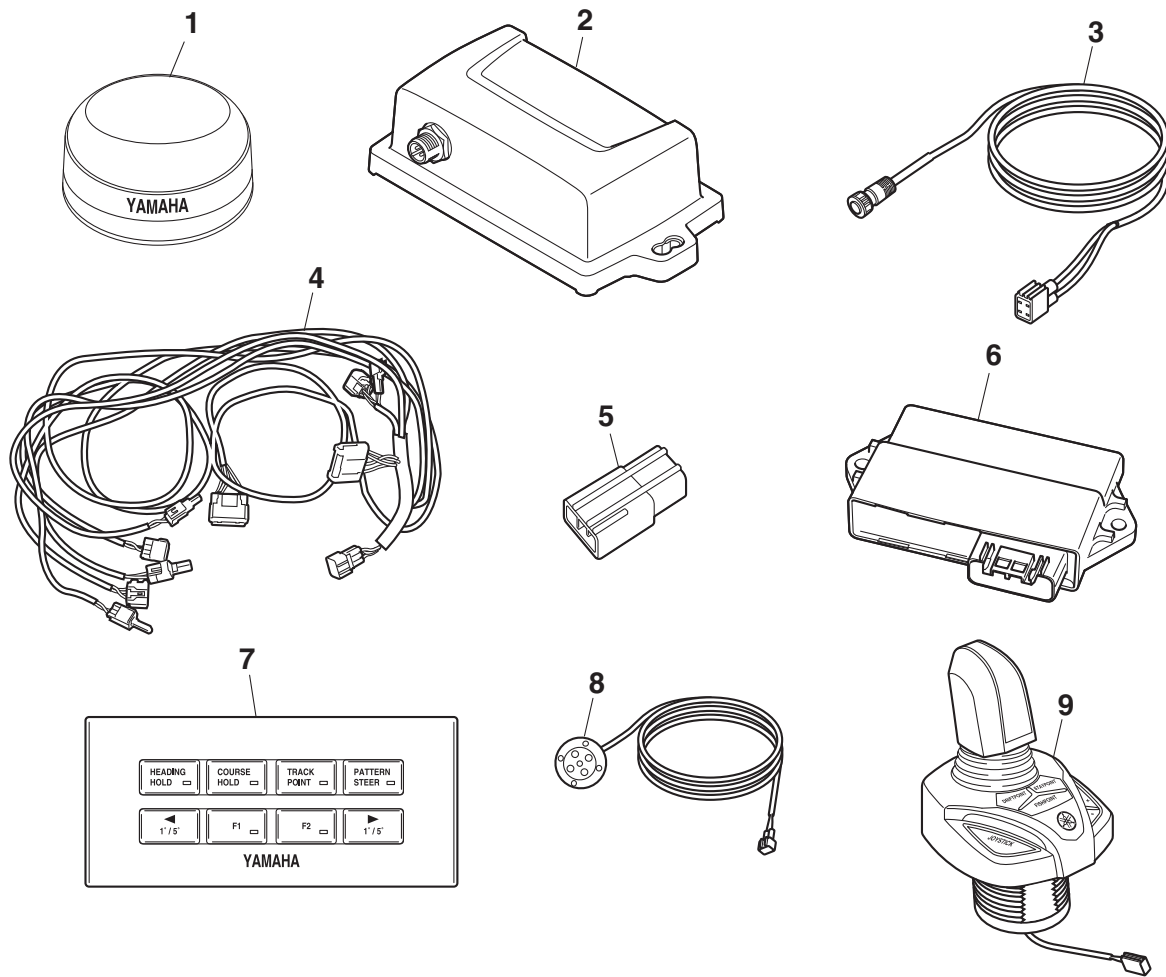
Autopilot Kit (2nd station/6X9-762P0-11)



No.	Part name	Q'ty	Part No.	Remarks
1	BCU harness	1	6X9-82386-10	
2	Autopilot panel	1	6X9-8253V-01	

Joystick

Joystick Kit (Single engine/boat mounted lights/6X9-762J0-07)

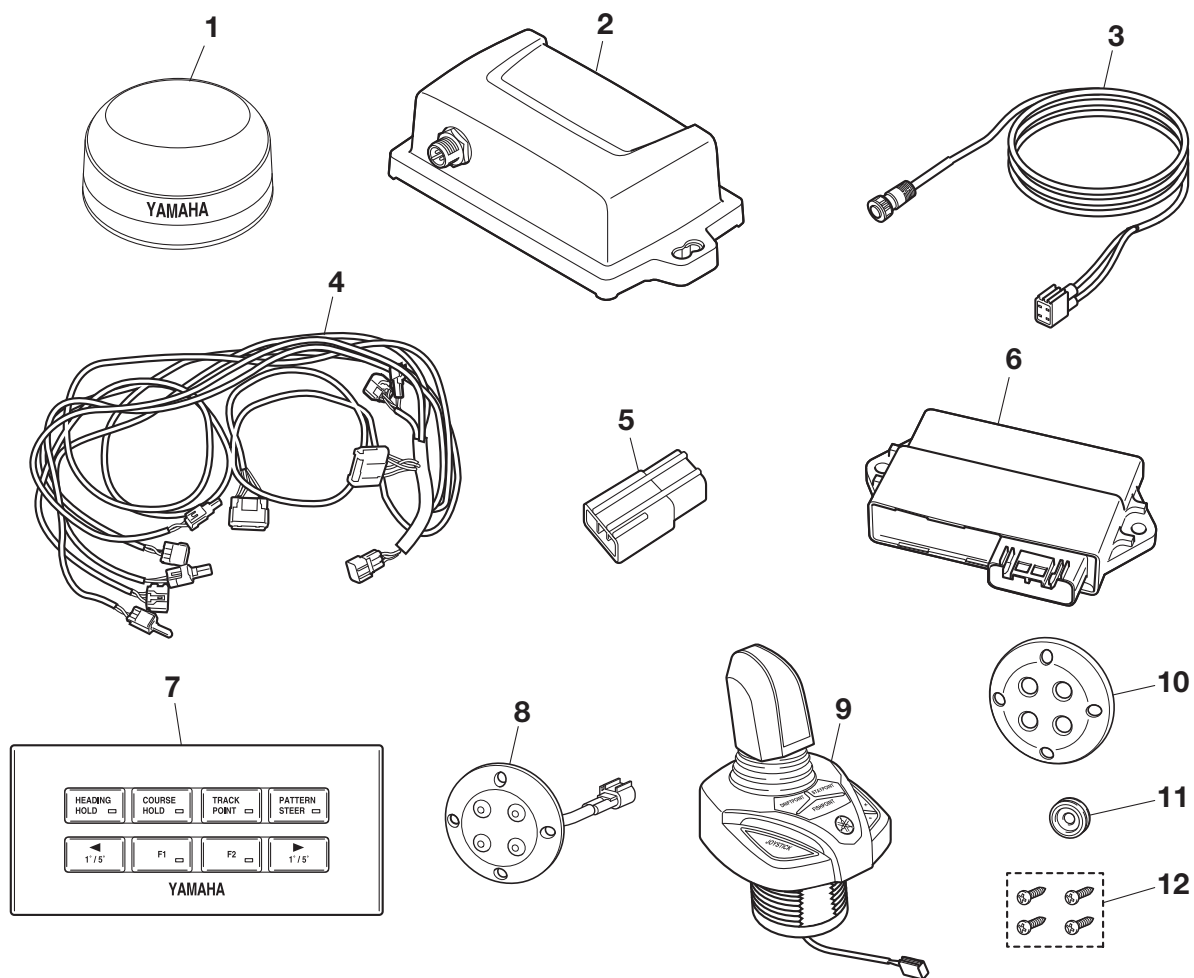


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-14	Autopilot and single engine joystick
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	2	6ES-83720-02	
9	Joystick controller assembly	1	6X9-482A0-02	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Joystick Kit (Single engine/engine mounted lights/6X9-762J0-80)

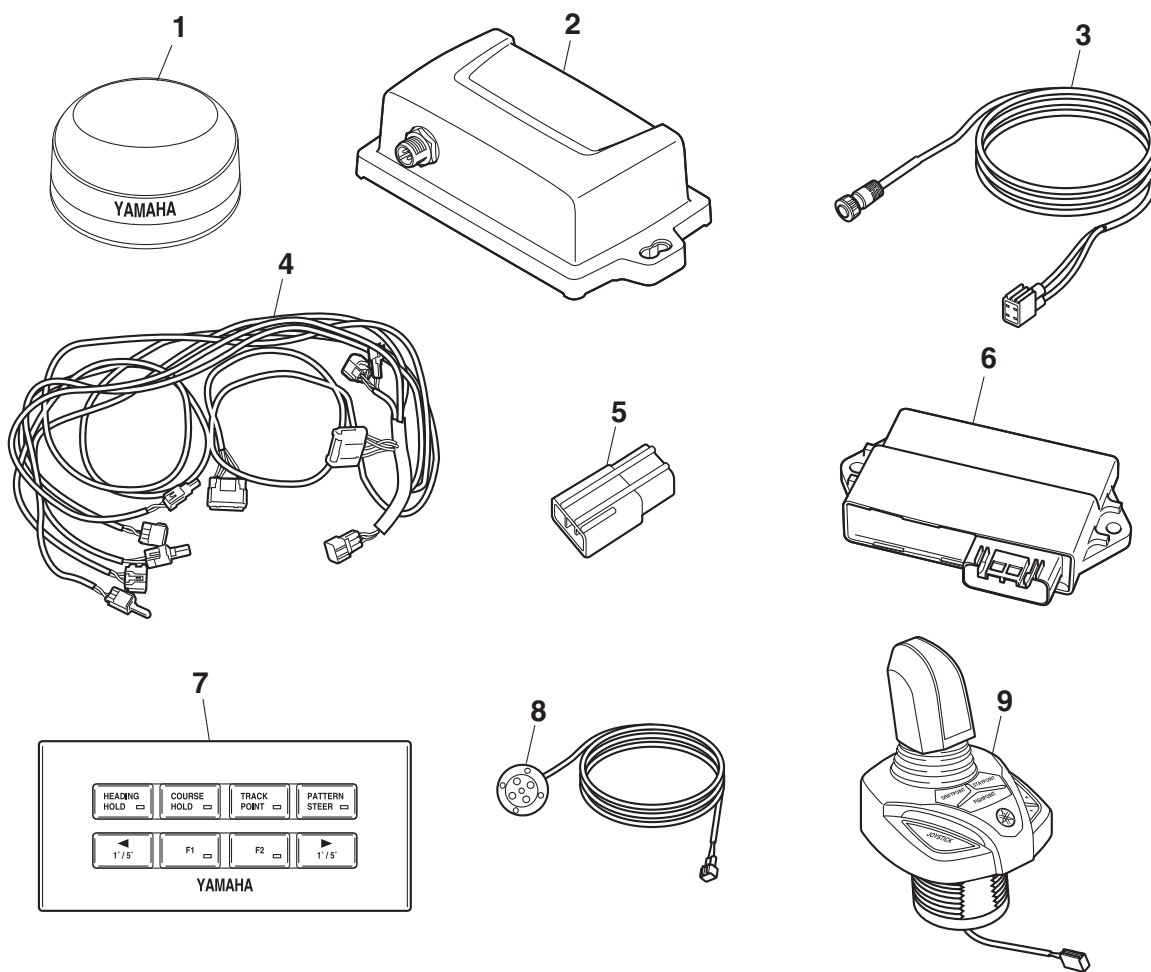


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-14	Autopilot and single engine joystick
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	1	6KA-83720-00	
9	Joystick controller assembly	1	6X9-482A0-02	
10	Tail light cover	1	6KA-84516-00	
11	Grommet	1	90480-20006	
12	Screw	4	97780-40112	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Joystick Kit (Twin engine/boat mounted lights/6X9-762J0-17)

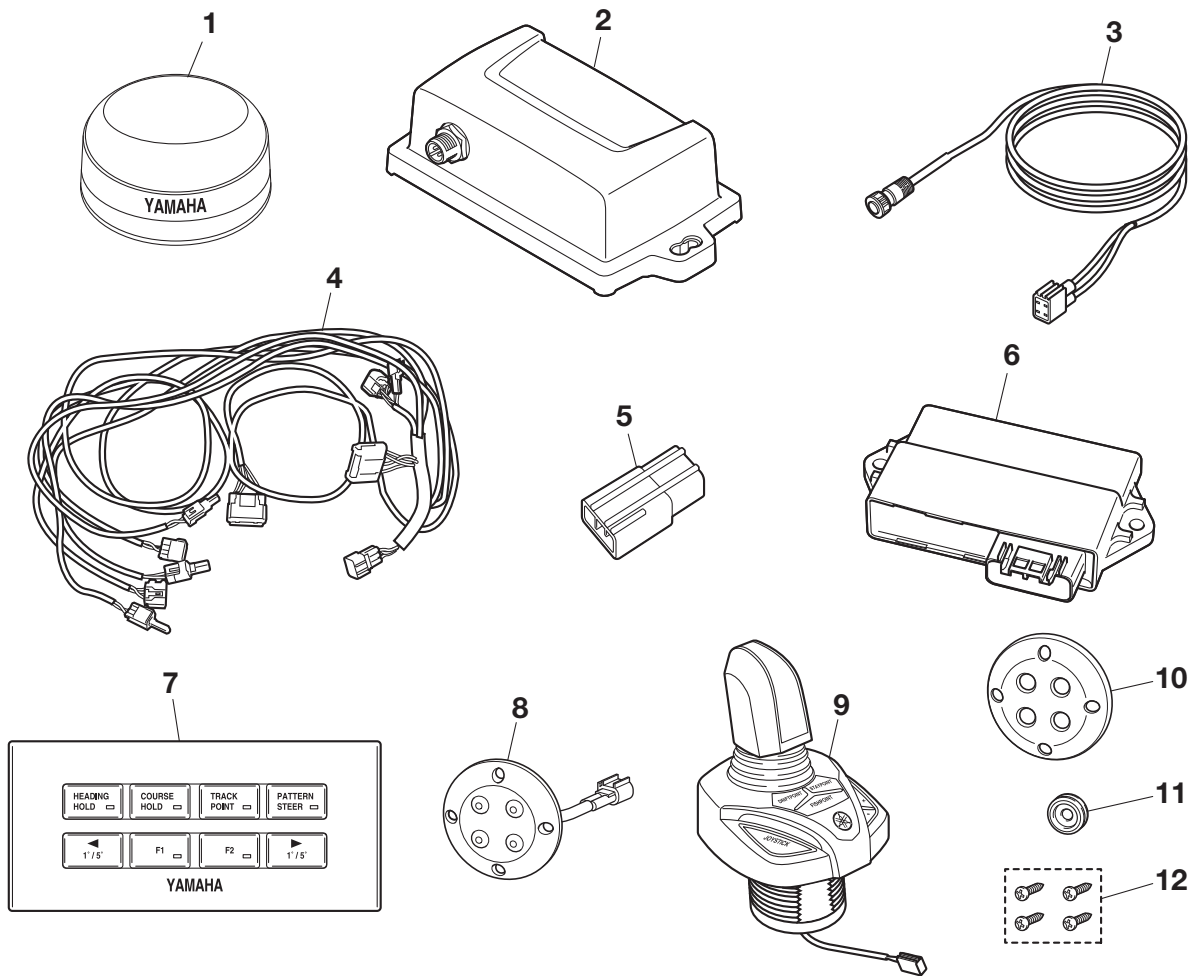


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-24	
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	2	6ES-83720-02	
9	Joystick controller assembly	1	6X9-482A0-02	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Joystick Kit (Twin engine/engine mounted lights/6X9-762J0-90)

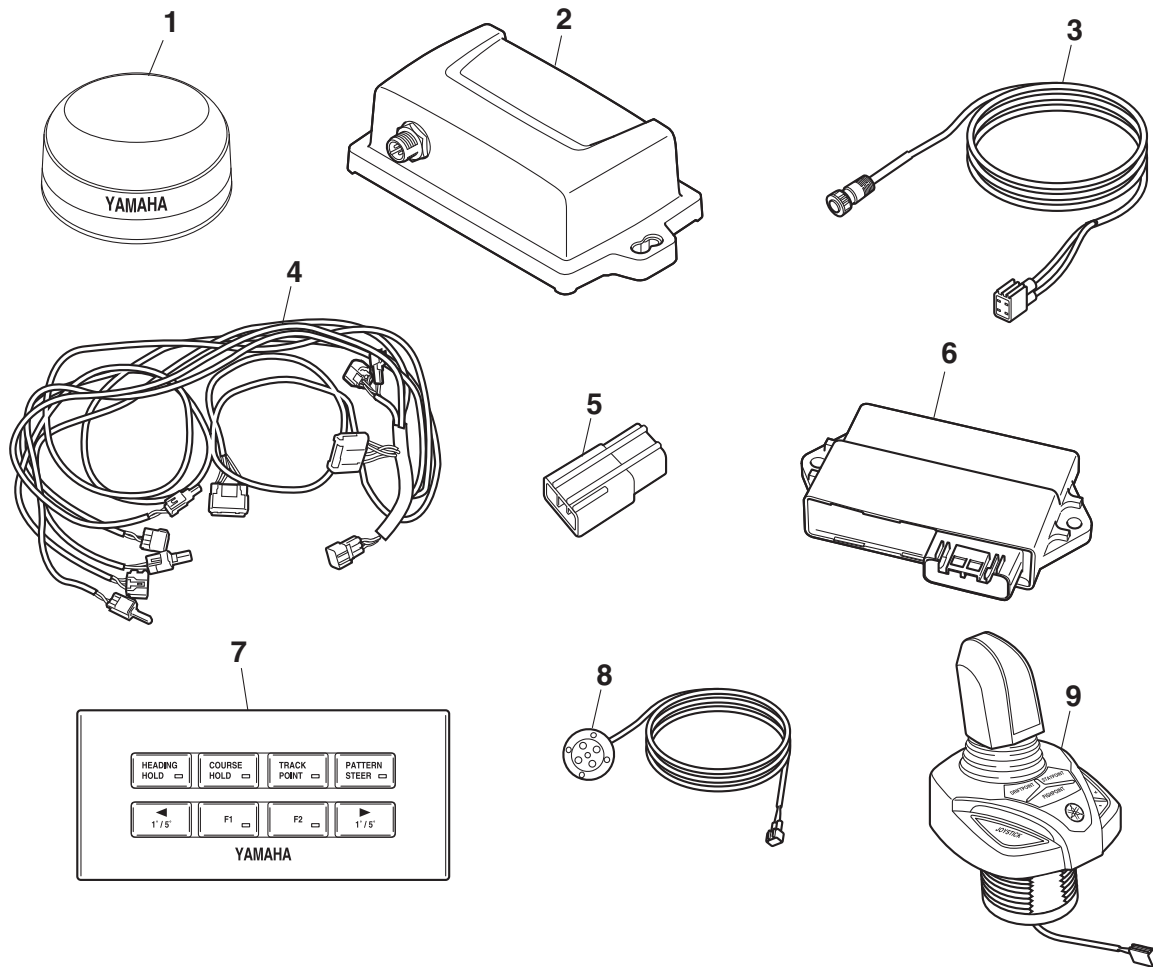


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-24	Autopilot and single engine joystick
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	2	6KA-83720-00	
9	Joystick controller assembly	1	6X9-482A0-02	
10	Tail light cover	2	6KA-84516-00	
11	Grommet	2	90480-20006	
12	Screw	8	97780-40112	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Joystick Kit (Triple engine/boat mounted lights/6X9-762J0-27)

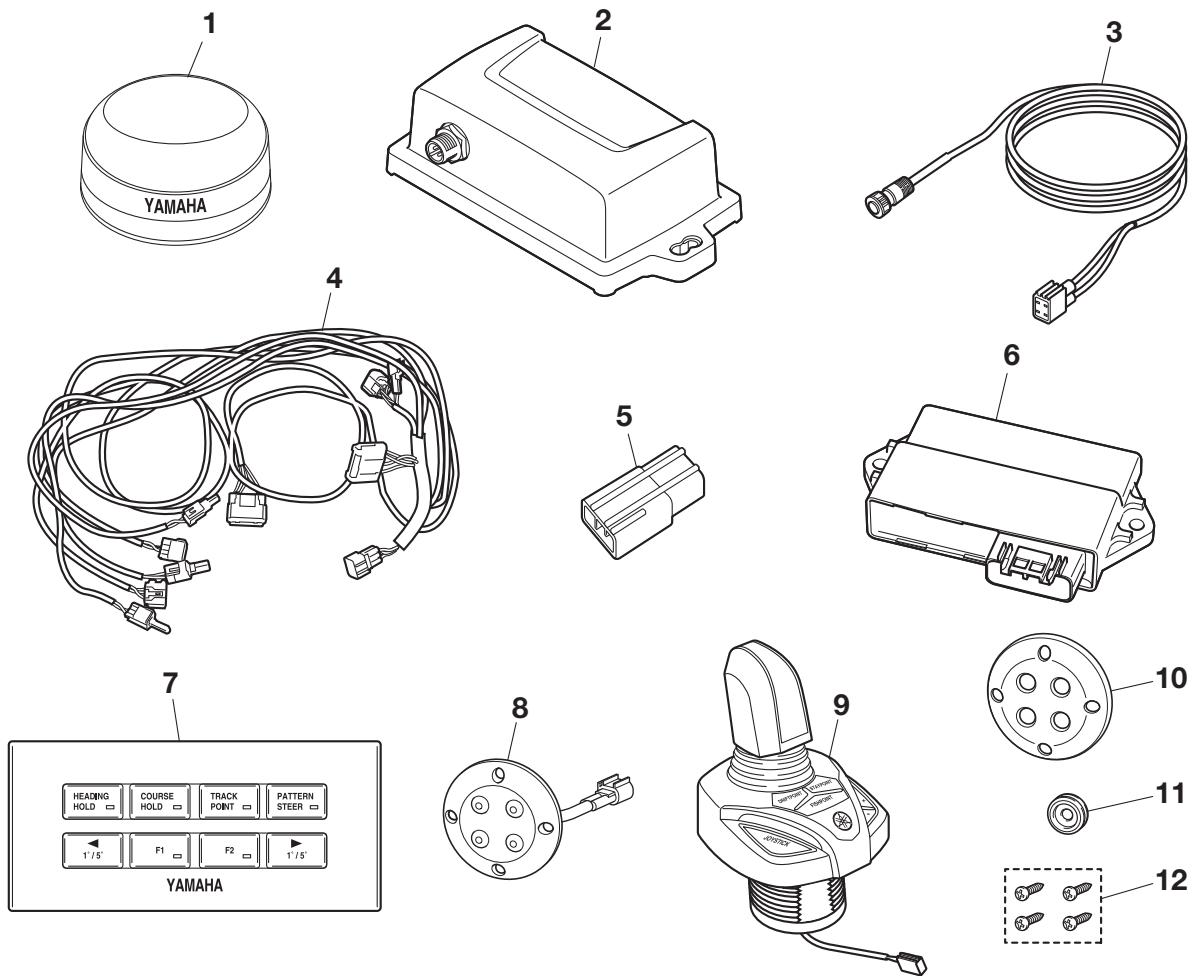


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-34	
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	2	6ES-83720-02	
9	Joystick controller assembly	1	6X9-482A0-02	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Joystick Kit (Triple engine/engine mounted lights/6X9-762J0-A0)

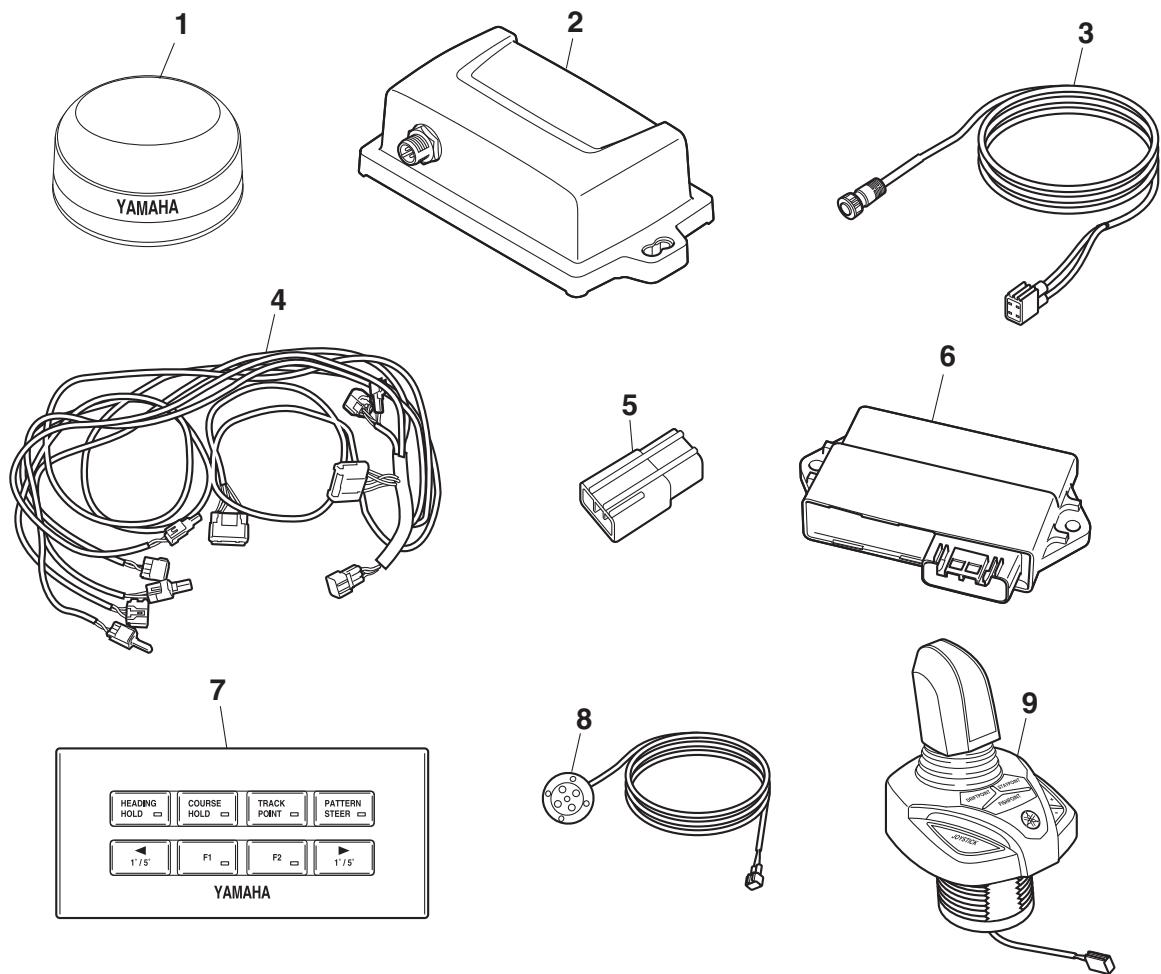


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-34	Autopilot and single engine joystick
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	2	6KA-83720-00	
9	Joystick controller assembly	1	6X9-482A0-02	
10	Tail light cover	2	6KA-84516-00	
11	Grommet	2	90480-20006	
12	Screw	8	97780-40112	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Joystick Kit (Quad engine/boat mounted lights/6X9-762J0-37)

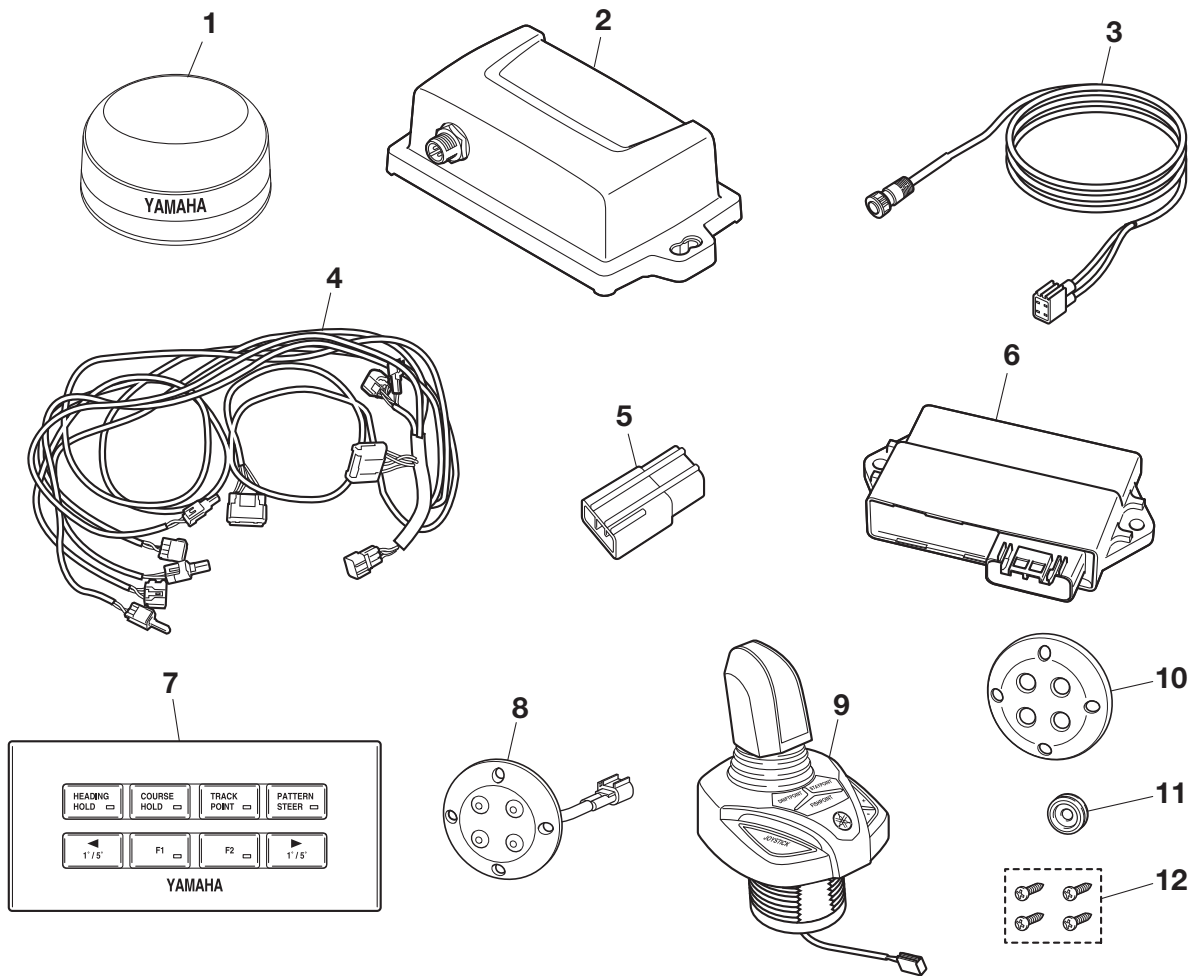


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-44	
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	2	6ES-83720-02	
9	Joystick controller assembly	1	6X9-482A0-02	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Joystick Kit (Quad engine/engine mounted lights/6X9-762J0-B0)

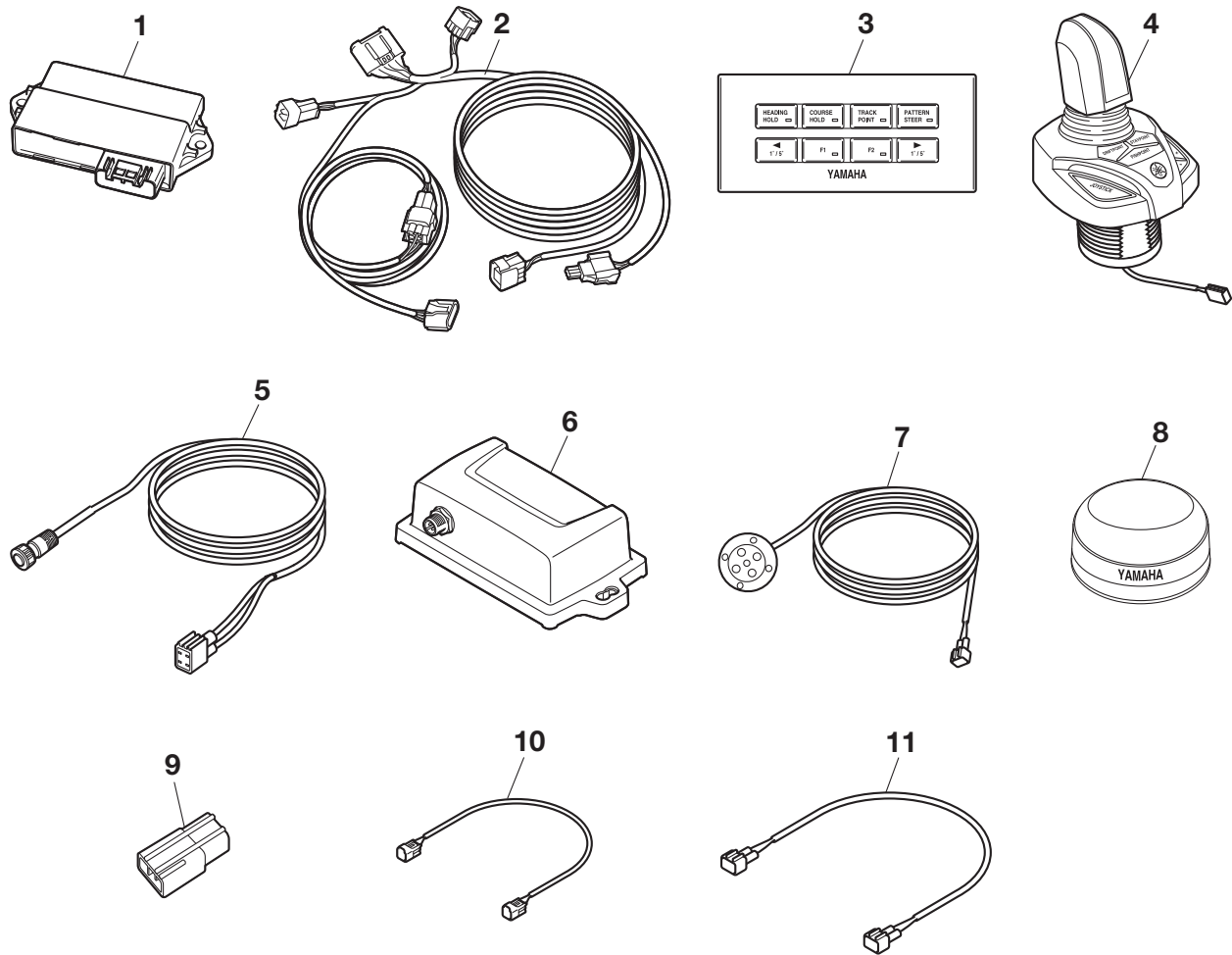


No.	Part name	Q'ty	Part No.	Remarks
1	GPS unit	1	6X9-88107-02	
2	Heading sensor	1	6X9-8A410-01	
3	Conversion harness	2	6YM-83553-00	
4	BCU harness	1	6X9-82386-01	
5	Single hub	1	6Y8-81920-11	
6	BCU	1	6X9-8591T-44	Autopilot and single engine joystick
7	Autopilot panel	1	6X9-8253V-01	
8	Notification light	2	6KA-83720-00	
9	Joystick controller assembly	1	6X9-482A0-02	
10	Tail light cover	2	6KA-84516-00	
11	Grommet	2	90480-20006	
12	Screw	8	97780-40112	

TIP:

To use 3rd-party MFD waypoint (route) information for the Autopilot's TRACK POINT function or the SetPoint's DRIFTPOINT TRACK function, you need NMEA2000Gateway (6YG) (6YG-8A2D0-11 or later).

Autopilot and Joystick (Quint engine)

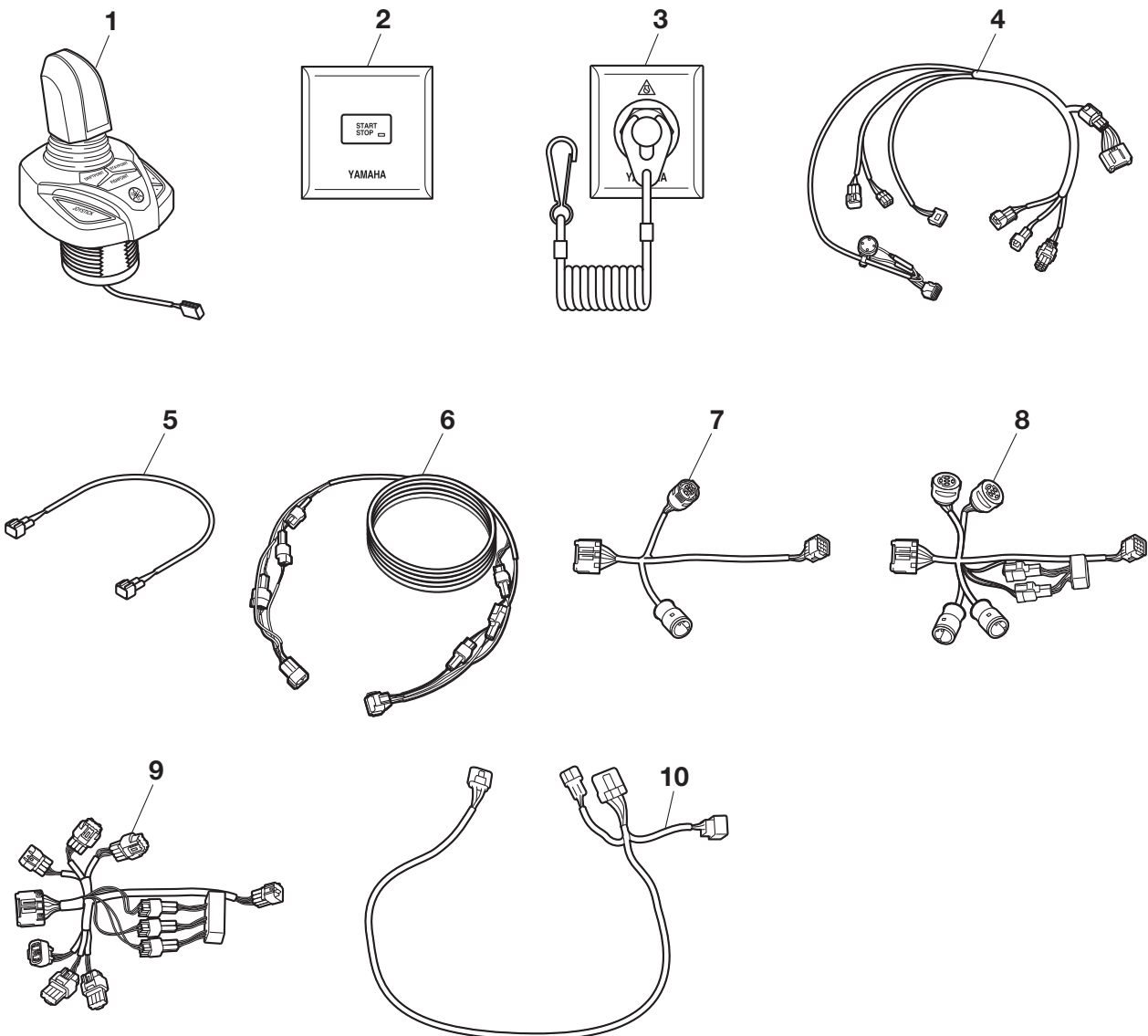


No.	Part name	Q'ty	Part No.	Remarks
1	BCU	1	6X9-8591T-51	Quint engine joystick
2	BCU harness	1	6X9-82386-20	
3	Autopilot panel	1	6X9-8253V-01	Main station
4	Joystick controller assembly	2	6X9-482A0-02	Main station, 2nd station
5	Conversion harness	2	6YM-83553-00	
6	Heading sensor	1	6X9-8A410-01	
7	Notification light	2	6ES-83720-02	
8	GPS unit	1	6X9-88107-02	
9	Single hub	1	6Y8-81920-11	
10	Pigtail bus wire	1	6Y8-82521-xx	0.3 m, 0.6 m
11	Main bus wire	1	6Y8-82553-xx	0.3 m, 3 m, 4.6 m, 6.1 m, 7.6 m, 9.7 m available

TIP:

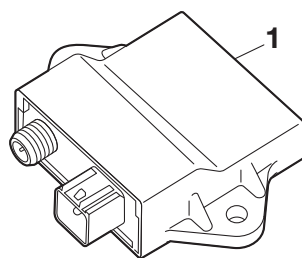
When using the Joystick, change the BCU from 6X9-8591T-14 to 6X9-8591T-51.

Joystick station



No.	Part name	Q'ty	Part No.	Remarks
1	Joystick controller assembly	1	6X9-482A0-02	
2	ALL START/STOP switch	1	6X9-82570-B1	
3	Engine shut-off switch	1	6X9-82570-D1	
4	Aux joystick harness	1	6X9-82580-G0	
5	Main bus wire	1	6Y8-82553-xx	0.3 m, 3 m, 4.6 m, 6.1 m, 7.6 m, 9.7 m available
6	Extension harness	2	6X9-83553-xx	7 m, 10 m
7	Split harness 1	1	6X9-8258A-C0	
8	Split harness 2	1	6X9-8258A-D0	
9	Split harness 3	1	6X9-8258A-E0	
10	Autopilot panel harness	1	6X9-83553-90	

Thruster Driver



No.	Part name	Q'ty	Part No.	Remarks
1	Thruster driver	1	6X9-86500-00	

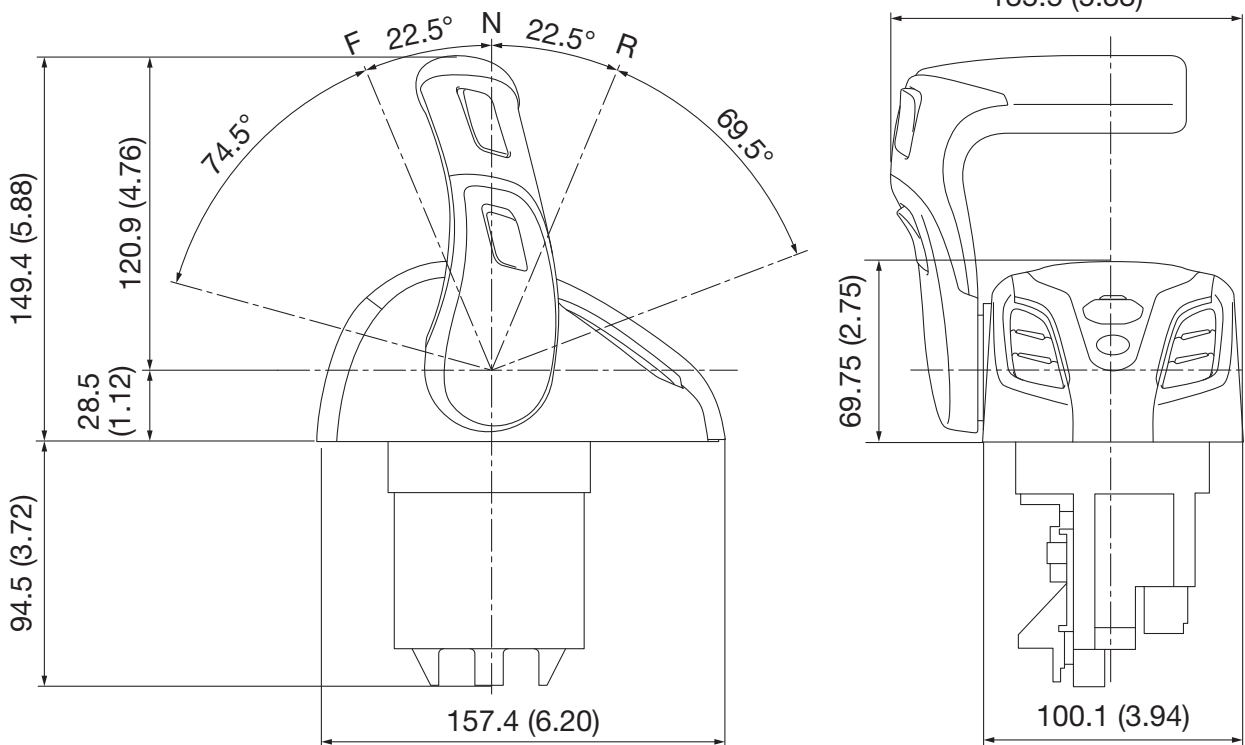
Component dimensions

Dimensions of the 6X9 components are shown below.
 Confirm that there is enough space for the installation.

DEC (Single lever)

See “6X9 Digital Electronic Control” (page 345) in Template.

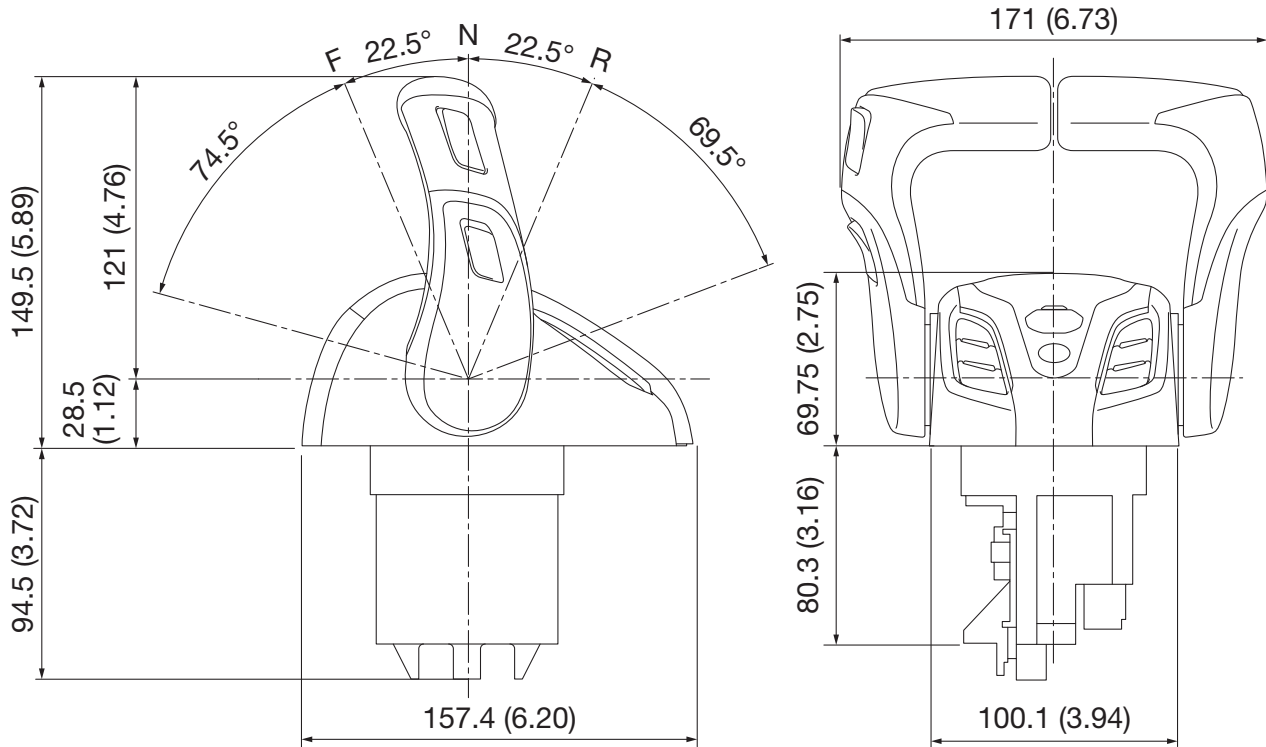
mm (in)



DEC (Twin lever)

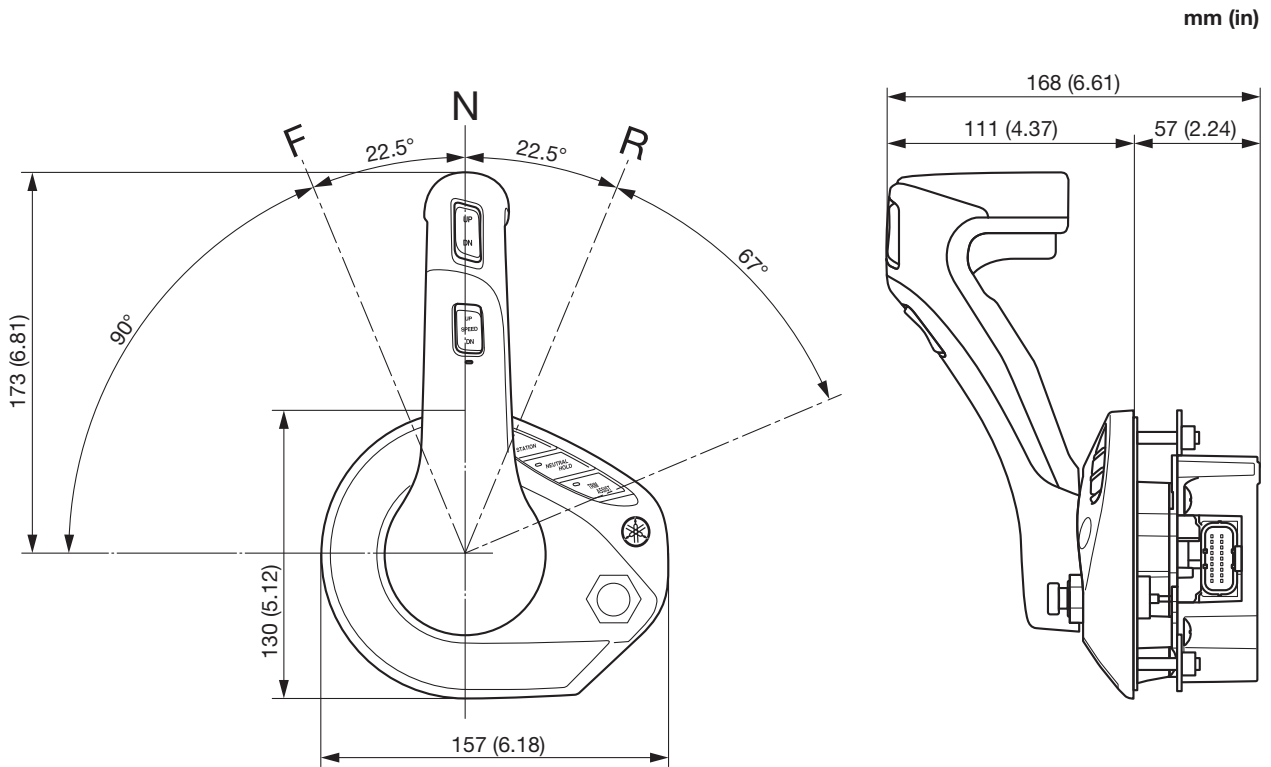
See “6X9 Digital Electronic Control” (page 345) in Template.

mm (in)



DEC (Flush side mount)

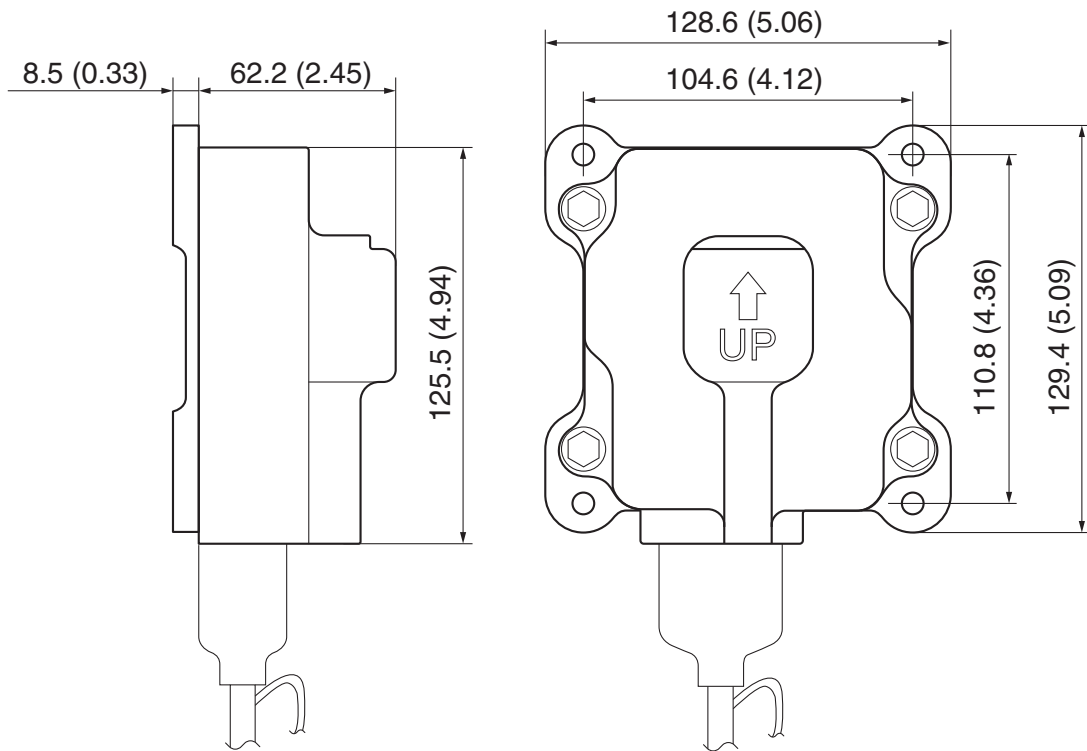
See "6X9 Flush side mount (DEC)" (page 346) in Template.



Keyless unit (receiver assy)

See “Keyless unit (receiver assy)” (page 349) in Template.

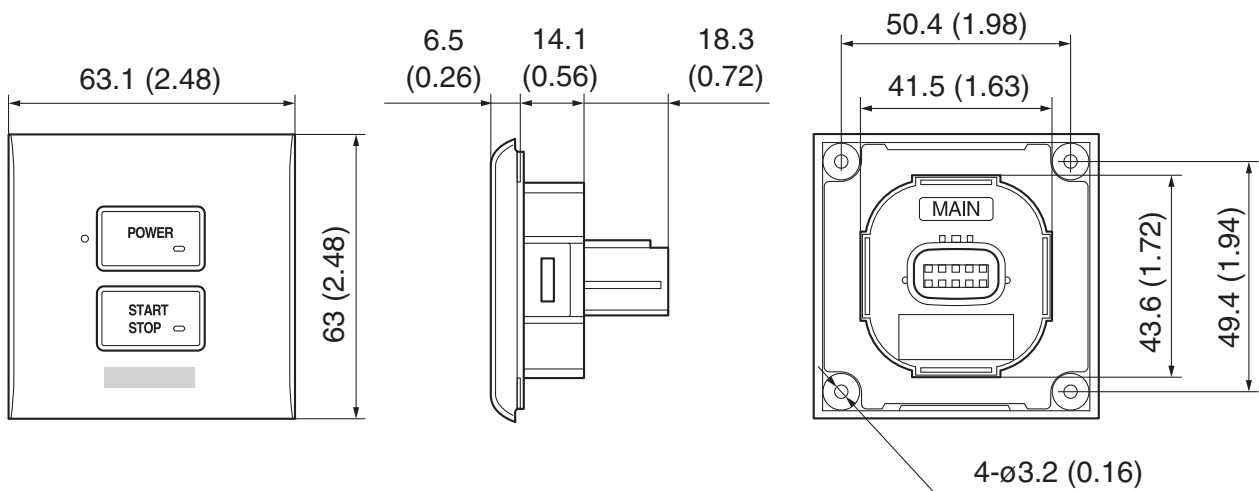
mm (in)



Power switch (Single engine application)

See “Power switch (Single engine application)” (page 347) in Template.

mm (in)

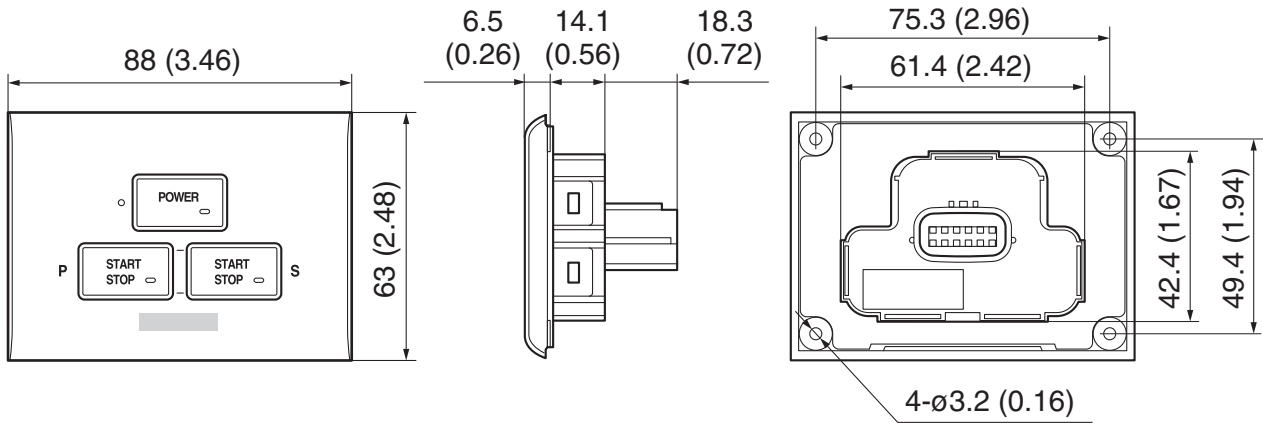


Power switch (Twin engine application/main station)

Power switch (Twin engine application/main station)

See “Power switch (Twin engine application/main station)” (page 347) in Template.

mm (in)

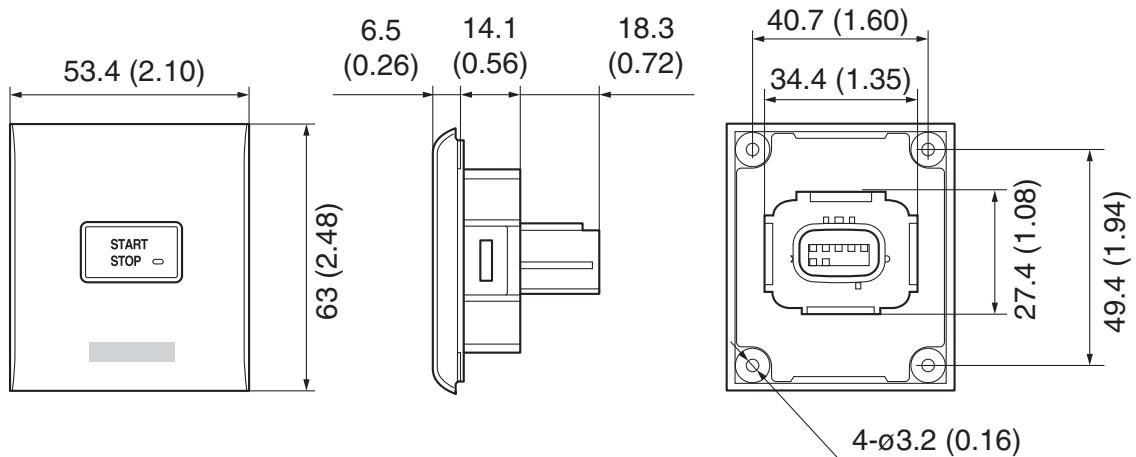


Start/stop switch (Single engine application)

All start/stop switch (Twin/triple/quad/quint engine application)

“All start/stop switch (Twin/triple/quad/quint engine application)” and See “All start/stop switch (Twin/triple/quad/quint engine application)” (page 348) in Template.

mm (in)

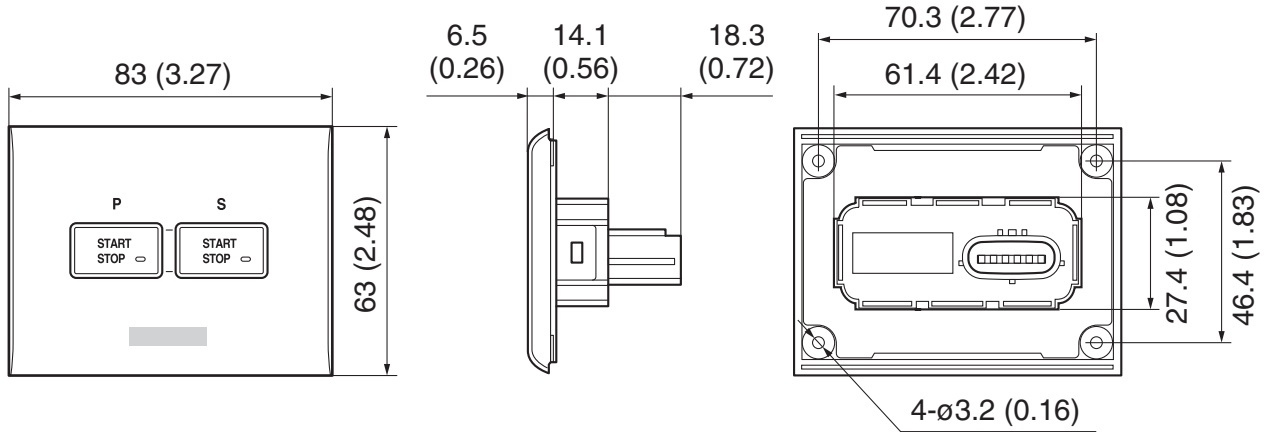


Start/stop switch (Twin engine application)

Start/stop switch (Twin engine application)

See “Power switch (Twin engine application/main station)” (page 347) in Template.

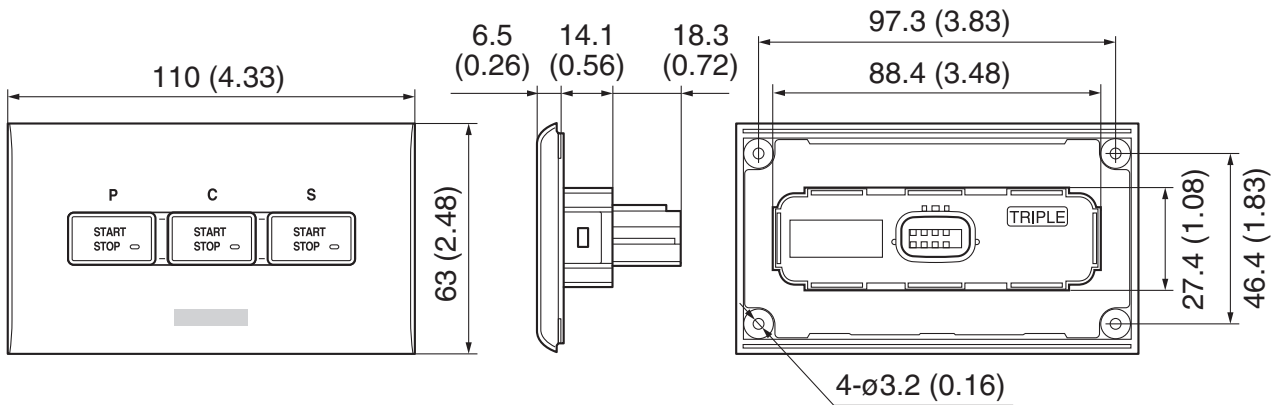
mm (in)



Start/stop switch (Triple engine application)

See “Start/stop switch (Triple engine application)” (page 347) in Template.

mm (in)

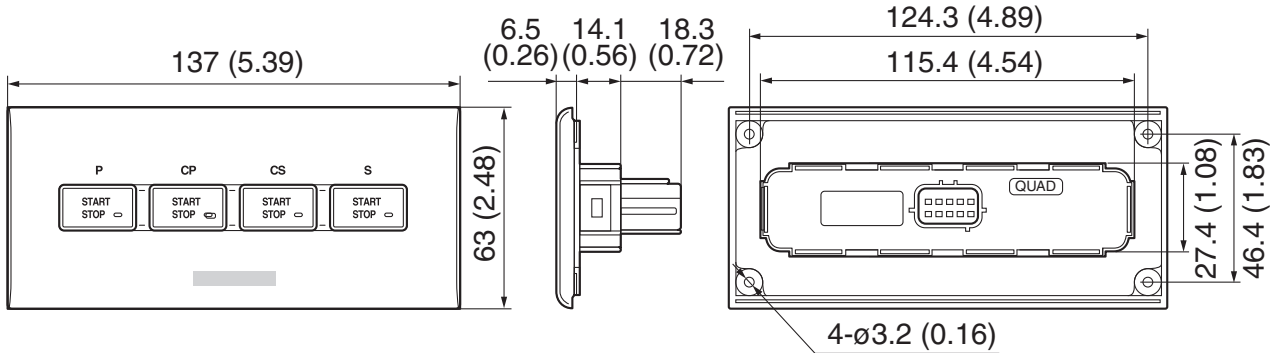


Start/stop switch (Quad engine application)

Start/stop switch (Quad engine application)

See “Start/stop switch (Quad engine application)” (page 347) in Template.

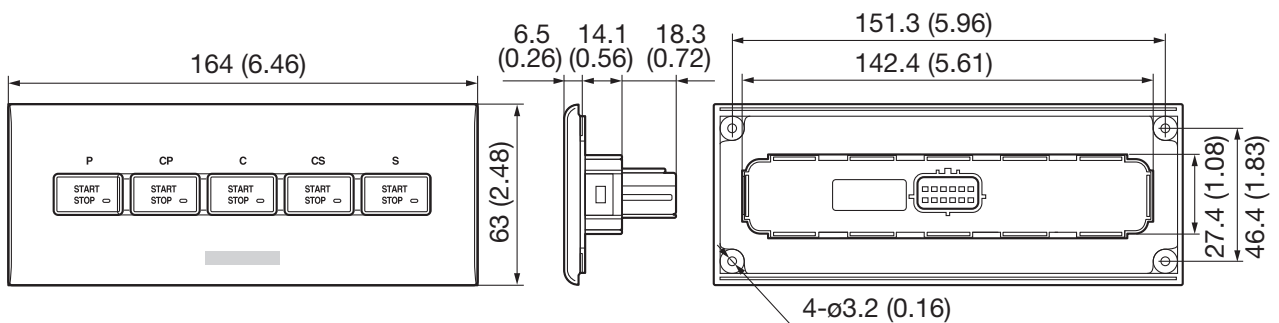
mm (in)



Start/stop switch (Quint engine application)

See “Start/stop switch (Quint engine application)” (page 348) in Template.

mm (in)

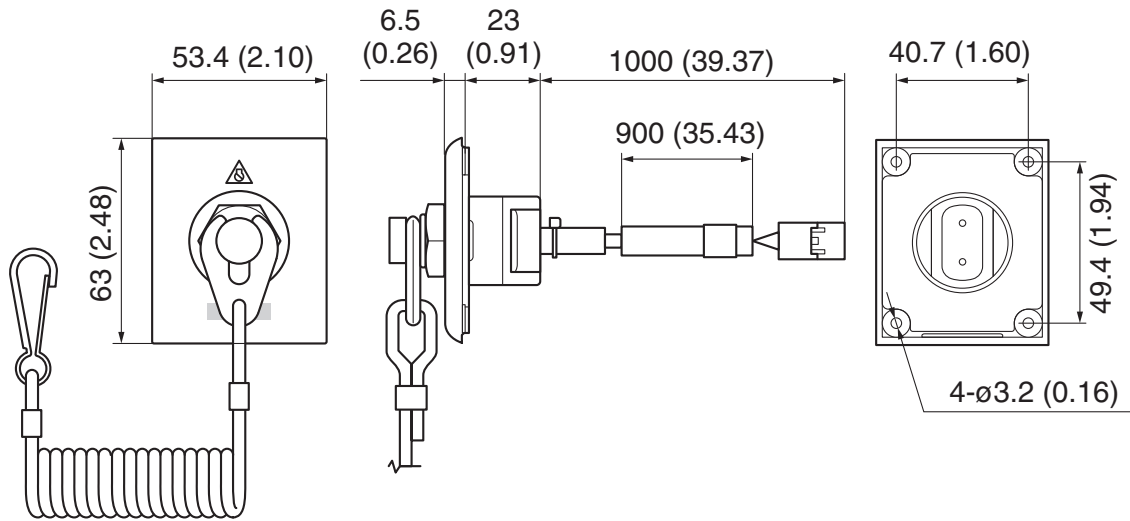


Engine shut-off switch (Single engine application)

Engine shut-off switch (Single engine application)

See "Engine shut-off switch" (page 348) in Template.

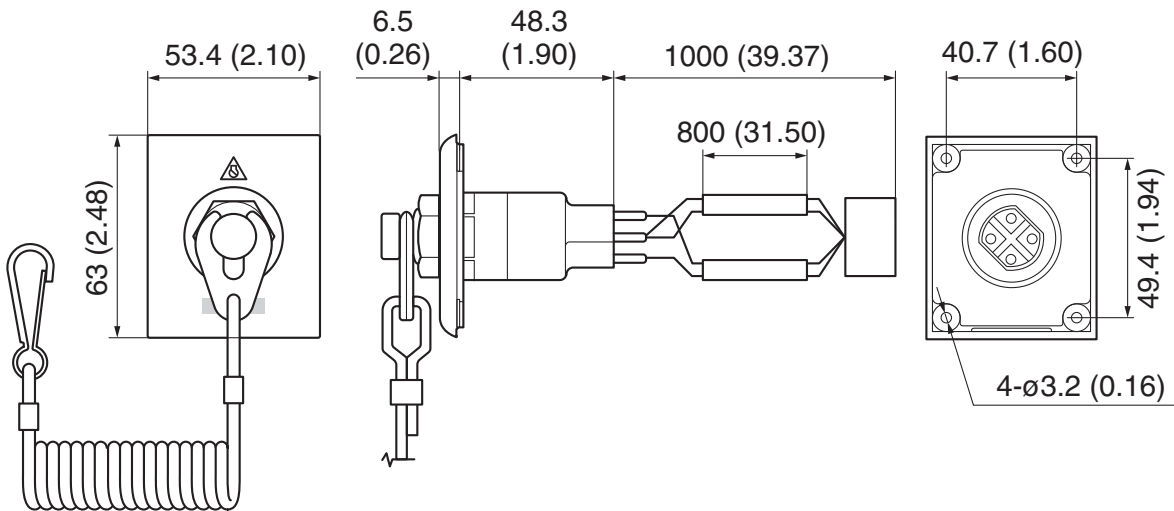
mm (in)



Engine shut-off switch (Twin engine application)

See "Engine shut-off switch" (page 348) in Template.

mm (in)

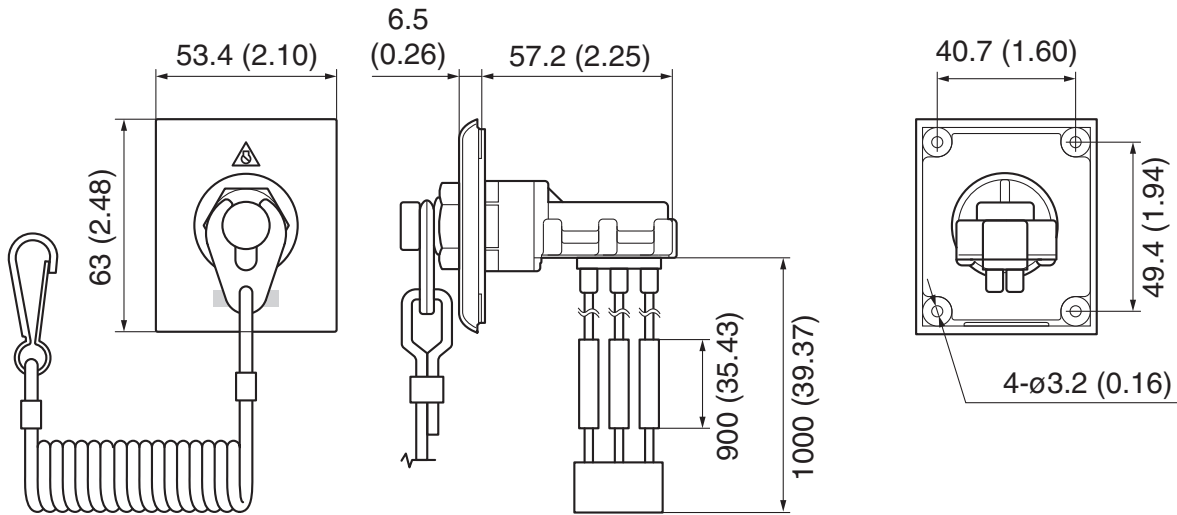


Engine shut-off switch (Triple engine application)

Engine shut-off switch (Triple engine application)

See "Engine shut-off switch" (page 348) in Template.

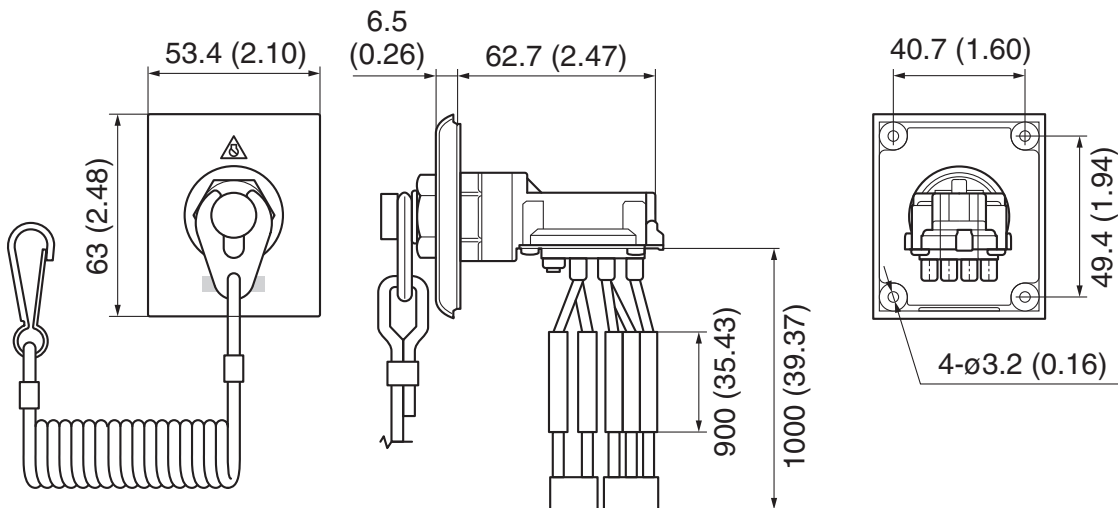
mm (in)



Engine shut-off switch (Quad/quint engine application)

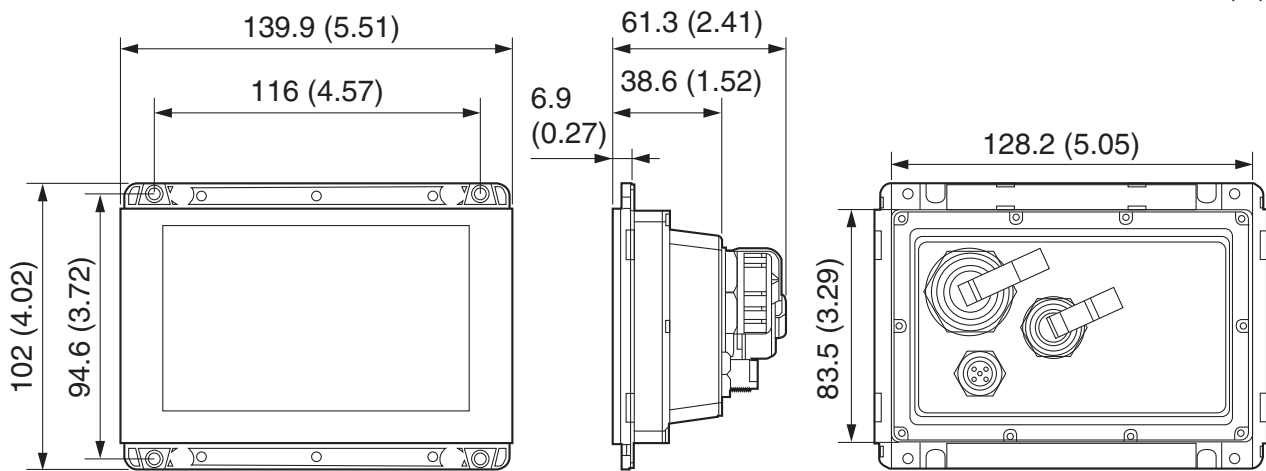
See "Engine shut-off switch" (page 348) in Template.

mm (in)



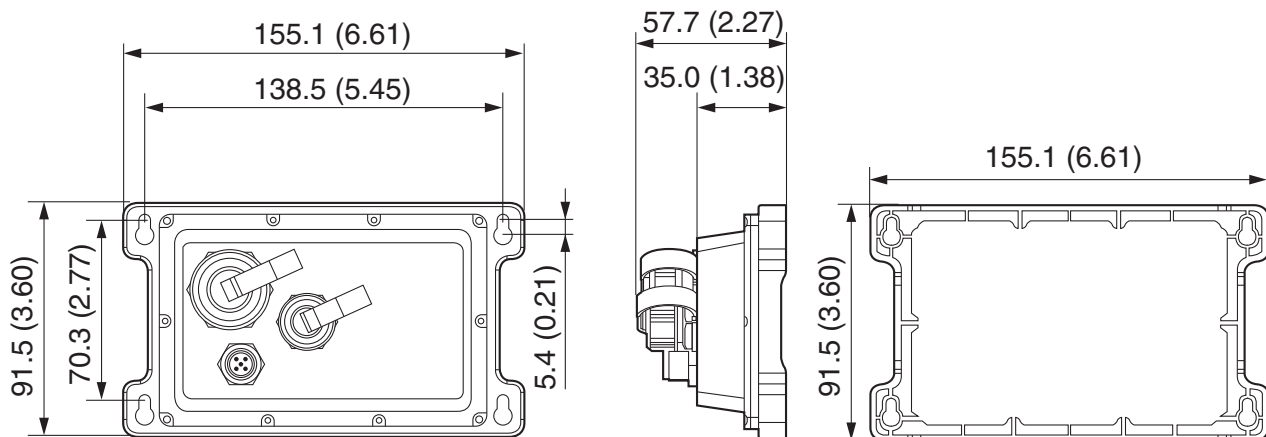
CL5 Display

mm (in)



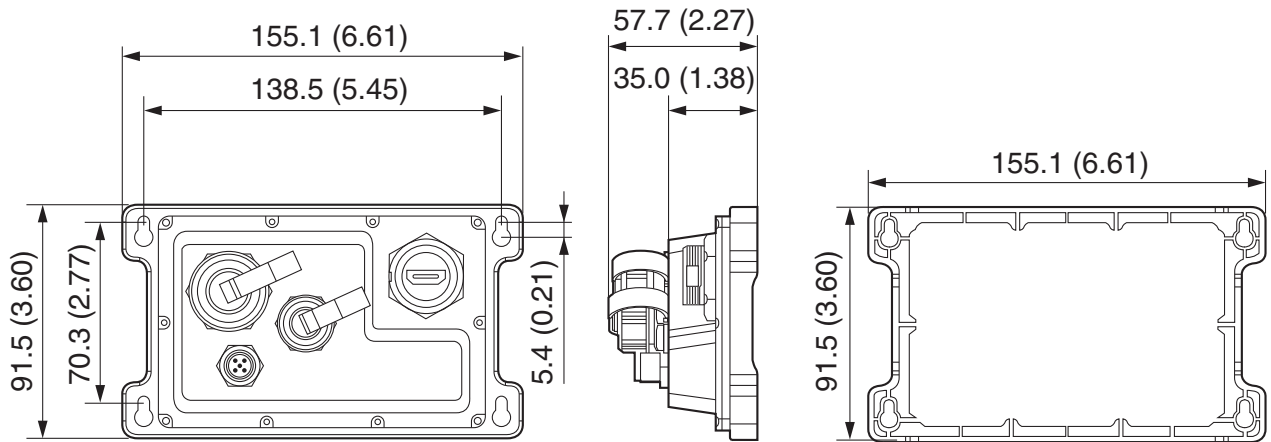
MFD Interface Type-1

mm (in)



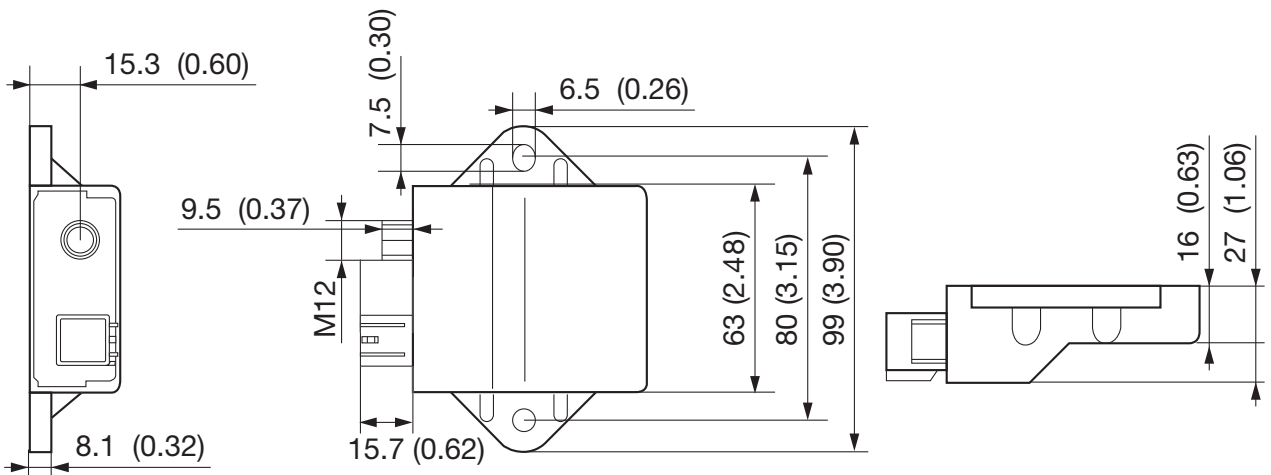
MFD Interface Type-2

mm (in)



NMEA2000 6YG Gateway (6YG)

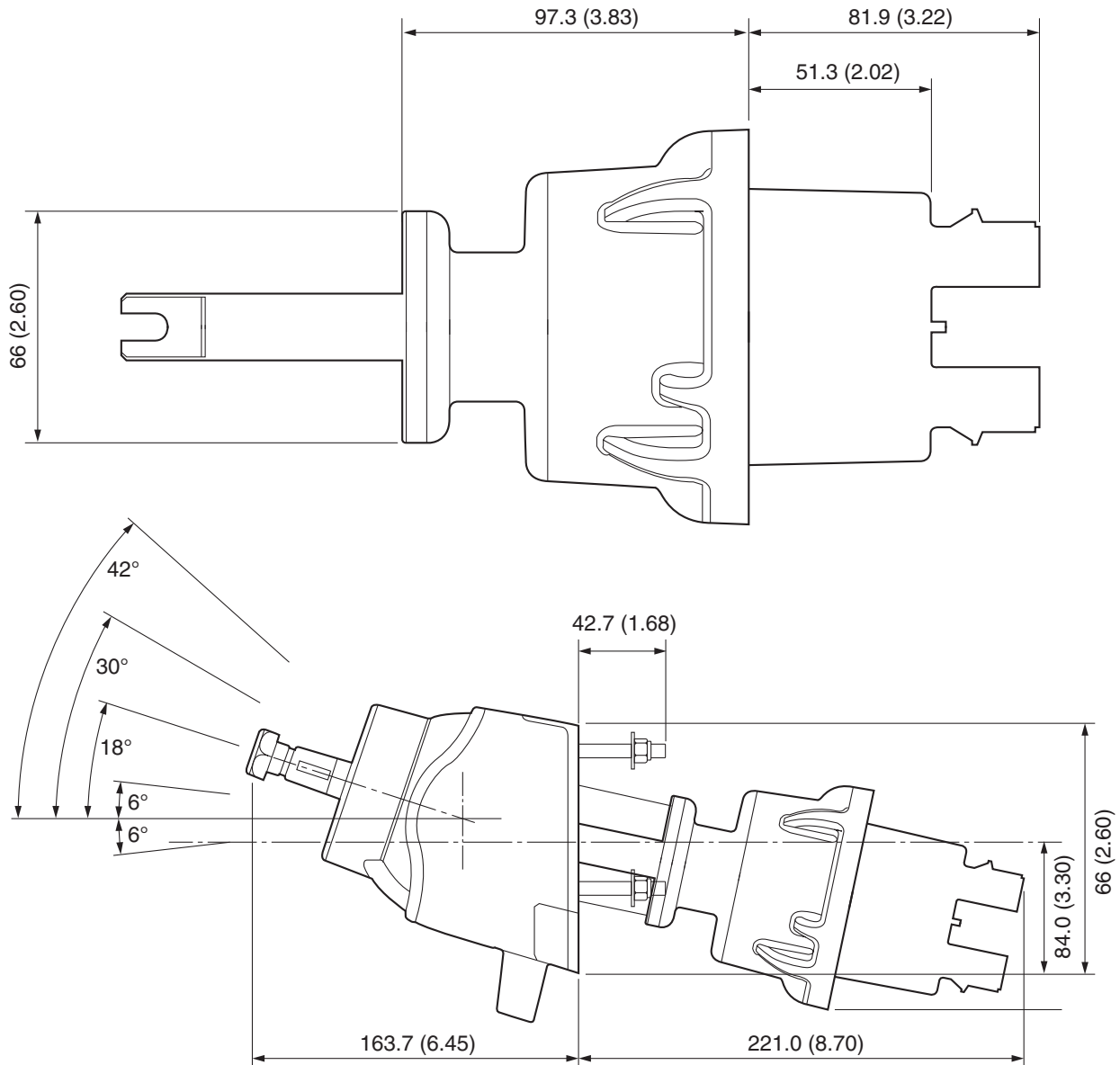
mm (in)



Tilt helm unit

See "Tilt helm unit" (page 350) in Template.

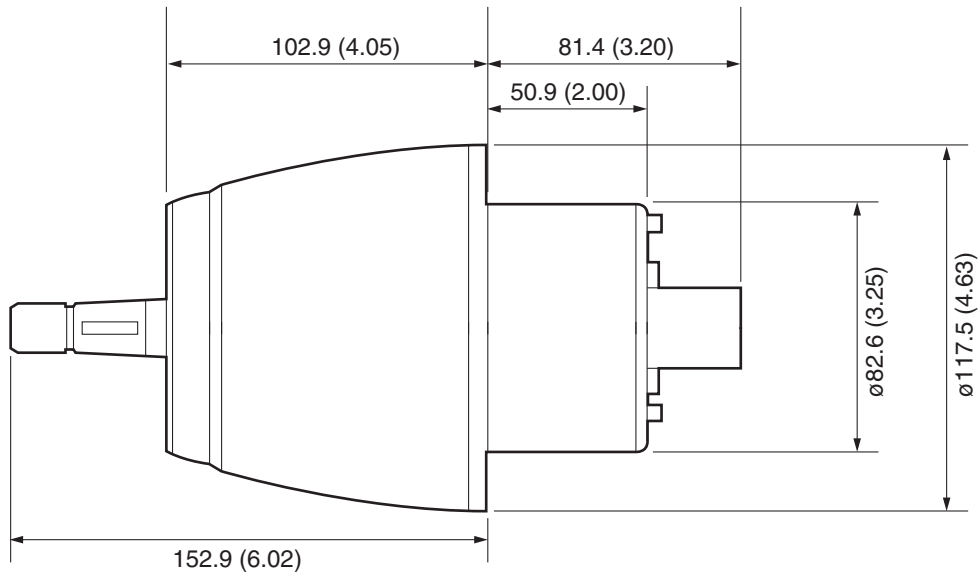
mm (in)



Helm unit

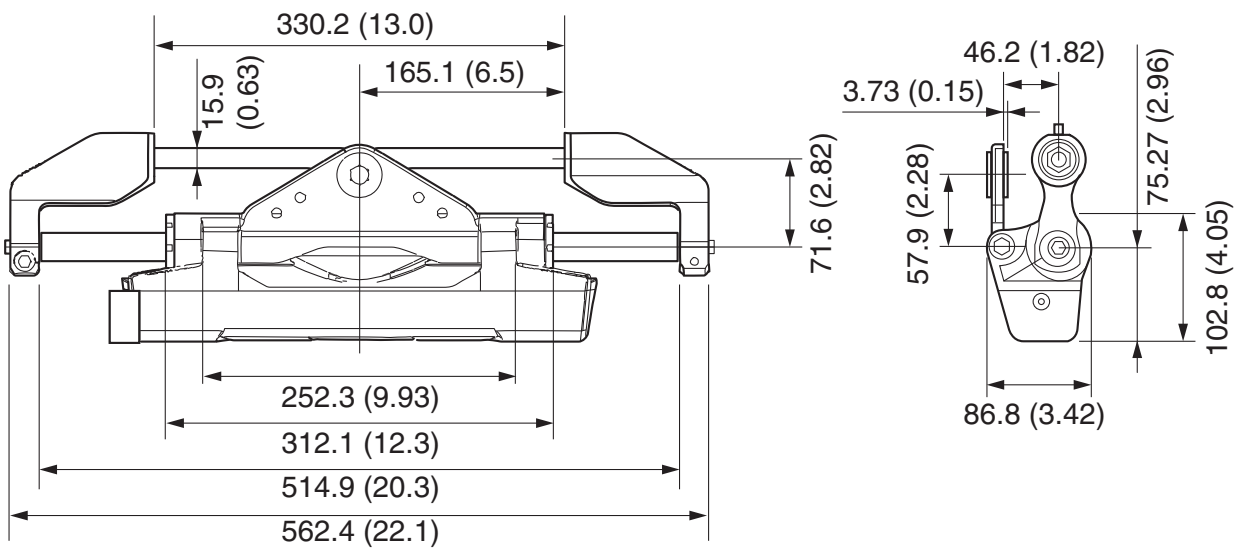
See "Helm unit" (page 349) in Template.

mm (in)



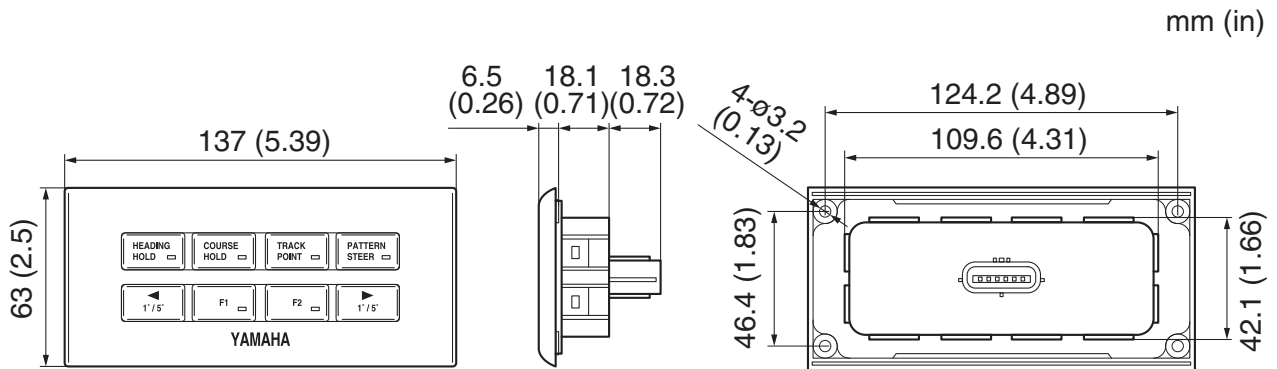
Bolt-on DES

mm (in)



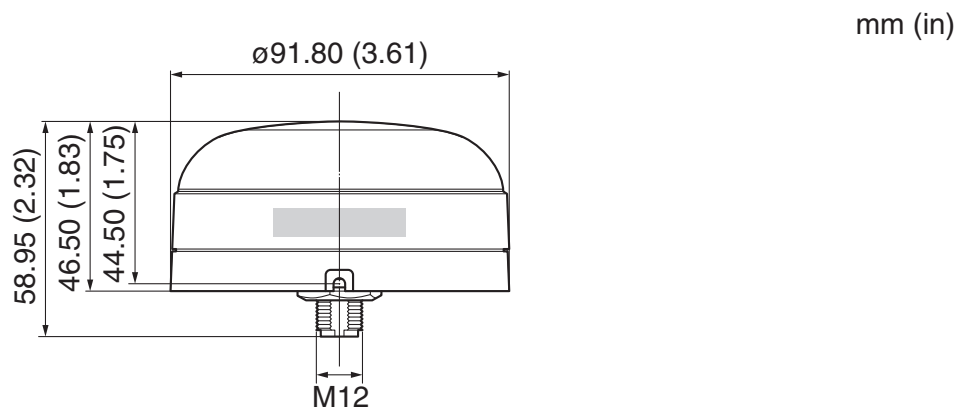
Autopilot panel

See “Autopilot panel” (page 350) in Template.



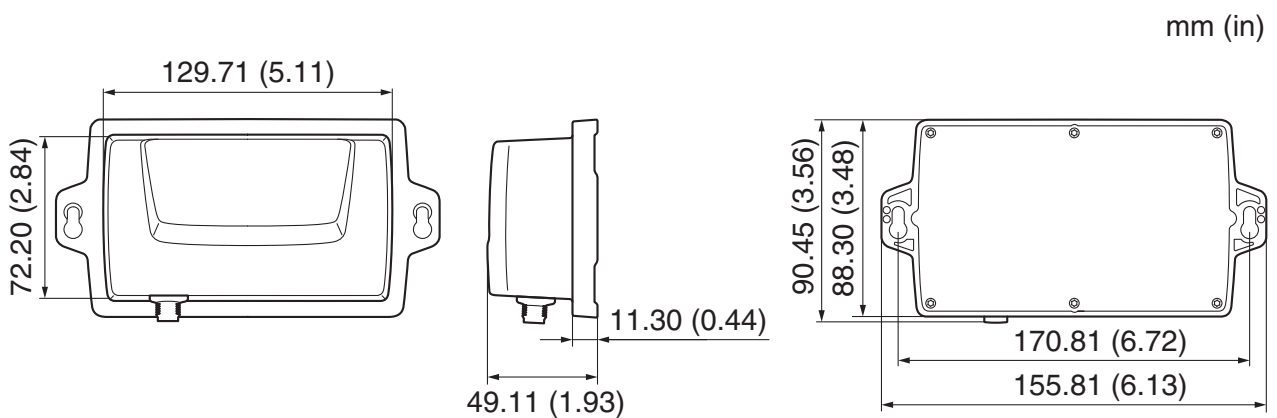
GPS unit

See “GPS unit” (page 350) in Template.



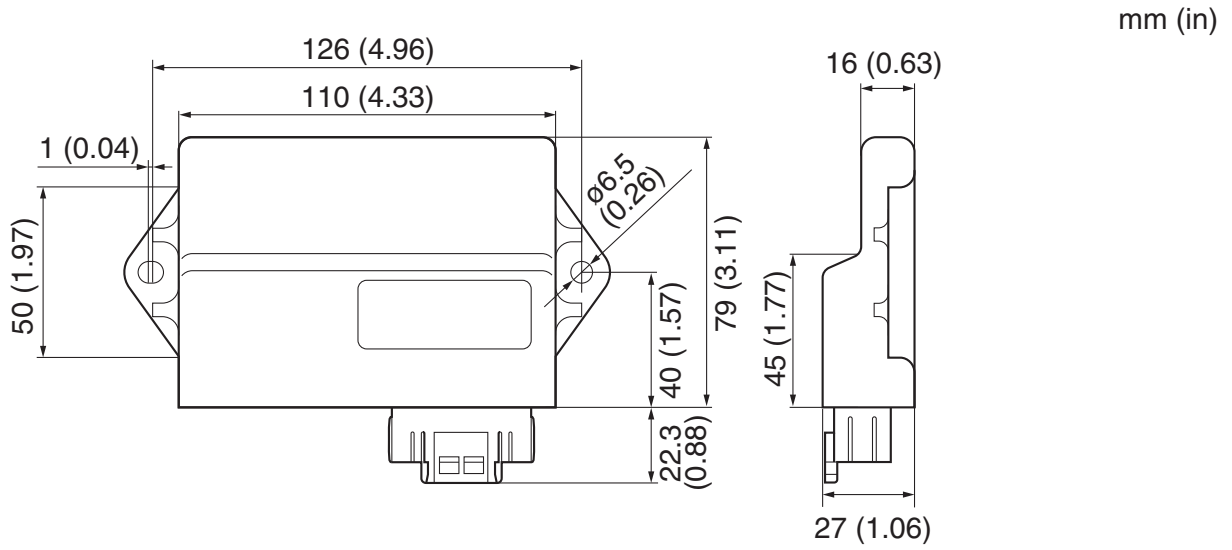
Heading sensor

See “Heading sensor” (page 351) in Template.



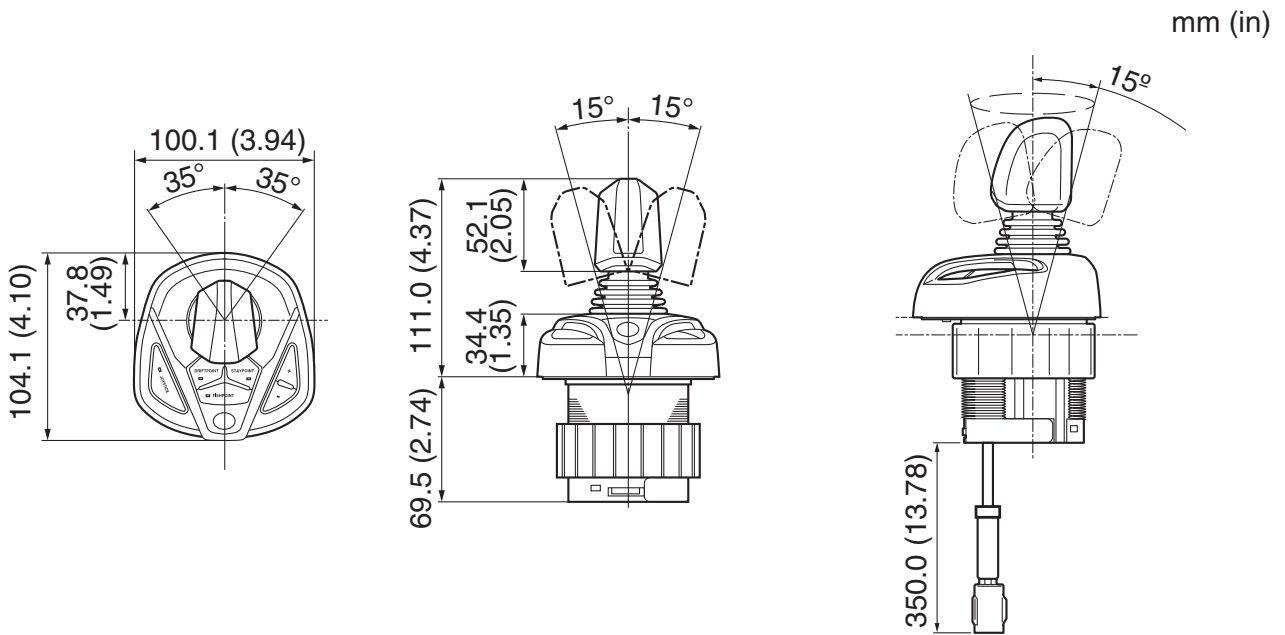
BCU

See "BCU" (page 351) in Template.



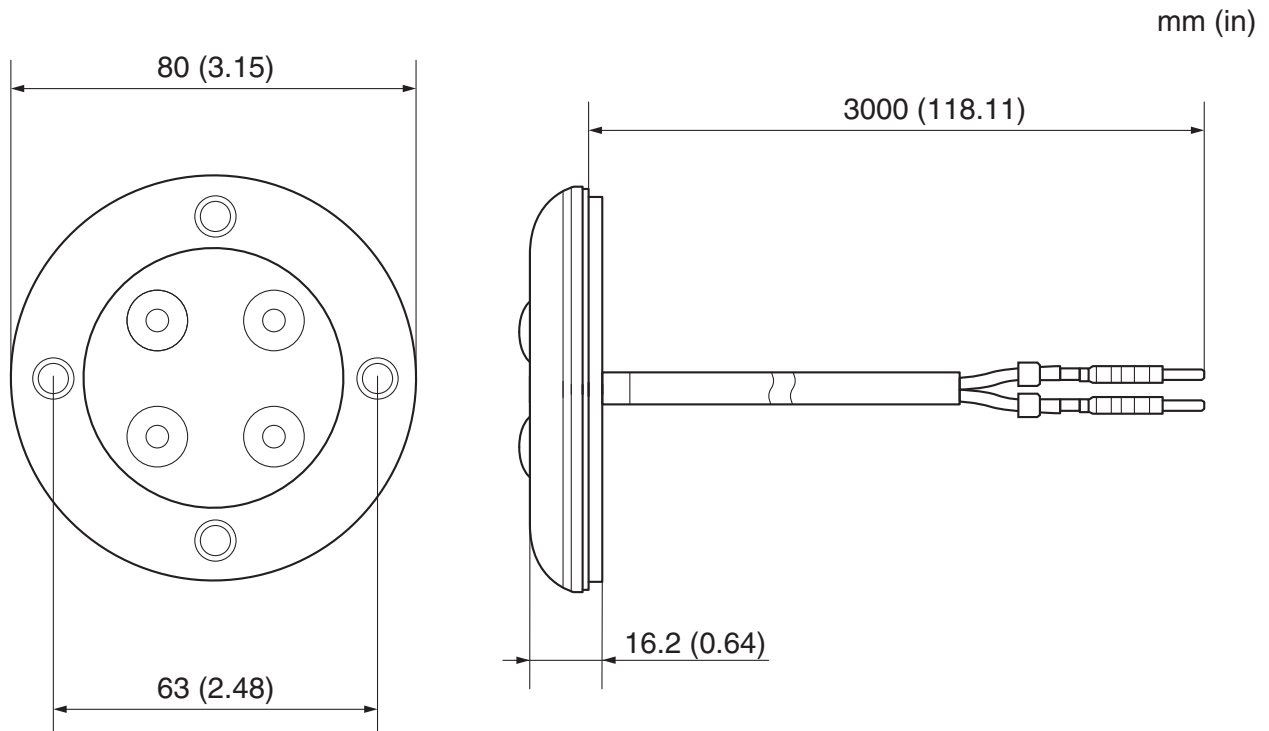
Joystick

See "Joystick" (page 356) in Template.

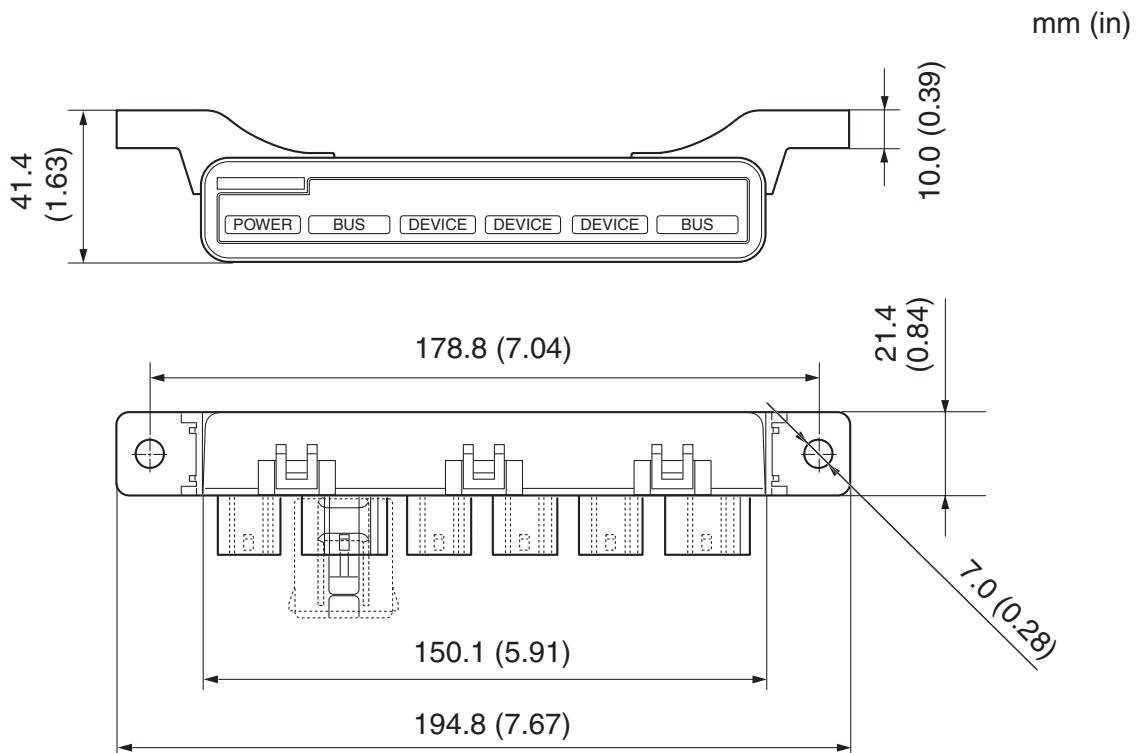


Notification light

See “Notification light” (page 356) in Template.

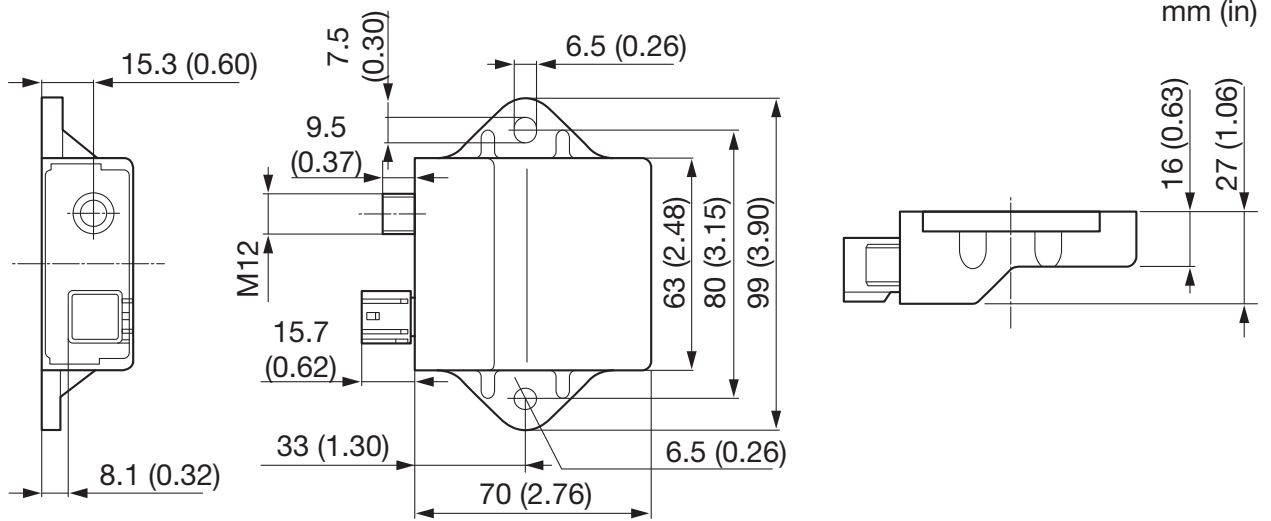


Multi-hub



Thruster Driver

See "Thruster Driver" (page 357) in Template.



Basic rigging procedure

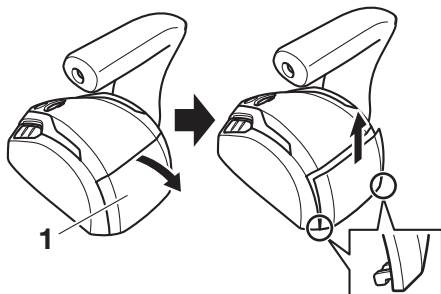
Installing the 6X9 Remote control

NOTICE

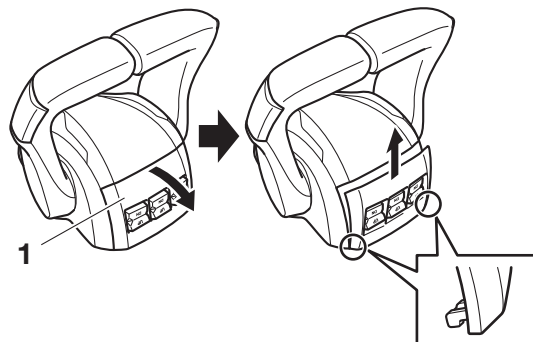
- Allow sufficient space to prevent the bottom of the Digital Electronic Control box from coming into contact with any other parts.
- Install the system in a location where it will not be exposed to rain or wave splashes directly, or submerged in the bilge.
- Install the unit and wire harness at least 1 ft (30 cm) away from two-way radio, antenna cable, and generators to avoid pickup of noise.
- Be careful not to bind the wire harness of this system and the antenna cable together.
- Install the system in a location where the ambient temperature does not exceed 55 °C (131 °F).
- Install the wire harnesses so that they do not come into contact with any edges or moving parts that may cause shearing. Do not apply excessive force when pulling on the wire harnesses to lay them out.
- Connect the negative terminals of the batteries together using battery cable(s).
- Please check the software version before use. Depending on the version, some functions may be restricted. If you have any questions, please contact your Yamaha dealer.

1. Remove the front cover "1" in the direction of the arrow.

Single lever

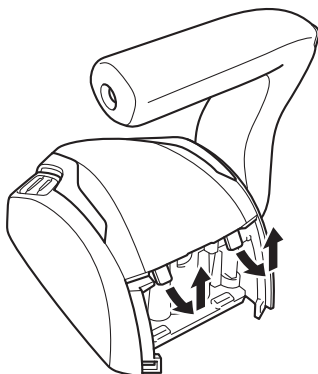


Twin lever

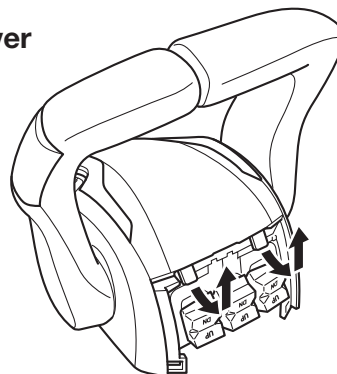


2. Raise the left and right hooks in the direction of the arrows to lift the top cover upward.

Single lever

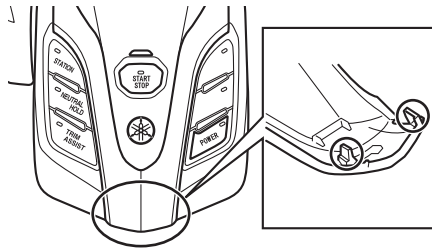


Twin lever

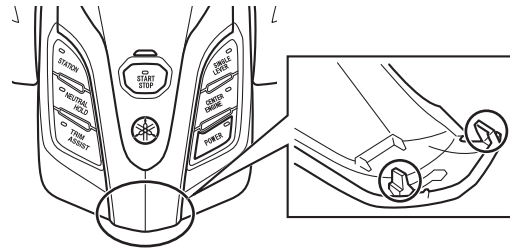


3. Release the hooks on the front of the top cover to remove it from the remote control.

Single lever



Twin lever

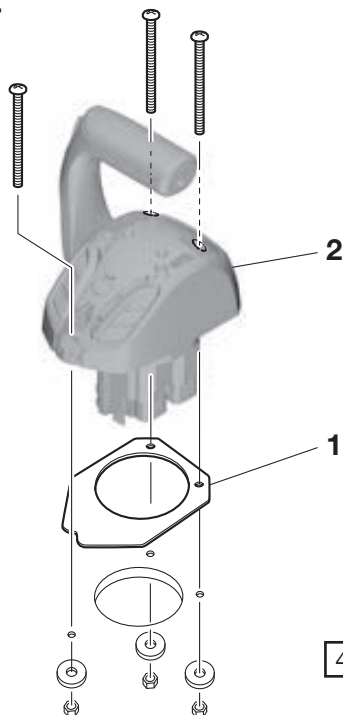


4. Make holes in the console using the template. See “6X9 Digital Electronic Control” (page 345) in Template.
5. Install the gasket “1” and Digital Electronic Control “2” to the dashboard.

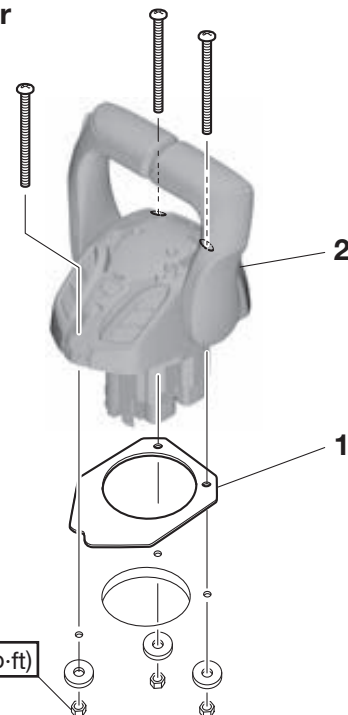
TIP:

- Set the Digital Electronic Control in a position in which the operation of the remote control lever and switches is not obstructed, and leave a gap below the Digital Electronic Control so that it does not contact other parts.
- When installing the remote control, make sure there is a minimum distance of 50.0 mm (1.97 in) between the lever and any obstructions “3”.

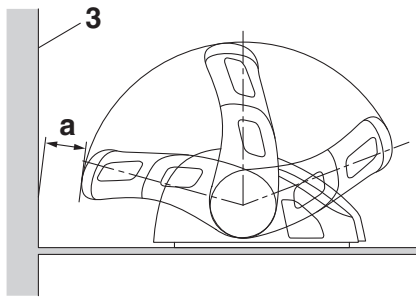
Single lever



Twin lever



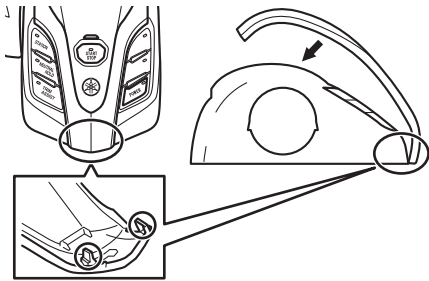
4.0 N·m (0.40 kgf·m, 3.0 lb·ft)



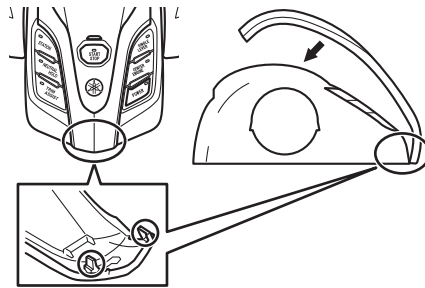
a. Minimum distance 50.0 mm (1.97 in)

6. Hook the hooks on the front of the top cover to the remote control.

Single lever

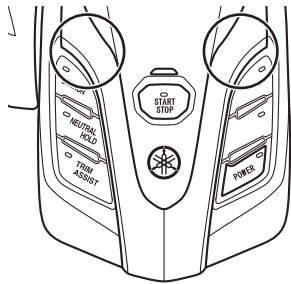


Twin lever

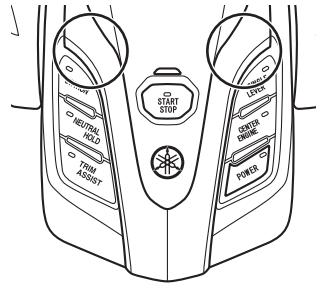


7. Press on the left and right sides of the center of the top cover at the same time.

Single lever



Twin lever

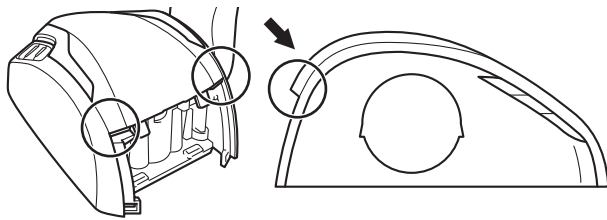


8. Press so the gap between the top cover and the Digital Electronic Control is even.

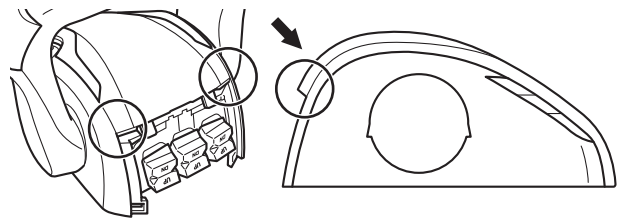
TIP:

- After attaching the top cover, confirm that the top cover is not suspended and that the left and right gaps are even.
- If the top cover is not securely attached, the front cover cannot be attached.

Single lever

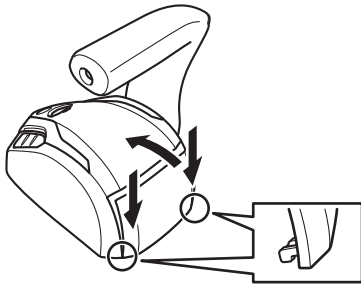


Twin lever

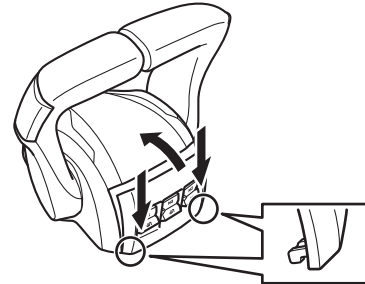


9. Hook the hooks on the bottom of the front cover, and then press on the hooks on the top of the front cover to insert them.

Single lever



Twin lever



10. Determine the ECM bracket installation position.

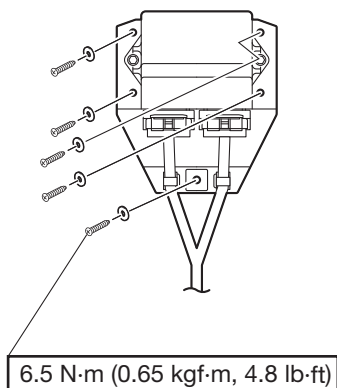
11. Make holes in the console using the template. See “ECM” (page 352) in Template.

12. Install the ECM bracket.

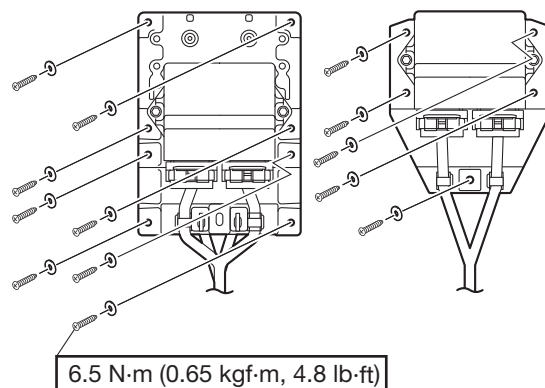
NOTICE

- Make sure that the coupler faces down when installing the ECM unit.

Single lever



Twin lever



13. Connect the remote control harness.

TIP:

- Couplers that do not have labels on their bases are in arbitrary order, so there is no effect on functions even if they are connected backwards.
- Connect couplers so their labels match the symbols. (P to P, S to S, etc.)

Removing the remote control lever cover (single / twin: port side)

NOTICE

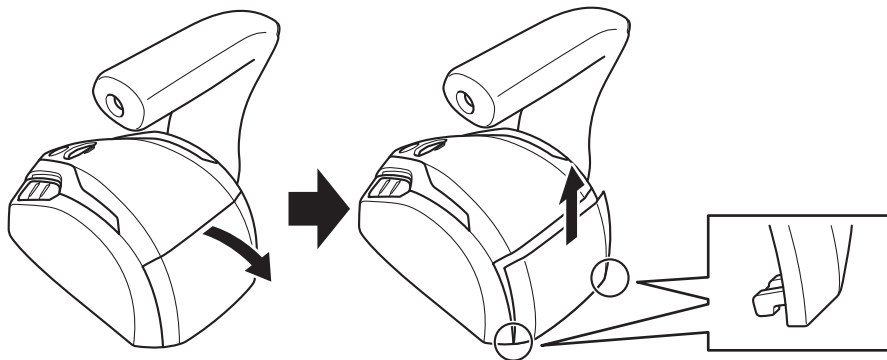
After you replace the remote control twin lever cover, you cannot reuse the old cover.

TIP:

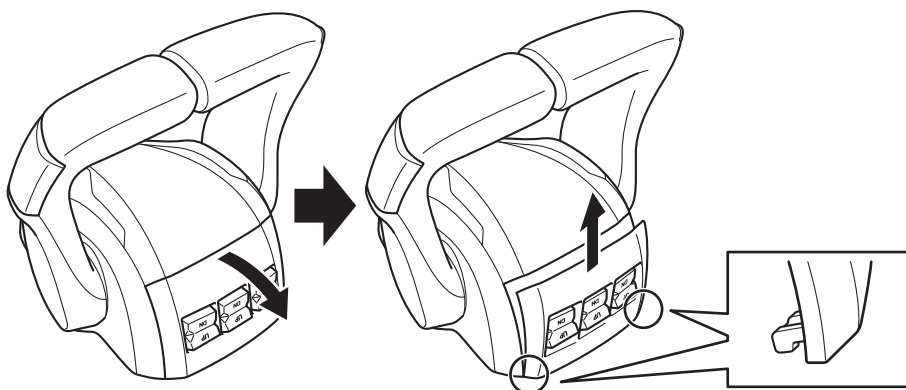
- We recommend that you replace the remote control twin lever cover before installing the remote control box.
- Refer to steps 1 to 11 for a single lever.

1. Remove the front cover in the direction of the arrow.

Single lever



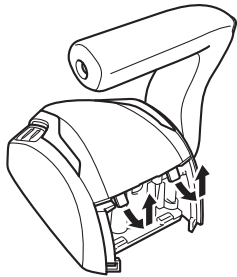
Twin lever



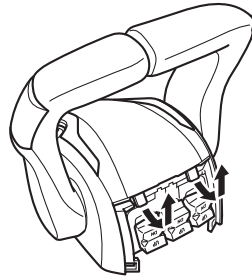
Installing the 6X9 Remote control

2. Raise the left and right hooks in the direction of the arrows to lift the top cover upward.

Single lever

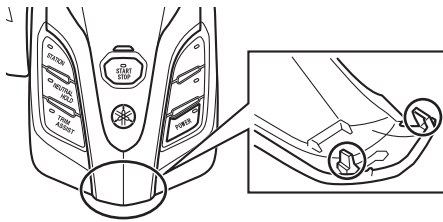


Twin lever

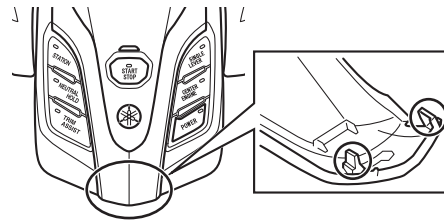


3. Remove the hooks on the front of the top cover to remove it from the remote control.

Single lever

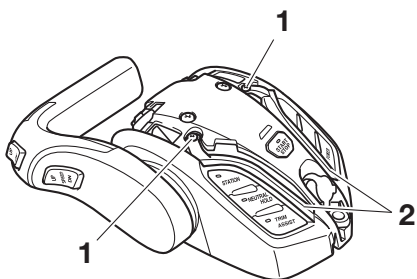


Twin lever

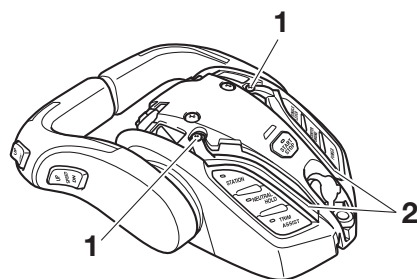


4. Lower the remote control lever forward, remove the lighting LED lens screw "1", and then remove the lighting LED lens "2".

Single lever



Twin lever



5. Remove the center cover screw "1", and then remove the center cover "2".

NOTICE

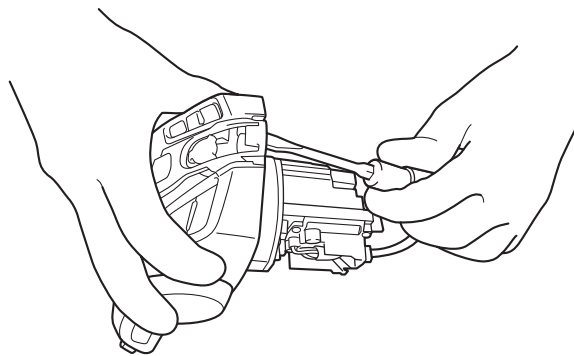
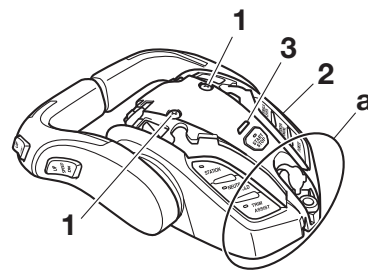
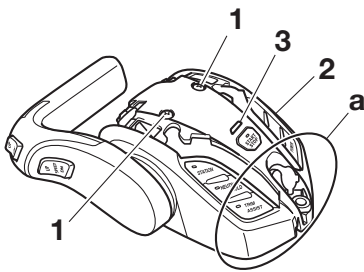
While removing the center cover, be careful to not lose the LED lens "3".

TIP:

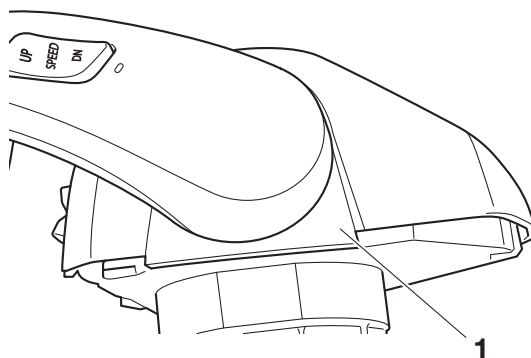
- Be careful to not lose the cover for the control buttons.
- While pushing from the left and right of the remote control cover near "a" on the center cover, remove the front hooks and raise the front and back of the remote control cover as perpendicularly as possible.

Single lever

Twin lever



6. Remove the cover "1".

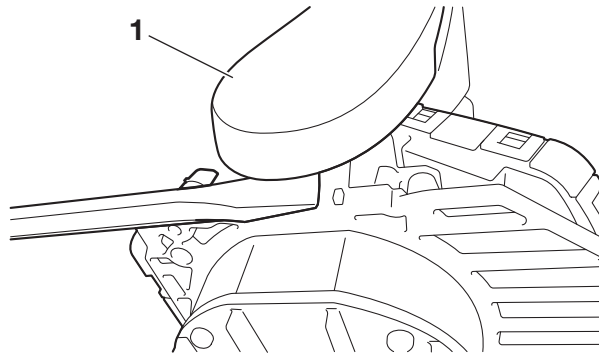


Installing the 6X9 Remote control

7. Insert a flathead screwdriver into the position shown in the image and remove the remote control lever cover (lower) "1".

NOTICE

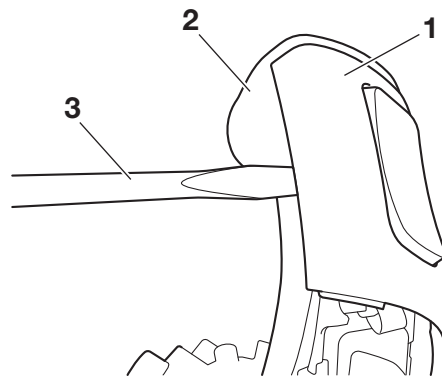
There is a risk of damaging the wire harness that is inside the cover if you insert the flathead screwdriver in a position other than the area shown in the image.



8. Insert the flathead screwdriver "3" between the remote control lever cover (upper) "1" and the remote control lever grip "2" to the position shown in the image and remove the remote control lever cover (upper) "1".

NOTICE

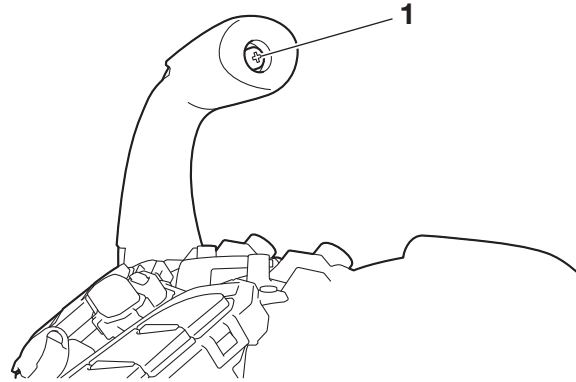
There is a risk of damaging the wire harness that is inside the cover if you insert the flathead screwdriver in a position other than the area shown in the image.



9. Remove the remote control lever grip screw "1".

NOTICE

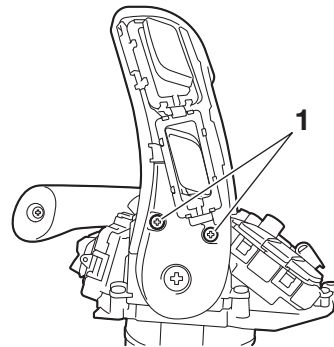
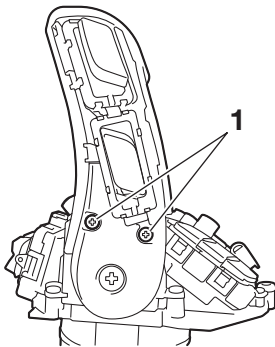
You cannot reuse the remote control lever grip screw.



10. Remove the remote control lever grip screw "1".

Single lever

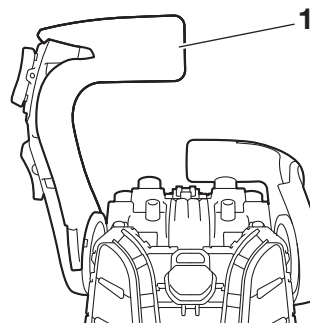
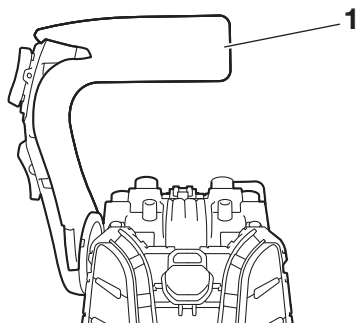
Twin lever



11. Remote control lever grip "1".

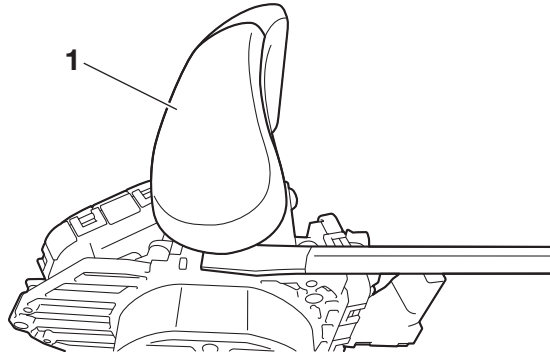
Single lever

Twin lever

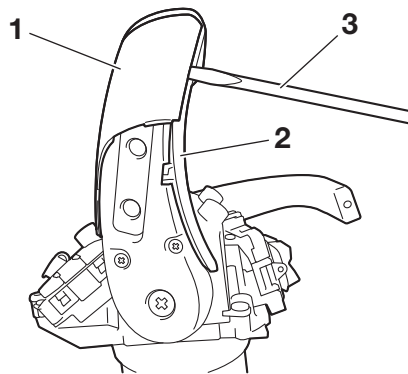


Removing the remote control lever cover (twin: starboard side)

1. Insert a flathead screwdriver into the position shown in the image and remove the remote control lever cover (lower) "1".



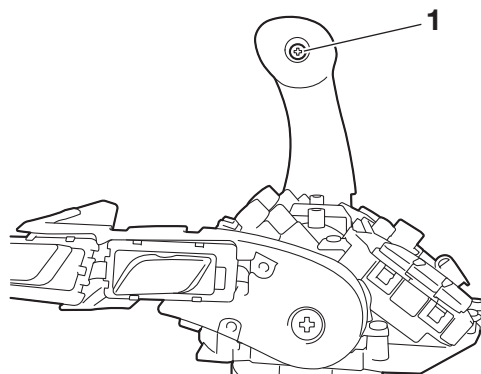
2. Insert the flathead screwdriver "3" between the remote control lever cover (upper) "1" and the remote control lever grip "2" to the position shown in the image and remove the remote control lever cover (upper) "1".



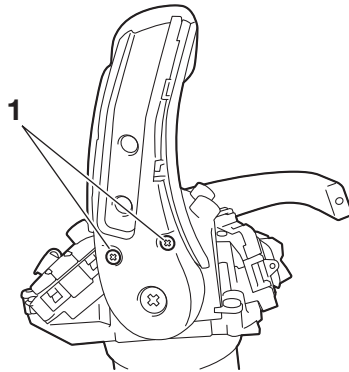
3. Remove the remote control lever grip screw "1".

NOTICE

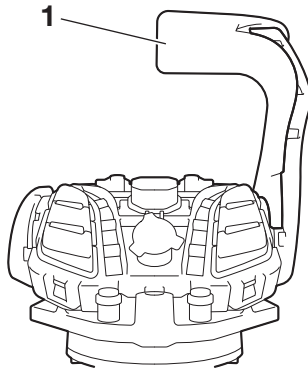
You cannot reuse the remote control lever grip screw.



4. Remove the remote control lever grip screw "1".



5. Remove the remote control lever grip "1".

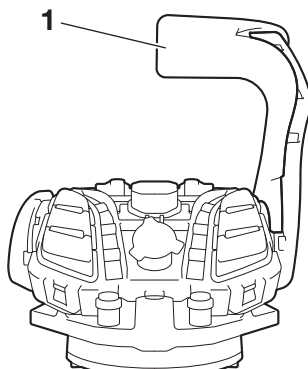


Installing the remote control lever cover (twin: starboard side)

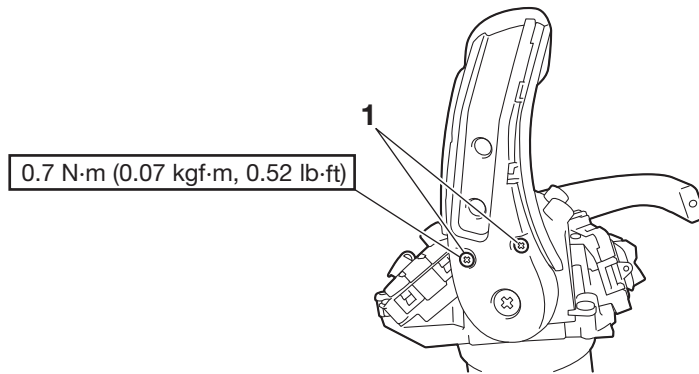
TIP: _____

Refer to the following steps for a single lever also.

1. Install the new remote control lever grip "1".



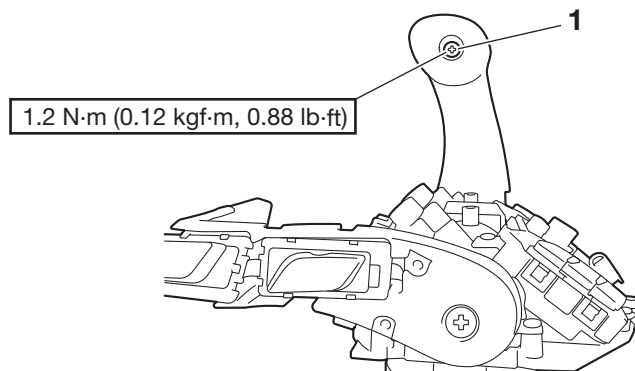
2. Install the remote control lever grip screw "1".



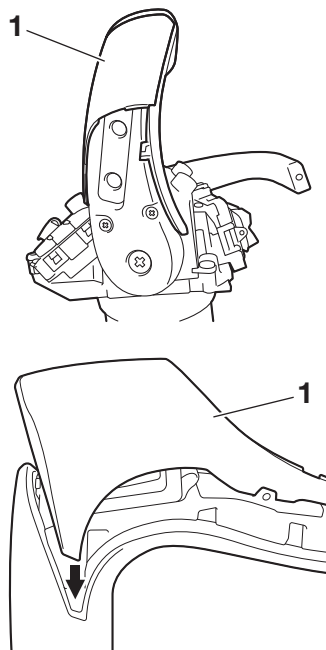
3. Install the new remote control lever grip screw "1".

NOTICE

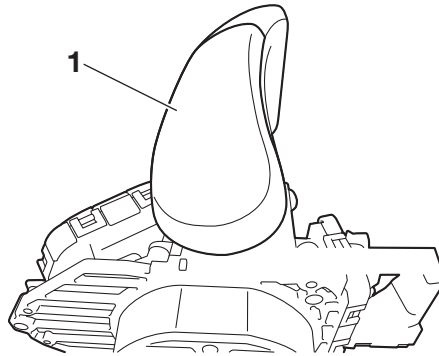
You cannot reuse the remote control lever grip screw.



4. Install the remote control lever cover (upper) "1".



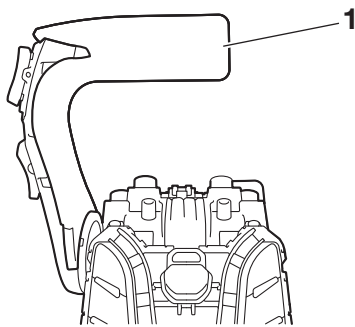
5. Install the remote control lever cover (lower) "1".



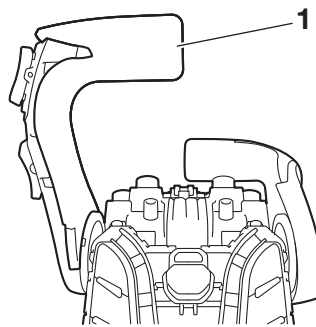
Installing the remote control lever cover (single / twin: port side)

1. Install the remote control lever grip "1".

Single lever

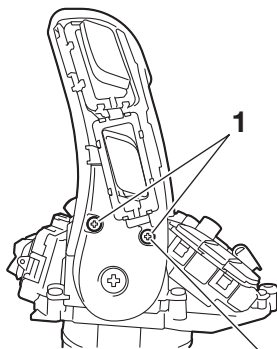


Twin lever

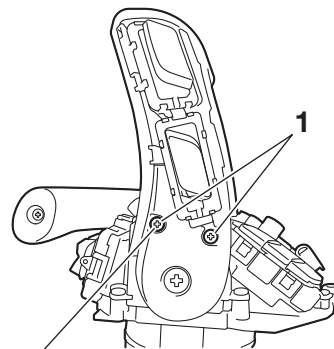


2. Install the remote control lever grip screw "1".

Single lever



Twin lever



0.7 N·m (0.07 kgf·m, 0.52 lb·ft)

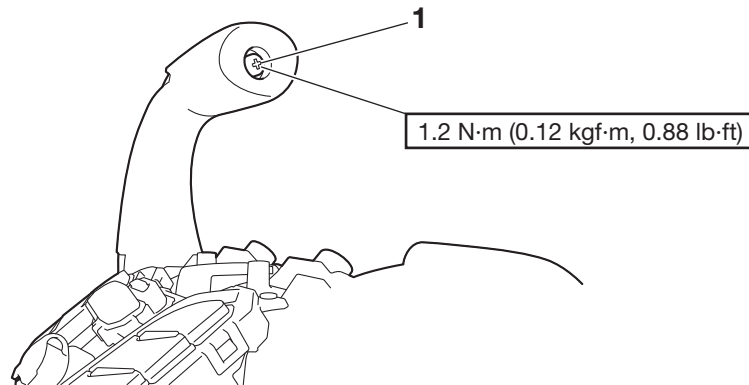
3. Install the new remote control lever grip screw "1".

NOTICE

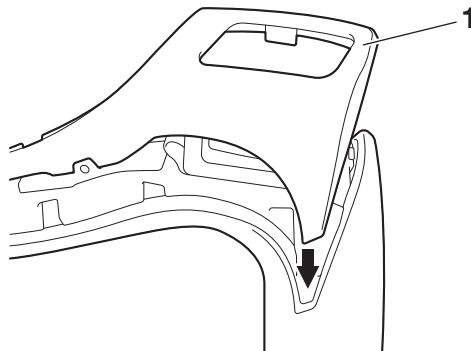
Screws cannot be reused.

TIP:

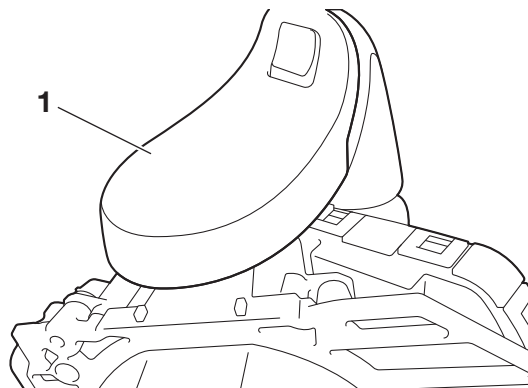
Before installing the screws, remove the old Loctite from the lever grip.



4. Install the remote control lever cover (upper) "1".

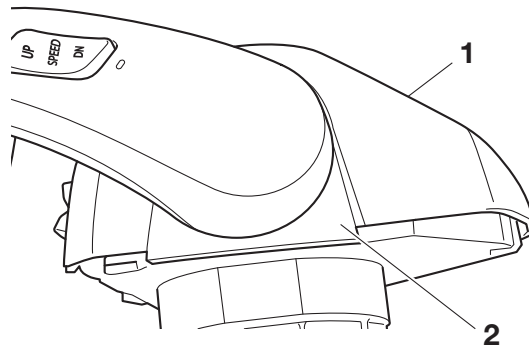


5. Install the remote control lever cover (lower) "1".



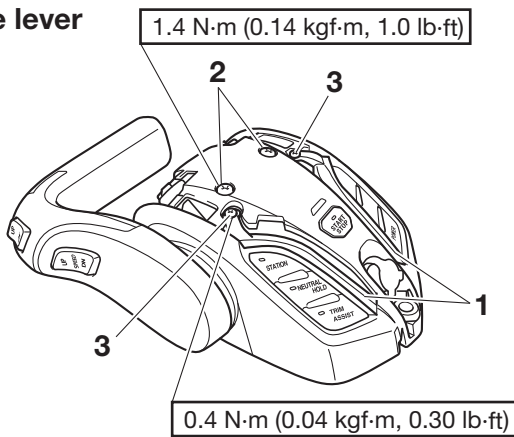
Installing the 6X9 Remote control

6. Lower the remote control lever to the front, and install the center cover "1" and cover "2".
 - While installing the center cover, confirm that the LED lens is attached.

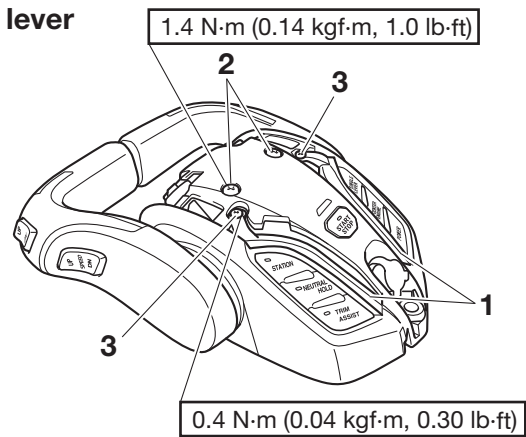


7. Install the lighting LED lens "1". Tighten the center cover screw "2" and lighting LED lens screw "3".

Single lever

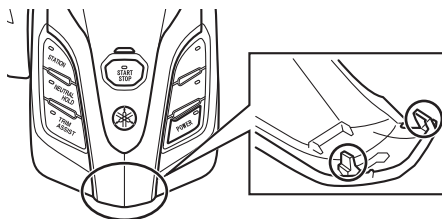


Twin lever

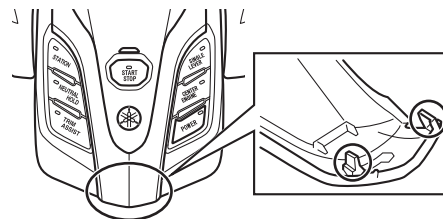


8. Hook the hooks on the front of the top cover to the remote control main unit, and then engage the hooks (2 places) on the back of the top cover.

Single lever



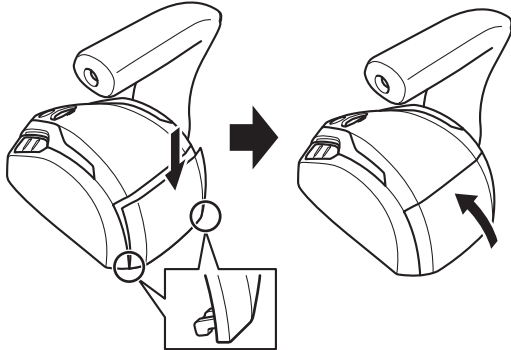
Twin lever



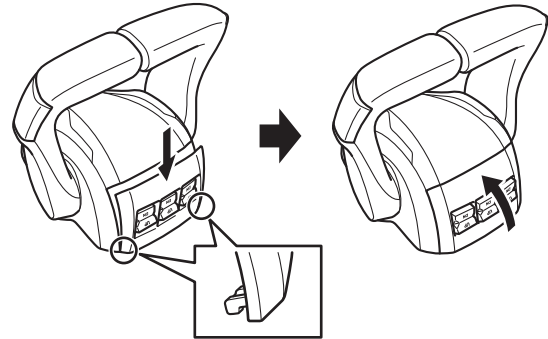
Installing the 6X9 Remote control

9. Hook the hooks (2 places) on the bottom of the front cover to the remote control box, and then press the front cover upward.

Single lever



Twin lever

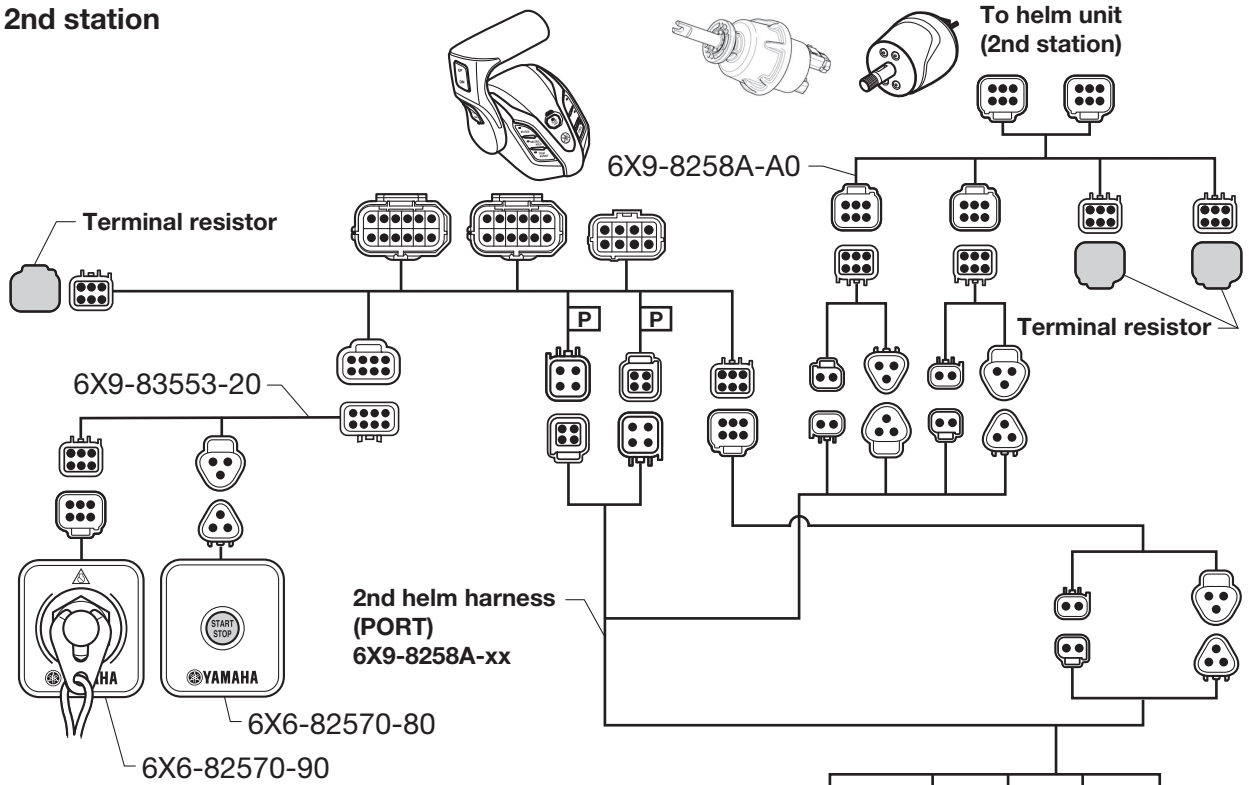


6X6 switch system

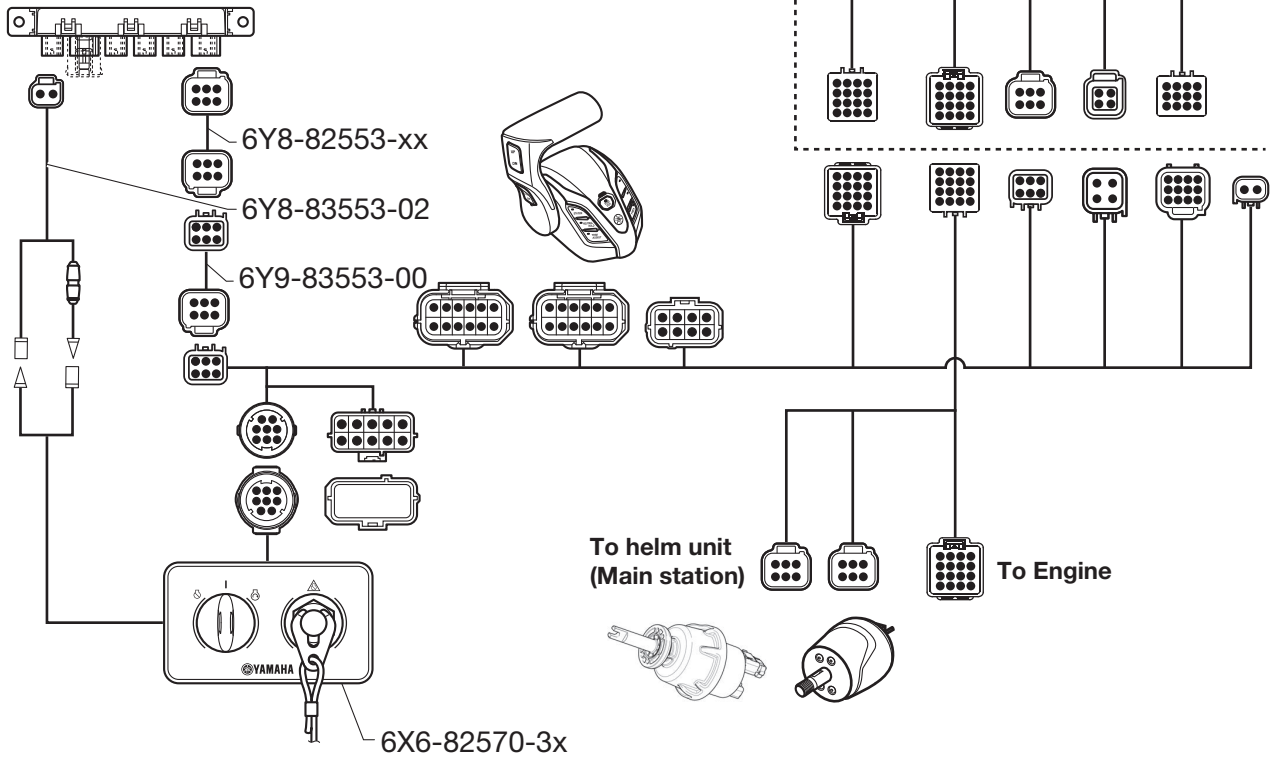
Main bus wire	
Part No.	Length
6Y8-82553-01	0.3 m (1 ft)
6Y8-82553-50	3 m (10 ft)
6Y8-82553-11	4.6 m (15 ft)
6Y8-82553-21	6.1 m (20 ft)
6Y8-82553-31	7.6 m (25 ft)
6Y8-82553-41	9.1 m (30 ft)
Helm harness (Main/Single)	
Part No.	Length
6GR-8258A-00	0.9 m (3 ft)
6GR-8258A-40	1.8 m (6 ft)
Helm harness (Main/Multi)	
Part No.	Length
6GR-8258A-11	0.9 m (3 ft)
6GR-8258A-51	1.8 m (6 ft)
6GR-8258A-61	2.7 m (9 ft)
Helm harness (2nd station/Single)	
Part No.	Length
6X9-8258A-A0	0.9 m (3 ft)
Helm harness (2nd station/Multi)	
Part No.	Length
6X9-8258A-B0	0.9 m (3 ft)
2nd helm harness (PORT)	
Part No.	Length
6X9-8258A-00	5 m (16 ft)
6X9-8258A-10	8 m (26 ft)
6X9-8258A-20	12 m (38 ft)
2nd helm harness (STBD)	
Part No.	Length
6X9-8258A-30	5 m (16 ft)
6X9-8258A-40	8 m (26 ft)
6X9-8258A-50	12 m (38 ft)
2nd helm harness (CENTER)	
Part No.	Length
6X9-8258A-60	5 m (16 ft)
6X9-8258A-70	8 m (26 ft)
6X9-8258A-80	12 m (38 ft)

6X6 switch panel (Single engine application/6X9-48205-20)

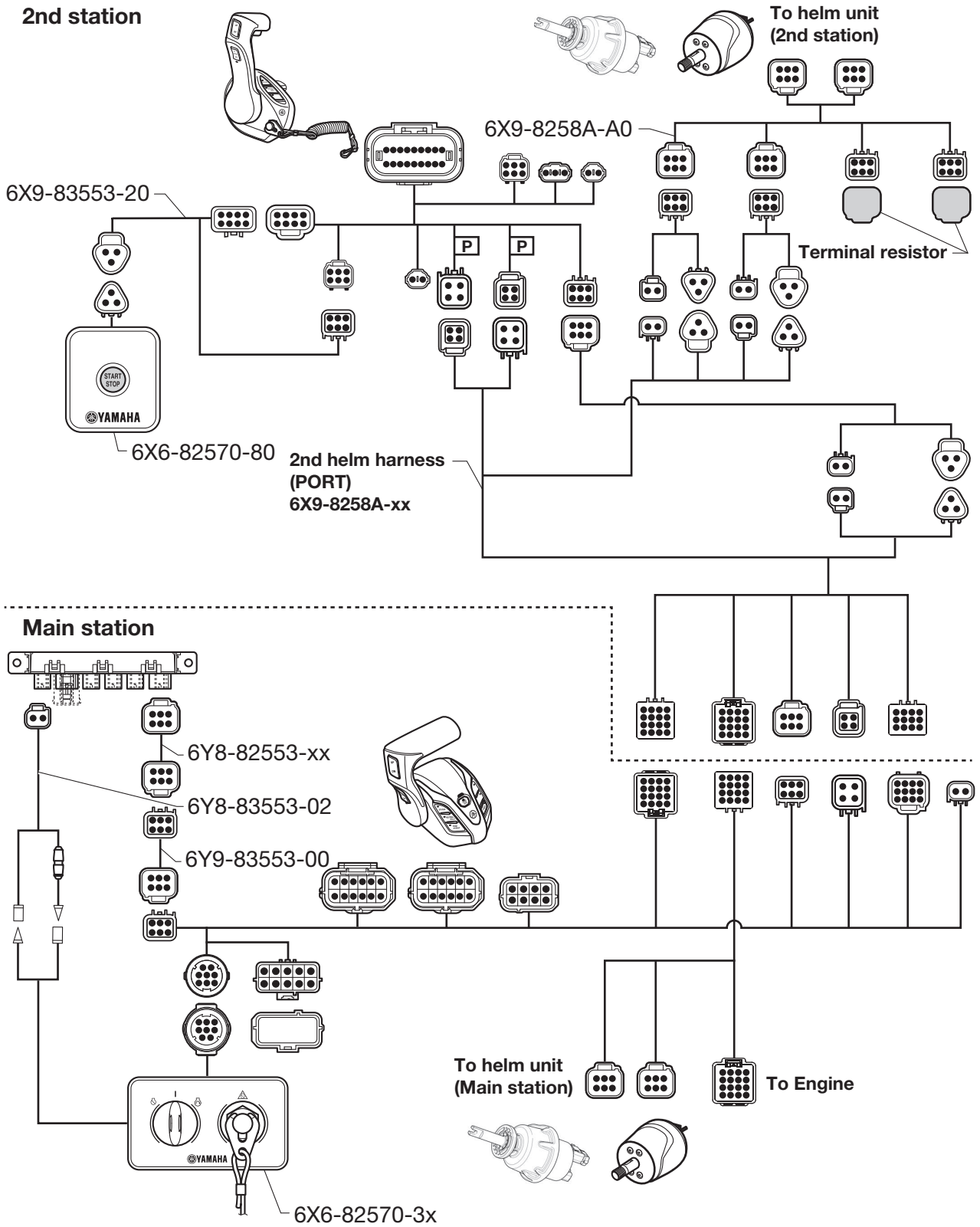
2nd station



Main station



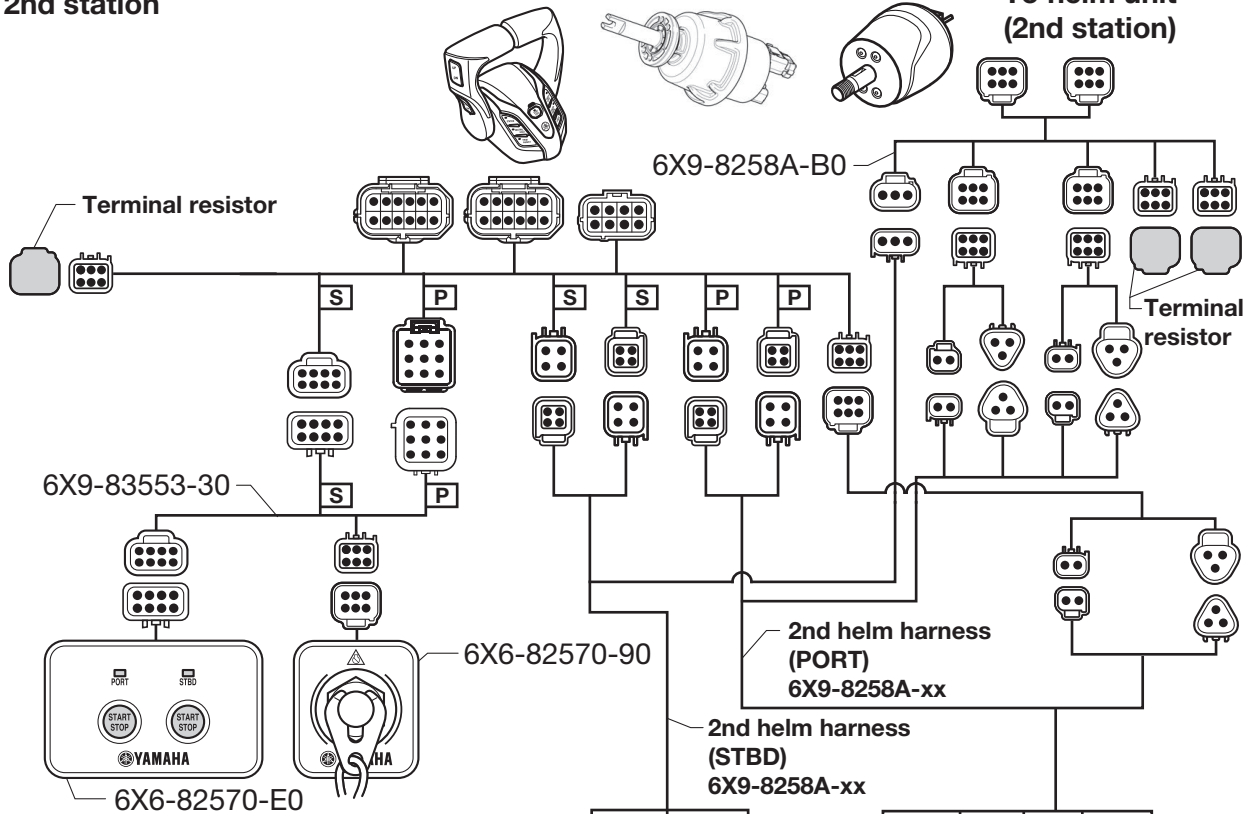
6X6 switch panel (Single engine application/6X9-48206-20)



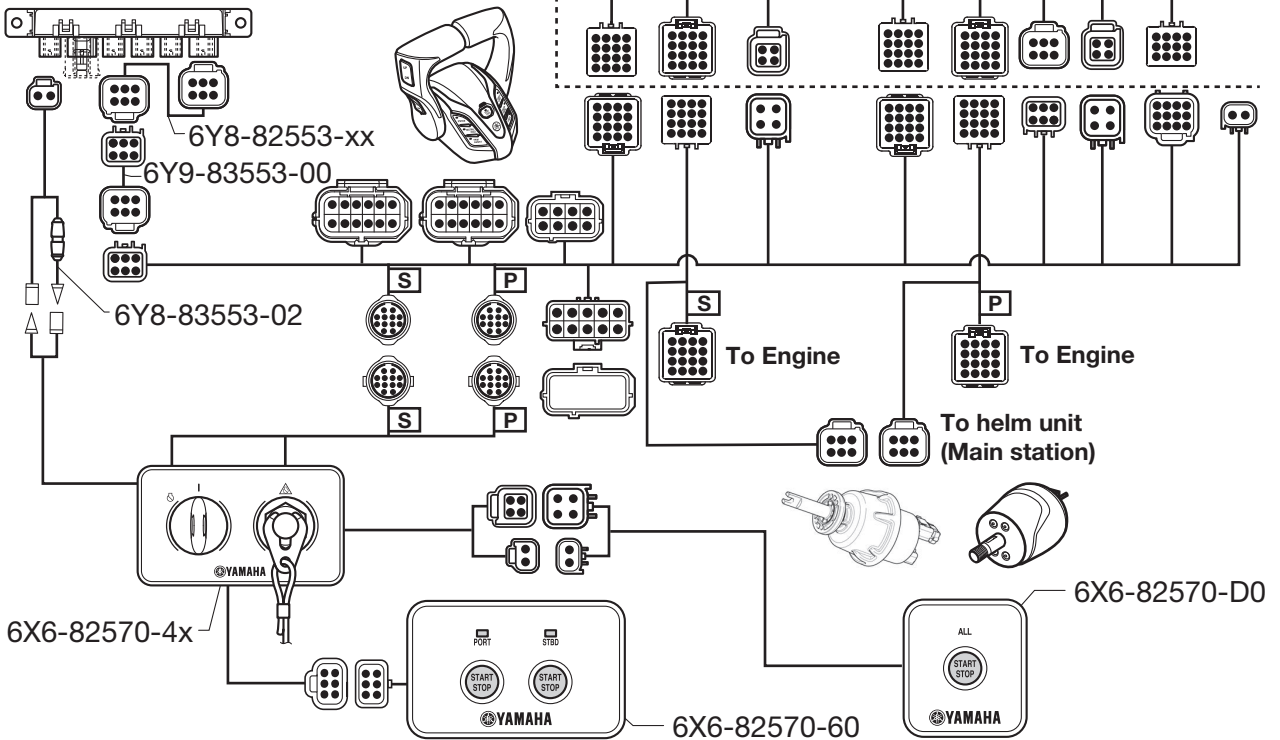
6X6 switch panel (Twin engine application)

2nd station

To helm unit
(2nd station)

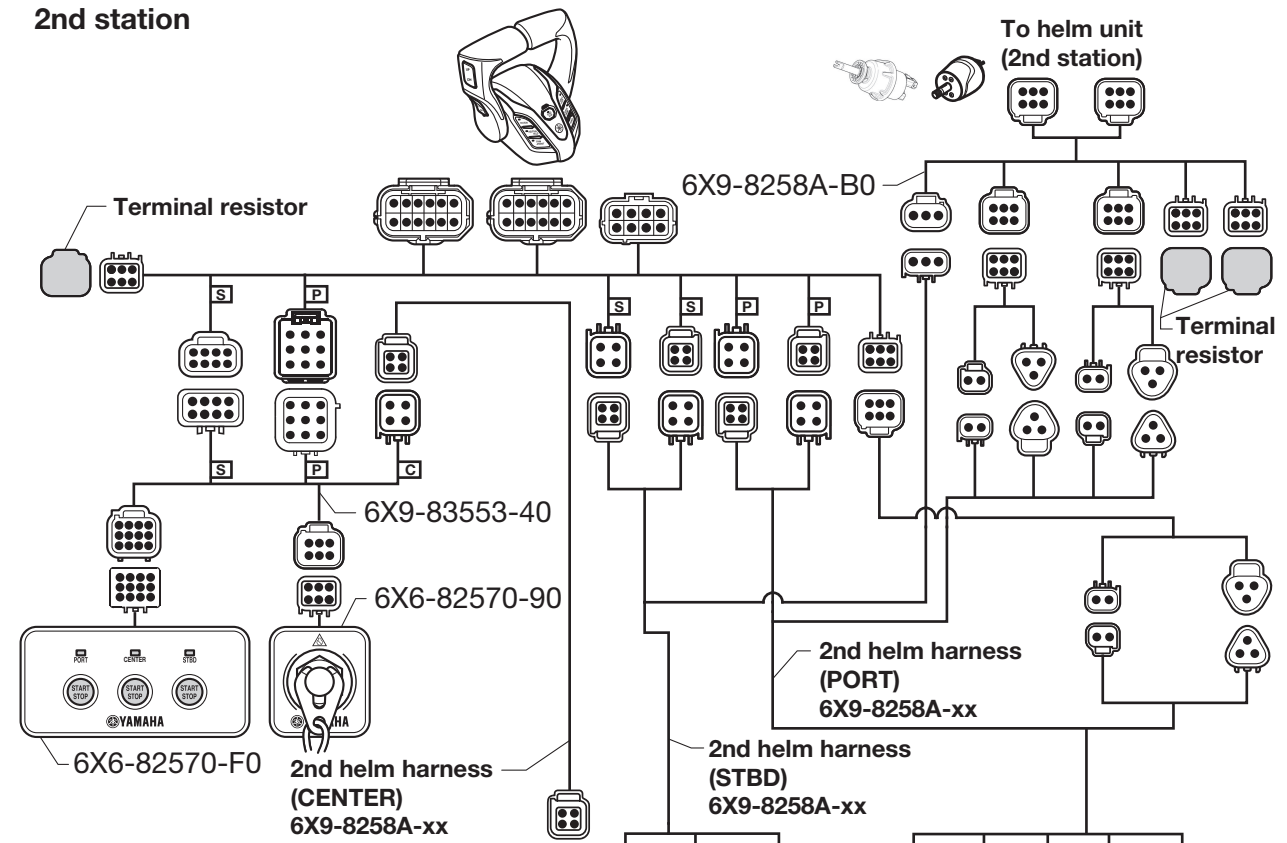


Main station

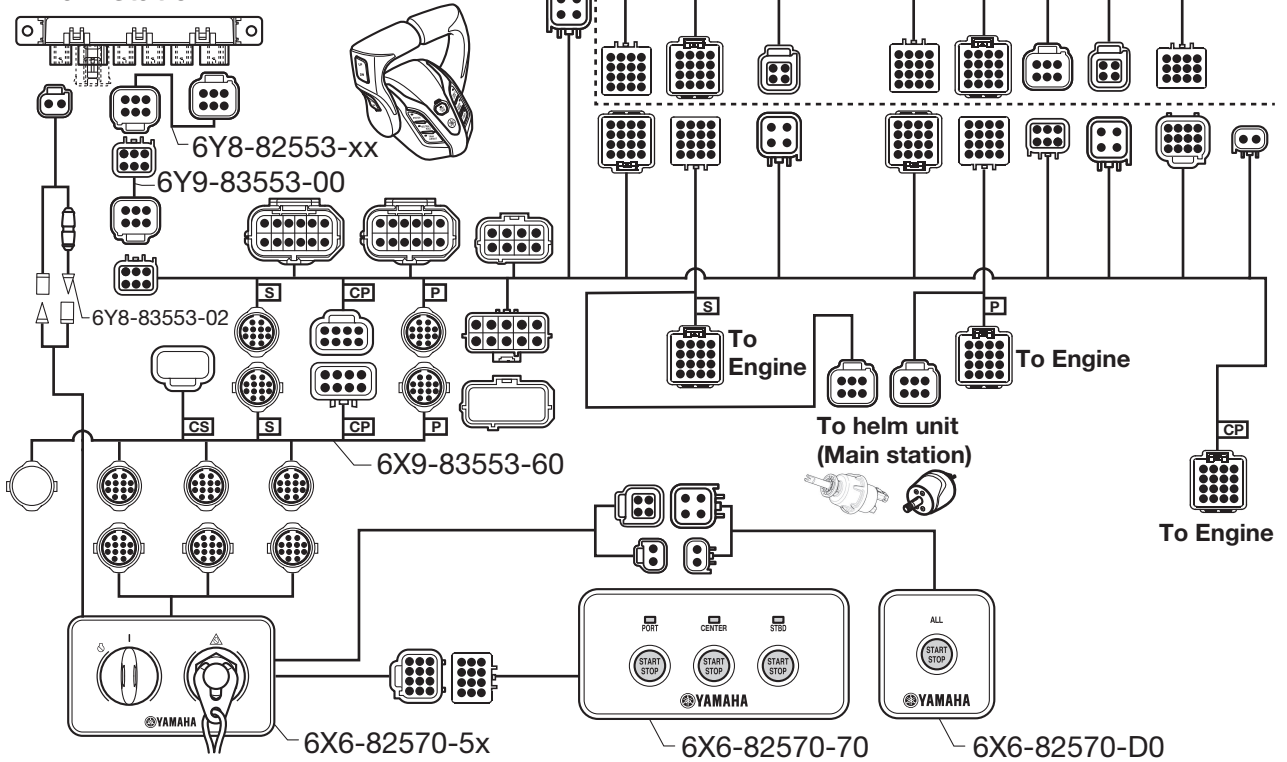


6X6 switch panel (Triple engine application)

2nd station



Main station



6X9 switch system

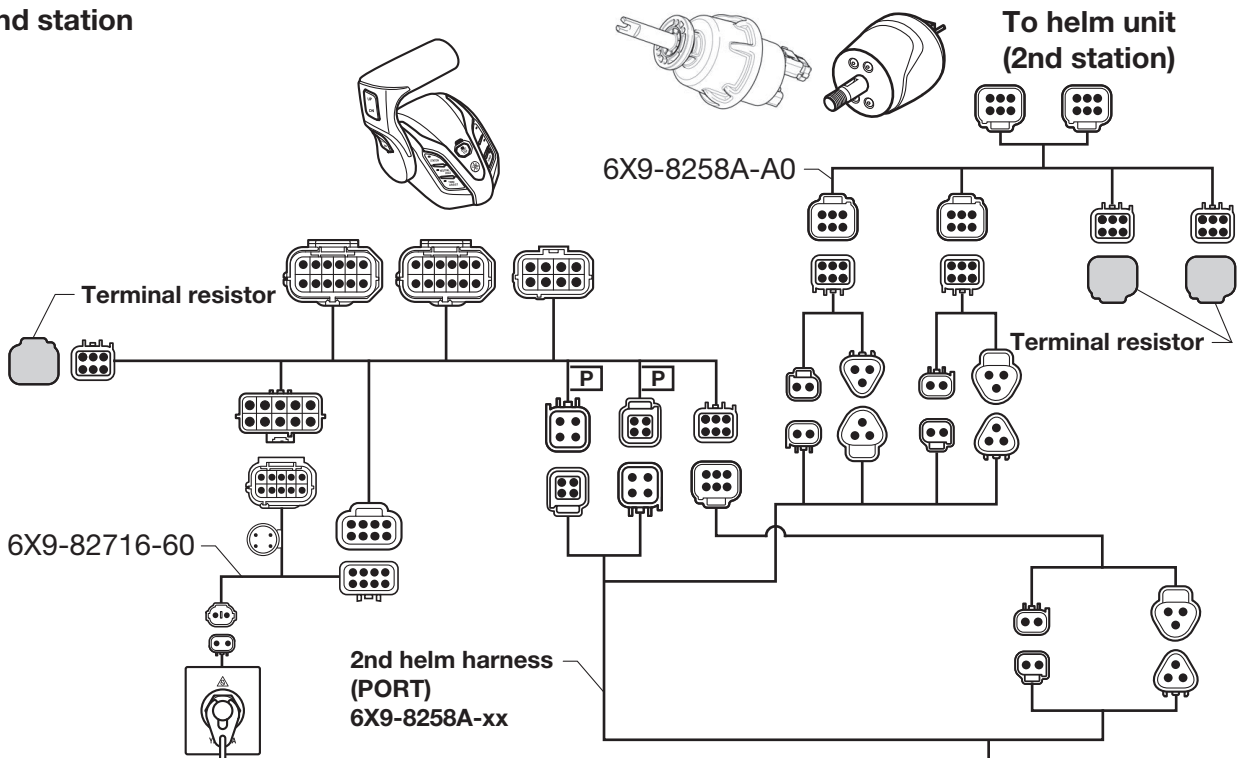
Main bus wire	
Part No.	Length
6Y8-82553-01	0.3 m (1 ft)
6Y8-82553-50	3 m (10 ft)
6Y8-82553-11	4.6 m (15 ft)
6Y8-82553-21	6.1 m (20 ft)
6Y8-82553-31	7.6 m (25 ft)
6Y8-82553-41	9.1 m (30 ft)
Helm harness (Main/Single)	
Part No.	Length
6GR-8258A-00	0.9 m (3 ft)
6GR-8258A-40	1.8 m (6 ft)
Helm harness (Main/Multi)	
Part No.	Length
6GR-8258A-11	0.9 m (3 ft)
6GR-8258A-51	1.8 m (6 ft)
6GR-8258A-61	2.7 m (9 ft)
Helm harness (2nd station/Single)	
Part No.	Length
6X9-8258A-A0	0.9 m (3 ft)
Helm harness (2nd station/Multi)	
Part No.	Length
6X9-8258A-B0	0.9 m (3 ft)
2nd helm harness (PORT)	
Part No.	Length
6X9-8258A-00	5 m (16 ft)
6X9-8258A-10	8 m (26 ft)
6X9-8258A-20	12 m (38 ft)
2nd helm harness (STBD)	
Part No.	Length
6X9-8258A-30	5 m (16 ft)
6X9-8258A-40	8 m (26 ft)
6X9-8258A-50	12 m (38 ft)
2nd helm harness (CENTER)	
Part No.	Length
6X9-8258A-60	5 m (16 ft)
6X9-8258A-70	8 m (26 ft)
6X9-8258A-80	12 m (38 ft)

TIP:

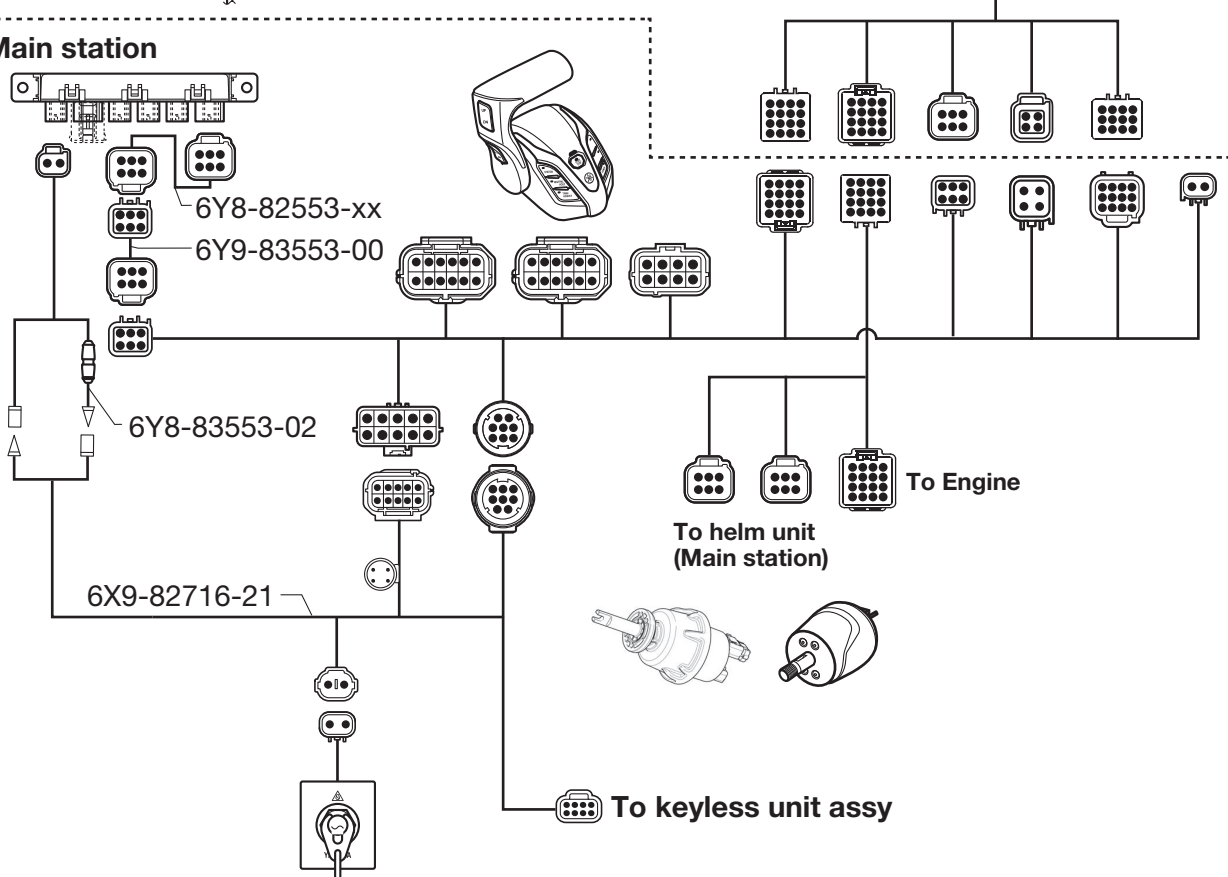
A ferrite core needs to be added for rigging the 2nd Station on the F425 (6GR). See Service Manual.

6X9 switch panel (Single engine application/6X9-48205-30)

2nd station

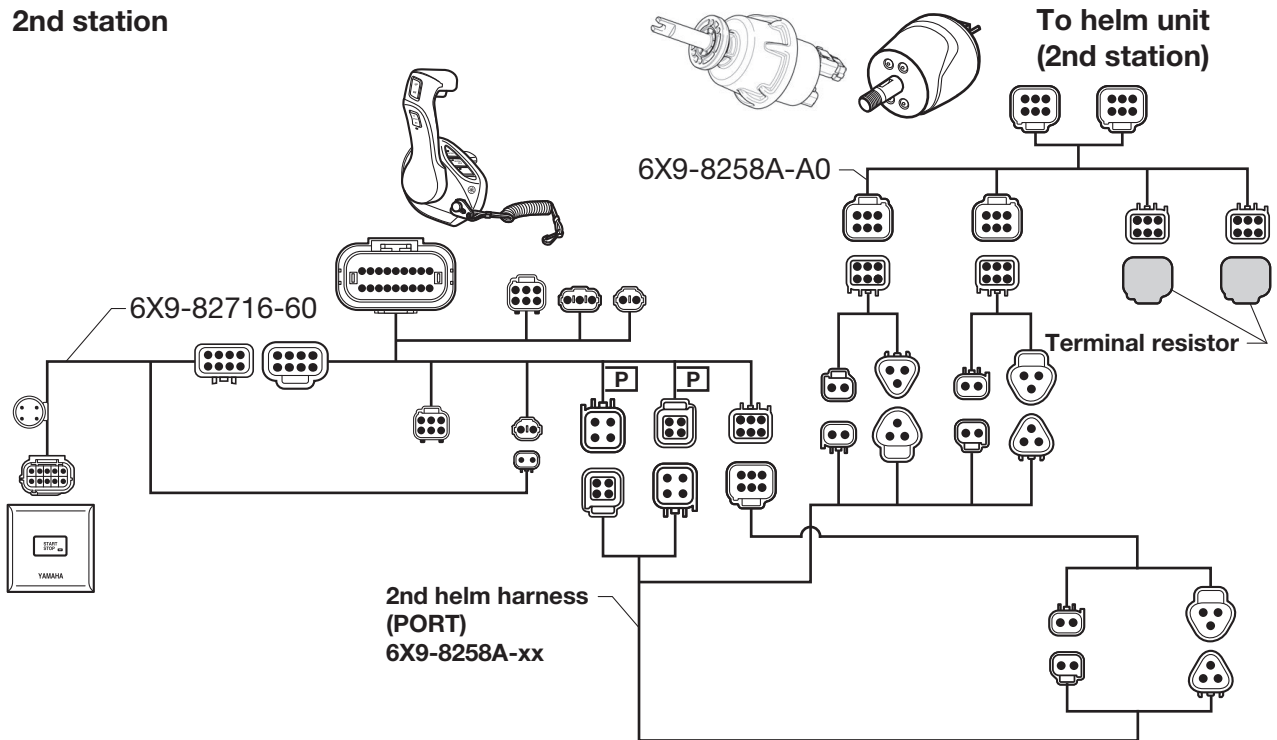


Main station

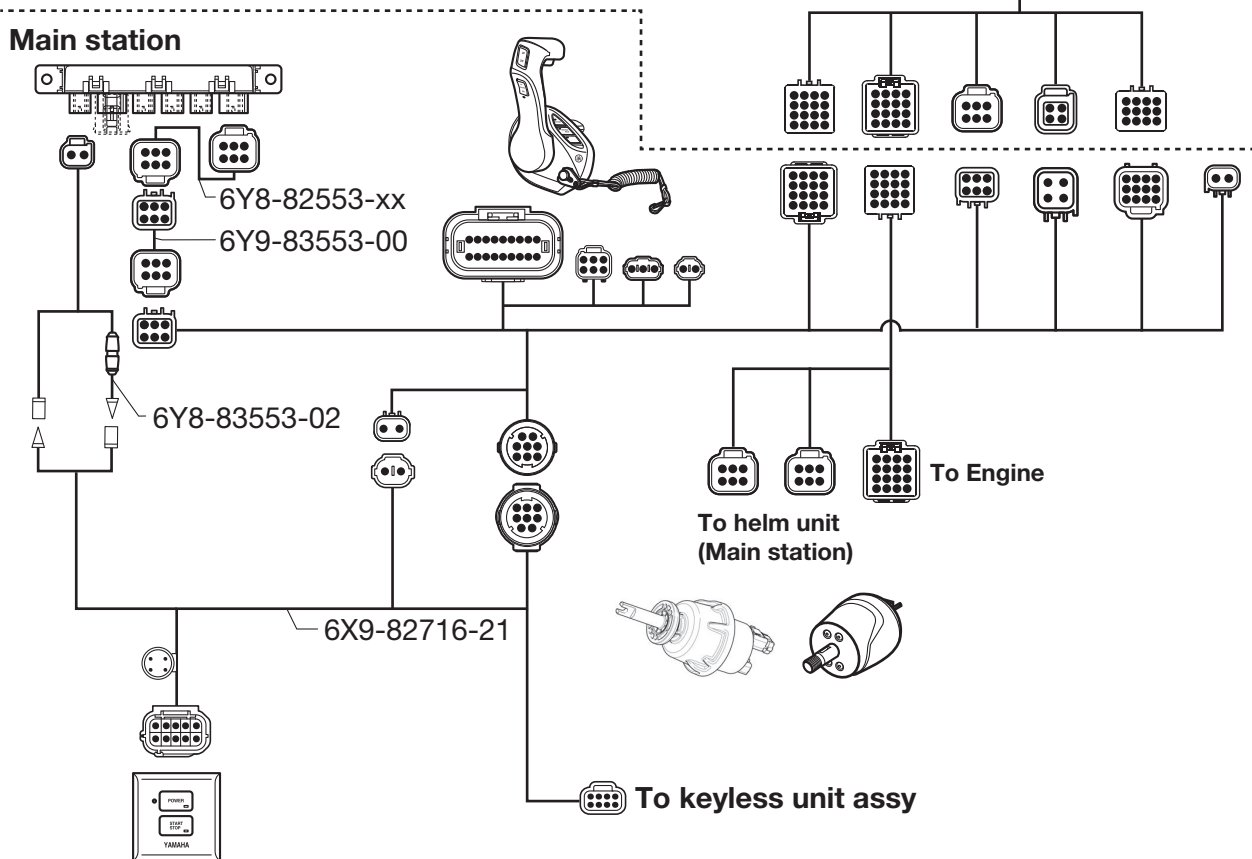


6X9 switch panel (Single engine application/6X9-48206-11)

2nd station

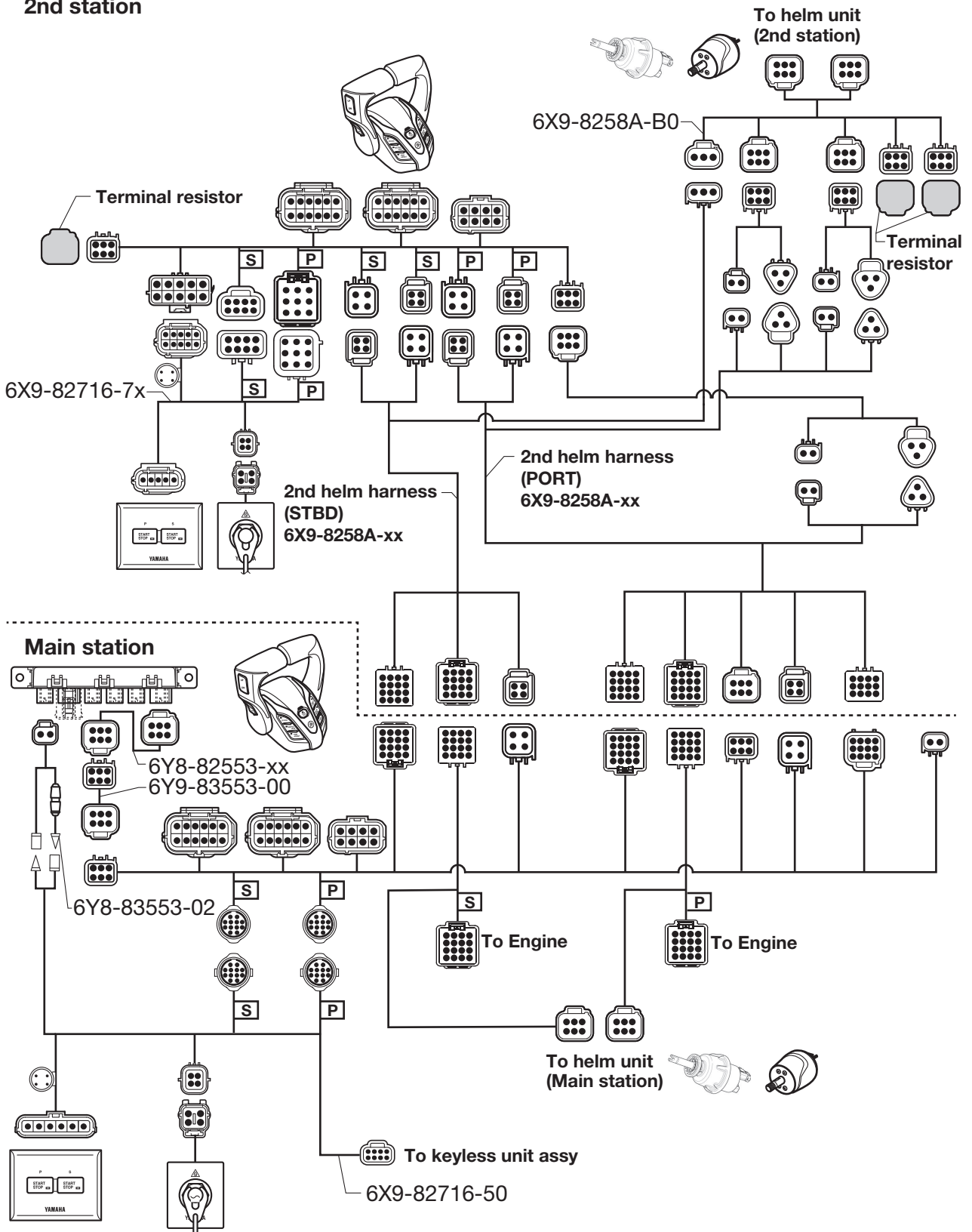


Main station



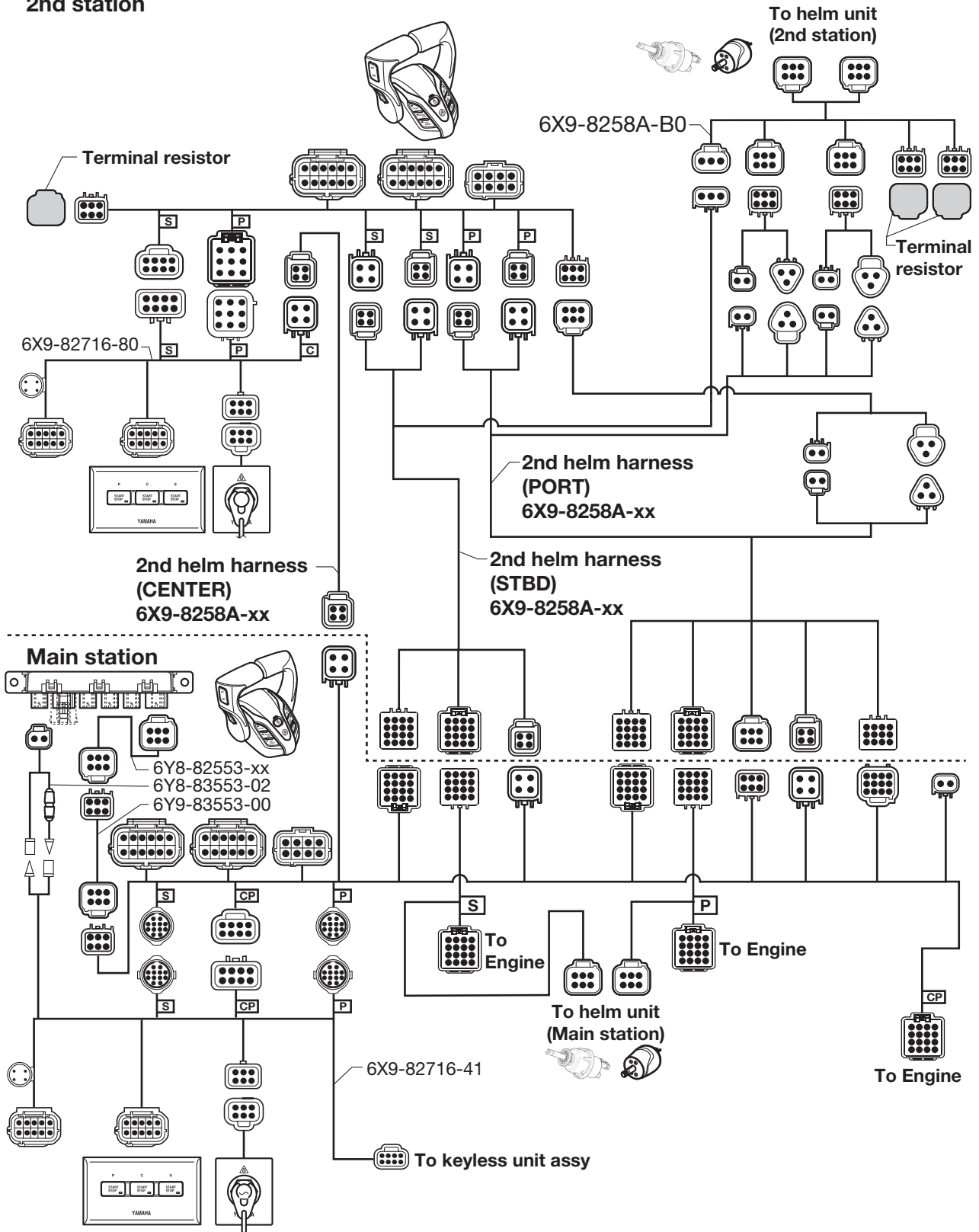
6X9 switch panel (Twin engine application)

2nd station

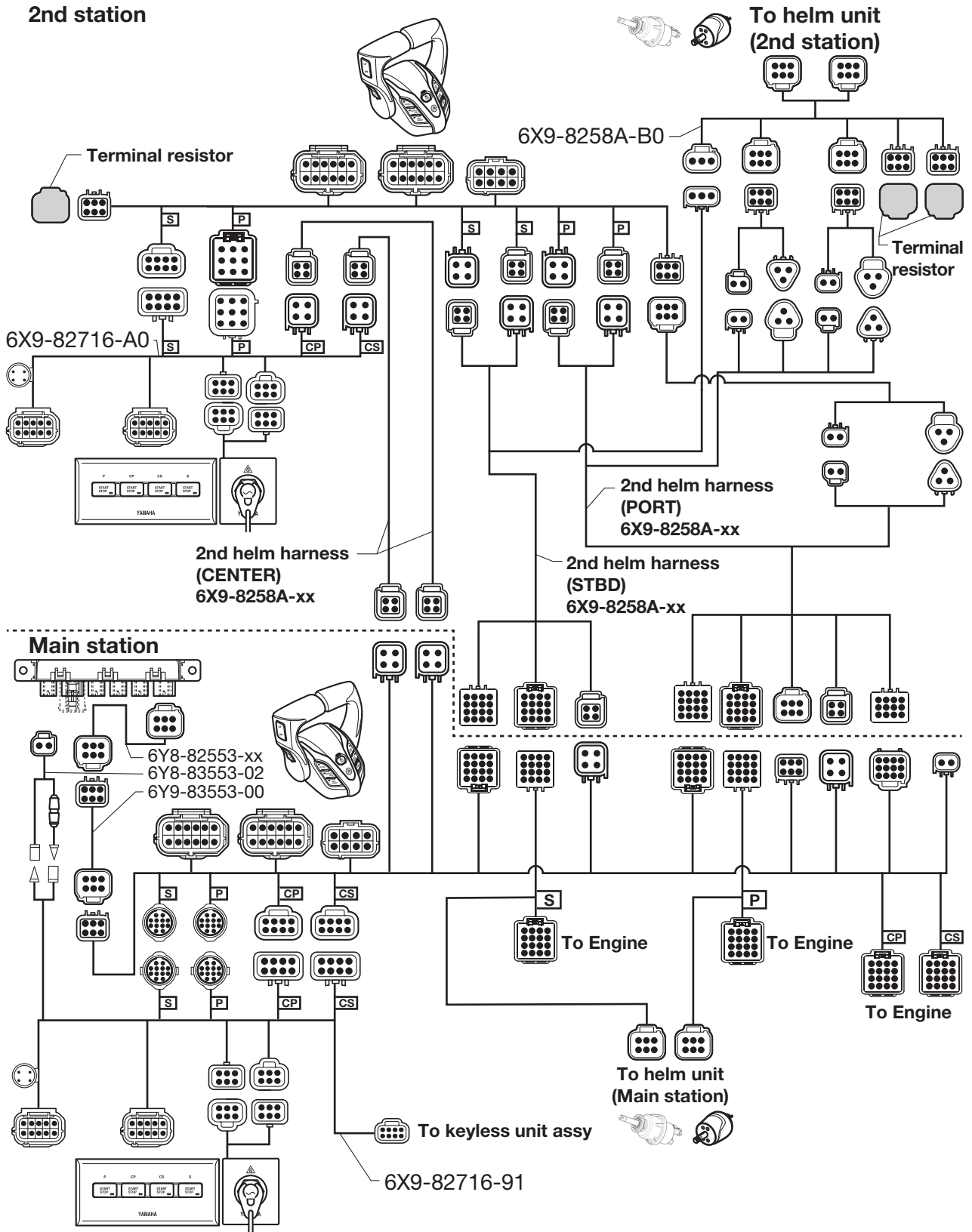


6X9 switch panel (Triple engine application)

2nd station

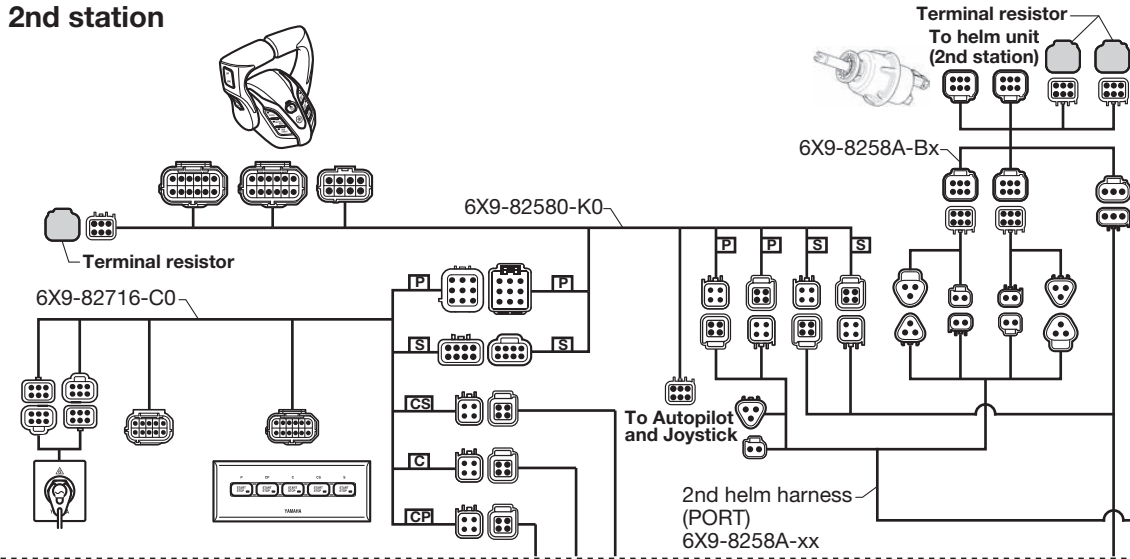


6X9 switch panel (Quad engine application)

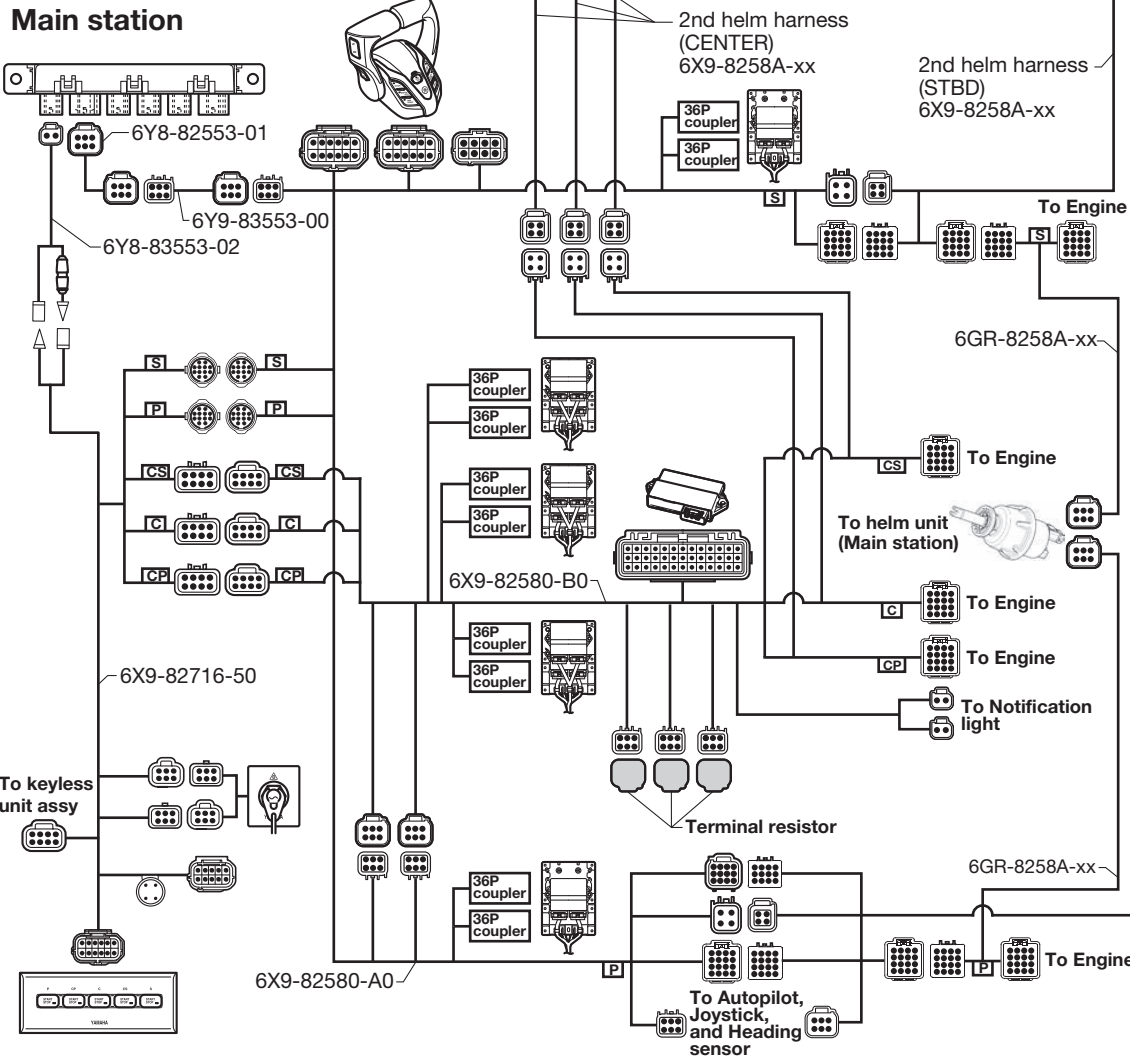


6X9 switch panel (Quint engine application)

2nd station



Main station



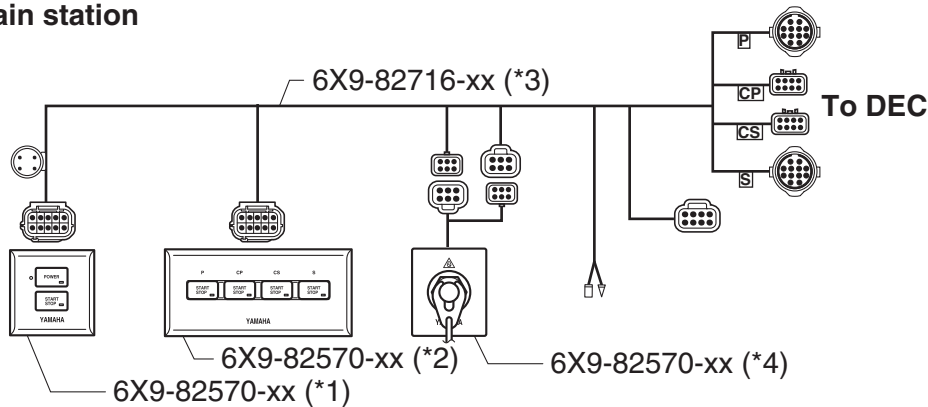
Installing the Power switch, start/stop switch, engine shut-off switch

NOTICE

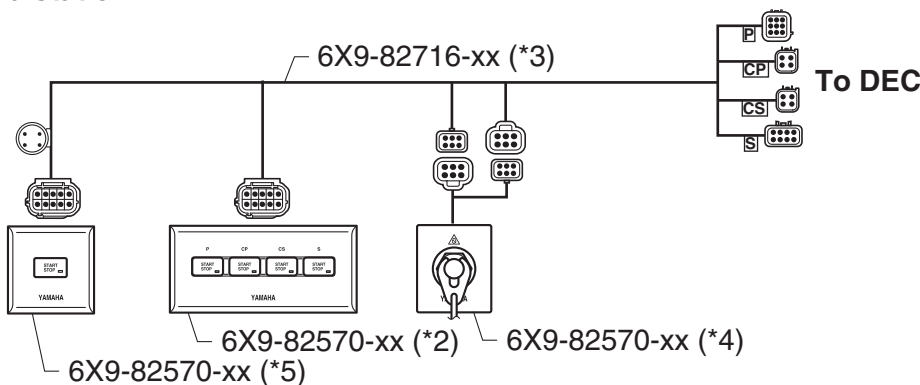
- Install the system in a location where it will not be exposed to rain or wave splashes directly, or submerged in the bilge.
- Do not cover the unit with metal objects as the signals may not communicate.
- Install the unit and wire at least 1 ft (30 cm) away from two-way radio, antenna cable, and generators to avoid pickup of noise.
- Be careful not to bind the wiring harness of this system and the antenna cable together.
- Install the system in a location where the ambient temperature does not exceed 55 °C (131 °F).
- Install the wire harnesses so that they do not come into contact with any edges or moving parts that may cause shearing. Do not apply excessive force when pulling on the wire harnesses to lay them out.

1. Determine the Power switch installation position.
2. Make holes in the console using the template.
3. Connect the EKS harness.

Main station



2nd station



Installing the Power switch, start/stop switch, engine shut-off switch

Main station				
	Power switch (*1)	Start/stop switch (*2)	EKS harness (*3)	Engine shut-off switch (*4)
Single engine application	6X9-82570-01	—	6X9-82716-21	6X9-82570-70
Twin engine application	—	6X9-82570-31	6X9-82716-50	6X9-82570-80
Triple engine application	—	6X9-82570-41	6X9-82716-41	6X9-82570-C0
Quad engine application	—	6X9-82570-51	6X9-82716-91	6X9-82570-D0
Quint engine application	—	6X9-82570-61	6X9-82716-B0	6X9-82570-D0
2nd station				
	All start/stop switch (*5)	Start/stop switch (*2)	EKS harness (*3)	Engine shut-off switch (*4)
Single engine application	—	6X9-82570-B1	6X9-82716-60	6X9-82570-70
Twin engine application	—	6X9-82570-31	6X9-82716-71	6X9-82570-80
Triple engine application	—	6X9-82570-41	6X9-82716-80	6X9-82570-C0
Quad engine application	—	6X9-82570-51	6X9-82716-A0	6X9-82570-D0
Quint engine application	—	6X9-82570-61	6X9-82716-C0	6X9-82570-D0

Installing the power switch and all start/stop switch (MY22)

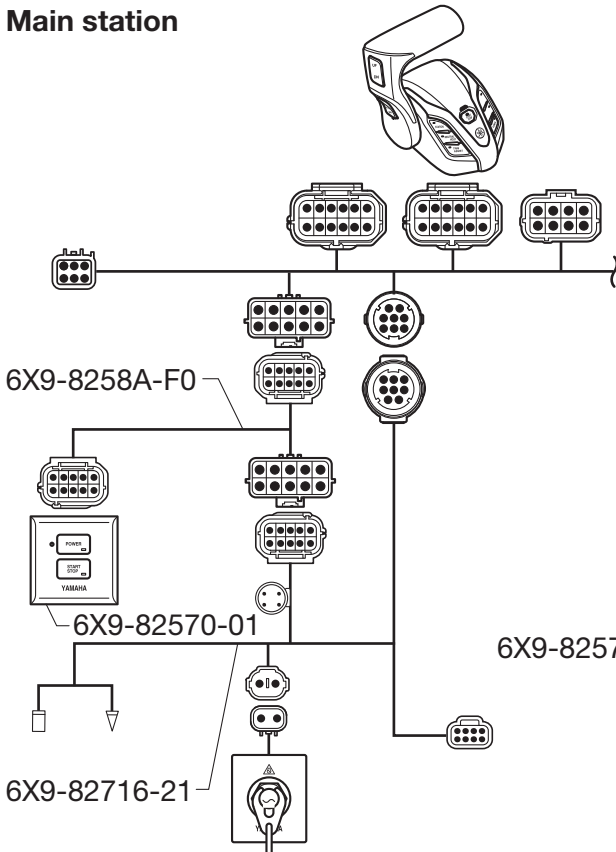
Installing the power switch and all start/stop switch (MY22)

The additional harness is required to keep using the existing EKS manufactured through MY22 when you replace from DEC manufactured through MY22 to New DEC.

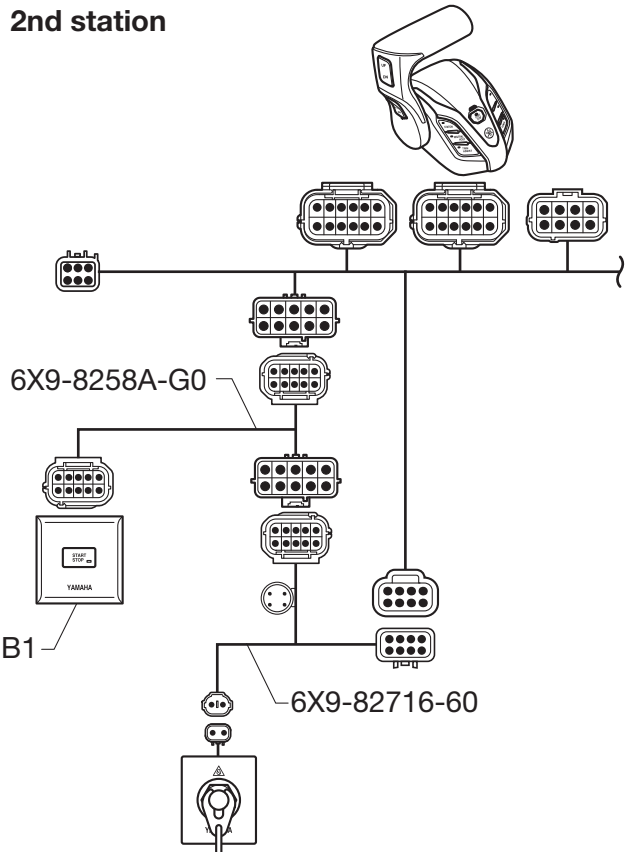
	Part name	Part number
Main station (except twin engine application)	Conversion harness	6X9-8258A-F0
Main station (twin engine application)	EKS harness	6X9-82716-32
2nd station	Conversion harness	6X9-8258A-G0

Single engine application

Main station



2nd station

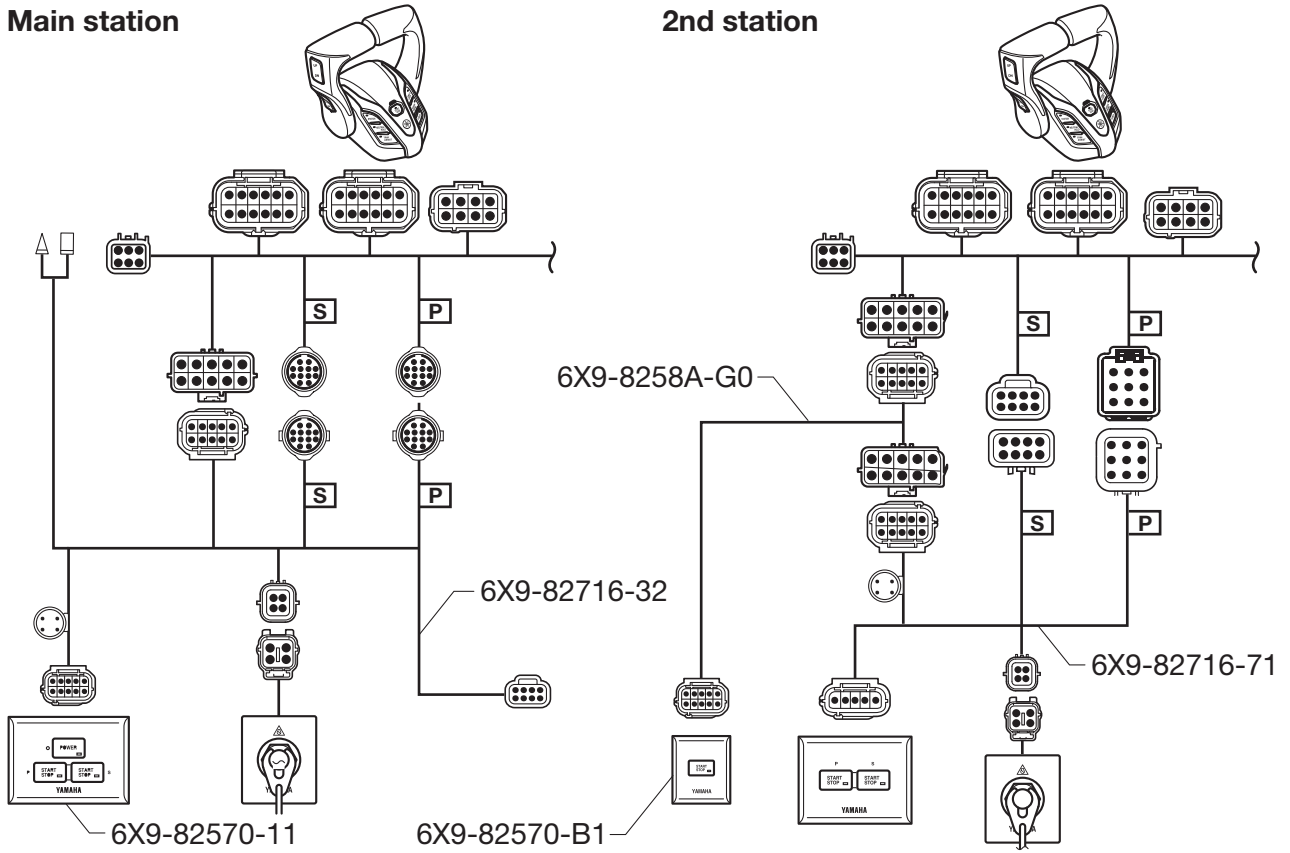


Installing the power switch and all start/stop switch (MY22)

Twin engine application

Main station

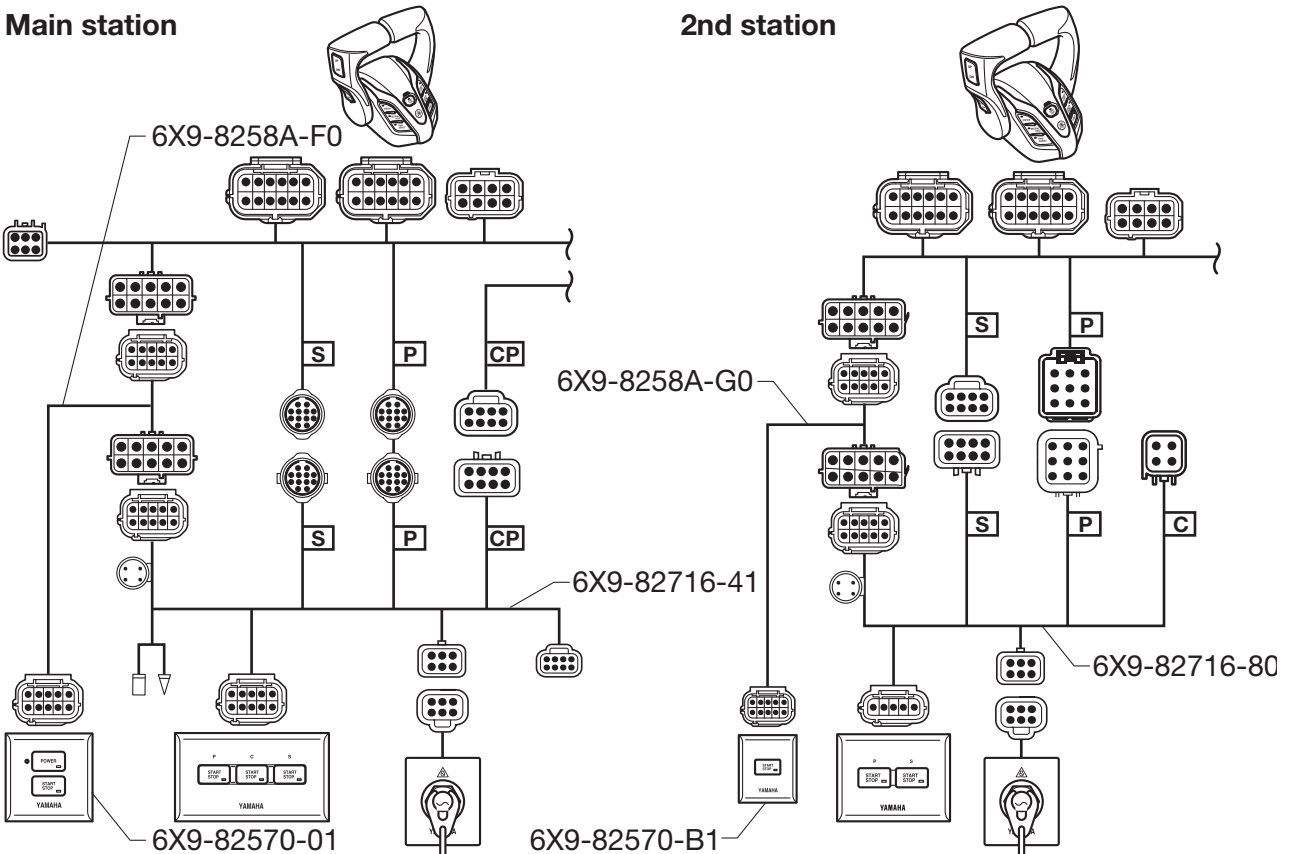
2nd station



Triple engine application

Main station

2nd station

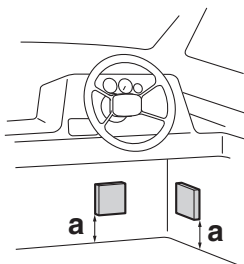
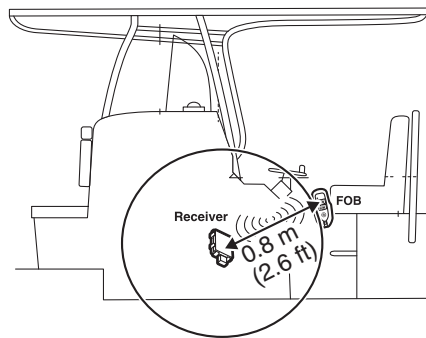


Installing the keyless unit assembly

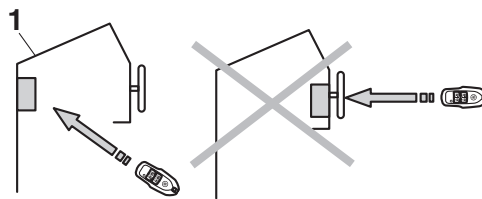
1. Determine the keyless unit assembly installation position.
2. Make holes in the console using the template.
See “Keyless unit (receiver assy)” (page 349) in Template.

NOTICE

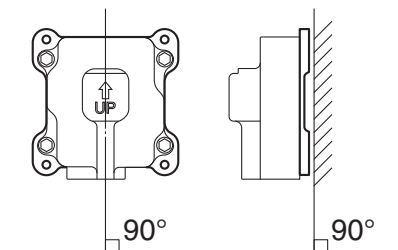
- Install the keyless unit by facing its UP mark upward.
- Install the keyless unit in a position where no water can enter.
- Do not cover the keyless unit with metal, or you may not receive signals.
- The keyless unit should be mounted within a 0.8 m (2.6 ft) range from the key fob.
- Make sure that the key fob communicates with the keyless unit from the steering position.



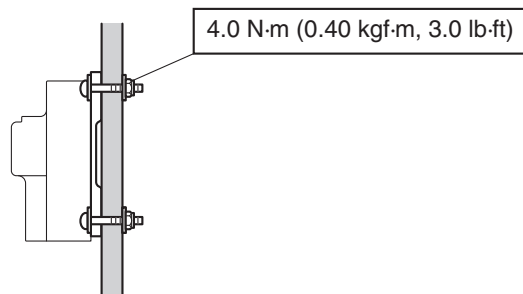
“a” ≥ 100 mm (3.94 in)



1. Metal console

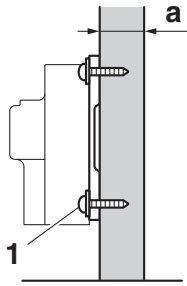


3. Mount the keyless unit using screws and nuts.



Installing the keyless unit assembly

4. If the mounting board is thicker than 15 mm “a”, use self-tapping screws “1”.

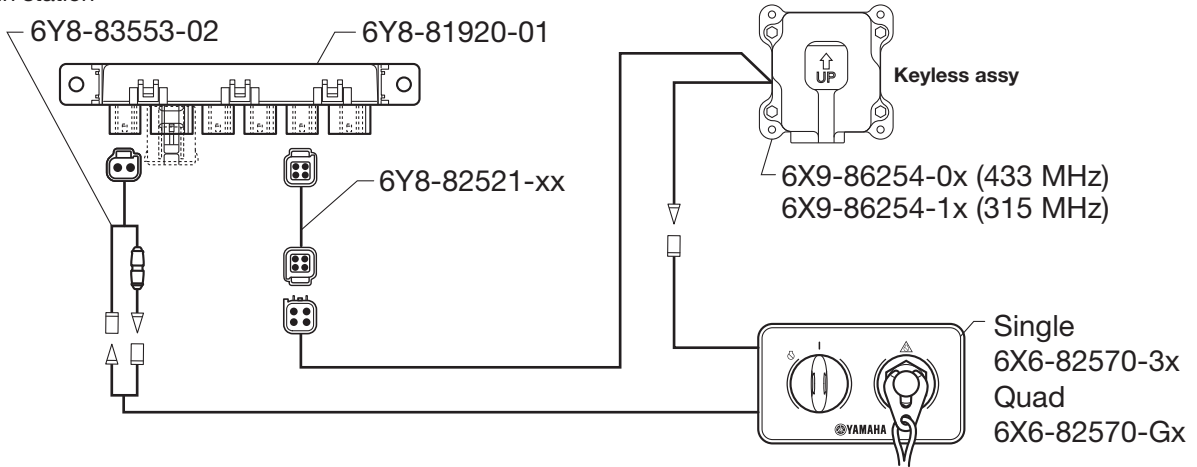


5. Connect the keyless unit harness.

6X6 switch system

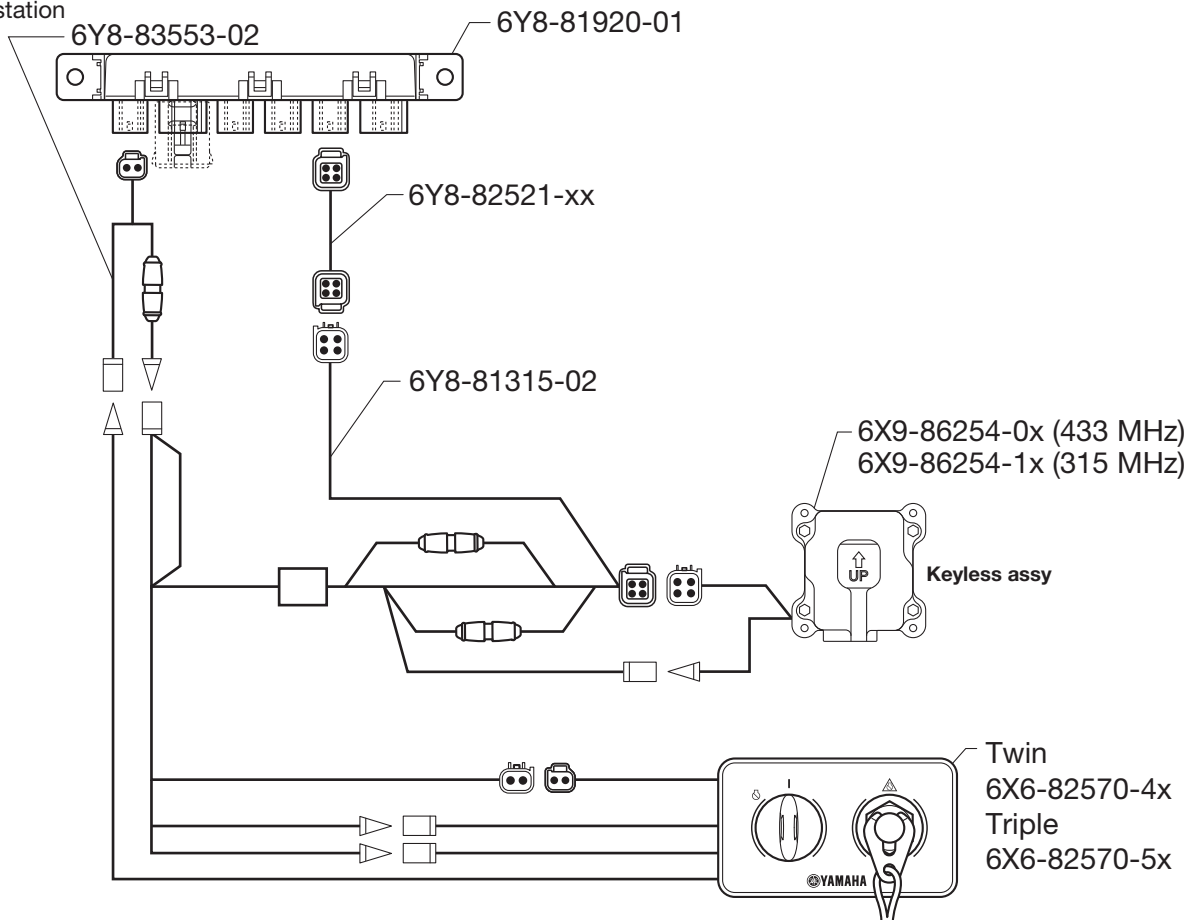
Single/Quad engine application

Main station



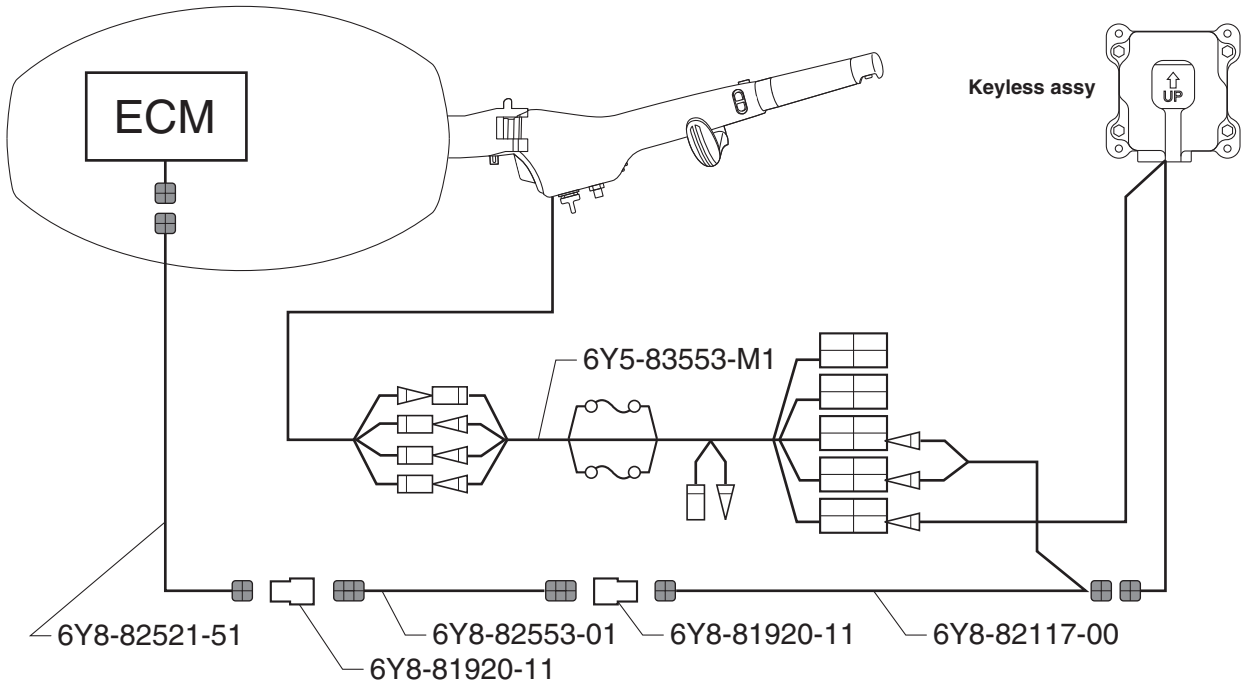
Twin/Triple engine application

Main station



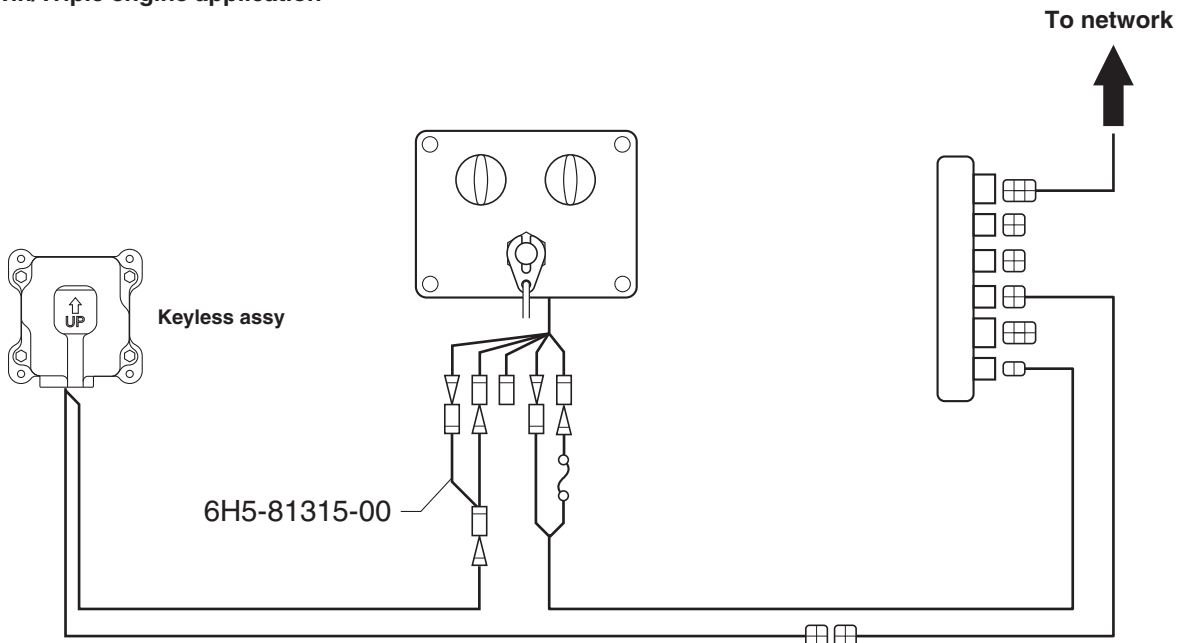
6X4 multi-function tiller handle

Single engine application



Fuel injection (FI), Mechanical RC

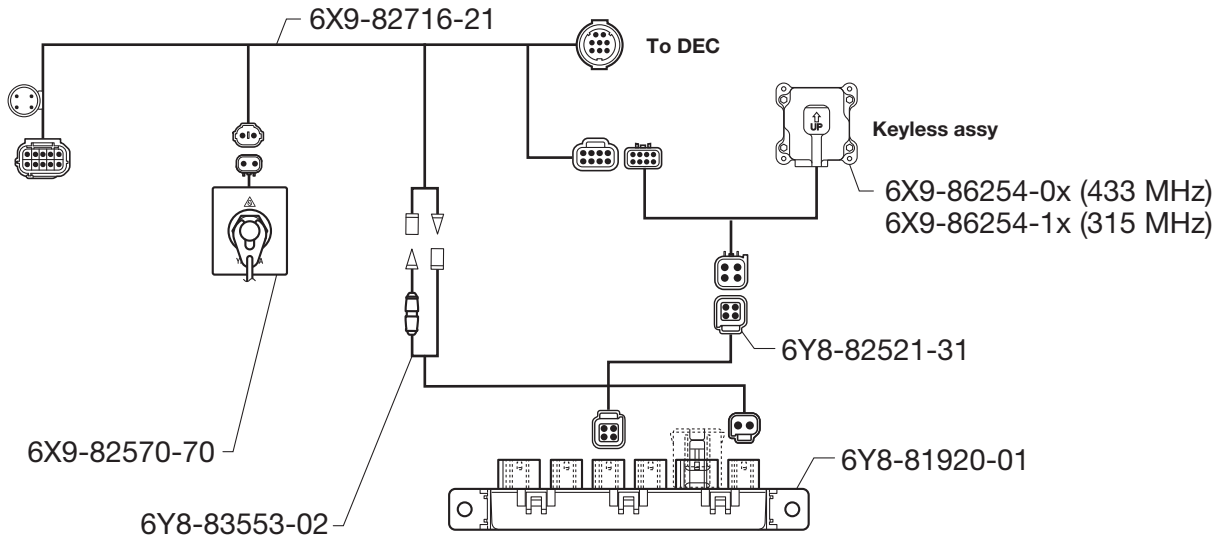
Twin/Triple engine application



6X9 switch system

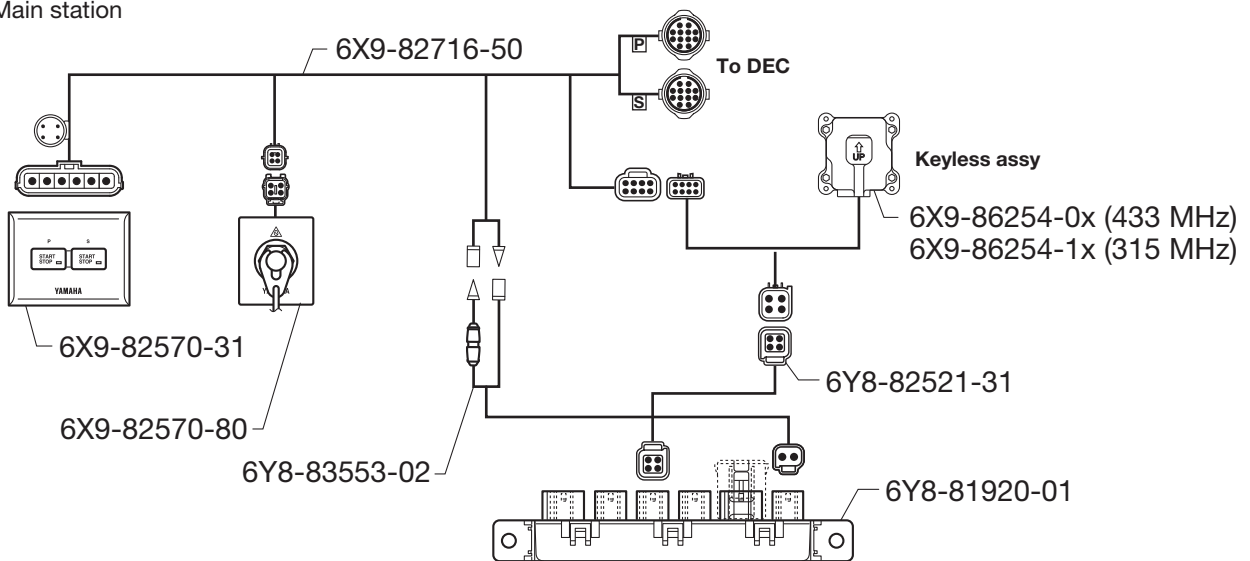
Single engine application

Main station



Twin engine application

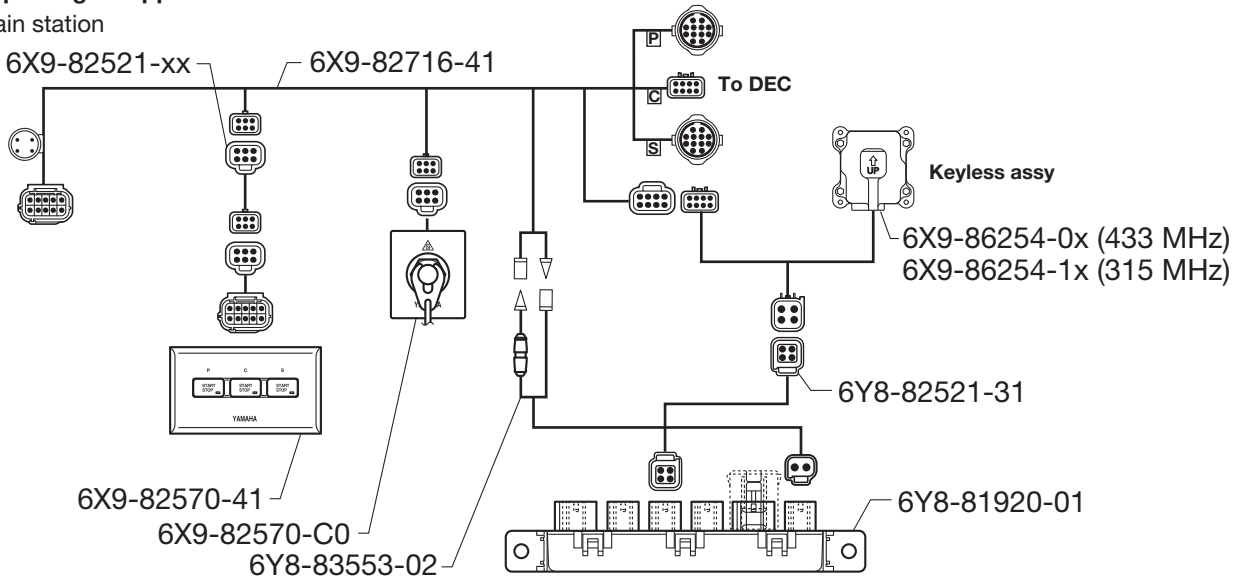
Main station



Installing the keyless unit assembly

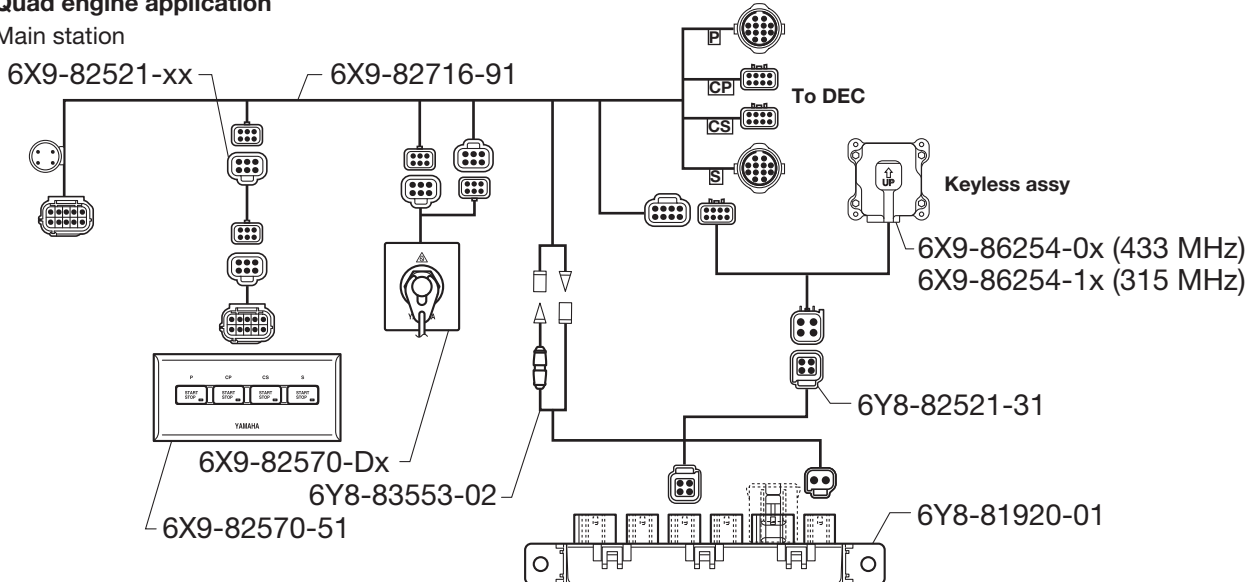
Triple engine application

Main station



Quad engine application

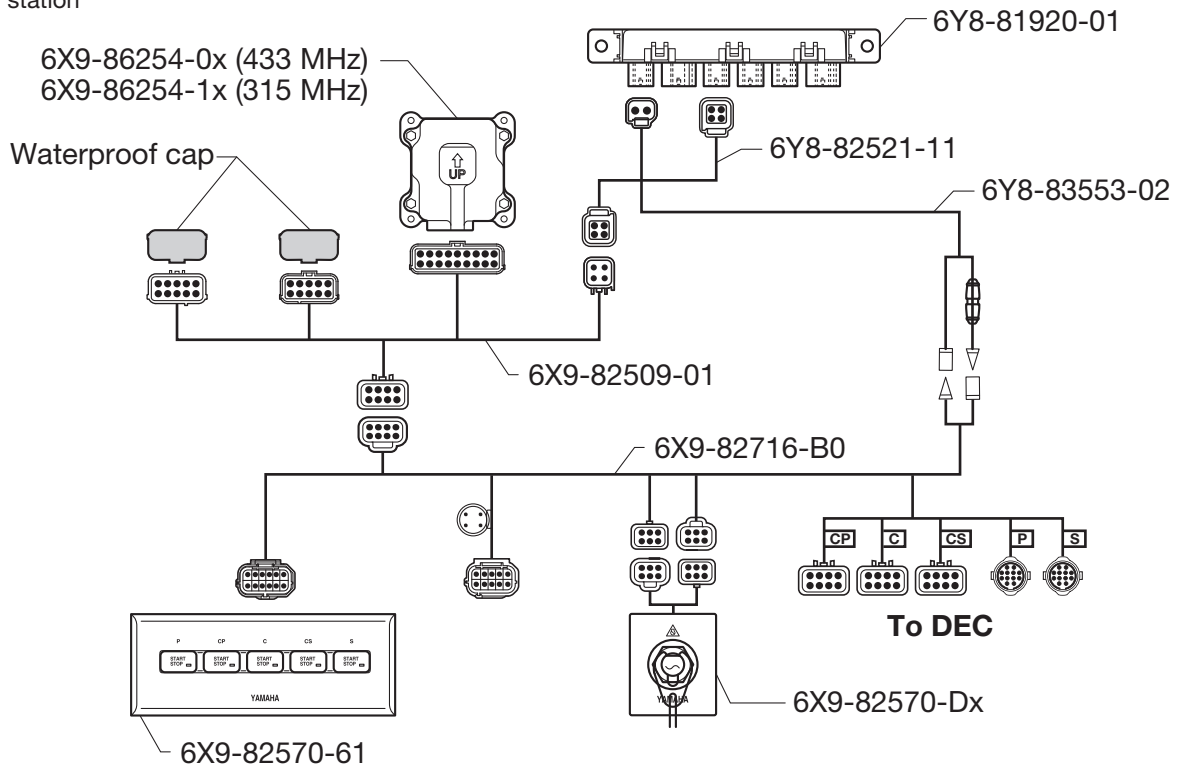
Main station



Installing the keyless unit assembly

Quint engine application

Main station



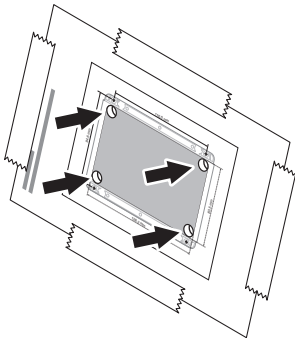
Installing the CL5 Display

1. Cut out the template page of this manual.
2. Make sure it fits in the location where you want to mount the CL5 Display, and then secure the template to the selected location.

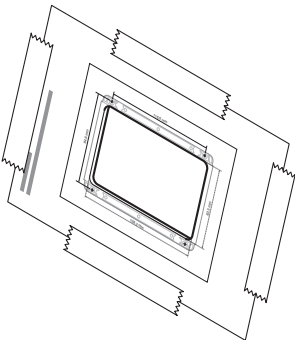
NOTICE

To avoid interference with a magnetic compass, the CL5 display should not be installed closer to a compass than the compass-safe distance value listed in the product specifications.

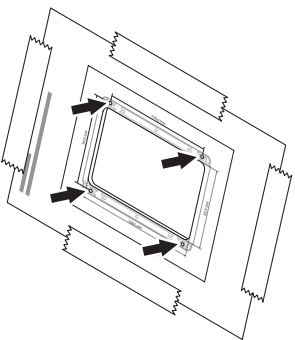
3. Drill the 9.1 mm holes inside the corners of the solid line on the template to prepare the mounting surface for cutting.



4. Cut the mounting surface along the inside line on the template.



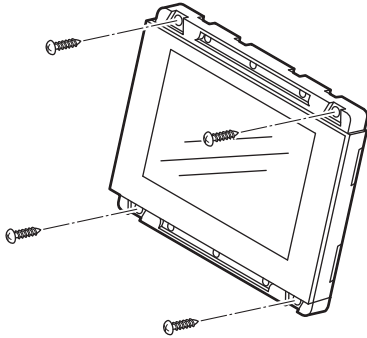
5. Place the CL5 Display in the cutout to test the fit. If necessary, refine the size of the cutout.
6. Drill 2.5 mm four holes for securing the CL5 Display.



7. Remove the template from the mounting surface.
8. Connect all necessary cables to the CL5 Display before placing it into the cutout, and then attach the weather caps to the unused connectors to prevent corrosion of the metal contacts.

Installing the CL5 Display

9. Apply marine sealant between the mounting surface and the CL5 Display to properly seal and prevent leakage behind the dashboard. If you will have access to the back of the CL5 Display, apply marine sealant around the cutout.
10. Place the CL5 Display into the cutout, then secure the CL5 Display to the mounting surface using the included screws.

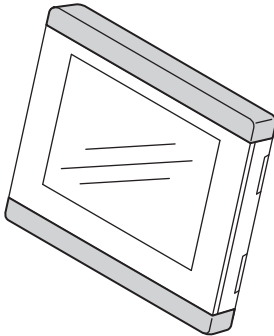


11. Wipe away all excess marine sealant.

NOTICE

Cleaners containing ammonia, ethanol blended gasoline, benzene and ethanol will harm the anti-reflective coating.

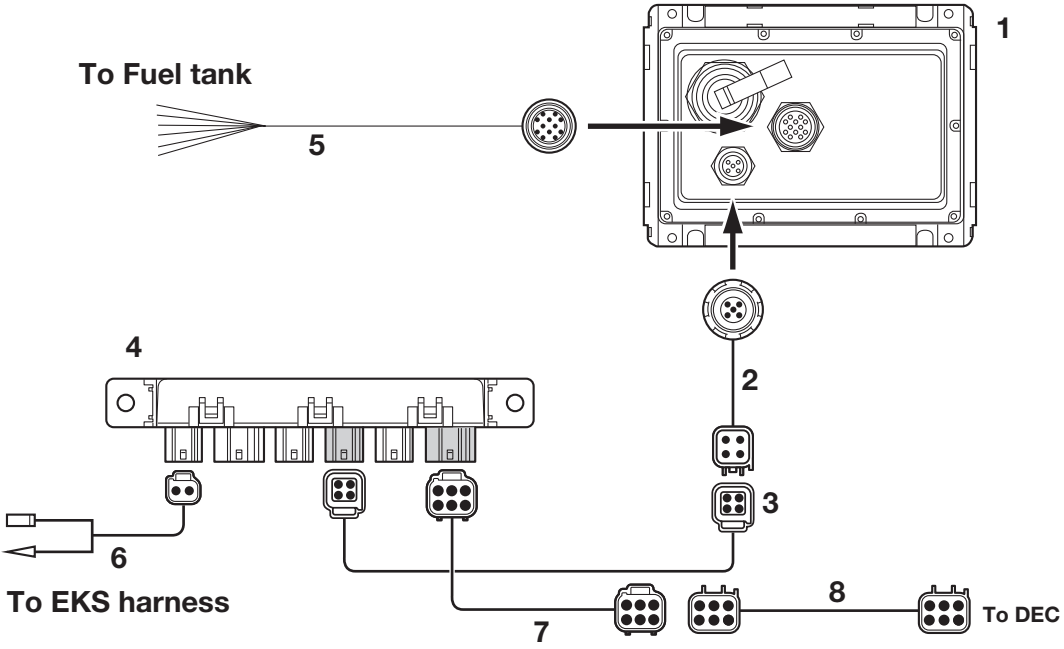
12. Install the decorative bezel by snapping it in place around the edges of the CL5 Display.



13. Connect the pigtail bus wire to the multi-hub.
14. Connect the gauge to the multi-hub and fuel tank.

TIP:

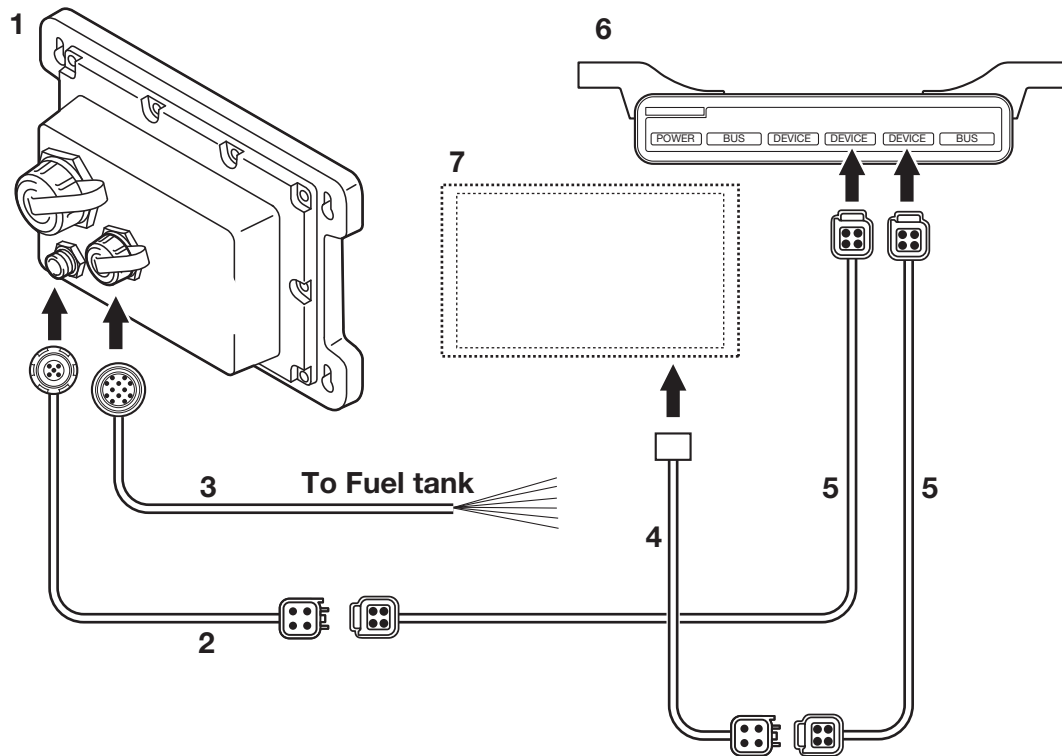
For further installation information, see the instructions in the gauge package.



No.	Part name	Q'ty	Part No.	Remarks
1	CL5 Display	1	6YM-83710-16	
2	Conversion harness	1	6YM-83553-00	
3	6 ft pigtail bus	1	6Y8-82521-31	
4	Multi-hub	1	6Y8-81920-01	
5	Wire lead	1	6YD-8356N-00	
6	Wire lead	1	6Y8-83553-02	
7	Main bus wire 1 ft	1	6Y8-82553-01	
8	Conversion harness	1	6Y9-83553-00	

Install the MFD Interface type-1

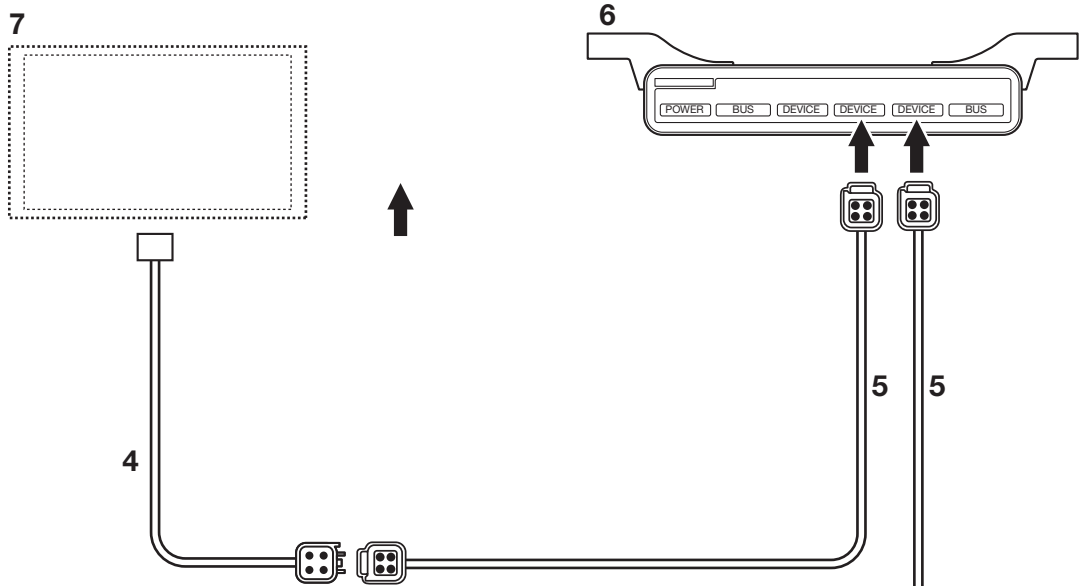
1. Connect the MFD Interface type-1.



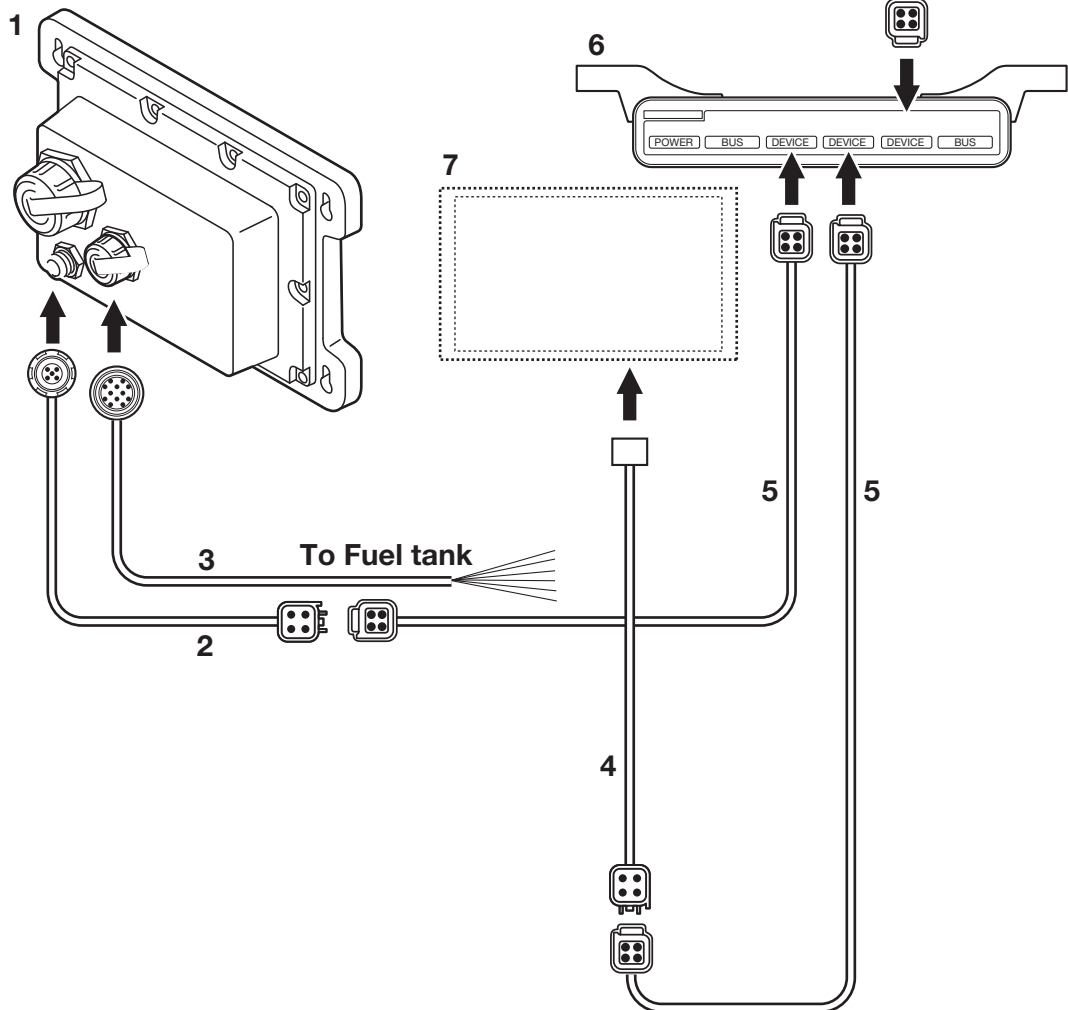
No.	Part name	Q'ty	Part No.	Remarks
1	MFDI unit	1	6YM-8A2D0-11	
2	Conversion harness	1	6YM-83553-10	
3	Wire lead	1	6YM-8356N-00	
4	J1939 harness for MFD connection	1		Not included (J1939 harness)
5	6 ft pigtail bus	2	6Y8-82521-31	
6	Multi-hub	1	6Y8-81920-01	
7	Compatible MFD	1		Not included

Install the MFD Interface type-1 (Dual station)

2nd station



Main station



Install the MFD Interface type-1

No.	Part name	Q'ty	Part No.	Remarks
1	MFDI unit	1	6YM-8A2D0-11	
2	Conversion harness	1	6YM-83553-10	
3	Wire lead	1	6YM-8356N-00	
4	Harnesses for MFD connection	2		Not included
5	6 ft pigtail bus	4	6Y8-82521-31	
6	Multi-hub	2	6Y8-81920-01	
7	Compatible MFD	2		Not included

Precautions for mounting

When deciding the mounting location, note the following:

- The location must be strong enough to support the weight of the MFDI unit and protect it from excessive vibration or shock.
- To avoid interference with a magnetic compass, the MFDI unit should not be installed closer to a compass than the compass-safe distance value listed in the product specifications.
- As the cable and USB memory card are connected to the MFDI unit, the MFDI unit must be installed in a place where these connections can be conducted easily.

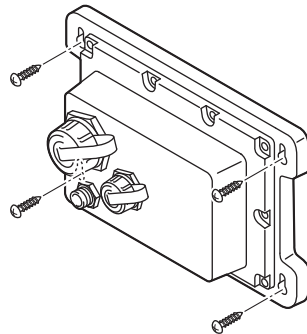
Mounting the MFDI unit

1. Cut out the template page of this manual.
2. Make sure it fits in the location where you want to mount the MFDI unit, and then secure the template to the selected location.

NOTICE

To avoid interference with a magnetic compass, the MFDI unit should not be installed closer to a compass than the compass-safe distance value listed in the product specifications.

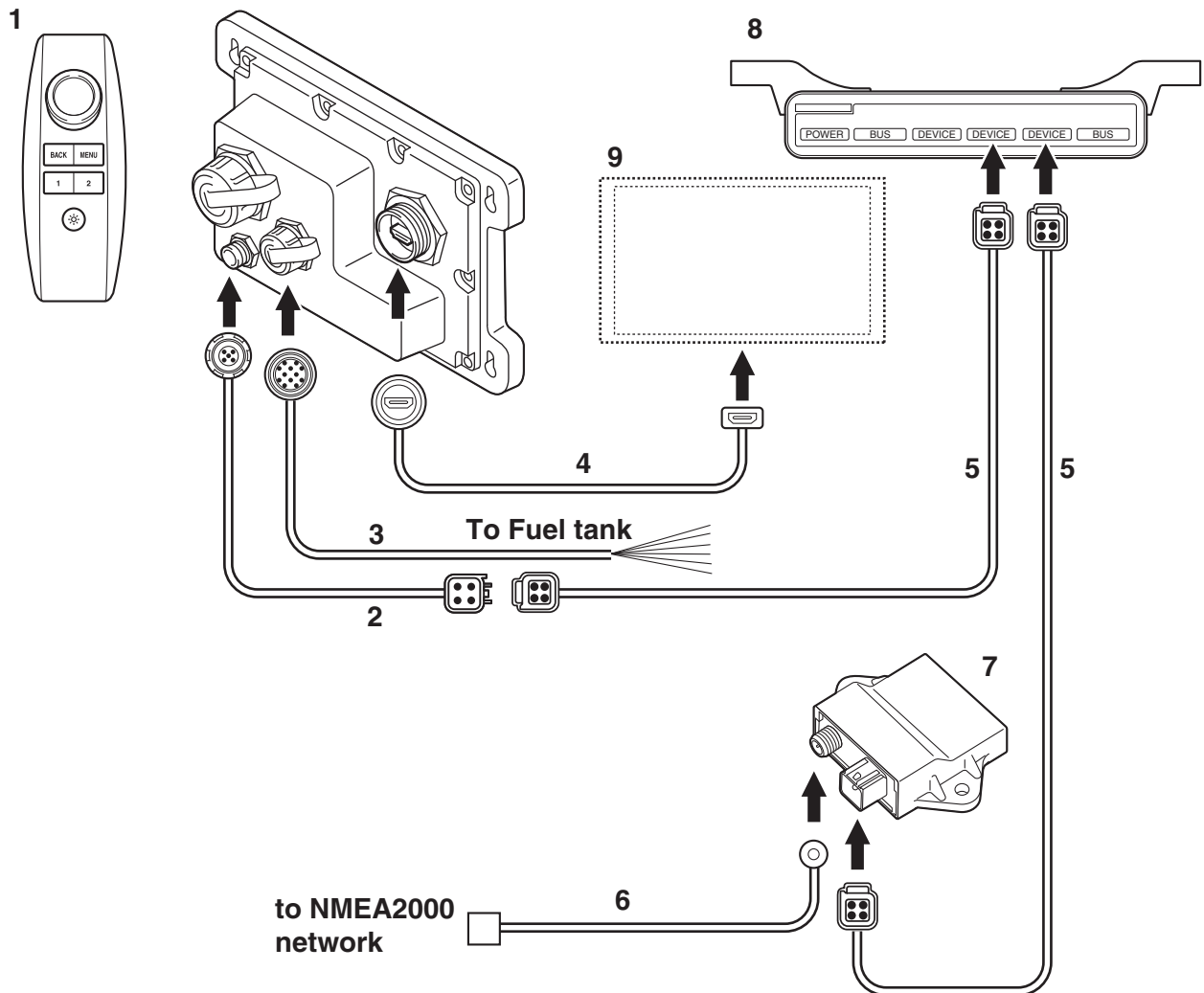
3. Drill 2.5 mm four holes for securing the MFDI unit.
4. Remove the template from the mounting surface.
5. Place the MFDI unit where you would like to install it, and secure it with the included screws.



6. Connect the conversion harness to the MFDI unit.
7. Connect one end of the pigtail bus wire to the conversion harness and the other end to the multi-hub.
8. Attach the weather caps to the unused connectors of the multi-hub to prevent corrosion of the metal contacts.
9. Connect one end of the harnesses for MFD connection to the compatible MFD and the other end to the multi-hub.

Install the MFD Interface type-2

1. Connect the MFD Interface type-2.

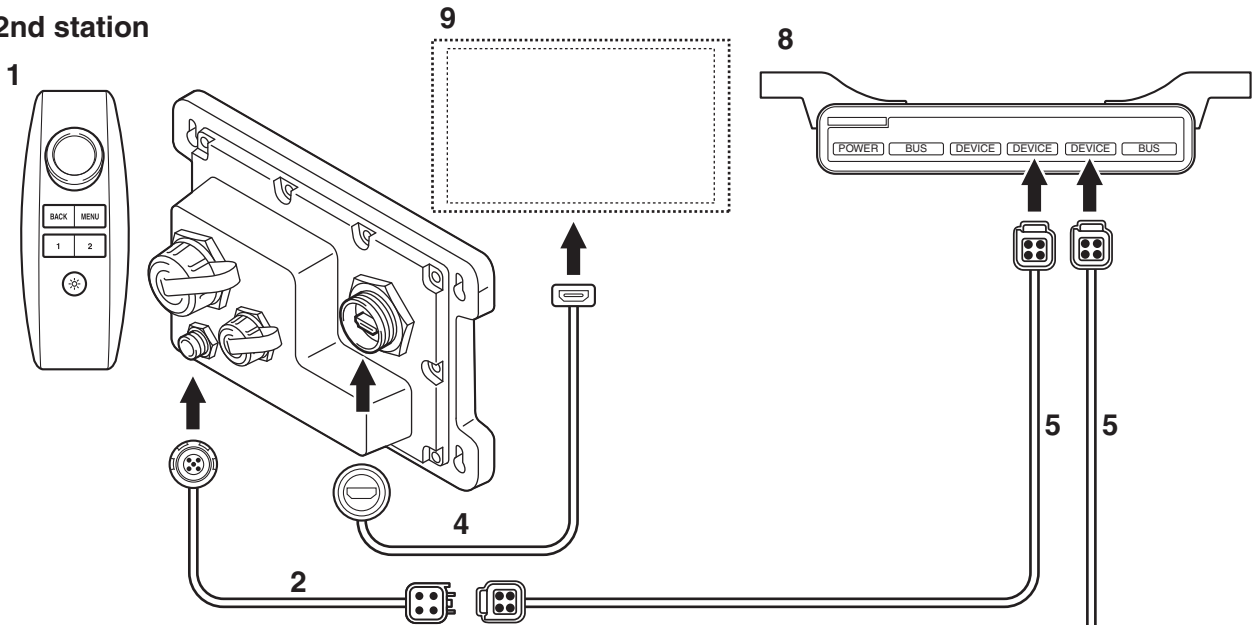


No.	Part name	Q'ty	Part No.	Remarks
1	MFDI unit / Remote controller	1	6YM-8A201-04	Pairing is complete
2	Conversion harness	1	6YM-83553-10	
3	Wire lead	1	6YM-8356N-00	
4	HDMI cable	1	6YM-8533A-00	
5	6 ft pigtail bus	2	6Y8-82521-31	
6	NMEA harness	1	6YG-82521-00	
7	NMEA2000 Gateway (6YG)	1	6YG-8A2D0-13	
8	Multi-hub	1	6Y8-81920-01	
9	Compatible MFD	1		Not included

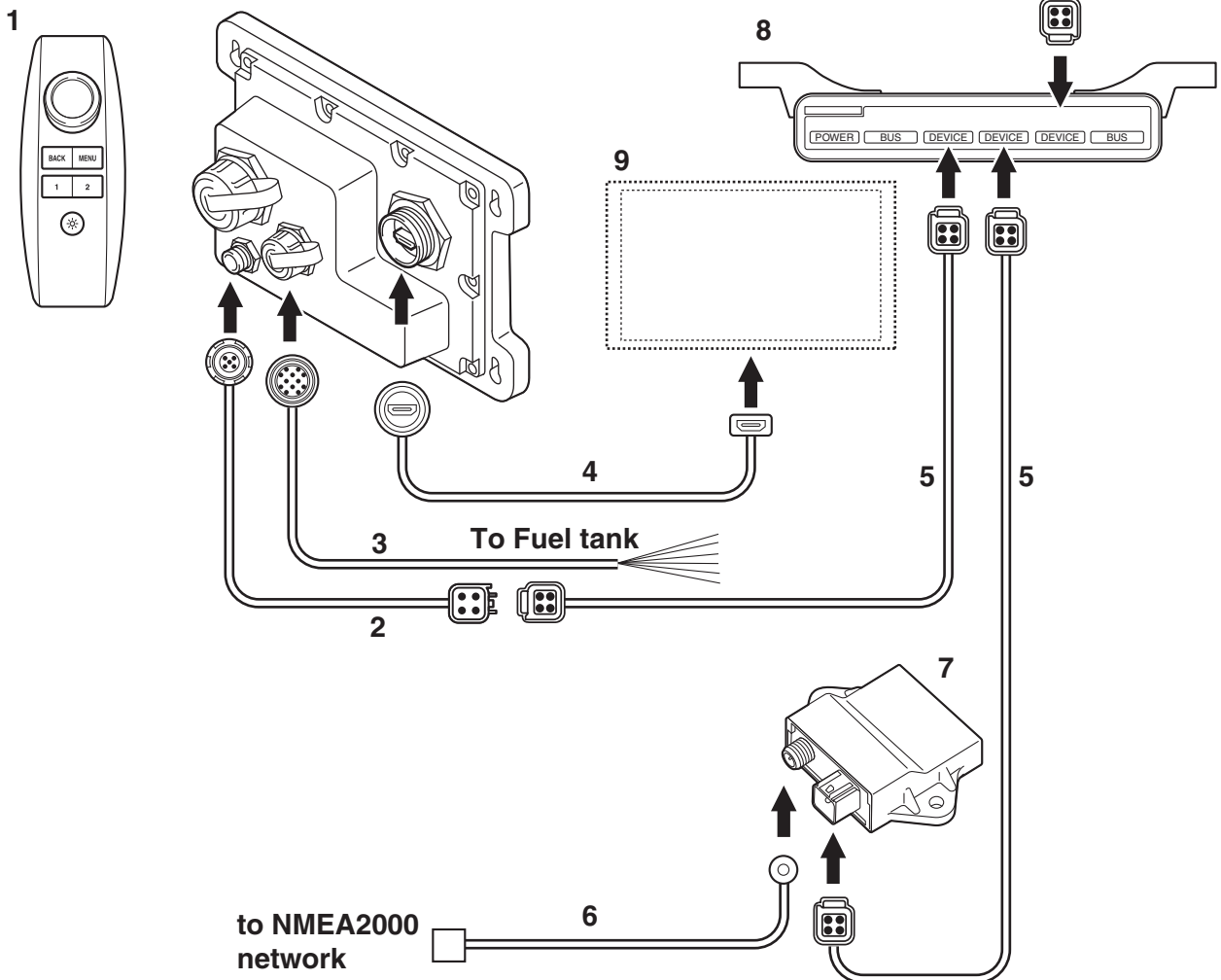
Install the MFD Interface type-2 (Dual station)

1. Connect the MFD Interface type-2 (Dual station).

2nd station



Main station



Install the MFD Interface type-2

No.	Part name	Q'ty	Part No.	Remarks
1	MFDI unit / Remote controller	2	6YM-8A201-04	Pairing is complete
2	Conversion harness	2	6YM-83553-10	
3	Wire lead	1	6YM-8356N-00	
4	HDMI cable	2	6YM-8533A-00	
5	6 ft pigtail bus	4	6Y8-82521-31	
6	NMEA harness	1	6YG-82521-00	
7	NMEA2000 Gateway (6YG)	1	6YG-8A2D0-13	
8	Multi-hub	2	6Y8-81920-01	
9	Compatible MFD	2		Not included

Precautions for mounting

When deciding the mounting location, note the following:

- The location must be strong enough to support the weight of the MFDI unit and protect it from excessive vibration or shock.
- To avoid interference with a magnetic compass, the MFDI unit should not be installed closer to a compass than the compass-safe distance value listed in the product specifications.
- As the cable and USB memory card are connected to the MFDI unit, the MFDI unit must be installed in a place where these connections can be conducted easily.

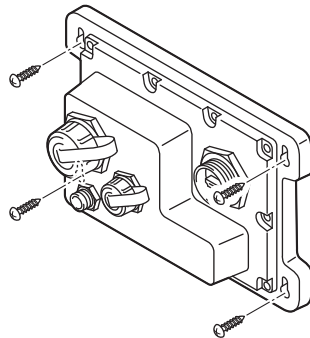
Mounting the MFDI unit

1. Cut out the template page of this manual.
2. Make sure it fits in the location where you want to mount the MFDI unit, and then secure the template to the selected location.

NOTICE

To avoid interference with a magnetic compass, the MFDI unit should not be installed closer to a compass than the compass-safe distance value listed in the product specifications.

3. Drill 2.5 mm four holes for securing the MFDI unit.
4. Remove the template from the mounting surface.
5. Place the MFDI unit where you would like to install it, and secure it with the included screws.



6. Connect the conversion harness to the MFDI unit.
7. Connect one end of the pigtail bus wire to the conversion harness and the other end to the multi-hub.
8. Connect one end of the HDMI cable to the compatible MFD and the other end to the MFDI unit.

TIP:

- To use the compatible MFD, a 6YG gateway (6YG-8A2D0-11 or later) must be connected to the multi-hub.
 - If the gateway is not connected or old (-00), the MFD is not compatible, the MFD software is old, or the MFD interface is not compatible, then a certification screen appears.
 - If the HDMI cable is cut or not connected, the MFDI unit is turned off, or the MFD is not set up correctly, then the screen blacks out.
-

Installing the Helm unit assembly (with tilt system)

1. Determine the steering helm installation position.

TIP: _____

There must be space for the steering wheel to be adjusted in all positions. The steering wheel may have a diameter of up to 400 mm (16 in) and its hub may have a height of up to 130 mm (5 in). There must be space to install the helm unit and to run the harnesses.

2. Install the components as shown in the figure.

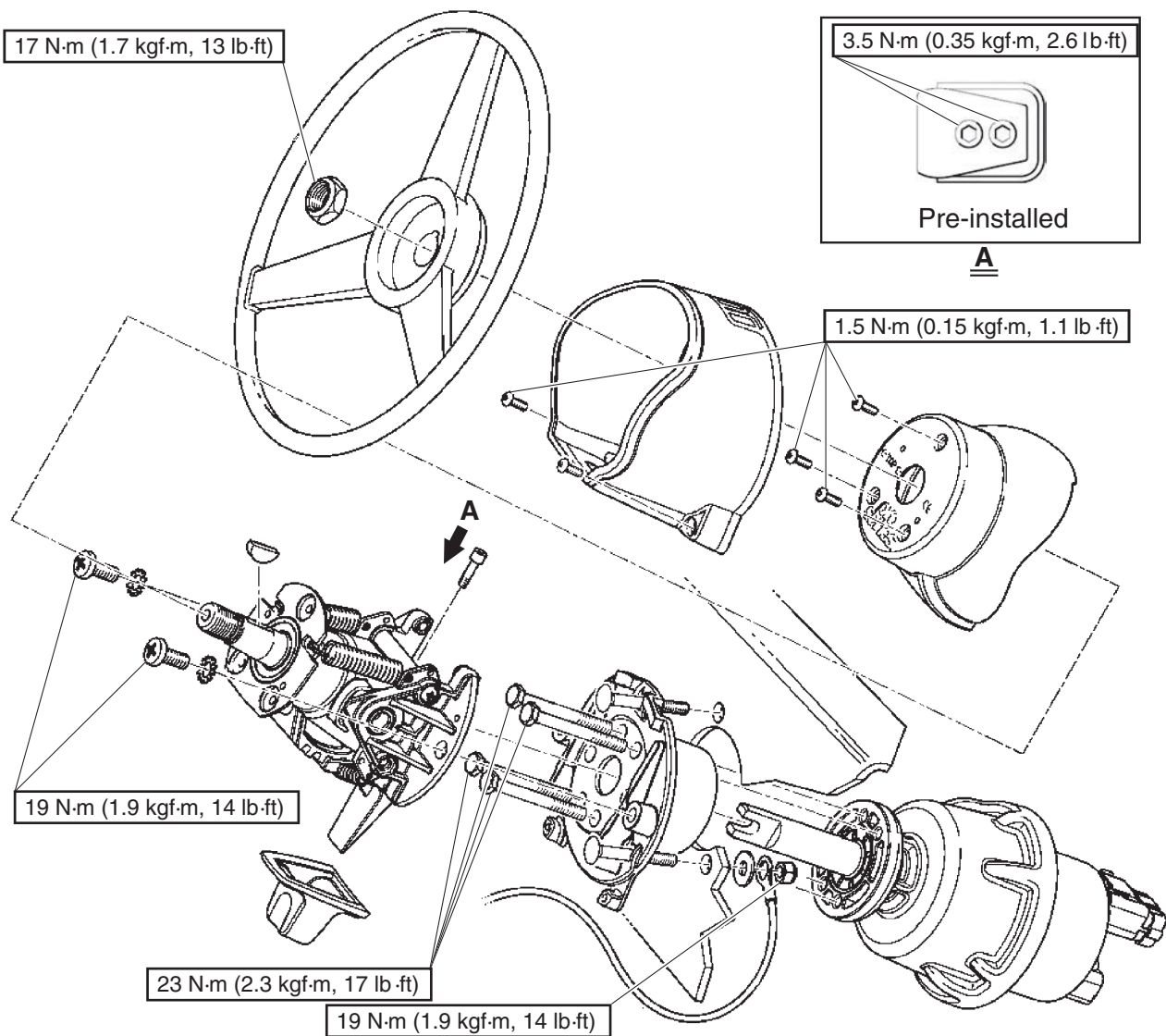
⚠ WARNING _____

**USE ONLY THE SELF-LOCKING FASTENERS PROVIDED!
SUBSTITUTING NON-SELF-LOCKING FASTENERS CAN RESULT IN LOOSENING OR SEPARATION OF EQUIPMENT, CAUSING LOSS OF STEERING CONTROL, PROPERTY DAMAGE, PERSONAL INJURY, AND/OR DEATH. DO NOT EXCEED 19 N·m (1.9 kgf·m, 14 lb·ft) TORQUE ON HELM NUTS AND BOLTS.**

Installing the Helm unit assembly (with tilt system)

TIP:

- Install one end of the ground strap between the nut and washer of one of the carriage bolts holding the adapter plate to the dash. Connect the other end to the ground of the network system or battery.
- The installation direction of the steering helm differs depending on the installation direction of the bracket.
- Check the direction of the bracket before drilling holes.
- The steering wheel is supplied as a market option.



Installing the Helm unit assembly (without tilt system)

1. Determine the steering helm installation position.

TIP: _____

There must be space for the steering wheel to be adjusted in all positions. The steering wheel may have a diameter of up to 400 mm (16 in) and its hub may have a height of up to 130 mm (5 in). There must be space to install the helm unit and to run the harnesses.

2. Install the components as shown in the figure.

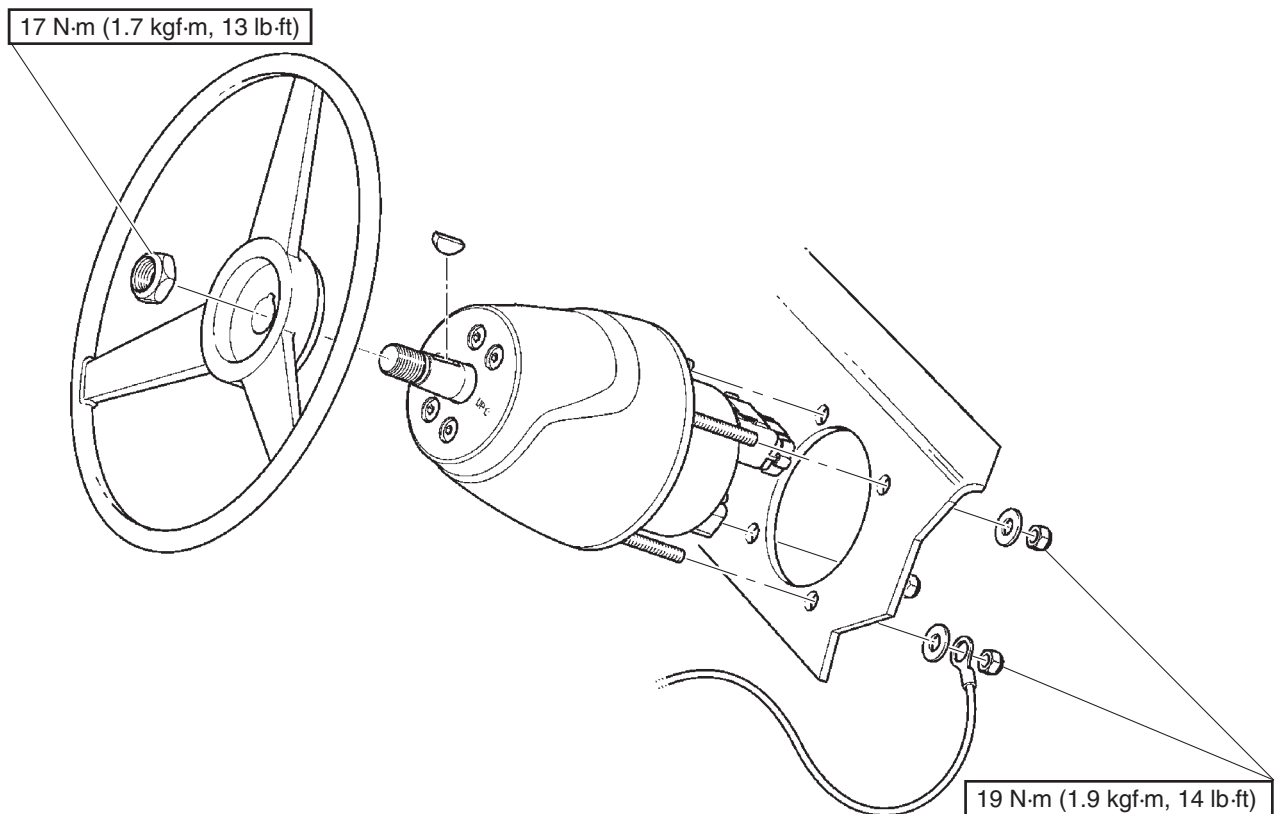
⚠ WARNING _____

**USE ONLY THE SELF-LOCKING FASTENERS PROVIDED!
SUBSTITUTING NON-SELF-LOCKING FASTENERS CAN RESULT IN LOOSENING OR SEPARATION OF EQUIPMENT, CAUSING LOSS OF STEERING CONTROL, PROPERTY DAMAGE, PERSONAL INJURY, AND/OR DEATH. DO NOT EXCEED 19 N·m (1.9 kgf·m, 14 lb·ft) TORQUE ON HELM NUTS AND BOLTS.**

Installing the Helm unit assembly (without tilt system)

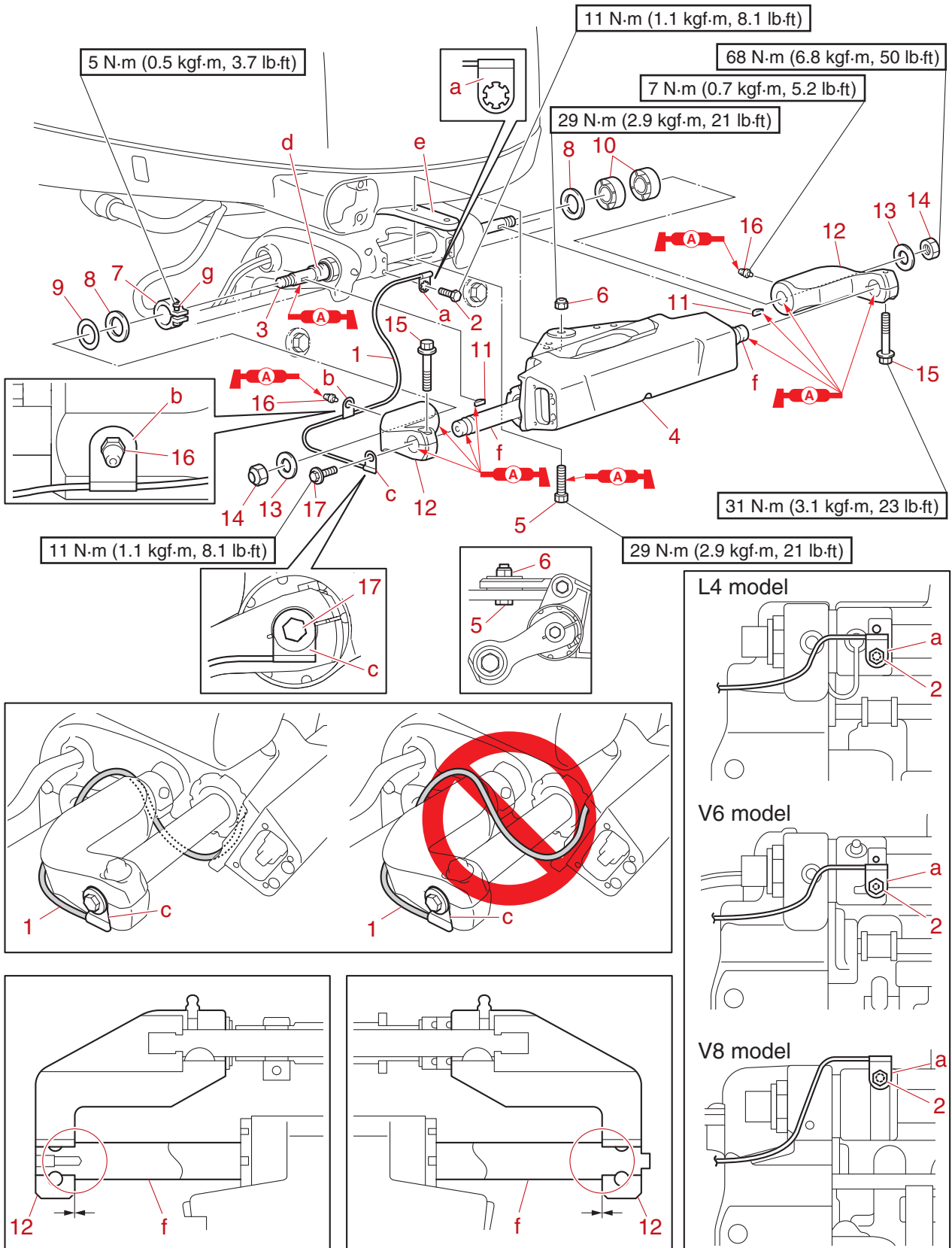
TIP:

- Install one end of the ground strap between the nut and washer of one of the carriage bolts holding the adapter plate to the dash. Connect the other end to the ground of the network system or battery.
- The installation direction of the steering helm differs depending on the installation direction of the bracket.
- Check the direction of the bracket before drilling holes.
- The steering wheel is supplied as a market option.
- F/FL150H, F/FL200N, F/LF150SA, F/LF175SA and F/LF200SA models only can be used for 6GR-762H0-10 and 6X9-762H0-10. And above mentioned models support single to twin application.



Bolt-on DES

Install the DES cylinder and ground wire (ground strap)



NOTICE

Note that the clamp of the ground wire “1” has a predetermined installation position.

Clamp “a” installation position: outboard clamp bracket

Clamp “b” installation position: The grease nipple “16” part of support bracket “12” (STBD)

Clamp “c” installation position: Right side of support bracket “12” (STBD)

To avoid the generation of noise, the DES as well as the communication line and the power line connected to the DES should not be installed within 3 m from any part of the VHF radio antenna.

1. Install the clamp “a” of the ground wire “1” using the bolt “2”.

TIP:

- Install clamp “a” of the ground wire “1” so that the convex portion of the crimped section faces upward and outside, and is horizontal.
 - As the L4 and V6 models have two bolt holes (STBD) for the clamp bracket, install them to the lower bolt hole (along with the tilt limiter).
 - Install the clamp “a” of the ground wire “1” to the upper side of the tilt limiter.
-

2. Insert the support rod “3” into through-tube “d”.
3. Install the DES cylinder “4” to steering arm “e” using the link rod bolt “5” and self-locking nut “6”.

NOTICE

As link rod bolt “5” is a high-strength bolt, do not substitute it with other bolts.

4. Install the adjuster nut “7” to through-tube “d”, and screw in all the way by turning clockwise.
5. Install the washers “8”, and spacers “9” and “10”.
6. Install the woodruff keys “11” to the support rod “3”, and then install support brackets “12”.

NOTICE

Make sure that support brackets “12” are seated on the end of DES cylinder rods “f”.

7. Install the washers “13” and self-locking nuts “14”.
8. Install the support bracket bolts “15”.
9. Turn adjuster nut “7” counterclockwise until there is no more free play of support rod “3”, and fasten it with hexagon socket head bolt “g”.
10. Install the clamps “b”, “c” of the ground wire “1” using the grease nipple “16” (STBD) and bolt “17”.

NOTICE

Ground wire “1” should pass under the through-tube “d”.

TIP:

Install clamps “b”, “c” of the ground wire “1” so that the convex portion of the crimped section faces downward and outside, and is horizontal.

11. Install the grease nipple “16” (PORT) and inject grease from the grease nipples “16” (PORT and STBD).

NOTICE

Apply grease to the following parts every 200 hours (1 year).

- Support rod “3”
- Rod insertion part of support brackets “12”
- Support bracket bolts “15”
- Grease nipples “16”

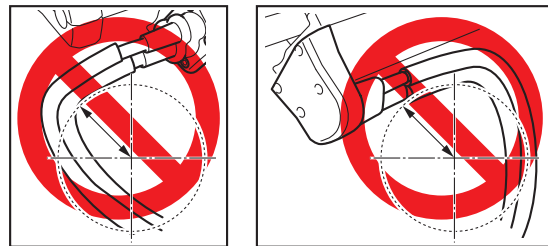
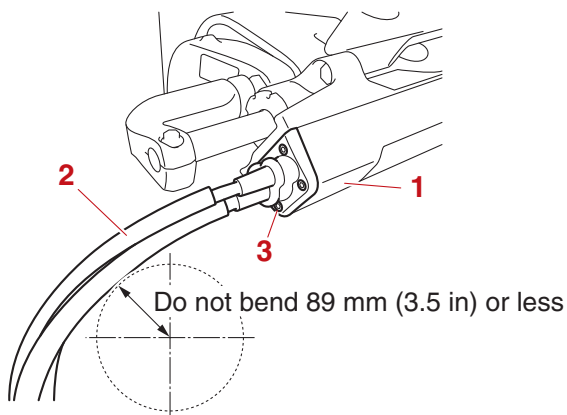
Connect the DES wire harness to the DES cylinder

See “Connect the DES wire harness” (page 141) for the DES wire harness selection.

1. Connect the DES wire harness “2” to DES cylinder “1”, and fasten it with four DES wire harness bolts “3”.

NOTICE

For DES wire harness “2”, be sure not to make the bending radius 89 mm (3.5 in) or less.



DES wire harness bolt “3”
2.3 N·m (0.23 kgf·m, 1.7 lb·ft)

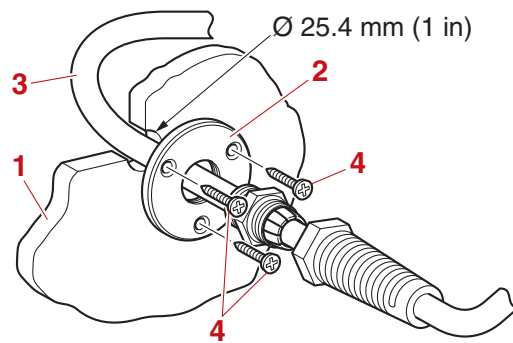
Install the bulkhead fitting

This step is not required for harnesses without bulkhead fittings. See “Connect the DES wire harness” (page 141) for the DES wire harness selection.

1. Determine the bulkhead fitting installation position.
2. Make holes in the bulkhead using the template. See “Bulkhead fitting” (page 351) in Template.

TIP:

- For bulkhead fitting “2” dimensions and screws “4” diameter, see appendix “Bulkhead fitting” (page 351).
- Repeat the same process in three places.



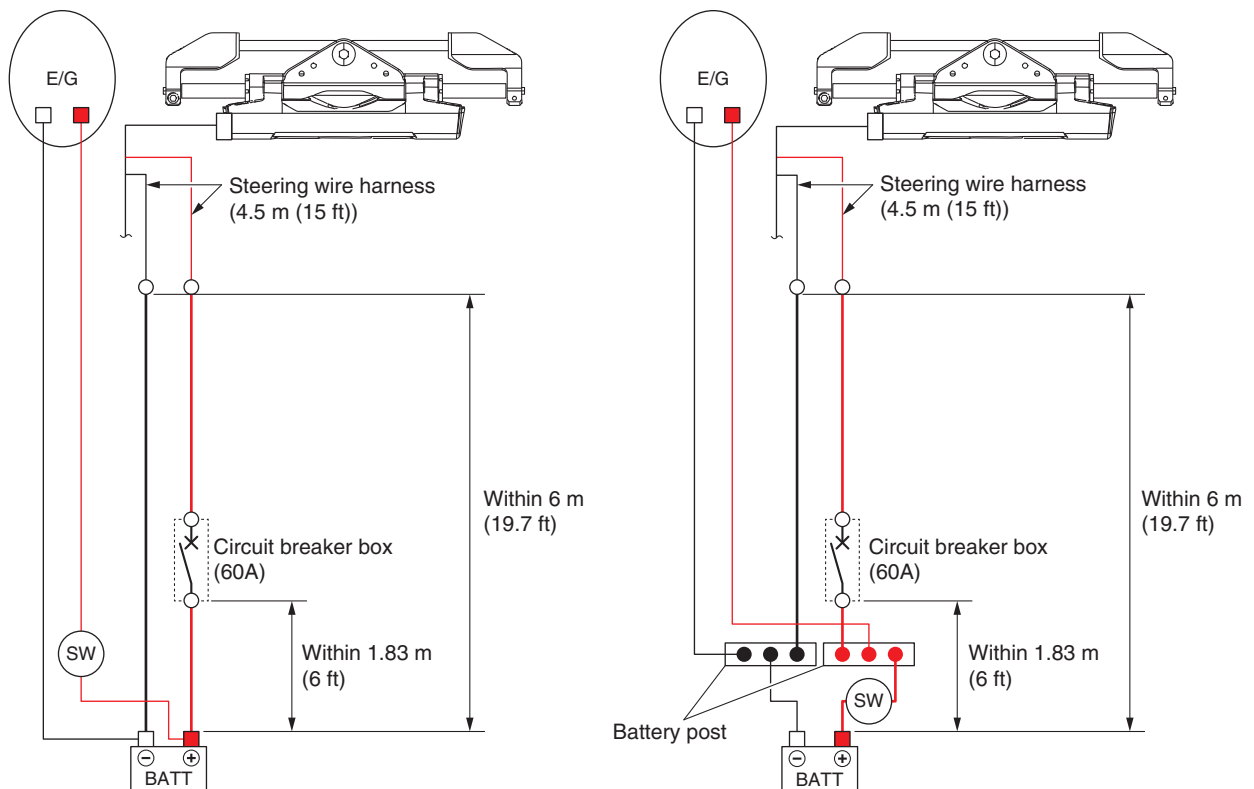
Connect the DES wire harness to the battery

NOTICE

- When extending the power line, install a circuit breaker box (60A) within 1.83 m (6 ft) from the battery.
- Use a battery extension cable of 14 sq (AWG6) or more, with a maximum length of 6 m (19.7 ft).
- When using the battery post, install a circuit breaker box (60A) between the battery post and the DES.
- Be sure to connect the positive and negative electrodes when cutting or extending the power line.

TIP:

Connect the power line of the DES wire harness to the engine battery.



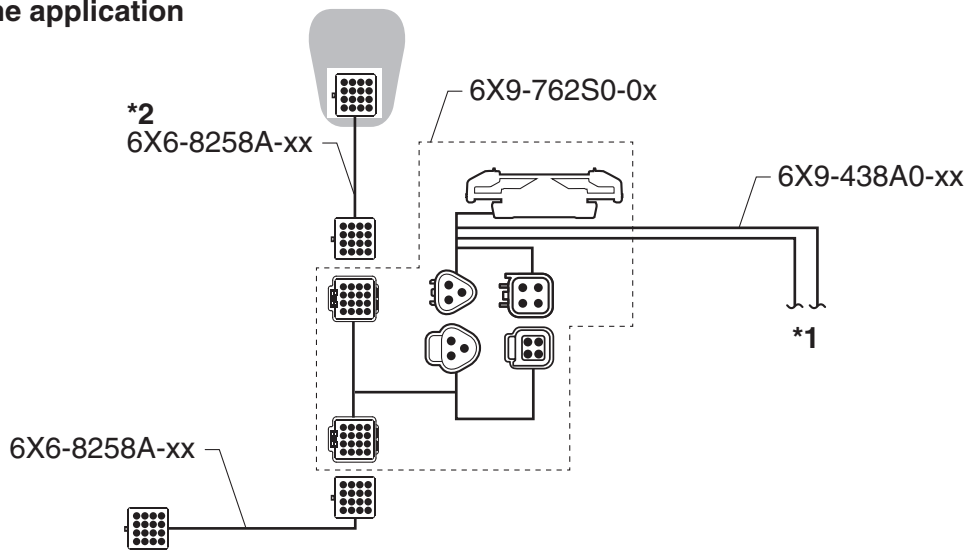
Connect the DES wire harness

Pigtail bus wire	
Part No.	Length
6Y8-82521-01	0.3 m (1 ft)
6Y8-82521-11	0.6 m (2 ft)
6Y8-82521-21	0.9 m (3 ft)
6Y8-82521-31	1.8 m (6 ft)
6Y8-82521-41	2.7 m (9 ft)
6Y8-82521-51	3.6 m (12 ft)
Main wire harness (16P)	
Part No.	Length
6X6-8258A-91	1.5 m (5 ft)
6X6-8258A-51	3.7 m (12 ft)
6X6-8258A-61	5.2 m (17 ft)
6X6-8258A-01	6.1 m (20 ft)
6X6-8258A-11	7.0 m (23 ft)
6X6-8258A-21	8.0 m (26 ft)
6X6-8258A-31	10 m (32 ft)
6X6-8258A-41	12 m (39 ft)
6X6-8258A-71	15 m (49 ft)
6X6-8258A-81	24 m (79 ft)
DES wire harness	
Part No.	Length
6X9-438A0-00	2.4 m (8 ft), straight
6X9-438A0-10	4.5 m (15 ft), straight
6X9-438A0-20	2.4 m (8 ft), U-shape
6X9-438A0-30	4.5 m (15 ft), U-shape
6X9-438A0-40	2.4 m (8 ft), U-shape (without bulkhead fitting)
SCU link harness (PORT/STBD)	
Part No.	Length
6X9-81115-00	0.3 m (1 ft)
6GR-81115-00	1.5 m (5 ft)
6GR-81115-10	3.0 m (10 ft)
SCU link harness (CENTER)	
Part No.	Length
6X9-81115-10	0.3 m (1 ft)
6GR-81115-20	1.5 m (5 ft)
6GR-81115-30	3.0 m (10 ft)

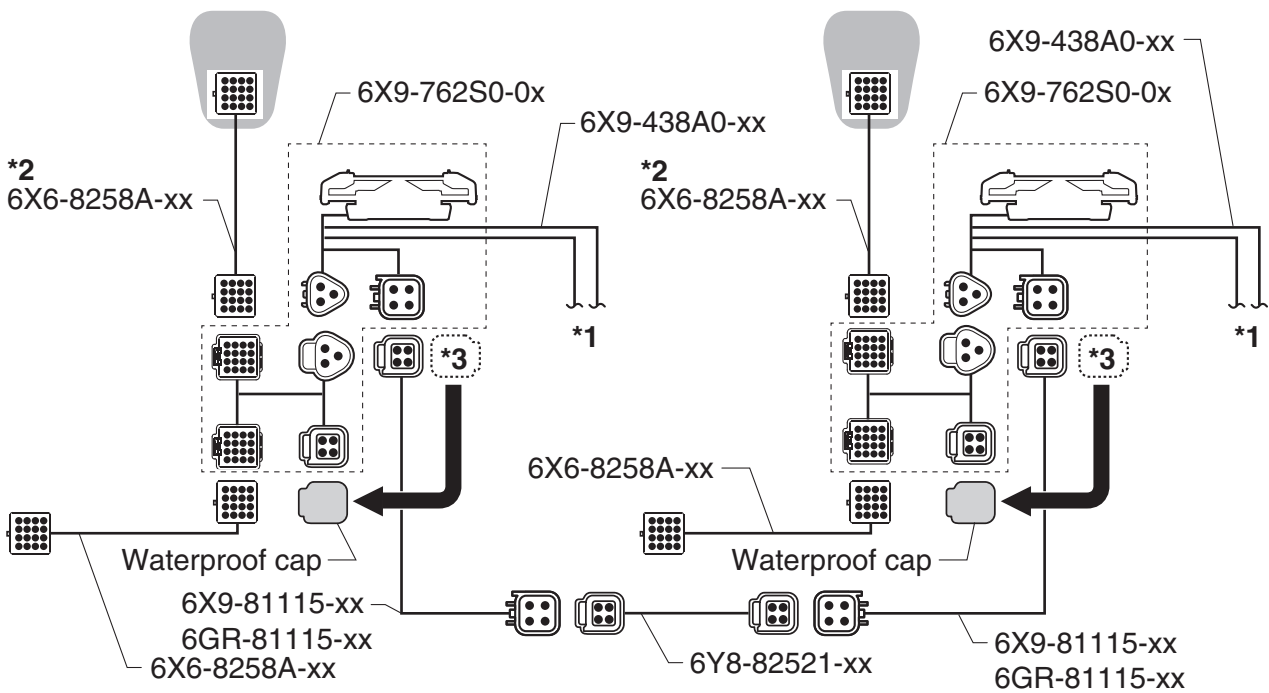
TIP:

- *1. For the connection to the battery, see “Connect the DES wire harness to the battery” (page 140).
- *2. Select from 1.5 m (5 ft) or 3.7 m (12 ft)
- *3. Remove the waterproof caps from the SCU link harness, and then install the cap to the coupler (4P) on the SCU split harness.

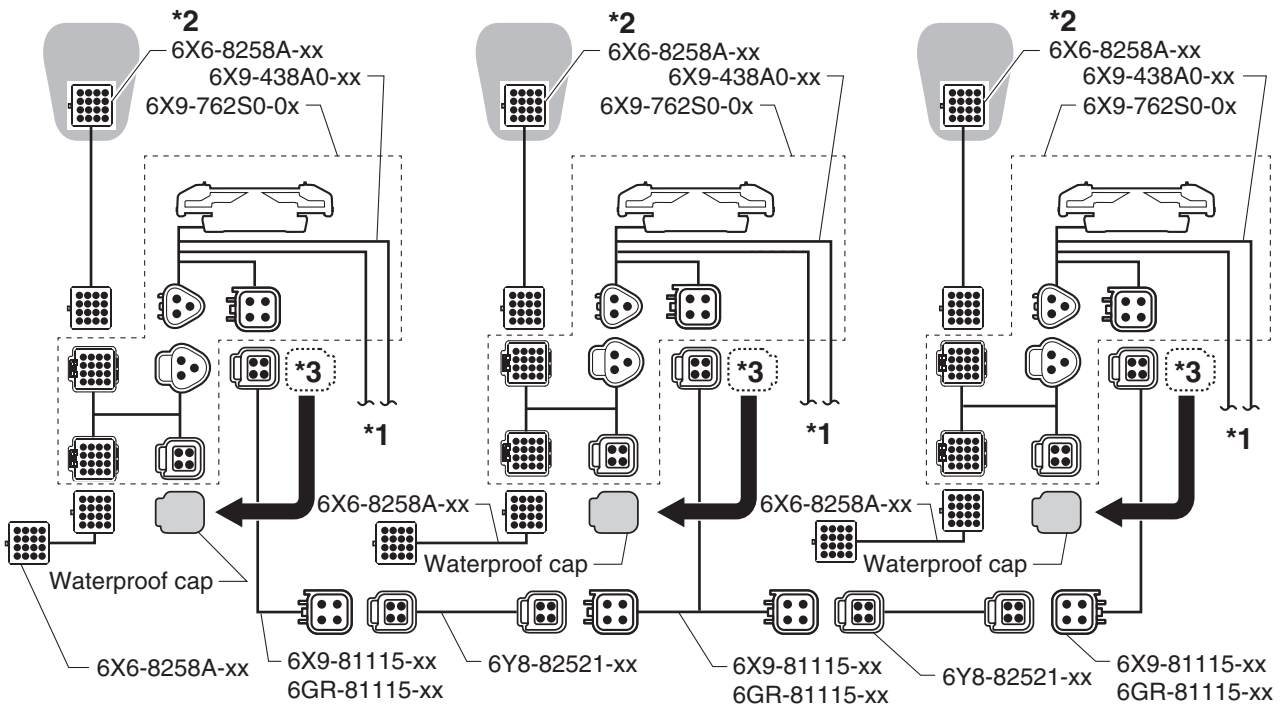
Single engine application



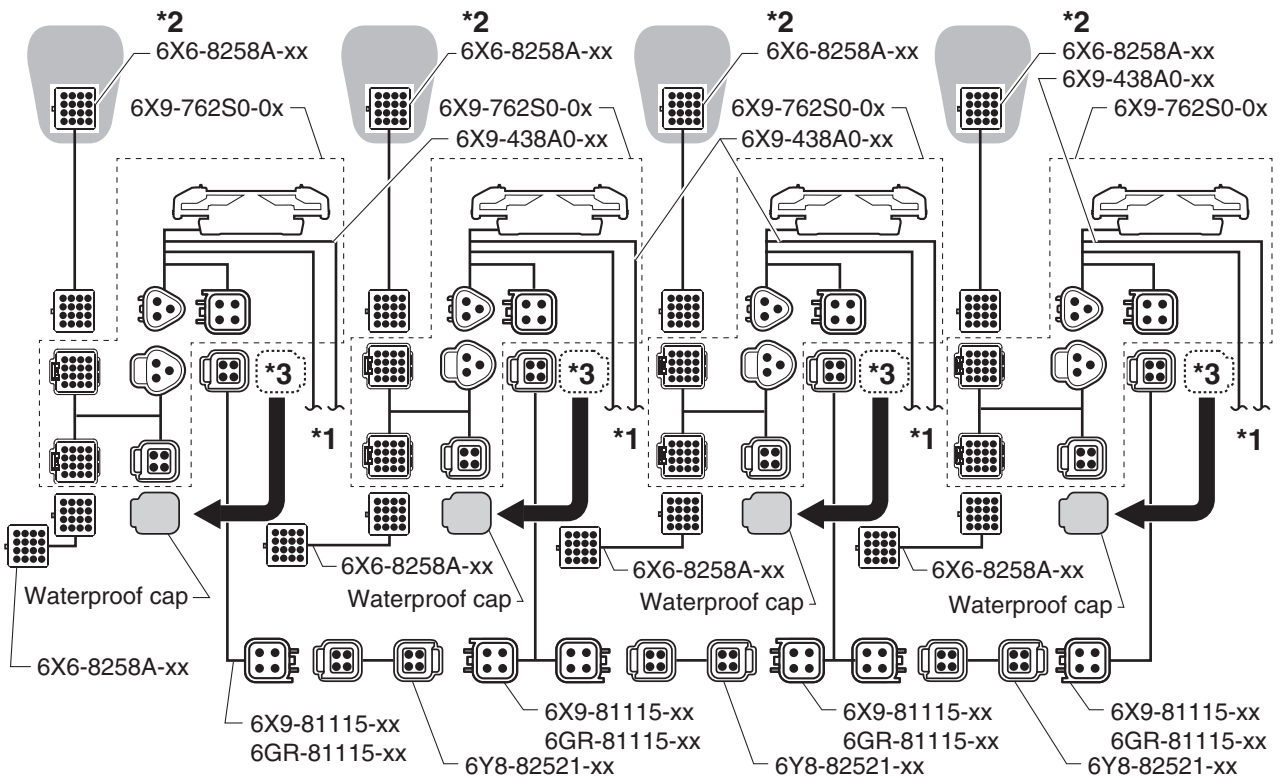
Twin engine application



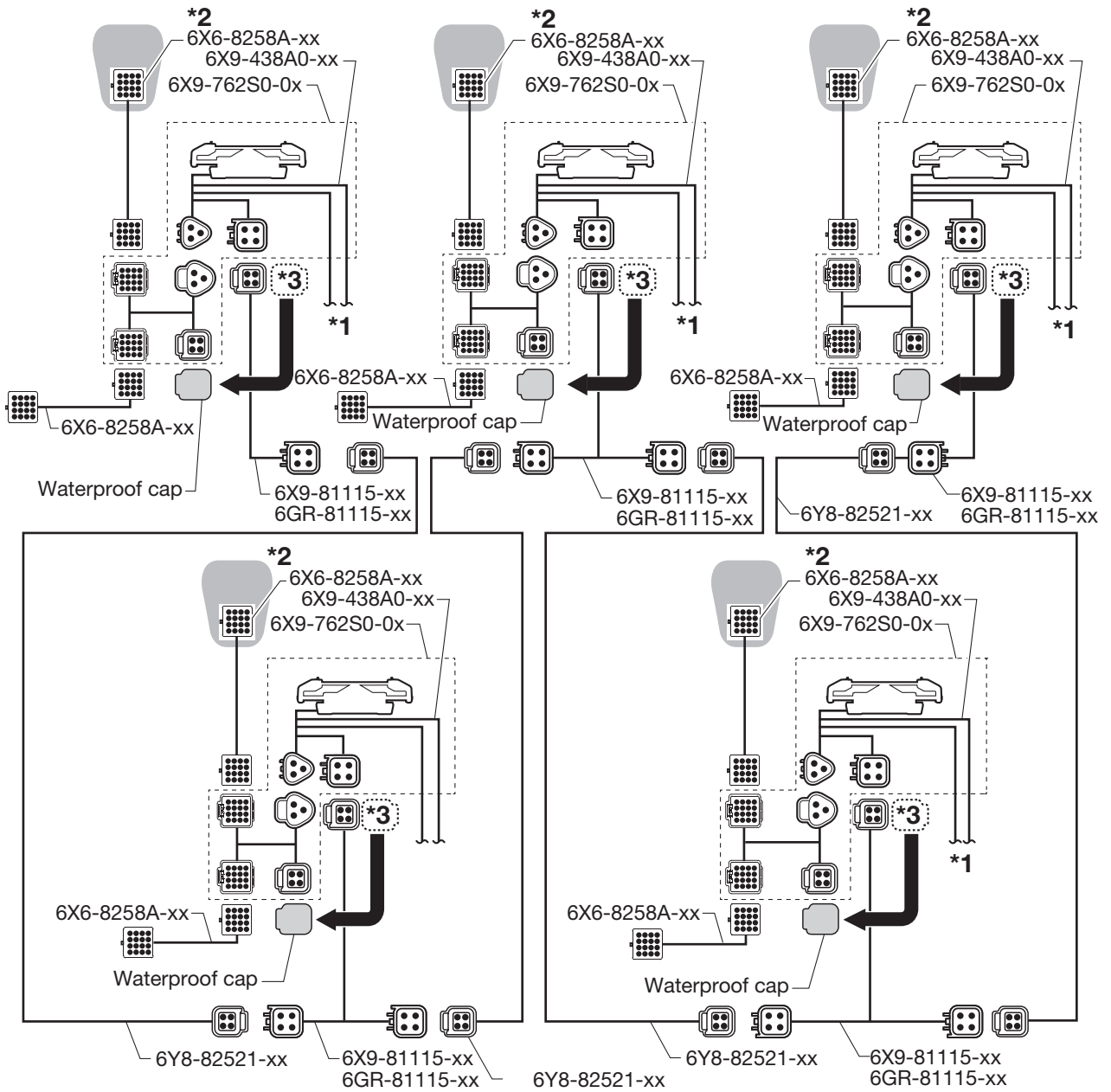
Triple engine application



Quad engine application



Quint engine application



Built-in DES

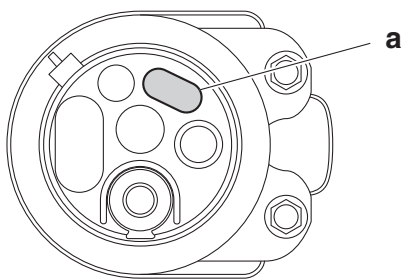
Connect the SCU link cable

To improve working efficiency for the rigging of multiple engine applications, start from the outboard motor on the port side of the boat.

1. Insert the SCU link cable into the bottom cowling.

TIP: _____

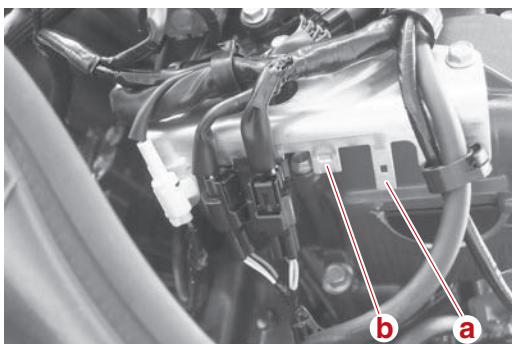
Route the SCU link cable to the SCU link cable hole "a".



2. Install the SCU link cable coupler.

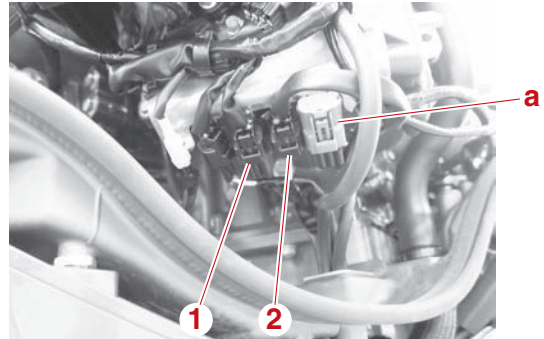
TIP: _____

- For the port or starboard outboard motor of multiple engine applications, install the coupler (6-pins) onto the tab "a" and install the coupler (4-pins) onto the tab "b".
- For the center outboard motor of multiple engine applications, install the coupler (4-pins) onto the tab "b".

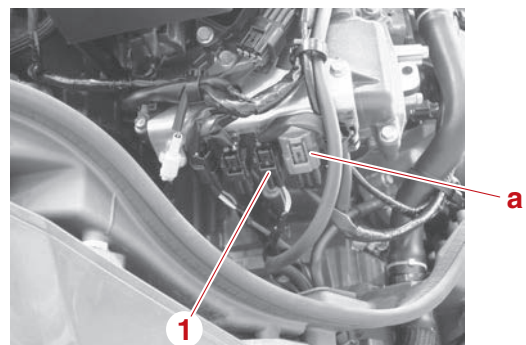


3. Disconnect the SCU harness coupler "1".

4. Remove the coupler cap from the SCU link cable coupler (4P) "2", and then install the cap to the SCU harness coupler (4P) "1" (female section).



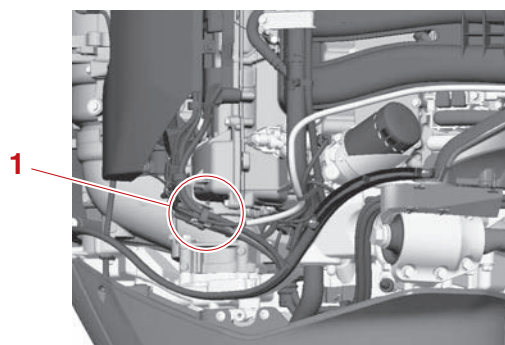
- a. For the port or starboard outboard motor of multiple engine applications only.
5. Connect the SCU harness coupler (male section) to the SCU link cable coupler (4P) "1".



- a. For the port or starboard outboard motor of multiple engine applications only.
6. Fasten the SCU link cable using the holder "1" shown in the illustration.

TIP: _____

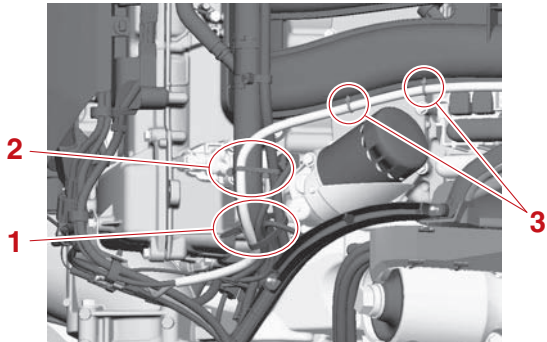
Make sure that there is no slack in the wire harness.



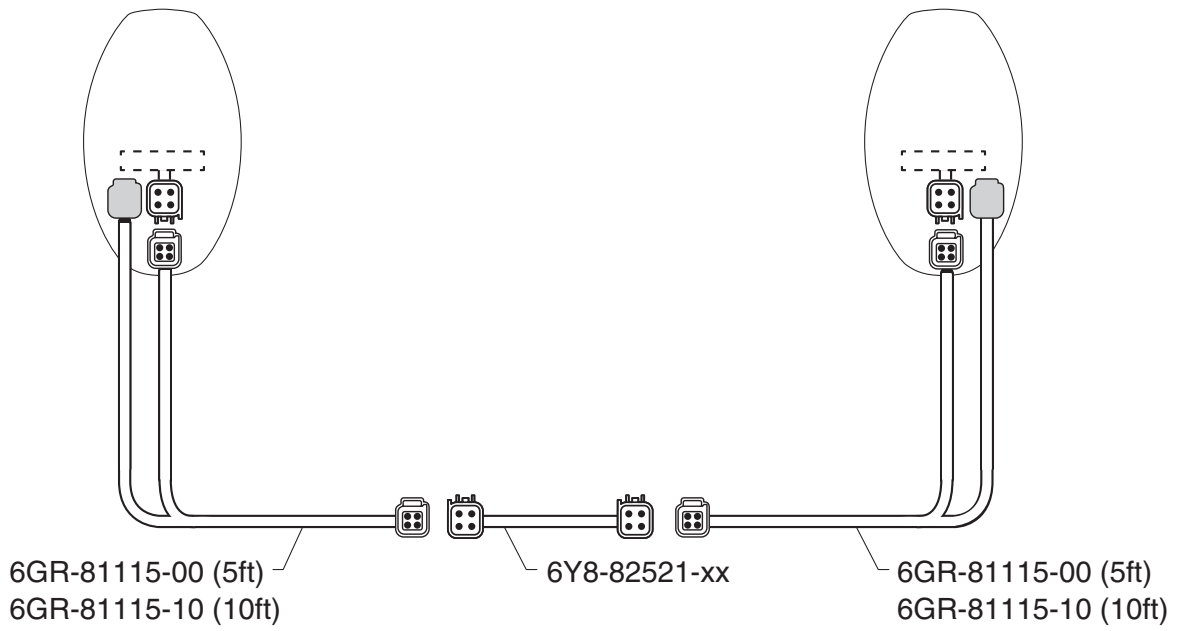
7. Fasten the SCU link cable using the plastic ties “1”, “2”, and “3” at the 4 locations shown in the illustration.

TIP: _____

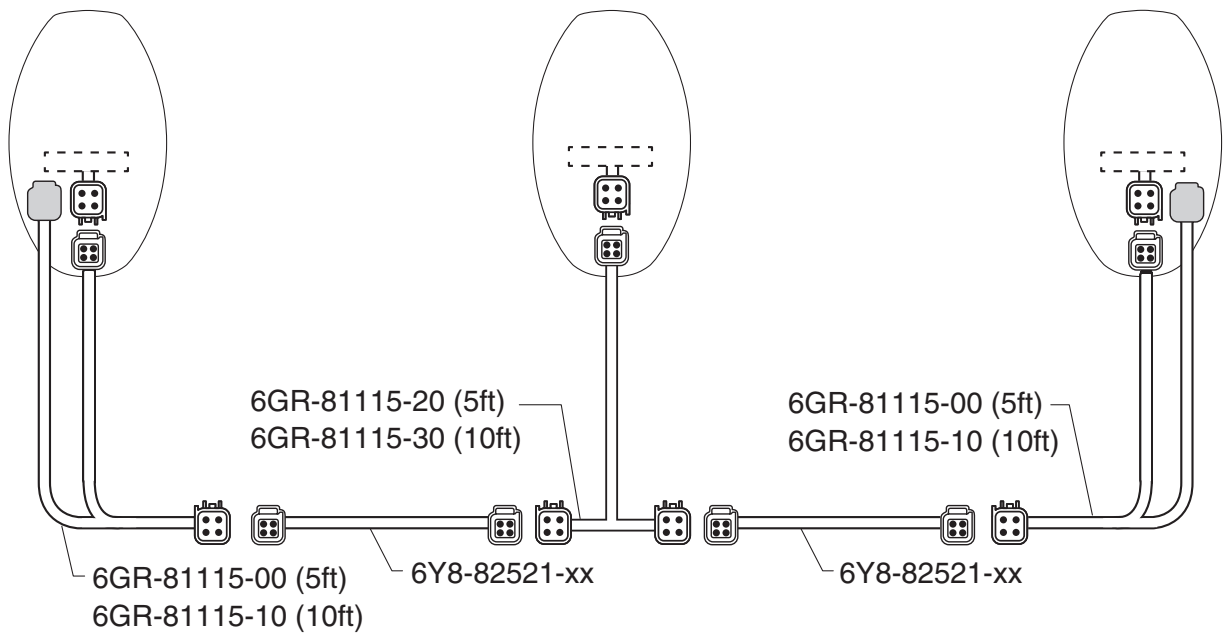
- Make sure that the SCU link cable does not contact the oil filter.
 - Make sure that there is no slack in the wire harness.
-



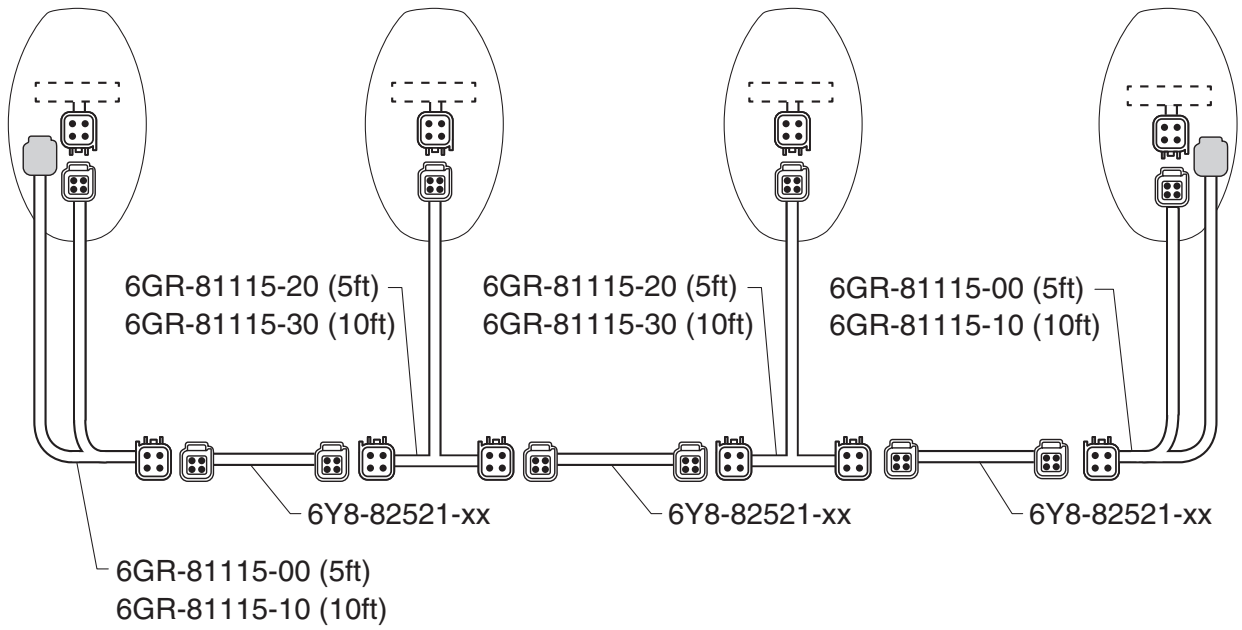
Twin



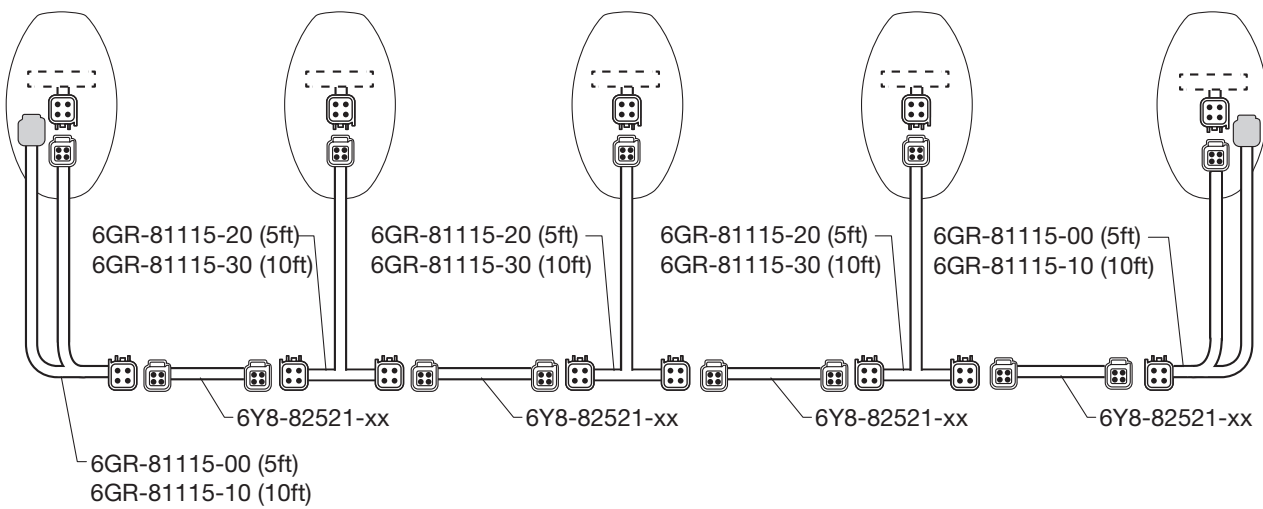
Triple



Quad



Quint



Installing the Autopilot panel

NOTICE

- Install the wire harnesses so that they do not come into contact with any edges or moving parts that may cause shearing. Do not apply excessive force when pulling on the wire harnesses to lay them out.
 - Do not connect to the NMEA2000 from multiple gateways at the same time on one Yamaha digital network (multi-hub). There is a risk of causing an abnormality on the information display on the Yamaha gauge.
-

TIP:

- If you are using MFD Interface Type-1 and acquiring route information from a compatible MFD, then the 6YG gateway is not needed.
 - The 6YG gateway is included in the MFD Interface Type-2 kit.
 - If you are acquiring route information from some other 3rd party MFD and you want to use the TRACK POINT and DRIFTPOINT TRACK functions, you need to purchase and install a separate 6YG gateway.
 - If you do not use the TRACK POINT and DRIFTPOINT TRACK functions, a 6YG gateway is not needed. HEADING HOLD, COURSE HOLD, PATTERN STEER, STAYPOINT, FISHPOINT and DRIFTPOINT function without a gateway.
-

1. Determine the Autopilot panel installation position.
2. Make holes in the console using the template.
See “Autopilot panel” (page 350) in Template.
3. Connect the BCU harness.

TIP:

- *1: If an extension harness is needed, disconnect the coupler and put in the extension harness.
-

BCU harness extension (Optional)	
Part No.	Length
6X9-82521-00	4.6 m (15 ft)
6X9-82521-10	9.1 m (30 ft)

Installing the Heading sensor

NOTICE

- Do not install or store the 6X9 Heading Sensor near strong magnets, including speakers. A strong magnetic field can permanently damage the sensor.
 - Do not install or store the 6X9 Heading Sensor near steering wheel.
 - When drilling or cutting, always check what is on the opposite side of the surface.
-

TIP:

- If the needle on the hand-held compass moves when you hold it where you intend to mount the sensor, magnetic interference is present. You must choose another location and test again.
 - A hand-held compass should be used to test for magnetic interference at the mounting location.
 - The sensor should also be mounted at least 2 ft (60 cm) away from high-current wires/devices such as water pumps or motors.
 - The sensor should be mounted at least 2 ft (60 cm) away from any ferrous/iron-containing objects such as a toolbox, steering helm, or compass.
 - Heading sensor can be mounted in any direction. For best performance, it should be mounted on the centerline and close to the ground. (To reduce effect of pitch and roll of boat during acceleration)
 - Every time you install a new heading sensor or change the position of the heading sensor, you need to do heading sensor calibration via a Yamaha Display.
 - The sensor should be mounted with the cable facing toward the front of the boat for best performance.
-

1. Determine the Heading sensor installation position.
2. Make holes in the console using the template.
See "Heading sensor" (page 351) in Template.
3. Connect the conversion harness and pigtail bus wirer.

Installing the BCU

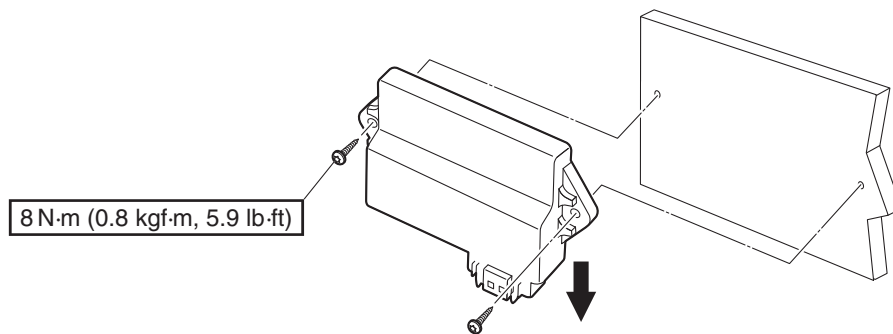
NOTICE

Do not install or store the sensor near strong magnets, including speakers. A strong magnetic field can damage the sensor.

1. Determine the BCU installation position.

TIP:

Install the boat control unit coupler facing downward.

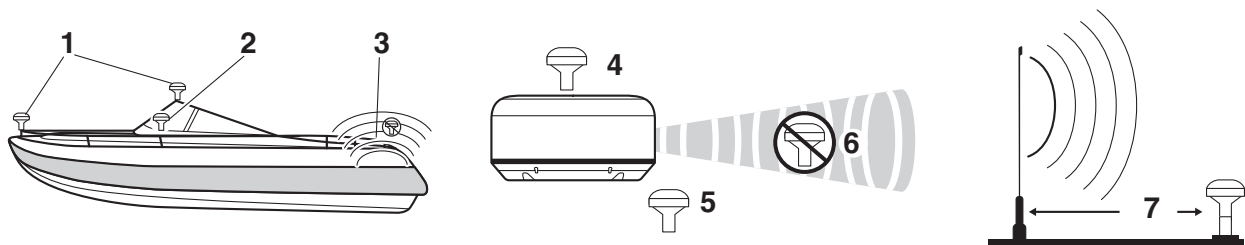


2. Make holes in the console using the template.
See “BCU” (page 351) in Template.
3. Connect the BCU harness.

Installing the GPS unit

NOTICE

- To ensure the best reception, the antenna should be mounted in a location that has a clear, unobstructed view of the sky in all directions “1”.
- The antenna should not be mounted where it is shaded by the superstructure of the boat “2” a radome antenna, or the must.
- The antenna should not be mounted near the engine or other sources of Electromagnetic Interference (EMI) “3”.
- If a radar is present, it is best to install the antenna above the path of the radiator “4”, though it is acceptable to install it below the path of the radar “5” if necessary. The antenna should not be installed directly in the path of the radar “6”.
- The antenna should be mounted at least 3 ft (1 m) away from (preferably above) the path of a radar beam of a VHF radio antenna “7”.



Testing the Mounting Location

1. Temporarily secure the antenna in the preferred mounting location and test it for correct operation.
2. If you experience interference with other electronics, move the antenna to a different location, and test it again.
3. Repeat steps 1-2 until you can verify that the antenna operates correctly.
4. Permanently mount the antenna.
5. GPS should be mounted far (> 150 cm / 4.9 ft.) from any compass.

Surface Mount

Before you permanently mount the antenna, test the mounting location for correct operation. Use the surface-mount bracket “1” as your mounting template.

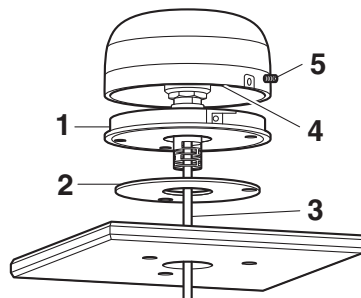
1. Drill the three 1/8 in (3.2 mm) pilot holes. (Using template)

TIP:

If you are mounting the GPS on fiberglass, it is recommended to use a countersink bit to drill a clearance counter bore through the top gelcoat layer (but no deeper).

This will help to avoid cracking in the gelcoat layer when the screws are tightened.

2. Use a 1 in (25 mm) hole saw to cut the cable hole in the center.
3. Place the seal pad “2” on the bottom of the surface-mount bracket, aligning the screw holes.
4. Use the included M4 screws to attach the surface-mount bracket to the mounting surface.
5. Route the cable “3” through the 1 in (25 mm) hole and connect it to the antenna.
6. Verify that the large gasket “4” is in place on the bottom of the antenna, place the antenna on the surface-mount bracket, and twist it clockwise to lock it in place.
7. Secure the antenna to the mounting bracket with the included M3 set screw “5”.
8. Route the cable away from sources of electronic interference, and connect it to network.



Pole mount

With the included pole-mount adapter attached to the antenna, you can install it on a standard 1 in. OD, 14 threads per inch, pipe-threaded pole (not included)

You can route the cable outside of the pole or through the pole.

Before you permanently mount the antenna, test the mounting location for correct operation.

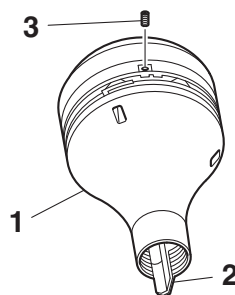
Mounting the Antenna with the Cable Routed Outside of the Pole

1. Route the cable through the pole-mount adapter “1”, and place the cable in the vertical slot “2” along the base of the pole-mount adapter.
2. Screw the pole-mount adapter onto a standard 1 in. OD, 14 threads per inch, pipe-threaded pole (not included).

NOTICE

Do not overtighten the adapter on the pole.

3. Connect the cable to the antenna.
4. Place the antenna on the pole-mount adapter, and twist it clockwise to lock it in place.
5. Secure the antenna to the adapter with the included M3 set screw “3”.



6. With the antenna installed on the pole mount, fill the remaining gap in the vertical cable slot with a marine sealant (optional).
7. Attach the pole to the boat if it is not already attached.
8. Route the cable away from sources of electronic interference, and connect it to the network.

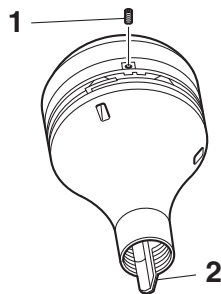
Mounting the Antenna with the Cable Routed Through the Pole

1. Position a standard 1 in. OD, 14 threads per in., pipe-threaded pole (not included) in the selected location, and mark the approximate center of the pole.
2. Drill a hole using a 3/4 in. (19 mm) drill bit for the cable to pass through.
3. Fasten the pole to the boat.
4. Thread the pole-mount adapter onto the pole.

NOTICE

Do not overtighten the adapter on the pole.

5. Route the cable through the pole and connect it to the antenna.
6. Place the antenna on the pole-mount adapter and twist it clockwise to lock it in place.
7. Secure the antenna to the adapter with the included M3 set screw "1".
8. With the antenna installed on the pole mount, fill the vertical cable slot "2" with a marine sealant (optional).



9. Route the cable away from sources of electronic interference, and connect it to network.
10. Connect the GPS unit harness.

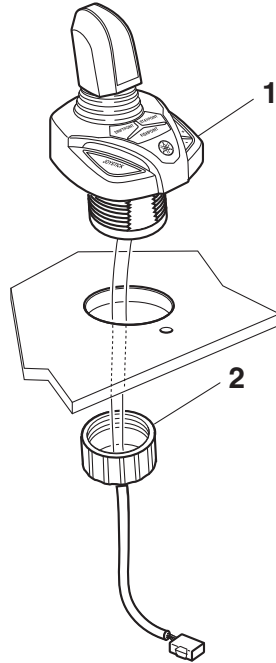
TIP:

Due to communications standards, use only the 6Y8-82521-01 or 6Y8-82521-11 pigtail bus wires for the GPS, do not use the -21, -31, -41, or -51.

Pigtail bus wire	
Part No.	Length
6Y8-82521-01	0.3 m (1 ft)
6Y8-82521-11	0.6 m (2 ft)

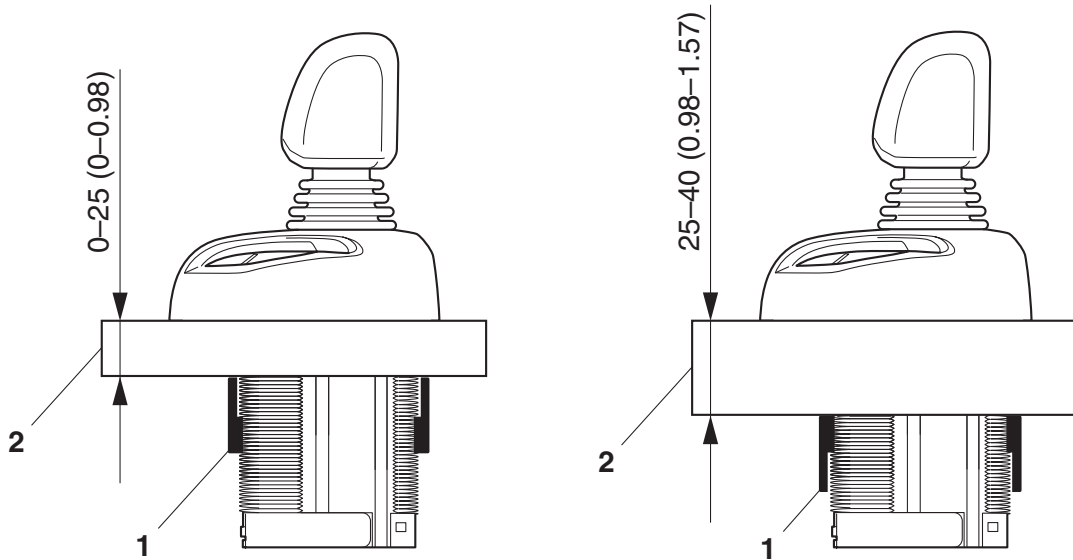
Installing the Joystick

1. Determine the Joystick installation position.
2. Make holes in the console using the template. See “Joystick” (page 356) in Template.
3. Install the joystick “1”, and then tighten the ring nut “2”.



Ring nut direction

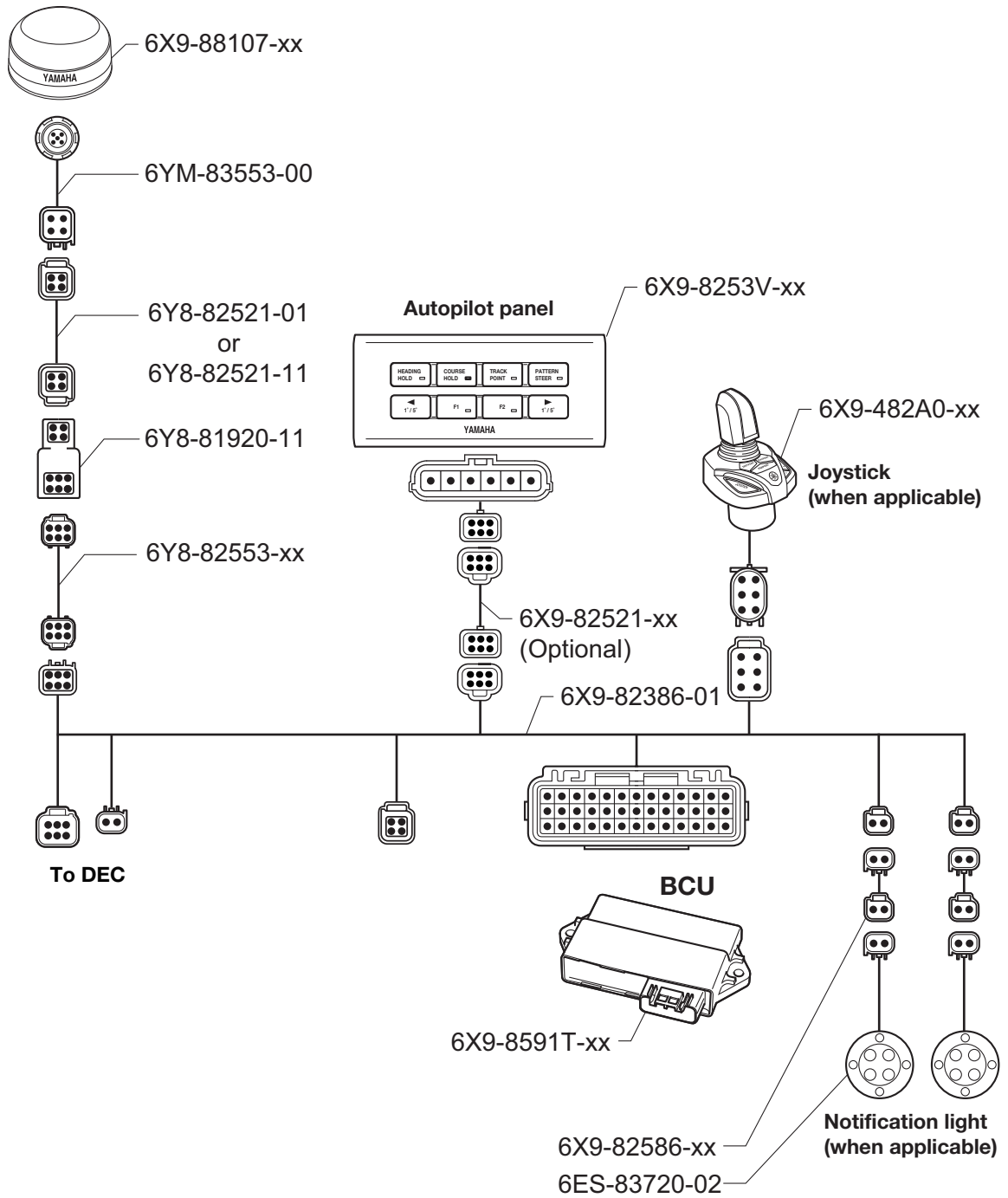
mm (in)



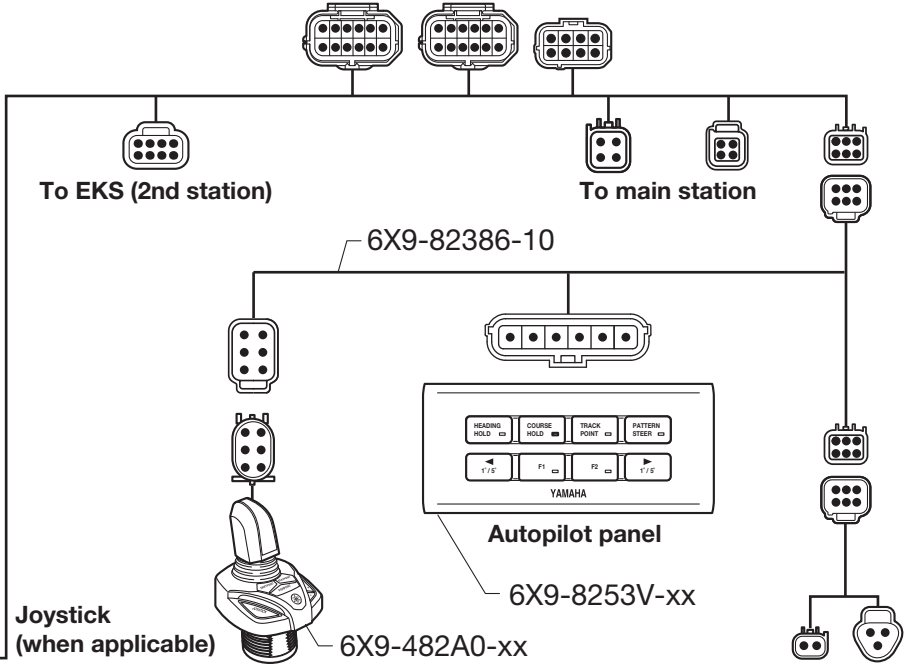
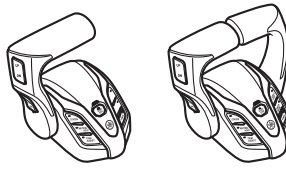
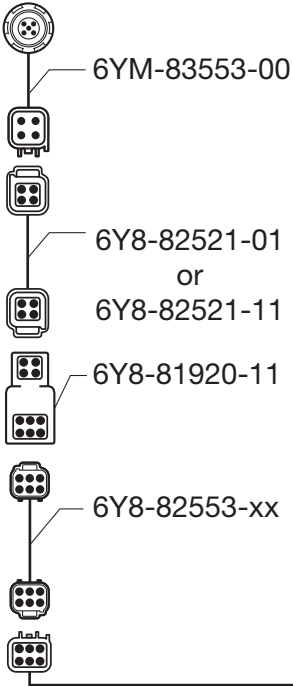
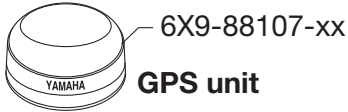
1. Ring nut
2. Console

4. Connect the BCU harness and joystick.

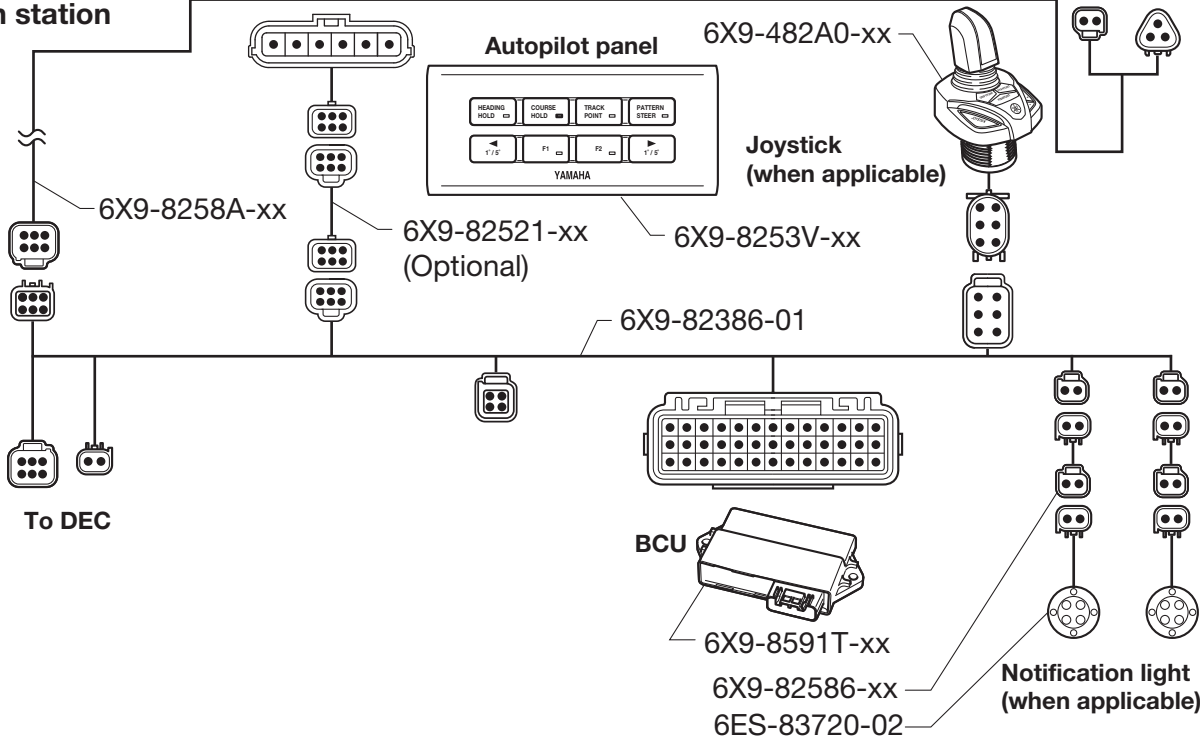
Single station



Dual station
2nd station



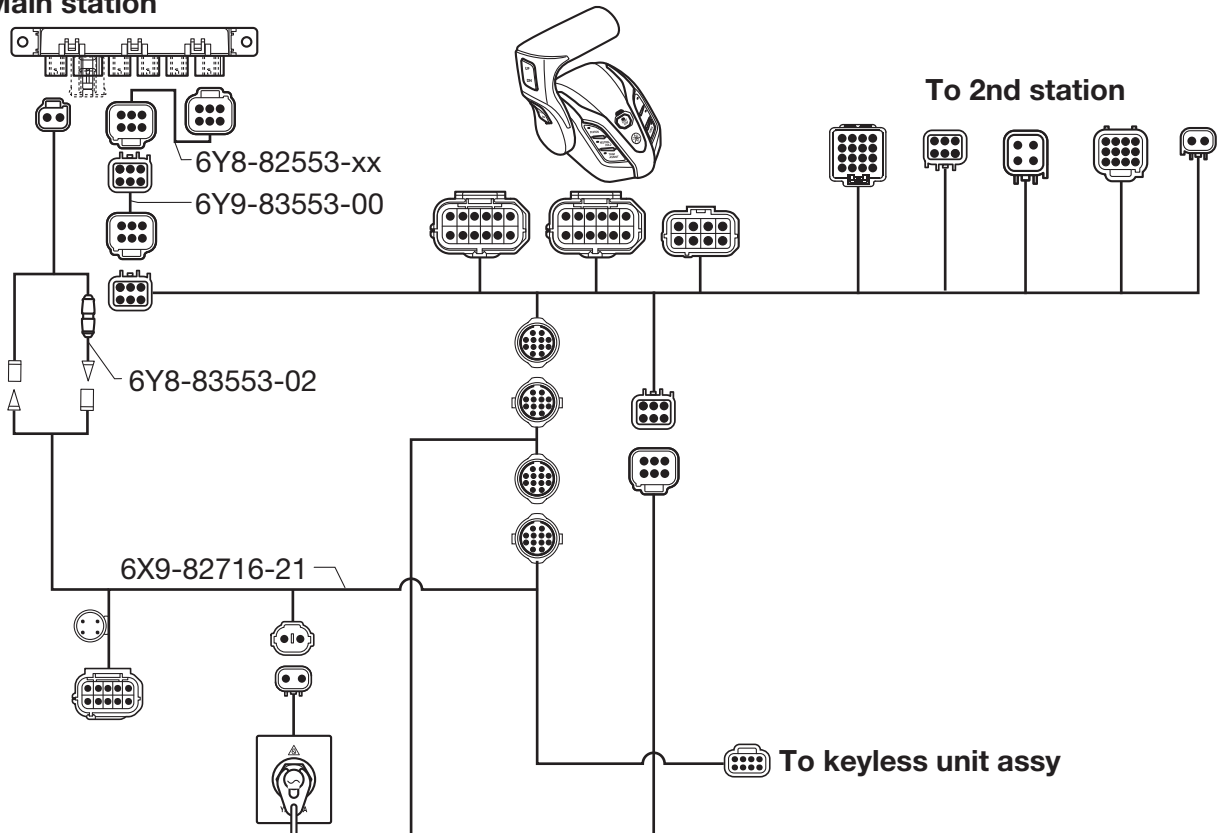
Main station



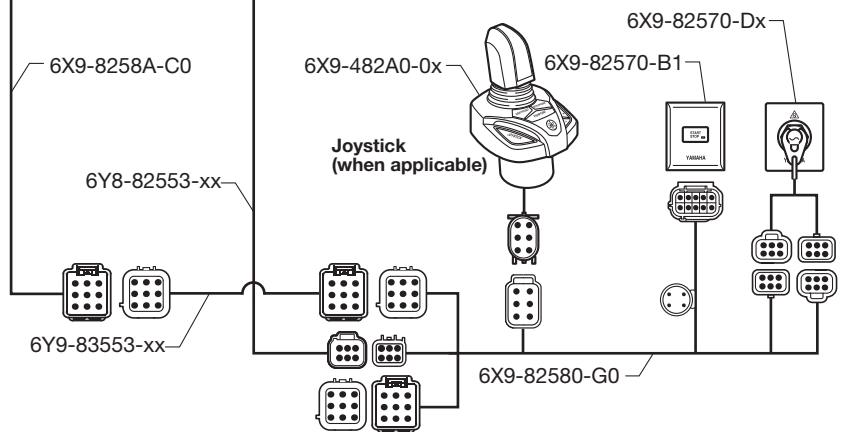
Joystick station

Single engine application

Main station

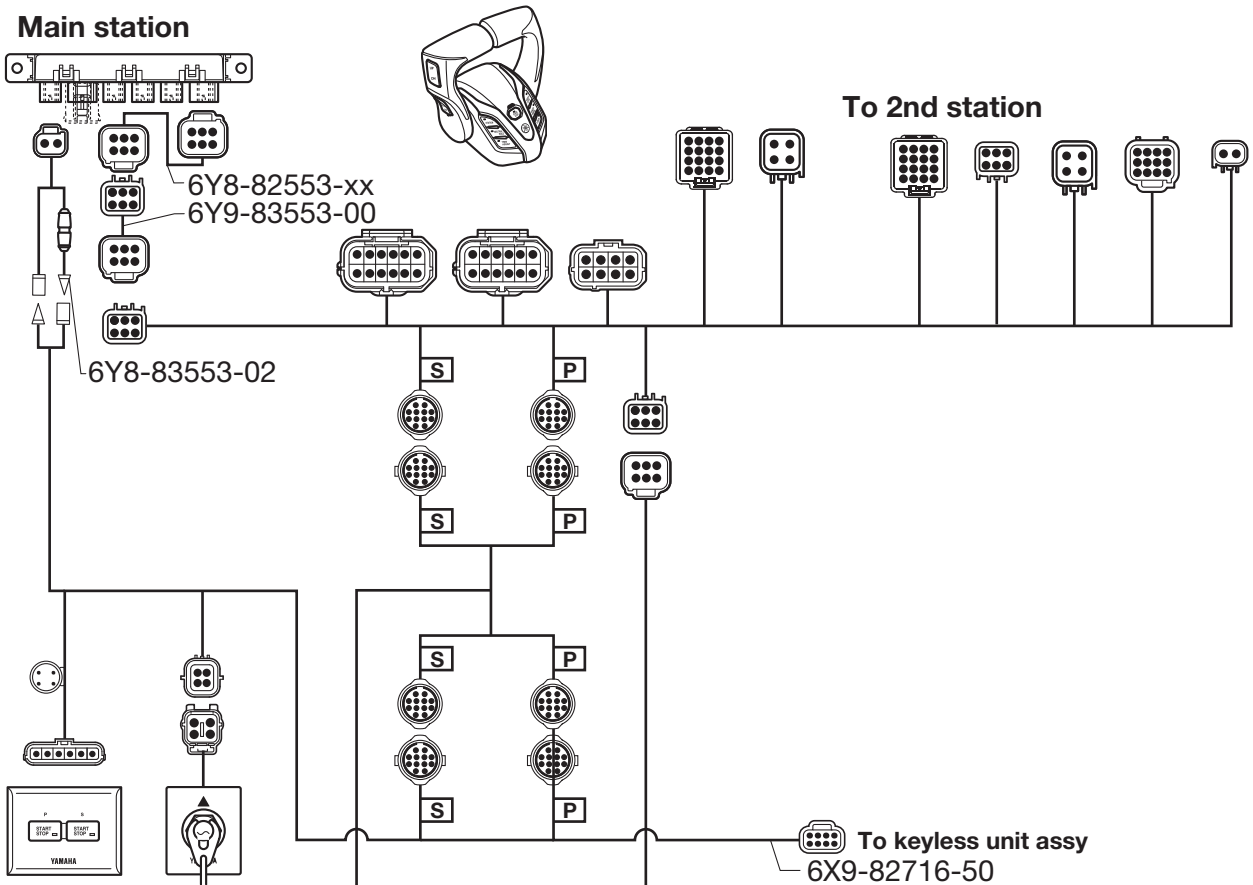


Joystick station

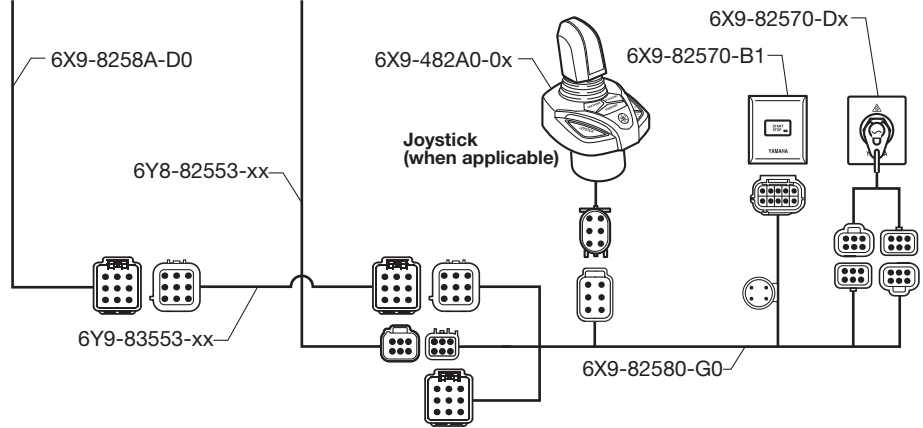


Twin engine application

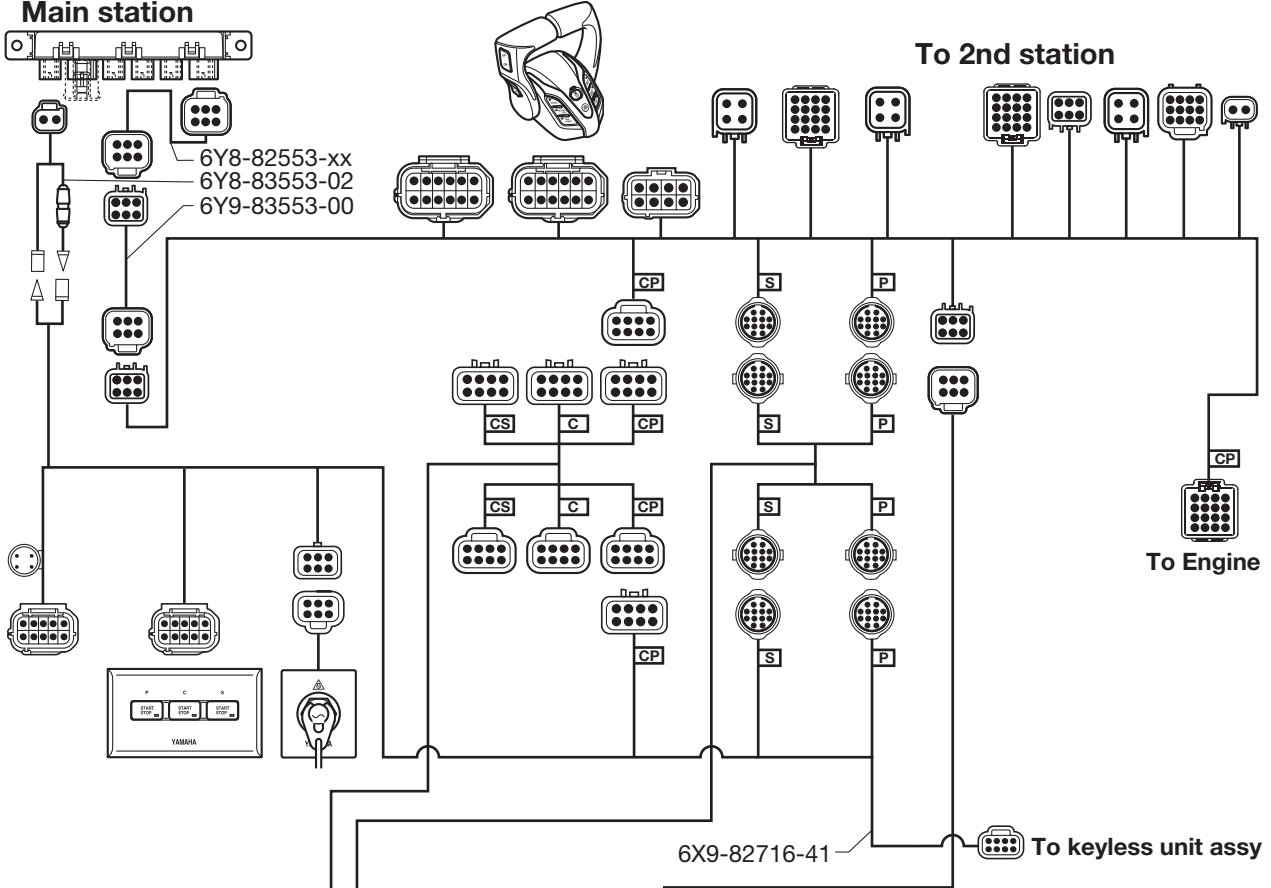
Main station



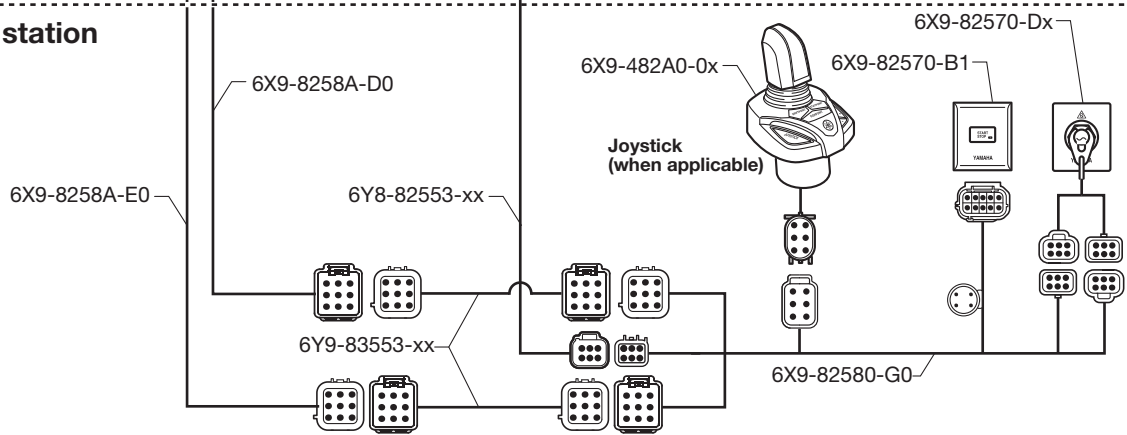
Joystick station



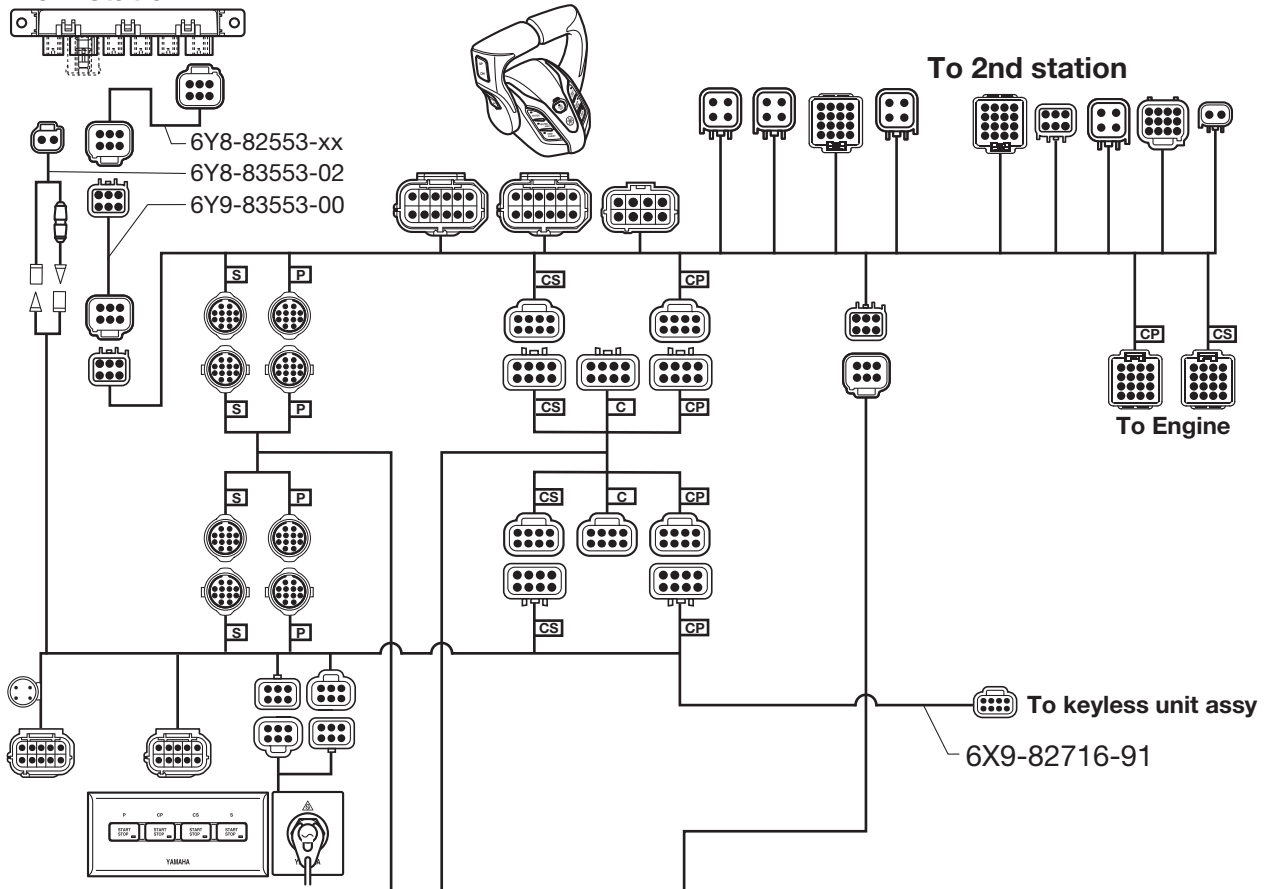
**Triple engine application
Main station**



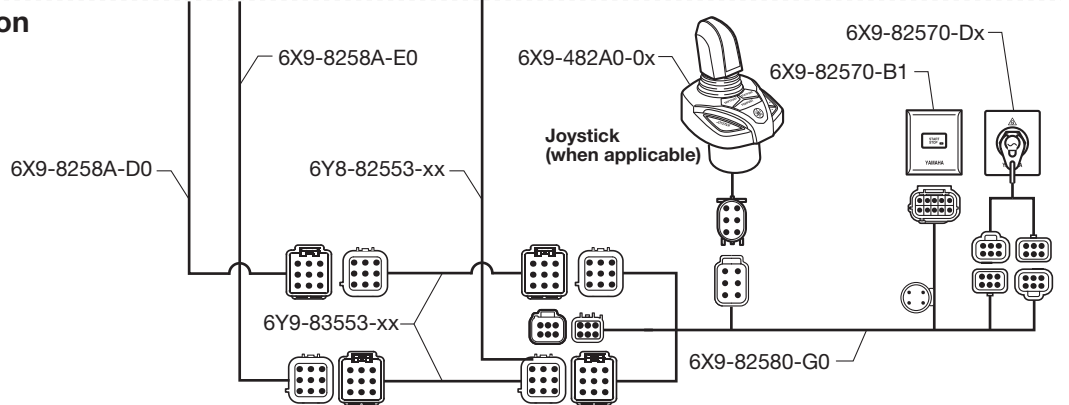
Joystick station



**Quad engine application
Main station**

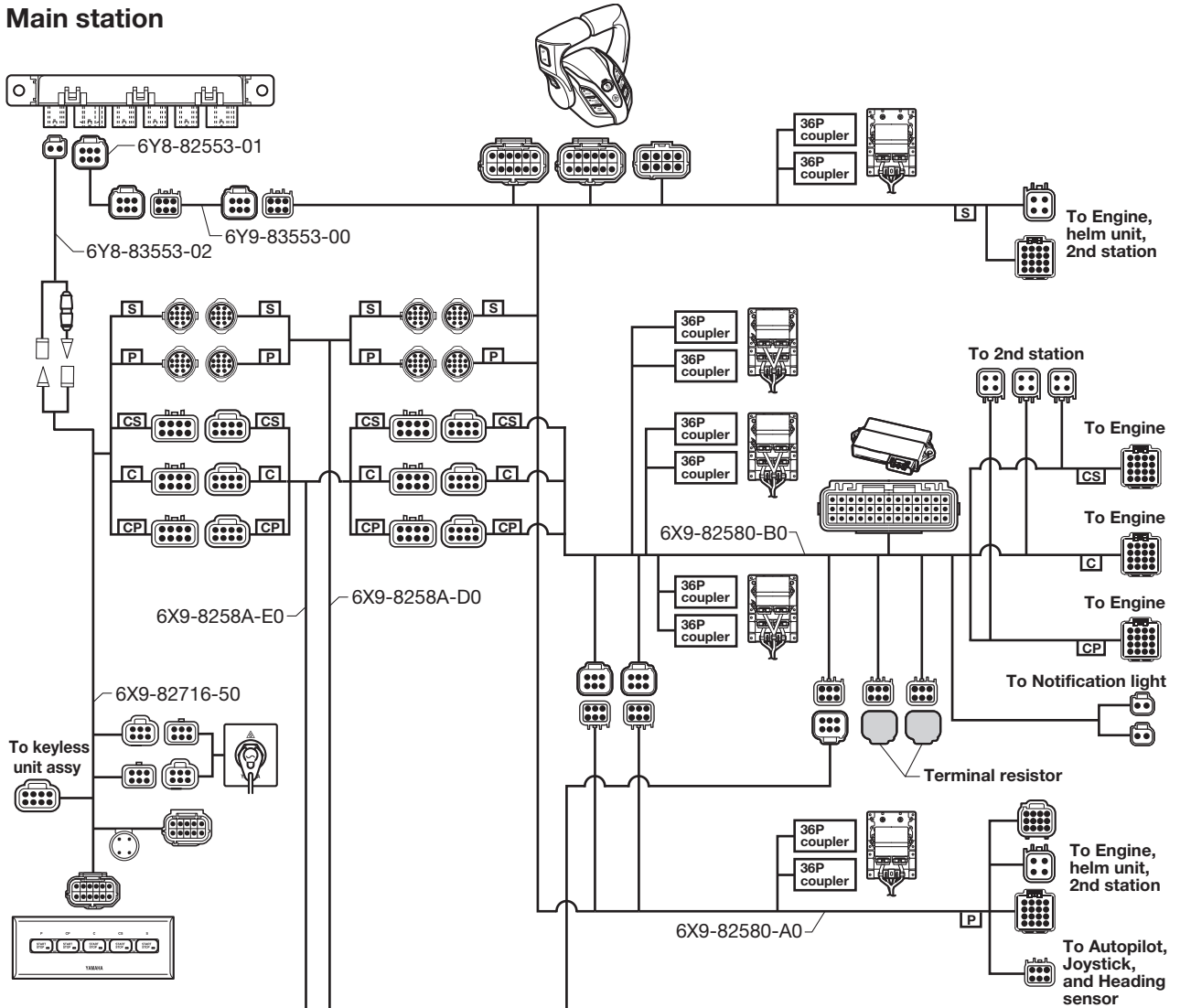


Joystick station

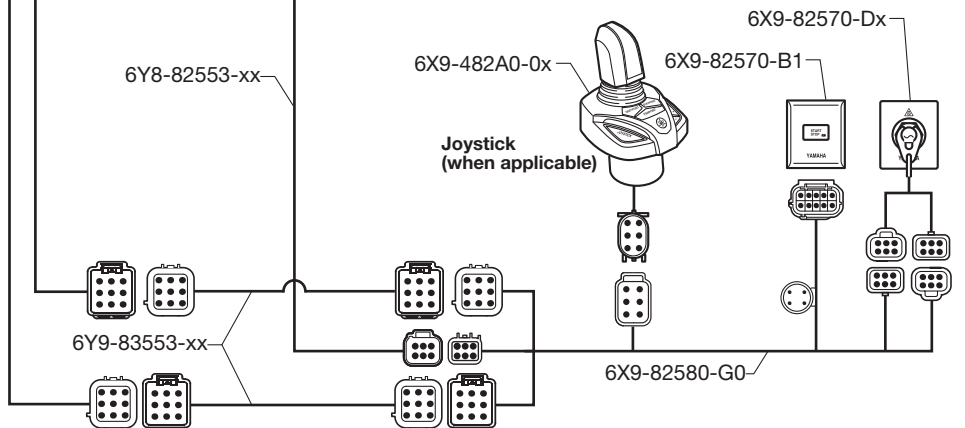


Quint engine application

Main station



Joystick station



Extension harness (Joystick station)	
Part No.	Length
6X9-83553-70	7 m (23 ft)
6X9-83553-80	10 m (32 ft)

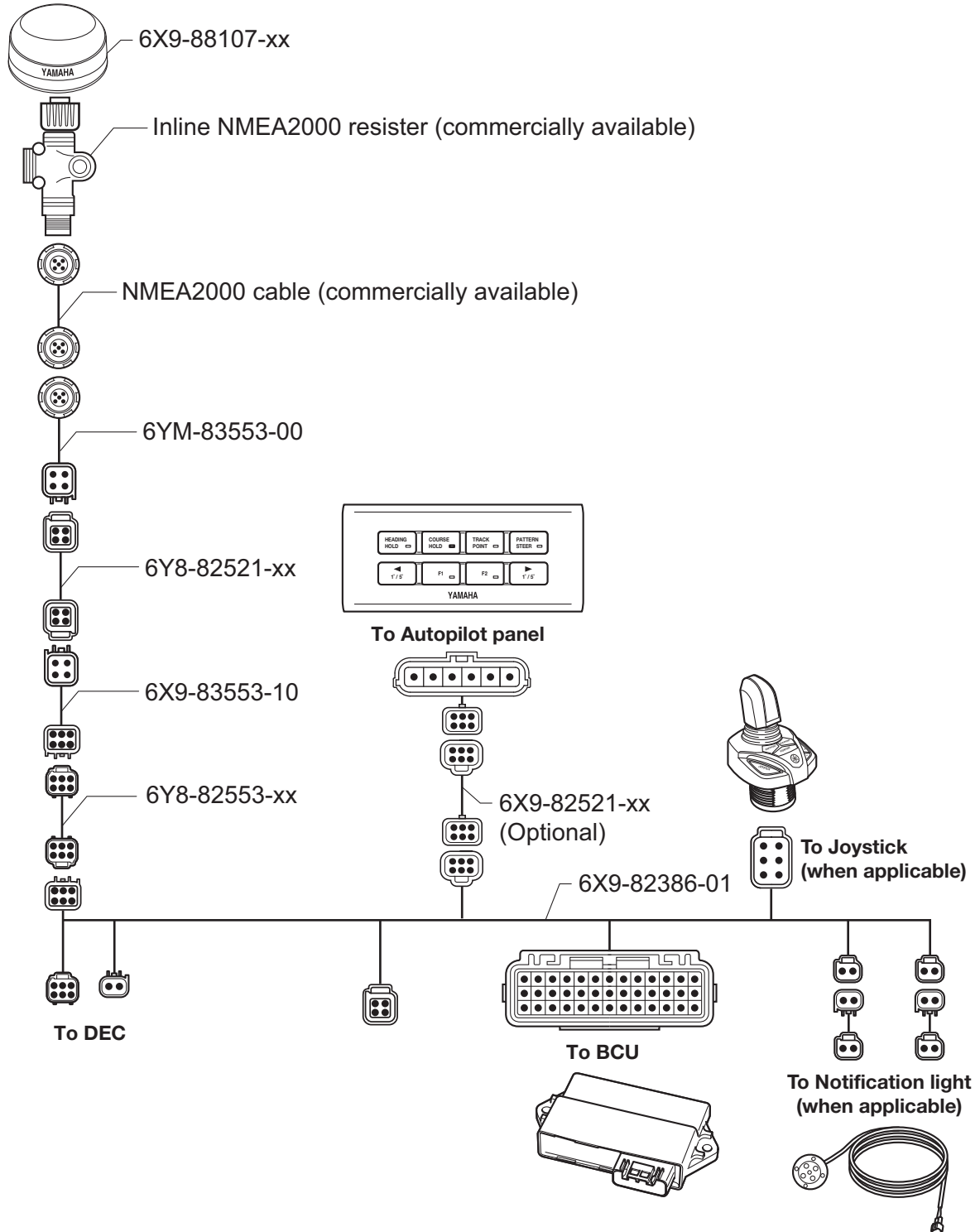
How to route the GPS harnesses in the narrow spaces

The market available NMEA2000 cables and inline NMEA2000 register can be used as shown below when the harness needs to be routed in the narrow spaces (e.g. bended pipes).

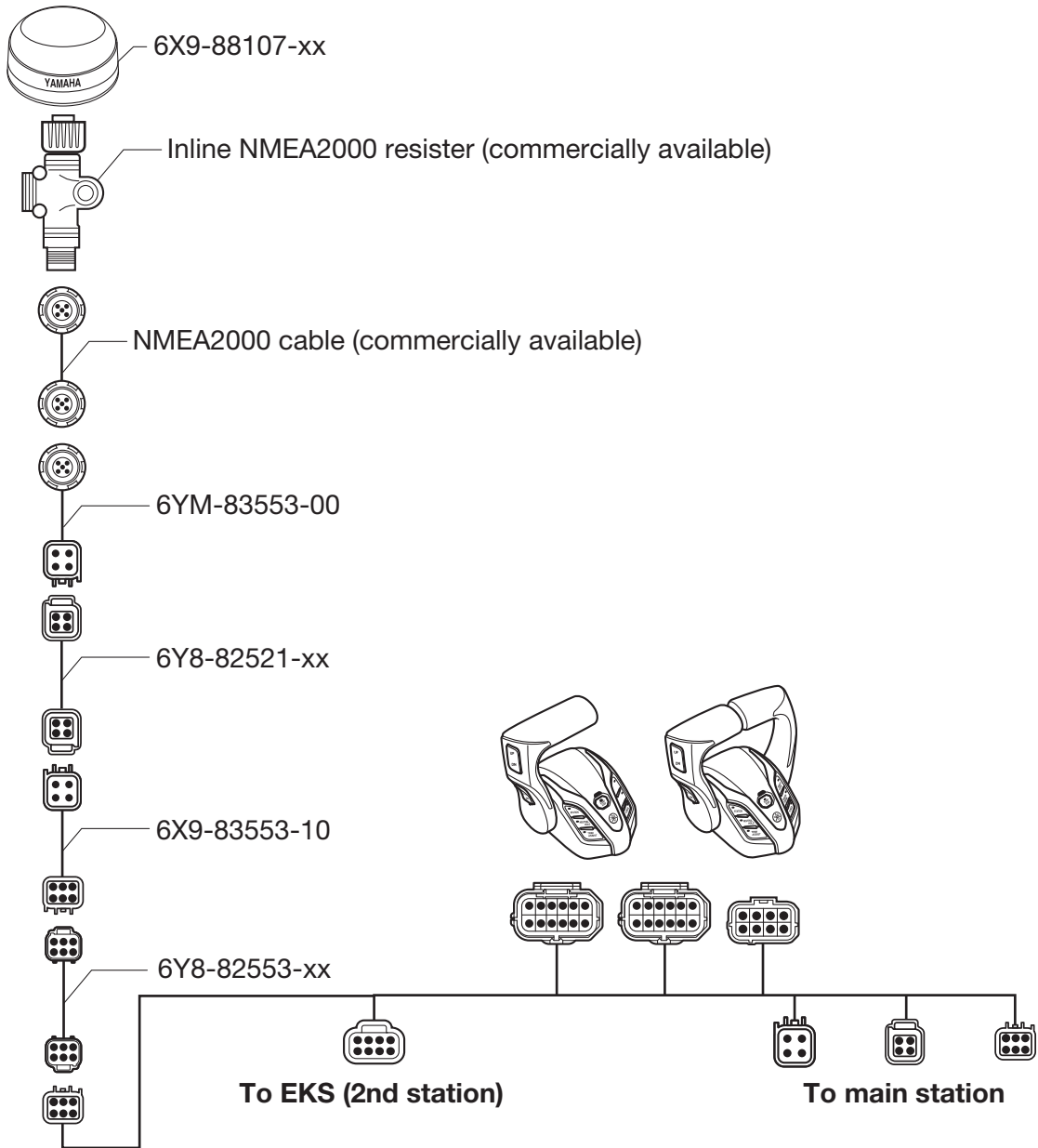
TIP:

Do not exceed 40 m (131 ft) for the length of the wire harness from DEC on the main station to the Inline NMEA2000 resistor.

Single station



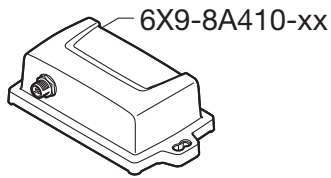
Dual station (2nd station)



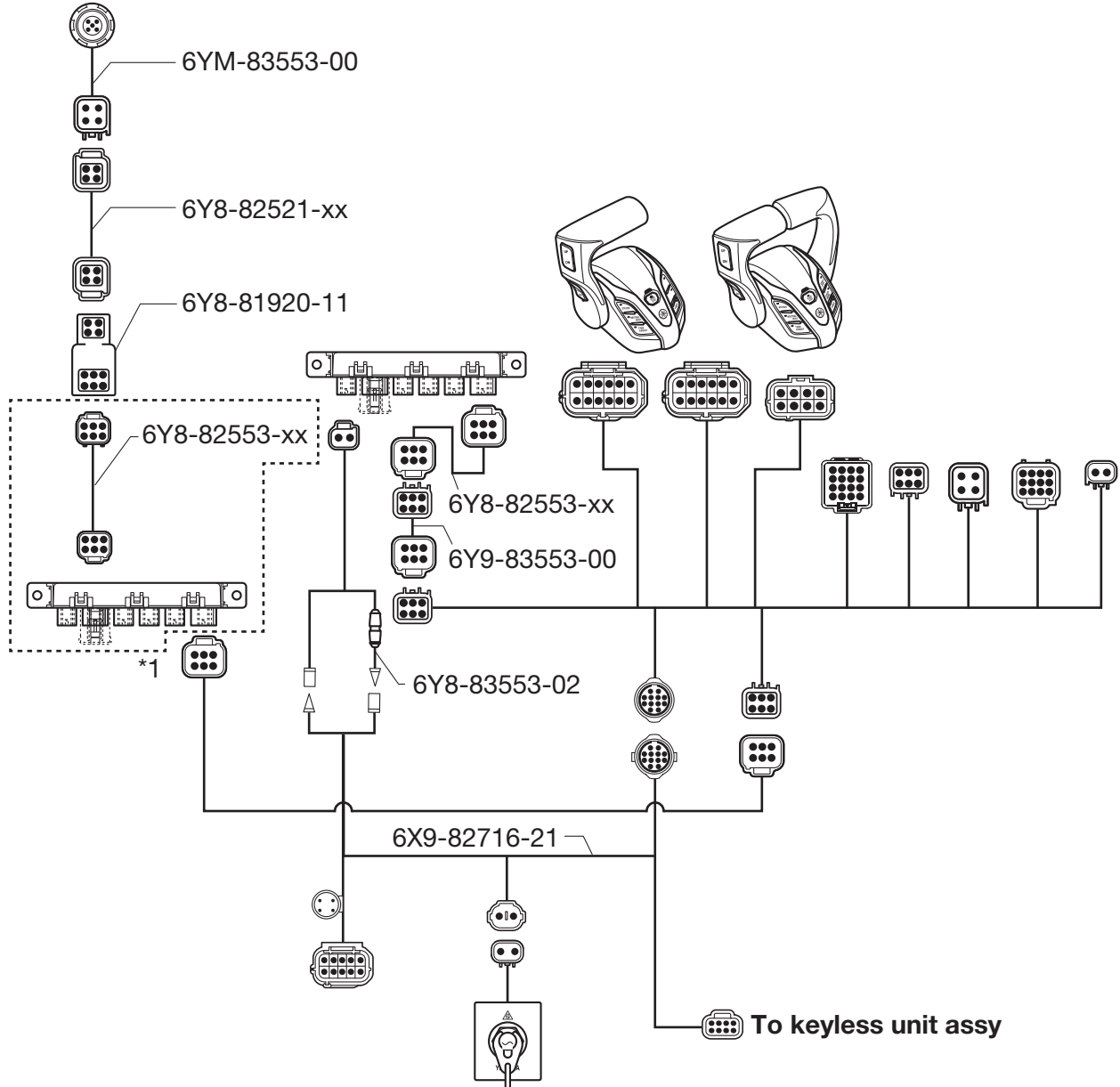
How to install the heading sensor remotely

The main bus wire, pigtail bus wire and multi hub can be used to install the heading sensor remotely when the appropriate rigging space cannot be found with the given BCU harness length.

Single - quad engine application

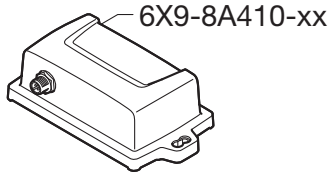


Heading sensor

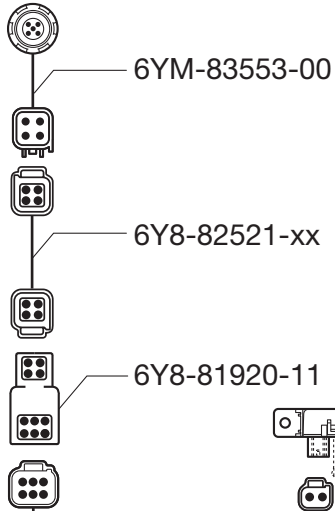


*1: As for the wiring of the remote control manufactured in July 2021 or later, please refer to the wiring diagram on the next page.

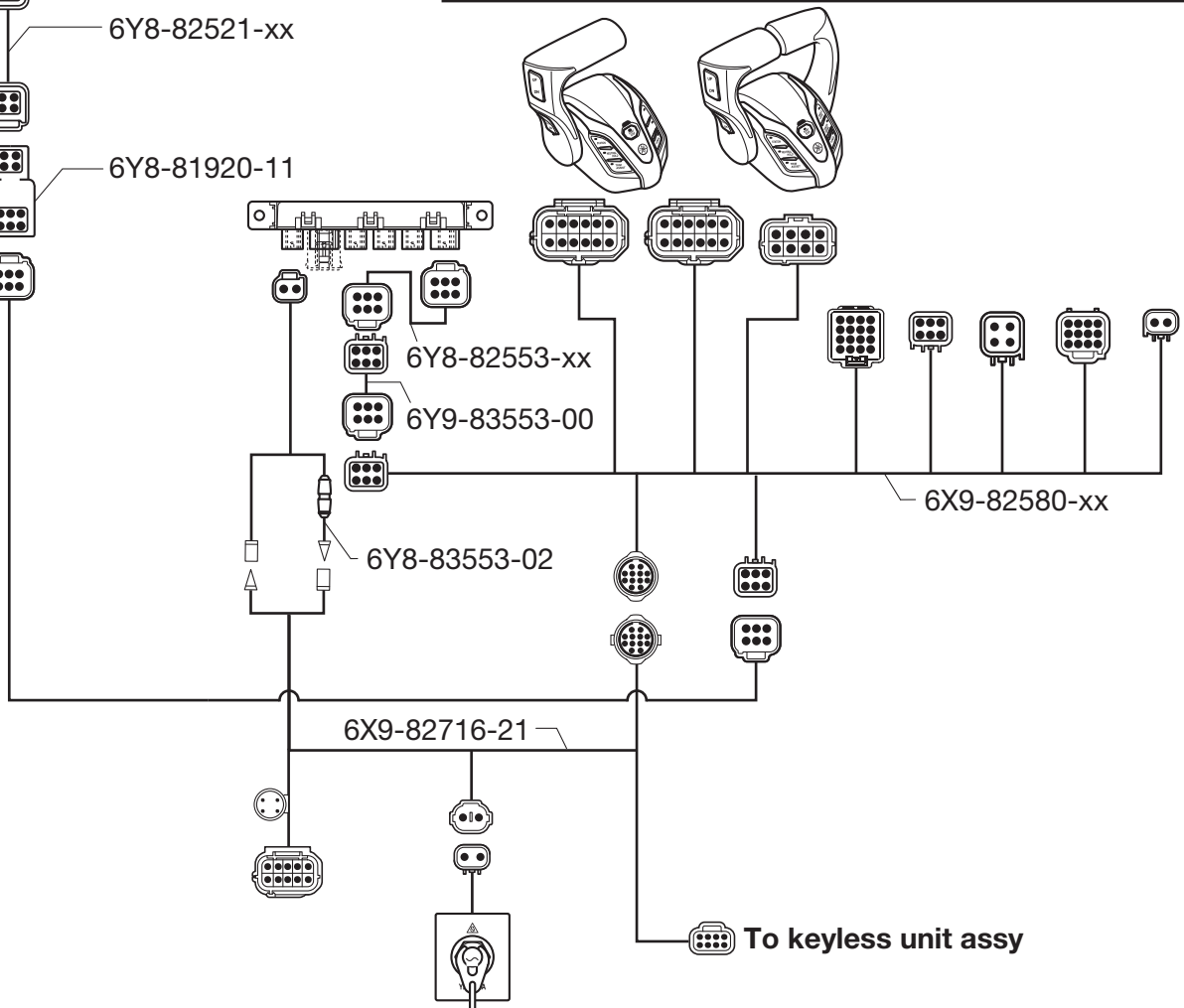
Quint engine application



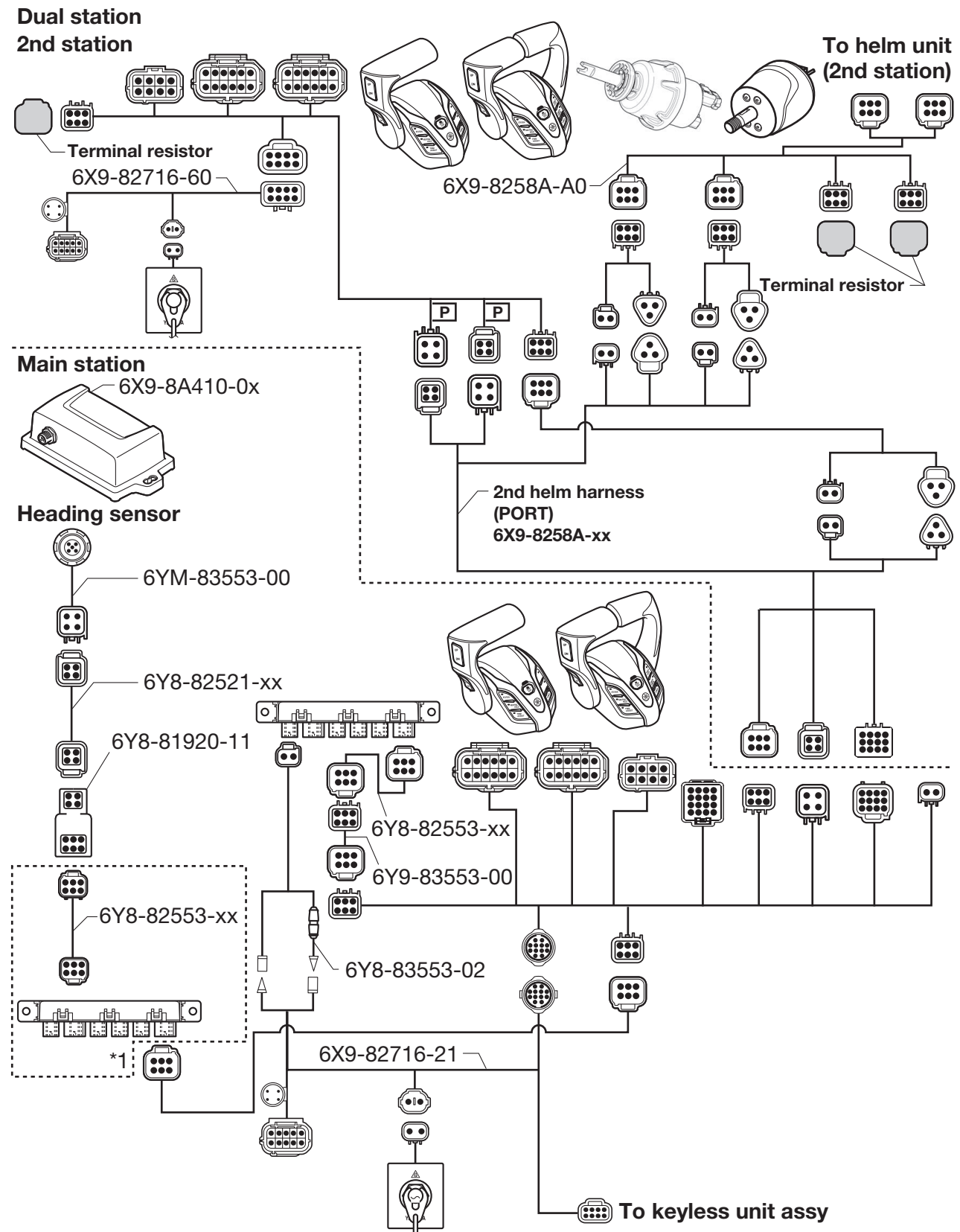
Heading sensor



	Remote control assy	Harness part no.
Single	6X9-48205-20	6X9-82580-02
Concealed	6X9-48206-20	6X9-82580-21
Twin	6X9-48207-20	6X9-82580-42
Triple	6X9-48208-10	6X9-82580-42
		6X9-82580-C2
Quad	6X9-48209-10	6X9-82580-42
		6X9-82580-C2
		6X9-82580-D2
Quint	6X9-48210-10	6X9-82580-F0
		6X9-82580-E0



Single - quad engine application

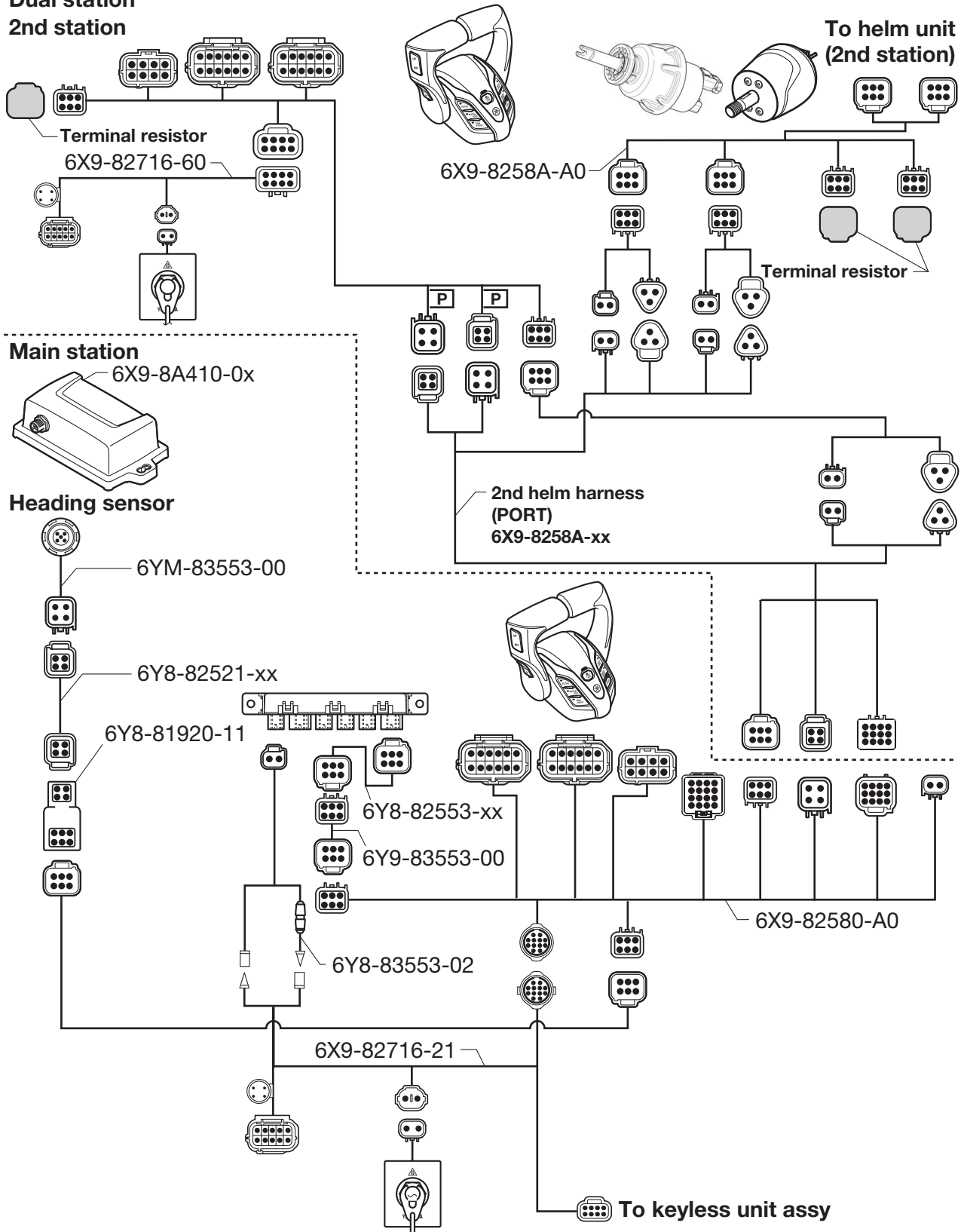


*1: As for the wiring of the remote control manufactured in July 2021 or later, please refer to the wiring diagram on the next page.

How to install the heading sensor remotely

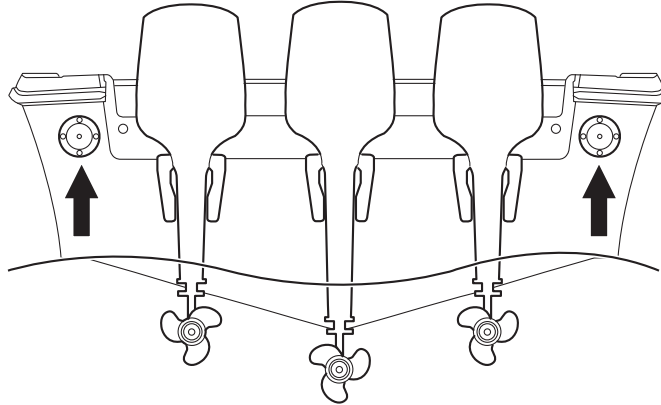
Quint engine application

Dual station
2nd station



Installing the notification light

1. Decide the installation location for the notification light at the stern (transom) of each side. The installation location should be above the water surface and clearly visible from swimmers and vessels nearby.

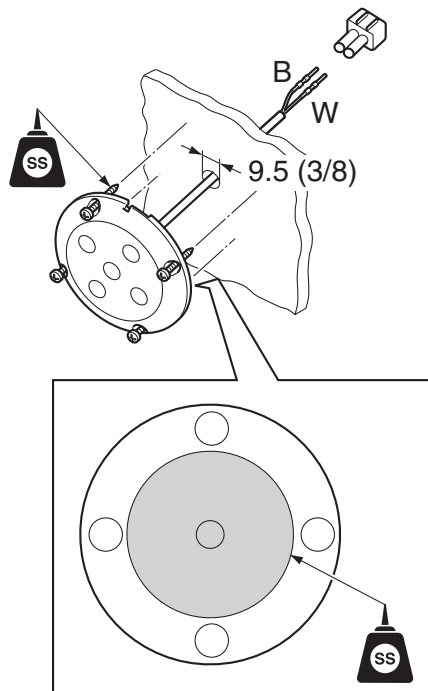


2. Drill a 9.5 mm (3/8-inch) hole in the boat hull.
3. Pass the notification light harness through the hole.
4. Install the coupler to the harness end.

TIP:

- Pass the harness through the hole in the hull first, and then install the coupler supplied with the notification light to the harness end.
- Apply silicon sealant (SS) to the mounting screws and the center of the back of the notification light.

mm (in)



B: Black
W: White

5. Connect the notification light harness.

Extension harness	
Part No.	Length
6X9-82586-20	6.1 m (20 ft)
6X9-82586-30	9.1 m (30 ft)
6X9-82586-40	12.2 m (40 ft)

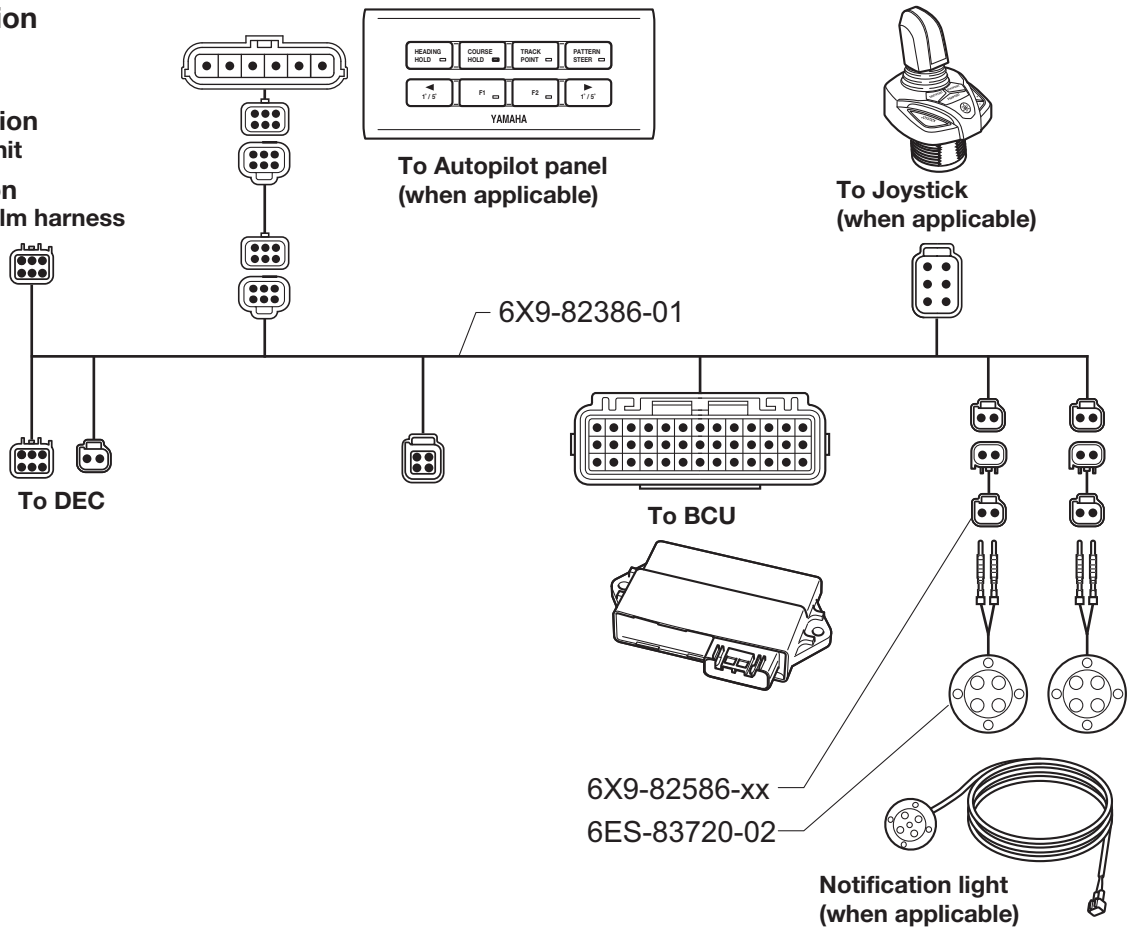
Main station

Single station

To GPS unit

Dual station

To 2nd helm harness



Installing the bow thruster

NOTICE

- Read and follow all the instructions in this manual, and the installation instructions that are supplied with components.
 - Install the system in a location that will not hinder operation of any of the components, referring to the dimensional drawing.
 - Secure enough space to avoid contact with other parts.
 - Install the system in a location where it will not be exposed to rain or wave splashes directly, or submerged in the bilge.
 - Install the unit and wire harness at least 1 ft (30 cm) away from two-way radio, antenna cable, and generators to avoid pickup of noise.
 - Be careful not to bind the wire harness of this system and the antenna cable together.
 - Install the system in a location where the ambient temperature does not exceed 55 °C (131 °F).
 - Install the wire harnesses so that they do not come into contact with any edges or moving parts that may cause shearing.
Do not apply excessive force when pulling on the wire harnesses to lay them out.
 - Please check the software version before use. Depending on the version, some functions may be restricted. If you have any questions, please contact your Yamaha dealer.
 - This manual is for twin engine application and triple engine application.
 - Please refer to the “Vetus PRO series” installation manual for how to attach the bow thruster to the hull.
-

1. Determine the thruster driver installation position.

TIP:

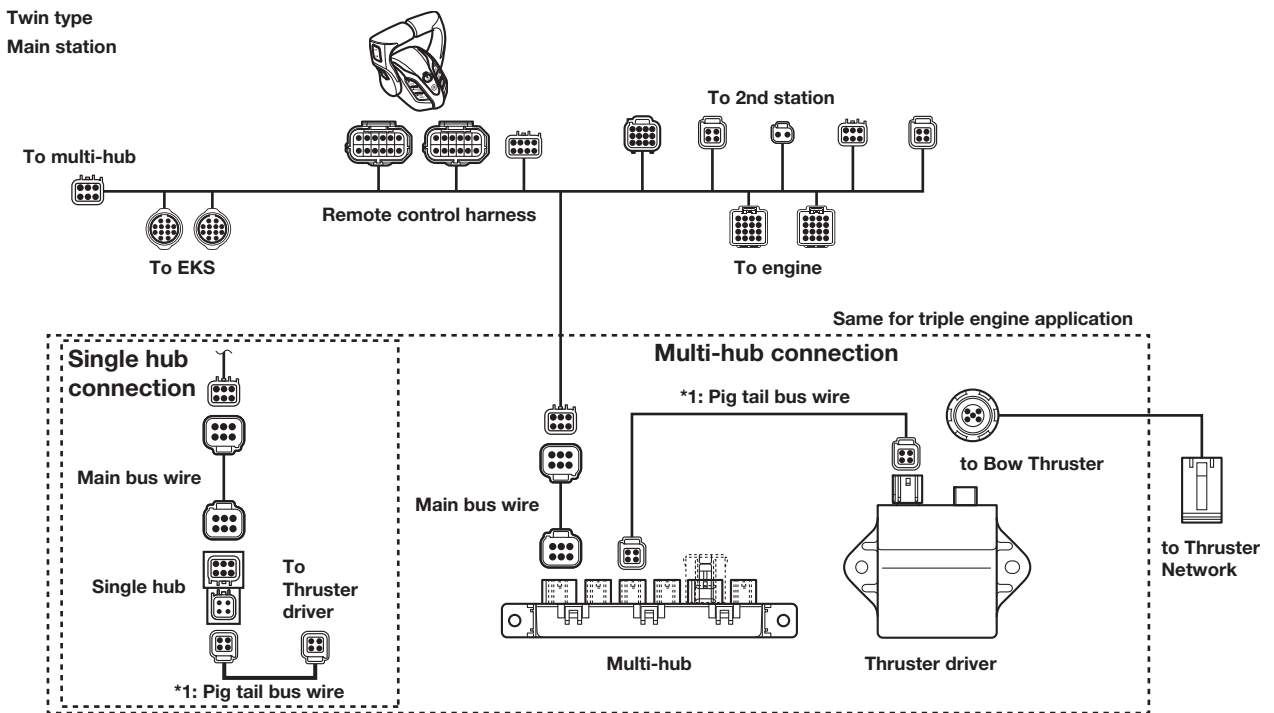
Install the thruster driver coupler facing downward.

2. Make holes in the console using the template.
See “Thruster Driver” (page 357) in Template.
3. Connect the pig tail bus wire.

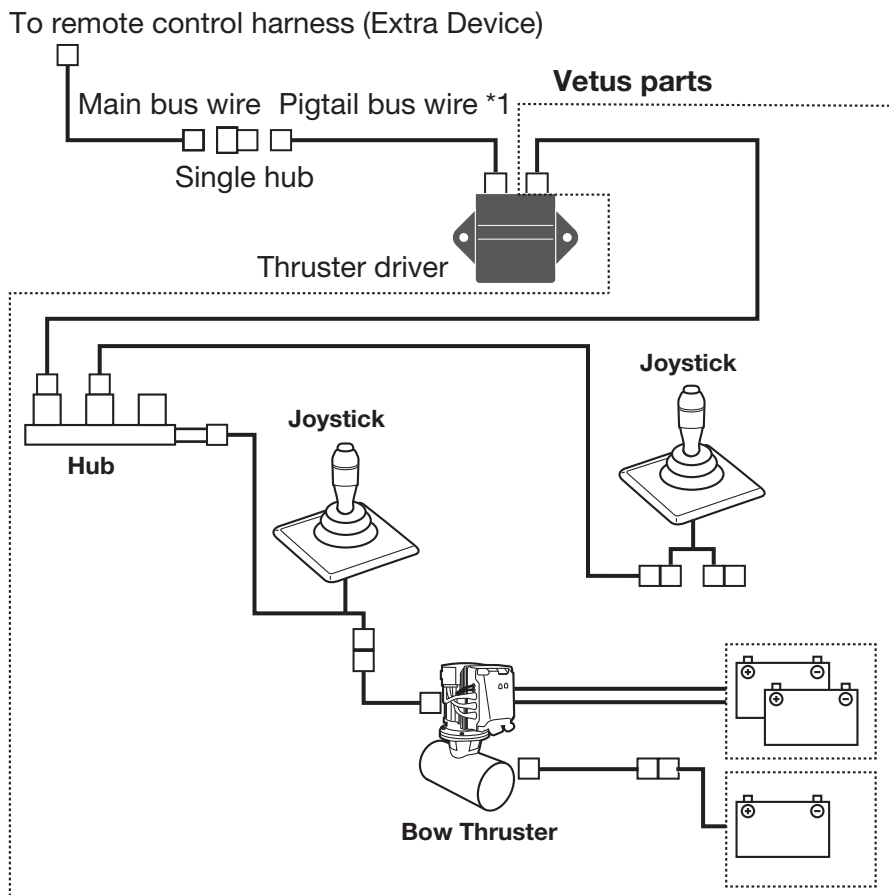
TIP:

For Vetus information, please refer to the Vetus installation manual.





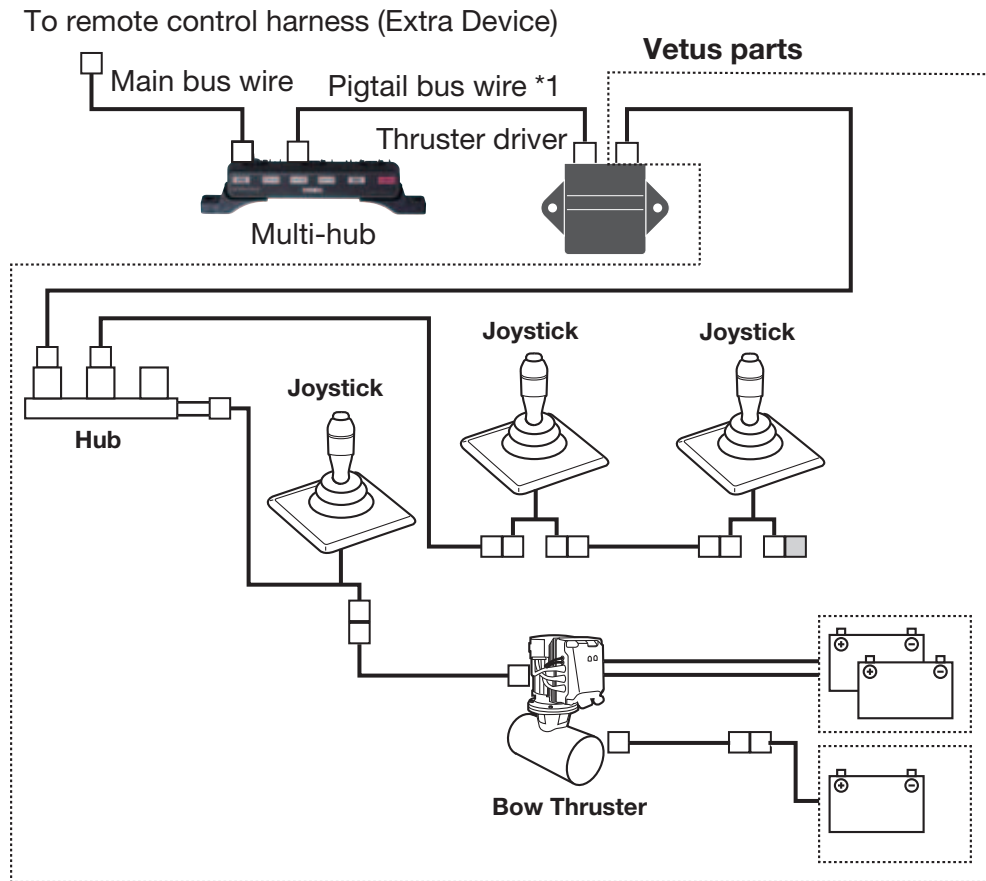
Single hub connection



TIP:

*1: Length of pigtail must be less than 0.9 m (3 ft).

Multi-hub connection



TIP:

*1: Length of pigtail must be less than 0.9 m (3 ft).

Single hub connection			
Part name	Q'ty	Part No.	Remarks
Thruster driver	1	6X9-86510-00	
Pigtail bus wire	1	6Y8-82521-xx	Less than 0.9 m (3 ft)
Main bus wire	1	6Y8-82553-xx	
Single hub	1	6Y8-81920-11	
CANVM12A	1	NMEA2000/J1939 to V-CAN	Order from Vetus

Multi-hub connection			
Part name	Q'ty	Part No.	Remarks
Thruster driver	1	6X9-86510-00	
Pigtail bus wire	1	6Y8-82521-xx	Less than 0.9 m (3 ft)
Main bus wire	1	6Y8-82553-xx	
Multi-hub	1	6Y8-81920-01	
CANVM12A	1	NMEA2000/J1939 to V-CAN	Order from Vetus

Calibration

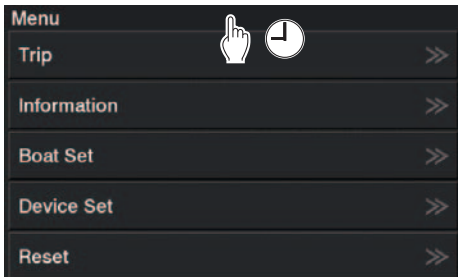
How to enter the technician setting page

NOTICE

Execute operation while Trip is at the top. If the Technician Setting screen does not appear, check whether it is scrolling, also check that the Station setting is suitable.

CL5 Display

Push and hold at top center area in Menu page.



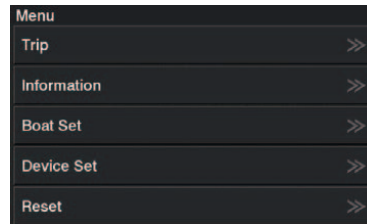
MFD Interface Type-1

Push and hold at top center area in Menu Bar.



MFD Interface Type-2

Push and hold the Brightness button on Remote Control.



CL5 Display Calibration

This section covers all steps necessary to complete the set-up for proper operation of the Helm Master EX control system. The steps to be performed are:

- Steer Sensor
- Toe Adjust
- Lock to Lock
- Friction Set
- Point Control

NOTICE

Check that the battery is fully charged before performing the calibration. Otherwise, calibration cannot be performed properly.

TIP:

- An error will occur if you do not execute a compass calibration and a steering sensor calibration.
- The DEC for the single, twin, triple, quad, and quint engine applications is packaged together with the owner’s manual and installation manual up to the full kit. The other kits are packaged together with the quick start guide and installation manual.

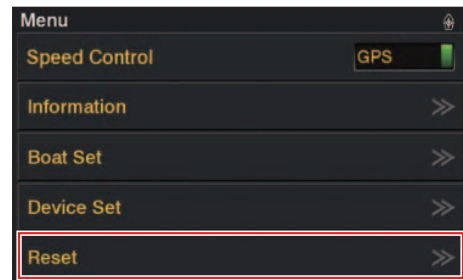
Before performing the calibration

Configuring the number of outboard motors

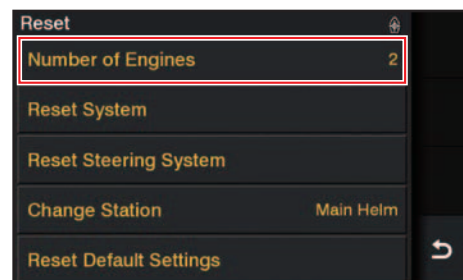
1. Turn the Power switch to “ON”.
2. Open the Menu Screen by swipe.



3. Tap “Reset”.



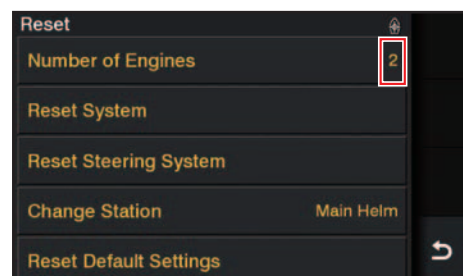
4. Tap “Number of Engines”.



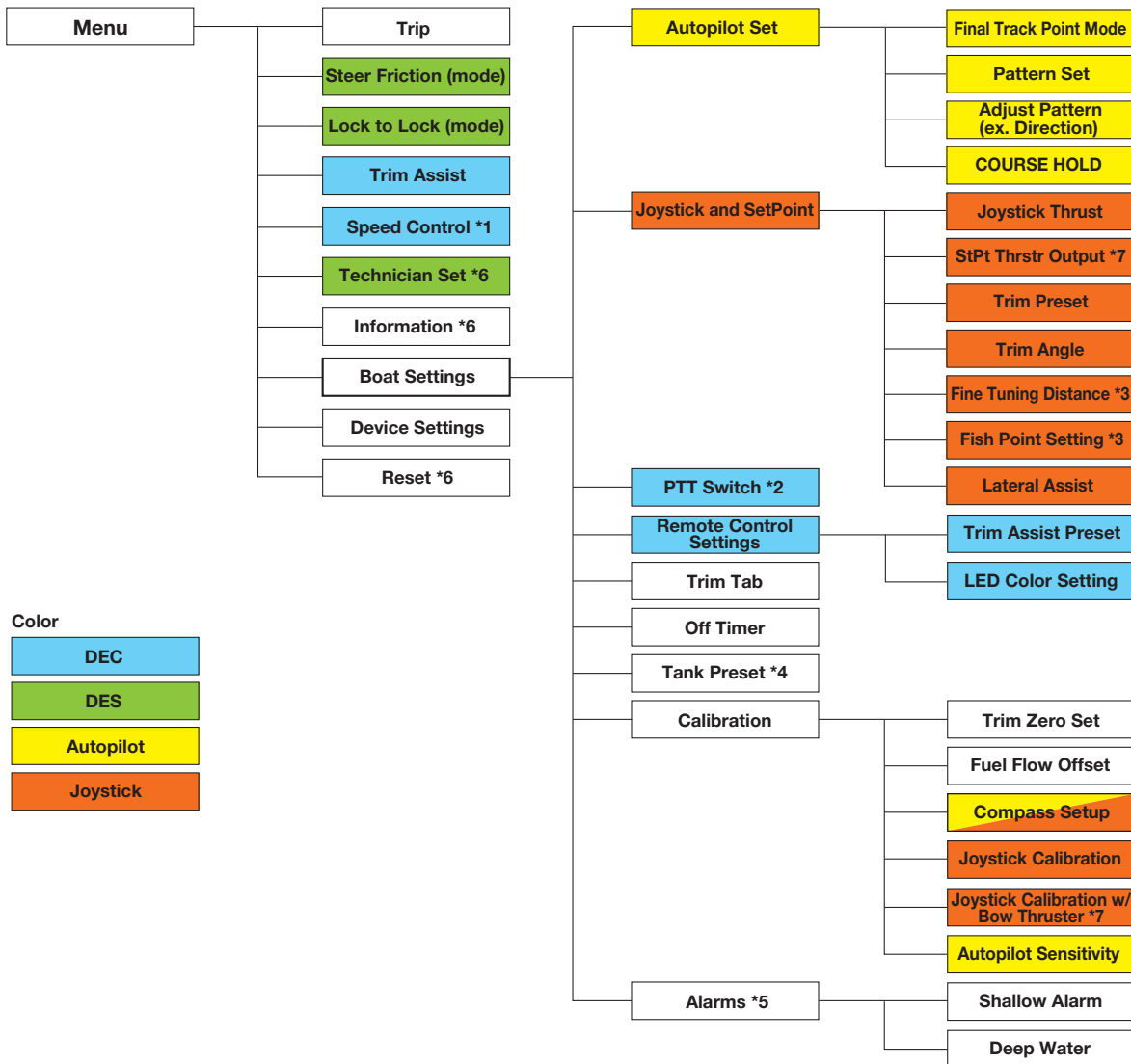
5. Select the number of outboard motors mounted on the boat.



6. Tap “Reset” to confirm that the number of outboard motors has been changed.



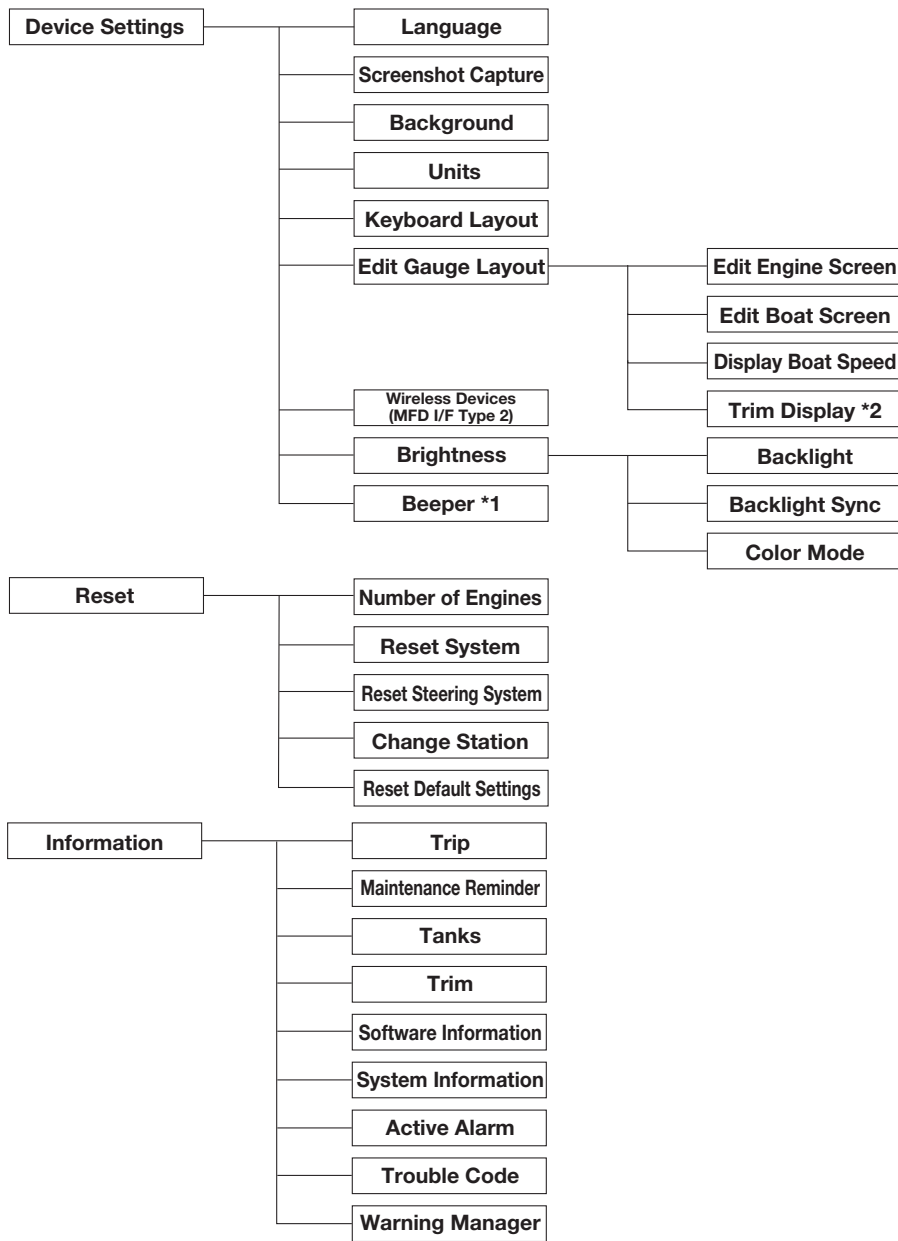
CL5 Display Menu tree



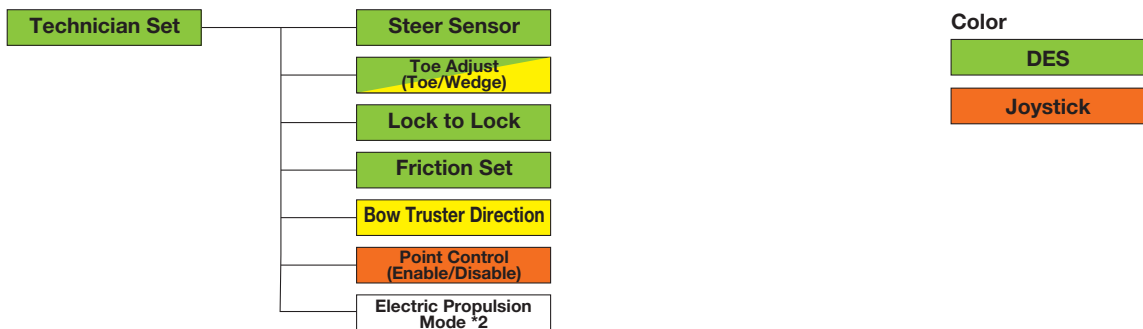
TIP:

The pilot function settings menu is not shown unless you enable the station for which you want to set the gauge. Change the station to match the installation location.

- *1: Boat Control GPS (with BCU) is needed to set “GPS” for Trim Assist and Speed Control.
- *2: Quad and quint engine application only
- *3: If Point control is disabled, Hidden.
- *4: Fuel Sender is necessary.
- *5: Depth information is necessary.
- *6: See next page.
- *7: Vetus PRO series bow thruster is necessary.



Technician Setting menu



*1: Not included (MFD Interface Type-2)

*2: Helm Master EX does not use this mode.

Accessing the calibration menu

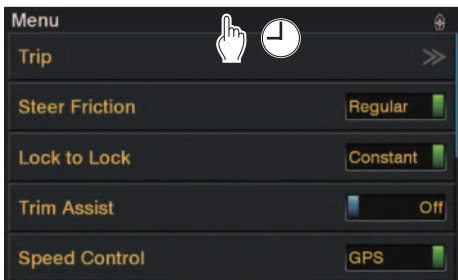
1. Open the Menu Screen by swipe.



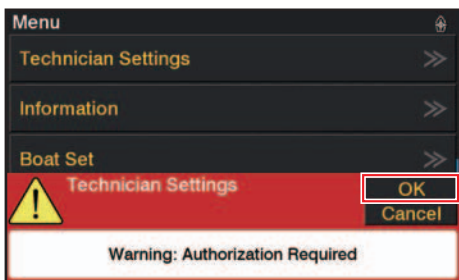
2. Tap and hold the “Menu” bar for 10 seconds. The “Technician Settings” menu will be added to the menu.

TIP:

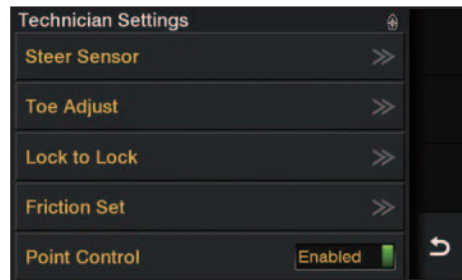
Tap while the screen is scrolled all the way to the top.



3. When the “Technician Settings” message appears, tap “OK”.



4. The “Technician Settings” menu will appear.



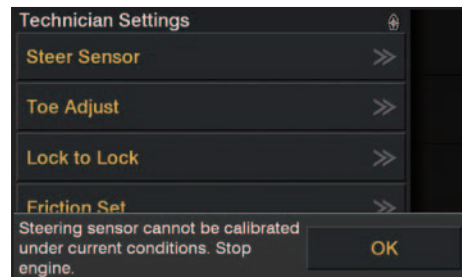
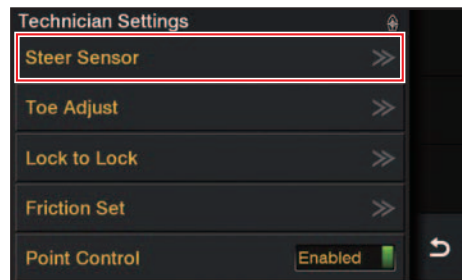
Steer Sensor

The Built-in DES (F375/F425) Steer Sensor is factory calibrated, requiring no steering calibration at the initial system power-up. On the other hand the Bolt-on DES always requires steer calibration in the field at the initial power-up.

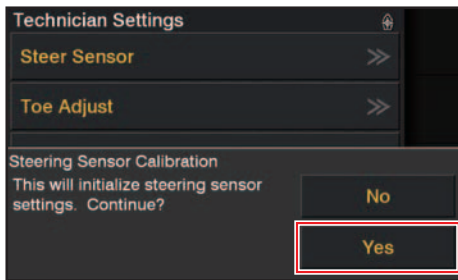
1. Before performing this menu, switch the battery switch(es) to the “ALL” position.
2. From the Technician Settings menu, select “Steer Sensor”, and then tap “Yes”.

TIP:

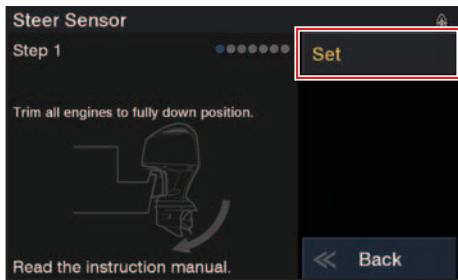
When the engine is running, this function is not available.



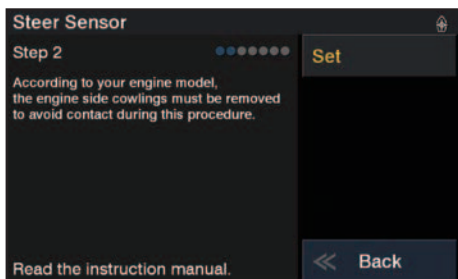
TER engine, then the C PORT engine, and then do the PORT engine.



3. Tap “Set” to trim all engines to the fully down position.



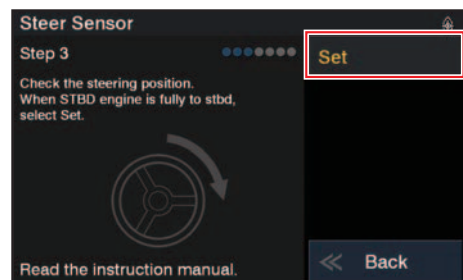
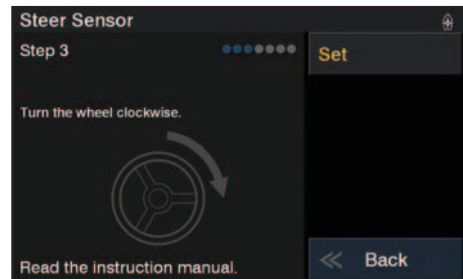
4. Remove side cowlings to avoid interference during the procedure. (F375/F425)



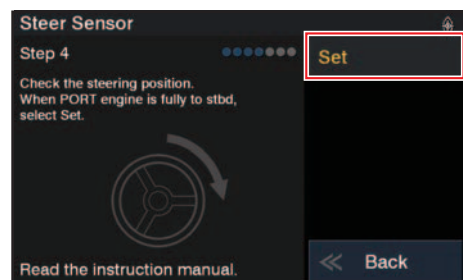
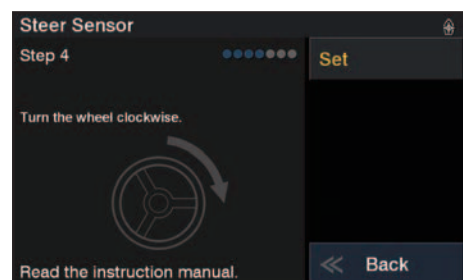
5. Turn the steering wheel clockwise until STBD engine reaches full STBD lock and the message appears. Confirm the STBD engine is at full STBD lock, and then tap “SET”.

TIP: _____

- For triple engine applications, after this step, do the CENTER engine, and then do the PORT engine.
- For quad engine applications, after this step, do the C STBD engine, then the C PORT engine, and then do the PORT engine.
- For quint engine applications, after this step, do the C STBD engine, then the CEN-



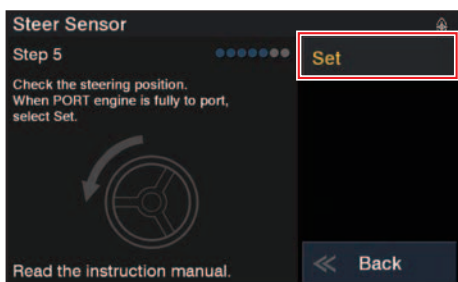
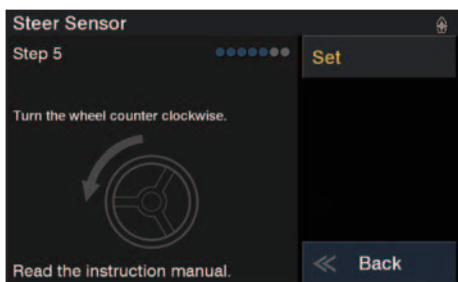
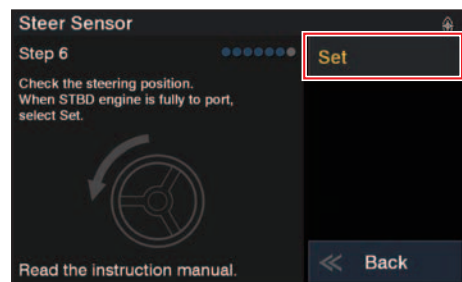
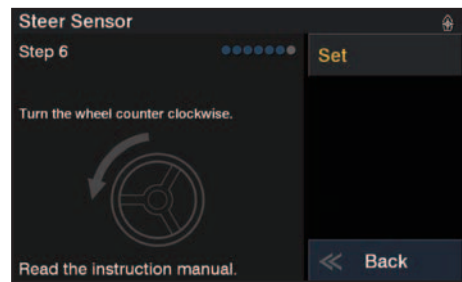
6. Turn the steering wheel clockwise until the PORT engine reaches full STBD lock and the message appears. Confirm the PORT engine is at full STBD lock, and then tap “SET”.



- Turn the steering wheel counterclockwise until the PORT engine reaches full PORT lock and the message appears. Confirm the PORT engine is at full PORT lock, and then tap "SET".

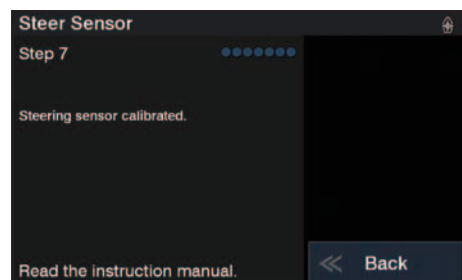
TIP:

- For triple engine applications, after this step, do the CENTER engine, and then do the PORT engine.
- For quad engine applications, after this step, do the C PORT engine, then the C STBD engine, and then do the STBD engine.
- For quint engine applications, after this step, do the C PORT engine, then the CENTER engine, then the C STBD engine, and then do the STBD engine.

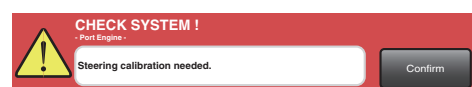


- Turn the steering wheel counterclockwise until the STBD engine reaches full PORT lock and the message appears. Confirm the STBD engine is at full PORT lock, and then tap "SET".

- Once the calibration is complete, a message will appear verifying the procedure is completed.



- If there is an invalid value when calibrating the steering sensor, a notification will appear. Perform the complete calibration procedure again.
- If the steering system still requires calibration, a warning notification will appear. The engine will not start until calibration is performed again.



Toe Adjust

You can freely adjust the toe angle of outboard motors according to the structure of the hull on which they are mounted.

This should be determined by on-water testing.

TIP: _____

- For double engines without BCU, triple engines (toe adjust: numerical value input)
- For double engines with BCU (wedge/toe: numerical value input, adjust up and down)
- For quad engines (inner/outer: numerical value input)

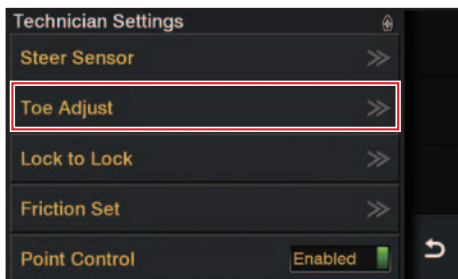
Wedge/Toe settings

Do this setting for “Wedge/Toe” only if the adjustment width of the toe angle is insufficient due to the shape of the transom.

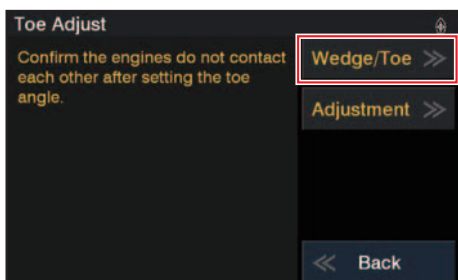
TIP: _____

Single engine application: No setting
 Twin engine application: Wedge and Toe
 Triple/quad/quint engine application: Toe Adjust only

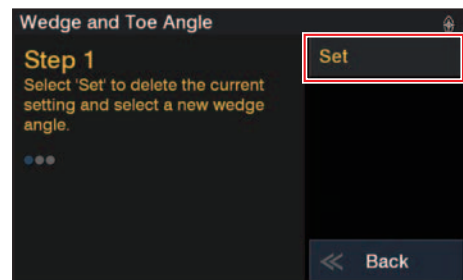
1. From the Technician Setting menu, select “Toe Adjust”.



2. Tap “Wedge/Toe”.



3. Select “Set” to delete the current setting and select a new wedge angle.



4. Adjust the wedge angle. Tap “Done” to confirm.

TIP: _____

The Helm Master EX control system comes with the toe set at 0°. The adjustment range is:

- 0° to +10° in 0.1° increments.
- Plus (+) degrees equals toe-out.



5. Select “Set” to adjust the toe angle.



6. Adjust the toe angle. Tap “Done” to confirm.

TIP: _____

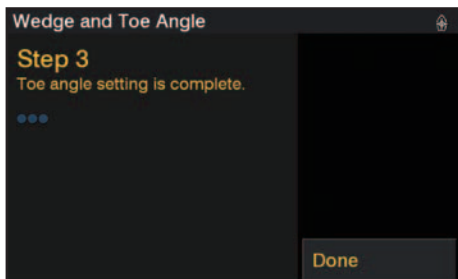
The Helm Master EX control system comes with the toe set at 0°. The adjustment range is:

- -2.0° to +2.0° in 0.2° increments (up to 0.2 in).
- Minus (-) degrees equals toe-in.

- Plus (+) degrees equals toe-out.



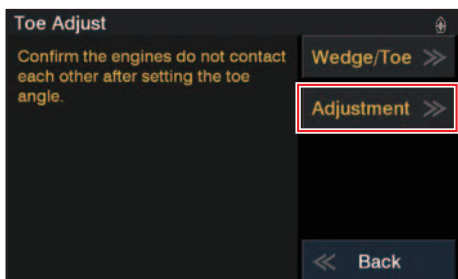
7. When the wedge/toe calibration is completed, a message will appear.



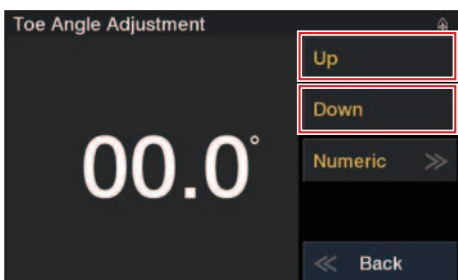
Adjustment settings

If you are adjusting only the toe angle, do the setting in “Adjustment”.

1. Tap “Adjustment”.



2. Tap “Up” or “Down” to adjust the toe angle.



Tap “Numeric” to adjust the toe angle.

TIP:

The Helm Master EX control system comes with the toe set at 0°. The adjustment range is:

- -2.0° to +22.0° in 0.2° increments.
- Minus (-) degrees equals toe-in.
- Plus (+) degrees equals toe-out.



Lock to Lock

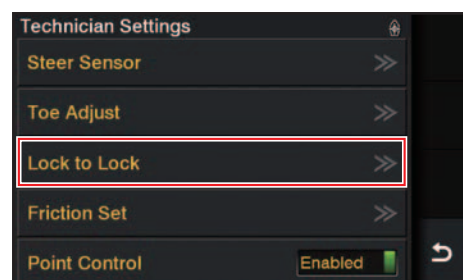
You can freely adjust the number of turns of the steering wheel lock to lock.

Constant

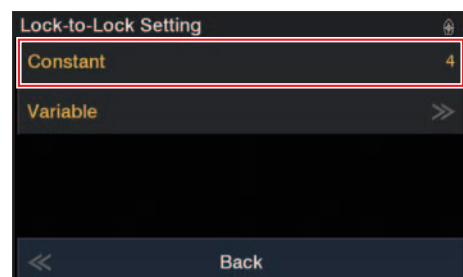
1. From the Technician Settings menu, select “Lock to Lock”.

TIP:

When the engine is running, this function is not available.



2. Tap “Constant”.

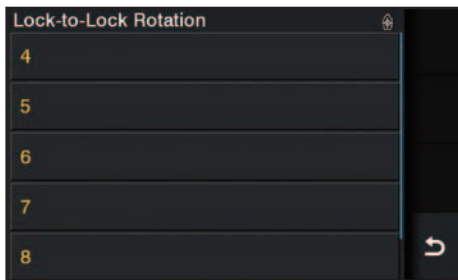


3. Select the steering wheels' rotation range.
Tap to confirm your setting.

TIP: _____

This setting allows you to adjust the number of turns from "Lock to Lock".

- Minimum: 4 turns
- Maximum: 9 turns
- Default: 4 turns



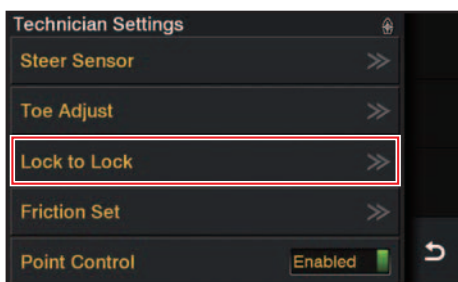
Variable

Select the rotational angle of the steering wheel according to the engine speed.

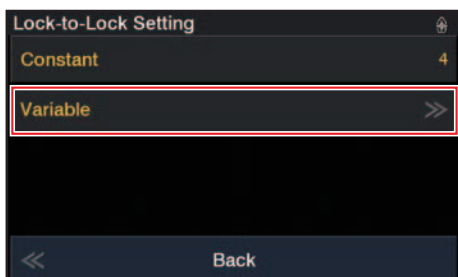
1. From the Technician Settings menu, select "Lock to Lock".

TIP: _____

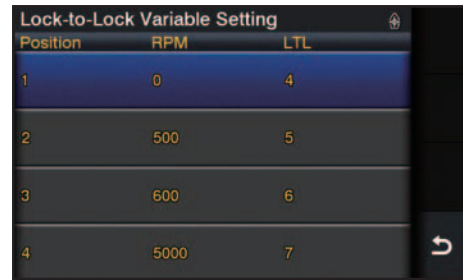
When the engine is running, this function is not available.



2. Tap "Variable".



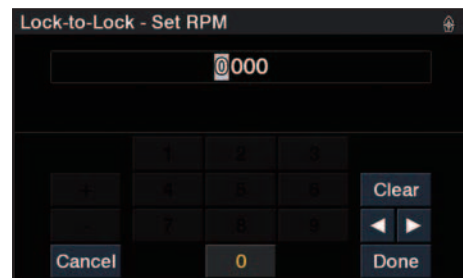
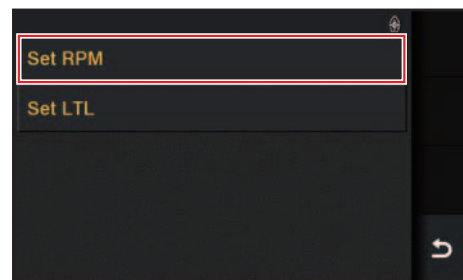
3. Select the positions, 1 to 4, to set.



4. Tap "Set RPM" to adjust the RPM of engines 1 to 4.

TIP: _____

You can adjust this to any value in a range of 0 to 6000 r/min.

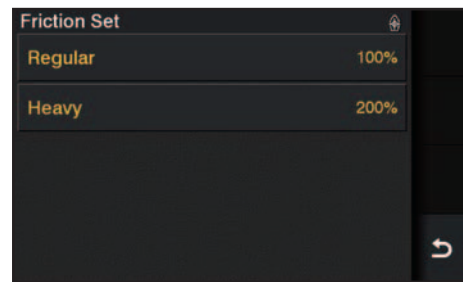
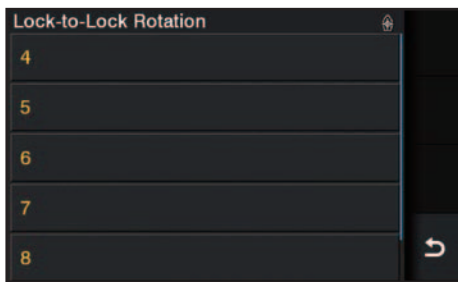


5. Tap "Set LTL" and then select a rotational angle, from 1 to 9, for the steering wheel.

TIP: _____

This setting allows you to adjust the number of turns from "Lock to Lock".

- Minimum: 4 turns
- Maximum: 9 turns
- Default: 4 turns



Friction Set

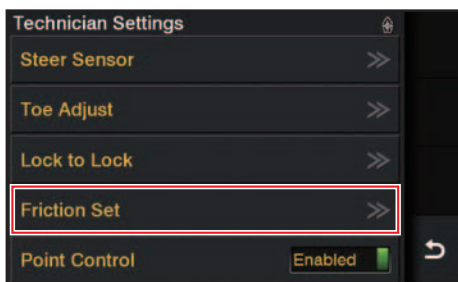
The Helm Master EX control steering system has a unique function related to the friction of the steering system. The steering will automatically adjust the friction setting depending on engine speed. At higher engine speeds, the friction increases. At lower engine speeds, the friction decreases.

Regardless of the setting chosen, the steering still increases and decreases the friction based on the engine speed.

1. From the Technician Settings menu, select “Friction Set”.

TIP: _____

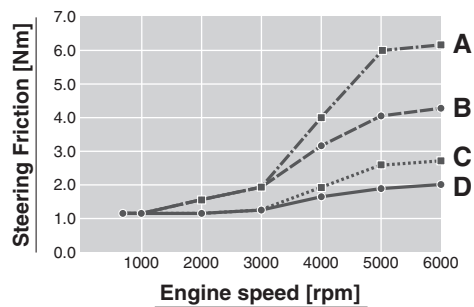
When the engine is running, this function is not available.



2. First choose “Regular” or “Heavy”, then adjust the percentage of friction. Tap “Done” to confirm.

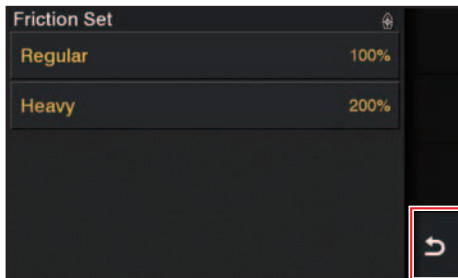
TIP: _____

The setting choices allow you to choose between “Regular” and “Heavy”. In each of those settings, it is adjustable between 100% and 200% in 10% increments. The default setting is 100%.



- A. Heavy 200%
- B. Regular 200%
- C. Heavy 100%
- D. Regular 100%

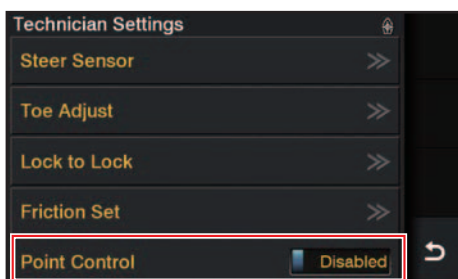
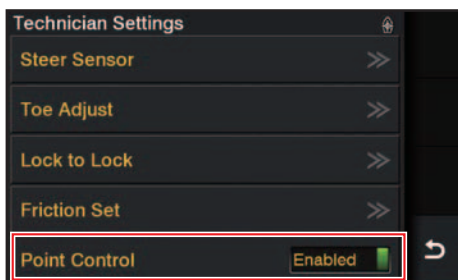
- When the “Friction Set” setting is completed, tap “return mark” to return to the Technician Settings menu.



Point Control

The SetPoint function can be enabled or disabled. Tapping the ‘Point Control’ option will switch between the enabled status and disabled status.

- From the Technician Settings menu, select “Point Control”.



TIP: _____
Default setting is Enabled.
See SetPoint function for setting the control mode.

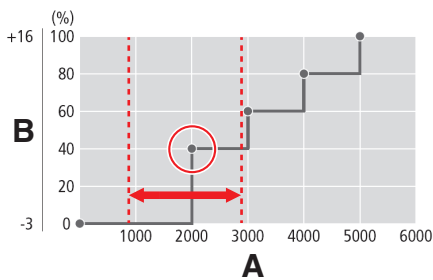
Trim Assist

Trim Assist Preset

TIP: _____

- Position setting must be position 1<2<3<4<5.
- If user set higher rpm than next position, user cannot overwrite.
- Setting range is limited between before and after position.
- For example, If actual value is out of range, gauge hide “Set” button in underway setting screen. If you want to clear this settings, please back to upper menu and select “Reset RPM Settings/Reset GPS Settings”.

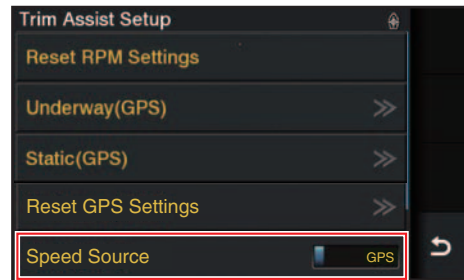
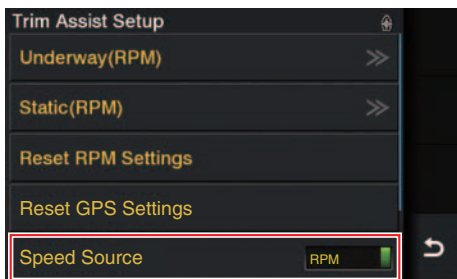
Example:



A. Engine speed (r/min)
B. Trim angle (degrees/percent)

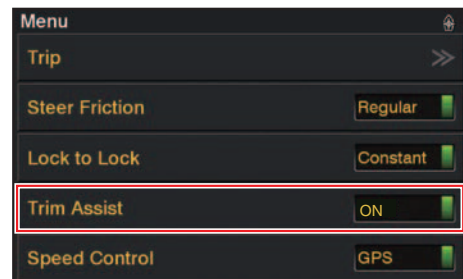
Speed Source

From the Trim Assist Preset menu, select “Speed Source”.



Trim Assist On/Off setting

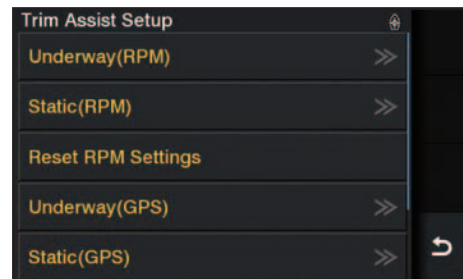
User can change Trim Assist On/Off setting with gauge or remote control.



Trim Assist Preset

TIP: _____

BCU is required when using GPS.



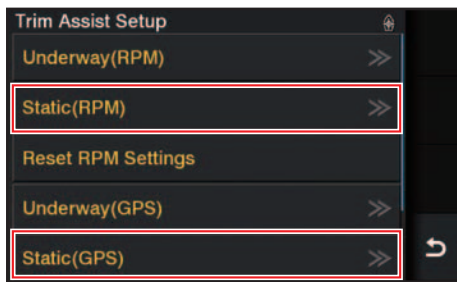
Trim Assist Static (RPM)/Static (GPS) setting

While your boat is stationary, you can set an appropriate trim angle corresponding to the speed.

“Static (RPM)” and “Static (GPS)” can be set only when the engine is stopped.

Menu > Boat Set > Trim Assist Preset > Static (RPM)

Menu > Boat Set > Trim Assist Preset > Static (GPS)



1. Turn off the Trim Assist feature.
2. Select “Static (RPM)” or “Static (GPS)” to open the setting screen.
3. Select position 1.
4. For “Static (GPS)”, select “Set Speed” and enter the boat speed.
5. Set the trim angle.
6. Select the next lower position.
7. Enter the engine speed for RPM and the boat speed for GPS.
8. Set the trim angle.
9. Repeat steps 6 to 8 to set the remaining positions.

TIP: _____

In the case of 3 outboard motors and 4 outboard motors, the trim angle different from that of port and starboard can be set by the central motor.

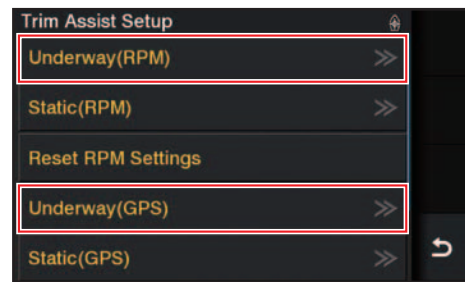
Trim Assist Underway (RPM)/ Underway (GPS) setting

While operating the boat, you can set an appropriate trim angle corresponding to the speed.

“Underway (RPM)” and “Underway (GPS)” can be set only while the engine is starting.

Menu > Boat Set > Trim Assist Preset > Underway (RPM)

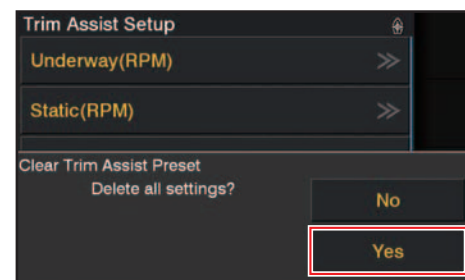
Menu > Boat Set > Trim Assist Preset > Underway (GPS)



1. Turn off the Trim Assist feature.
2. Select “Underway (RPM)” or “Underway (GPS)” to open the setting screen.
3. Select position 1.
4. For “Underway (GPS)”, operate at the boat speed you want to set.
5. Adjust the trim angle.
6. Select set button.
7. Select the next lower position.
8. For “Underway (RPM)”, operate at the engine speed you want to set, and for “Underway (GPS)”, operate at the boat speed you want to set.
9. Adjust the trim angle.
10. Select set button.
11. Set the remaining positions by repeating steps 7 to 10.

Reset RPM Settings/Reset GPS Settings

1. Select “Reset RPM/GPS Settings”.
2. Confirm pop-up and select “Yes”.



3. Each settings (RPM/GPS) are cleared.

Position	RPM	Trim	Econ
Actual	600	ALL 29%	0.0 mpg
1	IDLE	ALL 29%	
2	-----	ALL 0%	
3	-----	ALL 0%	

Trim Tab

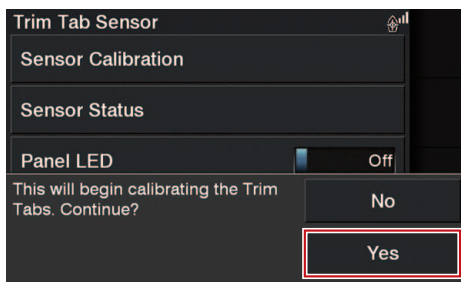
Set the Bennett Auto Trim Tab.

TIP: _____

“Trim tab” is displayed when equipped with the Bennett Auto Trim Tab.

To calibrate the Trim Tab Sensor

1. Display the sensor calibration screen.
2. Display the confirmation message, select “Yes”.

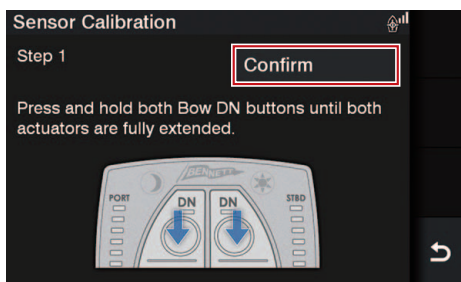


3. Press and hold the “DN” button on the AUTO TAB CONTROL until the actuator on the Bennett Auto Trim Tab is fully extended.

TIP: _____

Follow the instructions in the displayed information to operate AUTO TAB CONTROL.

4. Select “Confirm”.

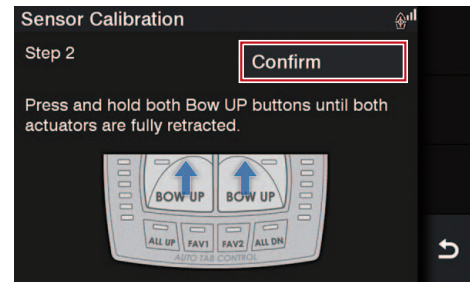


5. Press and hold the “UP” button on the AUTO TAB CONTROL until the actuator on the Bennett Auto Trim Tab is fully retracted.

TIP: _____

Follow the instructions in the displayed information to operate AUTO TAB CONTROL.

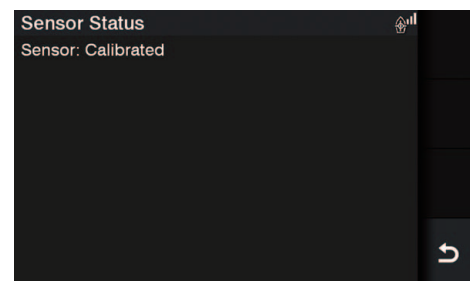
6. Select “Confirm”.



To display Sensor Status

To display the sensor status of Bennett Auto Trim Tab, select the button as follows.

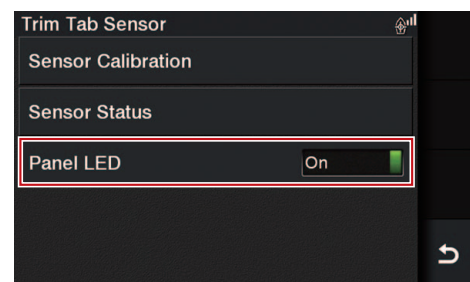
Menu > Boat Settings > Trim tab > Trim Tab Sensor > Sensor Status



To switch the LED on the panel

To switch the LED of the AUTO TAB CONTROL on and off, select the button as follows.

Menu > Boat Settings > Trim tab > Trim Tab Sensor > Panel LED

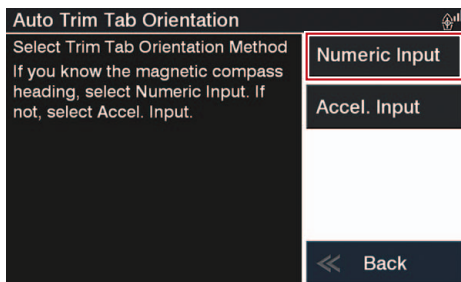


To display the setting status

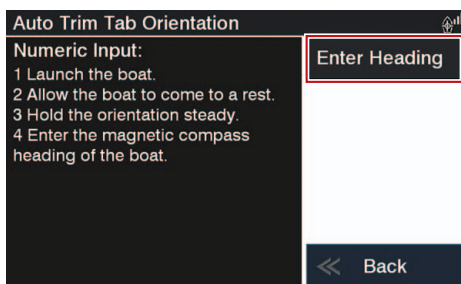
To check the settings of the Bennett Auto Trim Tab, open the status screen.

To set the Auto Trim Tab Orientation (Numeric Input)

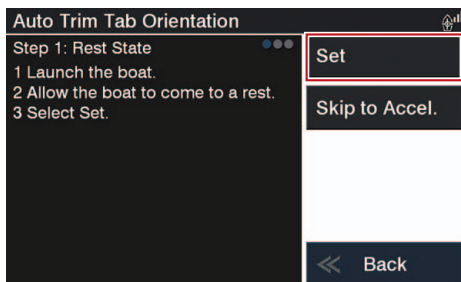
1. Display the orientation setting screen.



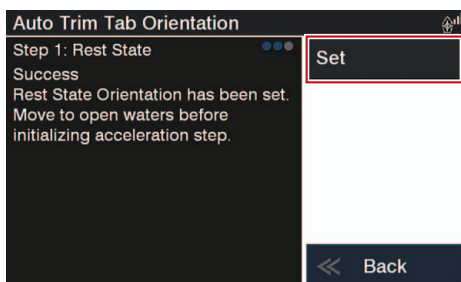
2. On the numerical input screen, follow the display procedure to operate the boat and select "Enter Heading".



3. Follow the displayed "Step 1: Rest State" procedure to operate the boat and select "Set".

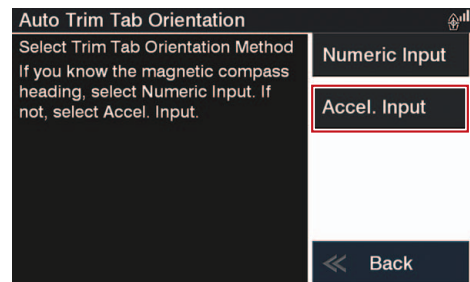


4. "Success" is displayed. Select "Set" to continue to the "Accel. Input" step.

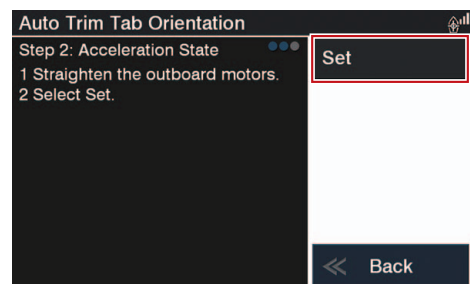


To set the Auto Trim Tab Orientation (Accel. Input)

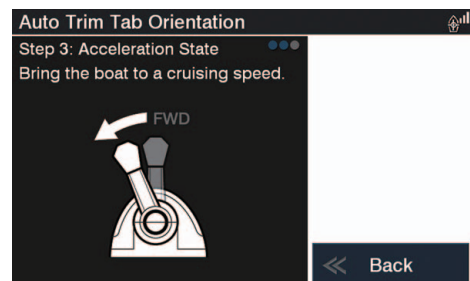
1. Display the orientation setting screen.



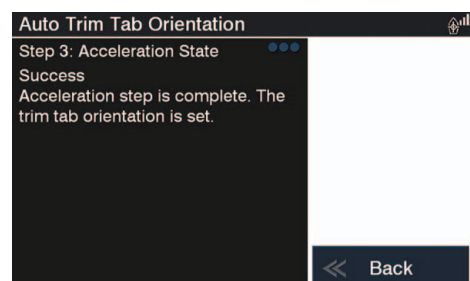
2. Follow the displayed "Step 2: Acceleration State" procedure to operate the boat and select "Set".



3. Follow the displayed "Step 3: Acceleration State" procedure to operate the boat.

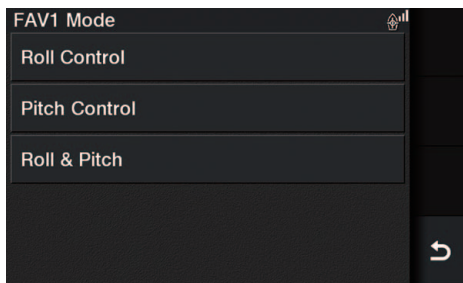
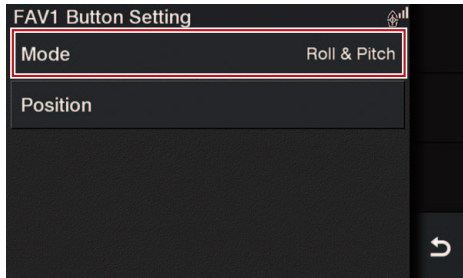


4. "Success" is displayed.



To set the mode for the FAV button

Display the mode setting screen, and select the mode to be assigned to the FAV button of AUTO TAB CONTROL from “Roll Control”, “Pitch Control”, and “Roll & Pitch”.

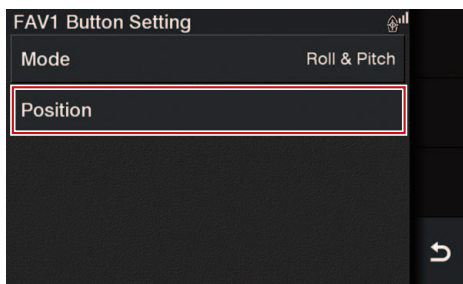


TIP: _____

Select either “FAV1” or “FAV2” and select the mode to assign to the button.

To set the trim angle of the FAV button

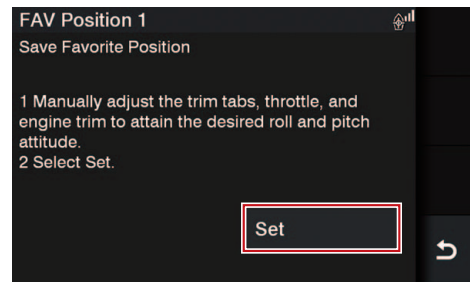
1. Displays the trim angle setting screen.



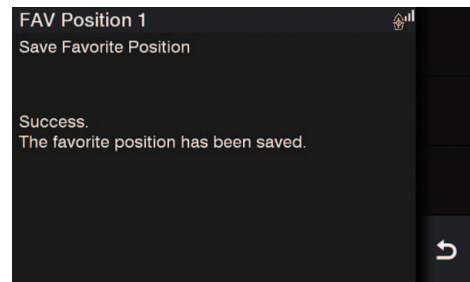
TIP: _____

Select either “FAV1” or “FAV2” and select the position you want to assign to the button.

2. Manually determine the Bennett Auto Trim Tab, throttle, and outboard motor trim to get the desired roll and pitch, and operate the boat.
3. Select “Set”.



4. “Success” is displayed.



Off Timer

You can switch the Off Timer feature. The Off Timer is a feature that turns off the ignition switch of all engines one hour after the engine stops.

TIP: _____

“Off Timer” is displayed only when using Electronic Key Switch (EKS).

Heading Sensor Calibration

Heading Sensor Operation

Calibrate the compass before using the Auto-pilot or SetPoint functions.

Heading Sensor Calibration

Before and during calibration, take care to keep the boat as steady and as level as possible. You may not use any Autopilot function (e.g. Heading Hold) before and during calibration.



The compass setup screen pictured above shows whether Compass Calibration and Heading Alignment (Set North Calibration) currently is done or not done.

1. To start calibration, go to compass setup screen.

TIP: _____

You can go to the setup screen anytime by pressing the following on-screen buttons.

CL5 Display, MFD Interface Type-2: Menu > BoatSet > Calibration

2. First, ensure that the boat is level before starting calibration to make sure pitch and roll values are accurate. Next, perform "Compass Cal." according to on screen instructions until you see "Calibration Status: Success".

TIP: _____

You cannot start calibration in Autopilot mode. Also, you must do "Compass Cal." before Set North calibration or Set North Calibration will fail.

3. Point the bow leeward/towards drifting direction to reduce inaccuracy caused by the boat drifting. Perform Set North Calibration according to the on-screen instructions until you see "Calibration Status: Success". Doing Compass Cal. again will erase the previous Set North Calibration data (i.e. Heading Alignment: Not Done). So it is necessary to do Set North Calibration again after every Compass Cal.
4. (Optional) You can use the Fine Adjustment function to fine tune the Heading Alignment. Using a far landmark or a good compass, determine the heading of your boat. Adjust the heading in 1 degree increments/decrements until it matches your determined heading value.

TIP: _____

Do not change the position of the Heading Sensor after calibration. If you change its position, do the calibration again.

Joystick calibration

You can calibrate the joystick if the boat does not move correctly in sync with the movement of the joystick.

TIP:

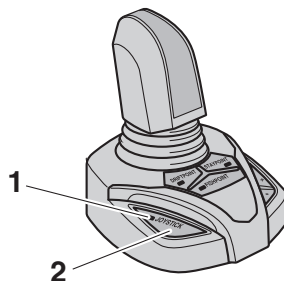
- For single engine applications, there is no joystick calibration.
 - When calibrating the joystick, maneuver the boat safely in water where there are no obstacles.
 - Avoid doing calibrations in high seas or strong winds, which could affect the results of the calibrations.
 - When doing calibrations, run the boat long distances. Grip the joystick firmly and keep it steady.
 - The joystick lever is designed to be calibrated for both STBD tilting and for PORT tilting. Because of this, you need to calibrate both the directions the lever tilts.
 - If you calibrate the joystick once, but moving laterally is difficult, do the calibration again. The calibration information can be overwritten based on the previous calibration information.
 - The calibration information is reset by pressing the joystick switch while the joystick is in the N position and if the joystick has not been operated after entering joystick mode.
-

How to operate

1. Long press the joystick switch.
2. The joystick calibration mode activates.
3. Find the position in which the boat moves abeam, and then press the joystick control button.

How to release

Press the joystick switch.



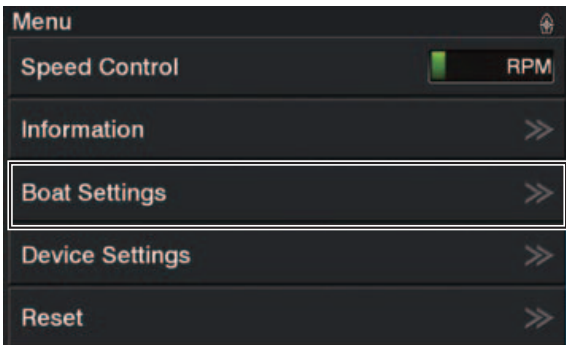
1. LED
2. Joystick switch

Joystick Calibration w/ Bow Thruster

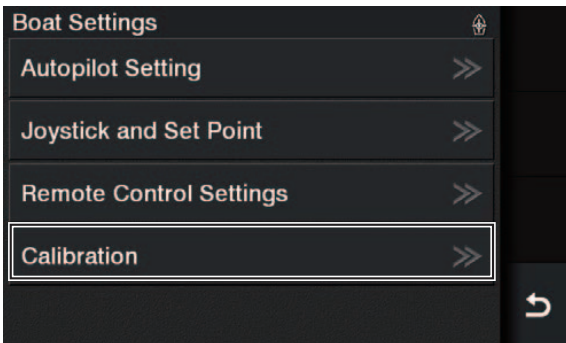
TIP: _____

- Before calibrating the Joystick + Bow Thruster, be sure to calibrate the Joystick only.
- Set the joystick output level to a commonly used level or higher.
- Joystick operations are described in detail in the YAMAHA CL5 Owner’s manual.
- Please refer to the Vetus Owner’s Manual for information on how to adjust and operate Vetus.

1. From the “Menu”, select “Boat Settings”.



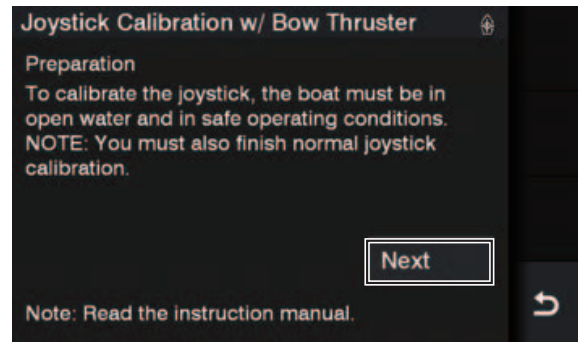
2. From the “Boat Settings”, select “Calibration”.



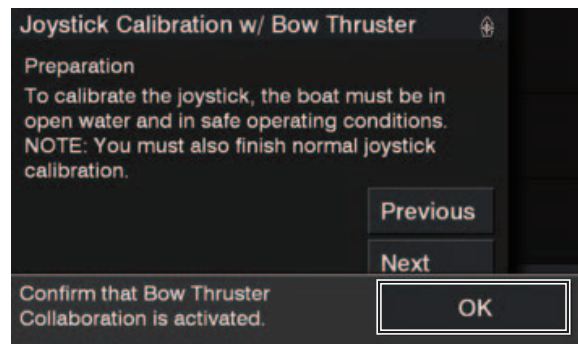
3. From the “Calibration”, select “Joystick Calibration w/ Bow Thruster”.



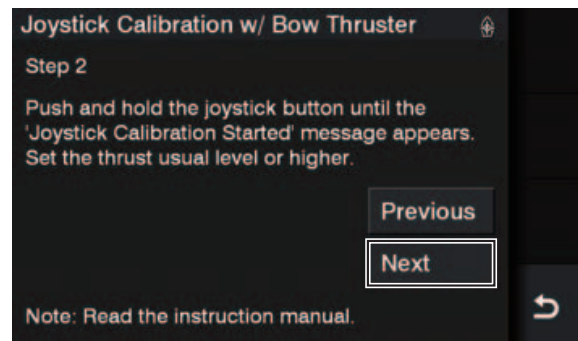
4. Tap “Next”.



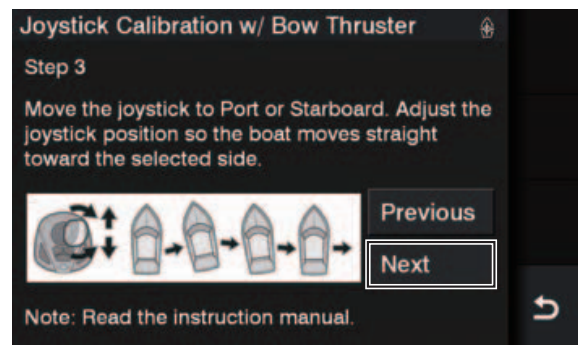
5. Confirm that Bow Thruster Collaboration is activated. Tap “OK”.



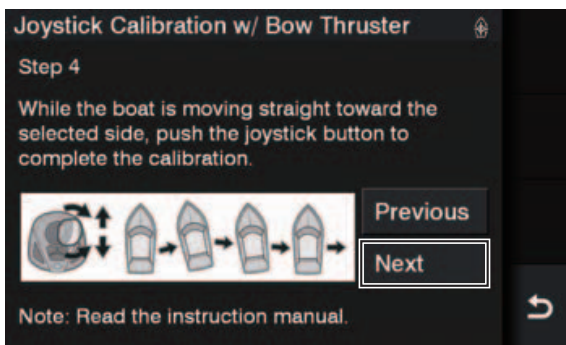
6. Tap “Next”.



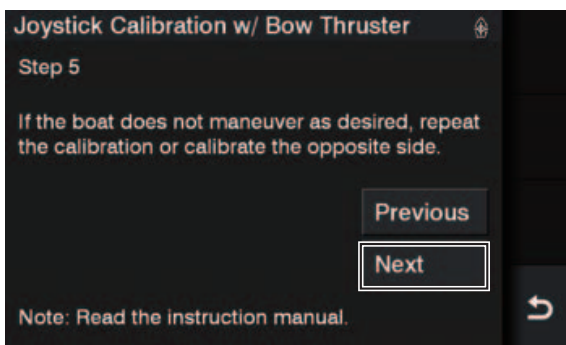
7. Tap “Next”.



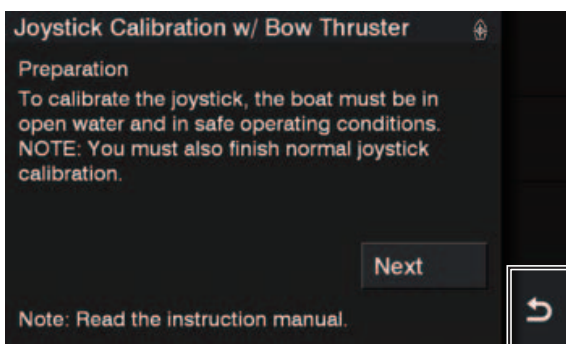
8. Tap “Next”.



9. Tap “Next”.



10. Return to the 1st screen of Joystick calibration. Tap “↶”.

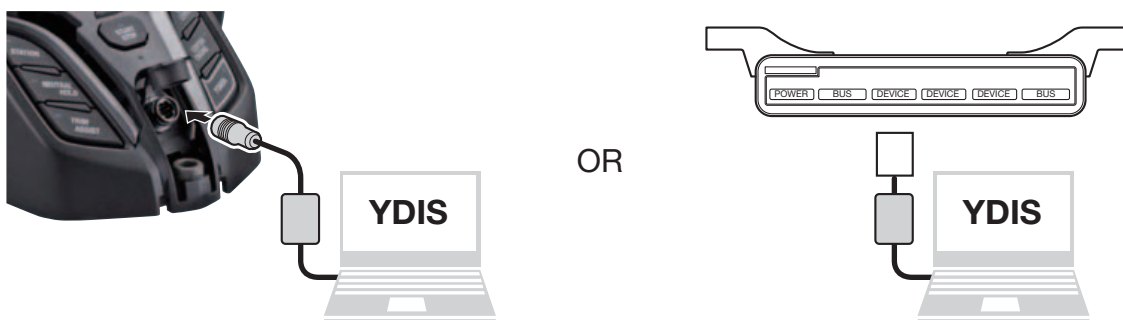


Predelivery checks

To make the delivery process smooth and efficient, complete the predelivery checks as explained in the following procedure.

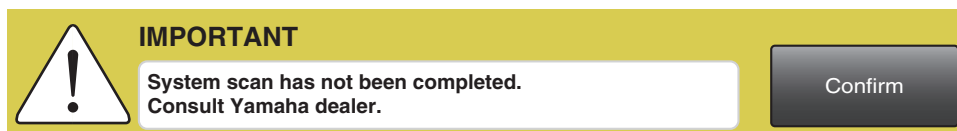
Before operation

- Implement BPS scan upon completion of Helm Master EX installation, calibration and setting. YDIS can be connected to Helm Master EX to the easily accessible built-in YDIS connection port under the top cover of 6X9 DEC, or conventional connection to multi-hub. For d tailed BPS scan procedure, please see corresponding help menu.



TIP:

- Helm Master EX compatible displays (i.e. CL5 Display, MFD Interface Type 1 or Type2) will show the error message shown below each time Helm Master EX system is powered on.
- This error message can be deleted by the BPS scan. YDIS needs to have the version 2.44 or newer.



During operation

- Check that the calibration for all the items is complete. “Calibration” (page 174)
- Turn the steering wheel to the left and right, and check that the outboard motors do not interfere with other outboard motors, harnesses, or hoses. Also, check that the harnesses or hoses are not pulled excessively.
- Face the outboard motors forward, and one at a time, tilt them up and down. Check that the outboard motors do not interfere with other outboard motors, harnesses, or hoses. Also, check that the harnesses or hoses are not pulled excessively.
- Check that the outboard motors do not interfere with each other when in the Joystick mode.

Periodic maintenance

Maintenance table

The following chart provides a basic guideline for the periodic maintenance. However, maintenance may need to be performed more frequently depending on your operating conditions.

Item	Actions	Every time	Initial	Every	
			20 hours	100 hours (6 months)	200 hours (1 year)
Battery voltage	Check the battery voltage.	✓	✓	✓	✓
DES system components	Check the DES system components for tightness, looseness, wear, and leaks.	✓	✓	✓	✓
DES cylinder responsiveness	Check whether the DES responds immediately when the steering wheel is turned.	✓	✓	✓	✓
DES system connections	Check that all DES system fasteners and electrical connectors are tight and secure. Where necessary, tighten fasteners to the correct torque values and electrical connectors are locked.		✓	✓	✓
DES system	Check the DES for play. Repair if abnormal play is found.		✓	✓	✓
DES system corrosion	DES system for signs of corrosion. Contact a Yamaha dealer if any corrosion is found.		✓	✓	✓
Greasing points	Apply marine grease.				✓

Greasing points

NOTICE

Here, only the procedure necessary for greasing in the periodic maintenance is described. Assemble properly according to the “Bolt-on DES”.

1. Remove the support brackets (PORT and STBD) and support rod.

TIP:

It is not necessary to remove the link rod bolt when greasing it for maintenance.

2. Clean the support brackets, support bracket bolts, DES cylinder shafts, support rod, and through-tube.
3. Apply a sufficient amount of grease to the contact points between the support brackets, support bracket bolts, DES cylinder shafts, and the support rod.
4. Reassemble the support rod and the support brackets (PORT and STBD).

NOTICE

If the support bracket was removed when greasing, be sure to perform calibration after assembly. If used without calibration, it may cause a serious failure.

Setting and operation

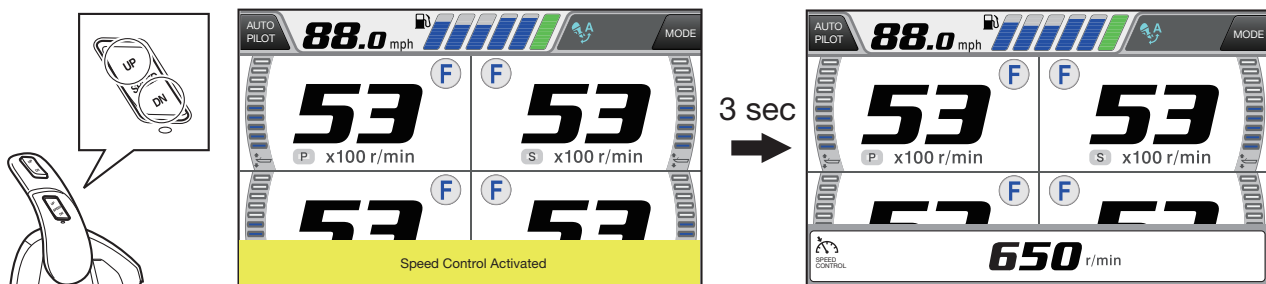
Speed control

Adjust the Speed Control (r/min)

TIP: _____

Speed Control source “GPS” can be selected when upgraded to Autopilot (Level 3) or Joystick Full Maneuverability (Level 4).

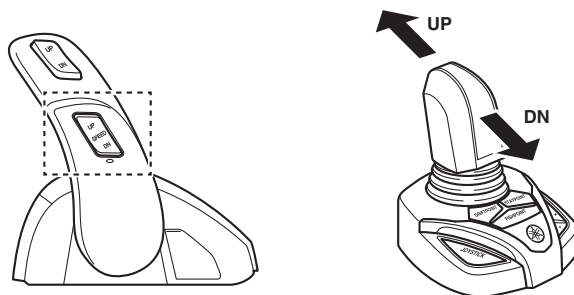
1. Push the Speed “UP” or “DN” button to activate speed control.



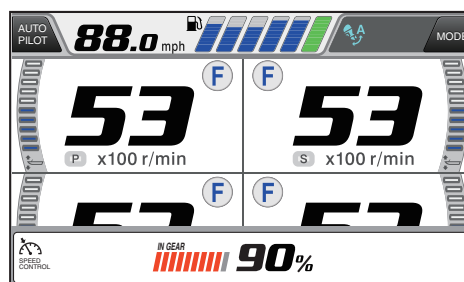
2. Adjust the Speed “UP”/“DN” button to change the target speed. It can also be adjusted by pressing Joystick knob forward/backward if upgraded to Joystick Full Maneuverability (Level 4).

TIP: _____

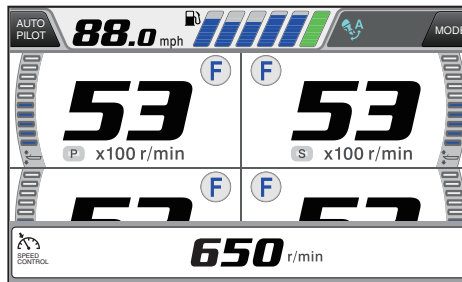
A user can also adjust the speed by using the joystick.



3. Press the “DN” button to activate Pattern Shift to reduce the speed from trolling speed to even lower than idling speed.



- Pressing Speed “UP” button above the upper limit deactivates Pattern Shift and re-displays the Target r/min.

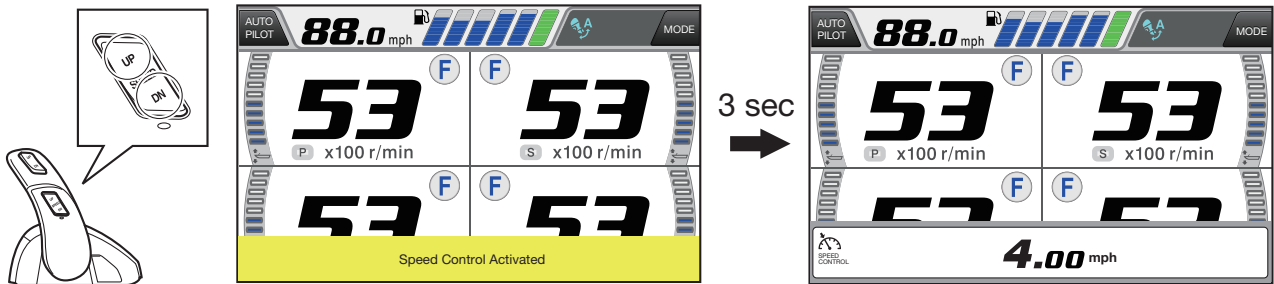


Adjust the speed Control (GPS)

TIP: _____

Speed Control source “GPS” can be selected when upgraded to Autopilot (Level 3) or Joystick Full Maneuverability (Level 4).

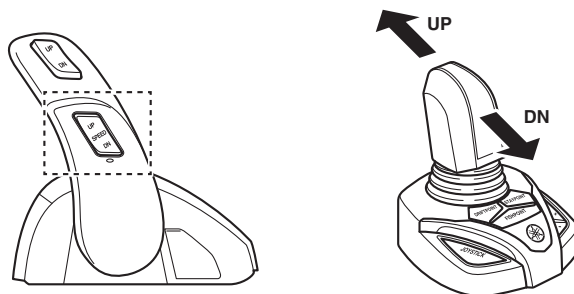
- Push the Speed “UP” or “DN” button to activate speed control.



- Adjust the Speed “UP”/“DN” button to change the target speed. It can also be adjusted by pressing Joystick knob forward/backward if upgraded to Joystick Full Maneuverability (Level 4).

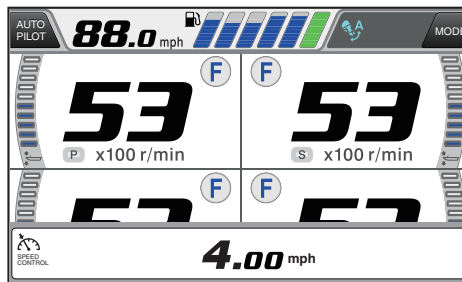
TIP: _____

A user can also adjust the speed by using the joystick.



- Press the “DN” button to activate Pattern Shift to reduce the speed from trolling speed to even lower than idling speed.

- Pressing Speed “UP” button above the upper limit deactivates Pattern Shift and re-displays the Target r/min.



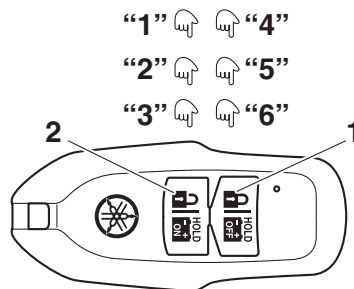
Electronic Key Switch (EKS)

Key fob settings

Delete a key

When a key is stolen or lost and you want to delete it, perform the following:

- Put all registered keys you own around the panel.
- Push the registered key button to lock EKS (for security).
- After the power switch is turned on, push the registered key button (Lock button “1”, Unlock button “2”) 3 times on each side, for a total of 6 times.

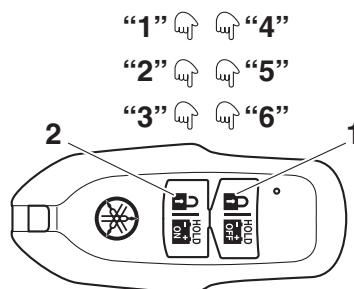


- The buzzer sounds and any key that is not near the panel will no longer have access.

Restore a key

When you want to restore a key that had been lost, perform the following:

- Put all registered keys around the panel, including keys you want to restore.
- Push the registered key button to lock EKS (for security).
- After the power switch is turned on, push the registered key button (Lock button “1”, Unlock button “2”) 3 times on each side, for a total of 6 times.



- The buzzer sounds and the key will now have access.

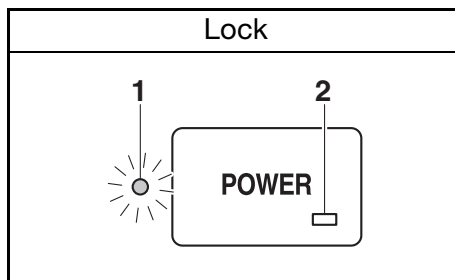
Adding a new key fob

If you want to add a new key fob, you can use the following procedure to do it.

TIP:

- Keys can be added in the same way as mechanical models.
- When adding a new key fob, prepare a key fob with one of the following part numbers.
 6X9-86261-00 (433 MHz)
 6X9-86261-10 (315 MHz)

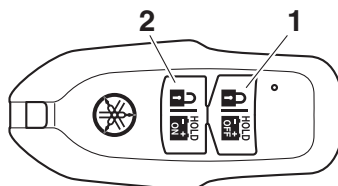
1. Place the key fob near the EKS panel.
2. Use your original key fob to lock the system. (The lock indicator turns on)



1. Lock indicator
2. LED

3. Within 10 seconds after turning on the POWER switch, on your original key fob, alternately press the lock button and then unlock button 6 times.

“1” “2”
 “3” “4”
 “5” “6”



1. Lock button
2. Unlock button

4. Beep sounds.

TIP:

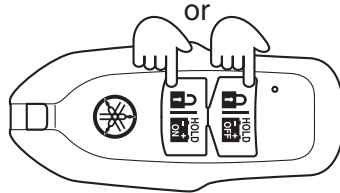
If registration is not possible, setup ends.

	Number of beeps
Registration possible	●
Registration not possible (6 keys are already registered)	●●●●●●

5. Press the lock or unlock button on the new key fob that you want to register one time.

TIP: _____

YDIS can be used to do deregistration.



- The beep stops after the third round. After registration is successful or fails, the beep beeps once for each of the key fobs that have been registered and not deregistered.

TIP: _____

The beep stops after the third round.

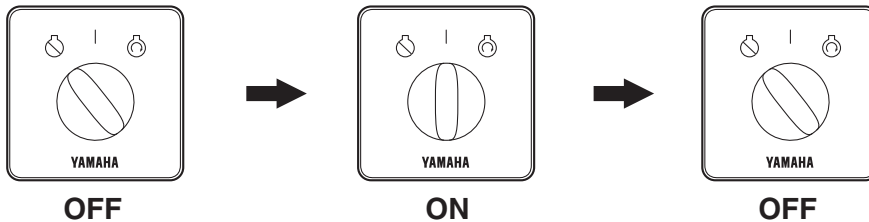
Example of beep) If registration is successful and there are 4 key fobs that have been registered and not deregistered

Number of beeps
● ●●●●

Addition of key (When lost all registered keys/6X6 System)

How to set (how to enter setting mode)

- Turn the main switch to “ON”, and then immediately turn it to “OFF”. (Turn it off before the beeping, from being turned on, stops.)

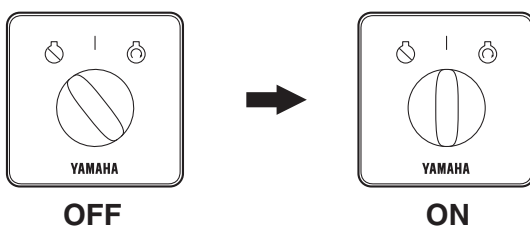


- Wait at least 3 seconds while the main switch is off.
- Repeat steps 1 and 2 three times.
- After that, a beep sounds one time.

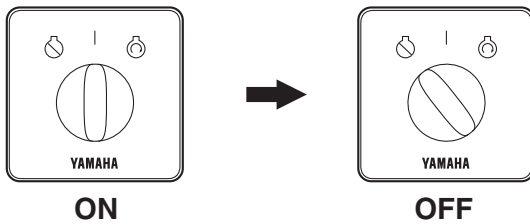
	Number of beeps
When recognition succeeds	●

How to set (how to set passwords)

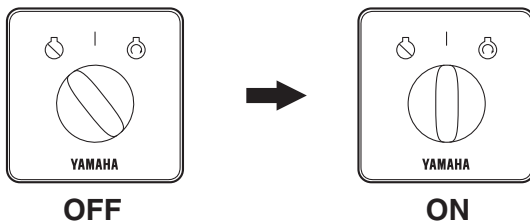
- Turn the main switch to “ON”. (Input the first digit to start)



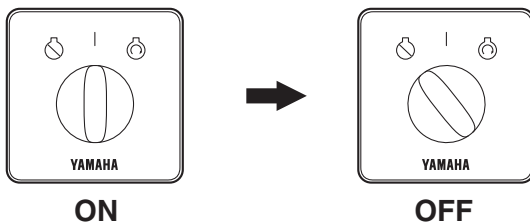
- Set the first digit “●○○○” of the password. Turn the main switch to “OFF”, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



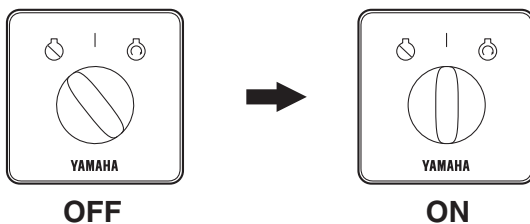
- After the first digit is set, turn the main switch to “ON” to start setting the second digit of your password.



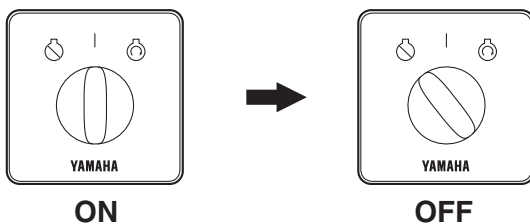
- Set the second digit “○●○○” of the password. Turn the main switch to “OFF”, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



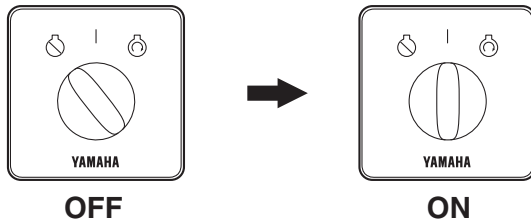
- After the second digit is set, turn the main switch to “ON” to start setting the third digit of your password.



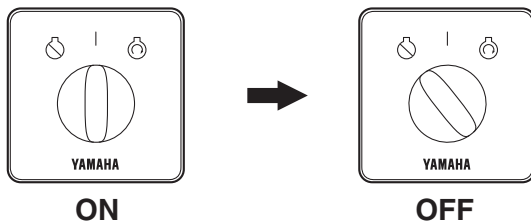
- Set the third digit “○○●○” of the password. Turn the main switch to “OFF”, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



7. After the third digit is set, turn the main switch to “ON” to start setting the fourth digit of your password.



8. Set the fourth digit “○○○●” of the password. Turn the main switch to “OFF”, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



9. Set the fourth digit, and then turn the main switch to “ON” to complete the change.

	Number of beeps
Recognition succeeded	●
Recognition failed	●●●

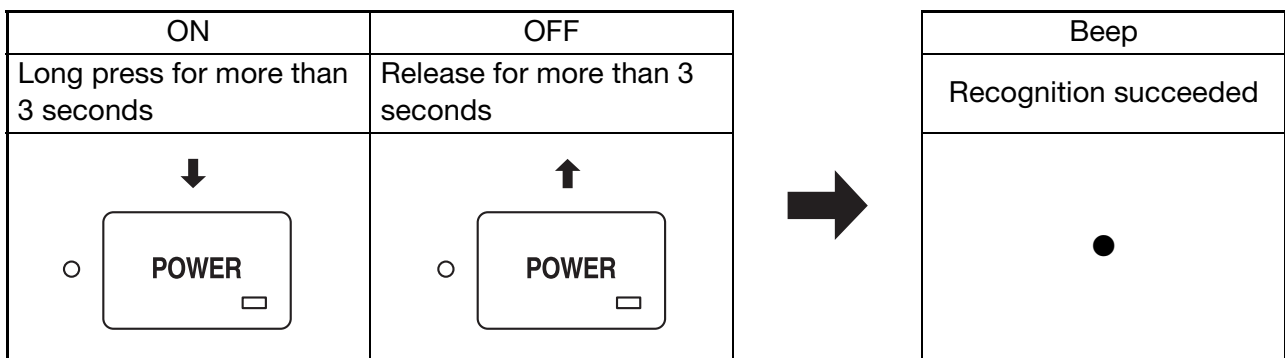
Adding a new key fob

10. Press a button on the new key fob you are adding. (push any button)

Addition of key (When lost all registreted keys/6X9 System)

How to set (how to enter setting mode)

1. Press the POWER switch repeatedly on and off three times. After that, a beep sounds one time.

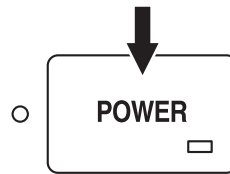


How to set (how to set passwords)

1. The password input mode activates and a beep sounds.

	Number of beeps
When recognition succeeds	●

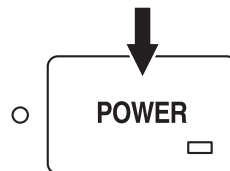
- Press the POWER switch once to start the password beep.



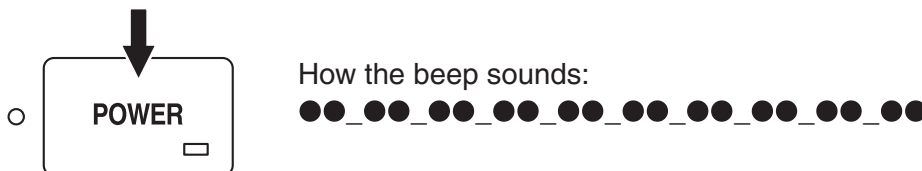
- Set the first digit "●○○○" of the password. Press the POWER switch, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



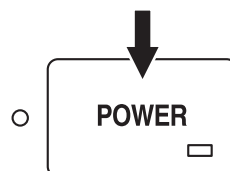
- After the first digit is set, press the POWER switch to start setting the second digit of your password.



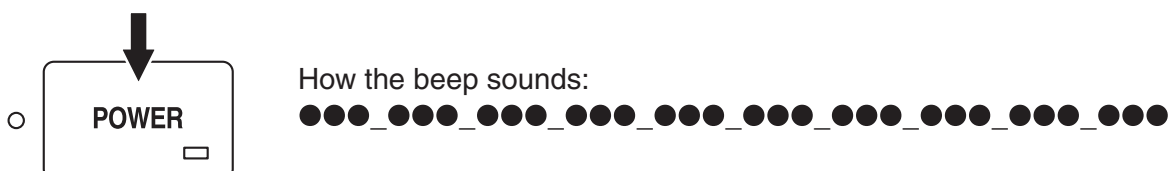
- Set the second digit "○●○○" of the password. Press the POWER switch, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



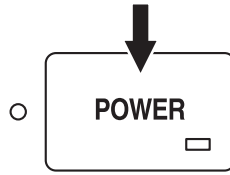
- After the second digit is set, press the POWER switch to start setting the third digit of your password.



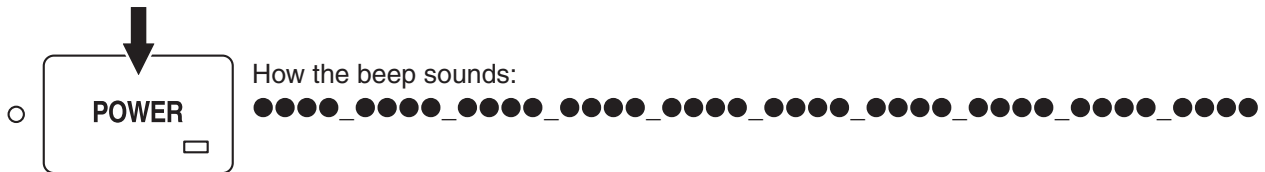
- Set the third digit "○○●○" of the password. Press the POWER switch, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



8. After the third digit is set, press the POWER switch to start setting the fourth digit of your password.



9. Set the fourth digit "○○○●" of the password. Press the POWER switch, while the beep is beeping, when it reaches the number of beeps that is equal to the number you want for this digit of your password.



10. After the fourth digit is set, the POWER switch turns on, and the change is complete.

	Number of beeps
Recognition succeeded	●
Recognition failed	●●●

Adding a new key fob

11. Press a button on the new key fob you are adding. (push any button)

TIP: _____

- A short beep sounds 10 times according to the numbers in the password (password: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0).

Number of beeps	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Ninth	Tenth
Password number	1	2	3	4	5	6	7	8	9	0





- When setting the numbers in the password, the beep sounds differently for the selection of each digit, first through fourth.

Sound of beep for first digit of password (short beep 1 time x 10)	● _ _ _ _ _ ●
Sound of beep for second digit of password (short beep 2 times x 10)	●● _ _ _ _ _ ●● ●●
Sound of beep for third digit of password (short beep 3 times x 10)	●●● _ _ _ _ _ ●●● ●●● _ _ _ _ _ ●●●
Sound of beep for fourth digit of password (short beep 4 times x 10)	●●●● _ _ _ _ _ ●●●● ●●●● _ _ _ _ _ ●●●●

- Even if you forget the password you pressed in the first round, after the password beep sounds 10 times, you can input your password again. However, if there is no input by the third round, the mode is shutdown.

Example of how to set a password

Example) To set "3468" as the password. ●: Beep

	1	2	3	4	5	6	7	8	9	0
First digit	●	●	●	●	●	●	●	●	●	●
										
Second digit	●●	●●	●●	●●	●●	●●	●●	●●	●●	●●
										
Third digit	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●	●●●
										
Fourth digit	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●
										

Replacing the battery in the key fob

After power is turned on and then after the recognition succeeded beep sounds one time, if the beep sounds 10 times in a row, then replace the battery in the key fob.



⚠ WARNING

- If battery is incorrectly discarded or heated to high temperature (100 °C (212 °F) or higher), gas may be generated inside battery, causing electrolyte leak, internal short circuit, heat generation, explosion and violent flaring.
- Swallowing the battery or other removable parts could cause injury. Keep the battery and other removable parts out of the reach of children.
- Do not expose the battery to direct sunlight or other heat sources.
- If you take the key fob onto an airplane, do not press the operation buttons. Also, when put it in a bag, store it so the operation buttons cannot be easily pressed. If the operation buttons are pressed, the key fob will output a radio signal, which could interfere with the airplane's controls.
- If you take the key fob onto an airplane, do not press the operation buttons. Also, when put it in a bag, store it so the operation buttons cannot be easily pressed. If the operation buttons are pressed, the key fob will output a radio signal, which could interfere with the airplane's controls.
- The key fob is considered an electronic device whose use in airplanes is restricted.

NOTICE

- Do not subject the key fob to excessive force when changing the battery.
- Do not use a screwdriver, or other hard object, to force open the key fob.
- Take care that the waterproof seal is not damaged or fouled by dirt.
- Do not touch the circuits or terminals inside it. Doing so could cause a malfunction.
- Be sure that the battery is installed correctly. Confirm the "+" side of the battery.

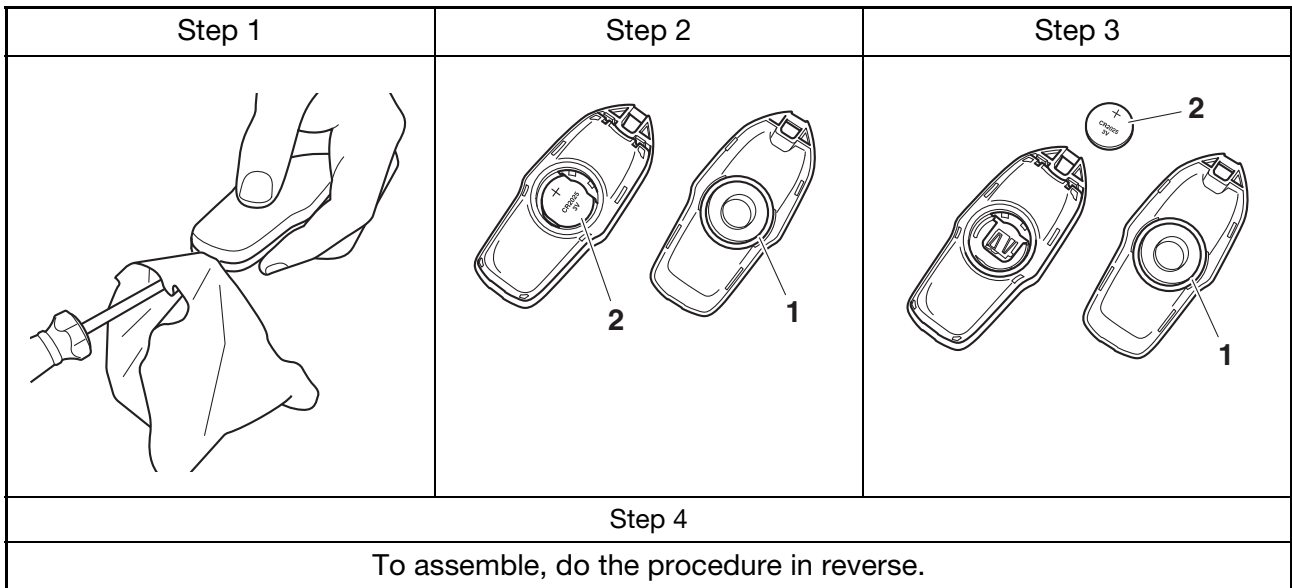
Battery replacement procedure

NOTICE

Be aware of the polarity of the battery.

TIP:

Dispose of the used batteries correctly according to the rules in your region.



- 1. O-ring
- 2. Battery

Recommended battery:
CR2025

Setting up the EKS

There are six programming slots for keys.

Two keys come with the system, and the operator can add four additional keys.

If all key fobs are lost, the dealer can add another key fob with the password. If the immobilizer malfunctions, the dealer can use YDIS to unlock the Electronic Control Module (ECM). The special tool (entry-box) used on current Y-COP system is no longer required.

Autopilot

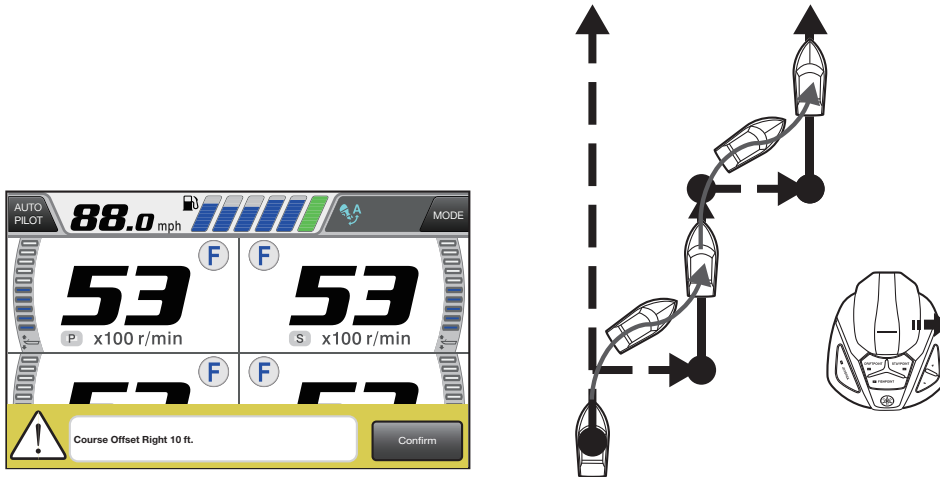
COURSE HOLD Offset

User can select Offset Distance (10, 20, 50 ft) (for COURSE HOLD)

Offsets the course in the direction of your operation.

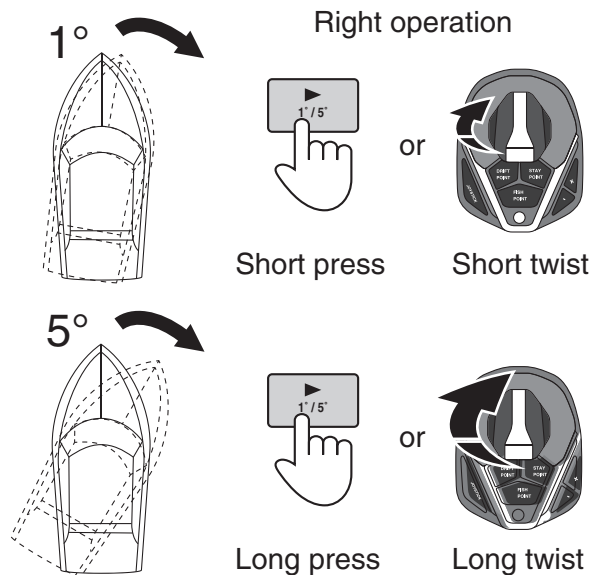
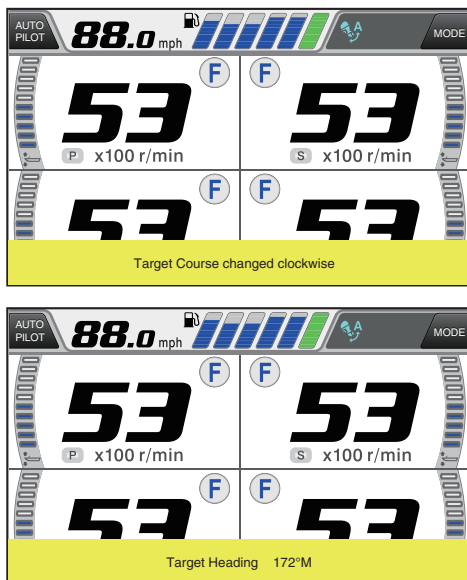
Decide the amount of offset on the MFD.

Tilting the joystick for a long time will increase the amount of offset at regular intervals. (Up to 10 times)



HEADING HOLD/COURSE HOLD Angle adjust

Adjusts the desired heading 1°/5° in the direction of your operation.

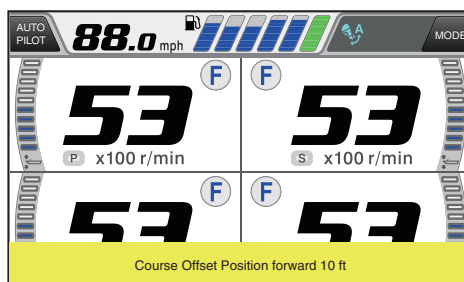


DRIFTPOINT TRACK Course Offset

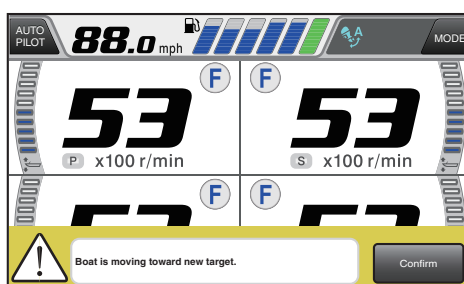
TIP:

For DRIFTPOINT TRACK only, tilting the joystick in the opposite direction does not cancel the operation.

1. Target Position Moved forward 10 ft.



2. Move to target position.



Thrust level (SetPoint/Joystick)

Enabling the SetPoint or the joystick switch allows you to adjust the maximum engine speed and to adjust the thrust level.

SetPoint is enabled

TIP:

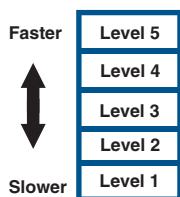
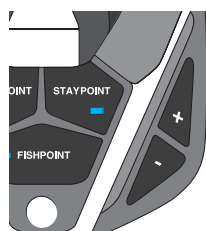
- Cannot be used while STAYPOINT is enabled. (for Twin/triple/quad/quint engine application)
- When the adjustment level is "0", the SetPoint is maintained using only the CENTER PORT/CENTER STBD engines. (Quad engine)
- When the adjustment level is "0", the SetPoint is maintained using only the CENTER PORT/CENTER/CENTER STBD engines. (Quint engine)

1. While SetPoint is enabled, each time you press the plus (+) button the engine speed increases; each time you press the minus (-) button the engine speed decreases.

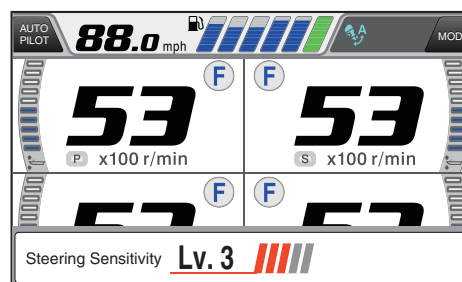
Adjustment level	Engine speed is low = 1 to 5 = Engine speed is high
Adjustment level (quad engine)	Engine speed is low = 0 to 5 = Engine speed is high

Autopilot sensitivity

You can adjust the sensitivity speed level of the outboard motors while Autopilot is being used.



- TIP:
- If the rudder angle is hunting while in Autopilot, lower the sensitivity speed level.
 - Sensitivity speed level can also be adjusted via compatible Yamaha displays.



	Tuning		
	Position	Angle	Thrust
STAYPOINT	✓ *1	✓	(Auto)
FISHPOINT	✓ *1	—	✓
DRIFTPOINT	—	✓	✓
DRIFTPOINT TRACK	✓ *1 (Fwd/Back)	✓	✓

	Tuning		
	Course	Angle	Autopilot sensitivity
HEADING HOLD	—	✓	✓
COURSE HOLD	✓ *2	✓	
TRACKPOINT	—	—	
Pattern Steer	—	—	

*1: User can select Fine-tuning Distance (5, 10, 20 ft) (for SetPoint)

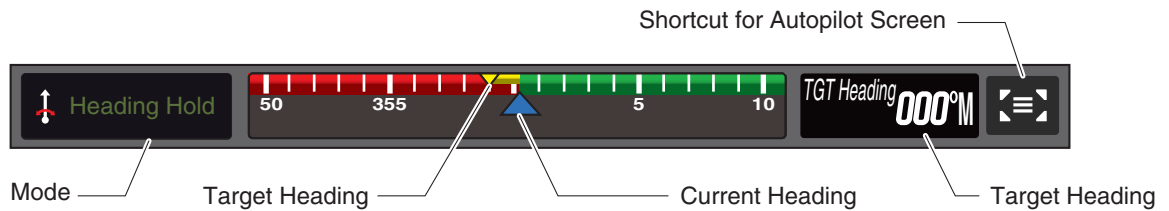
*2: User can select Offset Distance (10, 20, 50 ft) (for COURSE HOLD)

Autopilot bar

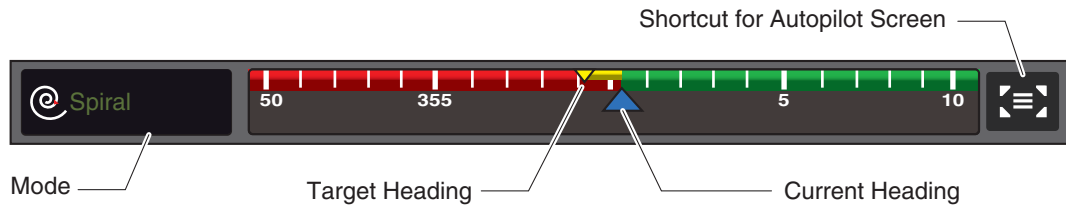
Autopilot bar shrinks and displays the information of Autopilot screen. User can confirm them at engine screen.



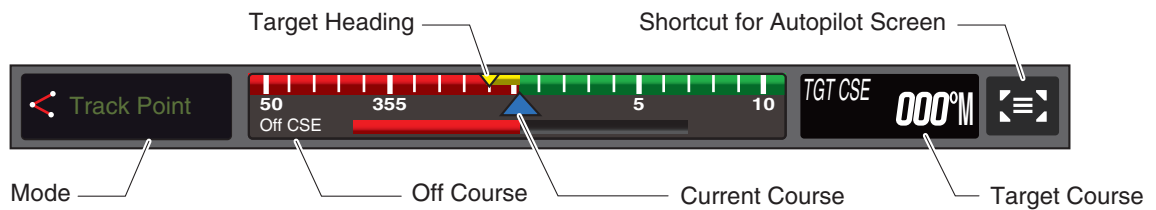
HEADING HOLD



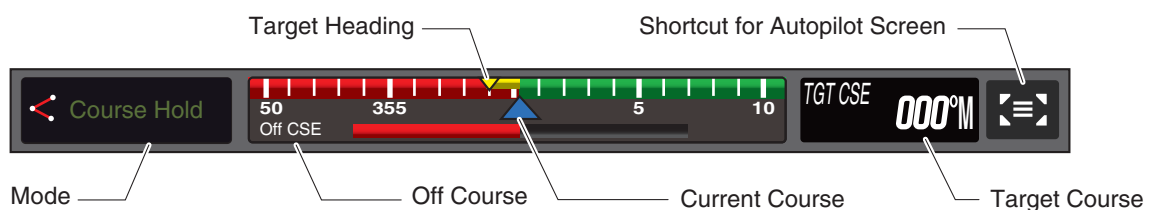
PATTERN STEER



TRACK POINT

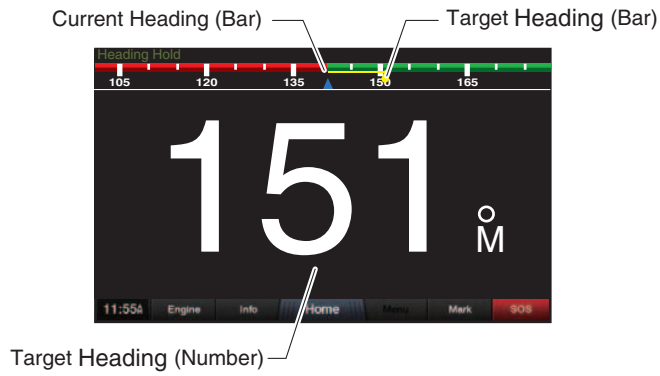


COURSE HOLD

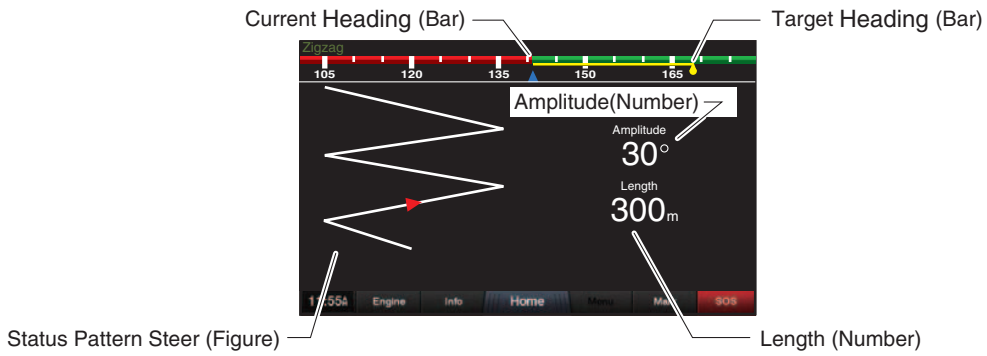


Autopilot screen

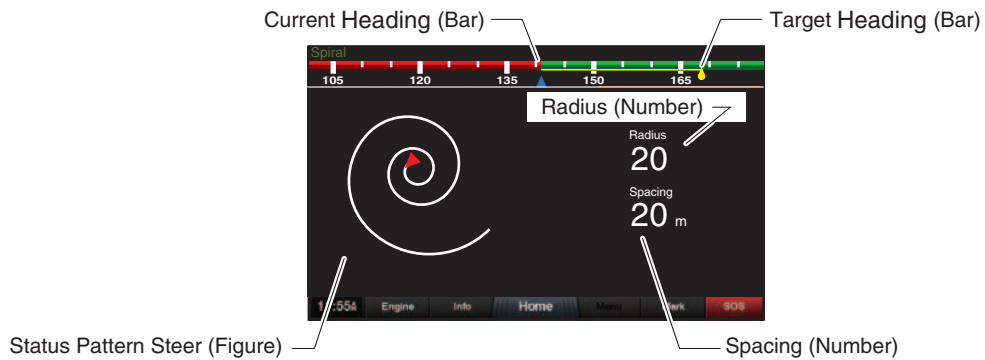
HEADING HOLD



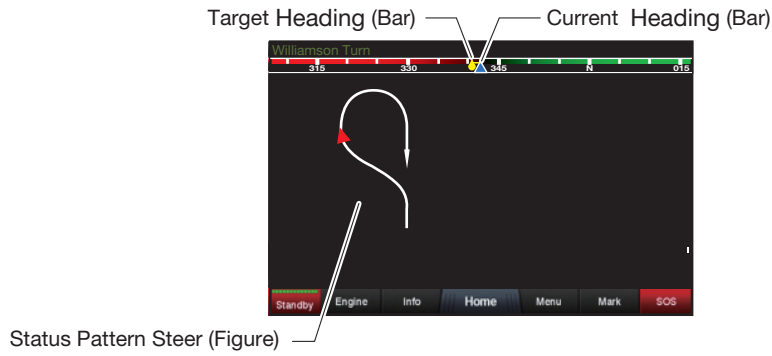
PATTERN STEER/Zigzag



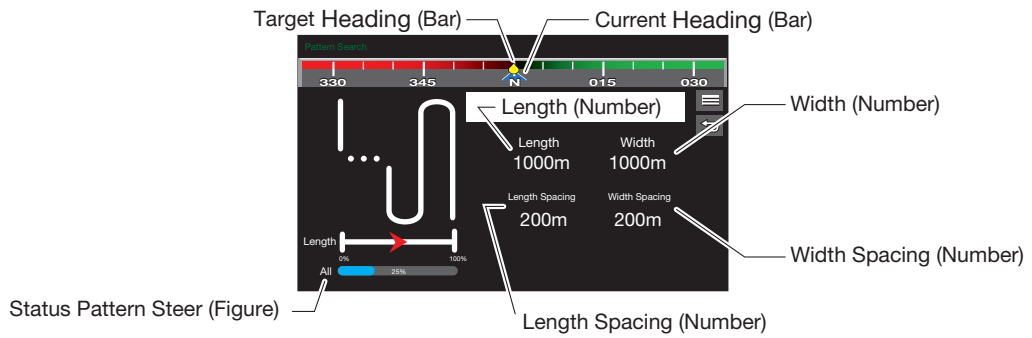
PATTERN STEER/Spiral



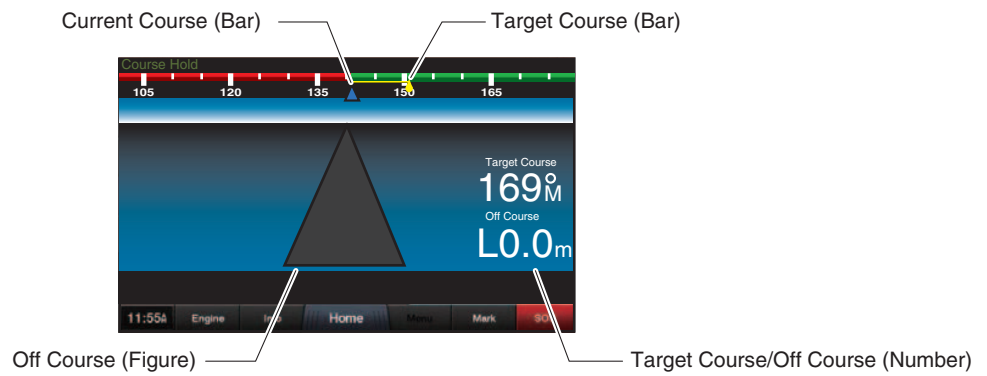
PATTERN STEER/Williamson Turn



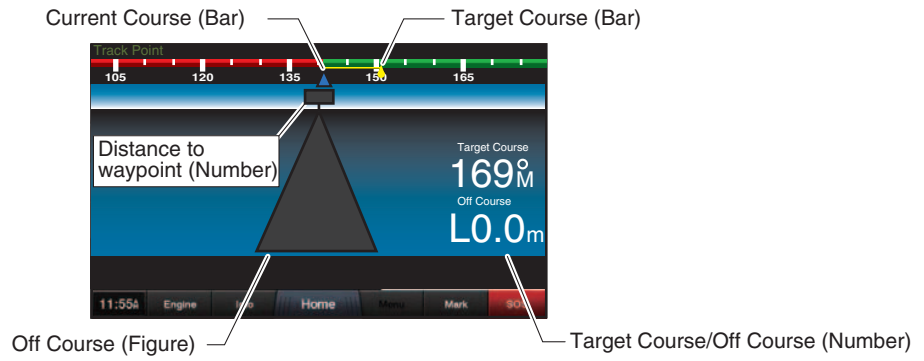
PATTERN STEER/Pattern Search



COURSE HOLD

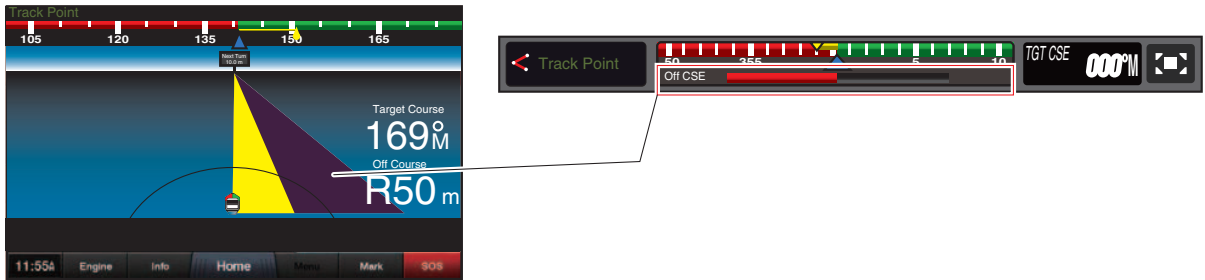


TRACK POINT



TIP:

Magenta line means Off course indicator. If distance is more than L/R 75 ft, gauge shows yellow line.



Pattern Steer setting (CL5 Display)

Pattern 1

A user can open Pattern Steer Setting Screen by 4 steps.

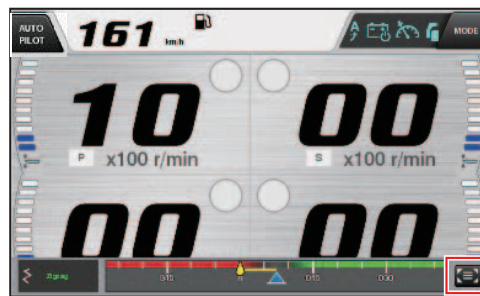
1. Touch the “AUTO PILOT” button to Autopilot is activated.



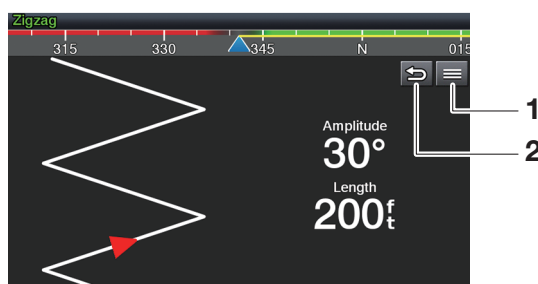
TIP:

Press and hold “AUTO PILOT” to display the autopilot setting screen (step 4).

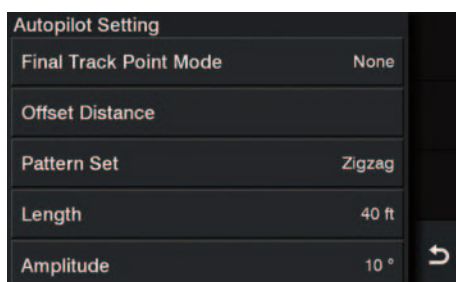
2. Touch the figure button.



3. Touch the “1” button.
If “2” button is pressed, Screen 2 is displayed.



4. Autopilot Setting Screen is displayed.



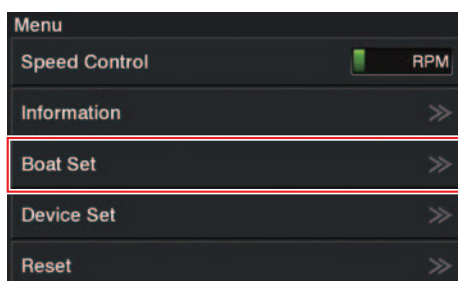
Pattern 2

A user can open Pattern Steer Setting Screen by 4 steps.

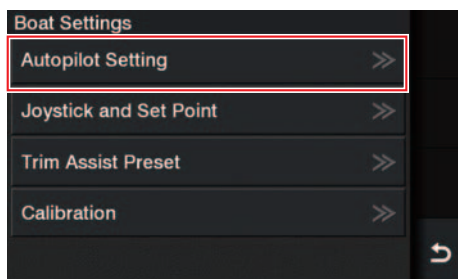
1. Open the Menu Screen by swipe.



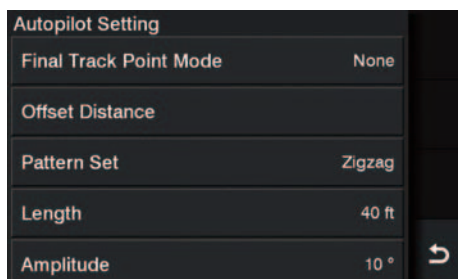
2. Touch the “Boat Set” button.



3. Touch the “Autopilot Setting” button.

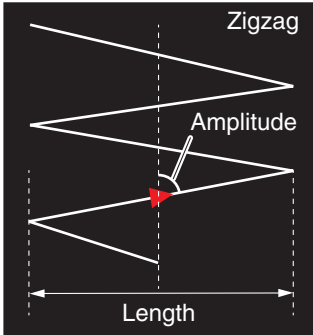
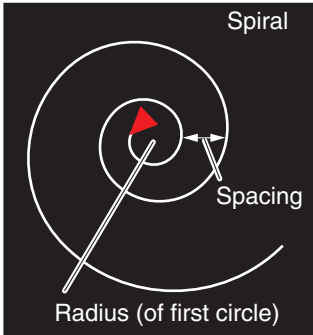
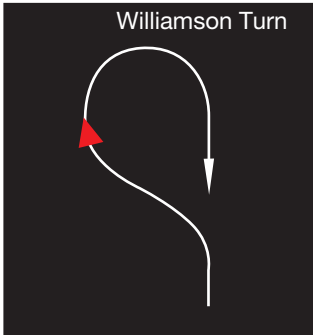
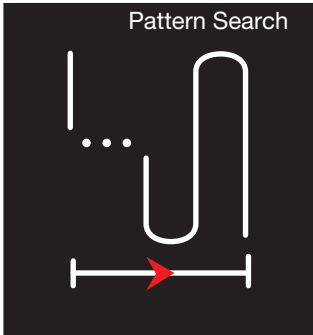


4. Autopilot Setting Screen is displayed.



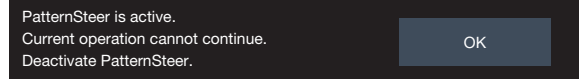
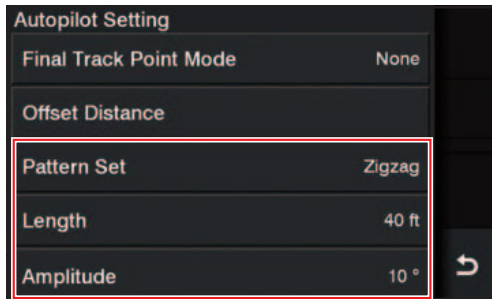
Autopilot settings

User can select Pattern Steer button setting.

 <p>The diagram shows a zigzag path on a black background. A red arrow at the center indicates the direction of travel. A vertical dashed line represents the centerline. The distance from the centerline to the outer edge of the zigzag is labeled 'Amplitude'. The total horizontal distance of the path is labeled 'Length'.</p>	<p>Amplitude: 5–75° (resolution is 5°) Length: 20–1000 ft (resolution is 20 ft)</p>
 <p>The diagram shows a spiral path on a black background. A red arrow at the center indicates the direction of travel. The distance from the center to the outer edge of the first circle is labeled 'Radius (of first circle)'. The distance between two consecutive turns of the spiral is labeled 'Spacing'.</p>	<p>Direction: PORT/STBD Radius: 20–1000 ft (resolution is 20 ft) Spacing: 20–1000 ft (resolution is 20 ft)</p>
 <p>The diagram shows a Williamson Turn path on a black background. A red arrow at the start indicates the direction of travel. The path consists of a series of turns that eventually straighten out.</p>	<p>Direction: PORT/STBD</p>
 <p>The diagram shows a Pattern Search path on a black background. A red arrow at the start indicates the direction of travel. The path consists of a series of parallel lines with a U-shaped turn in the middle. A horizontal double-headed arrow at the bottom indicates the width of the pattern.</p>	<p>Direction: PORT/STBD Length: 0.1–15 mi Length Spacing: 60–9500 ft Width: 0.1–15 mi Width Spacing: 60–9500 ft</p>

TIP:

These settings cannot be changed if pattern steer is active.

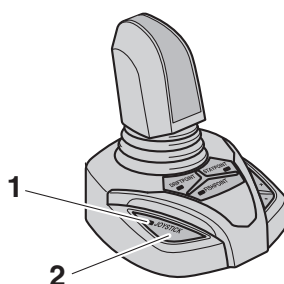


Joystick

By moving the joystick left, right, forward, reverse, or diagonally, you can move the boat in that direction. When you release the joystick, it returns to the neutral (N) position.

TIP:

- Joystick support Single/twin/triple/quad/quint engine application.
 - The position of the joystick and the movement of the boat may not coincide, depending on the wind, the current, the boat's load, and the hull design. Turn the knob on the joystick to correct the direction of movement as needed.
-



1. LED
2. Joystick switch

Joystick switch

Enabling the joystick switch allows you to operate the boat at low speeds when leaving or arriving at a dock.

How to operate

1. While the engine is running, put the remote control levers and joystick in the N position.
2. Press the "JOYSTICK" switch. (LED turns on)
3. You can operate the joystick.

TIP:

- When the joystick is being used, the engine speed is restricted and the steering wheel is locked.
 - When the joystick is enabled, you can press the plus (+) button/minus (-) button to increase or decrease the thrust level. (Refer to plus (+) button/minus (-) button)
 - When the TrimPreset is ON, the outboard motors automatically move to the set trim position.
-

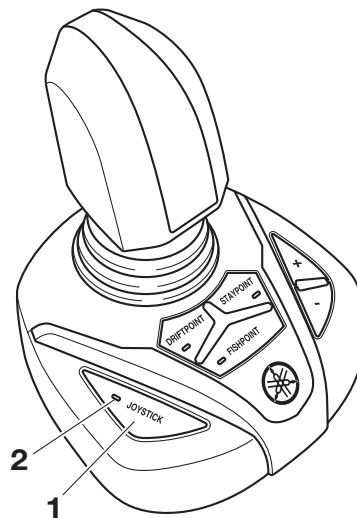
How to release

If you want to end the operation, do any of the following.

- Press the "JOYSTICK" switch. (LED goes out)
- Move the remote control levers to the F or R position. (LED goes out)

TIP:

- Joystick mode ends even if the engine is stopped.
 - When the joystick mode is ended, the LED goes out and the steering wheel lock is released.
-



1. Joystick switch
2. LED

Joystick calibration (for twin/triple/quad/quint)

You can calibrate the joystick if the boat does not move correctly in sync with the movement of the joystick.

TIP:

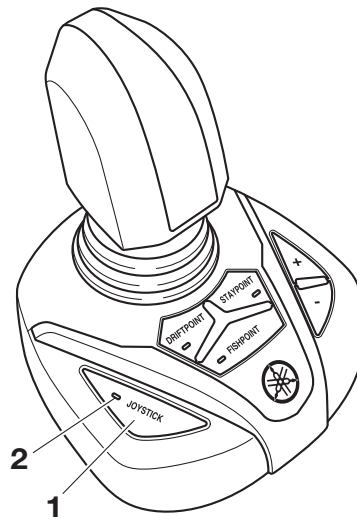
- When calibrating the joystick, maneuver the boat safely in water where there are no obstacles. Avoid doing calibrations in high seas or strong winds, which could affect the results of the calibrations.
 - When doing calibrations, run the boat long distances. Grip the joystick firmly and keep it steady.
 - The joystick lever is designed to be calibrated for both STBD tilting and for PORT tilting. Because of this, you need to calibrate both the directions the lever tilts.
 - If you calibrate the joystick once, but moving laterally is difficult, do the calibration again. The calibration information can be overwritten based on the previous calibration information.
 - The calibration information is reset by pressing the joystick switch while the joystick is in the N position and if the joystick has not been operated after entering joystick mode.
-

How to operate

1. Long press the joystick switch.
2. The joystick calibration mode activates.
3. Adjust the joystick to calibrate it.

How to release

1. Press the joystick switch.



1. Joystick switch
2. LED

Joystick station

This function is for when just a joystick is installed, separate from the joystick at the main station or 2nd station, so the ship can be maneuvered while away from the pilot's seat.

TIP:

- This function can only be used with the CL5 Display.
 - If one of the engines stops while using the joystick station, then only forward/backward operations and steering operations are possible.
-

How to operate

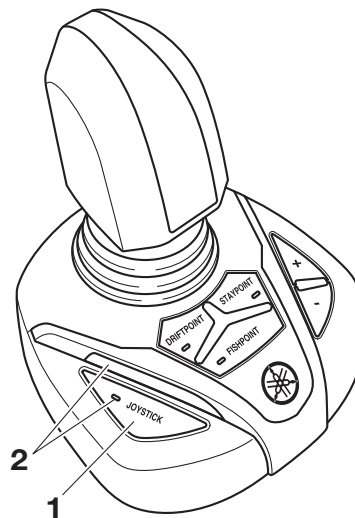
1. Put the main station helm and the 2nd station helm remote control levers in the N position.
2. When the "JOYSTICK" switch on the joystick station is pressed, the beep sounds and the LED turns on.

TIP:

- While ship maneuvering at the joystick station, can be maneuvered in the switch mode enabled by pressing the SetPoint switches (STAYPOINT, DRIFTPOINT, FISHPOINT).
 - During SetPoint mode, press the enabled switch and so the mode will be canceled and the ship maneuvering in the mode will end.
-

How to release

1. When the "STATION" switch on the remote control of the main station helm or 2nd station helm is pressed, a beep sounds and the LED on the joystick station turns off.



1. Joystick switch
2. LED

SetPoint switches (STAYPOINT/DRIFTPOINT/FISHPOINT)

- Enabling the various switches allows you to do the following operations.
- Enabling the STAYPOINT switch keeps both the boat's position and heading.
- Enabling the DRIFTPOINT switch keeps only the boat's heading, while the boat drifts with the wind and current.
- Enabling the DRIFTPOINT switch (Track), and by using both the route setting function and the DRIFT POINT function on the MFD, allows you to drift along a set route while keeping a heading.

TIP:

- To use this function correctly, the boat's heading must be perpendicular to, or at some angle to, the direction of the current. (So the boat drifts sideways.)
- Straight sideways operation is not available with single-engine joystick applications.

FISHPOINT switch

Enabling the FISHPOINT switch (bow) keeps the bow heading into the wind or current.

Enabling the FISHPOINT switch (stern) keeps the stern heading into the wind or current.

- You can switch between FishPoint Bow and Stern by using the setting on the MFD. Engine > Mode > FishPoint Button
MFD Interface Type-1: Engine > Menu > Joystick and SetPoint > FishPoint Button
CL5 Display, MFD Interface Type-2: Menu > Boat Set> Joystick and SetPoint > FishPoint Button
- While SetPoint is enabled, the two notification lights installed on both sides of the transom flash. The flashing lights notify people in the surrounding area that a SetPoint mode is enabled, to warn them not to enter the water. The prop lights' brightness is automatically adjusted according to the brightness of the surroundings.
- The SetPoint function is cancelled if the GPS antenna cannot receive a GPS signal. The SetPoint function is cancelled while the remote control lever, neutral hold switch, or CENTER engine switch is operated.
- You may not be able to turn on the SetPoint switch if the boat is moving too fast.
- Straight sideways operation is not available with single-engine joystick applications.
- In addition to not being able to receive the GPS signal, the signal could become unreliable if a large building is nearby that reflects the satellite signal so accurate information cannot be received.

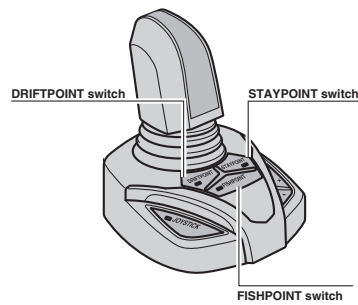
How to operate

1. While the engine is running, put the remote control levers and joystick in the N position.
2. Press the switch you want to select. (LED turns on)

How to release

If you want to end the operation, do any of the following.

- Press the switch you enabled. (LED turn off)
- Move the remote control levers to the F or R position. (LED goes out)



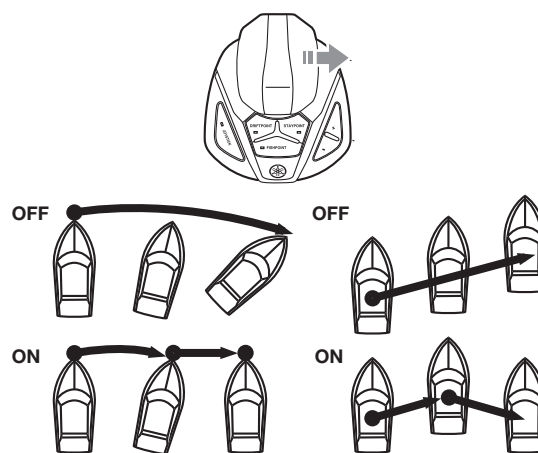
Lateral Assist (Multi engine only)

This function automatically corrects the deviation between the joystick operation and the boat movement in joystick mode.

Lateral assist ON/OFF setting

Menu > Boat Set > Joystick and Set Point > Lateral Assist

TIP: _____
 Default is ON.



Plus (+) button/minus (-) button

Enabling the SetPoint or the joystick switch allows you to adjust the maximum engine speed and to adjust the thrust level.

Adjust the maximum engine speed

How to operate (when SetPoint is enabled)

1. While SetPoint is enabled, each time you press the plus (+) button the engine speed increases; each time you press the minus (-) button the engine speed decreases.

Adjustment level	Engine speed is low = 1 to 5 = Engine speed is high
Adjustment level (quad engine)	Engine speed is low = 0 to 5 = Engine speed is high

TIP:

- Cannot be used while STAYPOINT is enabled.
- When the adjustment level is “0”, the SetPoint is maintained using only the CENTER PORT/CENTER STBD engines. (Quad engine)
- When the adjustment level is “0”, the SetPoint is maintained using only the CENTER PORT/CENTER/CENTER STBD engines. (Quint engine)

Adjust the thrust level

How to operate (when joystick switch is enabled)

TIP:

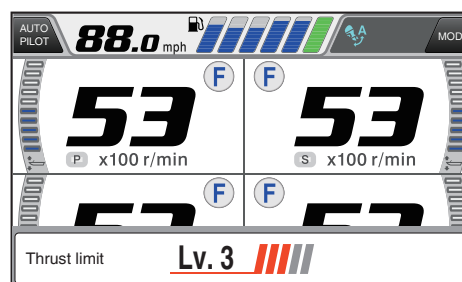
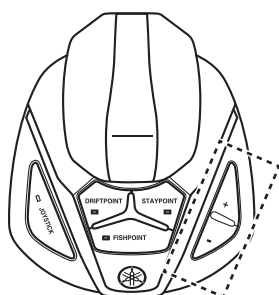
You can use the MFD to change the settings of default values.

MFD Interface Type-1: Engine Menu > Joystick and Set Point > Joystick Thrust

CL5 Display, MFD Interface Type-2: Menu > Boat Set> Joystick and SetPoint > Joystick Thrust

1. Press the plus (+) button/minus (-) button to adjust the thrust level.

Adjustment level	Thrust level slower = 1 to 5 = Thrust level faster
------------------	--

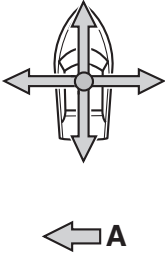
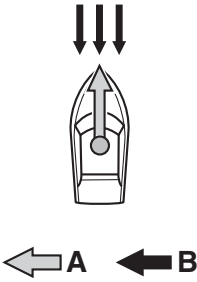
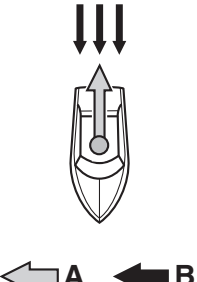


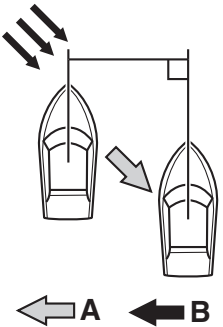
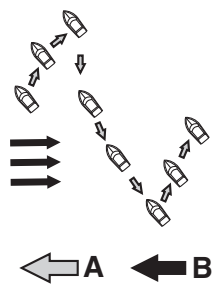
SetPoint functions

NOTICE

- While the SetPoint function is enabled, the engines operate automatically, as needed, to maintain the boat's position or heading. Do not enable this function when people are in the water or if other boat's or obstacles are nearby. There is a risk of collision with the propeller or boat, which are moving for adjustments. In addition, the operator should be prepared to steer at any time, in case the SetPoint function is released unexpectedly.
 - There is a risk of serious injury or death if anyone in the water comes in contact with the rotating propeller or the moving boat. While the SetPoint function is operating, the propeller rotates and the boat moves to maintain a fixed position. If anyone enters the water near the boat, immediately stop the engines and disable the SetPoint function.
-

SetPoint functions

Mode	Maximum engine speed setting (Plus (+)/minus (-) buttons)	Wind and current direction, and maintained orientation	Remarks
<p>STAYPOINT (for twin / triple / quad / quint) Maintains both the boat's position and heading. This mode is suitable for such occasions as preparing to dock, waiting to refuel, or when fishing.</p>	—		
<p>FISHPOINT (Bow) Keeps the bow heading into the wind or current. This mode is suitable for fishing from a fixed point. Shifting and engine speed are restricted so the operating sounds do not scare away the fish.</p>	<p>Thrust level (twin – triple engine) Lv1–5 Thrust level (quad – quint engine) Lv0–5</p>		The engine being controlled switches according to the thrust level.
<p>FISHPOINT (Stern) Keeps the stern heading into the wind or current. This mode is suitable for fishing from a fixed point. Shifting and engine speed are restricted so the operating sounds do not scare away the fish.</p>	<p>Thrust level (twin – triple engine) Lv1–5 Thrust level (quad – quint engine) Lv0–5</p>		The engine being controlled switches according to the thrust level.

Mode	Maximum engine speed setting (Plus (+)/minus (-) buttons)	Wind and current direction, and maintained orientation	Remarks
<p>DRIFTPOINT Keeps only the boat's heading, while the boat can drift diagonally with the wind and current.</p>	<p>Thrust level (single – triple engine) Lv1–5 Thrust level (quad – quint engine) Lv0–5</p>		<p>The engine being controlled switches according to the thrust level.</p>
<p>DRIFTPOINT TRACK Allows the boat to drift along a set route while keeping a heading by using both the route setting function and the DRIFTPOINT function on the MFD.</p>	<p>Thrust level (twin – triple engine) Lv1–5 Thrust level (quad – quint engine) Lv0–5</p>		<ul style="list-style-type: none"> • The engine being controlled switches according to the thrust level. • To use this function correctly, the boat's heading must be perpendicular to, or at some angle to, the direction of the current. (That is to say, so the boat drifts sideways.) In addition, for single engine boats, the boat is controlled to drift abeam to the bow heading at the time regular DRIFTPOINT is turned on. • If this function goes past the final destination, it just goes into regular DRIFTPOINT at that point. Use caution, because the boat may drift in some unintended direction. In addition, if the radius of a waypoint on the MFD is small, the boat may not switch to the next waypoint, so you should constantly confirm the boat is following the route.

A. Boat direction ✓: Operates
 B. Current/wind —: Does not operate

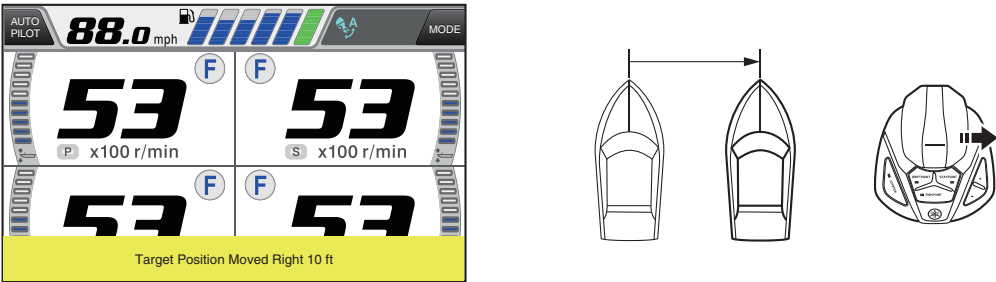
Changing the position of your boat in SetPoint mode

Joystick tilt

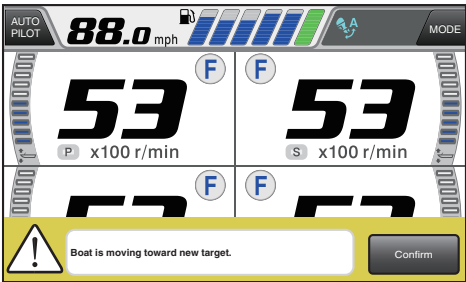
TIP:

- You can select a distance to move from 1.5 m, 3 m, or 6 m (5 ft, 10 ft, or 20 ft).
- Only the STAYPOINT and FISHPOINT can change the target position by tilting the joystick.

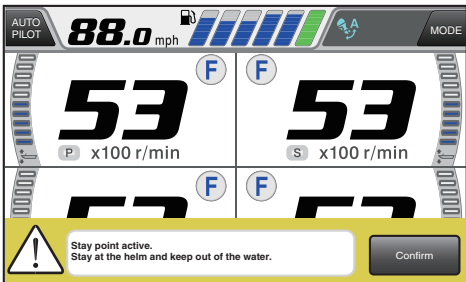
1. Target Position Moved Right 10 ft.



2. Move to target position.



3. Stop to target position.

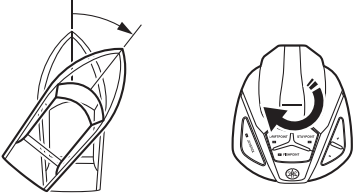
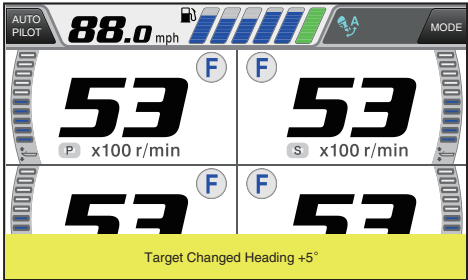


Joystick twist

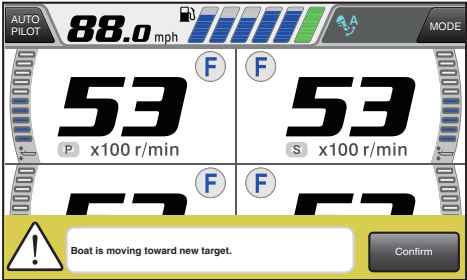
TIP:

- You can push and hold your long press on the panel or long twist of the joystick to reach total amount desired (up to 50 degrees). You will hear one beep per each 5 degree of change.
- Only the FISHPOINT and DRIFTPOINT can change the target position by twisting the joystick.

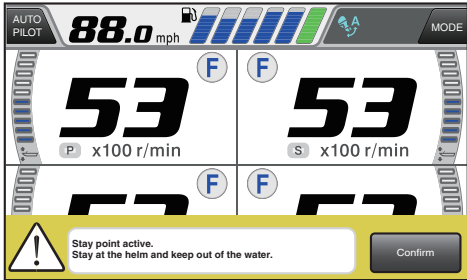
1. Target direction moved right 5°.



2. Move to target position.



3. Stop to target position.



Bow Thruster

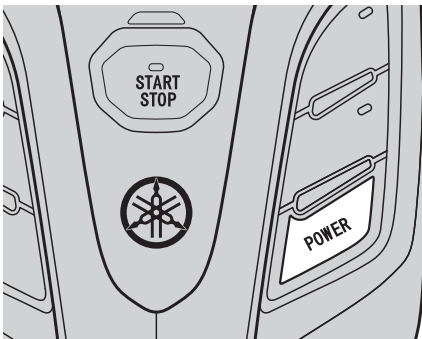
Bow Thruster can be combined with Helm Master-EX to work together.

TIP: _____

- This bow thruster is available for twin engine application and triple engine application.
- As a target model, Vetus Bow PRO series is suitable.

Bow thruster activation

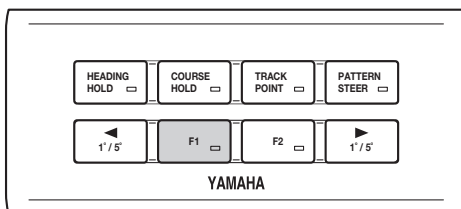
1. Turn the bow thruster power “ON”.
2. Turn the power switch to “ON”.



3. Press the “F1” switch on the autopilot panel.

TIP: _____

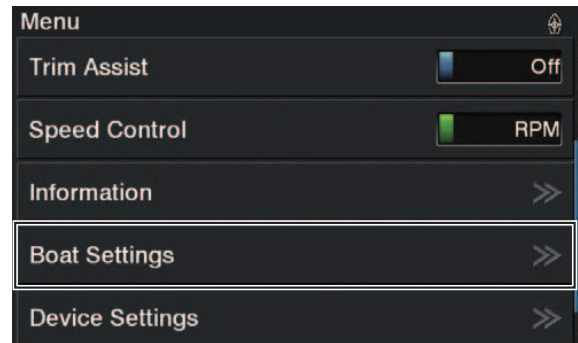
If you press the F1 button when the bow thruster is not powered or there is a problem with the bow thruster, the buzzer sounds twice, the LED of the F1 button flashes off, and the following notification message is displayed.



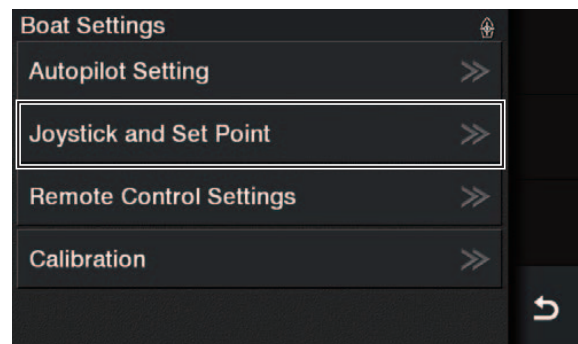
Thruster collaboration is not available under the current conditions.

Bow thruster output change

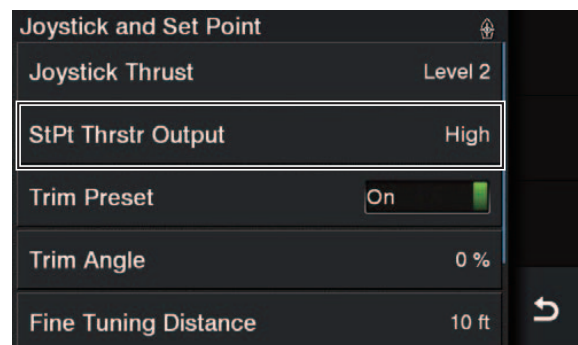
1. Select the “Boat Settings” screen.



2. Select the “Joystick and Set Point” screen.



3. Select the “StPt Thrstr Output” screen.



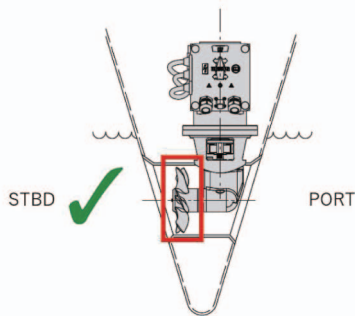
4. Select your desired output from “Low”, “Medium” and “High”.



Change bow thruster direction

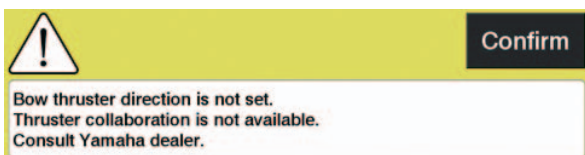
Select the thruster direction which is STBD or PORT by actual unit.

If the PORT and STBD directions are wrong, the output direction will be opposite.



TIP:

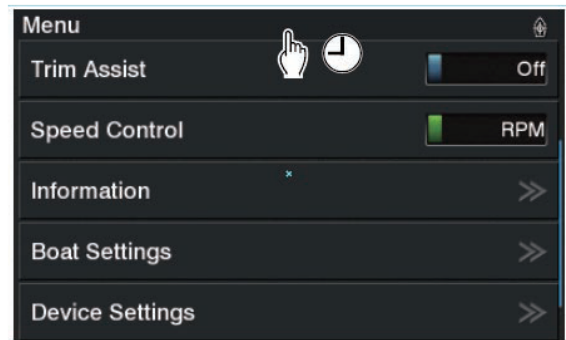
- If it does not initial setting, the bow thruster integration w/ Helm Master EX is not available. If no initial setting, the following message is displayed.
- This setting must be performed on each system (Helm Master-EX and Vetus).
- Before setting on HelmMaster-EX, be sure to set Vetus.



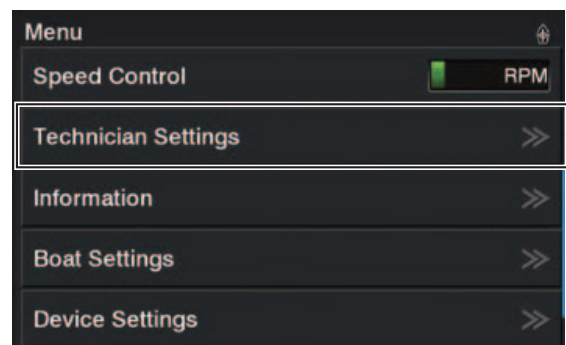
1. Push and hold at top center area in Menu page.

NOTICE

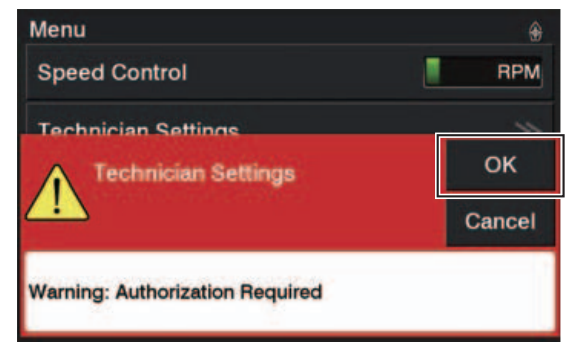
Execute operation while Trip is at the top. If the Technician Setting screen does not appear, check whether it is scrolling, also check that the Station setting is suitable.



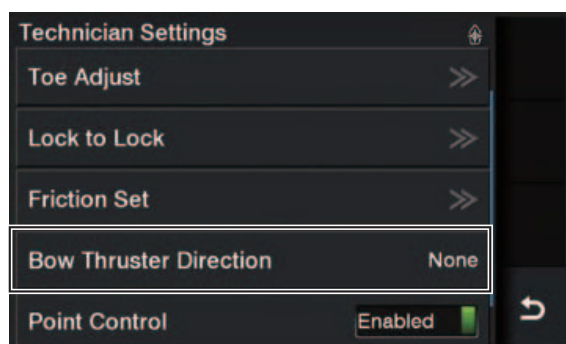
2. Select the "Technician Settings".



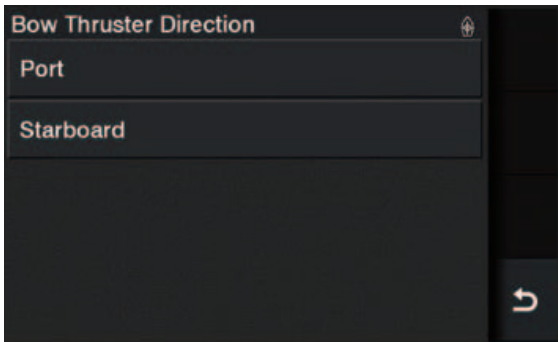
3. Select the "OK".



4. Select the "Bow Thruster Direction".



5. Select the “Port” or “Starboard”.



Transportation with boat (trailing) (F150-F350)

⚠ WARNING

Do not use the tilt support lever or knob when trailering the boat. If the motor cannot be trailered in the normal running position, use an additional support device to secure it in the tilt position.

NOTICE

- To prevent unintentional steering movement during transportation, position all engines to full rudder angle using the steering helm.
 - To prevent interference between outboard motors when using the tilt function of the PTT, all motors should be positioned at zero rudder angle.
 - When trailering the outboard motor in the tilt position, make sure to keep sufficient clearance between the outboard motor and the boat to prevent interference between the outboard motor or steering cylinder and the boat due to shock or vibrations during transportation.
-

Troubleshooting

The Helm Master EX system is equipped with a self-diagnosis function. The trouble codes can be checked on the CL5 Display and MFD Interface Type-1/Type-2 screen.

Up to 5 trouble codes and items can be displayed for each engine.

The YDIS is essential for checking and deleting the diagnosis record, or to perform the troubleshooting. For detailed information on the YDIS, refer to the service manual for the outboard motor, or the instruction manual for the latest version of the YDIS.

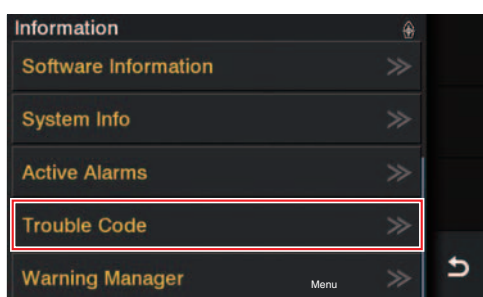
TIP: _____

The illustration shows an example of CL5.

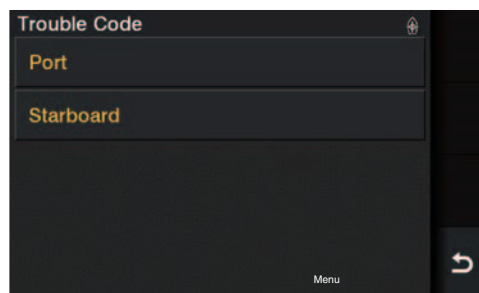
1. From the menu, select “Information”.



2. From the Information, select “Trouble Code”.



The trouble codes are listed and shown as follows.



Helm master EX troubleshooting (trouble code detected)

Troubleshooting procedure

1. Check that all electrical connections are secure and free from corrosion, and that the battery is fully charged.
2. Check the 6X9 system following the trouble code chart.
3. Delete the trouble codes after checking, repairing, or replacing a part and check that the trouble codes are not detected again.

TIP: _____

- A different trouble code may be detected if the coupler is disconnected and connected at the time of checking. When performing the troubleshooting, distinguish between the trouble code that occurred previously and the trouble code detected when the coupler was disconnected and connected.
 - Since the main relay comes on for approximately 10 seconds after the power switch is turned to OFF, the power of the DEC ECM cannot be turned off. Therefore, if the power switch is turned to on within 10 seconds after it was turned to OFF, the trouble codes cannot be deleted.
-

Troubleshooting the 6X9 system using the YDIS

1. Use the trouble codes, displayed by the YDIS, to check each part according to the table of “Trouble code and checking step” (page 242).

TIP: _____

Due to the system configuration, more than one code may be displayed on the YDIS “Diagnosis” screen.

2. Delete the trouble codes after checking, repairing, or replacing a part and check that the trouble codes are not detected again. If the same trouble codes are detected, the DEC ECM, BCU, or SCU may be faulty.
3. Check the items listed in the table. If all of the items are in good condition, delete the trouble codes, and then check the trouble codes again. If the same trouble codes are detected again, the DEC ECM, BCU, or SCU is faulty.

Trouble code table

✓: Indicated

—: Not indicated

Code No.	Item	YDIS diagnosis	YDIS diagnosis record
156, 157	Engine-R/C communication	✓	✓
160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 183, 184, 186, 187	Remote control system	✓	✓
223	Steering system	✓	✓
224	Steering system–Outboard (SCU)	✓	✓
225	Steering system–Helm (HELM)	✓	✓
320	Trim drive	✓	✓
321	RC to SCU communication	✓	✓
322	Y-HCU CLP communication failure	✓	✓
323	RC system	✓	✓
324	RC to steering system comm. (BC)	✓	✓
325	RC to BC system communication	✓	✓
326	Main RC unit communication	✓	✓
327	2nd ST. RC unit communication	✓	✓
328	RC to BCU communication	✓	✓
512, 513	System voltage low	✓	✓
514	System voltage high	✓	✓
515, 517, 518, 519, 520, 521	Steering system – position sensor	✓	✓
516	Steering system – calibration	✓	✓
522	Steering system – actuator temperature	✓	✓
523, 524	Steering system – temperature sensor	✓	✓
525, 526, 527	Steering system – actuator current	✓	✓
528, 529	Steering system – control unit	✓	✓

Trouble code table

Code No.	Item	YDIS diagnosis	YDIS diagnosis record
530	Steering system – current sensor	✓	✓
531	Steering system – brake current	✓	✓
532, 533	Steering system – actuator	✓	✓
534	RC to steering communication	✓	✓
535	Steering – steering communication	✓	✓
536	Steering system communication	✓	✓
537	Main helm – steering communication	✓	✓
538	Steering system – main helm	✓	✓
539	2nd helm – steering communication	✓	✓
540	Steering system – 2nd helm	✓	✓
541	Steering system – control unit	✓	✓
542	Incompatible hardware	✓	✓
543	Steering system – control unit	✓	✓
544	Steering – RC communication	✓	✓
545	Incompatible software	✓	✓
546	Steering system – configuration	✓	✓
547	Outboard – steering communication	✓	✓
548	SCU internal failure	✓	✓
549	Incompatible Helm version	✓	✓
576	BCU to RC ECU communication (P)	✓	✓
577	BCU to RC ECU communication (S)	✓	✓
578	BCU to RC ECU communication (C/CP)	✓	✓
579	BCU to RC ECU communication (CS)	✓	✓
580	BCU to RC ECU communication (CPP)	✓	✓
581	BCU to GPS communication	✓	✓
582	BCU to main ST. joystick communication	✓	✓
583	BCU to 2nd ST. Joystick communication	✓	✓
584	BCU to main ST. AP panel communication	✓	✓
585	BCU to 2nd ST. AP panel communication	✓	✓
586	BCU to heading sensor communication	✓	✓
587	BCU configuration	✓	✓
588	Joystick - main ST.	✓	✓
589	Joystick - main ST.	✓	✓
590	Joystick - 2nd ST.	✓	✓
591	Joystick - 2nd ST.	✓	✓
592	Heading sensor	✓	✓
593	Engine Number Setting	✓	—

Trouble code table

Code No.	Item	YDIS diagnosis	YDIS diagnosis record
594	BCU to Joy station. Joystick communication	✓	✓
595	Joystick - Joy station	✓	✓
596	Joystick - Joy station	✓	✓
597	BCU to Docking ST. SW Panel communication	✓	✓
598	BCU to Thruster Driver communication	✓	✓

Trouble code and checking step

The descriptions enclosed by < > are applicable to multiple engine installations.

*1: See the outboard motor service manual.

*2: See YDIS (latest version) instruction manual.

—: Not applicable

Trouble code	Item (Condition)	Symptom	Checking steps	See page
156 157	Engine-R/C communication (Communication error)	“Check Engine” is displayed. Alert indicator is on. <Engine speeds do not synchronize>	Check the wiring between the DEC unit and outboard motor is connected properly and that there is no damage.	332
			Check for wiring continuity between the engine ECM and the engine main harness.	*1
			Measure the input voltage of the DEC ECM.	263
			Check the DEC unit circuit.	260
			Replace the DEC ECM or engine ECM.	—
		Engine does not restart. Fully closed throttle. Shift actuator rod returns to the N position. CL5/CLG does not operate. Trouble codes 156 and 157 detected simultaneously. Alert indicator is on. <Engine speeds do not synchronize> Unable to switch the active station in the case of dual station arrangement (trouble code 186).	Check the wiring between the DEC unit and outboard motor is connected properly and that there is no damage.	332
			Check for wiring continuity between the engine ECM and the engine main harness.	*1
			Measure the input voltage of the DEC ECM.	263
			Check the DEC unit circuit.	260
			Replace the DEC ECM or engine ECM.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
160 161 162 163	Remote control system (Main station [LPS Irregular signal])	<p>“Check Engine” is displayed. Alert indicator is on. <Engine speeds do not synchronize></p>	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	260
			Check the LPS circuit.	261
			Replace the DEC or DEC ECM.	—
		<p>Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on. <Engine speeds do not synchronize></p> <p>When either one of the trouble codes 160 and 161, and either one of the trouble codes 162 and 163 took place simultaneously.</p>	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	260
			Check the LPS circuit.	261
Replace the DEC or DEC ECM.	—			
164	Remote control system (Main station LPS Irregular signal [DEC ECM internal circuit malfunction])	<p>“Check Engine” is displayed. Locked at engine idle speed. Shift actuator rod returns to the N position. Shift actuator can be operated manually. Alert indicator is on.</p>	Replace the DEC ECM.	—
165	Remote control system (Main station [LPS Irregular signal])	<p>“Check Engine” is displayed. Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on. <Difference in engine idle speeds> <Engine speeds do not synchronize></p>	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	260
			Check the LPS circuit.	261
		Replace the DEC or DEC ECM.	—	

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
166 167 168 169	Remote control system (Main station, center out-board motor [LPS Irregular signal])	“Check Engine” is displayed. Locked at engine idle speed. Alert indicator is on.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	260
			Check the LPS circuit.	261
			Replace the DEC or DEC ECM.	—
		Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on. When either one of the trouble codes 166 and 167, and either one of the trouble codes 168 and 169 took place simultaneously.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	260
			Check the LPS circuit.	261
			Replace the DEC or DEC ECM.	—
170	Remote control system (Main station [LPS Irregular signal])	“Check Engine” is displayed. Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	260
			Check the LPS circuit.	261
			Replace the DEC or DEC ECM.	—
171 172 173 174	Remote control system (2nd station [LPS Irregular signal])	“Check Engine” is displayed. Locked at engine idle speed. Alert indicator is on.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	261
			Check the LPS circuit.	262
			Replace the DEC or DEC ECM.	—
		Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on. When either one of the trouble codes 171 and 172, and either one of the trouble codes 173 and 174 took place simultaneously.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	261
			Check the LPS circuit.	262
			Replace the DEC or DEC ECM.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
175	Remote control system (LPS Irregular signal [2nd station DEC ECM internal circuit malfunction])	“Check Engine” is displayed. Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on.	Replace the DEC ECM.	—
176	Remote control system (2nd station, center out-board motor [LPS Irregular signal])	“Check Engine” is displayed. Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	261
			Check the LPS circuit.	262
			Replace the DEC or DEC ECM.	—
177 178 179 180	Remote control system (2nd station, center out-board motor [LPS Irregular signal])	“Check Engine” is displayed. Locked at engine idle speed. Alert indicator is on.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	261
			Check the LPS circuit.	262
			Replace the DEC or DEC ECM.	—
		Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on. When either one of the trouble codes 177 and 178, and either one of the trouble codes 179 and 180 took place simultaneously.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	261
			Check the LPS circuit.	262
			Replace the DEC or DEC ECM.	—
181	Remote control system (2nd station [LPS Irregular signal])	“Check Engine” is displayed. Locked at engine idle speed. Throttle does not operate. Shift actuator rod returns to the N position. Alert indicator is on.	Measure the LPS output voltage using the YDIS.	260
			Check the LPS input voltage.	261
			Check the LPS circuit.	262
			Replace the DEC or DEC ECM.	—
183	Remote control system (LPS Irregular signal [DEC ECM internal circuit malfunction])	“Check Engine” is displayed. Station selection is impossible. Alert indicator is on.	Replace the DEC ECM.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
184	Remote control system (LPS Irregular signal [DEC ECM internal circuit malfunction])	“Check Engine” is displayed. Engine selection is impossible. Alert indicator is on.	Replace the DEC ECM.	—
186	Remote control system (Main station [LPS Irregular signal])	Sub station DEC does not operate. Unable to change to the 2nd station DEC. Locked at engine idle speed. Shift actuator rod returns to the N position. Alert indicator is on.	Turn off the engine start switch once, and turn it on	—
			Check the wiring between the DEC and outboard motor is connected properly and that there is no damage.	—
187	Remote control system (LPS Irregular signal [DEC ECM internal circuit malfunction])	“Check Engine” is displayed. Engine does not restart. Alert indicator is on.	Replace the DEC ECM.	—
223	Steering system (Engine ECM receives DES system trouble code)	Same symptoms as the detected DES system trouble codes (512/513/514/516/522/525/534/535/536/543/544/545/546/547/548/549). <Engine speeds do not synchronize>	Troubleshoot the detected DES system trouble code.	—
224	Steering system—Outboard (SCU) (Engine ECM receives DES system trouble code)	Same symptoms as the detected DES system trouble codes (515/517/518/519/520/521/523/524/526/527/528/529/530/531/532/533/541/542/548). <Engine speeds do not synchronize>	Troubleshoot the detected DES system trouble code.	—
225	Steering system—Helm (HELM) (Engine ECM receives DES system trouble code)	Same symptoms as the detected DES system trouble codes (537/538/539/540/549). <Engine speeds do not synchronize>	Troubleshoot the detected DES system trouble code.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
320	Trim drive (trim-up abnormality)	Auto trim function will not be available.	Check the PTT unit operation.	(*1)
			Check the PTT sensor using the YDIS.	(*1)
			Check the wiring continuity between the engine ECM and PTT sensor.	(*1)
321	RC to SCU communication (communication error)		Check the wiring is connected properly and that there is no damage.	332
			Measure the DEC unit input voltage.	262
			Measure the DEC ECM input voltage.	263
			Measure the steering actuator input voltage. (Built-in DES models)	(*1)
			Measure the steering actuator input voltage. (Bolt-on DES models)	265
			Replace the DEC ECM or SCU.	—
322	Y-HCU CLP communication failure (communication error)		Check the wiring is connected properly and that there is no damage.	332
			Measure the DEC unit input voltage.	262
			Measure the DEC ECM input voltage.	263
			Replace the DEC ECM.	—
323	RC system (communication error) (double failure)		Check the wiring is connected properly and that there is no damage.	332
			Measure the DEC unit input voltage.	262
			Measure the DEC ECM input voltage.	263
			Replace the DEC ECM or SCU.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
324	RC to steering system comm. (BC) (BC communication error between the helm and the DEC ECM.)	Unable to receive boat control CAN signal on DEC ECM from DES.	Check the wiring is connected properly and that there is no damage.	332
			Measure the helm unit input voltage.	267 268
			Check the helm unit circuit (communication).	269 270
			Replace the helm unit.	—
325	RC to BC system communication (BC communication error between the DEC ECMs.)	Unable to receive boat control CAN signal on DEC ECM from other than DES. Boat control feature (single lever or etc) deactivated and cannot activate again.	Check the wiring is connected properly and that there is no damage.	332
			Measure the DEC ECM input voltage.	263
			Check the wire harness continuity between the DEC ECM.	282 284 287 289 293
			Replace the DEC ECM.	—
326	Main RC unit communication (Communication error with RC (main) determined by DEC ECM)	Unable to receive signal on DEC ECM from DEC. No function on all remote control functions.	Check the wiring is connected properly and that there is no damage.	332
			Check the DEC circuit (communication). (Main station)	282 284 287 289 293
			Replace the DEC.	—
327	2nd ST. RC unit communication (Communication error with RC (sub) determined by DEC ECM)	Unable to receive signal on DEC ECM from 2nd station DEC. No function on all remote control functions on 2nd station DEC.	Check the wiring is connected properly and that there is no damage.	332
			Measure the DEC input voltage. (2nd station)	271
			Check the DEC circuit (communication). (2nd station)	271
			Replace the DEC.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
328	RC to BCU communication (Communication error with BCU determined by RC ECM)	Y-HCU BCU communication failure. Unable to receive signal on DEC ECM from BCU.	Check the wiring is connected properly and that there is no damage.	332
			Measure the BCU input voltage.	272
			Check the BCU circuit (communication).	273
			Replace the BCU.	—
512	System voltage low (low battery voltage)	DES system does not operate.	Check the wiring is connected properly and that there is no damage.	332
			Check the battery voltage using the YDIS.	(*1)
			Turn the system power off and on again.	—
			Replace the DES.	—
513	System voltage low (weak battery voltage)	Operation is slow.	Check the wiring is connected properly and that there is no damage.	332
			Check the battery voltage using the YDIS.	(*1)
			Turn the system power off and on again.	—
			Replace the DES.	—
514	System voltage high (high battery voltage)	DES system does not operate.	Check the wiring is connected properly and that there is no damage.	332
			Check the battery voltage using the YDIS.	(*1)
			Turn the system power off and on again.	—
			Replace the DES.	—
515 517	Steering system - position sensor (irregular signal)		Turn the system power off and on again.	—
			Replace the DES.	—
516	Steering system - calibration (calibration unset)	DES system does not operate.	Calibrate the steering system by using CL5 function.	(*1)
			Replace the DES.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
518	Steering system - position sensor (position sensor and hall sensor malfunction)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—
519	Steering system - position sensor (sensor value mismatch)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—
520	Steering system - position sensor (hall sensor malfunction)		Turn the system power off and on again.	—
			Replace the DES.	—
521	Steering system - position sensor (calibration unset)	DES system does not operate.	Turn the system power off and on again.	—
522	Steering system - actuator temperature (irregular signal)		Check the wiring is connected properly and that there is no damage.	332
			Check the battery voltage using the YDIS.	(*1)
			Replace the DES.	—
523	Steering system - temperature sensor (irregular signal)		Turn the system power off and on again.	—
			Replace the DES.	—
524	Steering system - temperature sensor (temperature sensor malfunction)		Turn the system power off and on again.	—
			Replace the DES.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
525	Steering system - actuator current (out of specification)	Operation is slow.	Check the wiring is connected properly and that there is no damage.	332
			Check the battery voltage using the YDIS.	(*1)
			Replace the DES.	—
526	Steering system - actuator current (motor or battery short circuit)	DES system does not operate.	Check the wiring is connected properly and that there is no damage.	332
			Turn the system power off and on again.	—
			Replace the DES.	—
527	Steering system - actuator current (motor circuit fault)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—
528	Steering system - control unit (motor circuit fault)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—
529	Steering system - control unit (motor circuit fault)		Turn the system power off and on again.	—
			Replace the DES.	—
530	Steering system - current sensor (current sensor malfunction)	Operation is slow.	Turn the system power off and on again.	—
			Replace the DES.	—
531	Steering system - brake current (brake malfunction)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—
532	Steering system - actuator (irregular signal)		Turn the system power off and on again.	—
			Replace the DES.	—
533	Steering system - actuator (irregular signal)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
534	RC to steering communication (communication error)		Check the wiring is connected properly and that there is no damage.	332
			Measure the DEC unit input voltage.	262
			Measure the DEC ECM input voltage.	263
			Measure the steering actuator input voltage. (Built-in DES models)	(*1)
			Measure the steering actuator input voltage. (Bolt-on DES models)	265
			Replace the DES.	—
535	Steering - steering communication (communication error)		Check the wiring is connected properly and that there is no damage.	332
			Measure the steering actuator input voltage. (Built-in DES models)	(*1)
			Measure the steering actuator input voltage. (Bolt-on DES models)	265
			Replace the DES.	—
536	Steering system communication (communication error)	DES system does not operate.	Check the wiring is connected properly and that there is no damage.	332
			Measure the steering actuator input voltage. (Built-in DES models)	(*1)
			Measure the steering actuator input voltage. (Bolt-on SBW models)	265
			Replace the DES.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
537	Main helm - steering communication (communication error)		Check the wiring is connected properly and that there is no damage.	332
			Check the DEC unit circuit (power and ground).	281 283 286 288 291
			Measure the helm unit input voltage. (Main station)	267
			Turn the system power off and on again.	—
			Replace the DES.	—
538	Steering system - main helm (main helm malfunction)	Locked at engine idle speed. Outboard motor cannot be steered by the power-operated steering system.	Check the wiring is connected properly and that there is no damage.	332
			Check the DEC unit circuit (power and ground).	281 283 286 288 291
			Measure the helm unit input voltage. (Main station)	267
			Turn the system power off and on again.	—
			Replace the DES.	—
539	2nd helm - steering communication (communication error)		Check the wiring is connected properly and that there is no damage.	332
			Check the DEC unit circuit (power and ground).	281 283 286 288 291
			Measure the helm unit input voltage. (2nd station)	268
			Turn the system power off and on again.	—
			Replace the DES.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
540	Steering system - 2nd helm (2nd helm malfunction)	Locked at engine idle speed. Outboard motor cannot be steered by the power-operated steering system.	Check the wiring is connected properly and that there is no damage.	332
			Check the DEC unit circuit (power and ground).	281 283 286 288 291
			Measure the helm unit input voltage. (2nd station)	268
			Turn the system power off and on again.	—
			Replace the DES.	—
541	Steering system – control unit (out of specification)	DES system does not operate.	Check the wiring is connected properly and that there is no damage.	332
			Replace the DES.	—
542	Incompatible hardware (out of specification)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—
543	Steering system – control unit (out of specification)		Turn the system power off and on again.	—
			Replace the DES.	—
544	Steering - RC communication (irregular signal)	DES system does not operate.	Turn the system power off and on again.	—
			Replace the DES.	—
545	Incompatible software (out of specification)	DES system does not operate.	Check the wiring is connected properly and that there is no damage.	332
			Turn the system power off and on again.	—
			Check the situation of system devices by using “BPS Scan” function of YDIS.	(*2)
			Replace the DES.	—
546	Steering system - configuration (irregular signal)	DES system does not operate.	Reset the steering system by using CL5 function.	(*1)
			Replace the DES.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
547	Outboard - steering communication (communication error)	Steering friction adjustment function depending on the engine speed is disabled.	Check the wiring is connected properly and that there is no damage.	332
			Measure the steering actuator input voltage. (Built-in DES models)	(*1)
			Measure the steering actuator input voltage. (Bolt-on DES models)	265
			Replace the DES.	—
548	SCU internal failure	Integrated Electro-Hydraulic Steering system does not operate.	Turn the system power off and on again.	—
			Replace the SCU.	(*1)
549	Incompatible Helm version	Steering continues to turn (does not lock) when turned all the way.	Check the product number of the helm unit, and change it to a compatible helm unit.	—
576 577 578 579 580	BCU to RC ECU communication (communication error with RC ECU determined by BCU) 576: ECM (P) 577: ECM (S) 578: ECM (C/CP) 579: ECM (CS) 580: ECM (CPP)	Unable to receive signal on BCU from DEC ECM. BCU controls (autopilot and joystick functions) are not available.	Check the wiring is connected properly and that there is no damage.	332
			Measure the DEC ECM input voltage.	263
			Check the BCU circuit. (communication)	273
			Replace the DEC ECM.	—
581	BCU to GPS communication (communication error with GPS determined by BCU)	Unable to receive signal on BCU from GPS unit. BCU control with GPS information is not available.	Check the wiring is connected properly and that there is no damage.	332
			Measure the GPS unit input voltage.	274
			Check the GPS unit circuit.	274
			Replace the GPS unit.	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
582	BCU to main ST. joystick communication (communication error with joystick determined by BCU)	Unable to receive signal on BCU from main station joystick. The joystick on the main station does not work.	Check the wiring is connected properly and that there is no damage.	332
			Measure the joystick input voltage. (Main station)	275
			Check the joystick circuit. (Main station)	276
			Replace the joystick. (Main station)	—
583	BCU to 2nd ST. Joystick communication (communication error with joystick determined by BCU)	Unable to receive signal on BCU from 2nd station Joystick. The joystick on the 2nd station does not work.	Check the wiring is connected properly and that there is no damage.	332
			Measure the joystick input voltage. (2nd station)	275
			Check the joystick circuit. (2nd station)	276
			Replace the joystick. (2nd station)	—
584	BCU to main ST. AP panel communication (communication error with autopilot panel determined by BCU) (main station)	Unable to receive signal on BCU from main station autopilot panel. No control is available at the autopilot panel on the main station.	Check the wiring is connected properly and that there is no damage.	332
			Measure the autopilot panel input voltage. (Main station)	277
			Check the autopilot panel circuit. (Main station)	278
			Replace the autopilot panel. (Main station)	—
585	BCU to 2nd ST. AP panel communication (communication error with autopilot panel determined by BCU) (2nd station)	Unable to receive signal on BCU from 2nd station autopilot panel. No control is available at the autopilot panel on the 2nd station.	Check the wiring is connected properly and that there is no damage.	332
			Measure the autopilot panel input voltage. (2nd station)	277
			Check the autopilot panel circuit. (2nd station)	278
			Replace the autopilot panel. (2nd station)	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
586	BCU to heading sensor communication (communication error with heading sensor determined by BCU)	Unable to receive signal on BCU from heading sensor. BCU control by heading sensor information is not possible.	Check the wiring is connected properly and that there is no damage.	332
			Measure the heading sensor input voltage.	279
			Checking the heading sensor circuit.	279
			Replace the heading sensor.	—
587	BCU configuration (settings/configuration error with heading sensor determined by BCU)	Configuration (setting or connected units) difference from information saved on BCU. (This BCU is not capable of joystick operations.) Normal operation. (No joystick functions.)	Replace with a BCU that matches the system configuration.	—
588	Joystick - main ST. (joystick sensor single failure)	Normal operation.	Replace the joystick. (Main station)	—
589	Joystick - main ST. (joystick sensor double failure)	The joystick on the main station does not work.	Replace the joystick. (Main station)	—
590	Joystick - 2nd ST. (joystick sensor single failure)	Normal operation.	Replace the joystick. (2nd station)	—
591	Joystick - 2nd ST. (joystick sensor double failure)	The joystick on the 2nd station does not work.	Replace the joystick. (2nd station)	—
592	Heading sensor (internal failure with heading sensor determined by heading sensor)	BCU control with heading sensor information is not possible.	Replace the heading sensor.	—
593	Engine Number Setting (wrong engine number)		Configure the number of outboard motors.	(*1)
			Replace the MFD (CL5).	—

Trouble code and checking step

Trouble code	Item (Condition)	Symptom	Checking steps	See page
594	BCU to Joy station Joystick communication (communication error with joystick determined by BCU)	The joystick on the joystick station does not work.	Check the wiring is connected properly and that there is no damage.	332
			Measure the joystick input voltage. (Joystick station)	275
			Check the joystick circuit. (Joystick station)	276
			Replace the joystick. (Joystick station)	—
595	Joystick - Joy station (joystick sensor single failure)	Normal operation.	Replace the joystick. (Joystick station)	—
596	Joystick - Joy station (joystick sensor double failure)	The joystick on the joystick station does not work.	Replace the joystick. (Joystick station)	—
597	BCU to Docking ST. SW Panel communication	Unable to receive signal on BCU from Joystick station autopilot panel. No control is available at the autopilot panel on the Joystick station.	Check the wiring is connected properly and that there is no damage.	332
			Measure the autopilot panel input voltage. (Joystick station)	277
			Check the autopilot panel circuit. (Joystick station)	278
			Replace the autopilot panel. (Joystick station)	—
598	BCU to Thruster Driver communication	Bow thruster integration does not work.	Check the wiring is connected properly and that there is no damage.	332
			Measure the thruster driver input voltage.	279
			Check the Thruster Driver circuit.	280
			Replace the thruster driver.	—

Checking the electrical component


NOTICE

Make sure to disconnect the battery when disconnecting/connecting the coupler.

- When checking the input voltage or wiring continuity, the coupler or connector must be disconnected. As a result, the ECM determines that the part is disconnected and a trouble code is detected. Therefore, make sure to delete the diagnosis record after checking the input voltage or wiring continuity.
- Before checking the electrical components, make sure that the battery is fully charged.

Using the digital tester

The electrical technical data applies to the measurements taken using the Yamaha recommended tester.

	Digital circuit tester
	90890-03243
	Digital multimeter
	YU-34899-A


The input voltage changes depending on the battery voltage. Check the battery and wire harness if the input voltage is less than the specified value. Check the components between the battery and the input voltage measuring point if there is no problem with the battery and wire harness.

If the tester probe cannot be brought into contact with the terminal, prepare a test lead suitable for the measurement.

NOTICE

Do not insert test probe into coupler terminals. This could cause the damage or deformation to the terminal.

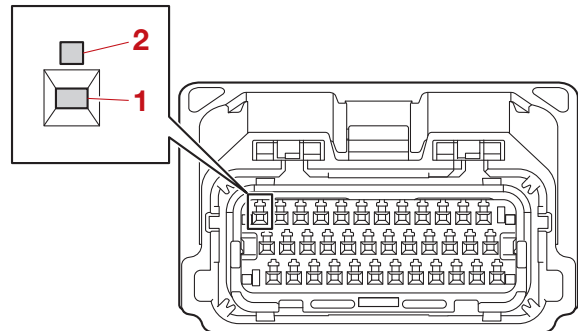


	Tester leads 90890-06976
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ECM coupler (new DEC unit)

NOTICE

Do not insert a test probe into the ECM coupler terminal. This could cause the damage or deformation to the terminal. Insert the test probe into the inspection hole.



1. Terminal
2. Inspection hole

Checking the DEC unit circuit

1. Check:

- DEC harness (communication) (single DEC unit)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282).
- DEC harness (communication) (twin DEC unit)
See “Checking the DEC harness (communication) (twin DEC unit)” (page 284).
- DEC harness (communication) (triple DEC unit)
See “Checking the DEC harness (communication) (triple DEC unit)” (page 287).
- DEC harness (communication) (quad DEC unit)
See “Checking the DEC harness (communication) (quad DEC unit)” (page 289).
- DEC harness (communication) (quint DEC unit)
See “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
- 2nd helm harness (Port) (if equipped)
See “Checking the 2nd helm harness (Port)” (page 301).
- 2nd helm harness (Stbd) (if equipped)
See “Checking the 2nd helm harness (Stbd)” (page 301).
- Helm harness
See “Checking the helm harness (Main/Single)” (page 298) or “Checking the helm harness (Main/Multi)” (page 299).
- Main-harness (16P)
See “Checking the main-harness (16P)” (page 281).
- Split harness (SCU) (if equipped)
See “Checking the split harness (SCU)” (page 297).
No continuity → Replace the faulty wiring.
Continuity → Check for short circuits in the communication lines and all other lines. If defective, replace the faulty wiring.

Checking the LPS output voltage

1. Check:

- Output voltage
Out of specification → Measure the LPS input voltage.

See “Measuring the LPS input voltage (main station)” (page 260), “Measuring the LPS input voltage (2nd station)” (page 261).

- a. Connect the YDIS.
- b. Check the output voltages corresponding to F and R shift-in positions, F and R fully open throttle position, and the N position.

Parameter	Unit	Value 1	Value 2
LPS 1	V	0.00	0.00
LPS 2	V	0.00	0.00
LPS1 OP	V	0.00	0.00
LPS2 OP	V	0.00	0.00
LPS1 OS	V	0.00	0.00
LPS2 OS	V	0.00	0.00
Flare throttle switch (main)	ON		0.00
Station change switch (main)	ON		0.00

	LPS output voltage
	F fully open throttle position
	4.451–4.671 V
	F shift-in position
	2.659–3.001 V
	N position
	2.068–2.308 V
	R shift-in position
1.467–1.737 V	
R fully open throttle position	
0.329–0.549 V	
Fail: Over 4.79 V and less than 0.2 V	

Measuring the LPS input voltage (main station)

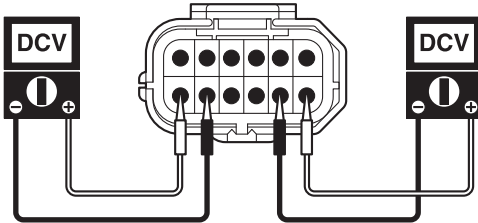
RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - DEC harness coupler (RC-11)
2. Measure:
 - Input voltage
Out of specification → Check the LPS circuit.
See “Checking the LPS circuit (main station)” (page 261).
 - a. Turn on the power switch.

Trouble code and checking step

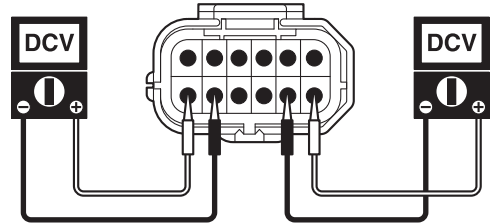
b. Measure the input voltage at the DEC harness coupler.

<Single lever>

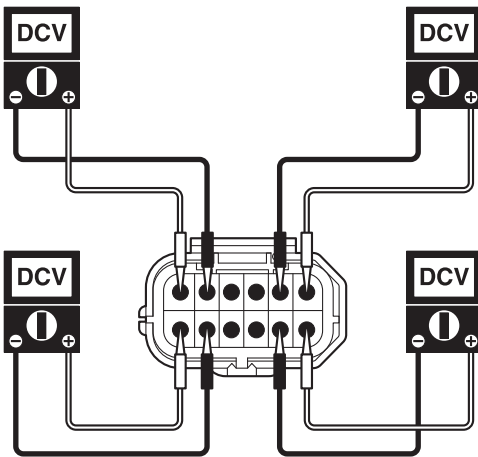


b. Measure the input voltage at the DEC harness coupler.

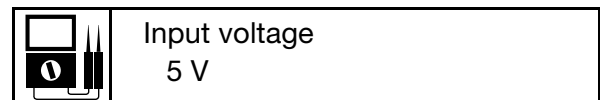
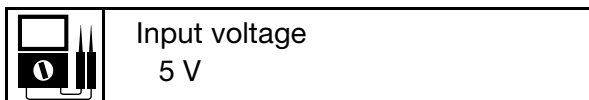
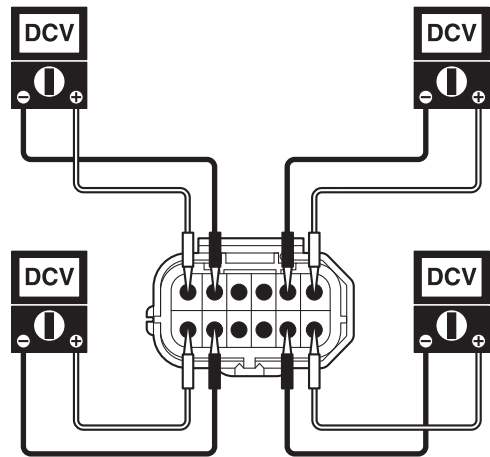
<Single lever>



<Twin lever>



<Twin lever>



3. Connect:

- DEC harness coupler (RC-11)

3. Connect:

- DEC harness coupler (RC-47)

Measuring the LPS input voltage (2nd station)

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See "Connecting diagram" (page 332).

1. Disconnect:

- DEC harness coupler (RC-47)

2. Measure:

- Input voltage

Out of specification → Check the LPS circuit.

See "Checking the LPS circuit (2nd station)" (page 262).

a. Turn on the power switch.

Checking the LPS circuit (main station)

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See "Connecting diagram" (page 332).

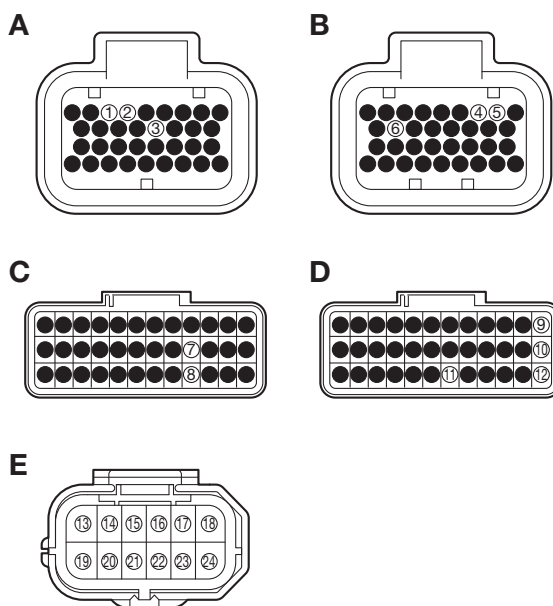
1. Disconnect:

- DEC harness coupler (RC-1, RC-2)
- DEC harness coupler (RC-3, RC-4) (except single DEC unit)
- DEC harness coupler (RC-11)

2. Check:

- LPS circuit

No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC1 or RC-3) (previous DEC unit)
- B. DEC harness coupler (RC-2 or RC-4) (previous DEC unit)
- C. DEC harness coupler (RC1 or RC-3) (new DEC unit)
- D. DEC harness coupler (RC-2 or RC-4) (new DEC unit)
- E. DEC harness coupler (RC-11)

Continuity	
Terminal	Terminal
1	24 (*1), 18 (*2)
2	22 (*1), 16 (*2)
3	23 (*1), 17 (*2)
4	21 (*1), 15 (*2)
5	19 (*1), 13 (*2)
6	20 (*1), 14 (*2)

(*1). Only the PORT circuit has continuity.
 (*2). Only the STBD circuit has continuity.

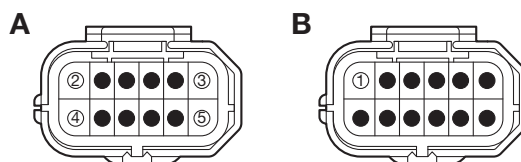
3. Connect:
 - DEC harness coupler (RC-1, RC-2)
 - DEC harness coupler (RC-3, RC-4) (except single DEC unit)
 - DEC harness coupler (RC-11)

Checking the LPS circuit (2nd station)

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - DEC harness coupler (RC-47)
 - DEC harness coupler (RC-48)
2. Check:
 - LPS circuit (output)

No continuity → Replace the DEC harness (2nd station).



- A. DEC harness coupler (RC-47)
- B. DEC harness coupler (RC-48)

Continuity	
Terminal	Terminal
1	2 (*1), 3 (*1), 4 (*2), 5 (*2)

(*1). Twin lever
 (*2). Single lever

3. Check:
 - LPS circuit (ground)

See “Checking the DEC harness (2nd station/single)” (page 296) or “Checking the DEC harness (2nd station/multi)” (page 296).
4. Connect:
 - DEC harness coupler (RC-47)
 - DEC harness coupler (RC-48)

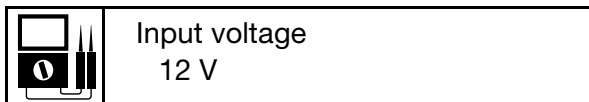
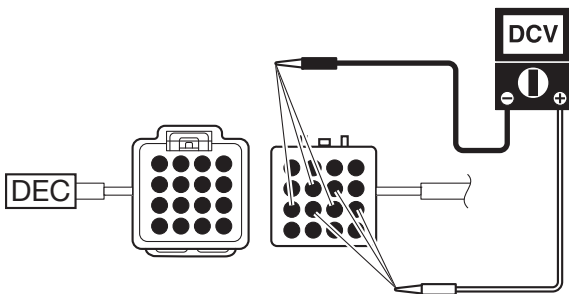
Measuring the DEC unit input voltage

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

- The number of couplers to be disconnected depends on the number of outboard motors installed.

1. Disconnect:
 - DEC harness coupler (RC-32a)
 - DEC harness coupler (RC-33a) (except single DEC unit)
 - DEC harness coupler (RC-34a) (quint DEC unit)
 - DEC harness coupler (RC-35a) (triple/quad/quint DEC unit)
 - DEC harness coupler (RC-36a) (quad/quint DEC unit)
2. Measure:
 - Input voltage

Out of specification → Proceed to step 3 and check the related wire harness.



3. Check:
 - Main harness (16P)
See “Checking the main-harness (16P)” (page 281).
 - Helm harness
See “Checking the helm harness (Main/Single)” (page 298) or “Checking the helm harness (Main/Multi)” (page 299).
 - 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
 - 2nd helm harness (Stbd)
See “Checking the 2nd helm harness (Stbd)” (page 301).
4. Connect:
 - All of the disconnected couplers

Measuring the DEC ECM input voltage

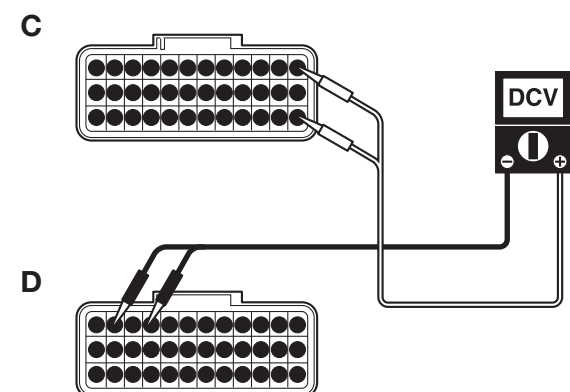
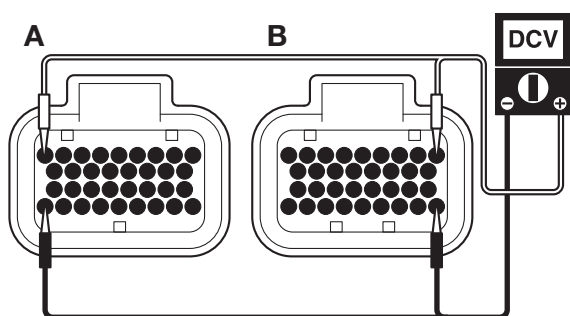
- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
 - The number of couplers to be disconnected depends on the number of outboard motors installed.
1. Disconnect:
 - DEC harness coupler (RC-1, RC-2)
 - DEC harness coupler (RC-3, RC-4) (except single DEC unit)
 - DEC harness coupler (RC-5, RC-6) (quint DEC unit)
 - DEC harness coupler (RC-7, RC-8) (triple/quad/quint DEC unit)
 - DEC harness coupler (RC-9, RC-10) (quad/quint DEC unit)
 2. Measure:
 - Input voltage

TIP: _____

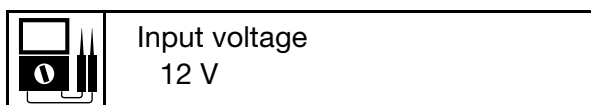
Take measurement at all the couplers on the ECMs installed.

- a. Measure the input voltage at the ECM 1 and ECM 2 couplers.
Out of specification → Check the DEC harness (power and ground).
See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286), “Checking the DEC harness (power and ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).

Trouble code and checking step



- A. DEC harness coupler (RC-1, RC-3, RC-5, RC-7, or RC-9) (previous DEC unit)
 B. DEC harness coupler (RC-2, RC-4, RC-6, RC-8, or RC-10) (previous DEC unit)
 C. DEC harness coupler (RC-1, RC-3, RC-5, RC-7, or RC-9) (new DEC unit)
 D. DEC harness coupler (RC-2, RC-4, RC-6, RC-8, or RC-10) (new DEC unit)

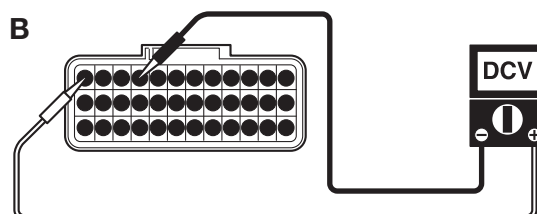
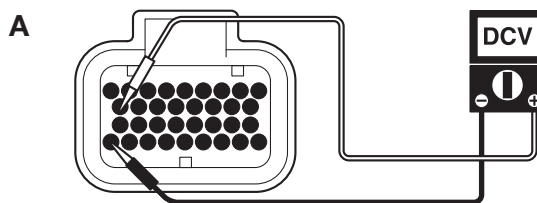


- b. Turn on the power switch.
 c. Measure the input voltage at the ECM 1 coupler (previous DEC unit) or ECM 2 coupler (new DEC unit).

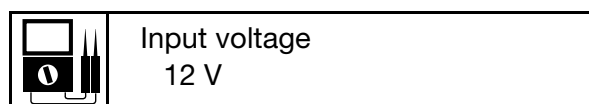
Out of specification → Check the DEC harness.

See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286), “Checking the DEC harness (power and

ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).



- A. DEC harness coupler (RC-1, RC-3, RC-5, RC-7, or RC-9) (previous DEC unit)
 B. DEC harness coupler (RC-2, RC-4, RC-6, RC-8, or RC-10) (new DEC unit)



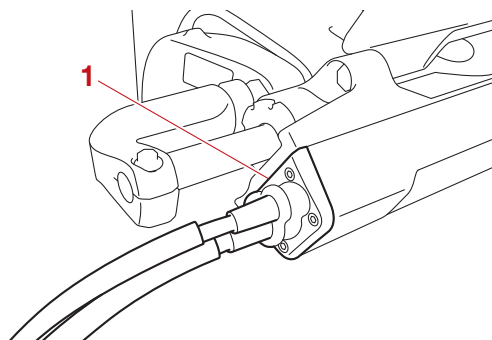
3. Connect:
- DEC harness coupler (RC-1, RC-2)
 - DEC harness coupler (RC-3, RC-4)
 - DEC harness coupler (RC-5, RC-6)
 - DEC harness coupler (RC-7, RC-8)
 - DEC harness coupler (RC-9, RC-10)

Measuring the DES input voltage (bolt-on DES) (single DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:

- Steering actuator coupler (RC-50) "1"

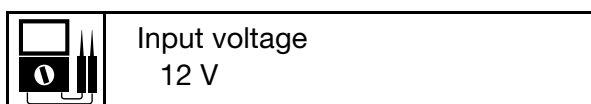
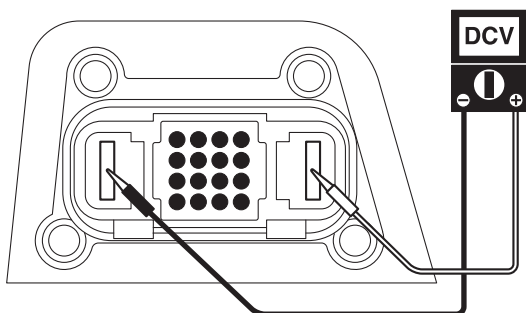


2. Measure:

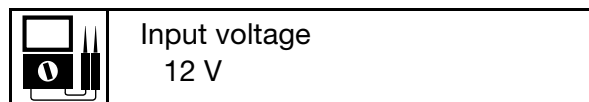
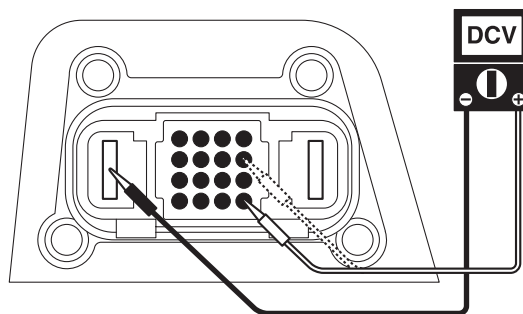
- Input voltage

- Measure the input voltage at the DES wire harness coupler.

Out of specification → Check that the steering actuator harness is properly installed to the battery or check the steering actuator harness. See "Checking the steering actuator harness" (page 308).

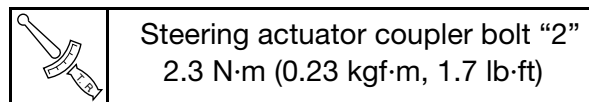
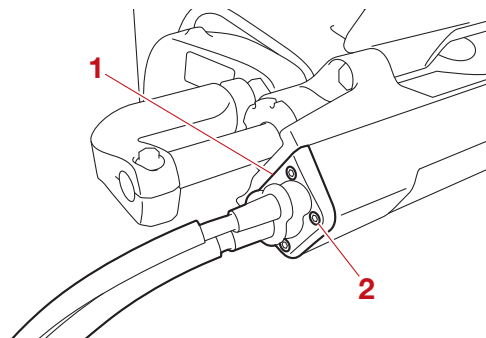


- Turn on the power switch.
- Measure the input voltage at the steering actuator coupler.
Out of specification → Check the steering actuator harness and split harness (SCU). See "Checking the steering actuator harness" (page 308) and "Checking the split harness (SCU)" (page 297).



3. Connect:

- Steering actuator coupler (RC-50) "1"

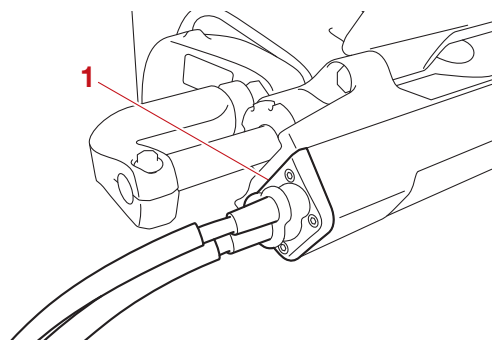


Measuring the DES input voltage (bolt-on DES) (except single DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC coupler in the connecting diagram. See "Connecting diagram" (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

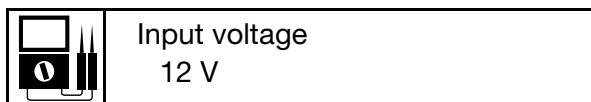
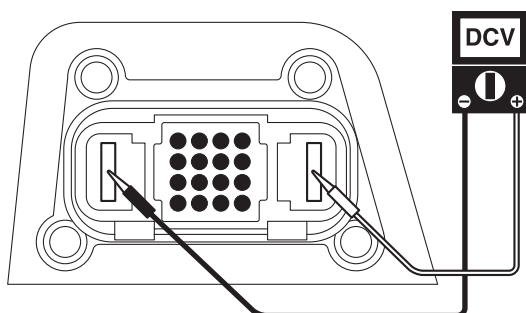
1. Disconnect:

- Steering actuator coupler (RC-50, RC-51, RC-52, RC-53, RC-54) "1"

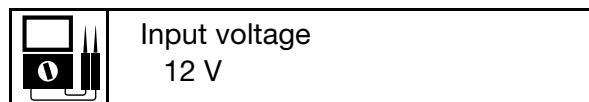
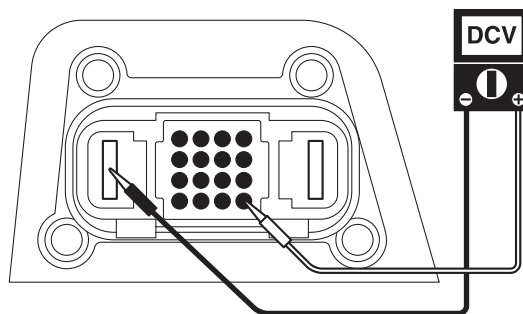


2. Measure:

- Input voltage
 - Measure the input voltage at the DES wire harness coupler.
Out of specification → Check that the steering actuator harness is properly installed to the battery or check the steering actuator harness. See "Checking the steering actuator harness" (page 308).

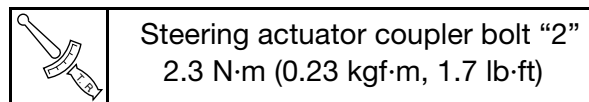
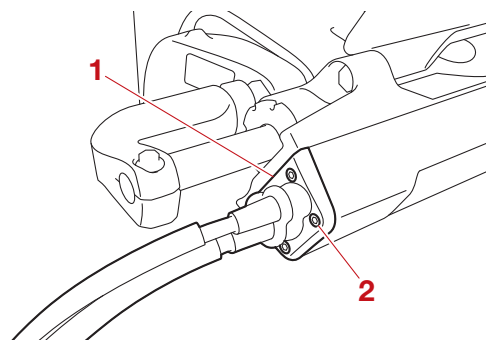


- Turn on the power switch.
- Measure the input voltage at the steering actuator coupler.
Out of specification → Check the steering actuator harness and split harness (SCU). See "Checking the steering actuator harness" (page 308) and "Checking the split harness (SCU)" (page 297).



3. Connect:

- Steering actuator coupler (RC-50) "1"



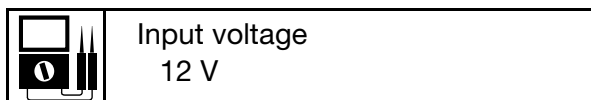
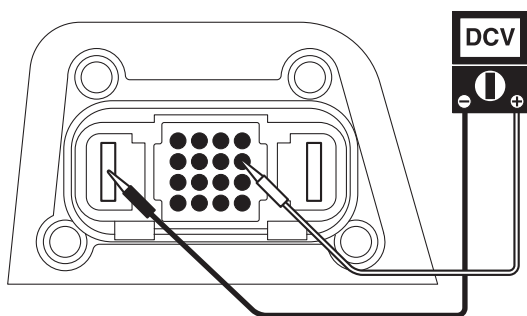
4. Measure:

- Input voltage

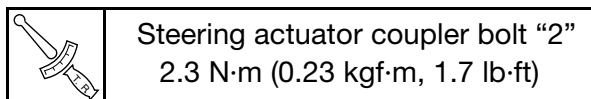
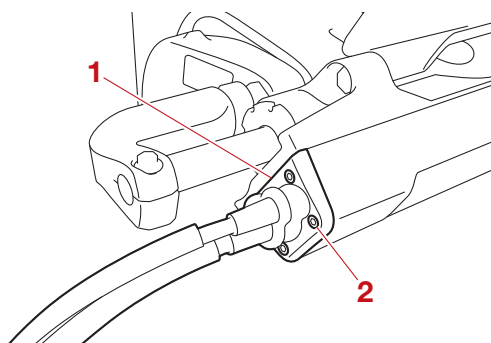
TIP: Measure with steering actuator coupler (RC-51, RC-52, RC-53, or RC-54).

- Turn on the power switch.
- Measure the input voltage at the steering actuator coupler.
Out of specification → Measure the DES output voltage. See "Measuring the DES output voltage (bolt-on DES)" (page 267).
Within specification → Proceed to step 5 and check the related wire harness.

Trouble code and checking step



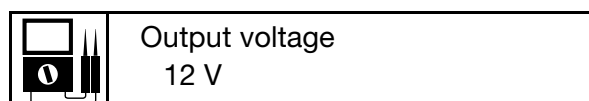
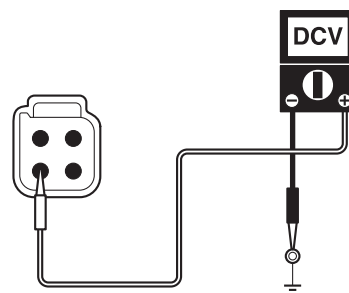
5. Check:
 - Steering actuator harness
See “Checking the steering actuator harness” (page 308).
 - SCU link harness (Port/Stbd)
See “Checking the SCU link harness (Port/Stbd)” (page 303).
 - SCU link harness (Center)
See “Checking the SCU link harness (Center)” (page 303).
No continuity → Replace the faulty wire harness.
6. Connect:
 - Steering actuator coupler (RC-51, RC-52, RC-53, RC-54) “1”



Measuring the DES output voltage (bolt-on DES)

RC-** in parentheses indicates the symbol assigned to the DEC coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - Steering actuator coupler (RC-55a)
2. Measure:
 - Output voltage
Out of specification → Check the steering actuator harness or If there is no problem, the Steering actuator.
See “Checking the steering actuator harness” (page 308).



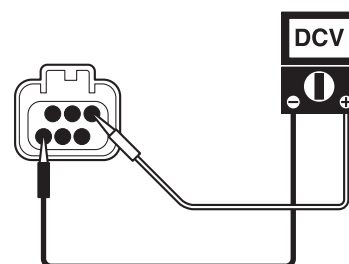
3. Connect:
 - Steering actuator coupler (RC-55a)

Measuring the helm unit input voltage (main station)

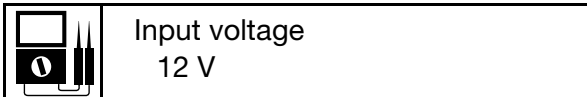
1. Disconnect:
 - Helm unit coupler
2. Measure:
 - Input voltage
Out of specification → Proceed to step 3 and check the related wire harness.

TIP: _____
Measure with both couplers of the helm harness.

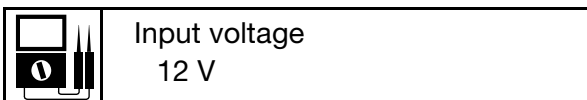
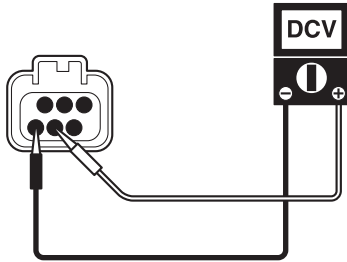
- a. Measure the input voltage at the helm unit couplers.



Trouble code and checking step



- b. Turn on the power switch.
- c. Measure the input voltage at the helm unit couplers.



3. Check:
 - Helm harness (Main/Single) (single DEC unit)
See “Checking the helm harness (Main/Single)” (page 298).
 - Helm harness (Main/Multi) (except single DEC unit)
See “Checking the helm harness (Main/Multi)” (page 299).
No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

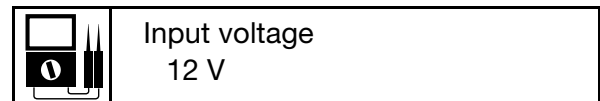
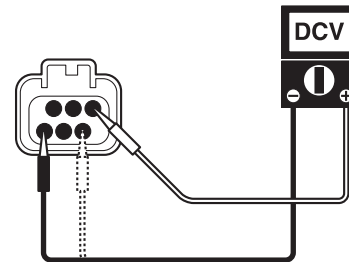
Measuring the helm unit input voltage (2nd station)

1. Disconnect:
 - Helm unit coupler
2. Measure:
 - Input voltage
Out of specification → Proceed to step 3 and check the related wire harness.

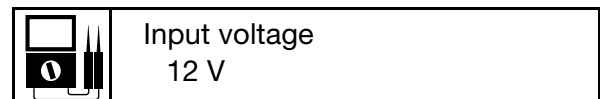
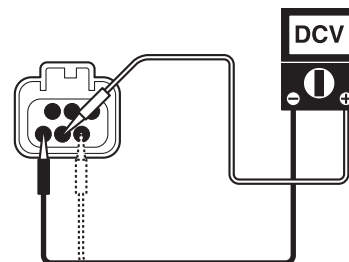
TIP: _____

Measure with both couplers of the helm unit harness.

- a. Measure the input voltage at the helm unit couplers.



- b. Turn on the power switch.
- c. Measure the input voltage at the helm unit couplers.



3. Check:
 - 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
 - 2nd helm harness (Stbd)
See “Checking the 2nd helm harness (Stbd)” (page 301).
 - Helm harness (2nd station)
See “Checking the helm harness (2nd station)” (page 300).
No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

Checking the helm unit circuit (communication) (main station)

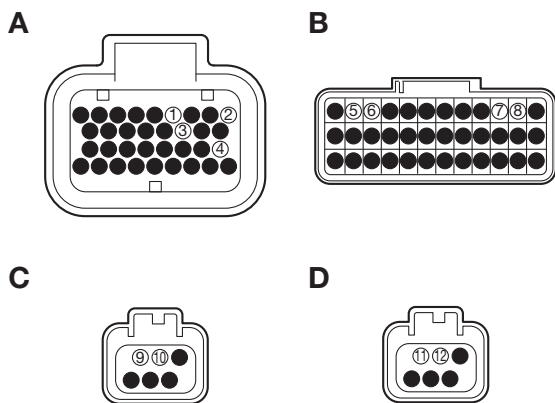
RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - DEC harness coupler (RC-1)
 - DEC harness coupler (RC-3) (except single DEC unit)
 - Helm unit coupler (main station)
2. Check:
 - Helm unit circuit (communication)
Out of specification → Proceed to step 3 and check the related wire harness.

TIP:

Except for the single DEC unit, check the continuity between the DEC harness coupler (RC-1) and the helm unit coupler, as well as the continuity between the DEC harness coupler (RC-3) and the helm unit coupler, respectively.

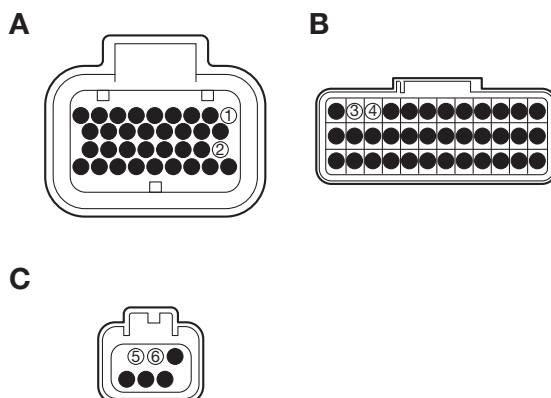
<Single DEC unit>



- A. DEC harness coupler (RC-1) (previous DEC unit)
- B. DEC harness coupler (RC-1) (new DEC unit)
- C. Helm unit coupler 1
- D. Helm unit coupler 2

Continuity	
Terminal	Terminal
1, 7	11
2, 5	9
3, 8	12
4, 6	10

<Except single DEC unit>



- A. DEC harness coupler (RC-1 or RC-3) (previous DEC unit)
- B. DEC harness coupler (RC-1 or RC-3) (new DEC unit)
- C. Helm unit coupler

Continuity	
Terminal	Terminal
1, 4	5
2, 3	6

3. Check:
 - DEC harness (communication)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
 - Helm harness (Main/Single) (single DEC unit)

See "Checking the helm harness (Main/Single)" (page 298).

- Helm harness (Main/Multi) (except single DEC unit)

See "Checking the helm harness (Main/Multi)" (page 299).

No continuity → Replace the faulty wiring.

4. Connect:

- All of the disconnected couplers

Checking the helm unit circuit (communication) (2nd station)

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See "Connecting diagram" (page 332).

1. Disconnect:

- DEC harness coupler (RC-1)
- DEC harness coupler (RC-3) (except single DEC unit)
- Helm unit coupler (2nd station)

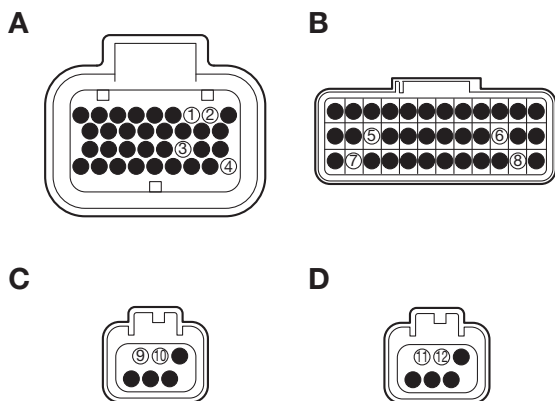
2. Check:

- Helm unit circuit (communication)
Out of specification → Proceed to step 3 and check the related wire harness.

TIP:

Except for the single DEC unit, check the continuity between the DEC harness coupler (RC-1) and the helm unit coupler, as well as the continuity between the DEC harness coupler (RC-3) and the helm unit coupler, respectively.

<Single DEC unit>

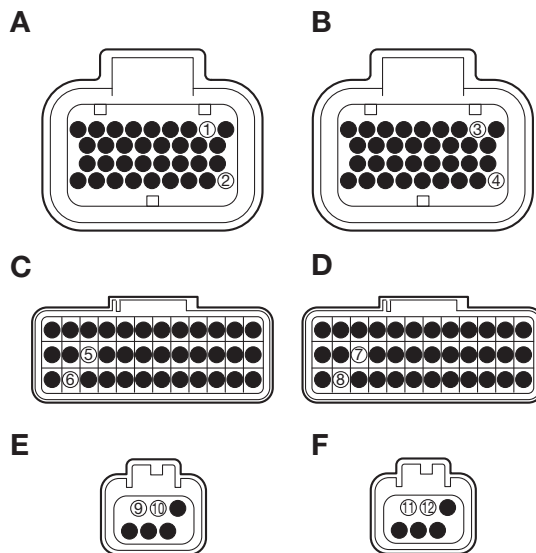


A. DEC harness coupler (RC-1) (previous DEC unit)
B. DEC harness coupler (RC-3) (previous DEC unit)
C. Helm unit (2nd station) coupler 1
D. Helm unit (2nd station) coupler 2

- B. DEC harness coupler (RC-1) (new DEC unit)
- C. Helm unit coupler 1
- D. Helm unit coupler 2

Continuity	
Terminal	Terminal
1, 3	11
2, 5	10
3, 8	12
4, 7	9

<Except single DEC unit>



- A. DEC harness coupler (RC-1) (previous DEC unit)
- B. DEC harness coupler (RC-3) (previous DEC unit)
- C. DEC harness coupler (RC-1) (new DEC unit)
- D. DEC harness coupler (RC-3) (new DEC unit)
- E. Helm unit (2nd station) coupler 1
- F. Helm unit (2nd station) coupler 2

Continuity	
Terminal	Terminal
1, 5	9
2, 6	10
3, 7	12
4, 8	11

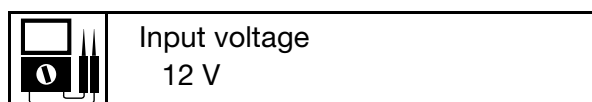
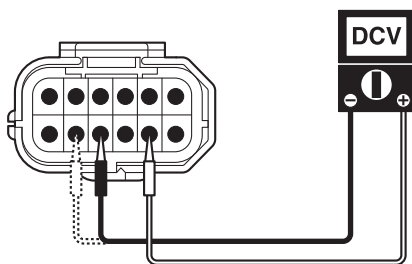
Trouble code and checking step

3. Check:
 - DEC harness (communication)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
 - 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
 - Helm harness (2nd station)
See “Checking the helm harness (2nd station)” (page 300).
No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

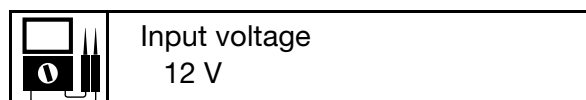
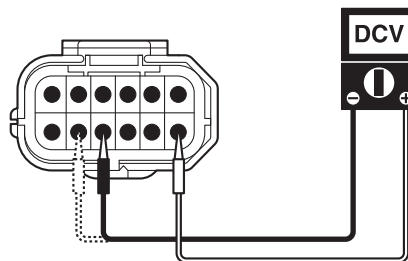
Measuring the DEC input voltage (2nd station)

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - DEC harness coupler (RC-48) (2nd station)
2. Measure:
 - Input voltage
Out of specification → Proceed to step 3 and check the related wire harness.
 - a. Measure the input voltage at the DEC harness coupler (RC-48).



- b. Turn on the power switch.
- c. Measure the input voltage at the DEC coupler (RC-48).



3. Check:
 - DEC harness (power and ground)
See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286), “Checking the DEC harness (power and ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).
 - 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
 - DEC harness (2nd station) (power and ground)
See “Checking the DEC harness (2nd station/single)” (page 296) or “Checking the DEC harness (2nd station/multi)” (page 296).
No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

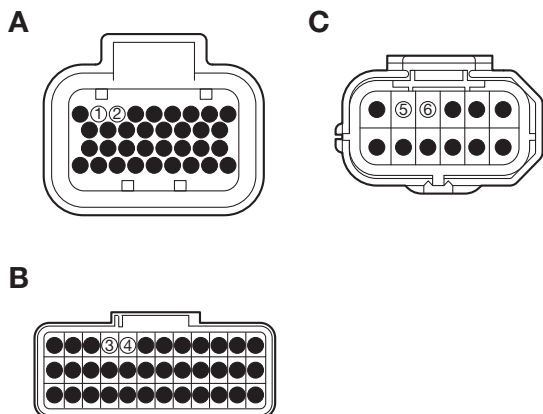
Checking the DEC circuit (communication) (2nd station)

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - DEC harness coupler (RC-2)

Trouble code and checking step

- DEC harness coupler (RC-4) (except single DEC unit)
 - DEC harness coupler (RC-48)
2. Check:
- DEC circuit (communication) continuity Out of specification → Proceed to step 3 and check the related wire harness.



<Single DEC unit>

- DEC harness coupler (RC-2) (previous DEC unit)
- DEC harness coupler (RC-2) (new DEC unit)
- DEC harness coupler (RC-48)

<Except single DEC unit>

- DEC harness coupler (RC-2 or RC-4) (previous DEC unit)
- DEC harness coupler (RC-1 or RC-3) (new DEC unit)
- DEC harness coupler (RC-48)

Continuity	
Terminal	Terminal
1, 4	6
2, 3	5

3. Check:
- DEC harness (communication)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad

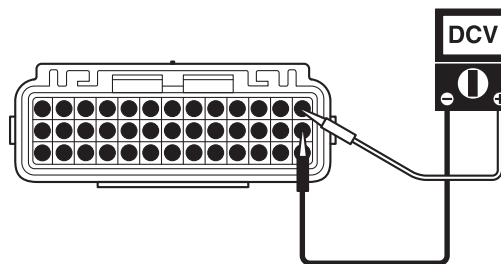
DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).

- 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
 - BCU harness (2nd station)
See “Checking the BCU harness (2nd station)” (page 305).
 - DEC harness (2nd station) (communication)
See “Checking the DEC harness (2nd station/single)” (page 296) or “Checking the DEC harness (2nd station/multi)” (page 296).
- No continuity → Replace the faulty wiring.
4. Connect:
- All of the disconnected couplers

Measuring the BCU input voltage

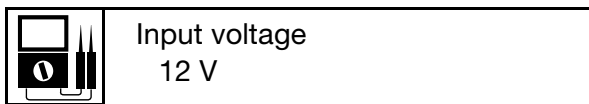
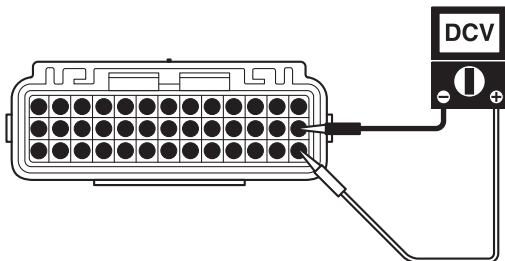
RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

- Disconnect:
 - BCU coupler (except quint DEC unit)
 - DEC harness coupler (RC-23) (quint DEC unit)
- Measure:
 - Input voltage
Out of specification → Proceed to step 3 and check the related wire harness.
 - Measure the input voltage at the BCU coupler (except quint DEC unit) or DEC harness coupler (RC-23) (quint DEC unit).



	Input voltage 12 V
--	-----------------------

- b. Turn on the power switch.
- c. Measure the input voltage at the BCU coupler (except quint DEC unit) or DEC harness coupler (RC-23) (quint DEC unit).



3. Check:
 - DEC harness (power and ground)

See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286), “Checking the DEC harness (power and ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).
 - BCU harness (main station) (except quint DEC unit)

See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303).

No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

Checking the BCU circuit (communication)

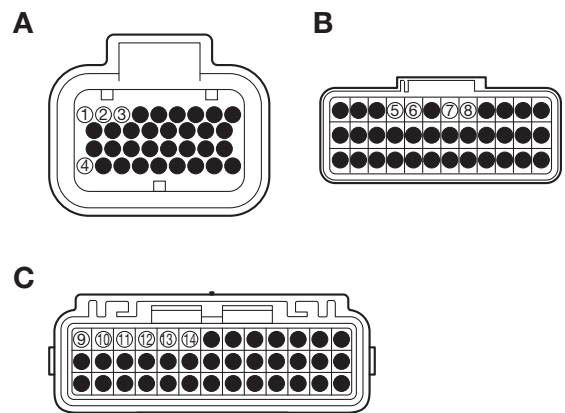
RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - DEC harness coupler (RC-1) (previous DEC unit)
 - DEC harness coupler (RC-2) (new DEC unit)

- DEC harness coupler (RC-3) (previous DEC unit) (except single DEC unit)
- DEC harness coupler (RC-4) (new DEC unit) (except single DEC unit)
- DEC harness coupler (RC-7) (previous DEC unit) (triple/quad/quint DEC unit)
- DEC harness coupler (RC-8) (new DEC unit) (triple/quad/quint DEC unit)
- DEC harness coupler (RC-9) (previous DEC unit) (quad/quint DEC unit)
- DEC harness coupler (RC-10) (new DEC unit) (quad/quint DEC unit)
- DEC harness coupler (RC-5) (previous DEC unit) (quint DEC unit)
- DEC harness coupler (RC-6) (new DEC unit) (quint DEC unit)
- BCU coupler (except quint DEC unit)
- DEC harness coupler (RC-23) (quint DEC unit)

2. Check:
 - BCU circuit (communication) continuity

Out of specification → Proceed to step 3 and check the related wire harness.



- A. DEC harness coupler (RC-1, RC-3, RC-5, RC-7, or RC-9) (previous DEC unit)
- B. DEC harness coupler (RC-2, RC-4, RC-6, RC-8, or RC-10) (new DEC unit)
- C. BCU coupler or DEC harness coupler (RC-23)

Continuity	
Terminal	Terminal
1, 8	12
2, 6	9 (*1), 13 (*2)
3, 5	10 (*1), 14 (*2)
4, 7	11

(*1). Except quint DEC unit (C PORT, C STBD)
 (*2). Quint DEC unit (C PORT, C STBD)

3. Check:

- DEC harness (communication)
 See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
- BCU harness (main station) (except quint DEC unit)
 See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303).
 No continuity → Replace the faulty wiring.

4. Connect:

- All of the disconnected couplers

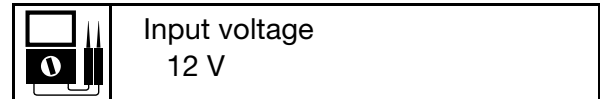
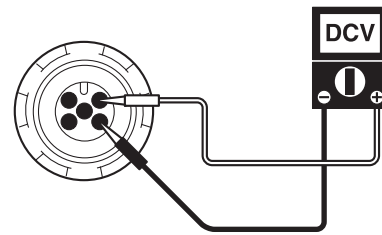
Measuring the GPS unit input voltage

1. Disconnect:

- GPS unit coupler

2. Measure:

- Input voltage
 Out of specification → Proceed to step 3 and check the related wire harness.
 - a. Turn on the power switch.
 - b. Measure the input voltage at the GPS unit coupler.



3. Check:

- Conversion harness (GPS/heading sensor/MFD)
 See “Checking the conversion harness (GPS/heading sensor/MFD)” (page 306).
- Pigtail bus wire
 See “Checking the pigtail bus wire” (page 302).
- Main bus wire
 See “Checking the main bus wire” (page 302).
- DEC harness (2nd station)
 See “Checking the DEC harness (2nd station/single)” (page 296) or “Checking the DEC harness (2nd station/multi)” (page 296).
- BCU harness (main station) (single station model)
 See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).
- Single-hub
 See “Checking the single-hub” (page 309).
 No continuity → Replace the faulty wiring.

4. Connect:

- All of the disconnected couplers

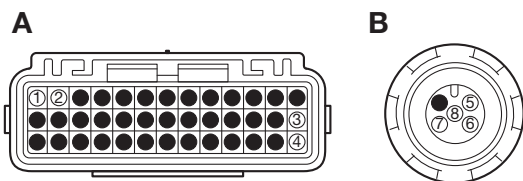
Checking the GPS unit circuit

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:

- BCU coupler (except quint DEC unit)

- DEC harness coupler (RC-23) (quint DEC unit)
 - GPS unit coupler
2. Check:
- GPS unit circuit
Out of specification → Proceed to step 3 and check the related wire harness.



- A. BCU coupler (except quint DEC unit) or DEC harness coupler (RC-23) (quint DEC unit)
- B. GPS unit coupler

Continuity	
Terminal	Terminal
1	7
2	8
3	6
4	5

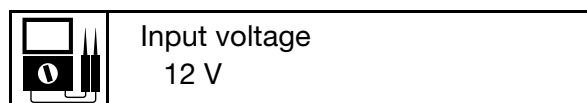
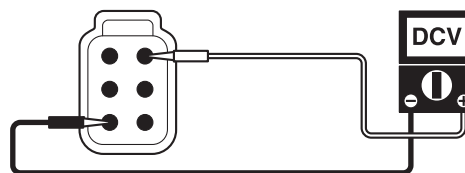
3. Check:
- Pigtail bus wire
See “Checking the pigtail bus wire” (page 302).
 - Main bus wire
See “Checking the main bus wire” (page 302).
 - DEC harness (2nd station)
See “Checking the DEC harness (2nd station/single)” (page 296) or “Checking the DEC harness (2nd station/multi)” (page 296).
 - BCU harness (main station) (single station model)
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).

- Single-hub
See “Checking the single-hub” (page 309).
No continuity → Replace the faulty wiring.
4. Connect:
- All of the disconnected couplers

Measuring the joystick input voltage

Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:
 - Joystick coupler (main station)
 - Joystick coupler (2nd station)
 - Joystick coupler (joystick station)
2. Measure:
 - Input voltage
 - Out of specification → Proceed to step 3 and check the related wire harness.
 - a. Turn on the power switch.
 - b. Measure the input voltage at the joystick coupler.



3. Check:
- Main bus wire
See “Checking the main bus wire” (page 302).
 - BCU harness (main station)
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).
 - BCU harness (2nd station)
See “Checking the BCU harness (2nd station)” (page 305).

- Aux joystick harness
See “Checking the aux joystick harness” (page 307).
- DEC harness (power and ground)
See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286), “Checking the DEC harness (power and ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).
- DEC harness (communication)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
- 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
No continuity → Replace the faulty wiring.

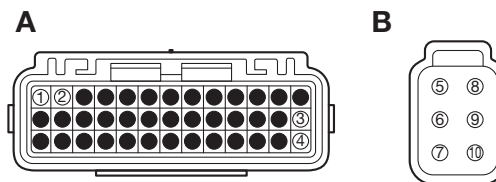
4. Connect:

- All of the disconnected couplers

Checking the joystick circuit

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
 - Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.
1. Disconnect:
 - Joystick coupler
 - Joystick coupler
 - Joystick coupler
 - BCU coupler (except quint DEC unit)
 - DEC harness coupler (RC-23) (quint DEC unit)
 2. Check:
 - Joystick circuit

Out of specification → Proceed to step 3 and check the related wire harness.



- A. BCU coupler (except quint DEC unit) or DEC harness coupler (RC-23) (quint DEC unit)
- B. Joystick coupler

Continuity	
Terminal	Terminal
1	5
2	6
3	7, 9 (*1), 10 (*2)
4	8

- (*1). Except main station
- (*2). Joystick station

3. Check:

- Main bus wire
See “Checking the main bus wire” (page 302).
- BCU harness (main station)
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).
- BCU harness (2nd station)
See “Checking the BCU harness (2nd station)” (page 305).
- Aux joystick harness
See “Checking the aux joystick harness” (page 307).
- DEC harness (power and ground)
See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286),

“Checking the DEC harness (power and ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).

- DEC harness (communication)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
- 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
No continuity → Replace the faulty wiring.

4. Connect:

- All of the disconnected couplers

Measuring the autopilot panel input voltage

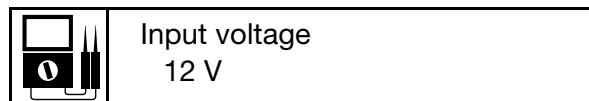
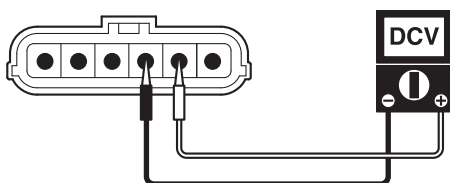
Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:

- Autopilot panel coupler (main station)
- Autopilot panel coupler (2nd station)
- Autopilot panel coupler (joystick station)

2. Measure:

- Input voltage
Out of specification → Proceed to step 3 and check the related wire harness.
 - a. Turn on the power switch.
 - b. Measure the input voltage at the autopilot panel coupler.



3. Check:

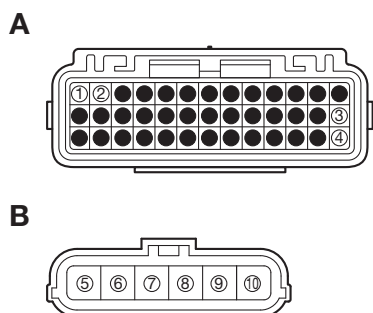
- BCU harness (main station)
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).
- BCU harness (2nd station)
See “Checking the BCU harness (2nd station)” (page 305).
- BCU harness extension
See “Checking the BCU harness extension” (page 306).
- Aux joystick harness
See “Checking the aux joystick harness” (page 307).
- Autopilot panel harness
See “Checking the autopilot panel harness” (page 308).
- DEC harness (power and ground)
See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286), “Checking the DEC harness (power and ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).
- DEC harness (communication)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
- 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
No continuity → Replace the faulty wiring.

4. Connect:

- All of the disconnected couplers

Checking the autopilot panel circuit

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
 - Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.
1. Disconnect:
 - Autopilot panel coupler (main station)
 - Autopilot panel coupler (2nd station)
 - Autopilot panel coupler (joystick station)
 - BCU coupler (except quint DEC unit)
 - DEC harness coupler (RC-23) (quint DEC unit)
 2. Check:
 - Autopilot panel circuit
Out of specification → Proceed to step 3 and check the related wire harness.



- A. BCU coupler (except quint DEC unit) or DEC harness coupler (RC-23) (quint DEC unit)
- B. Autopilot panel coupler

Continuity	
Terminal	Terminal
1	5
2	6
3	7 (*1), 8, 10 (*2)
4	8

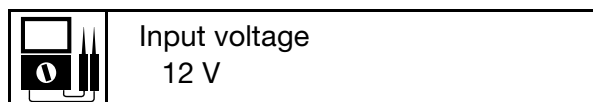
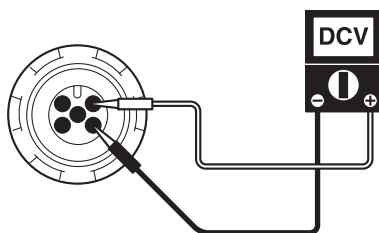
- (*1). Joystick station
(*2). Except main station

3. Check:
 - Main bus wire
See “Checking the main bus wire” (page 302).

- BCU harness (main station)
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).
 - BCU harness (2nd station)
See “Checking the BCU harness (2nd station)” (page 305).
 - BCU harness extension
See “Checking the BCU harness extension” (page 306).
 - Aux joystick harness
See “Checking the aux joystick harness” (page 307).
 - Autopilot panel harness
See “Checking the autopilot panel harness” (page 308).
 - DEC harness (power and ground)
See “Checking the DEC harness (power and ground) (single DEC unit)” (page 281), “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283), “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286), “Checking the DEC harness (power and ground) (quad DEC unit)” (page 288), or “Checking the DEC harness (power and ground) (quint DEC unit)” (page 291).
 - DEC harness (communication)
See “Checking the DEC harness (communication) (single DEC unit)” (page 282), “Checking the DEC harness (communication) (twin DEC unit)” (page 284), “Checking the DEC harness (communication) (triple DEC unit)” (page 287), “Checking the DEC harness (communication) (quad DEC unit)” (page 289), or “Checking the DEC harness (communication) (quint DEC unit)” (page 293).
 - 2nd helm harness (Port)
See “Checking the 2nd helm harness (Port)” (page 301).
No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

Measuring the heading sensor input voltage

1. Disconnect:
 - Heading sensor coupler
2. Measure:
 - Input voltage
Out of specification → Proceed to step 3 and check the related wire harness.
 - a. Turn on the power switch.
 - b. Measure the input voltage at the heading sensor coupler.



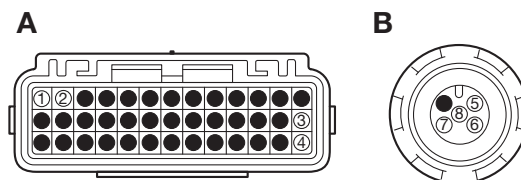
3. Check:
 - Conversion harness (GPS/heading sensor/MFD)
See “Checking the conversion harness (GPS/heading sensor/MFD)” (page 306).
 - BCU harness (main station)
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).
No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

Checking the heading sensor circuit

RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).

1. Disconnect:
 - Heading sensor coupler
 - BCU coupler (except quint DEC unit)
 - DEC harness coupler (RC-23) (quint DEC unit)
2. Check:

- Heading sensor circuit
Out of specification → Proceed to step 3 and check the related wire harness.



- A. BCU coupler (except quint DEC unit) or DEC harness coupler (RC-23) (quint DEC unit)
- B. Heading sensor coupler

Continuity	
Terminal	Terminal
1	7
2	8
3	5
4	6

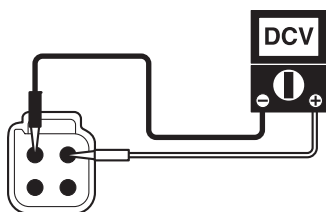
3. Check:
 - Conversion harness (GPS/heading sensor/MFD)
See “Checking the conversion harness (GPS/heading sensor/MFD)” (page 306).
 - BCU harness (main station)
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303) or “Checking the BCU harness (main station) (quint DEC unit)” (page 305).
No continuity → Replace the faulty wiring.
4. Connect:
 - All of the disconnected couplers

Measuring the thruster driver input voltage

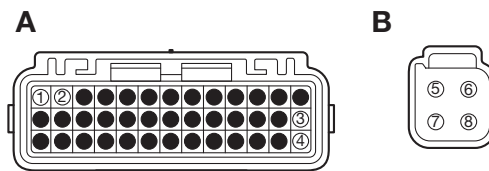
1. Disconnect:
 - Thruster driver coupler
2. Measure:
 - Input voltage
Out of specification → Proceed to step 3 and check the related wire harness.
 - a. Turn on the power switch.

Trouble code and checking step

- b. Measure the input voltage at the thruster driver coupler.



Out of specification → Proceed to step 3 and check the related wire harness.



	Input voltage 12 V
--	-----------------------

- A. BCU coupler
B. Thruster driver coupler

3. Check:

- Pigtail bus wire
See “Checking the pigtail bus wire” (page 302).
- Main bus wire
See “Checking the main bus wire” (page 302).
- DEC harness
See “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283) or “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286).
- BCU harness
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303).
- Single-hub
See “Checking the single-hub” (page 309).
- Multi-hub
See “Checking the multi-hub” (page 310).
No continuity → Replace the faulty wiring.

4. Connect:

- All of the disconnected couplers

Checking the thruster driver circuit

1. Disconnect:

- Thruster driver coupler
- BCU coupler

2. Check:

- Thruster driver circuit

Continuity	
Terminal	Terminal
1	8
2	7
3	5
4	6

3. Check:

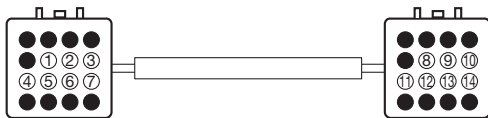
- Pigtail bus wire
See “Checking the pigtail bus wire” (page 302).
- Main bus wire
See “Checking the main bus wire” (page 302).
- BCU harness
See “Checking the BCU harness (main station) (except quint DEC unit)” (page 303).
- Single-hub
See “Checking the single-hub” (page 309).
- Multi-hub
See “Checking the multi-hub” (page 310).
No continuity → Replace the faulty wiring.

4. Connect:

- All of the disconnected couplers

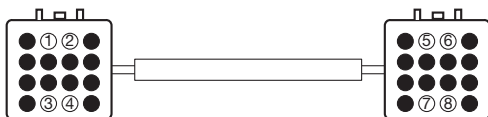
Checking the main-harness (16P)

1. Disconnect:
 - Main-harness (16P)
(Part No.: 6X6-8258A-**)
2. Check:
 - Main-harness (16P) continuity (power and ground)
No continuity → Replace the main-harness (16P).



Continuity	
Terminal	Terminal
1	8
2	9
3	10
4	11
5	12
6	13
7	14

3. Check:
 - Main-harness (16P) continuity (communication)
No continuity → Replace the main-harness (16P).



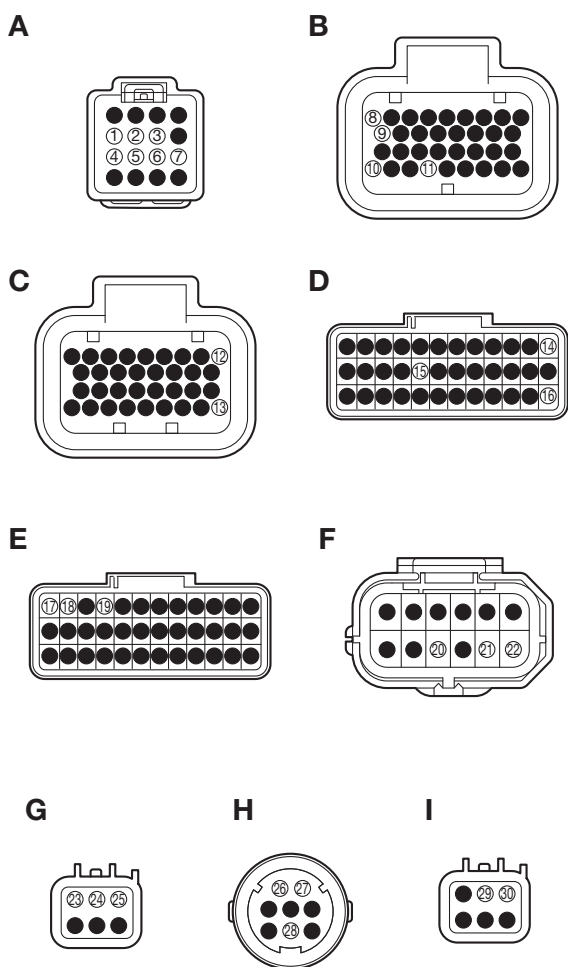
Continuity	
Terminal	Terminal
1	5
2	6
3	7
4	8

4. Connect:
 - Main-harness (16P)

Checking the DEC harness (power and ground) (single DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:
 - DEC harness coupler (RC-1, RC-2)
 - DEC harness coupler (RC-12)
 - DEC harness coupler (RC-15a)
 - DEC harness coupler (RC-24a)
 - DEC harness (16P) coupler (RC-32a)
 - DEC harness coupler (RC-38a)
2. Check:
 - DEC circuit (power and ground) continuity
No continuity → Replace the DEC harness.



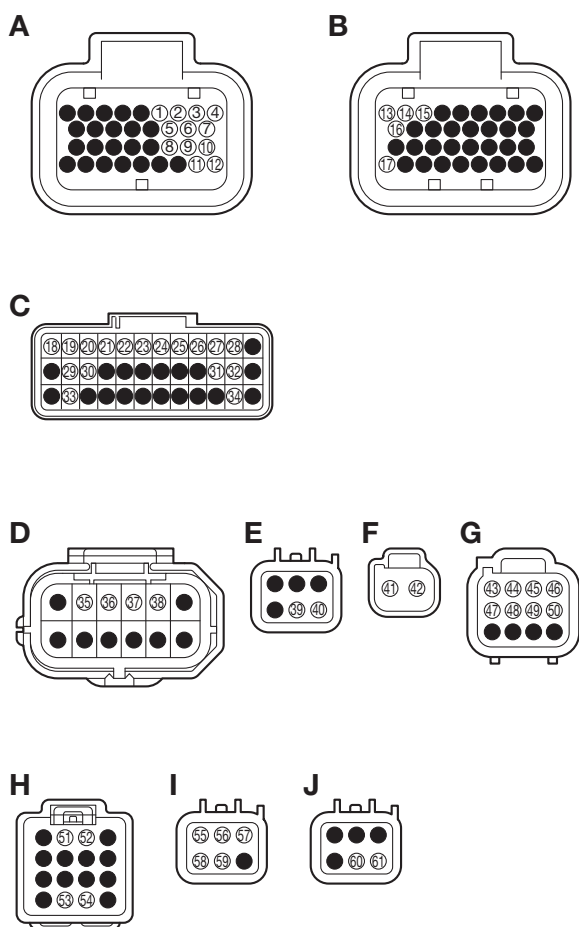
- A. Main harness (16P) coupler (RC-32a)
- B. DEC harness coupler (RC-1) (previous DEC unit)
- C. DEC harness coupler (RC-2) (previous DEC unit)
- D. DEC harness coupler (RC-1) (new DEC unit)
- E. DEC harness coupler (RC-2) (new DEC unit)
- F. DEC harness coupler (RC-12)
- G. DEC harness coupler (RC-15a)
- H. DEC harness coupler (RC-24a)
- I. DEC harness coupler (RC-38a)

Continuity	
Terminal	Terminal
1	11, 15
2, 6	8, 12, 14, 16, 21, 25
3, 5, 7	10, 13, 18, 19, 20, 24, 26, 29
4	28
27	9, 17, 22, 23, 30

3. Connect:
 - DEC harness coupler (RC-1, RC-2)
 - DEC harness coupler (RC-12)
 - DEC harness coupler (RC-15a)
 - DEC harness coupler (RC-24a)
 - DEC harness coupler (RC-32a)
 - DEC harness coupler (RC-38a)

Checking the DEC harness (communication) (single DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
 - Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.
1. Disconnect:
 - DEC harness coupler (RC-1, RC-2) (previous DEC unit)
 - DEC harness coupler (RC-1) (new DEC unit)
 - DEC harness coupler (RC-12)
 - DEC harness coupler (RC-15a)
 - DEC harness coupler (RC-16a)
 - DEC harness coupler (RC-22a)
 - DEC harness coupler (RC-32a)
 - DEC harness coupler (RC-37a)
 - DEC harness coupler (RC-38a)
 2. Check:
 - DEC harness (communication) continuity
No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC-1) (previous DEC unit)
- B. DEC harness coupler (RC-2) (previous DEC unit)
- C. DEC harness coupler (RC-1) (new DEC unit)
- D. DEC harness coupler (RC-12)
- E. DEC harness coupler (RC-15a)
- F. DEC harness coupler (RC-16a)
- G. DEC harness coupler (RC-22a)
- H. DEC harness coupler (RC-32a)
- I. DEC harness coupler (RC-37a)
- J. DEC harness coupler (RC-38a)

Continuity	
Terminal	Terminal
1, 27	54
2, 31	48
3, 30	44
4, 20	52
5, 28	53
6, 26	49
7, 18	50
8, 34	47
9, 32	45
10, 19	51
11, 29	46
12, 33	43
13, 25	37, 41, 56, 59
14, 22	36, 40, 61
15, 21	35, 39, 60
16, 23	55
17, 24	38, 42, 57, 58

3. Connect:
 - DEC harness coupler (RC-1, RC-2) (previous DEC unit)
 - DEC harness coupler (RC-1) (new DEC unit)
 - DEC harness coupler (RC-12)
 - DEC harness coupler (RC-15a)
 - DEC harness coupler (RC-16a)
 - DEC harness coupler (RC-22a)
 - DEC harness coupler (RC-32a)
 - DEC harness coupler (RC-37a)
 - DEC harness coupler (RC-38a)

Checking the DEC harness (power and ground) (twin DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

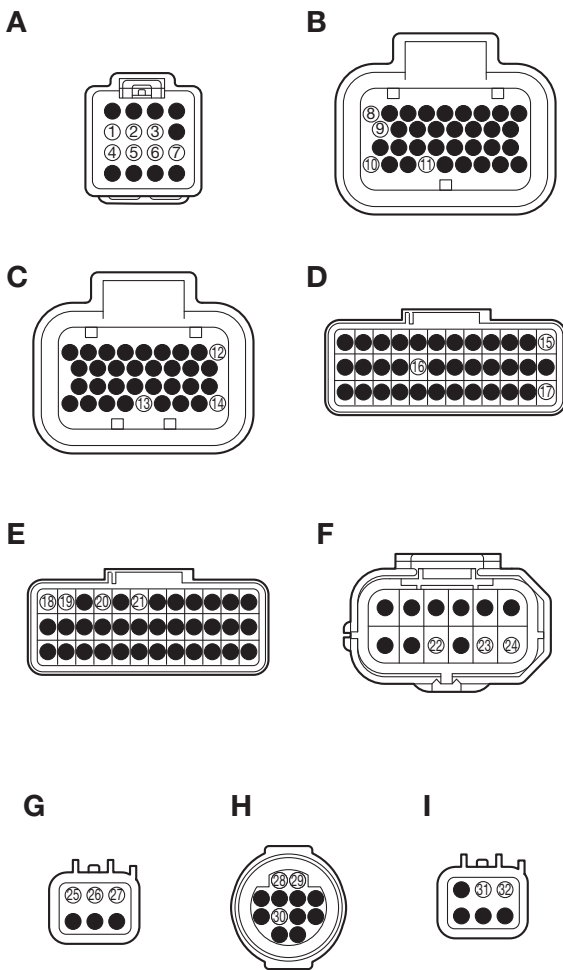
1. Disconnect:

Trouble code and checking step

- DEC harness coupler (RC-1 to RC-4)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-24a, RC-25a)
- DEC harness coupler (RC-32a, RC-33a)
- DEC harness coupler (RC-40a)

2. Check:

- DEC unit circuit (power and ground) continuity
No continuity → Replace the DEC harness.



- A. Main harness (16P) coupler (RC-32a or RC-33a)
 B. DEC harness coupler (RC-1 or RC-3) (previous DEC unit)
 C. DEC harness coupler (RC-2 or RC-4) (previous DEC unit)
 D. DEC harness coupler (RC-1 or RC-3) (new DEC unit)
 E. DEC harness coupler (RC-2 or RC-4) (new DEC unit)
 F. DEC harness coupler (RC-12)

- G. DEC harness coupler (RC-15a)
 H. DEC harness coupler (RC-24a or RC-25a)
 I. DEC harness coupler (RC-40a)

Continuity	
Terminal	Terminal
1	11, 16
2, 6	8, 12, 15, 17, 23 (*1), 27
3, 5, 7	10, 13 (*2), 14, 19, 20, 21 (*2), 22 (*1), 26, 28, 31
4	30
29	9, 18 (*2), 24 (*1), 25 (*1), 32 (*1)

- (*1). Only the PORT circuit has continuity.
 (*2). Only the STBD circuit has continuity.

3. Connect:

- DEC harness coupler (RC-1 to RC-4)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-24a, RC-25a)
- DEC harness coupler (RC-32a, RC-33a)
- DEC harness coupler (RC-40a)

Checking the DEC harness (communication) (twin DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:

- DEC harness coupler (RC-1, RC-2) (previous DEC unit)
- DEC harness coupler (RC-3, RC-4) (previous DEC unit)
- DEC harness coupler (RC-1) (new DEC unit)
- DEC harness coupler (RC-3) (new DEC unit)
- DEC harness coupler (RC-12)

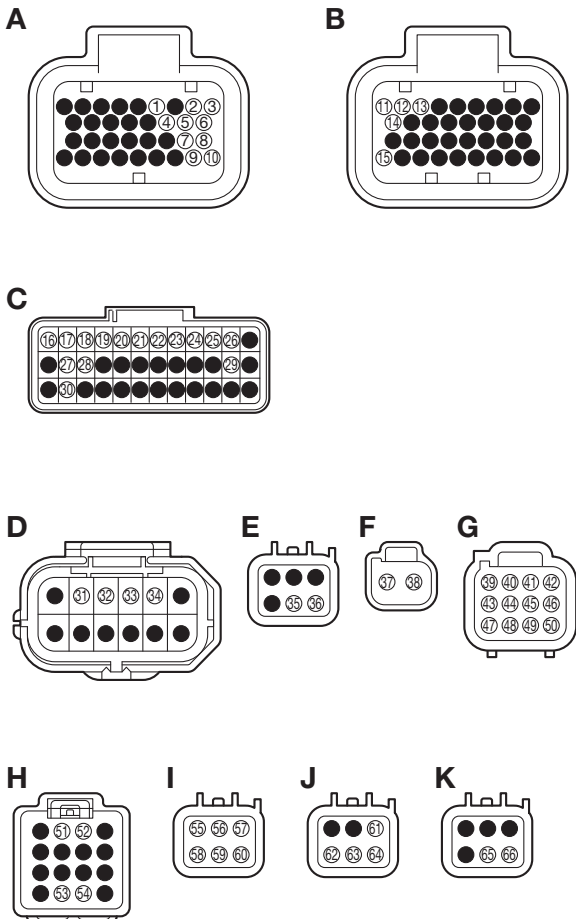
Trouble code and checking step

- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-16a)
- DEC harness coupler (RC-22a)
- DEC harness coupler (RC-32a)
- DEC harness coupler (RC-33a)
- DEC harness coupler (RC-37a)
- DEC harness coupler (RC-39a) (*1)
- DEC harness coupler (RC-40a)

(*1). Remove the joint coupler. (Except when used in triple DEC unit, quad DEC unit models)

2. Check:

- DEC harness (communication) continuity
No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC-1 or RC-3)
(previous DEC unit)
- B. DEC harness coupler (RC-2 or RC-4)
(previous DEC unit)
- C. DEC harness coupler (RC-1 or RC-3)
(new DEC unit)

- D. DEC harness coupler (RC-12)
- E. DEC harness coupler (RC-15a)
- F. DEC harness coupler (RC-16a)
- G. DEC harness coupler (RC-22a)
- H. DEC harness coupler (RC-32a or RC-33a)
- I. DEC harness coupler (RC-37a)
- J. DEC harness coupler (RC-39a)
- K. DEC harness coupler (RC-40a)

Continuity	
Terminal	Terminal
1, 25	54
2, 28	40 (*1), 44 (*2)
3, 18	52
4, 26	53
5, 24	47 (*2), 48, (*1)
6, 16	45 (*2), 46 (*1)
7, 29	49 (*2), 50 (*1)
8, 17	51
9, 27	41 (*2), 42 (*1)
10, 30	39 (*1), 43 (*2)
11 (*1), 23 (*1)	33, 37, 56 (*1), 61 (*1)
12 (*1), 20 (*1)	32, 36, 66 (*1)
13 (*1), 19 (*1)	31, 35, 65 (*1)
14, 21	55 (*2), 60, (*1)
15 (*1), 22 (*1)	34, 38, 58 (*1), 63 (*1)
57	64
59	62

(*1). Only the PORT circuit has continuity.

(*2). Only the STBD circuit has continuity.

3. Connect:

- DEC harness coupler (RC-1, RC-2) (previous DEC unit)
- DEC harness coupler (RC-3, RC-4) (previous DEC unit)
- DEC harness coupler (RC-1 or RC-3) (new DEC unit)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-16a)

- DEC harness coupler (RC-22a)
- DEC harness coupler (RC-32a)
- DEC harness coupler (RC-33a)
- DEC harness coupler (RC-37a)
- DEC harness coupler (RC-39a) (*1)
- DEC harness coupler (RC-40a)

(*1). Make sure to install the joint coupler. (Except when used in triple DEC unit, quad DEC unit models)

Checking the DEC harness (power and ground) (triple DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:

- DEC harness coupler (RC-1 to RC-4)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-24a, RC-25a)
- DEC harness coupler (RC-32a, RC-33a)
- DEC harness coupler (RC-40a)

2. Check:

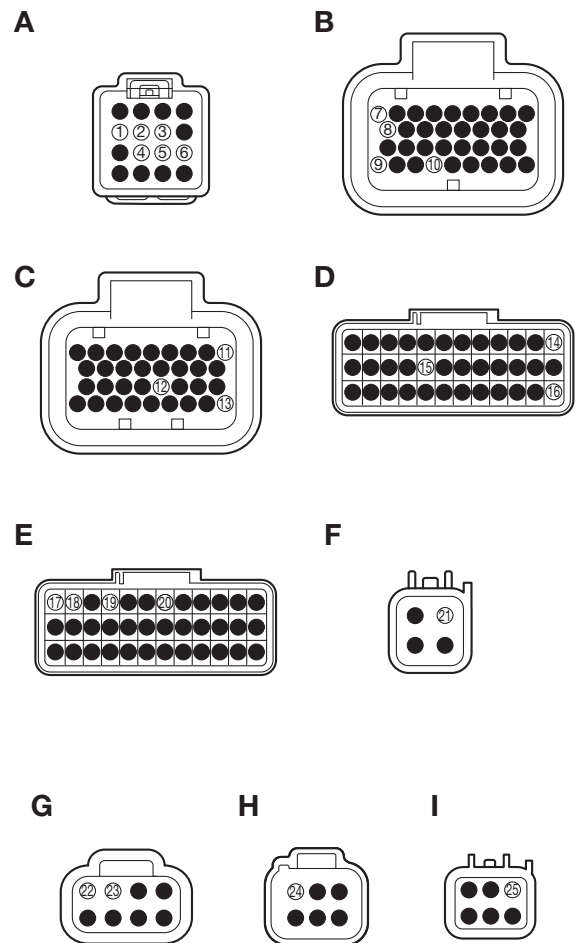
- DEC unit circuit (power and ground) continuity (PORT/STBD wire harness)
No continuity → Replace the DEC harness.
See steps 2 and 3 in “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283).

3. Disconnect:

- DEC harness coupler (RC-7, RC-8)
- DEC harness coupler (RC-20a)
- DEC harness coupler (RC-27a)
- DEC harness coupler (RC-35a)
- DEC harness coupler (RC-40b)
- DEC harness coupler (RC-42b)

4. Check:

- DEC unit circuit (power and ground) continuity (C PORT wire harness)
No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC-35a)
- B. DEC harness coupler (RC-7) (previous DEC unit)
- C. DEC harness coupler (RC-8 (previous DEC unit)
- D. DEC harness coupler (RC-9) (new DEC unit)
- E. DEC harness coupler (RC-10) (new DEC unit)
- F. DEC harness coupler (RC-20a)
- G. DEC harness coupler (RC-27a)
- H. DEC harness coupler (RC-40b)
- I. DEC harness coupler (RC-42b)

Continuity	
Terminal	Terminal
1	10, 15
2, 5	7, 11, 14, 16
3, 4, 6	9, 12, 13, 18, 19, 20, 21, 22
23	8, 17
24	25

5. Connect:
- DEC harness coupler (RC-7, RC-8)
 - DEC harness coupler (RC-20a)
 - DEC harness coupler (RC-27a)
 - DEC harness coupler (RC-35a)
 - DEC harness coupler (RC-40b)
 - DEC harness coupler (RC-42b)

Checking the DEC harness (communication) (triple DEC unit)

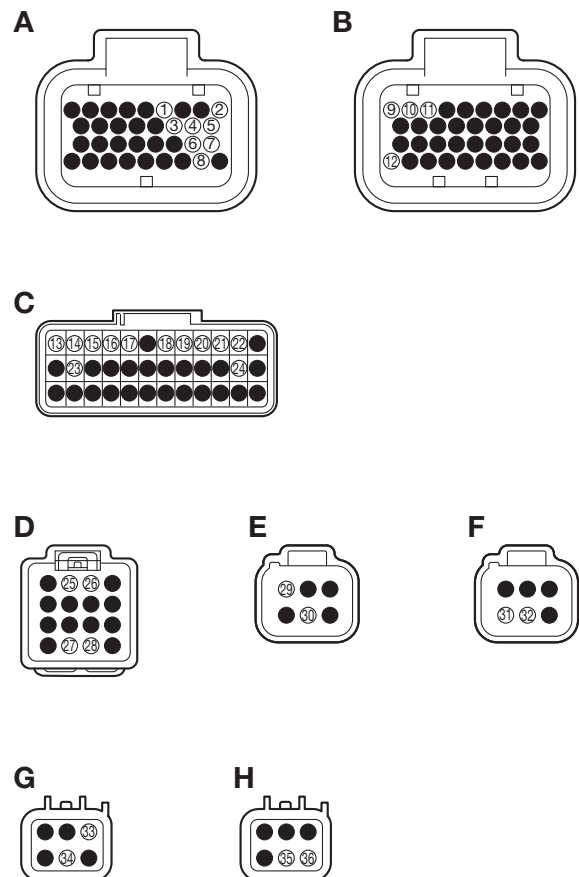
- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:
- DEC harness coupler (RC-1, RC-2) (previous DEC unit)
 - DEC harness coupler (RC-3, RC-4) (previous DEC unit)
 - DEC harness coupler (RC-1) (new DEC unit)
 - DEC harness coupler (RC-3) (new DEC unit)
 - DEC harness coupler (RC-12)
 - DEC harness coupler (RC-15a)
 - DEC harness coupler (RC-16a)
 - DEC harness coupler (RC-22a)
 - DEC harness coupler (RC-32a)
 - DEC harness coupler (RC-33a)
 - DEC harness coupler (RC-37a)
 - DEC harness coupler (RC-39a)
 - DEC harness coupler (RC-40a)
2. Check:
- DEC unit circuit (power and ground) continuity (PORT/STBD wire harness)

No continuity → Replace the DEC harness.

See steps 2 and 3 in “Checking the DEC harness (communication) (twin DEC unit)” (page 284).

3. Disconnect:
- DEC harness coupler (RC-7, RC-8) (previous DEC unit)
 - DEC harness coupler (RC-7) (new DEC unit)
 - DEC harness coupler (RC-35a)
 - DEC harness coupler (RC-39b)
 - DEC harness coupler (RC-40b)
 - DEC harness coupler (RC-41b)
 - DEC harness coupler (RC-42b)
4. Check:
- DEC unit circuit (power and ground) continuity (C PORT wire harness)
- No continuity → Replace the DEC harness.



A. DEC harness coupler (RC-7) (previous DEC unit)

- B. DEC harness coupler (RC-8) (previous DEC unit)
- C. DEC harness coupler (RC-7) (new DEC unit)
- D. DEC harness coupler (RC-35a)
- E. DEC harness coupler (RC-39b)
- F. DEC harness coupler (RC-40b)
- G. DEC harness coupler (RC-41b)
- H. DEC harness coupler (RC-42b)

Continuity	
Terminal	Terminal
1, 21	28
2, 15	26
3, 22	27
4, 20	6, 24
5, 13	8, 23
7, 14	25
9, 19	29, 33
10, 17	31, 36
11, 16	32, 35
12, 18	30, 34

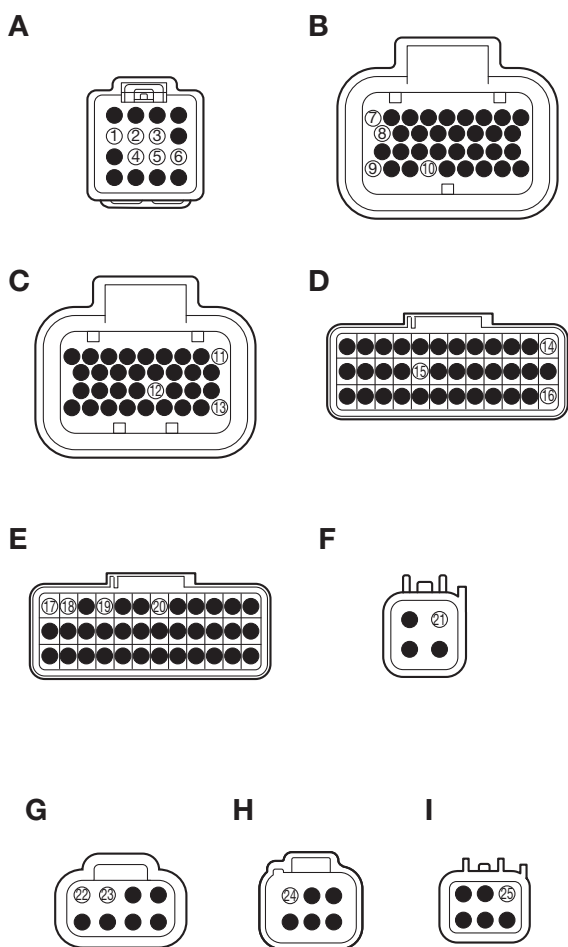
5. Connect:
 - DEC harness coupler (RC-7, RC-8) (previous DEC unit)
 - DEC harness coupler (RC-7) (new DEC unit)
 - DEC harness coupler (RC-35a)
 - DEC harness coupler (RC-39b)
 - DEC harness coupler (RC-40b)
 - DEC harness coupler (RC-41b)
 - DEC harness coupler (RC-42b)

Checking the DEC harness (power and ground) (quad DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:
 - DEC harness coupler (RC-1 to RC-4)
 - DEC harness coupler (RC-12)

- DEC harness coupler (RC-15a)
 - DEC harness coupler (RC-24a, RC-25a)
 - DEC harness coupler (RC-32a, RC-33a)
 - DEC harness coupler (RC-40a)
2. Check:
 - DEC unit circuit (power and ground) continuity (PORT/STBD wire harness)
No continuity → Replace the DEC harness.
See steps 2 and 3 in “Checking the DEC harness (power and ground) (twin DEC unit)” (page 283).
 3. Disconnect:
 - DEC harness coupler (RC-7, RC-8)
 - DEC harness coupler (RC-20a)
 - DEC harness coupler (RC-27a)
 - DEC harness coupler (RC-35a)
 - DEC harness coupler (RC-40b)
 - DEC harness coupler (RC-42b)
 4. Check:
 - DEC unit circuit (power and ground) continuity (C PORT wire harness)
No continuity → Replace the DEC harness.
See steps 3 and 4 in “Checking the DEC harness (power and ground) (triple DEC unit)” (page 286).
 5. Disconnect:
 - DEC harness coupler (RC-9, RC-10)
 - DEC harness coupler (RC-21a)
 - DEC harness coupler (RC-28a)
 - DEC harness coupler (RC-36a)
 - DEC harness coupler (RC-38a)
 - DEC harness coupler (RC-42a)
 - DEC harness coupler (RC-46a)
 6. Check:
 - DEC unit circuit (power and ground) continuity (C STBD wire harness)
No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC-36a)
- B. DEC harness coupler (RC-9) (previous DEC unit)
- C. DEC harness coupler (RC-10) (previous DEC unit)
- D. DEC harness coupler (RC-9) (new DEC unit)
- E. DEC harness coupler (RC-10) (new DEC unit)
- F. DEC harness coupler (RC-21a)
- G. DEC harness coupler (RC-28a)
- H. DEC harness coupler (RC-42a)
- I. DEC harness coupler (RC-46a)

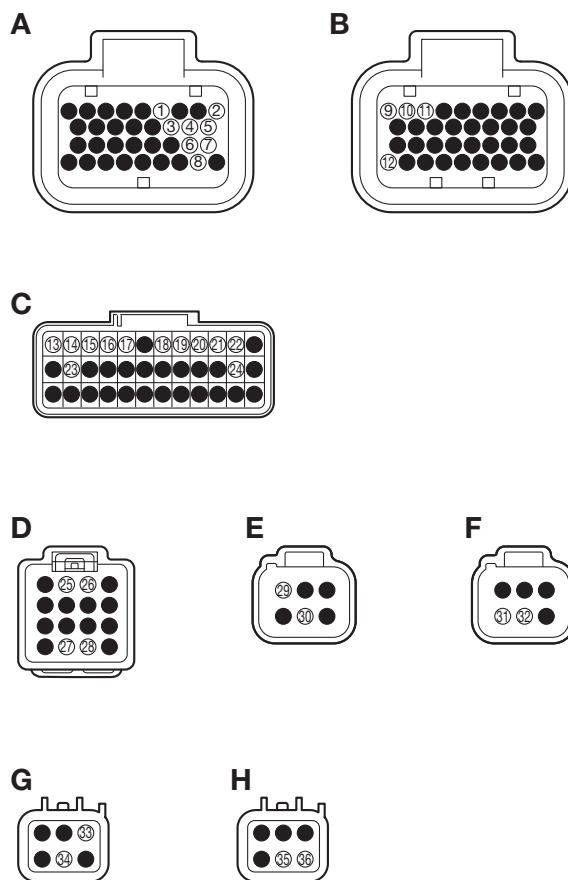
Continuity	
Terminal	Terminal
1	10, 15
2, 5	7, 11, 14, 16
3, 4, 6	9, 12, 13, 18, 19, 20, 21, 22
23	8, 17
24	25

7. Connect:
 - DEC harness coupler (RC-9, RC-10)
 - DEC harness coupler (RC-21a)
 - DEC harness coupler (RC-28a)
 - DEC harness coupler (RC-36a)
 - DEC harness coupler (RC-38a)
 - DEC harness coupler (RC-42a)
 - DEC harness coupler (RC-46a)

Checking the DEC harness (communication) (quad DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
 - Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.
1. Disconnect:
 - DEC harness coupler (RC-1, RC-2) (previous DEC unit)
 - DEC harness coupler (RC-3, RC-4) (previous DEC unit)
 - DEC harness coupler (RC-1) (new DEC unit)
 - DEC harness coupler (RC-3) (new DEC unit)
 - DEC harness coupler (RC-12)
 - DEC harness coupler (RC-15a)
 - DEC harness coupler (RC-16a)
 - DEC harness coupler (RC-22a)
 - DEC harness coupler (RC-32a)
 - DEC harness coupler (RC-33a)
 - DEC harness coupler (RC-37a)
 - DEC harness coupler (RC-39a)
 - DEC harness coupler (RC-40a)
 2. Check:

- DEC unit circuit (power and ground) continuity (PORT/STBD wire harness)
No continuity → Replace the DEC harness.
See steps 2 and 3 in “Checking the DEC harness (communication) (twin DEC unit)” (page 284).
3. Disconnect:
- DEC harness coupler (RC-7, RC-8) (previous DEC unit)
 - DEC harness coupler (RC-7) (new DEC unit)
 - DEC harness coupler (RC-35a)
 - DEC harness coupler (RC-39b)
 - DEC harness coupler (RC-40b)
 - DEC harness coupler (RC-41b)
 - DEC harness coupler (RC-42b)
4. Check:
- DEC unit circuit (power and ground) continuity (C PORT wire harness)
No continuity → Replace the DEC harness.
See steps 3 and 4 in “Checking the DEC harness (communication) (triple DEC unit)” (page 287).
5. Disconnect:
- DEC harness coupler (RC-9, RC-10) (previous DEC unit)
 - DEC harness coupler (RC-9) (new DEC unit)
 - DEC harness coupler (RC-36a)
 - DEC harness coupler (RC-41a)
 - DEC harness coupler (RC-42a)
 - DEC harness coupler (RC-45a)
 - DEC harness coupler (RC-46a)
6. Check:
- DEC unit circuit (power and ground) continuity (C STBD wire harness)
No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC-9, RC-10) (previous DEC unit)
- B. DEC harness coupler (RC-9) (new DEC unit)
- C. DEC harness coupler (RC-36a)
- D. DEC harness coupler (RC-41a)
- E. DEC harness coupler (RC-42a)
- F. DEC harness coupler (RC-45a)
- G. DEC harness coupler (RC-46a)

Continuity	
Terminal	Terminal
1, 21	28
2, 15	26
3, 22	27
4, 20	6, 24
5, 13	8, 23
7, 14	25
9, 19	29, 33
10, 17	31, 36
11, 16	32, 35
12, 18	30, 34

7. Connect:

- DEC harness coupler (RC-9, RC-10) (previous DEC unit)
- DEC harness coupler (RC-9) (new DEC unit)
- DEC harness coupler (RC-36a)
- DEC harness coupler (RC-41a)
- DEC harness coupler (RC-42a)
- DEC harness coupler (RC-45a)
- DEC harness coupler (RC-46a)

Checking the DEC harness (power and ground) (quint DEC unit)

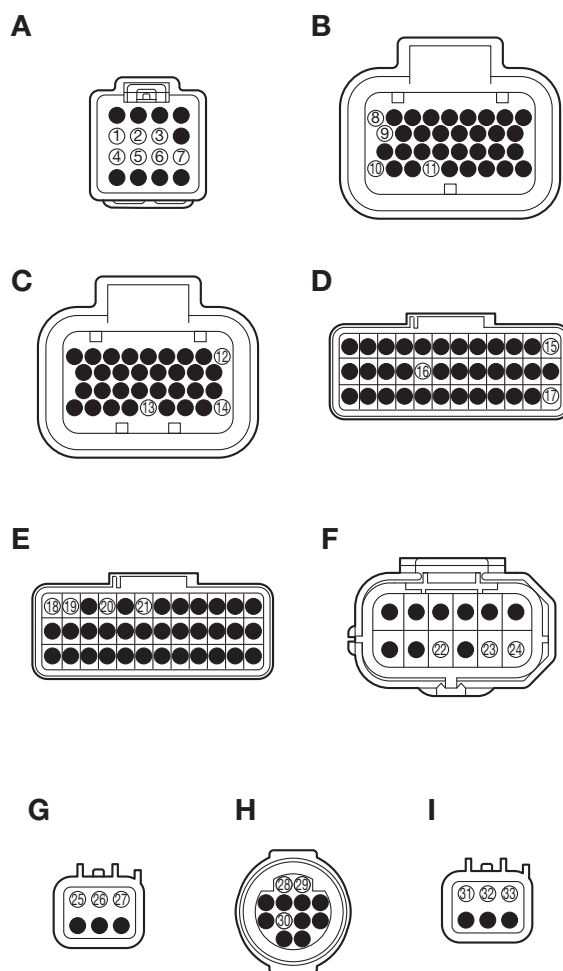
- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.

1. Disconnect:

- DEC harness coupler (RC-1 to RC-4)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-24a, RC-25a)
- DEC harness coupler (RC-32a, RC-33a)
- DEC harness coupler (RC-44a)

2. Check:

- DEC unit circuit (power and ground) continuity (PORT/STBD wire harness)
No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC-32a or RC-33a)
- B. DEC harness coupler (RC-1 or RC-3) (previous DEC unit)
- C. DEC harness coupler (RC-2 or RC-4) (previous DEC unit)
- D. DEC harness coupler (RC-1 or RC-3) (new DEC unit)
- E. DEC harness coupler (RC-2 or RC-4) (new DEC unit)
- F. DEC harness coupler (RC-12)
- G. DEC harness coupler (RC-15a)
- H. DEC harness coupler (RC-24a or RC-25a)
- I. DEC harness coupler (RC-44a)

Continuity	
Terminal	Terminal
1	11, 16
2, 6	8, 12, 15, 17, 23 (*1), 27 (*1), 33 (*1)
3, 5, 7	10, 13 (*2), 14, 19, 20, 21 (*2), 22 (*1), 26, 28 (*1), 32 (*1)
4	30
29	9, 18 (*2), 24 (*1), 25 (*1), 31 (*1)

(*1). Only the PORT circuit has continuity.

(*2). Only the STBD circuit has continuity.

3. Connect:

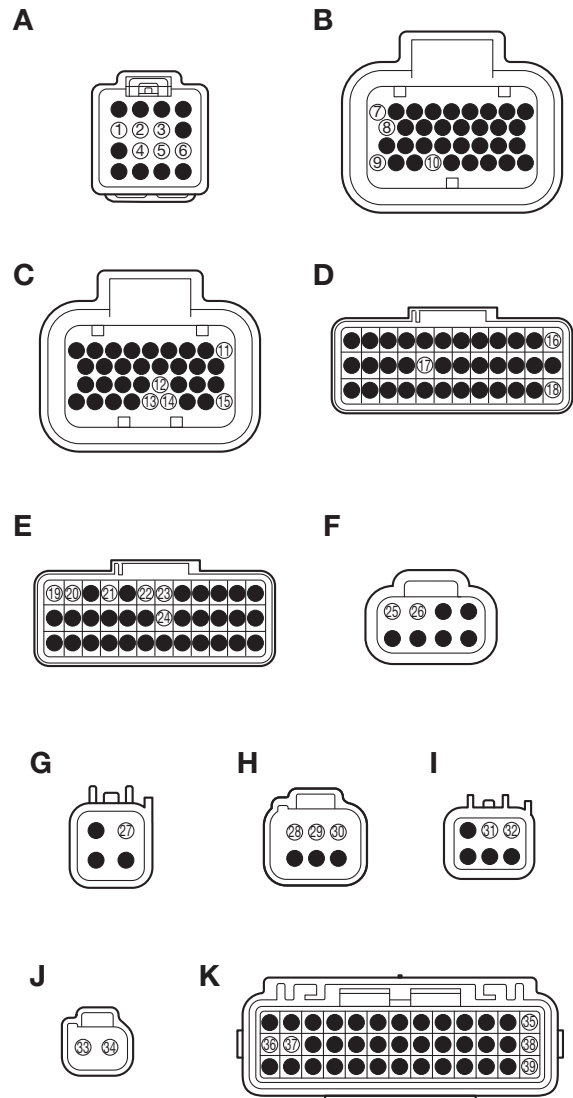
- DEC harness coupler (RC-1 to RC-4)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-24a, RC-25a)
- DEC harness coupler (RC-32a, RC-33a)
- DEC harness coupler (RC-44a)

4. Disconnect:

- DEC harness coupler (RC-5 to RC-10)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-19a to RC-21a)
- DEC harness coupler (RC-23)
- DEC harness coupler (RC-30, RC-31)
- DEC harness coupler (RC-34a to RC-35a)
- DEC harness coupler (RC-38a)
- DEC harness coupler (RC-44b)

5. Check:

- DEC unit circuit (power and ground) continuity (C PORT/CENTER/C STBD harness)
No continuity → Replace the DEC harness.



- A. DEC harness coupler (RC-34a, RC-35a, or RC-36a)
- B. DEC harness coupler (RC-5, RC-7, or RC-9) (previous DEC unit)
- C. DEC harness coupler (RC-6, RC-8, or RC-10) (previous DEC unit)
- D. DEC harness coupler (RC-5, RC-7, or RC-9) (new DEC unit)
- E. DEC harness coupler (RC-6, RC-8, or RC-10) (new DEC unit)
- F. DEC harness coupler (RC-26a, RC-27a, or RC-28a)
- G. DEC harness coupler (RC-19, RC-20, or RC-21)
- H. DEC harness coupler (RC-44b)
- I. DEC harness coupler (RC-38a)
- J. DEC harness coupler (RC-30 or RC-31)
- K. DEC harness coupler (RC-23)

Trouble code and checking step

Continuity	
Terminal	Terminal
1	10, 17
2, 5	7, 11, 16, 18
3, 4, 6	9, 12 (*1), 13 (*2), 14 (*3), 15, 20, 21, 22 (*2), 23 (*3), 24 (*1), 25, 27
26	8, 19
28	35
29	31, 38
30	32, 34, 39
33	36 or 37

(*1). Only the C PORT and the CENTER circuit have continuity.

(*2). Only the C PORT circuit has continuity.

(*3). Only the C STBD circuit has continuity.

6. Connect:

- DEC harness coupler (RC-5 to RC-10)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-19a to RC-21a)
- DEC harness coupler (RC-23)
- DEC harness coupler (RC-30, RC-31)
- DEC harness coupler (RC-34a to RC-35a)
- DEC harness coupler (RC-38a)
- DEC harness coupler (RC-44b)

Checking the DEC harness (communication) (quint DEC unit)

- RC-** in parentheses indicates the symbol assigned to the DEC harness coupler in the connecting diagram. See “Connecting diagram” (page 332).
- Different couplers must be disconnected depending on the specifications of the boat to be checked. The following steps assumes that all the couplers are connected.
- Remove the terminal resistor before checking the continuity. After the checking, make sure that the terminal resistor is installed.

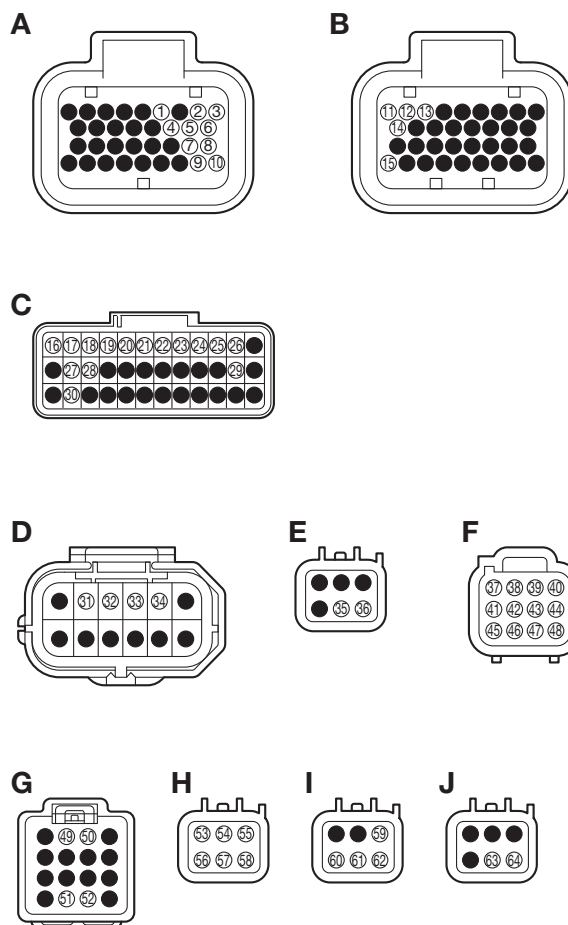
1. Disconnect:

- DEC harness coupler (RC-1, RC-2) (previous DEC unit)
- DEC harness coupler (RC-3, RC-4) (previous DEC unit)

- DEC harness coupler (RC-1) (new DEC unit)
- DEC harness coupler (RC-3) (new DEC unit)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)
- DEC harness coupler (RC-22a)
- DEC harness coupler (RC-32a)
- DEC harness coupler (RC-33a)
- DEC harness coupler (RC-37a)
- DEC harness coupler (RC-43a)
- DEC harness coupler (RC-44a)

2. Check:

- DEC unit circuit (communication) continuity (PORT/STBD wire harness)
No continuity → Replace the DEC harness.



A. DEC harness coupler (RC-1 or RC-3) (previous DEC unit)

B. DEC harness coupler (RC-2 or RC-4) (previous DEC unit)

Trouble code and checking step

- C. DEC harness coupler (RC-1 or RC-3)
(new DEC unit)
- D. DEC harness coupler (RC-12)
- E. DEC harness coupler (RC-15a)
- F. DEC harness coupler (RC-22a)
- G. DEC harness coupler (RC-32a or RC-33a)
- H. DEC harness coupler (RC-37a)
- I. DEC harness coupler (RC-43a)
- J. DEC harness coupler (RC-44a)

Continuity	
Terminal	Terminal
1, 25	52
2, 28	38 (*1), 42 (*2)
3, 18	50
4, 26	51
5, 24	45 (*2), 46, (*1)
6, 16	43 (*2), 44 (*1)
7, 29	47 (*2), 48 (*1)
8, 17	49
9, 27	39 (*2), 40 (*1)
10, 30	37 (*1), 41 (*2)
11 (*1), 23 (*1)	33, 54 (*1), 59 (*1)
12 (*1), 20 (*1)	32, 36, 64 (*1)
13 (*1), 19 (*1)	31, 35, 63 (*1)
14, 21	53 (*2), 58, (*1)
15 (*1), 22 (*1)	34, 56 (*1), 61 (*1)
55	62
57	60

(*1). Only the PORT circuit has continuity.

(*2). Only the STBD circuit has continuity.

3. Connect:

- DEC harness coupler (RC-1, RC-2) (previous DEC unit)
- DEC harness coupler (RC-3, RC-4) (previous DEC unit)
- DEC harness coupler (RC-1) (new DEC unit)
- DEC harness coupler (RC-3) (new DEC unit)
- DEC harness coupler (RC-12)
- DEC harness coupler (RC-15a)

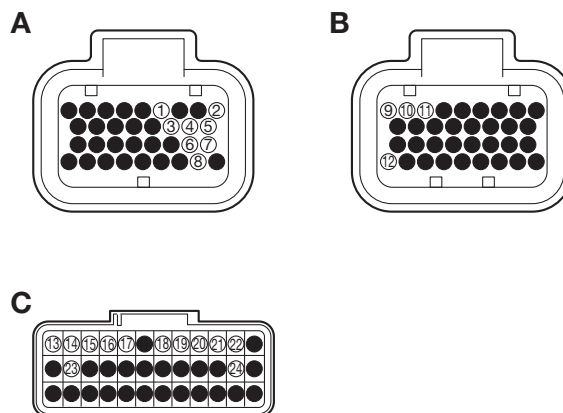
- DEC harness coupler (RC-22a)
- DEC harness coupler (RC-32a)
- DEC harness coupler (RC-33a)
- DEC harness coupler (RC-37a)
- DEC harness coupler (RC-43a)
- DEC harness coupler (RC-44a)

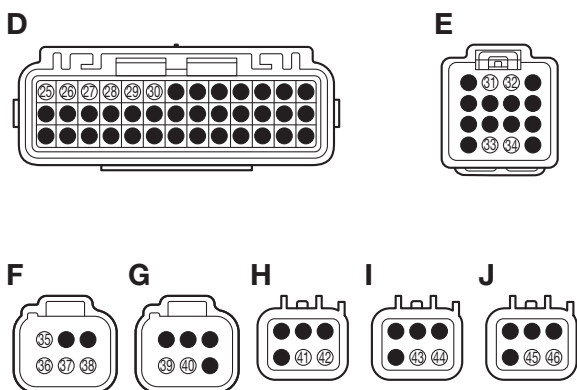
4. Disconnect:

- DEC harness coupler (RC-5, RC-6) (previous DEC unit)
 - DEC harness coupler (RC-7, RC-8) (previous DEC unit)
 - DEC harness coupler (RC-9, RC-10) (previous DEC unit)
 - DEC harness coupler (RC-5) (new DEC unit)
 - DEC harness coupler (RC-7) (new DEC unit)
 - DEC harness coupler (RC-9) (new DEC unit)
 - DEC harness coupler (RC-23)
 - DEC harness coupler (RC-34a, RC-35a, RC-36a)
 - DEC harness coupler (RC-38a)
 - DEC harness coupler (RC-43b)
 - DEC harness coupler (RC-44b)
 - DEC harness coupler (RC-65) (*1)
 - DEC harness coupler (RC-66) (*1)
- (*1). Disconnect the terminal resistor.

5. Check:

- DEC unit circuit (communication) continuity (C PORT/CENTER/C STBD harness)
No continuity → Replace the DEC harness.





- A. DEC harness coupler (RC-5, RC-7, or RC-9) (previous DEC unit)
- B. DEC harness coupler (RC-6, RC-8, or RC-10) (previous DEC unit)
- C. DEC harness coupler (RC-6, RC-8, or RC-10) (new DEC unit)
- D. DEC harness coupler (RC-23)
- E. DEC harness coupler (RC-34a, RC-35a, or RC-36a)
- F. DEC harness coupler (RC-38a)
- G. DEC harness coupler (RC-43b)
- H. DEC harness coupler (RC-44b)
- I. DEC harness coupler (RC-65)
- J. DEC harness coupler (RC-66)

Continuity	
Terminal	Terminal
1, 21	34
2, 15	32
3, 22	33
4	6
5	8
7, 14	31
9 (*1), 19 (*1)	28 (*1), 35 (*1), 38 (*1)
10, 17	25 (*1), 29 (*4), 39 (*1), 42 (*1), 44 (*4), 46 (*4)
11, 16	26 (*1), 30 (*4), 40 (*1), 41 (*1), 43 (*4), 45 (*4)
12 (*1), 18 (*1)	27 (*1), 36 (*1), 37 (*1)
13	23
20	24

- (*1). Only the CENTER circuit has continuity.
- (*2). Only the C PORT and the CENTER circuit have continuity.
- (*3). Only the C PORT circuit has continuity.
- (*4). Only the C PORT and the C STBD circuits have continuity.

6. Connect:
 - DEC harness coupler (RC-5, RC-6) (previous DEC unit)
 - DEC harness coupler (RC-7, RC-8) (previous DEC unit)
 - DEC harness coupler (RC-9, RC-10) (previous DEC unit)
 - DEC harness coupler (RC-5) (new DEC unit)
 - DEC harness coupler (RC-7) (new DEC unit)
 - DEC harness coupler (RC-9) (new DEC unit)
 - DEC harness coupler (RC-23)
 - DEC harness coupler (RC-34a, RC-35a, RC-36a)
 - DEC harness coupler (RC-38a)
 - DEC harness coupler (RC-43b)

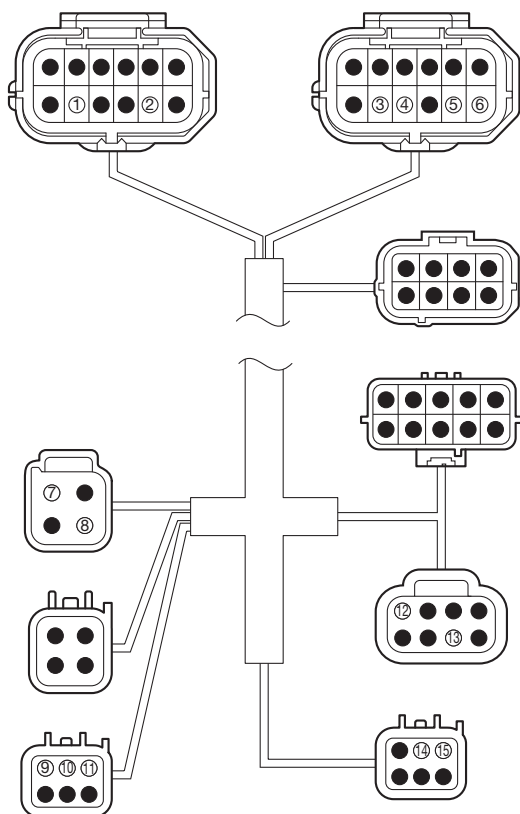
Trouble code and checking step

- DEC harness coupler (RC-44b)
 - DEC harness coupler (RC-65) (*1)
 - DEC harness coupler (RC-66) (*1)
- (*1). Connect the terminal resistor.

Checking the DEC harness (2nd station/single)

1. Disconnect:
 - DEC harness (2nd station/single) (Part No.: 6X9-82580-J*)
2. Check:
 - DEC harness (2nd station/single) continuity (power and ground)

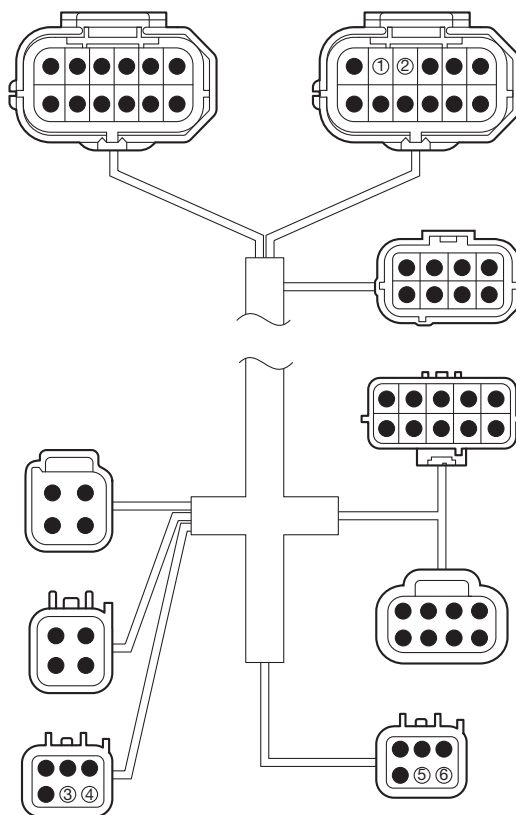
No continuity → Replace the DEC harness (2nd station/single).



Continuity	
Terminal	Terminal
1	2, 3, 4, 8, 10, 13, 14
5	7, 11
6	9, 12, 15

3. Check:
 - DEC harness (2nd station/single) continuity (communication)

No continuity → Replace the DEC harness (2nd station/single).



Continuity	
Terminal	Terminal
1	3, 5
2	4, 6

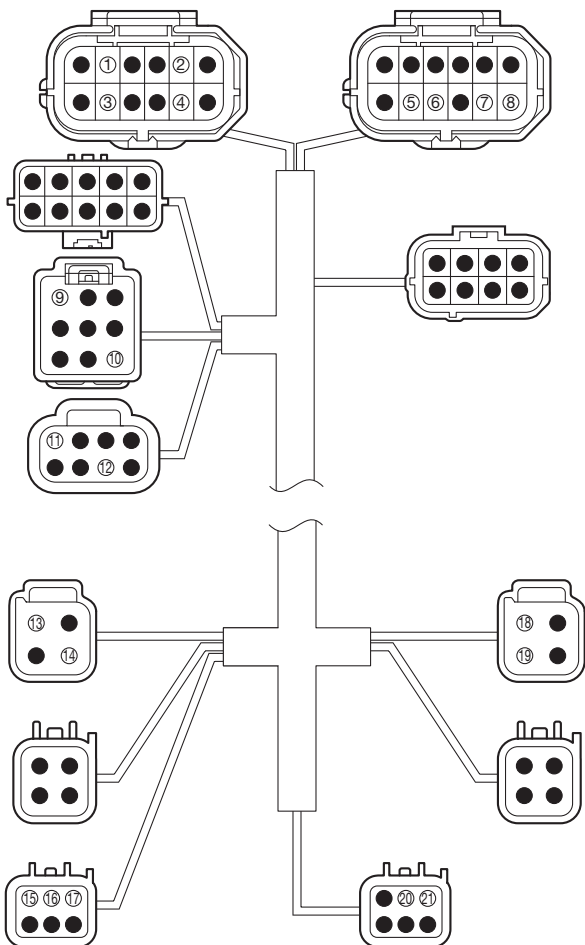
4. Connect:
 - DEC harness (2nd station/single)

Checking the DEC harness (2nd station/multi)

1. Disconnect:
 - DEC harness (2nd station/multi) (Part No.: 6X9-82580-K*)
2. Check:
 - DEC harness (2nd station/twin) continuity (power and ground)

Trouble code and checking step

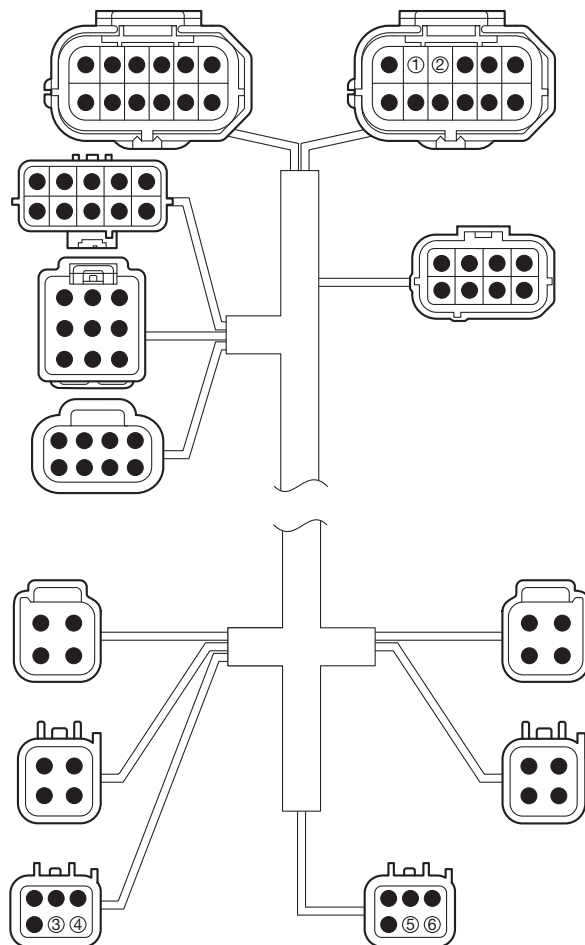
No continuity → Replace the DEC harness
(2nd station/twin).



Continuity	
Terminal	Terminal
1	2, 3, 4, 5, 6, 10, 14, 16, 20
7	13, 17
8	9, 15, 21
11	19
12	18

3. Check:
- DEC harness (2nd station/twin) continuity (communication)

No continuity → Replace the DEC harness
(2nd station/twin).



Continuity	
Terminal	Terminal
1	3, 5
2	4, 6

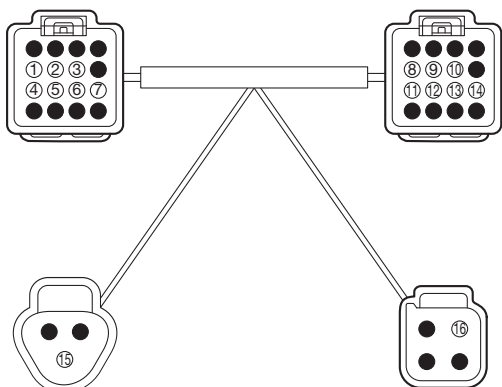
4. Connect:
- DEC harness (2nd station/twin)

Checking the split harness (SCU)

1. Disconnect:
 - Split harness (SCU)
(Part No.: 6X9-8258A-9*)
2. Check:
 - Split harness (SCU) continuity (power and ground)

Trouble code and checking step

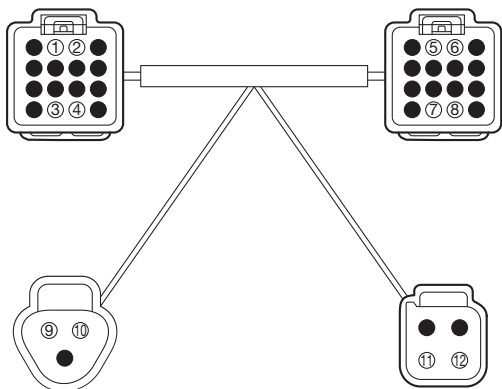
No continuity → Replace the split harness (SCU).



Continuity	
Terminal	Terminal
1	8, 15, 16
2	9
3	10
4	11
5	12
6	13
7	14

3. Check:

- Split harness (SCU) continuity (communication)
- No continuity → Replace the split harness (SCU).



Continuity	
Terminal	Terminal
1	5, 9
2	6, 10
3	7, 12
4	8, 11

4. Connect:

- Split harness (SCU)

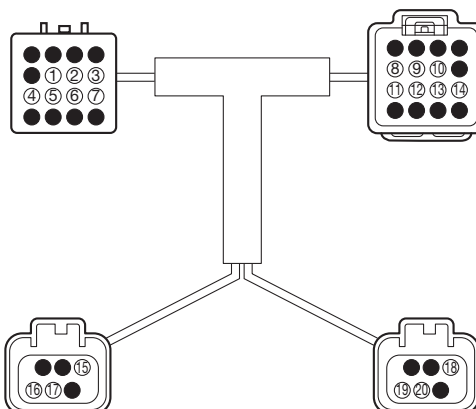
Checking the helm harness (Main/Single)

1. Disconnect:

- Helm harness (Main/Single)
(Part No.: 6GR-8258A-0*/4*)

2. Check:

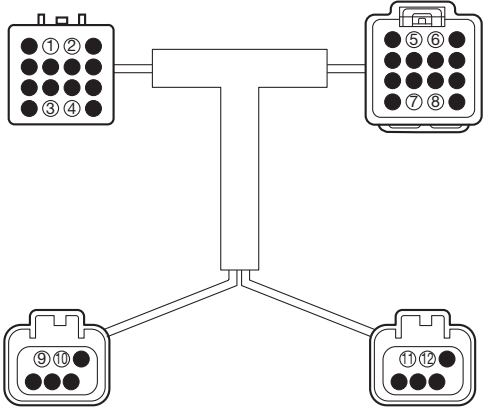
- Helm harness (Main/Single) continuity (power and ground)
- No continuity → Replace the helm harness (Main/Single).



Continuity	
Terminal	Terminal
1	10, 16
2	9, 15
3	8, 17, 20
4	14
5	13, 18
6	12, 19
7	11

Trouble code and checking step

3. Check:
- Helm harness (Main/Single) continuity (communication)
No continuity → Replace the helm harness (Main/Single).



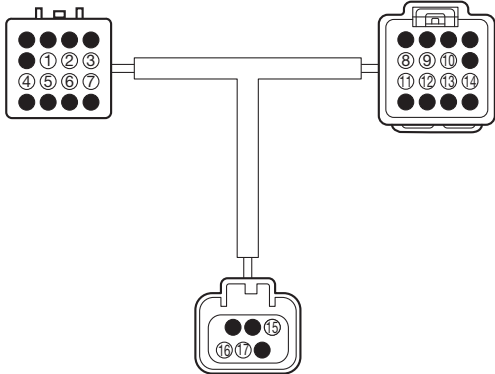
Continuity	
Terminal	Terminal
1	6, 9
2	5, 10
3	8, 11
4	7, 12

4. Connect:
- Helm harness (Main/Single)

Checking the helm harness (Main/Multi)

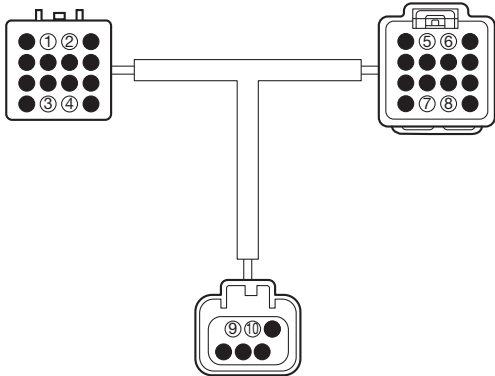
1. Disconnect:
 - Helm harness (Main/Multi) (Part No.: 6GR-8258A-1*/5*/6*)
2. Check:
 - Helm harness (Main/Multi) continuity (power and ground)

No continuity → Replace the helm harness (Main/Multi).



Continuity	
Terminal	Terminal
1	10, 16
2	9, 15
3	8, 17
4	14
5	13
6	12
7	11

3. Check:
- Helm harness (Main/Multi) continuity (communication)
No continuity → Replace the helm harness (Main/Multi).



Trouble code and checking step

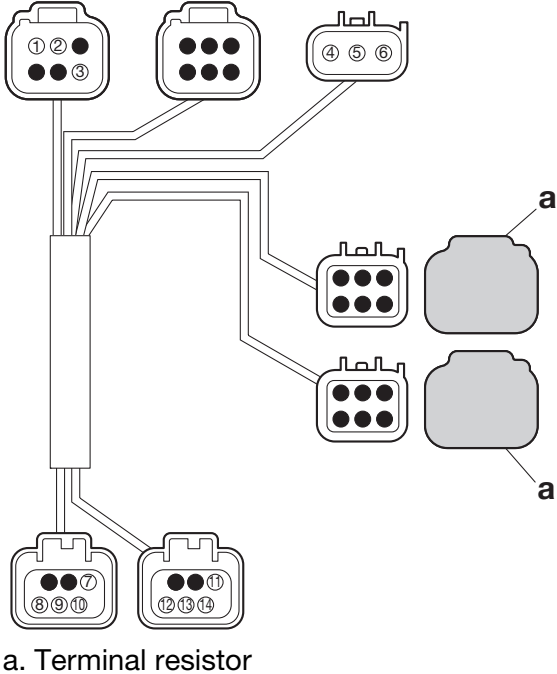
Continuity	
Terminal	Terminal
1	6, 9
2	5, 10
3	8
4	7

4. Connect:
- Helm harness (Main/Multi)

Checking the helm harness (2nd station)

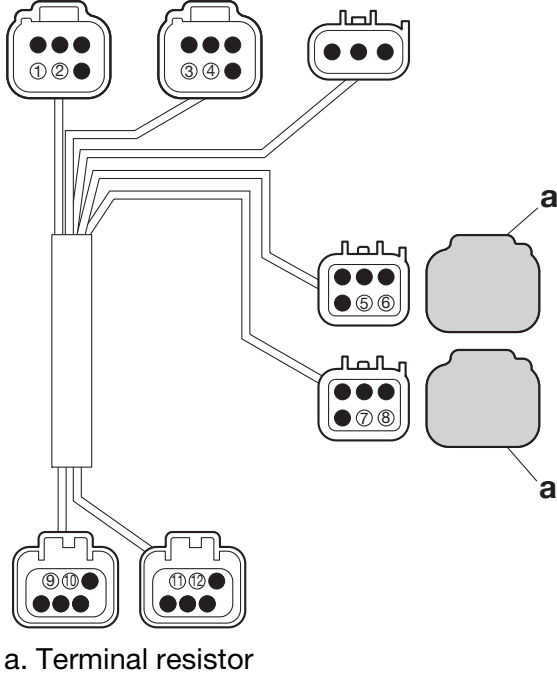
Remove the terminal resistor before checking the continuity. After the checking, make sure that the terminal resistor is installed.

1. Disconnect:
- Helm harness (2nd station) (Part No.: 6X9-8258A-B*)
2. Check:
- Helm harness (2nd station) continuity (power and ground)
- No continuity → Replace the helm harness (2nd station).



Continuity	
Terminal	Terminal
1	8, 10 or 12, 14
2	9 or 13
3	7 or 11
4	7 or 11
5	8, 10 or 12, 14
6	9 or 13

3. Check:
- Helm harness (2nd station) continuity (communication)
- No continuity → Replace the helm harness (2nd station).



a. Terminal resistor

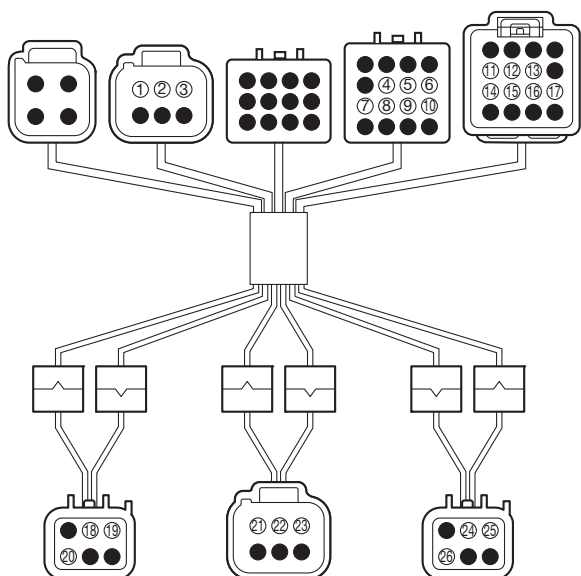
Continuity	
Terminal	Terminal
1	6, 10 or 8, 12
2	5, 9 or 7, 11
3	6, 10 or 8, 12
4	5, 9 or 7, 11

4. Connect:
- Helm harness (2nd station)

Checking the 2nd helm harness (Port)

Remove the terminal resistor before checking the continuity. After the checking, make sure that the terminal resistor is installed.

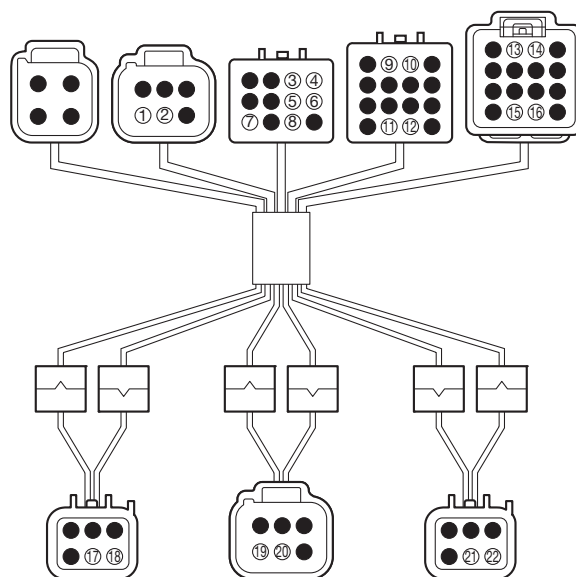
1. Disconnect:
 - 2nd helm harness (Port)
(Part No.: 6X9-8258A-0*/1*/2*)
2. Check:
 - 2nd helm harness (Port) continuity (power and ground)
No continuity → Replace the 2nd helm harness (Port).



Continuity	
Terminal	Terminal
1	21
2	22
3	23
4	13, 19, 25
5	12, 20, 26
6	11, 18, 24
7	17
8	16
9	15
10	14

3. Check:
 - 2nd helm harness (Port) continuity (communication)

No continuity → Replace the 2nd helm harness (Port).



Continuity	
Terminal	Terminal
1	19
2	20
3	17 or 21
4	18 or 22
5	17 or 21
6	18 or 22
7	8
9	14
10	13
11	16
12	15

4. Connect:
 - 2nd helm harness (Port)

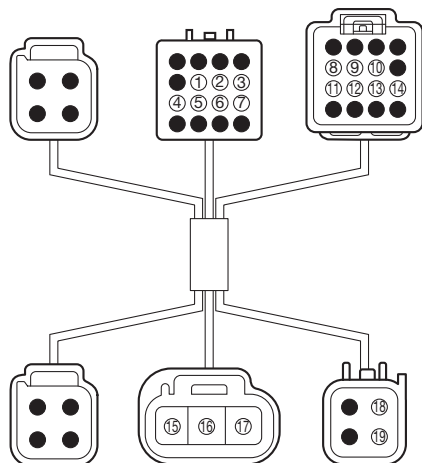
Checking the 2nd helm harness (Stbd)

Remove the waterproof cap before checking the continuity. After the checking, make sure that the waterproof cap is installed.

1. Disconnect:
 - 2nd helm harness (Stbd)
(Part No.: 6X9-8258A-3*/4*/5*)
2. Check:

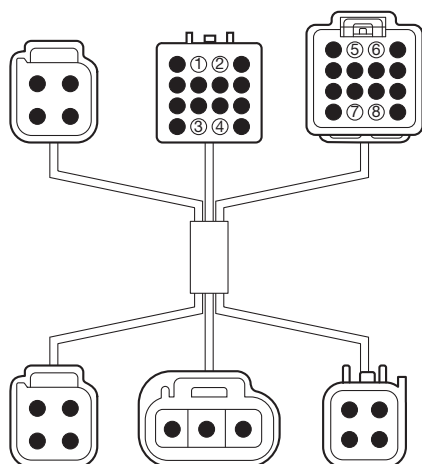
Trouble code and checking step

- 2nd helm harness (Stbd) continuity (power and ground)
No continuity → Replace the 2nd helm harness (Stbd).



Continuity	
Terminal	Terminal
1	10, 16, 18
2	9, 17
3	8, 15, 19
4	14
5	13
6	12
7	11

3. Check:
 - 2nd helm harness (Stbd) continuity (communication)
No continuity → Replace the 2nd helm harness (Stbd).

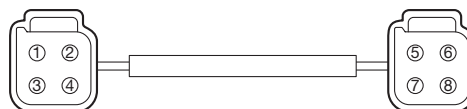


Continuity	
Terminal	Terminal
1	6
2	5
3	8
4	7

4. Connect:
 - 2nd helm harness (Stbd)

Checking the pigtail bus wire

1. Disconnect:
 - Pigtail bus wire
(Part No.: 6Y8-82521-**)
2. Check:
 - Pigtail bus wire continuity
No continuity → Replace the pigtail bus wire.



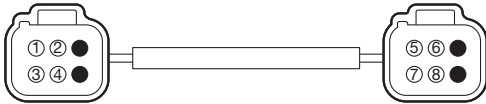
Continuity	
Terminal	Terminal
1	5
2	6
3	7
4	8

3. Connect:
 - Pigtail bus wire

Checking the main bus wire

1. Disconnect:
 - Main bus wire
(Part No.: 6Y8-82553-**)
2. Check:
 - Main bus wire continuity

No continuity → Replace the main bus wire.



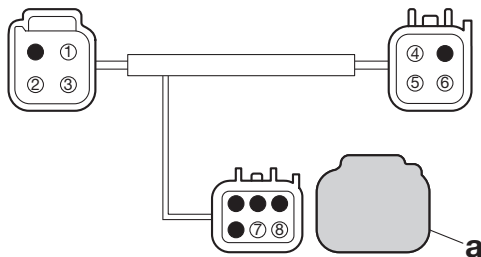
Continuity	
Terminal	Terminal
1	5
2	6
3	7
4	8

3. Connect:
- Main bus wire

Checking the SCU link harness (Port/Stbd)

Remove the terminal resistor before checking the continuity. After the checking, make sure that the terminal resistor is installed.

1. Disconnect:
 - SCU link harness (Port/Stbd)
(Part No.: 6X9-81115-0*/6GR-81115-0*/1*)
2. Check:
 - SCU link harness (Port/Stbd) continuity
No continuity → Replace the SCU link harness (Port/Stbd).



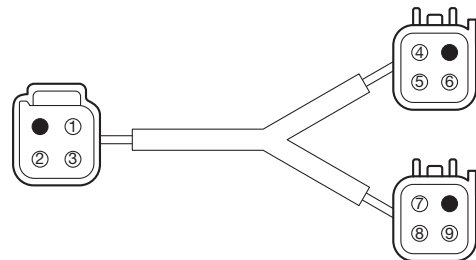
a. Terminal resistor

Continuity	
Terminal	Terminal
1	4
2	6, 8
3	5, 7

3. Connect:
- SCU link harness (Port/Stbd)

Checking the SCU link harness (Center)

1. Disconnect:
 - SCU link harness (Center)
(Part No.: 6X9-81115-1*/6GR-81115-2*/3*)
2. Check:
 - SCU link harness (Center) continuity
No continuity → Replace the SCU link harness (Center).



Continuity	
Terminal	Terminal
1	4, 7
2	6, 9
3	5, 8

3. Connect:
- SCU link harness (Center)

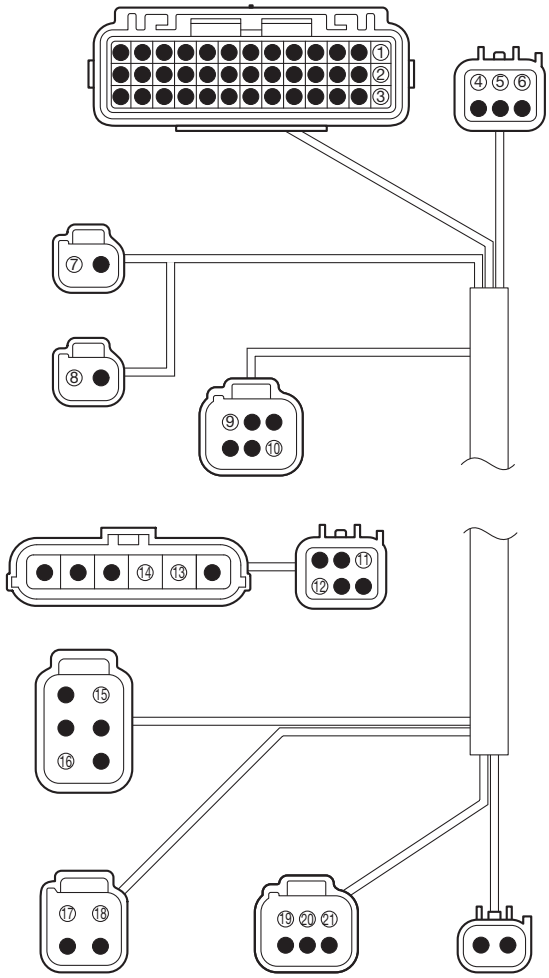
Checking the BCU harness (main station) (except quint DEC unit)

Remove the waterproof cap before checking the continuity. After the checking, make sure that the waterproof cap is installed.

1. Disconnect:
 - BCU harness (main station)
(Part No.: 6X9-82386-0*)

Trouble code and checking step

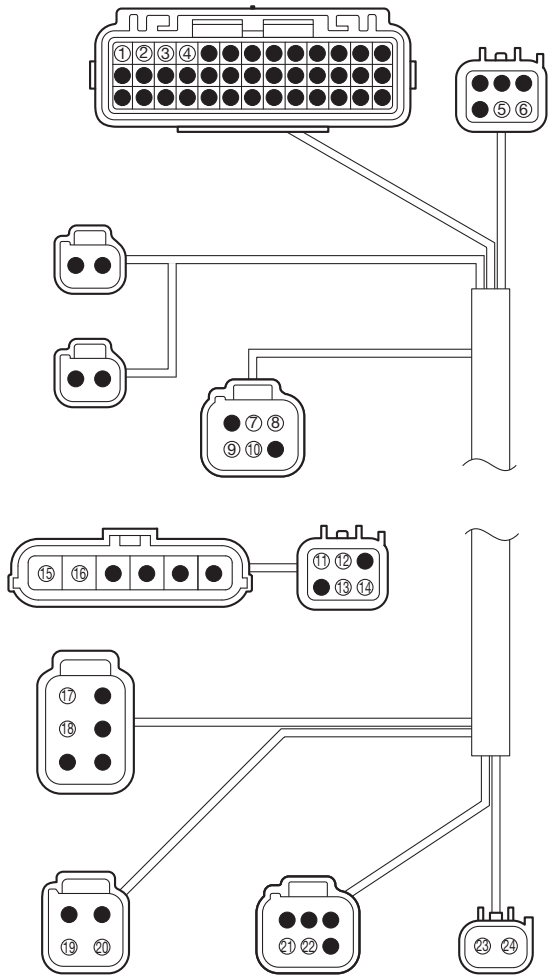
2. Check:
- BCU harness (main station) continuity (power and ground)
- No continuity → Replace the BCU harness (main station).



Continuity	
Terminal	Terminal
1	6, 19
2	5, 10, 16, 17, 20
3	4, 7, 8, 9, 15, 18, 21
11	13
12	14

3. Check:
- BCU harness (main station) continuity (communication)

No continuity → Replace the BCU harness (main station).



Continuity	
Terminal	Terminal
1	6, 10, 17, 20
2	5, 9, 18, 19
3	23
4	24
7	22
8	21
11	13, 16
12	14, 15

4. Connect:
- BCU harness (main station)

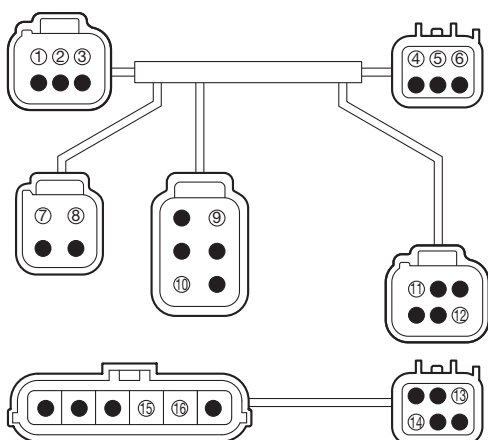
Trouble code and checking step

Checking the BCU harness (main station) (quint DEC unit)

Remove the waterproof cap before checking the continuity. After the checking, make sure that the waterproof cap is installed.

1. Disconnect:
 - BCU harness (main station)
(Part No.: 6X9-82386-2*)
2. Check:
 - BCU harness (main station) continuity (power and ground)

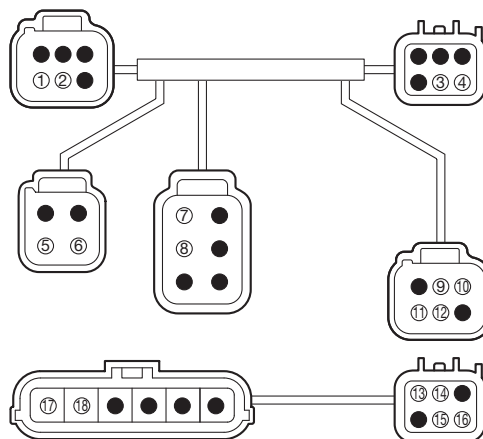
No continuity → Replace the BCU harness (main station).



Continuity	
Terminal	Terminal
1	6
2	5, 7, 10, 12
3	4, 8, 9, 11
13	16
14	15

3. Check:
 - BCU harness (main station) continuity (communication)

No continuity → Replace the BCU harness (main station).



Continuity	
Terminal	Terminal
1	10
2	9
3	5, 8, 11
4	6, 7, 12
13	15, 18
14	16, 17

4. Connect:
 - BCU harness (main station)

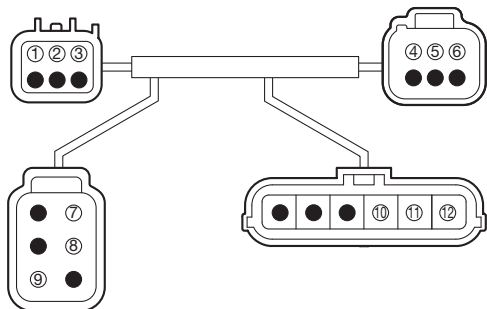
Checking the BCU harness (2nd station)

Remove the waterproof cap before checking the continuity. After the checking, make sure that the waterproof cap is installed.

1. Disconnect:
 - BCU harness (2nd station)
(Part No.: 6X9-82386-1*)
2. Check:
 - BCU harness (2nd station) continuity (power and ground)

Trouble code and checking step

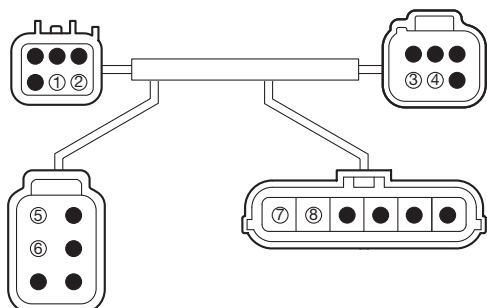
No continuity → Replace the BCU harness (2nd station).



Continuity	
Terminal	Terminal
1	6, 7, 11
2	5, 8, 9, 10, 12
3	4

3. Check:

- BCU harness (2nd station) continuity (communication)
No continuity → Replace the BCU harness (2nd station).



Continuity	
Terminal	Terminal
1	4, 6, 7
2	3, 5, 8

4. Connect:

- BCU harness (2nd station)

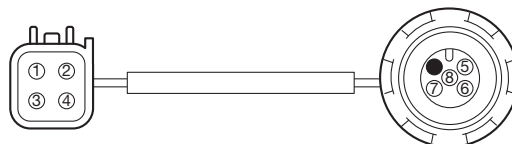
Checking the conversion harness (GPS/heading sensor/MFD)

1. Disconnect:

- Conversion harness (GPS/heading sensor/MFD)
(Part No.: 6YM-83553-0*/1*)

2. Check:

- Conversion harness (GPS/heading sensor/MFD) continuity
No continuity → Replace the conversion harness (GPS/heading sensor/MFD).



Continuity	
Terminal	Terminal
1	5
2	6
3	7
4	8

3. Connect:

- Conversion harness (GPS/heading sensor/MFD)

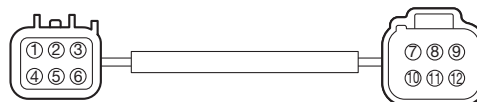
Checking the BCU harness extension

1. Disconnect:

- BCU harness extension
(Part No.: 6X9-82521-0*/1*)

2. Check:

- BCU harness extension continuity
No continuity → Replace the BCU harness extension.



Trouble code and checking step

Continuity	
Terminal	Terminal
1	9
2	8
3	7
4	12
5	11
6	10

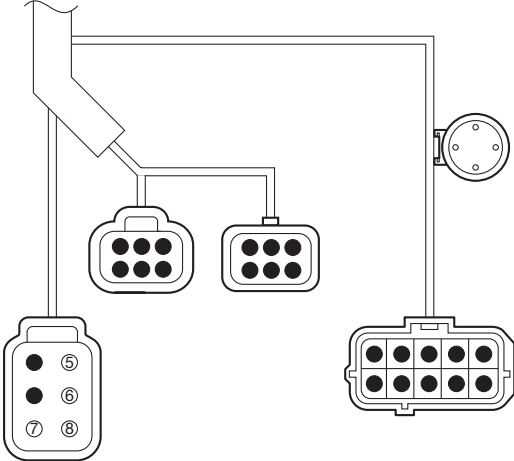
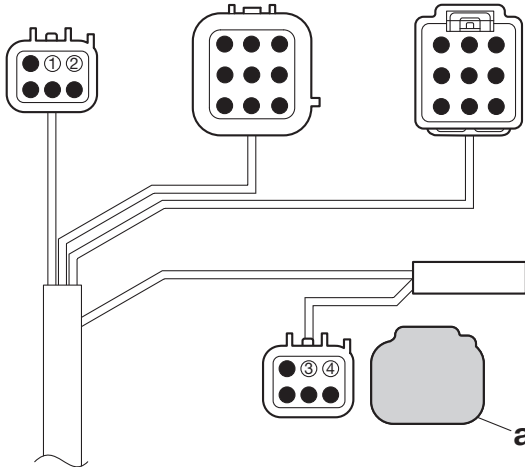
- 3. Connect:
 - BCU harness extension

Checking the aux joystick harness

Remove the terminal resistor before checking the continuity. After the checking, make sure that the terminal resistor is installed.

- 1. Disconnect:
 - Aux joystick harness (Part No.: 6X9-82580-G*)
- 2. Check:
 - Aux joystick harness continuity (power and ground)

No continuity → Replace the aux joystick harness.



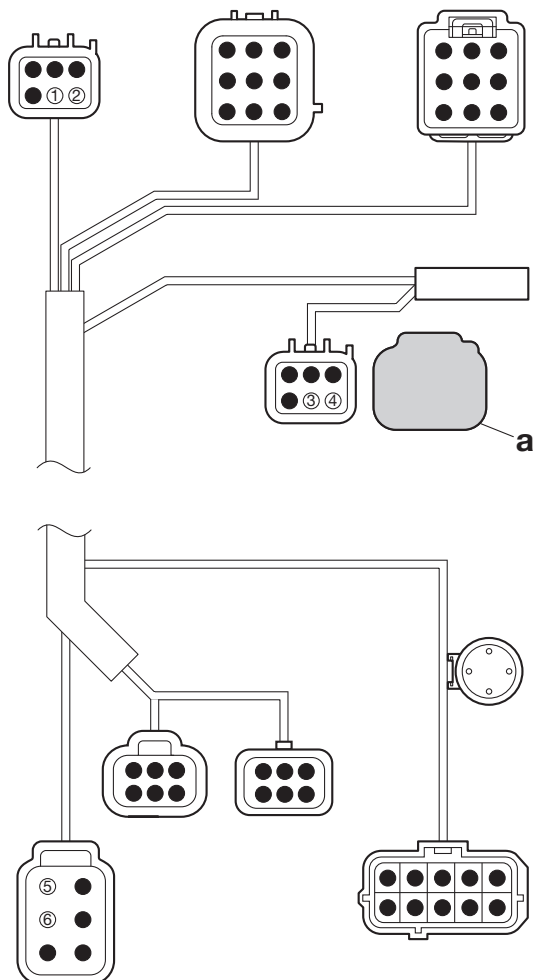
a. Terminal resistor

Continuity	
Terminal	Terminal
1	3, 6, 7, 8
2	4, 5

- 3. Check:
 - Aux joystick harness continuity (communication)

Trouble code and checking step

No continuity → Replace the aux joystick harness.



a. Terminal resistor

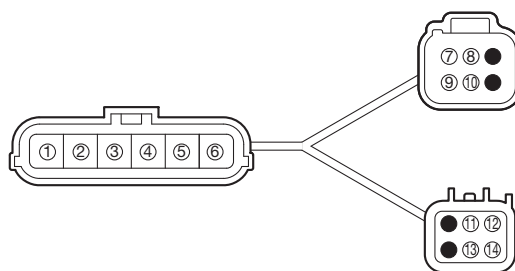
Continuity	
Terminal	Terminal
1	3, 6
2	4, 5

4. Connect:
- Aux joystick harness

Checking the autopilot panel harness

1. Disconnect:
 - Autopilot panel harness (Part No.: 6X9-83553-9*)
2. Check:
 - Autopilot panel harness continuity

No continuity → Replace the autopilot panel harness.

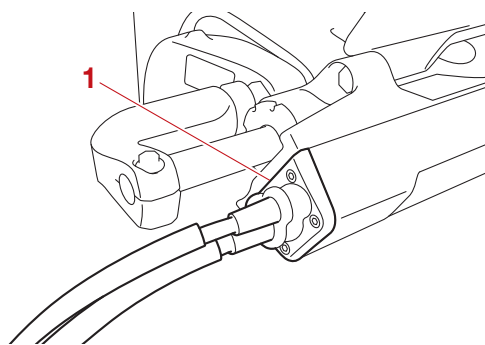


Continuity	
Terminal	Terminal
1	10, 13
2	9, 14
3	4, 6, 8, 11
5	7, 12

3. Connect:
- Autopilot panel harness

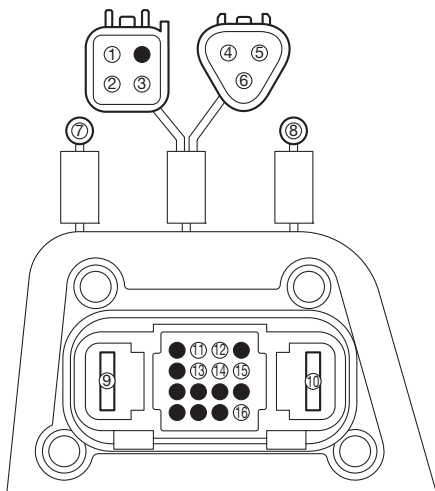
Checking the steering actuator harness

1. Disconnect:
 - Steering actuator coupler "1" (Part No.: 6X9-438A0-**) (indicated by red arrow 1 in the diagram)



2. Check:
 - Steering actuator harness continuity

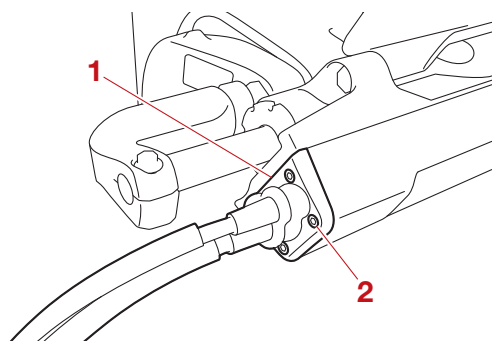
No continuity → Replace the steering actuator harness.




Continuity	
Terminal	Terminal
1	16
2	13
3	11
4	12
5	14
6	15
7	9
8	10

3. Connect:

- Steering actuator coupler “1”



 Steering actuator coupler bolt “2”
2.3 N·m (0.23 kgf·m, 1.7 lb·ft)

4. Connect:

- All of the disconnected couplers

Checking the single-hub

1. Disconnect:

- Single-hub
(Part No.: 6Y8-81920-1*)

2. Check:

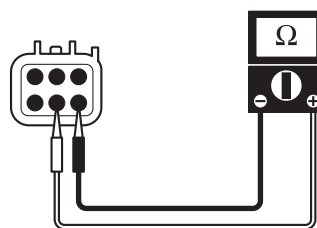
- Single-hub continuity
No continuity → Replace the single-hub.




Continuity	
Terminal	Terminal
1	6
2	5
3	8
4	7

3. Measure:

- Resistance
Out of specification → Replace the single-hub.



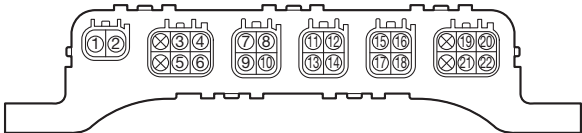
 Resistance
114–126 Ω
Terminal 1–Terminal 2

4. Connect:

- Single-hub

Checking the multi-hub

- 1. Disconnect:
 - Multi-hub
(Part No.: 6Y8-81920-0*)
- 2. Check:
 - Multi-hub continuity
No continuity → Replace the multi-hub.

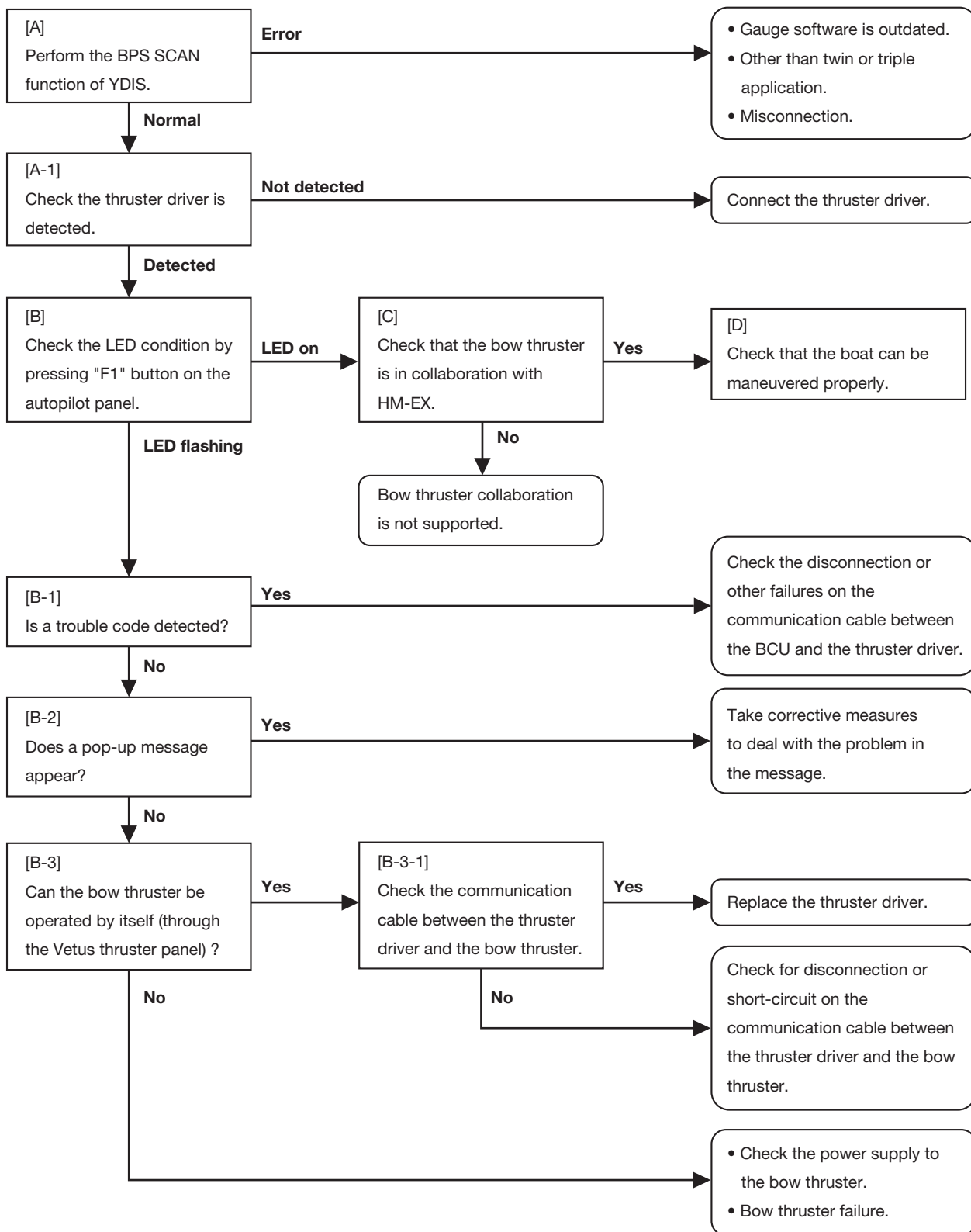


Continuity	
Terminal	Terminal
1	4, 7, 11, 15, 20
2	3, 8, 12, 16, 19
5	10, 14, 18, 21
6	9, 13, 17, 22

- 3. Connect:
 - Multi-hub

Helm master EX troubleshooting (trouble code not detected)

Troubleshooting chart for bow thruster



Troubleshooting the bow thruster

As for the troubleshooting of the Vetus product, refer to the documents of the Vetus product.

Item [A]

1. Check for errors in the system configuration using the BPS SCAN function of YDIS.
 - **Normal (No error message is shown)**
 - Go to item [A-1].
 - **An error message is shown**
 - Update the gauge software.
 - Check the outboard motor application. (Only twin and triple engine applications are supported by MY23 model.)

Item [A-1]

1. Check the thruster driver is detected.
 - **Detected**
 - Go to item [B].
 - **Not detected**
 - Check that the thruster driver is connected.
 - Check the connection between the thruster driver and the BC-CAN communication cable.
 - Replace the thruster driver.

Item [B]

1. Check the LED condition by pressing “F1” button on the autopilot panel.
 - **LED on**
 - Go to item [C]. (The system is working normally.)

TIP: _____

- Enabling the bow thruster collaboration function while operating through the Vetus thruster panel will result in the cancellation of operation privilege given to the Vetus thruster panel.
 - Activating the Vetus thruster panel while the bow thruster collaboration function is effective will result in the cancellation of the bow thruster collaboration.
-

- **LED flashing**

- Go to item [B-1].

- <The requirements for the approval of bow thruster collaboration>

- BCU version is MY23.
 - Twin or triple engine application.
 - Normal communication is established between the BCU and the thruster driver.
 - Normal communication is established between the thruster driver and the bow thruster.
 - The bow thruster works normally.
 - The “Bow Thruster Direction” item has already been set in the “Technician Settings” screen.

Item [B-1]

1. Check if Trouble code 598 is detected.
 - **Trouble code 598 is detected.**
 - Check that the pigtail bus wire length is 0.9 m (3 ft) or less.
 - Perform troubleshooting for Trouble code 598.
 - **Trouble code is not detected.**
 - Go to item [B-2].

Item [B-2]

1. Check if the pop-up message “thruster collaboration is not available under the current conditions.” is shown on the display.
 - **A pop-up message appears on the display.**
 - Go to next step.

TIP: _____

The bow thruster collaboration function cannot be activated while a warning exists on the bow thruster (e.g., Overheat, Overcurrent, Low Voltage, High Voltage, and Communication Lost). If Vetus thruster panel is active, turn off the Vetus thruster panel and check if the bow thruster collaboration can be activated. If it cannot be activated, check the status of the bow thruster system.

Thruster collaboration is not available under the current conditions.

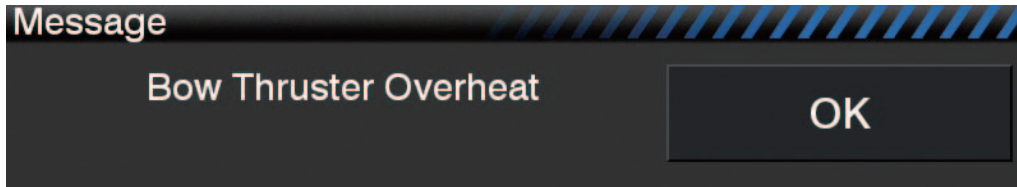
- **No pop-up message appears on the display.**
 - Check that the thruster driver is connected to the “Extra Device” coupler (blue/6 pin).
2. Check if the bow thruster warning pop-up message (Overheat, Overcurrent, Low Voltage, High Voltage, or Communication Lost) was displayed.
 - **The warning pop-up message of the bow thruster was not displayed.**
 - Go to next step.
 - **The warning pop-up message of the bow thruster was displayed.**
 - Go to step 4.
 3. Check that the thruster battery voltage is correctly indicated on the display.
 - **The thruster battery voltage is correctly indicated.**
 - Check the bow thruster installation direction.

TIP: _____

Check that the bow thruster direction setting on the “Technician Settings” screen agrees with the actual installation direction. See “Change bow thruster direction” (page 234).

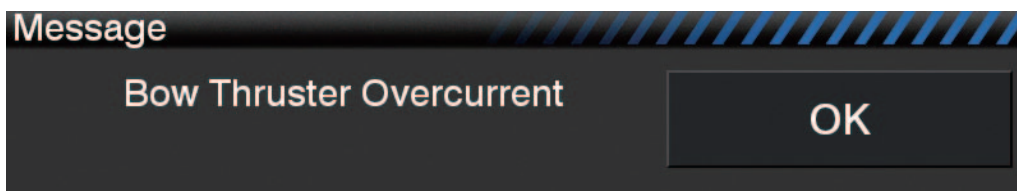
- **The thruster battery voltage is not indicated.**
 - Go to item [B-3].

4. Check the displayed bow thruster warning pop-up message.
 - **“Bow Thruster Overheat” pop-up message displayed.**
 - The bow thruster has detected overheat. The collaboration function cannot be used until the warning is resolved. (Please refer to the documents of the Vetus product.)



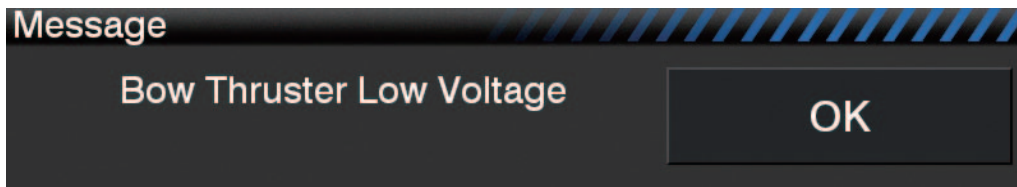
- **The pop-up message other than “Bow Thruster Overheat” was displayed.**
 - Go to next step.

5. Check the displayed bow thruster warning pop-up message.
 - **“Bow Thruster Overcurrent” pop-up message displayed.**
 - The bow thruster has detected overcurrent or overload. The collaboration function cannot be used until the warning is resolved. (Please refer to the documents of the Vetus product.)



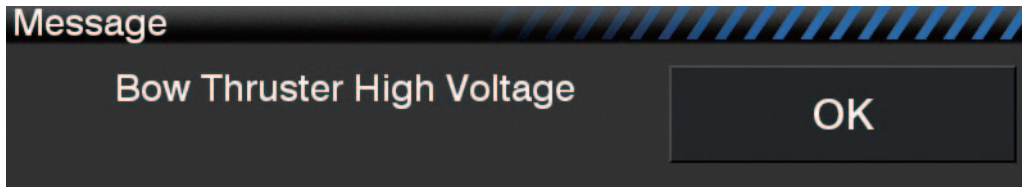
- **The pop-up message other than “Bow Thruster Overcurrent” was displayed.**
 - Go to next step.

6. Check the displayed bow thruster warning pop-up message.
 - **“Bow Thruster Low Voltage” pop-up message displayed.**
 - The bow thruster has detected low voltage. The collaboration function cannot be used until the warning is resolved. (Please refer to the documents of the Vetus product.)



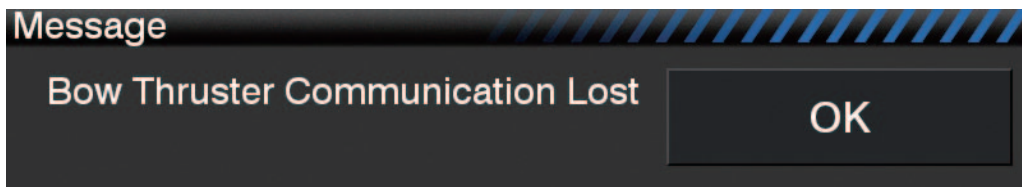
- **The pop-up message other than “Bow Thruster Low Voltage” was displayed.**
 - Go to next step.

7. Check the displayed bow thruster warning pop-up message.
 - **“Bow Thruster High Voltage” pop-up message displayed.**
 - The bow thruster has detected overvoltage. The collaboration function cannot be used until the warning is resolved. (Please refer to the documents of the Vetus product.)



- **The pop-up message other than “Bow Thruster High Voltage” was displayed.**
 - Go to next step.

8. Check the displayed bow thruster warning pop-up message.
 - **“Bow Thruster Communication Lost” pop-up message displayed.**
 - Communication error with the bow thruster was detected. The collaboration function cannot be used until the warning is resolved. (Please refer to the documents of the Vetus product.)



Item [B-3]

1. Check if the bow thruster can be operated by itself (through the Vetus thruster panel).
 - **The bow thruster can be operated by itself.**
 - Go to item [B-3-1].
 - **The bow thruster cannot be operated by itself.**

TIP: _____

As for the conditions in which the boat can be operated normally through the Vetus thruster panel (or in which some of the boat operating functions are limited), please refer to the documents of the Vetus product.

Item [B-3-1]

1. Check for the correct connection of the communication cable (Vetus-CAN) between the thruster driver and the bow thruster.
 - **No abnormality**
 - Go to next step.
 - **Incorrect connection**
 - Reconnect the cable correctly.

Helm master EX troubleshooting (trouble code not detected)

2. Check for any abnormality on the communication cable (Vetus-CAN) between the thruster driver and the bow thruster.
 - **No abnormality**
 - Replace the thruster driver.
 - **There is an abnormality (disconnection or short-circuit) on the communication cable.**
 - Replace the defective communication cable.

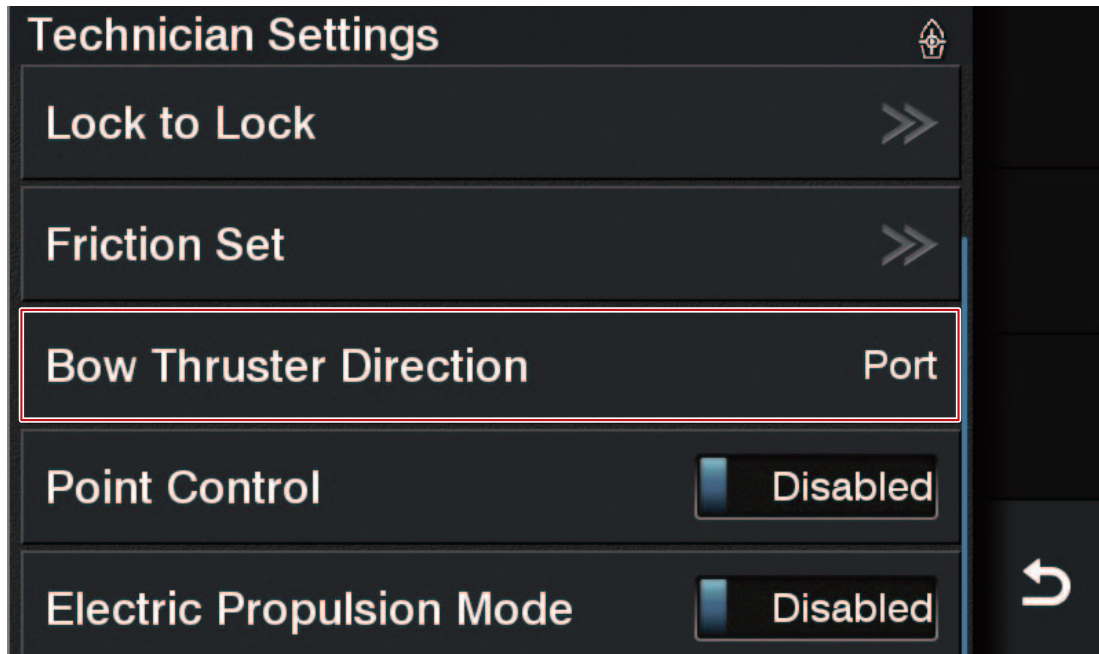
Item [C]

1. Check that the bow thruster collaboration is working properly.
 - **The collaboration is working properly.**
 - Go to item [D].
 - **No collaboration**
 - Check the bow thruster collaboration function of HM-EX.
<The bow thruster collaboration function works in the following conditions on MY23 model>
 - While operating with Joystick.
 - While operating in SetPoint mode (STAYPOINT / FISHPOINT / DRIFTPOINT).
 - When HEADING HOLD in the autopilot functions is selected (but only when Pattern Shift is activated)

Item [D]

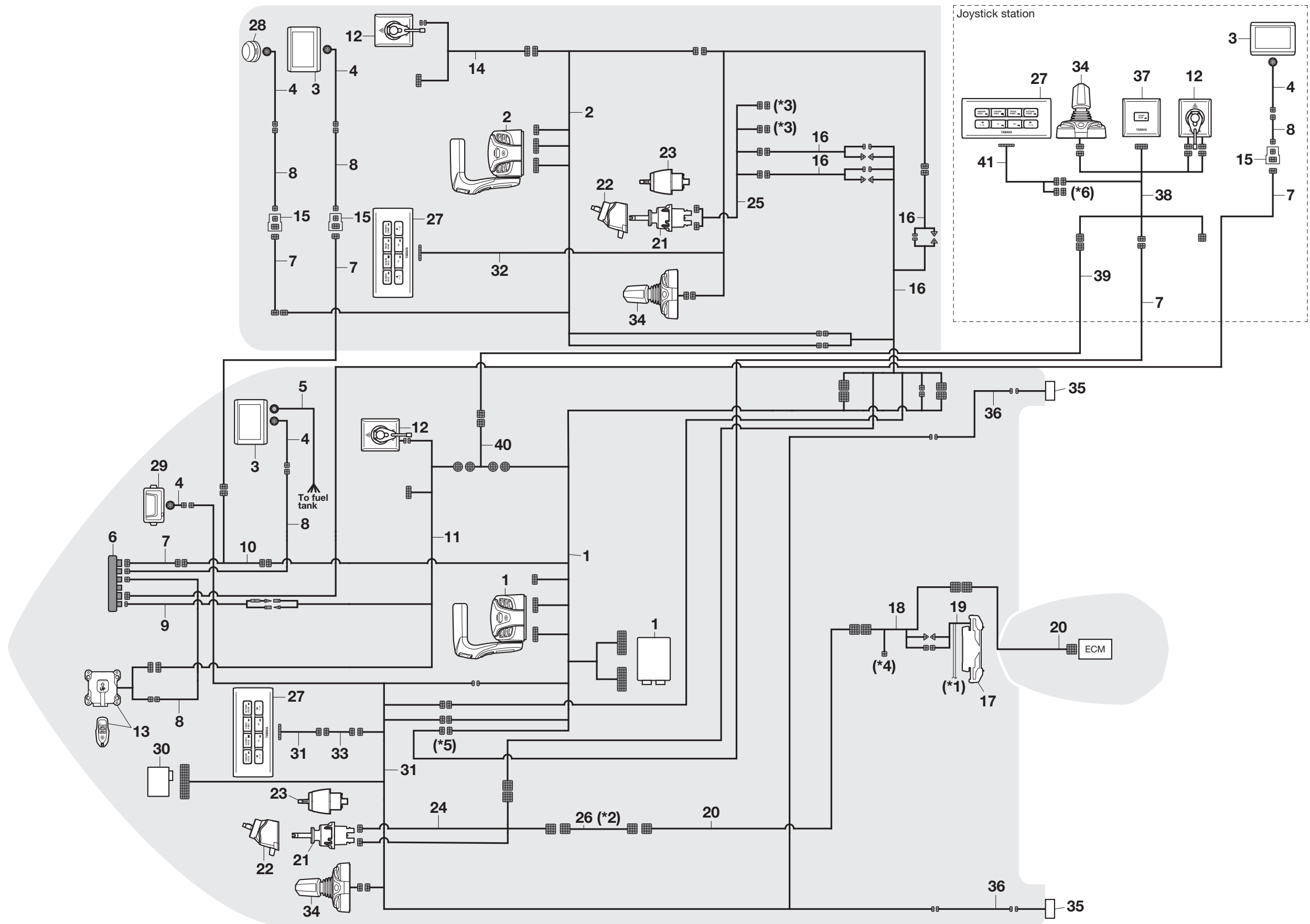
1. Check that the thrust force is generated by the thruster.
 - **Thrust force is generated by the bow thruster.**
 - Go to next step.
 - **No thrust force is generated by the bow thruster.**
 - Check for any damage on the bow thruster propeller.
2. Check the direction in which the boat turns when the bow thruster collaboration is activated.
 - **Thrust force is generated according to the operation.**
 - No problem.
 - **Thrust force is generated in the direction opposite to the operation. (boat turns in the opposite direction)**
 - Check the bow thruster installation direction.

TIP: _____
Check that the bow thruster direction setting on the “Technician Settings” screen agrees with the actual installation direction. See “Change bow thruster direction” (page 234).



Wiring diagram

Single engine application



Single engine application

No.	Part name	Part number	Q'ty	Remarks
1	6X9 single DEC	6X9-48205-20	1	
2	6X9 single DEC	6X9-48205-30	1	2nd station
Gauge kit		6YM-762G0-1A 6YM-762G0-07	1	
3	CL5 display	6YM-83710-16	1	No Wi-Fi
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)
5	Fuel tank wire	6YD-8356N-00	1	
6	Multi-hub	6Y8-81920-01	1	
7	Main bus wire	6Y8-82553-01	1	0.3 m (1 ft)
8	Pigtail bus wire	6Y8-82521-31	1	1.8 m (6 ft)
9	System power supply wire	6Y8-83553-02	1	With 10 amp fuse, 2.4 m (8 ft)
10	Conversion harness	6Y9-83553-10	1	DEC to hub, 0.3 m (1 ft)
	4-pin waterproof cap	6Y8-82582-11	2	White
	Speed sensor kit	60V-8A4L1-1B	1	—
EKS kit		6X9-762E0-00 6X9-762E0-40	1	
11	EKS harness	6X9-82716-21	1	DEC to SW panel
12	Emergency stop SW	6X9-82570-70	1	
13	Key fob and receiver assy	6X9-86254-04	1	Radio frequency 433 MHz, Key fob: 2 pcs.
		—	6X9-86254-14	1
8	Pigtail bus wire	6Y8-82521-11	1	0.6 m (2 ft)
EKS kit		6X9-762E0-80	1	2nd station
14	EKS harness	6X9-82716-60	1	
12	Emergency stop SW	6X9-82570-70	1	
3	CL5 display	6YM-83710-16	1	No Wi-Fi, 2nd station
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)
15	Single-hub	6Y8-81920-11	1	
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	See list 3	1	
16	2nd helm harness	See list 15	1	
Steering kit		6X9-762S0-03	1	
17	Bolt-on steering actuator	6X9-42401-11	1	
18	Split harness	6X9-8258A-90	1	SCU to 16-pin
19	Steering actuator harness	See list 10	1	
20	Main-harness (16P)	See list 1	1	Select from 1.5 m (5 ft) or 3.7 m (12 ft)
Helm and tilt kit		6GR-762H0-10	2	Main station, 2nd station
21	Helm unit assy	6GR-615A0-10	1	
22	Tilt helm unit	6GR-6154A-00	1	
23	Helm unit assy	6X9-762H0-10	2	Main station, 2nd station
24	Helm harness (Main/ Single)	See list 16	1	
25	Helm harness (2nd station)	6X9-8258A-A0	1	0.9 m (3 ft)
20	Main-harness (16P)	See list 1	1	
26	Extension harness	6GR-8258A-V0	1	

No.	Part name	Part number	Q'ty	Remarks
Autopilot kit		6X9-762P0-07	1	Single to Quint engine
27	Autopilot panel	6X9-8253V-01	1	
28	GPS unit	6X9-88107-02	1	
29	Heading sensor	6X9-8A410-01	1	
30	BCU	6X9-8591T-14	1	Autopilot and Single Joystick
15	Single-hub	6Y8-81920-11	1	
31	BCU harness	6X9-82386-01	1	DEC to Autopilot/ Joystick
4	Conversion harness	6YM-83553-00	2	0.9 m (3 ft)
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	See list 3	1	
Autopilot kit		6X9-762P0-11	1	2nd station
27	Autopilot panel	6X9-8253V-01	1	
32	BCU harness	6X9-82386-10	1	DEC to Autopilot/Joystick
Autopilot kit (Optional part)				
33	BCU harness extension	See list 12	1	Optional harness for remote panel installation.
Joystick kit		6X9-762J0-74	1	
34	Joystick controller assy	6X9-482A0-02	1	
35	Notification light	6ES-83720-02	2	
30	BCU	6X9-8591T-43	1	Autopilot and Quad Joystick
34	Joystick controller assy	6X9-482A0-02	1	2nd station
36	Extension harness	See list 13	2	
Joystick station kit				
34	Joystick controller assy	6X9-482A0-02	1	Joystick station
37	All start/stop SW	6X9-82570-B1	1	
12	Emergency stop SW	6X9-82570-D0	1	
38	Aux joystick harness	6X9-82580-G0	1	
39	Extension harness	See list 14	1	
40	Split harness 1	6X9-8258A-C0	1	
41	Autopilot panel harness	6X9-83553-90	1	
7	Main bus wire	See list 2	2	
3	CL5 Display	6YM-83710-16	1	No Wi-Fi, Joystick station
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)
8	Pigtail bus wire	See list 3	1	
16	Single-hub	6Y8-81920-11	1	

*1: See "Connect the DES wire harness to the battery" (page 140).

*2: Built-in DES only

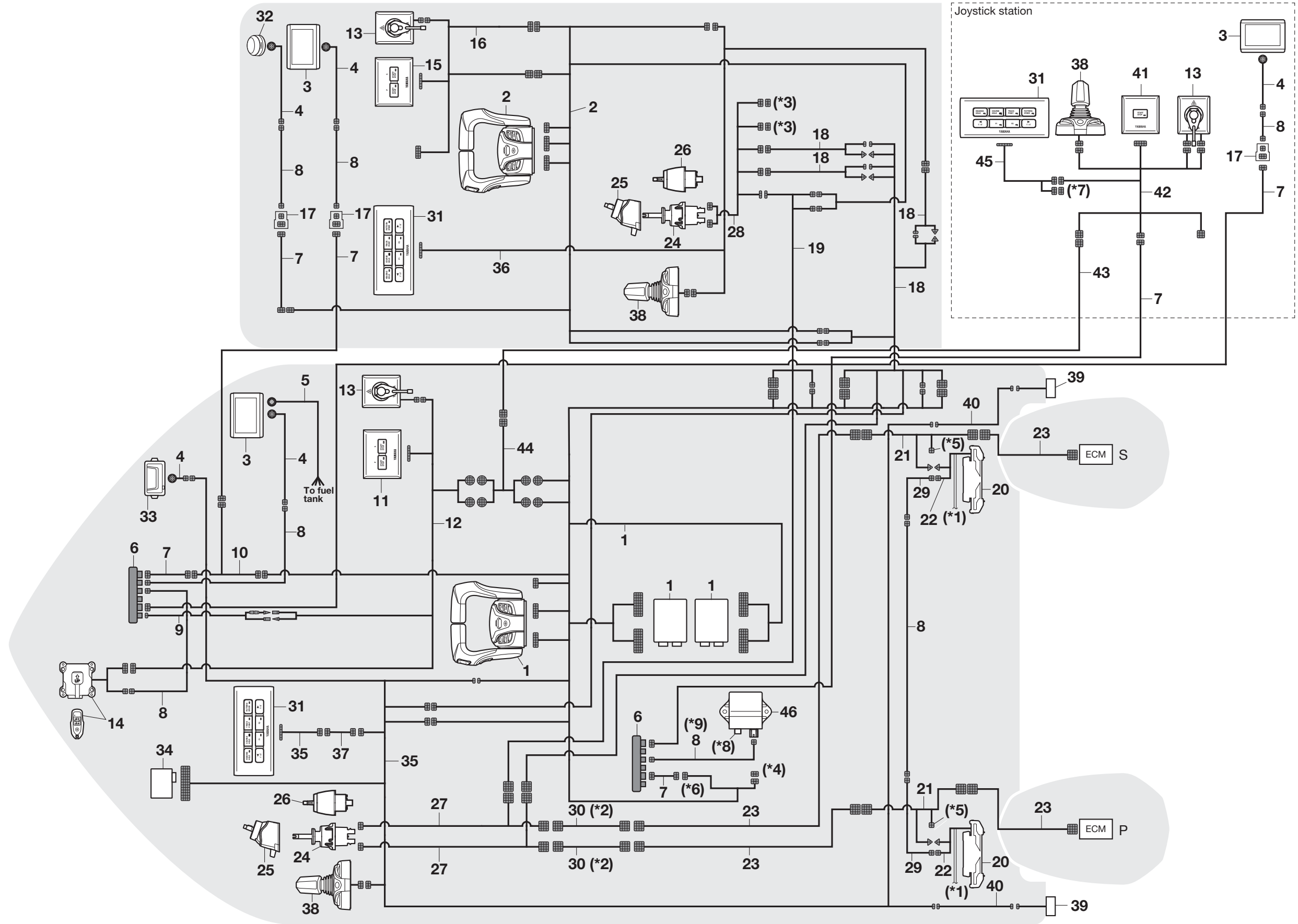
*3: Terminal resistor

*4: Remove the waterproof caps from the SCU link harness, and then install the cap to the coupler (4P) on the SCU split harness.

*5: Remove the terminal resistor, and then connect the main bus wire.

*6: Remove the terminal resistor from the aux joystick harness, and then connect the autopilot panel harness coupler.

Twin engine application



Twin engine application

No.	Part name	Part number	Q'ty	Remarks
1	6X9 twin DEC	6X9-48207-20	1	
2	6X9 multiple DEC	6X9-48207-30	1	2nd station
Gauge kit		6YM-762G0-1A 6YM-762G0-07	1	
3	CL5 display	6YM-83710-16	1	No Wi-Fi
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)
5	Fuel tank wire	6YD-8356N-00	1	
6	Multi-hub	6Y8-81920-01	1	
7	Main bus wire	6Y8-82553-01	1	0.3 m (1 ft)
8	Pigtail bus wire	6Y8-82521-31	1	1.8 m (6 ft)
9	System power supply wire	6Y8-83553-02	1	With 10 amp fuse, 2.4 m (8 ft)
10	Conversion harness	6Y9-83553-10	1	DEC to hub, 0.3 m (1 ft)
	4-pin waterproof cap	6Y8-82582-11	2	White
	Speed sensor kit	60V-8A4L1-1B	1	—
EKS kit		6X9-762E0-10 6X9-762E0-50	1	
11	Individual start/stop SW	6X9-82570-31	1	
12	EKS harness	6X9-82716-50	1	DEC to SW panel
13	Emergency stop SW	6X9-82570-80	1	
14	Key fob and receiver assy	6X9-86254-04	1	Radio frequency 433 MHz, Key fob: 2 pcs.
		—	1	6X9-86254-14 Radio frequency 315 MHz, Key fob: 2 pcs.
8	Pigtail bus wire	6Y8-82521-11	1	0.6 m (2 ft)
EKS kit		6X9-762E0-90	1	2nd station
15	Individual start/stop SW	6X9-82570-31	1	
16	EKS harness	6X9-82716-71	1	
13	Emergency stop SW	6X9-82570-80	1	
3	CL5 display	6YM-83710-16	1	No Wi-Fi, 2nd station
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)
17	Single-hub	6Y8-81920-11	1	
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	See list 3	2	
18	2nd helm harness (Port)	See list 7	1	
19	2nd helm harness (Stbd)	See list 8	1	
Steering kit		6X9-762S0-03	2	
20	Bolt-on steering actuator	6X9-42401-11	1	
21	Split harness	6X9-8258A-90	1	SCU to 16-pin
22	Steering actuator harness	See list 10	2	
23	Main-harness (16P)	See list 1	2	Select from 1.5 m (5 ft) or 3.7 m (12 ft)
Steering kit (Optional part)				
8	Pigtail bus wire	See list 3	1	
Helm and tilt kit		6GR-762H0-10	2	Main station, 2nd station
24	Helm unit assy	6GR-615A0-10	1	
25	Tilt helm unit	6GR-6154A-00	1	
26	Helm unit assy	6X9-762H0-10	2	Main station, 2nd station
27	Helm harness (Main/Multi)	See list 6	2	
28	Helm harness (2nd station)	6X9-8258A-B0	1	0.9 m (3 ft)

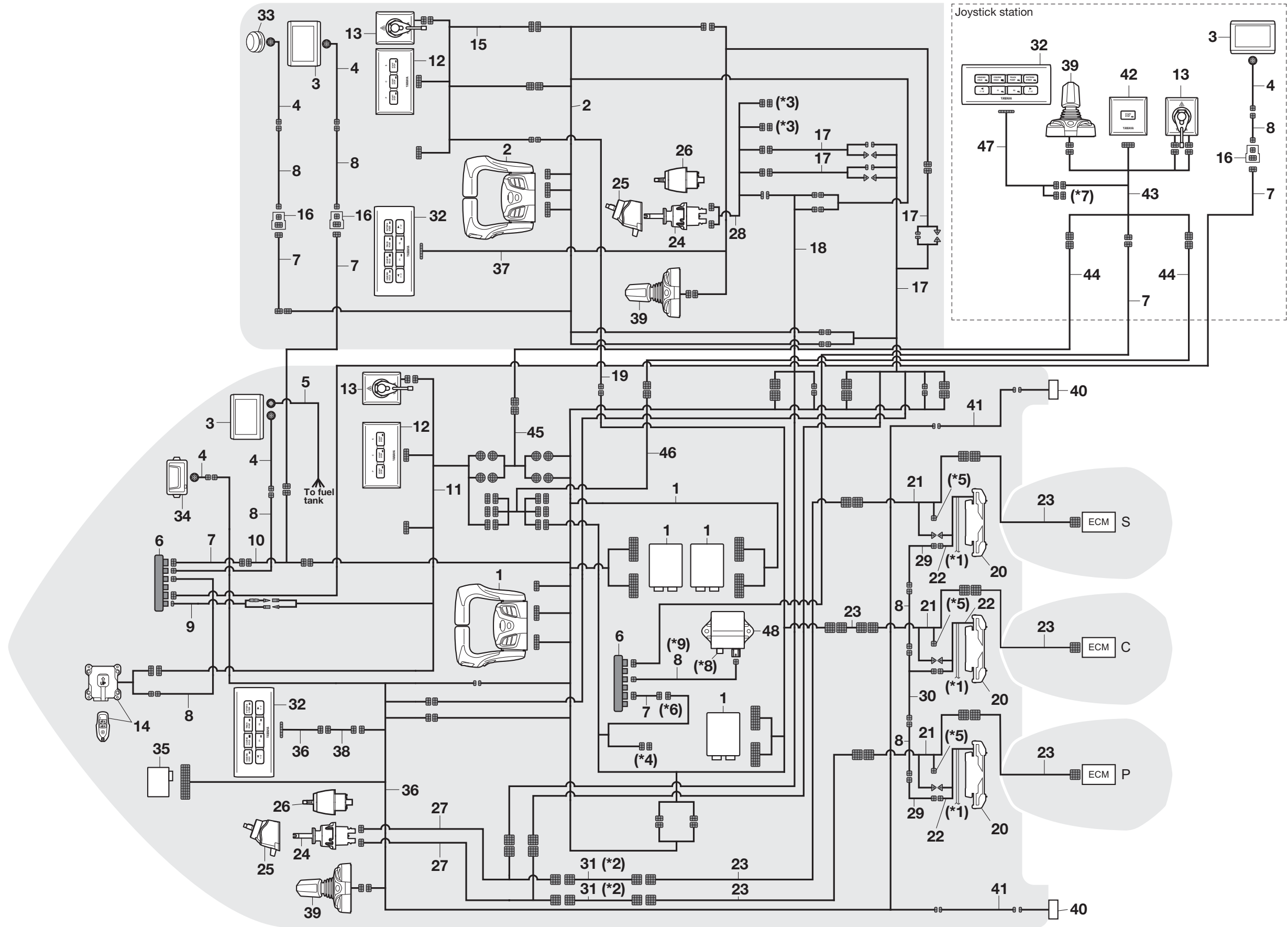
No.	Part name	Part number	Q'ty	Remarks
29	SCU link harness (Port/Stbd)	See list 4	2	
23	Main-harness (16P)	See list 1	2	
30	Extension harness	6GR-8258A-V0	2	
Autopilot kit		6X9-762P0-07	1	Single to Quint engine
31	Autopilot panel	6X9-8253V-01	1	
32	GPS unit	6X9-88107-02	1	
33	Heading sensor	6X9-8A410-01	1	
34	BCU	6X9-8591T-14	1	Autopilot and Single Joystick
17	Single-hub	6Y8-81920-11	1	
35	BCU harness	6X9-82386-01	1	DEC to Autopilot/Joystick
4	Conversion harness	6YM-83553-00	2	0.9 m (3 ft)
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	See list 3	1	
Autopilot kit		6X9-762P0-11	1	2nd station
31	Autopilot panel	6X9-8253V-01	1	
36	BCU harness	6X9-82386-10	1	DEC to Autopilot/Joystick
Autopilot kit (Optional part)				
37	BCU harness extension	See list 12	1	Optional harness for remote panel installation.
Joystick kit		6X9-762J0-74	1	
38	Joystick controller assy	6X9-482A0-02	1	
39	Notification light	6ES-83720-02	2	
34	BCU	6X9-8591T-23	1	Autopilot and Twin Joystick
38	Joystick controller assy	6X9-482A0-02	1	2nd station
40	Extension harness	See list 13	2	
Joystick station kit				
38	Joystick controller assy	6X9-482A0-02	1	Joystick station
41	All start/stop SW	6X9-82570-B1	1	
13	Emergency stop SW	6X9-82570-D0	1	
42	Aux joystick harness	6X9-82580-G0	1	
43	Extension harness	See list 14	1	
44	Split harness 2	6X9-8258A-D0	1	
45	Autopilot panel harness	6X9-83553-90	1	
7	Main bus wire	See list 2	2	
3	CL5 Display	6YM-83710-16	1	No Wi-Fi, Joystick station
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)
8	Pigtail bus wire	See list 3	1	
17	Single-hub	6Y8-81920-11	1	
Bow thruster				
6	Multi-hub	6Y8-81920-01	1	
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	6Y8-82521-21	1	0.9 m (3 ft)
46	Thruster driver	6X9-86510-00	1	

*1: See "Connect the DES wire harness to the battery" (page 140).

*2: Built-in DES only

- *3: Terminal resistor
- *4: Joint connector
- *5: Remove the waterproof caps from the SCU link harness, and then install the cap to the coupler (4P) on the SCU split harness.
- *6: Remove the terminal resistor, and then connect the main bus wire.
- *7: Remove the terminal resistor from the aux joystick harness, and then connect the autopilot panel harness coupler.
- *8: To the bow thruster (Vetus parts)
- *9: Length of pigtail bus wire must be less than 0.9 m (3 ft).

Triple engine application



Triple engine application

No.	Part name	Part number	Q'ty	Remarks	
1	6X9 triple DEC	6X9-48208-10	1		
2	6X9 multiple DEC	6X9-48207-30	1	2nd station	
Gauge kit		6YM-762G0-1A 6YM-762G0-07	1		
3	CL5 display	6YM-83710-16	1	No Wi-Fi	
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)	
5	Fuel tank wire	6YD-8356N-00	1		
6	Multi-hub	6Y8-81920-01	1		
7	Main bus wire	6Y8-82553-01	1	0.3 m (1 ft)	
8	Pigtail bus wire	6Y8-82521-31	1	1.8 m (6 ft)	
9	System power supply wire	6Y8-83553-02	1	With 10 amp fuse, 2.4 m (8 ft)	
10	Conversion harness	6Y9-83553-10	1	DEC to hub, 0.3 m (1 ft)	
	4-pin waterproof cap	6Y8-82582-11	2	White	
	Speed sensor kit	60V-8A4L1-1B	—	1	
EKS kit		6X9-762E0-20 6X9-762E0-60	1		
11	EKS harness	6X9-82716-41	1	DEC to SW panel	
12	Individual start/stop SW	6X9-82570-41	1		
13	Emergency stop SW	6X9-82570-C0	1		
14	Key fob and receiver assy	6X9-86254-04	—	1	Radio frequency 433 MHz, Key fob: 2 pcs.
		—	6X9-86254-14	1	Radio frequency 315 MHz, Key fob: 2 pcs.
8	Pigtail bus wire	6Y8-82521-11	1	0.6 m (2 ft)	
EKS kit		6X9-762E0-A0	1	2nd station	
12	Individual start/stop SW	6X9-82570-41	1		
15	EKS harness	6X9-82716-80	1		
13	Emergency stop SW	6X9-82570-C0	1		
3	CL5 display	6YM-83710-16	1	No Wi-Fi, 2nd station	
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)	
16	Single-hub	6Y8-81920-11	1		
7	Main bus wire	See list 2	1		
8	Pigtail bus wire	See list 3	3		
17	2nd helm harness (Port)	See list 7	1		
18	2nd helm harness (Stbd)	See list 8	1		
19	2nd helm harness (Center)	See list 9	1		
Steering kit		6X9-762S0-03	3		
20	Bolt-on steering actuator	6X9-42401-11	1		
21	Split harness	6X9-8258A-90	1	SCU to 16-pin	
22	Steering actuator harness	See list 10	3		
23	Main-harness (16P)	See list 1	3	Select from 1.5 m (5 ft) or 3.7 m (12 ft)	
Steering kit (Optional part)					
8	Pigtail bus wire	See list 3	2		

No.	Part name	Part number	Q'ty	Remarks
Helm and tilt kit		6GR-762H0-10	2	Main station, 2nd station
24	Helm unit assy	6GR-615A0-10	1	
25	Tilt helm unit	6GR-6154A-00	1	
26	Helm unit assy	6X9-762H0-10	2	Main station, 2nd station
27	Helm harness (Main/Multi)	See list 6	2	
28	Helm harness (2nd station)	6X9-8258A-B0	1	0.9 m (3 ft)
29	SCU link harness (Port/Stbd)	See list 4	2	
30	SCU link harness (Center)	See list 5	1	
23	Main-harness (16P)	See list 1	3	
31	Extension harness	6GR-8258A-V0	2	
Autopilot kit		6X9-762P0-07	1	Single to Quint engine
32	Autopilot panel	6X9-8253V-01	1	
33	GPS unit	6X9-88107-02	1	
34	Heading sensor	6X9-8A410-01	1	
35	BCU	6X9-8591T-14	1	Autopilot and Single Joystick
16	Single-hub	6Y8-81920-11	1	
36	BCU harness	6X9-82386-01	1	DEC to Autopilot/Joystick
4	Conversion harness	6YM-83553-00	2	0.9 m (3 ft)
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	See list 3	1	
Autopilot kit		6X9-762P0-11	1	2nd station
32	Autopilot panel	6X9-8253V-01	1	
37	BCU harness	6X9-82386-10	1	DEC to Autopilot/Joystick
Autopilot kit (Optional part)				
38	BCU harness extension	See list 12	1	Optional harness for remote panel installation.
Joystick kit		6X9-762J0-74	1	
39	Joystick controller assy	6X9-482A0-02	1	
40	Notification light	6ES-83720-02	2	
35	BCU	6X9-8591T-33	1	Autopilot and Triple Joystick
39	Joystick controller assy	6X9-482A0-02	1	2nd station
41	Extension harness	See list 13	2	
Joystick station kit				
39	Joystick controller assy	6X9-482A0-02	1	Joystick station
42	All start/stop SW	6X9-82570-B1	1	
13	Emergency stop SW	6X9-82570-D0	1	
43	Aux joystick harness	6X9-82580-G0	1	
44	Extension harness	See list 14	2	
45	Split harness 2	6X9-8258A-D0	1	
46	Split harness 3	6X9-8258A-E0	1	
47	Autopilot panel harness	6X9-83553-90	1	
7	Main bus wire	See list 2	2	No Wi-Fi, Joystick station

No.	Part name	Part number	Q'ty	Remarks
3	CL5 Display	6YM-83710-16	1	0.9 m (3 ft)
4	Conversion harness	6YM-83553-00	1	
8	Pigtail bus wire	See list 3	1	
16	Single-hub	6Y8-81920-11	1	
Bow thruster				
6	Multi-hub	6Y8-81920-01	1	
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	6Y8-82521-21	1	0.9 m (3 ft)
48	Thruster driver	6X9-86510-00	1	

*1: See "Connect the DES wire harness to the battery" (page 140).

*2: Built-in DES only

*3: Terminal resistor

*4: Joint connector

*5: Remove the waterproof caps from the SCU link harness, and then install the cap to the coupler (4P) on the SCU split harness.

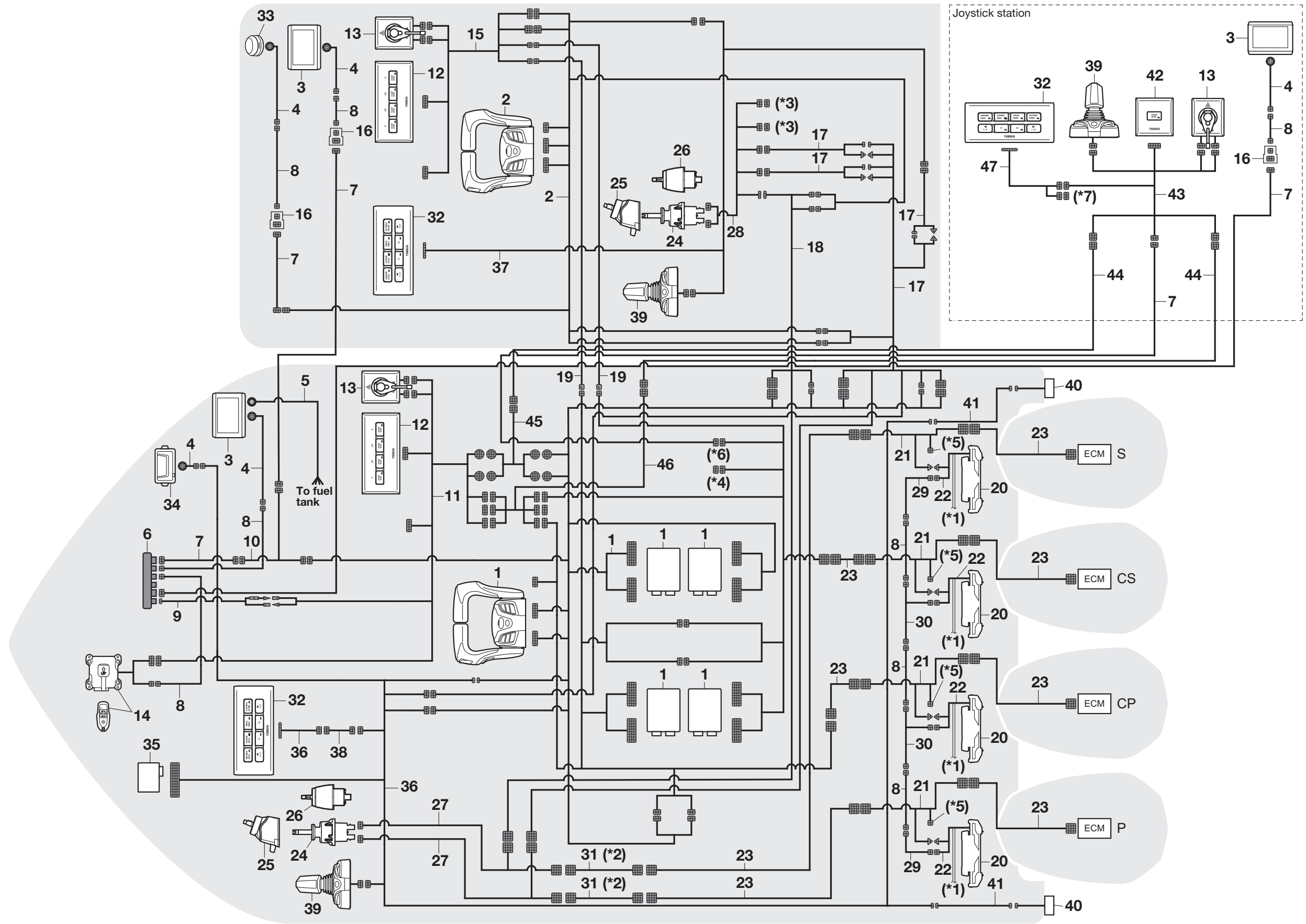
*6: Remove the terminal resistor, and then connect the main bus wire.

*7: Remove the terminal resistor from the aux joystick harness, and then connect the autopilot panel harness coupler.

*8: To the bow thruster (Vetus parts)

*9: Length of pigtail bus wire must be less than 0.9 m (3 ft).

Quad engine application



Quad engine application

No.	Part name	Part number	Q'ty	Remarks	
1	6X9 quad DEC	6X9-48209-10	1		
2	6X9 multiple DEC	6X9-48207-30	1	2nd station	
Gauge kit		6YM-762G0-1A 6YM-762G0-07	1		
3	CL5 display	6YM-83710-16	1	No Wi-Fi	
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)	
5	Fuel tank wire	6YD-8356N-00	1		
6	Multi-hub	6Y8-81920-01	1		
7	Main bus wire	6Y8-82553-01	1	0.3 m (1 ft)	
8	Pigtail bus wire	6Y8-82521-31	1	1.8 m (6 ft)	
9	System power supply wire	6Y8-83553-02	1	With 10 amp fuse, 2.4 m (8 ft)	
10	Conversion harness	6Y9-83553-10	1	DEC to hub, 0.3 m (1 ft)	
	4-pin waterproof cap	6Y8-82582-11	2	White	
	Speed sensor kit	60V-8A4L1-1B	—	1	
EKS kit		6X9-762E0-30 6X9-762E0-70	1		
11	EKS harness	6X9-82716-91	1	DEC to SW panel	
12	Individual start/stop SW	6X9-82570-51	1		
13	Emergency stop SW	6X9-82570-D0	1		
14	Key fob and receiver assy	6X9-86254-04	—	1	Radio frequency 433 MHz, Key fob: 2 pcs.
		—	6X9-86254-14	1	Radio frequency 315 MHz, Key fob: 2 pcs.
8	Pigtail bus wire	6Y8-82521-11	1	0.6 m (2 ft)	
EKS kit		6X9-762E0-B0	1	2nd station	
12	Individual start/stop SW	6X9-82570-51	1		
15	EKS harness	6X9-82716-A0	1		
13	Emergency stop SW	6X9-82570-D0	1		
3	CL5 display	6YM-83710-16	1	No Wi-Fi, 2nd station	
4	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)	
16	Single-hub	6Y8-81920-11	1		
7	Main bus wire	See list 2	1		
8	Pigtail bus wire	See list 3	4		
17	2nd helm harness (Port)	See list 7	1		
18	2nd helm harness (Stbd)	See list 8	1		
19	2nd helm harness (Center)	See list 9	2		
Steering kit		6X9-762S0-03	4		
20	Bolt-on steering actuator	6X9-42401-11	1		
21	Split harness	6X9-8258A-90	1	SCU to 16-pin	
22	Steering actuator harness	See list 10	4		
23	Main-harness (16P)	See list 1	4	Select from 1.5 m (5 ft) or 3.7 m (12 ft)	
Steering kit (Optional part)					
8	Pigtail bus wire	See list 3	3		

No.	Part name	Part number	Q'ty	Remarks
Helm and tilt kit		6GR-762H0-10	2	Main station, 2nd station
24	Helm unit assy	6GR-615A0-10	1	
25	Tilt helm unit	6GR-6154A-00	1	
26	Helm unit assy	6X9-762H0-10	2	Main station, 2nd station
27	Helm harness (Main/Multi)	See list 6	2	
28	Helm harness (2nd station)	6X9-8258A-B0	1	0.9 m (3 ft)
29	SCU link harness (Port/Stbd)	See list 4	2	
30	SCU link harness (Center)	See list 5	2	
23	Main-harness (16P)	See list 1	4	
31	Extension harness	6GR-8258A-V0	2	
Autopilot kit		6X9-762P0-07	1	Single to Quint engine
32	Autopilot panel	6X9-8253V-01	1	
33	GPS unit	6X9-88107-02	1	
34	Heading sensor	6X9-8A410-01	1	
35	BCU	6X9-8591T-14	1	Autopilot and Single Joystick
16	Single-hub	6Y8-81920-11	1	
36	BCU harness	6X9-82386-01	1	DEC to Autopilot/Joystick
4	Conversion harness	6YM-83553-00	2	0.9 m (3 ft)
7	Main bus wire	See list 2	1	
8	Pigtail bus wire	See list 3	1	
Autopilot kit		6X9-762P0-11	1	2nd station
32	Autopilot panel	6X9-8253V-01	1	
37	BCU harness	6X9-82386-10	1	DEC to Autopilot/Joystick
Autopilot kit (Optional part)				
38	BCU harness extension	See list 12	1	Optional harness for remote panel installation.
Joystick kit		6X9-762J0-74	1	
39	Joystick controller assy	6X9-482A0-02	1	
40	Notification light	6ES-83720-02	2	
35	BCU	6X9-8591T-43	1	Autopilot and Quad Joystick
39	Joystick controller assy	6X9-482A0-02	1	2nd station
41	Extension harness	See list 13	2	
Joystick station kit				
39	Joystick controller assy	6X9-482A0-02	1	Joystick station
42	All start/stop SW	6X9-82570-B1	1	
13	Emergency stop SW	6X9-82570-D0	1	
43	Aux joystick harness	6X9-82580-G0	1	
44	Extension harness	See list 14	2	
45	Split harness 2	6X9-8258A-D0	1	
46	Split harness 3	6X9-8258A-E0	1	
47	Autopilot panel harness	6X9-83553-90	1	
7	Main bus wire	See list 2	2	No Wi-Fi, Joystick station

No.	Part name	Part number	Q'ty	Remarks
3	CL5 Display	6YM-83710-16	1	0.9 m (3 ft)
4	Conversion harness	6YM-83553-00	1	
8	Pigtail bus wire	See list 3	1	
16	Single-hub	6Y8-81920-11	1	

*1: See "Connect the DES wire harness to the battery" (page 140).

*2: Built-in DES only

*3: Terminal resistor

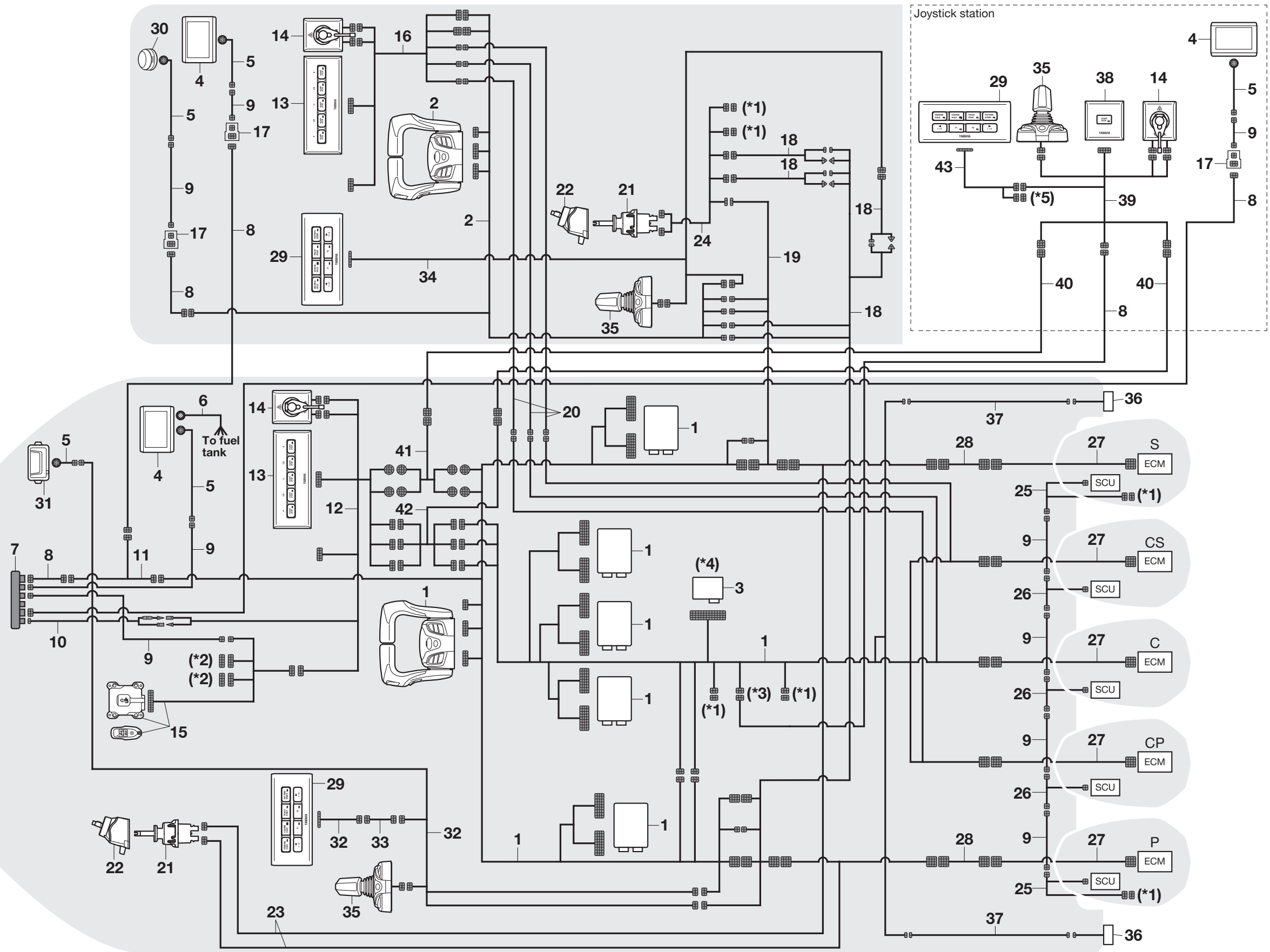
*4: Joint connector

*5: Remove the waterproof caps from the SCU link harness, and then install the cap to the coupler (4P) on the SCU split harness.

*6: Remove the terminal resistor, and then connect the main bus wire.

*7: Remove the terminal resistor from the aux joystick harness, and then connect the autopilot panel harness coupler.

Quint engine application



Quint engine application

No.	Part name	Part number	Q'ty	Remarks	
1	6X9 DEC	6X9-48210-10	1		
2	6X9 multiple DEC	6X9-48207-30	1	2nd station	
3	BCU	6X9-8591T-14	1		
Gauge kit		6YM-762G0-1A 6YM-762G0-07	1		
4	CL5 display	6YM-83710-16	1	No Wi-Fi	
5	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)	
6	Fuel tank wire	6YD-8356N-00	1		
7	Multi-hub	6Y8-81920-01	1		
8	Main bus wire	6Y8-82553-01	1	0.3 m (1 ft)	
9	Pigtail bus wire	6Y8-82521-31	1	1.8 m (6 ft)	
10	System power supply wire	6Y8-83553-02	1	With 10 amp fuse, 2.4 m (8 ft)	
11	Conversion harness	6Y9-83553-10	1	DEC to hub, 0.3 m (1 ft)	
	4-pin waterproof cap	6Y8-82582-11	2	White	
	Speed sensor kit	60V-8A4L1-1B	—	1	
EKS kit		6X9-762E0-C0 6X9-762E0-D0	1		
12	EKS harness	6X9-82716-B0	1	DEC to SW panel	
13	Individual start/stop SW	6X9-82570-61	1		
14	Emergency stop SW	6X9-82570-D0	1		
15	Key fob and receiver assy	6X9-86254-04	—	1	Radio frequency 433 MHz, Key fob: 2 pcs.
		—	6X9-86254-14	1	Radio frequency 315 MHz, Key fob: 2 pcs.
9	Pigtail bus wire	6Y8-82521-11	1	0.6 m (2 ft)	
EKS kit		6X9-762B0-H1	1	2nd station	
13	Individual start/stop SW	6X9-82570-61	1		
16	EKS harness	6X9-82716-C0	1		
14	Emergency stop SW	6X9-82570-D0	1		
4	CL5 display	6YM-83710-16	1	No Wi-Fi, 2nd station	
5	Conversion harness	6YM-83553-00	1	0.9 m (3 ft)	
17	Single-hub	6Y8-81920-11	1		
8	Main bus wire	See list 2	1		
9	Pigtail bus wire	See list 3	1		
18	2nd helm harness (PORT)	See list 7	1		
19	2nd helm harness (STBD)	See list 8	1		
20	2nd helm harness (CENTER)	See list 9	3		
Helm and tilt kit		6GR-762H0-10	2	Main station, 2nd station	
21	Helm unit assy	6GR-615A0-10	1		
22	Tilt helm unit	6GR-6154A-00	1		
23	Helm harness (Main/Multi)	See list 6	2		
24	Helm harness (2nd station)	6X9-8258A-B0	1	0.9 m (3 ft)	
25	SCU link harness (PORT/STBD)	See list 4	2		
26	SCU link harness (CENTER)	See list 5	3		

No.	Part name	Part number	Q'ty	Remarks
27	Main-harness (16P)	See list 1	5	
28	Extension harness	6GR-8258A-V0	2	
Helm and tilt kit (Optional part)				
9	Pigtail bus wire	See list 3	4	
Autopilot kit (Optional part)				
29	Autopilot panel	6X9-8253V-01	1	Main station
30	GPS unit	6X9-88107-02	1	
31	Heading sensor	6X9-8A410-01	1	
17	Single-hub	6Y8-81920-11	1	
32	BCU harness	6X9-82386-20	1	DEC to Autopilot/Joystick
5	Conversion harness	6YM-83553-00	2	0.9 m (3 ft)
8	Main bus wire	See list 2	2	
9	Pigtail bus wire	See list 3	1	Select from 0.3 m (1 ft) or 0.6 m (2 ft)
7	Multi-hub	6Y8-81920-01	1	
33	BCU harness extension	See list 12	1	Optional harness for re-remote panel installation.
Autopilot kit		6X9-762P0-11	1	2nd station
29	Autopilot panel	6X9-8253V-01	1	
34	BCU harness	6X9-82386-10	1	DEC to Autopilot/Joystick
Joystick kit (Optional part)				
35	Joystick controller assy	6X9-482A0-02	2	Main station, 2nd station
36	Notification light	6ES-83720-02	2	
3	BCU	6X9-8591T-51	1	Quint engine joystick
37	Extension harness	See list 13	2	
Joystick station kit				
35	Joystick controller assy	6X9-482A0-02	1	Joystick station
38	All start/stop SW	6X9-82570-B1	1	
14	Emergency stop SW	6X9-82570-D0	1	
39	Aux joystick harness	6X9-82580-G0	1	
40	Extension harness	See list 14	2	
41	Split harness 2	6X9-8258A-D0	1	
42	Split harness 3	6X9-8258A-E0	1	
43	Autopilot panel harness	6X9-83553-90	1	
8	Main bus wire	See list 2	2	No Wi-Fi, Joystick station
4	CL5 Display	6YM-83710-16	1	0.9 m (3 ft)
5	Conversion harness	6YM-83553-00	1	
9	Pigtail bus wire	See list 3	1	
17	Single-hub	6Y8-81920-11	1	

- *1: Terminal resistor
- *2: Joint connector
- *3: Remove the terminal resistor, and then connect the main bus wire.
- *4: When using the Joystick, change the BCU from 6X9-8591T-14 to 6X9-8591T-51.
- *5: Remove the terminal resistor from the aux joystick harness, and then connect the autopilot panel harness coupler.

Selection list

1. Main harness (16P)

Part number	Remarks
6X6-8258A-91	1.5 m (5 ft)
6X6-8258A-51	3.7 m (12 ft)
6X6-8258A-61	5.2 m (17 ft)
6X6-8258A-01	6 m (19 ft)
6X6-8258A-11	7 m (23 ft)
6X6-8258A-21	8 m (26 ft)
6X6-8258A-31	10 m (32 ft)
6X6-8258A-41	12 m (39 ft)
6X6-8258A-71	15 m (49 ft)
6X6-8258A-81	24 m (79 ft)

2. Main bus wire

Part number	Remarks
6Y8-82553-01	0.3 m (1 ft)
6Y8-82553-50	3.0 m (10 ft)
6Y8-82553-11	4.6 m (15 ft)
6Y8-82553-21	6.1 m (20 ft)
6Y8-82553-31	7.6 m (25 ft)
6Y8-82553-41	9.1 m (30 ft)

3. Pigtail bus wire

Part number	Remarks
6Y8-82521-01	0.3 m (1 ft)
6Y8-82521-11	0.6 m (2 ft)
6Y8-82521-21	0.9 m (3 ft)
6Y8-82521-31	1.8 m (6 ft)
6Y8-82521-41	2.7 m (9 ft)
6Y8-82521-51	3.6 m (12 ft)

4. SCU link harness (PORT/ STBD)

Part number	Remarks
6X9-81115-00	0.3 m (1 ft)
6GR-81115-00	1.5 m (5 ft)
6GR-81115-10	3.0 m (10 ft)

5. SCU link harness (CENTER)

Part number	Remarks
6X9-81115-10	0.3 m (1 ft)
6GR-81115-20	1.5 m (5 ft)
6GR-81115-30	3.0 m (10 ft)

6. Helm harness (Main/ Multi)

Part number	Remarks
6GR-8258A-11	0.9 m (3 ft)
6GR-8258A-51	1.8 m (6 ft)
6GR-8258A-61	2.7 m (9 ft)

7. 2nd helm harness (PORT)

Part number	Remarks
6X9-8258A-00	5 m (16 ft)
6X9-8258A-10	8 m (26 ft)
6X9-8258A-20	12 m (38 ft)

8. 2nd helm harness (STBD)

Part number	Remarks
6X9-8258A-30	5 m (16 ft)
6X9-8258A-40	8 m (26 ft)
6X9-8258A-50	12 m (38 ft)

9. 2nd helm harness (CENTER)

Part number	Remarks
6X9-8258A-60	5 m (16 ft)
6X9-8258A-70	8 m (26 ft)
6X9-8258A-80	12 m (38 ft)

10. Steering actuator harness

Part number	Remarks
6X9-438A0-00	2.4 m (8 ft)
6X9-438A0-10	4.5 m (15 ft)

11. EKS harness extension

Part number	Remarks
6X9-82586-00	4.6 m (15 ft)
6X9-82586-10	9.1 m (30 ft)

12. BCU harness extension

Part number	Remarks
6X9-82521-00	4.6 m (15 ft)
6X9-82521-10	9.1 m (30 ft)

13. Extension harness (Notification light)

Part number	Remarks
6X9-82586-20	6.1 m (20 ft)
6X9-82586-30	9.1 m (30 ft)
6X9-82586-40	12.2 m (40 ft)

14. Extension harness (Joystick station)

Part number	Remarks
6X9-83553-70	7 m (23 ft)
6X9-83553-80	10 m (32 ft)

15. 2nd helm harness

Part number	Remarks
6X9-8258A-00	5 m (16 ft)
6X9-8258A-10	8 m (26 ft)
6X9-8258A-20	12 m (38 ft)

16. Helm harness (Main/ Single)






Part number	Remarks
6GR-8258A-00	0.9 m (3 ft)
6GR-8258A-40	1.8 m (6 ft)

Connecting diagram

How to use the connecting diagram

Because the connecting diagram is prepared based on the new DEC unit parts configuration, some of the coupler shapes and the harness connections are different from the previous DEC unit.

Legend symbols in the connecting diagrams

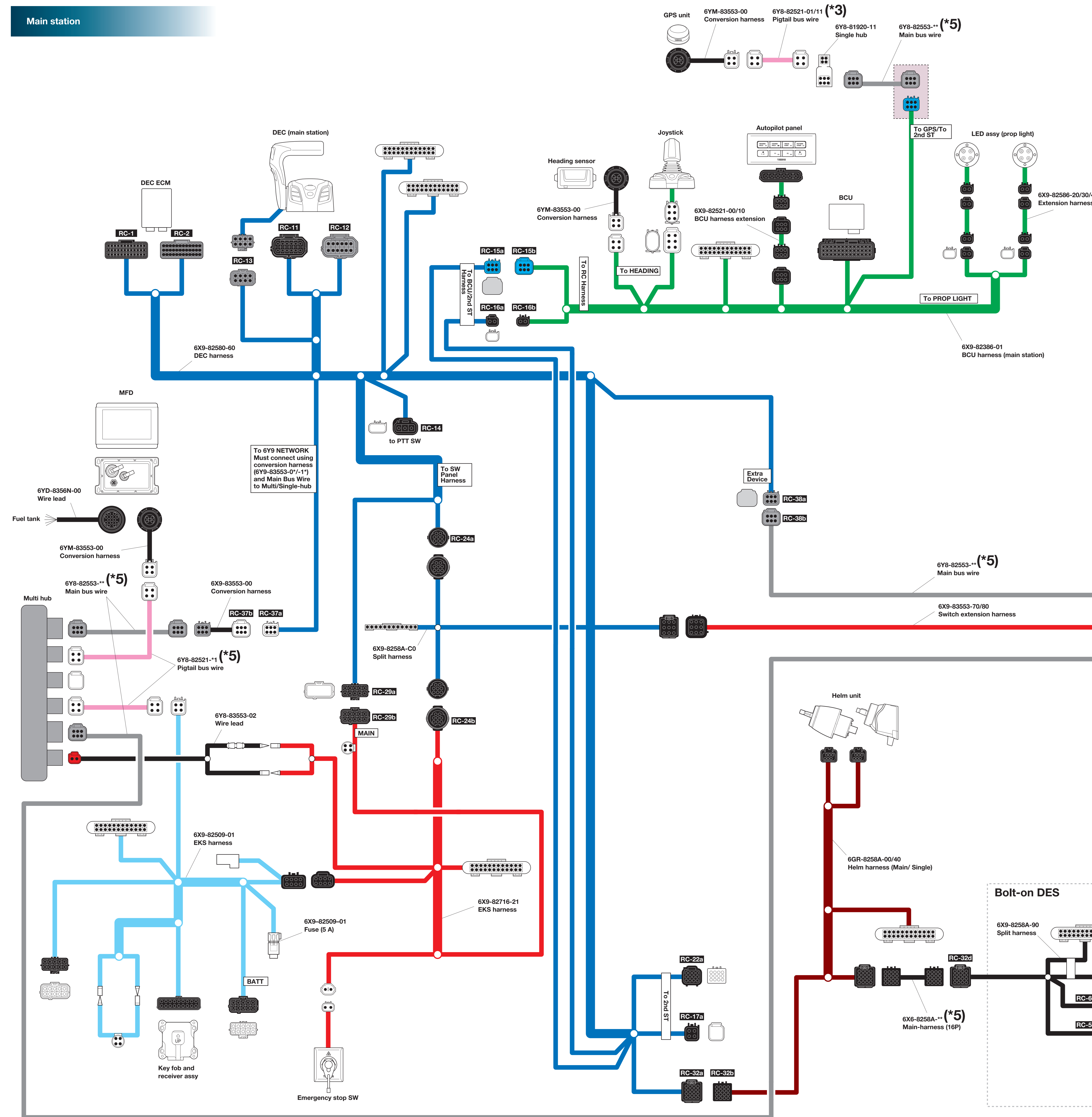
1 	2 	3 
4 	5 	

1. The locations to connect the couplers with different colors are indicated.
2. Terminal resistor
3. Waterproof cap (The shape different depending on the coupler to be connected.)
4. Joint coupler (The shape different depending on the coupler to be connected.)
5. The coupler numbers corresponding to those in the “Trouble code and checking step” chapter are indicated. (These numbers are not indicated on the actual wire harness.)

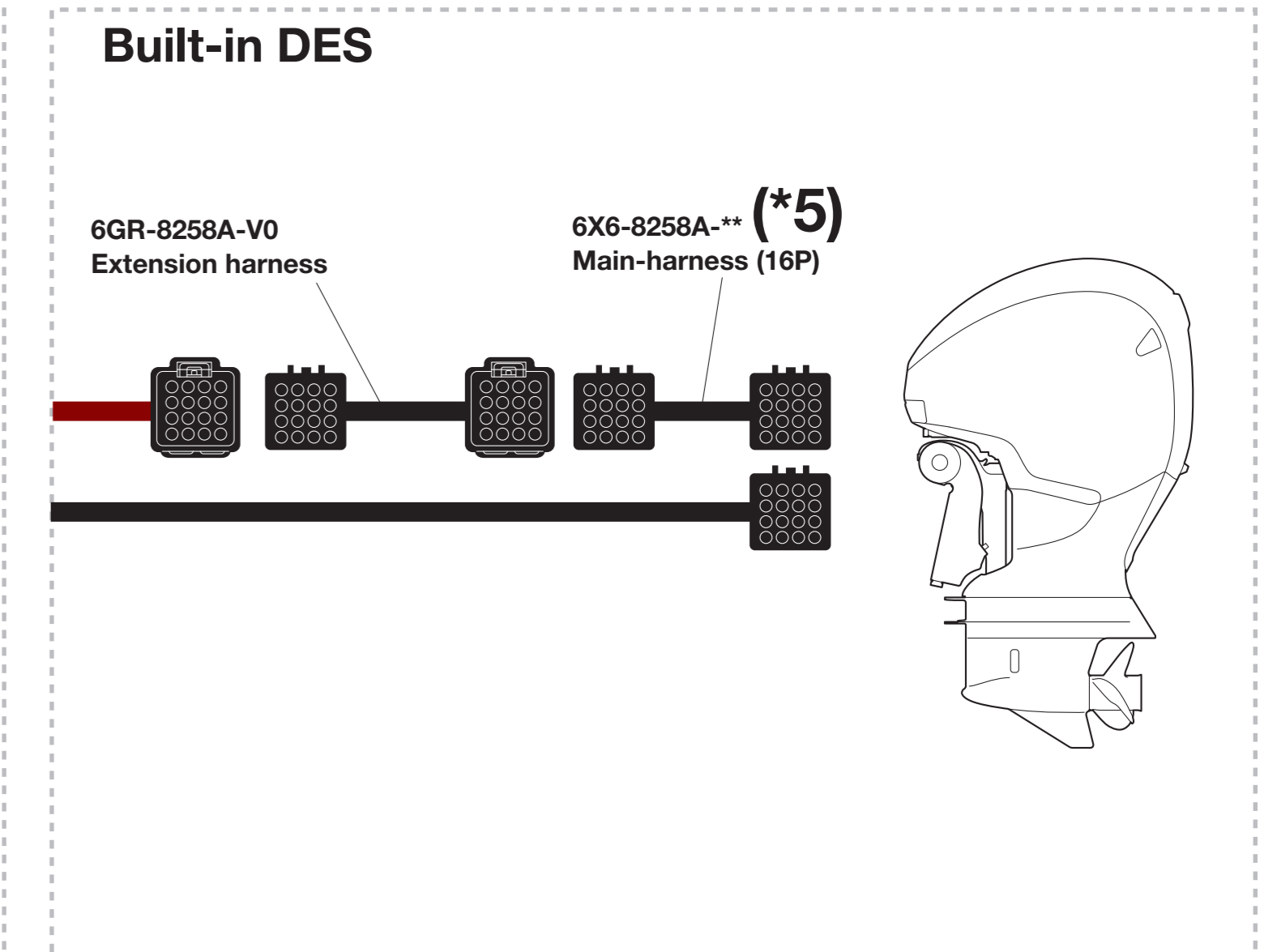
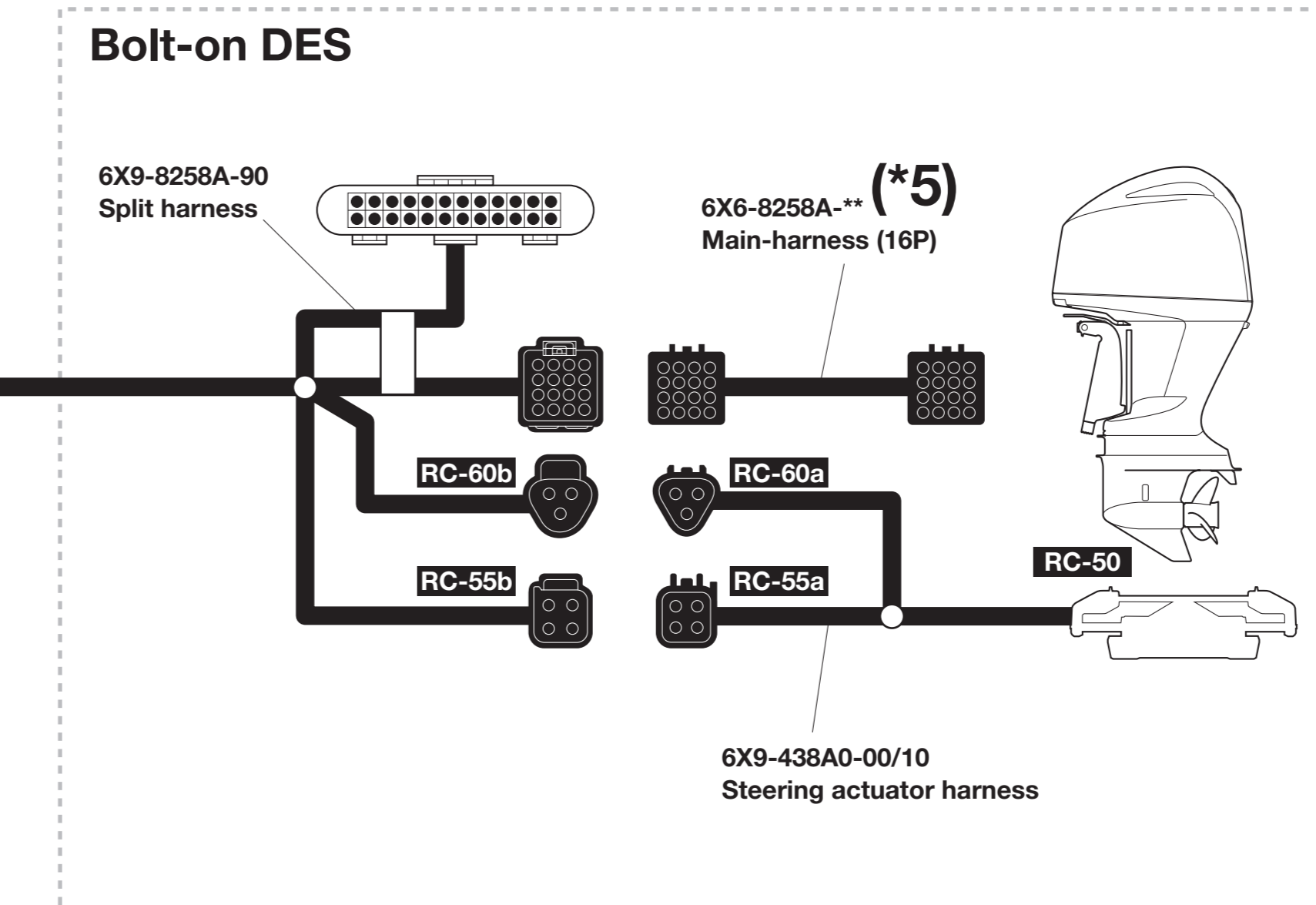
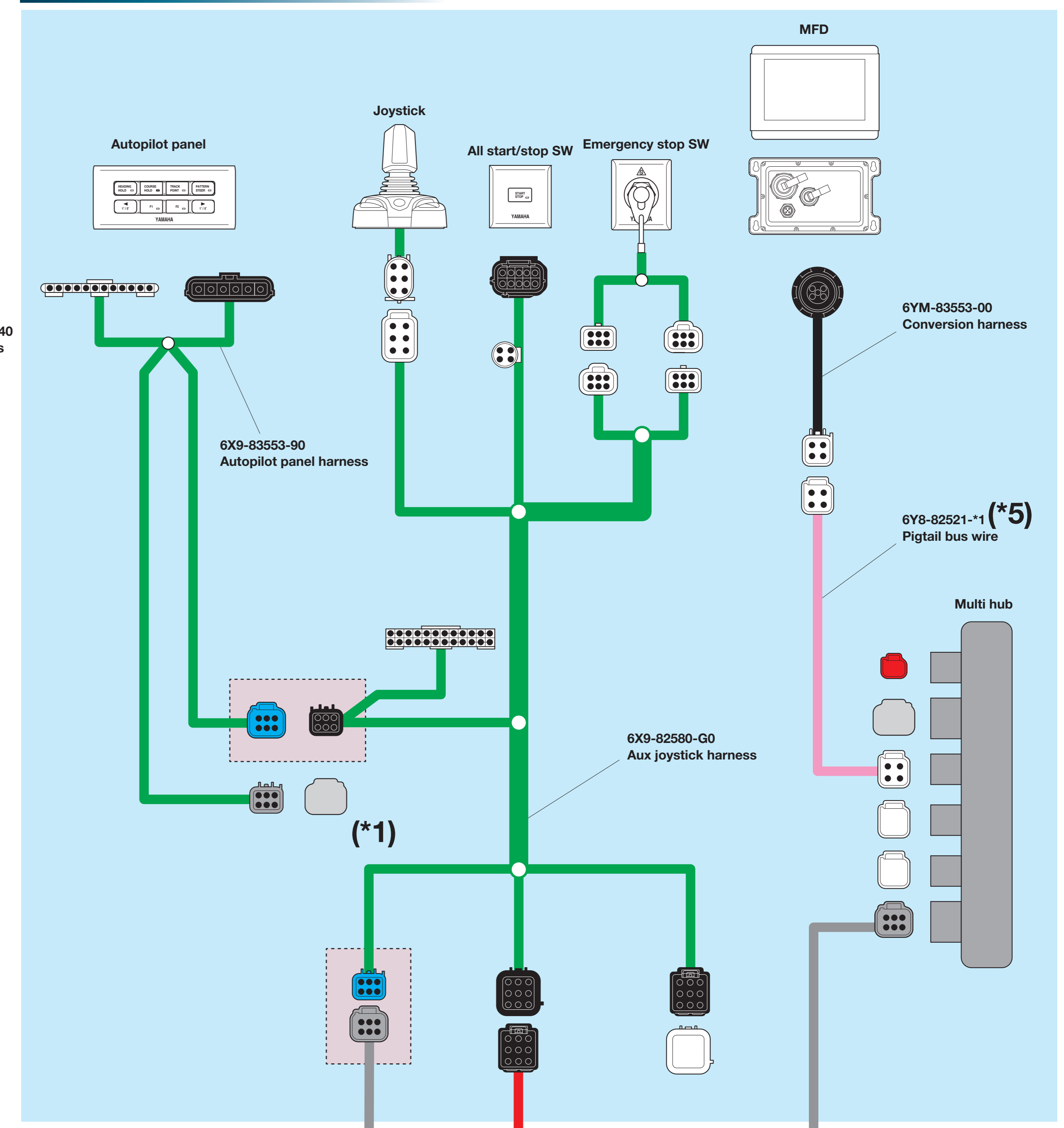
Supplementary information in the connecting diagram

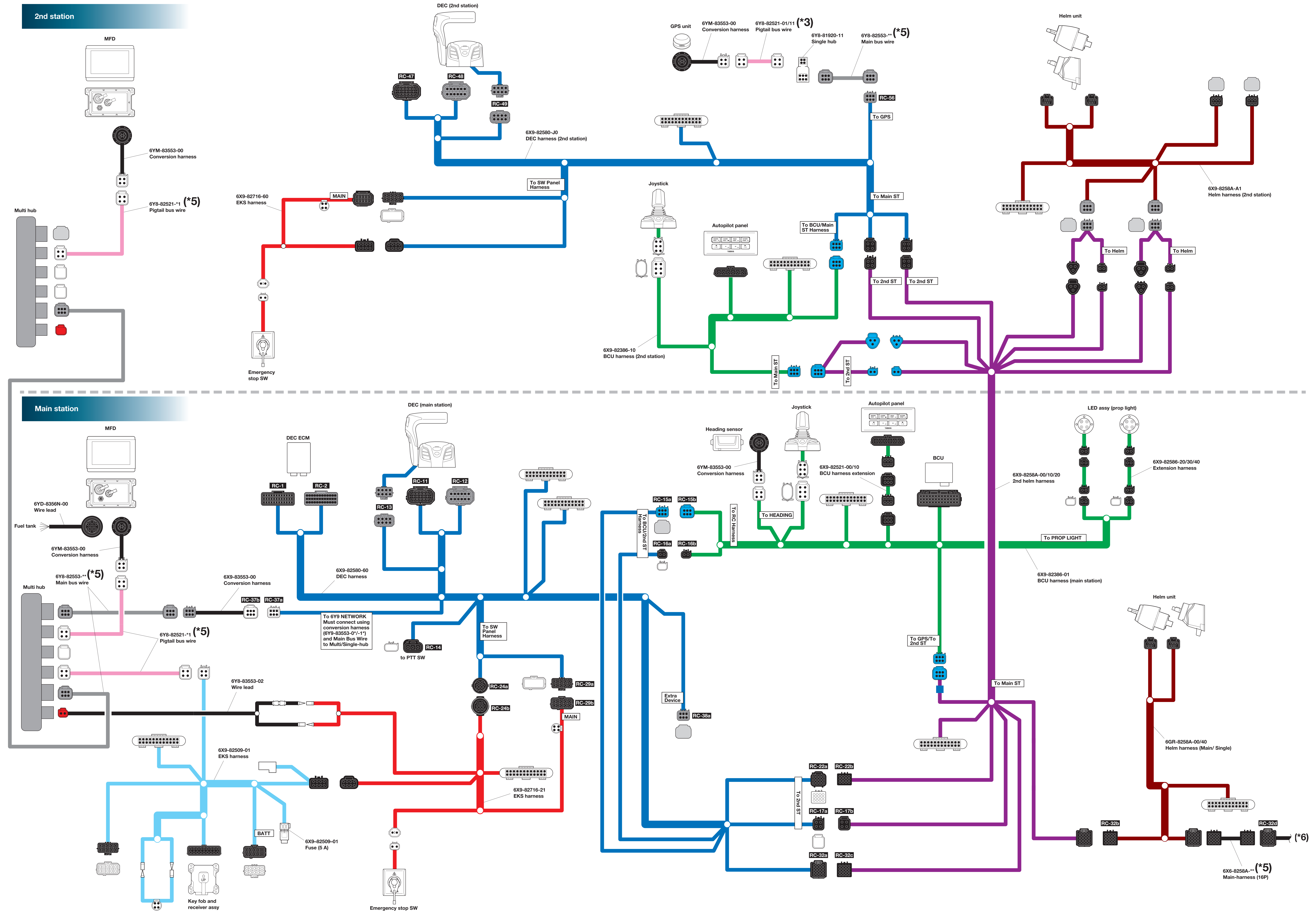
- (*1). Disengage the terminal resistor connected to the aux joystick harness, and then connect the terminal resistor to the 6-pin coupler of the autopilot panel harness.
- (*2). To the bow thruster (Vetus parts). See “Installing the bow thruster” (page 171).
- (*3). Length of pigtail bus wire must be less than 0.9 m (3 ft).
- (*4). If the thruster driver is not connected, connect the DEC harness coupler (identified by the “Extra Device” tag) and the main bus wire (to joystick station) coupler.
- (*5). Harness length can be selected. See the applicable list in the “Selection list” (page 331).
- (*6). For connection with DES, refer to the Connecting diagram of “Single station + joystick station”.

Main station

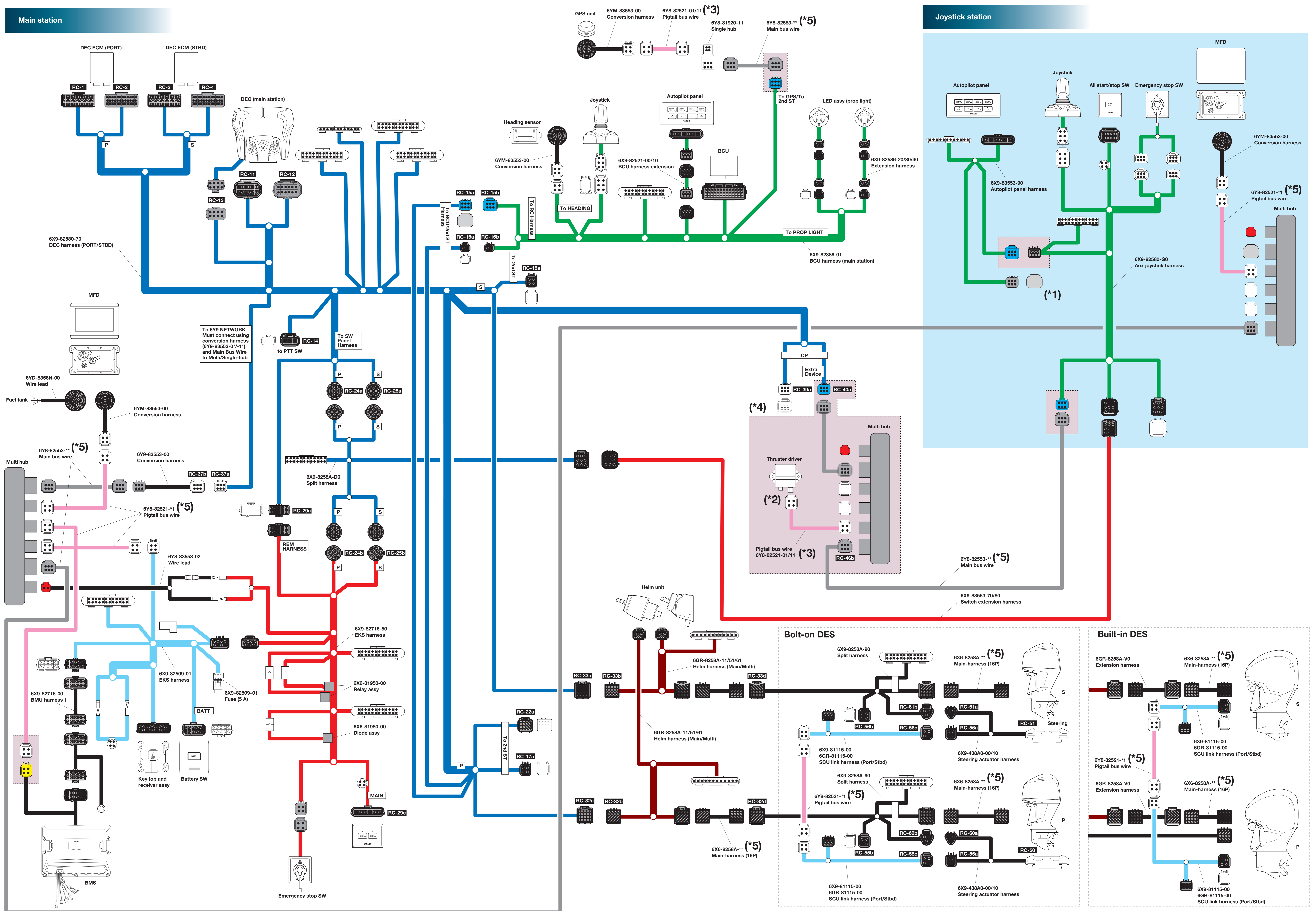


Joystick station

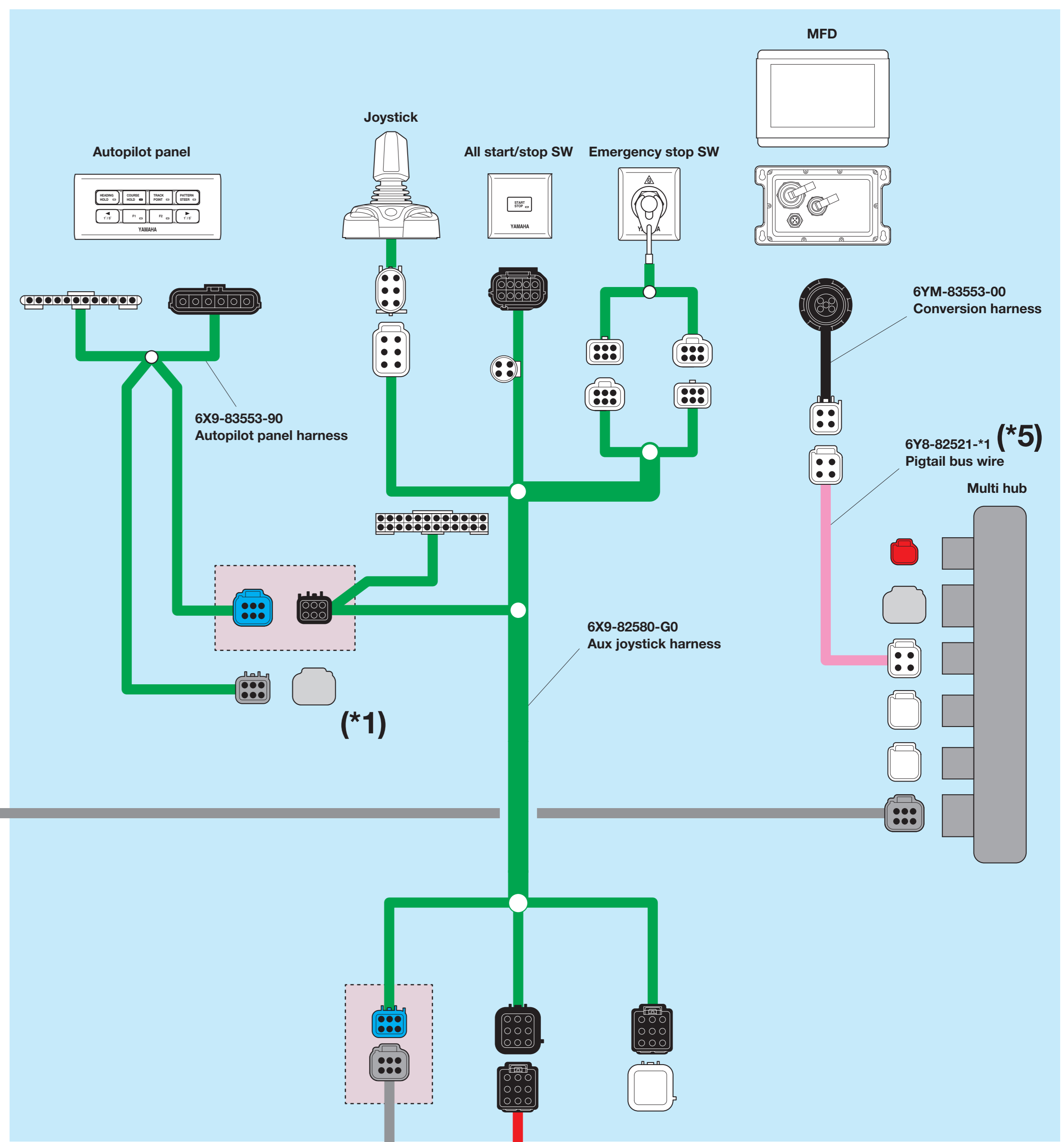




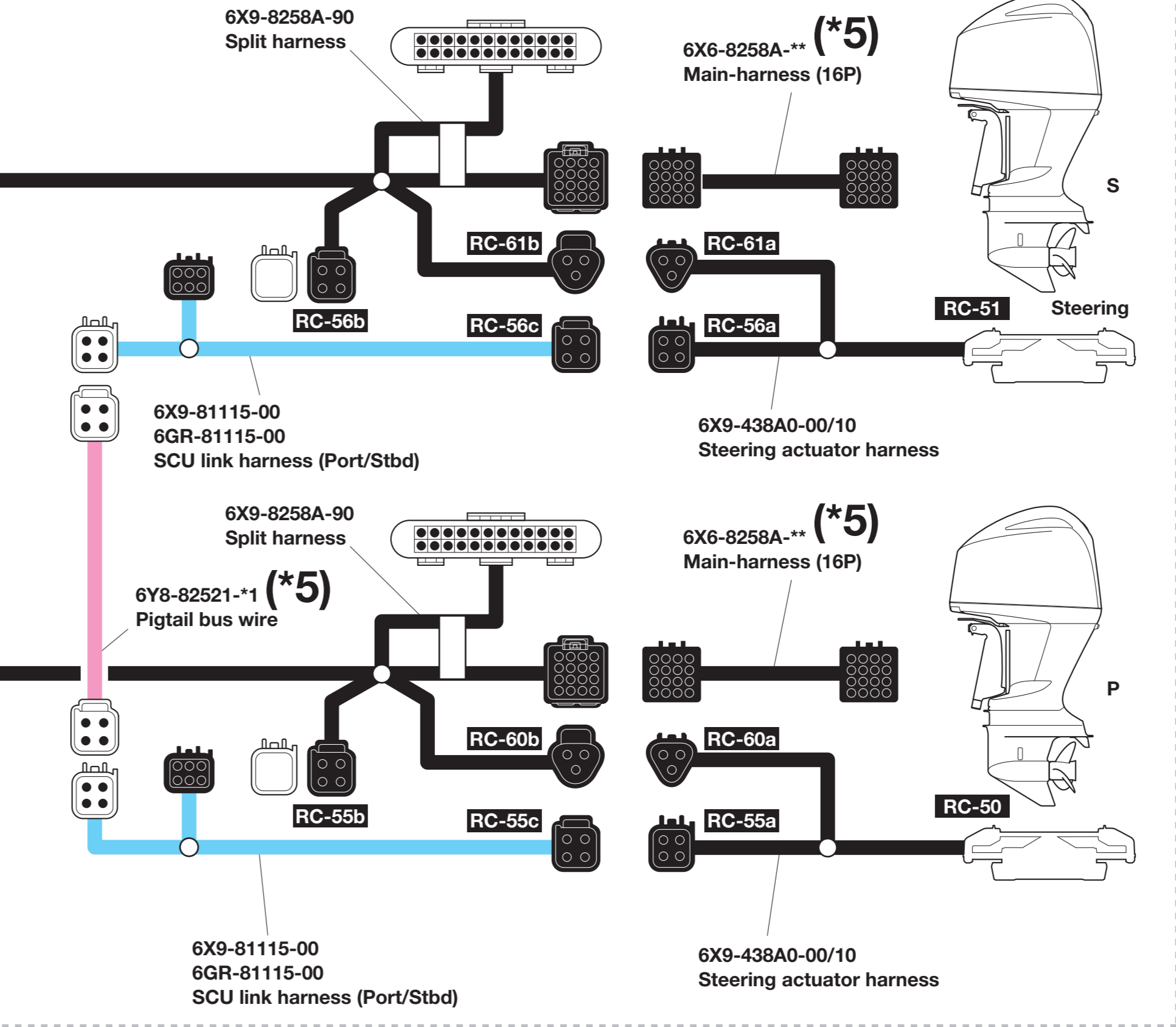
Main station



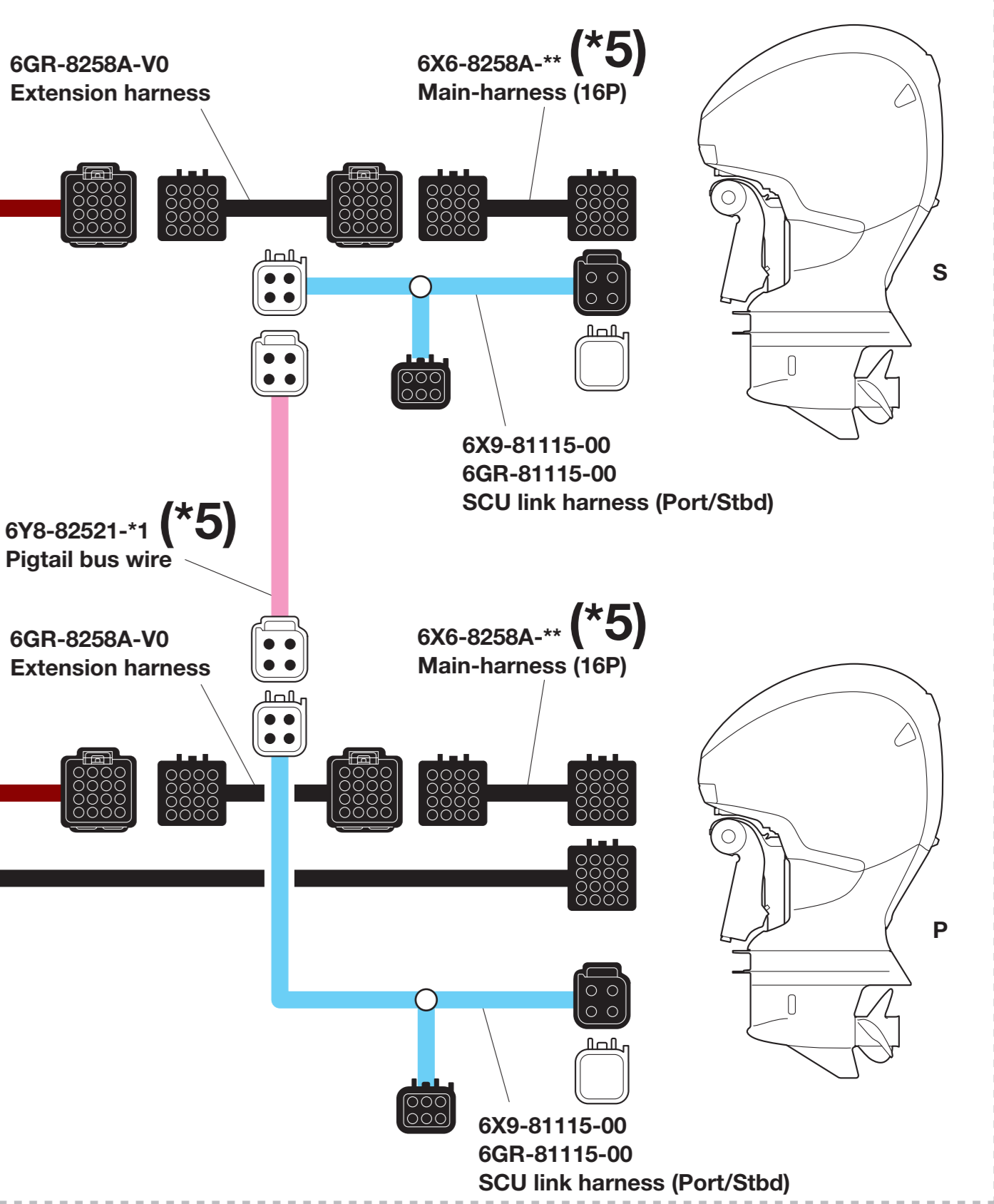
Joystick station



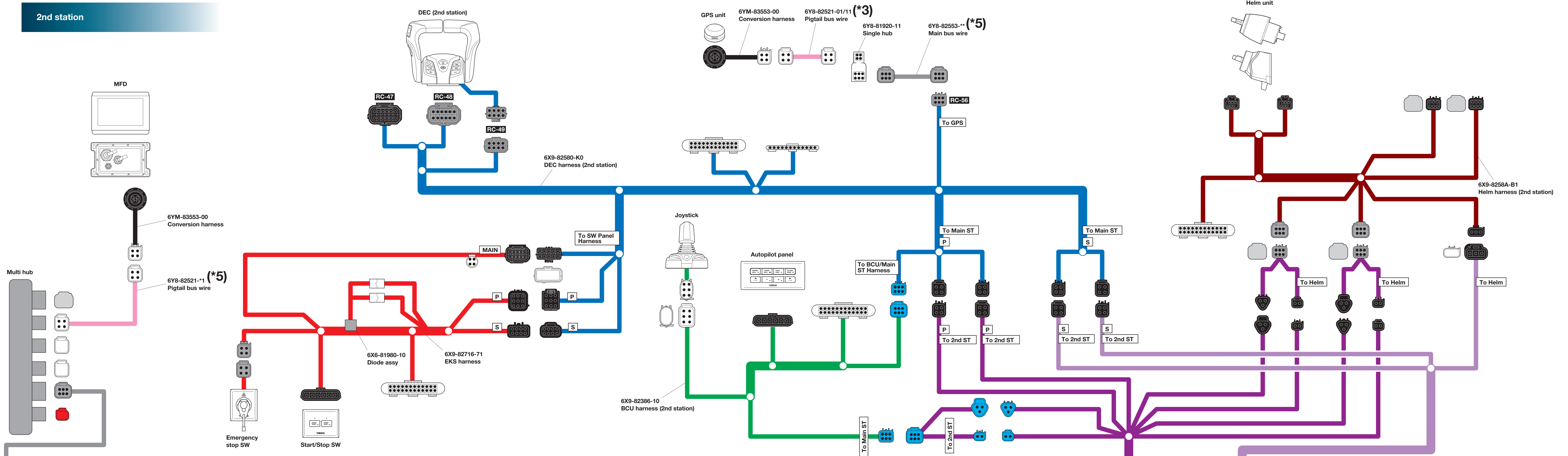
Bolt-on DES



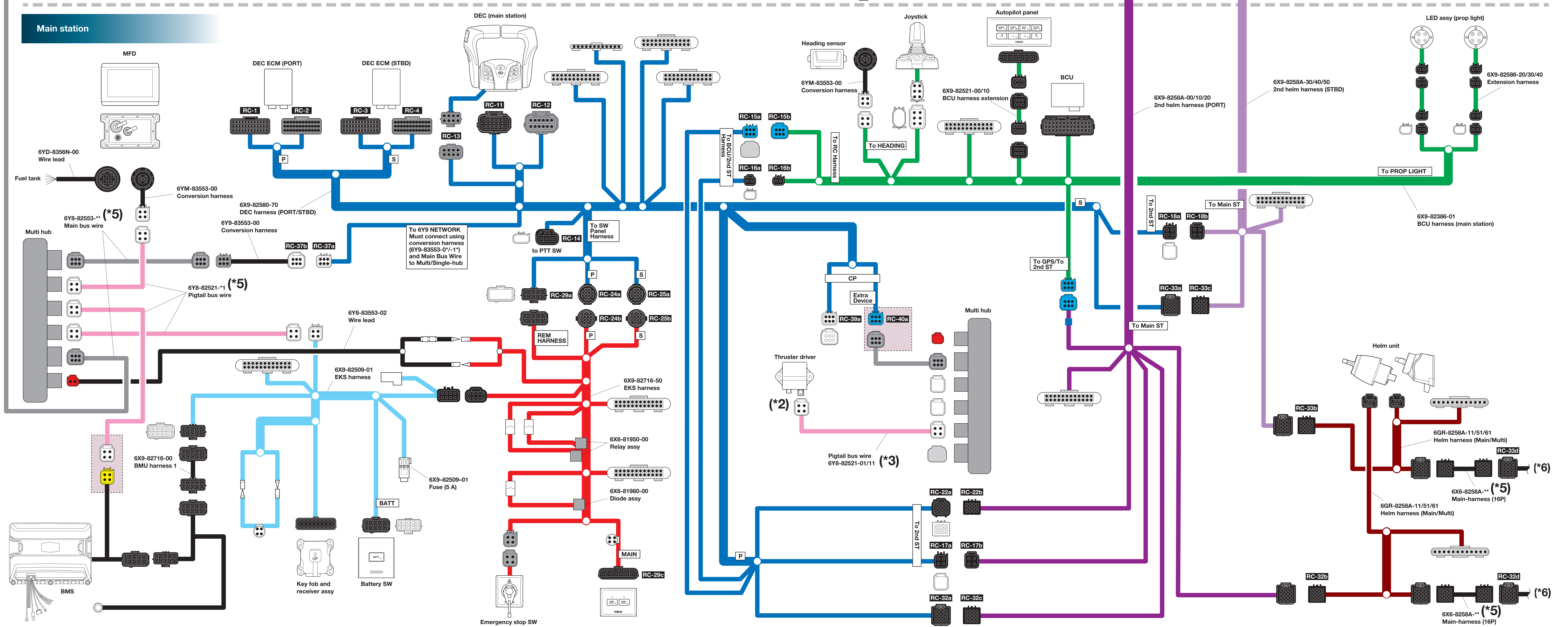
Built-in DES

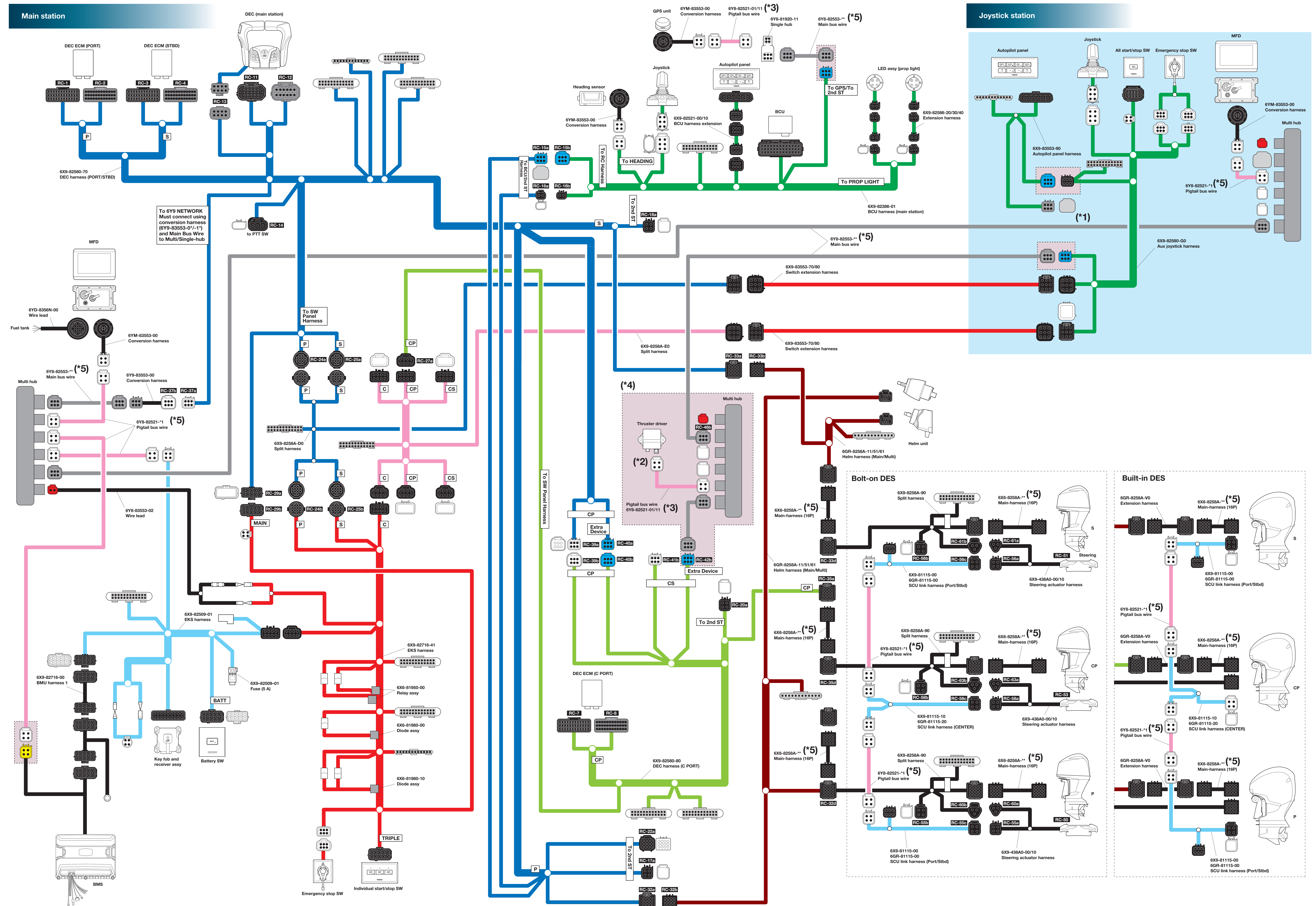


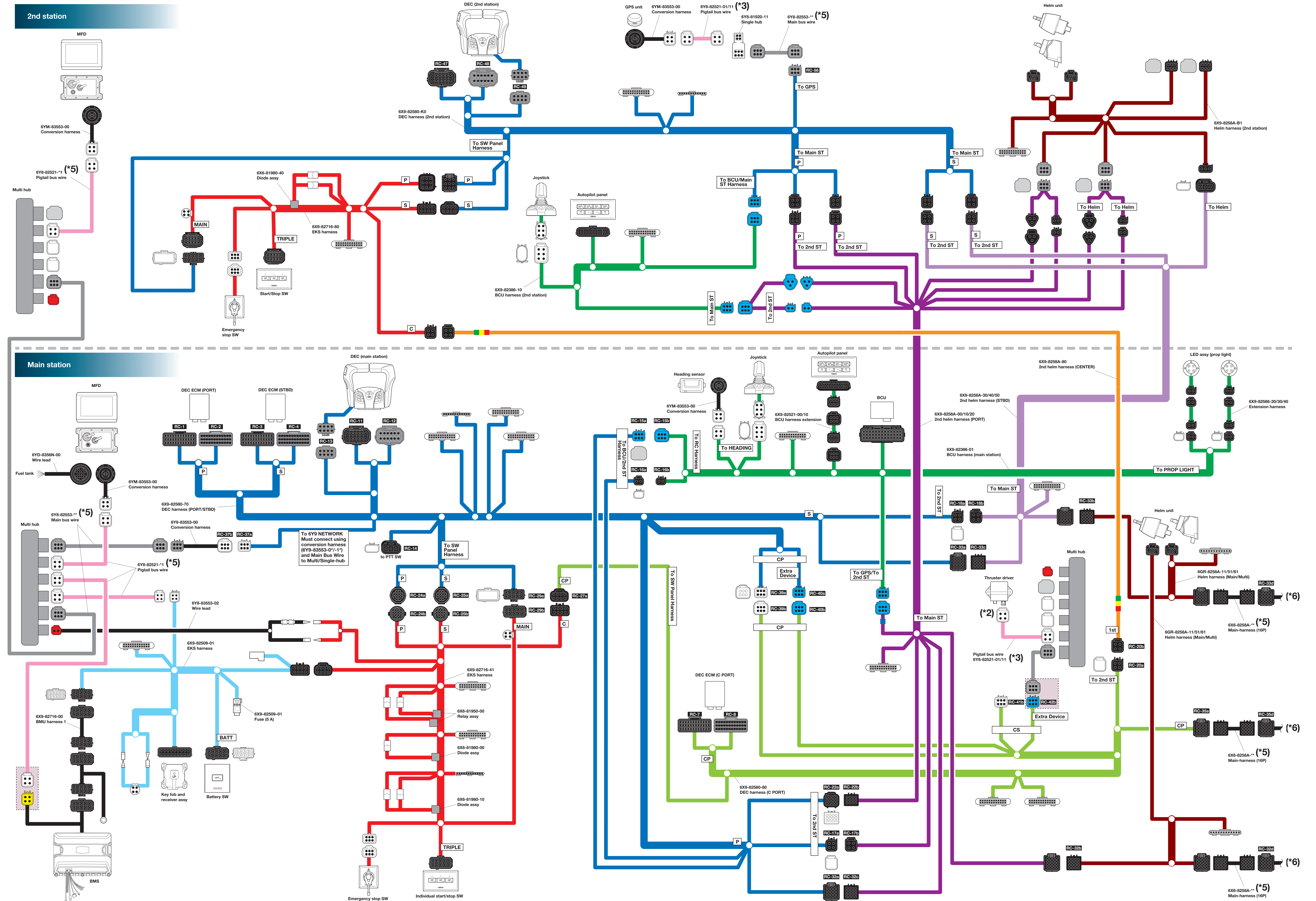
2nd station

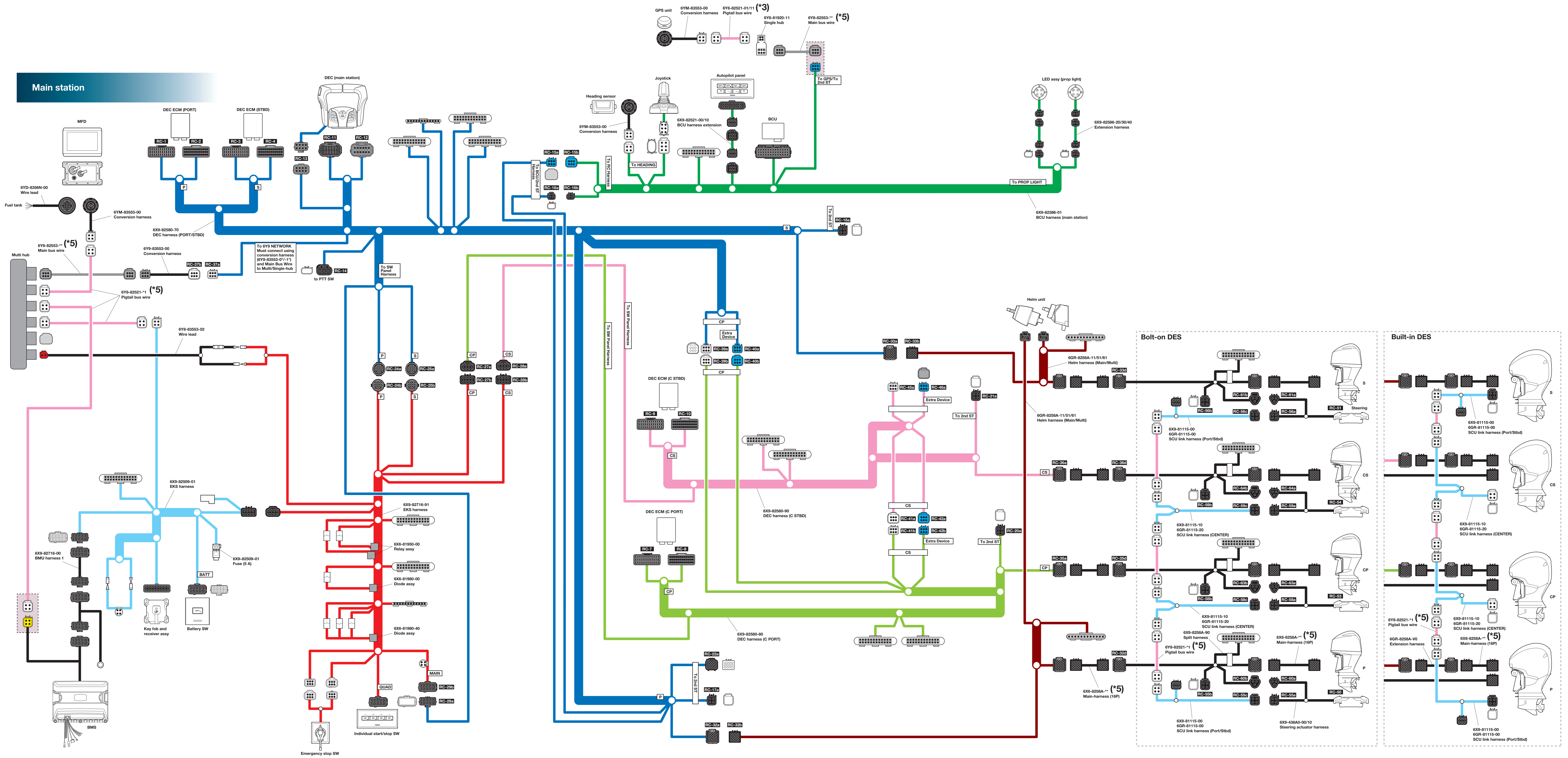


Main station

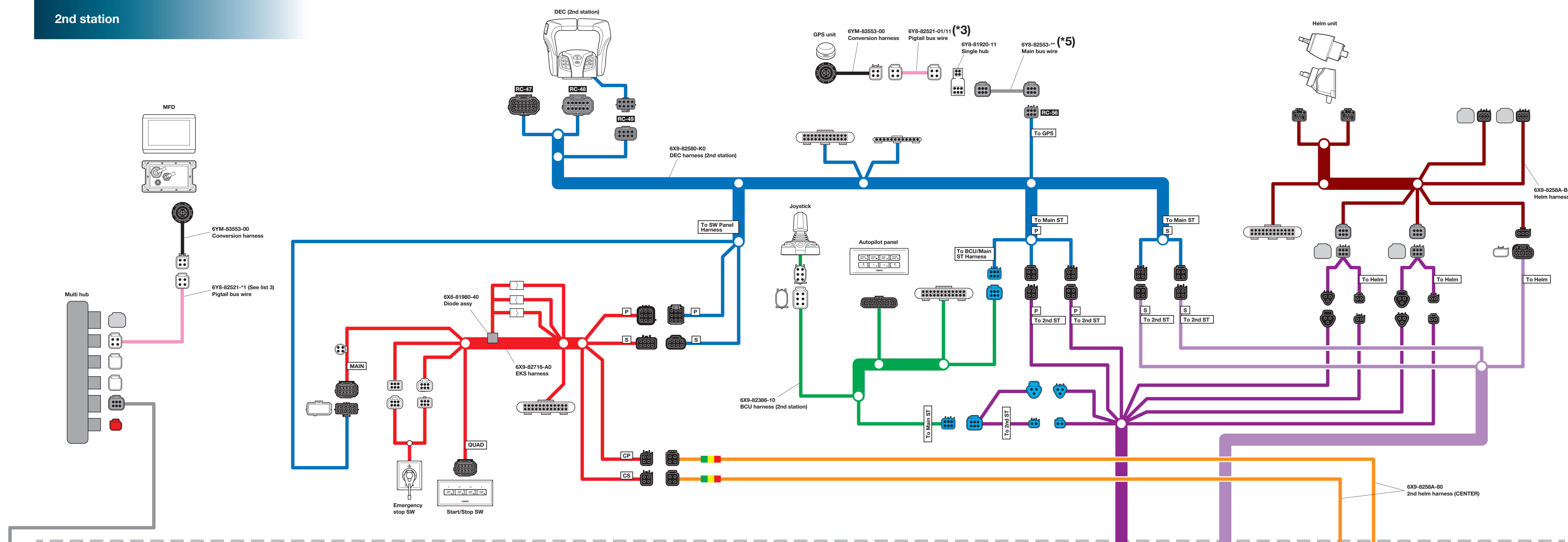




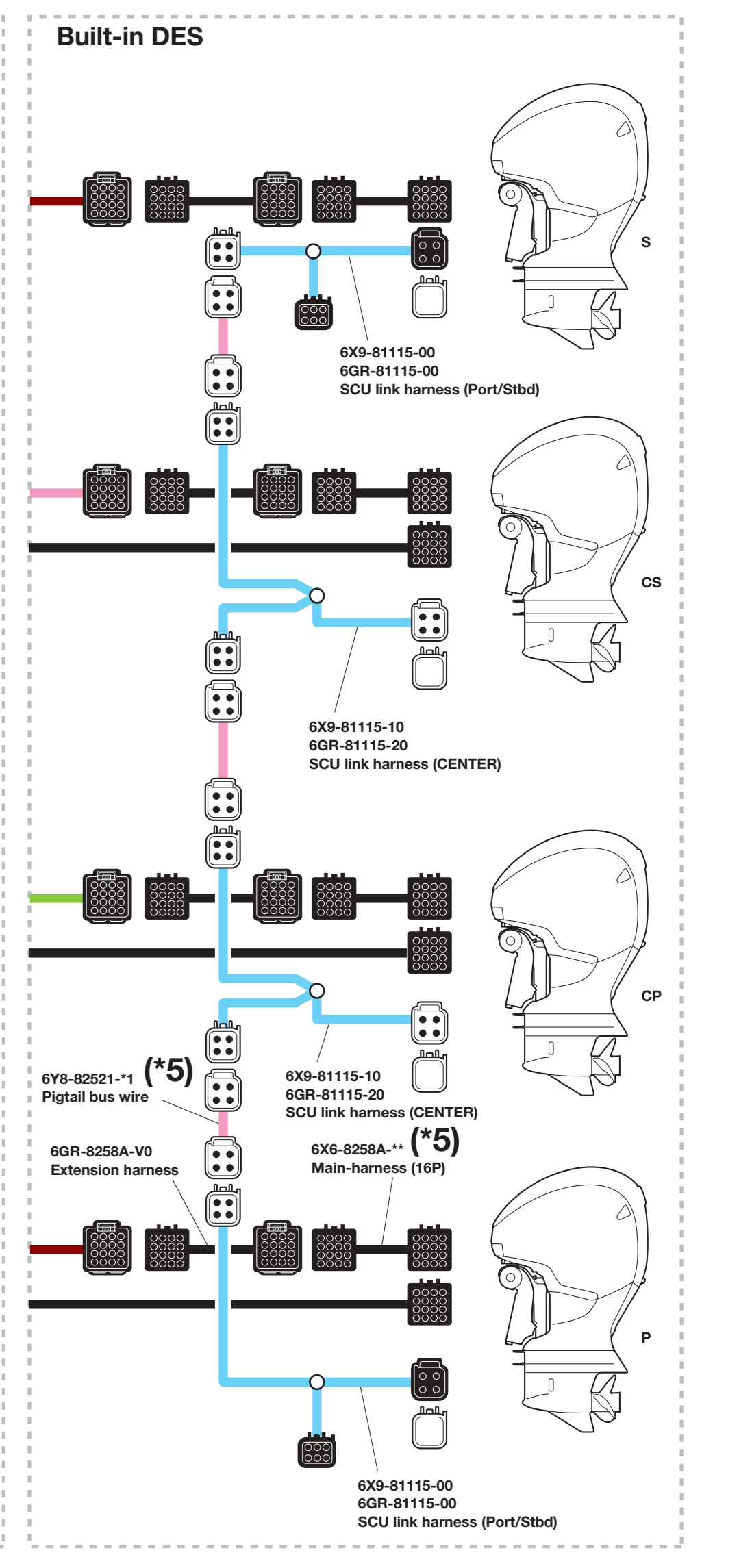
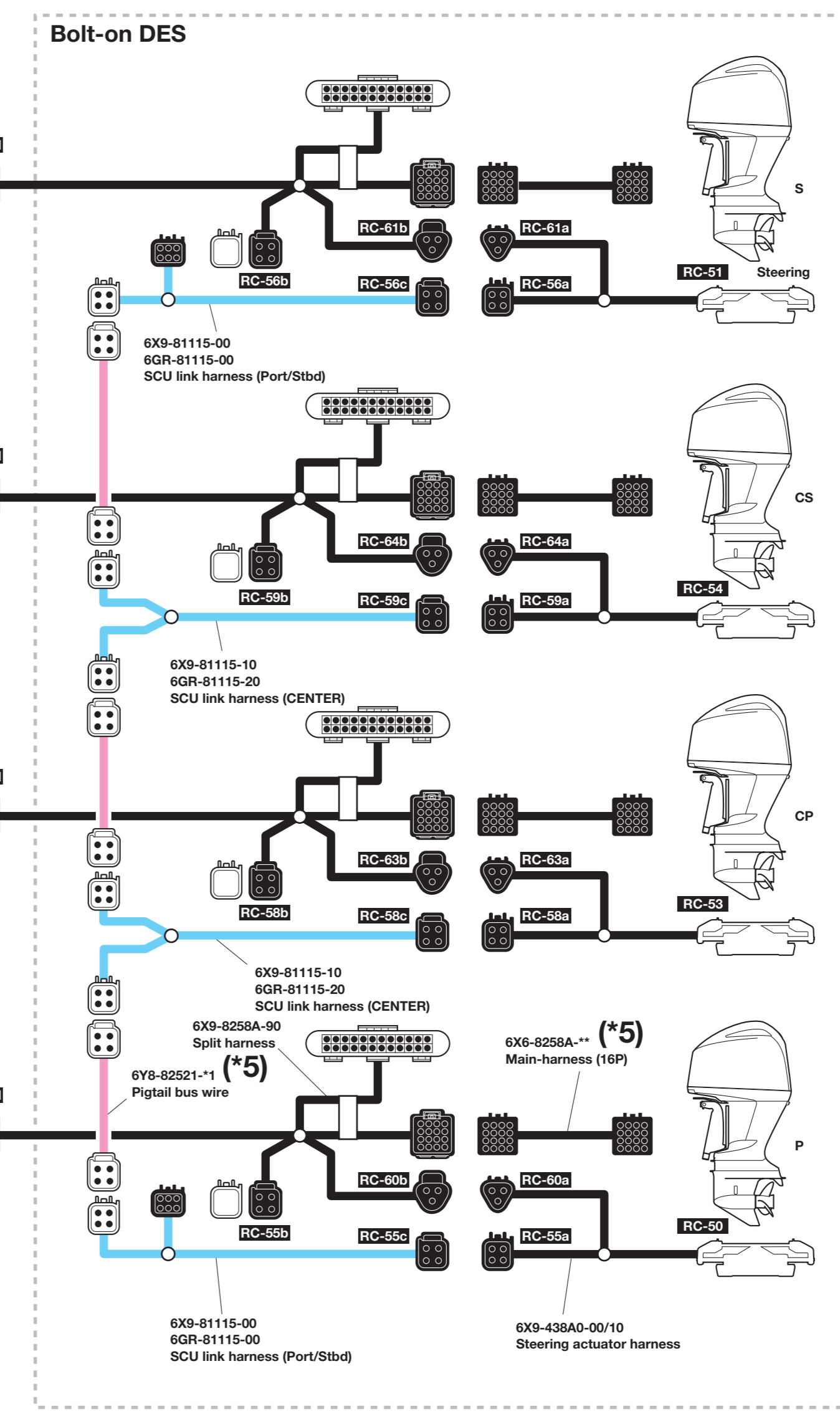
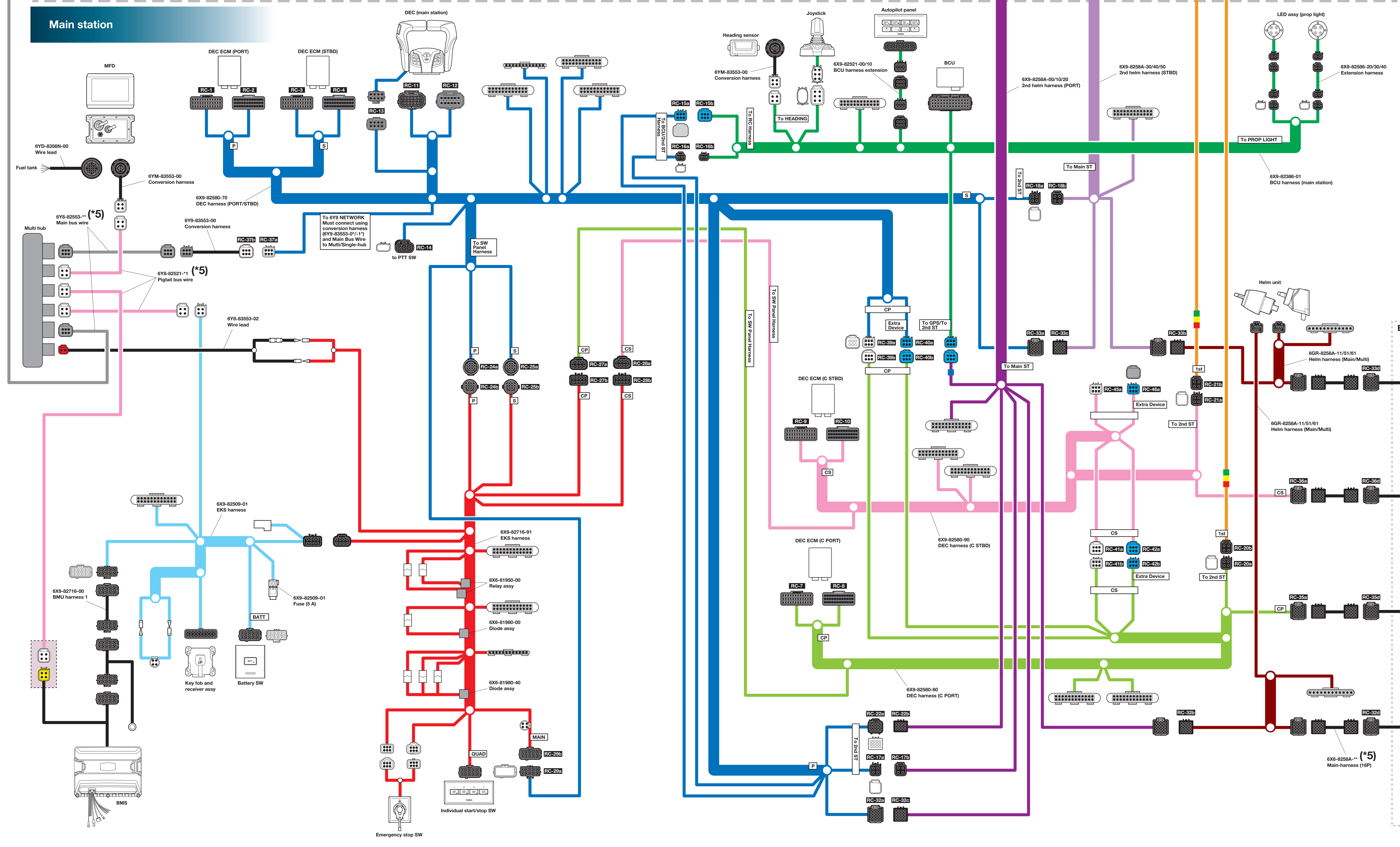




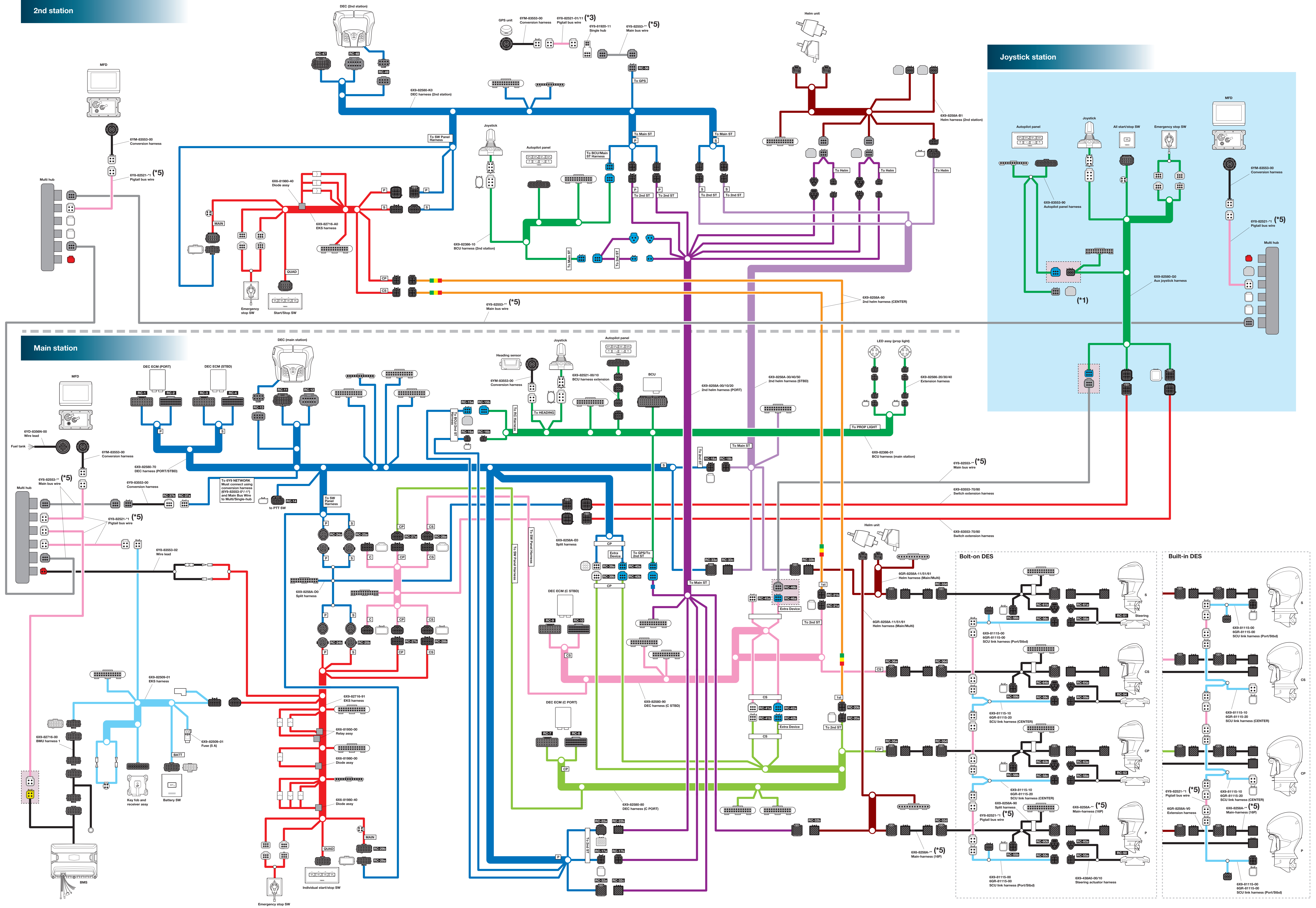
2nd station



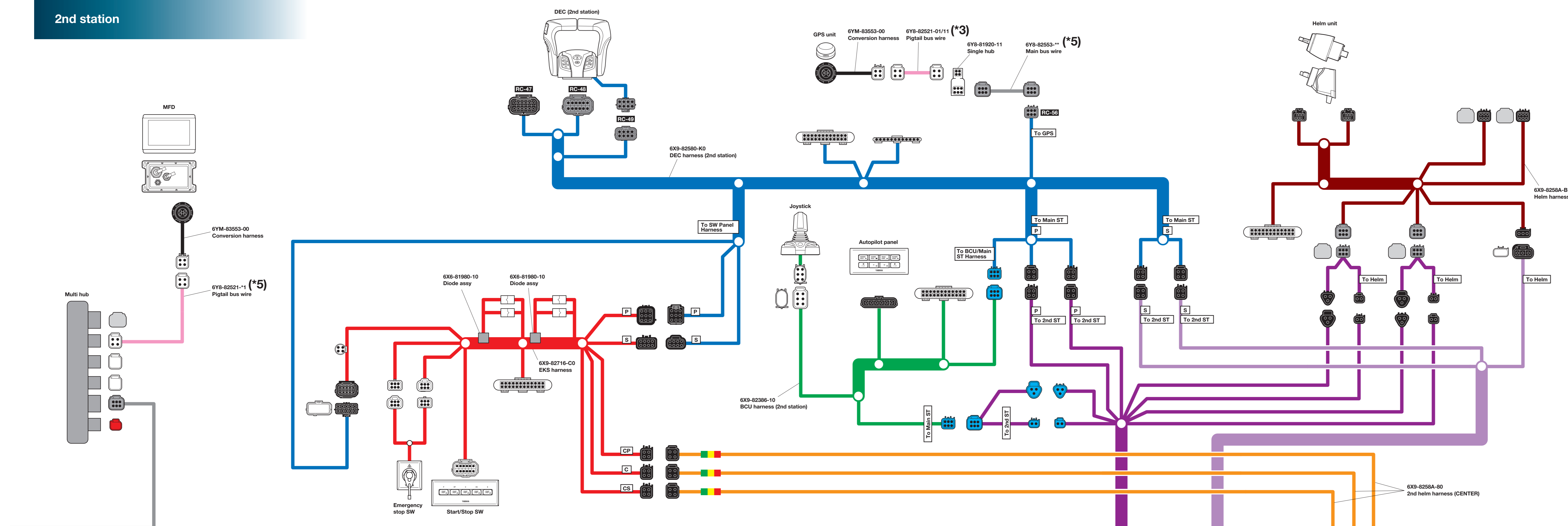
Main station



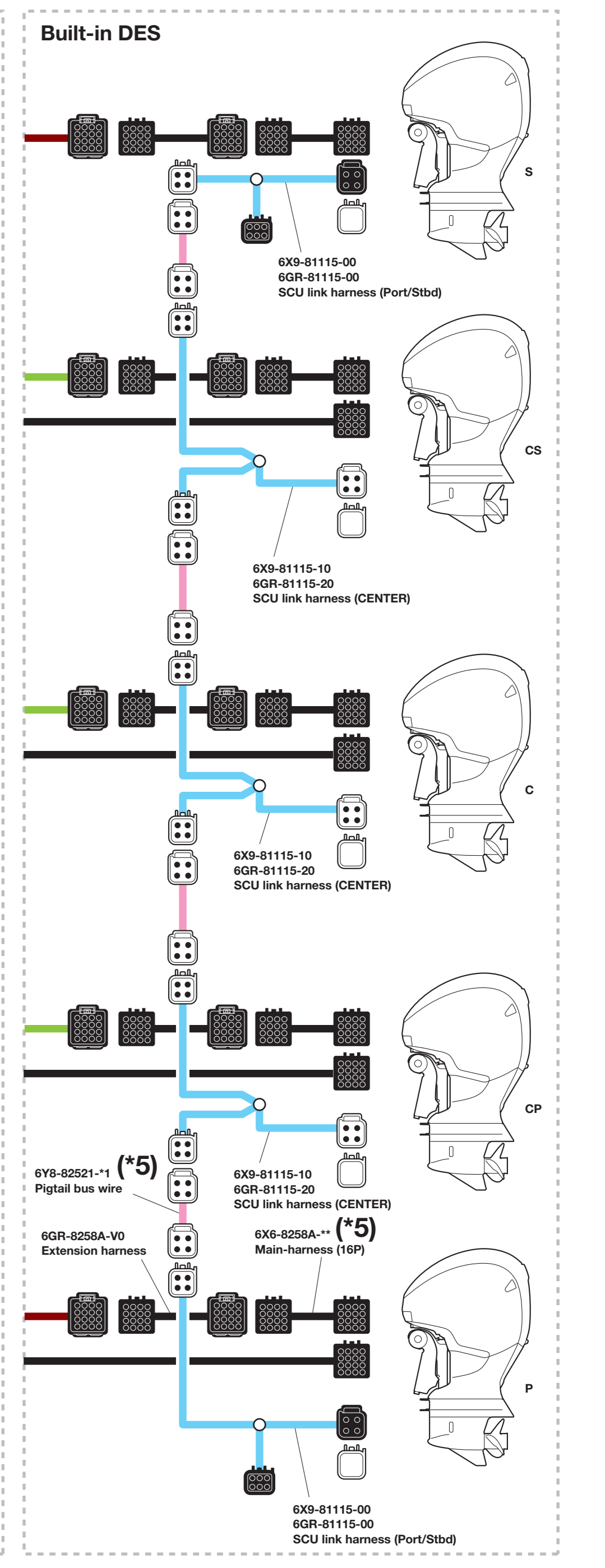
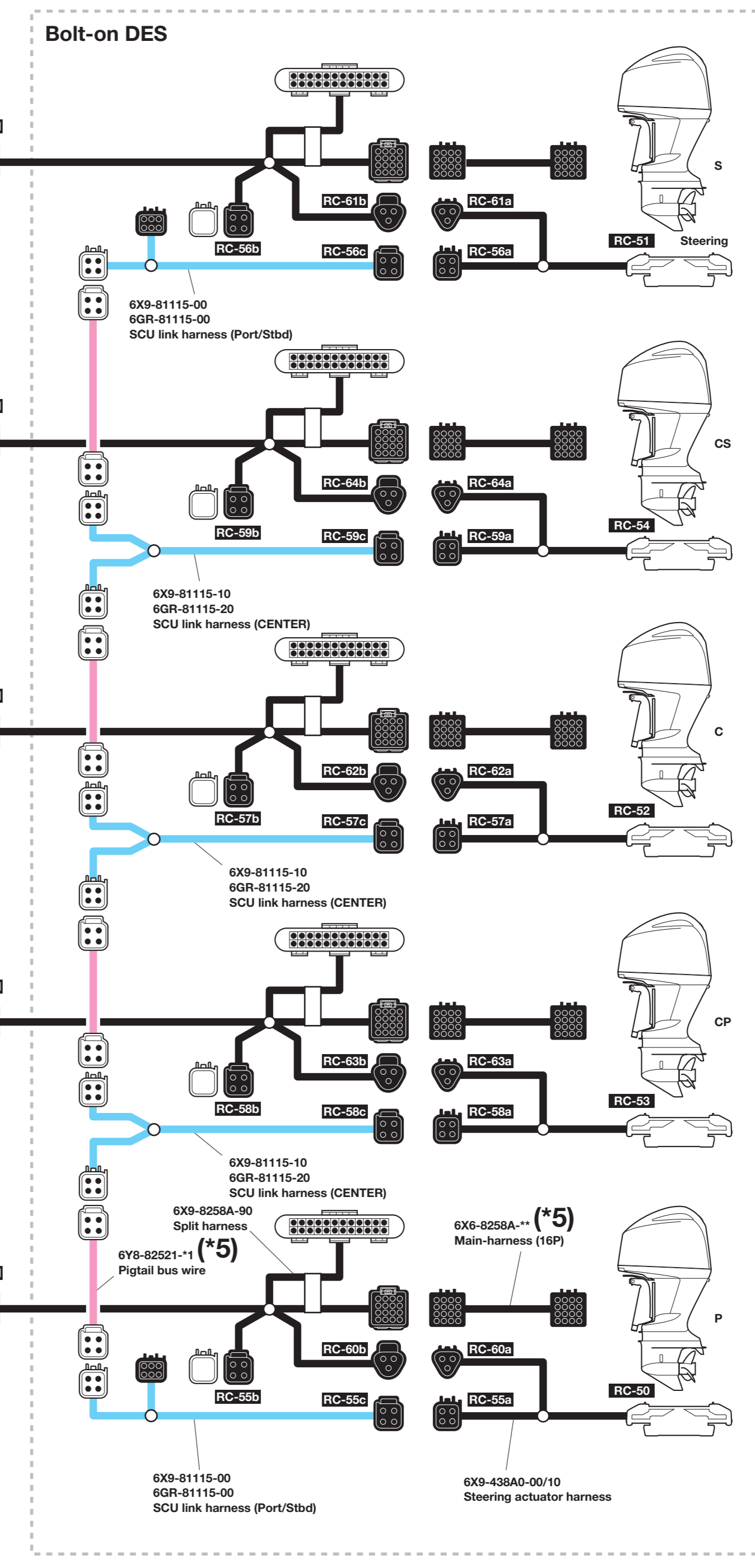
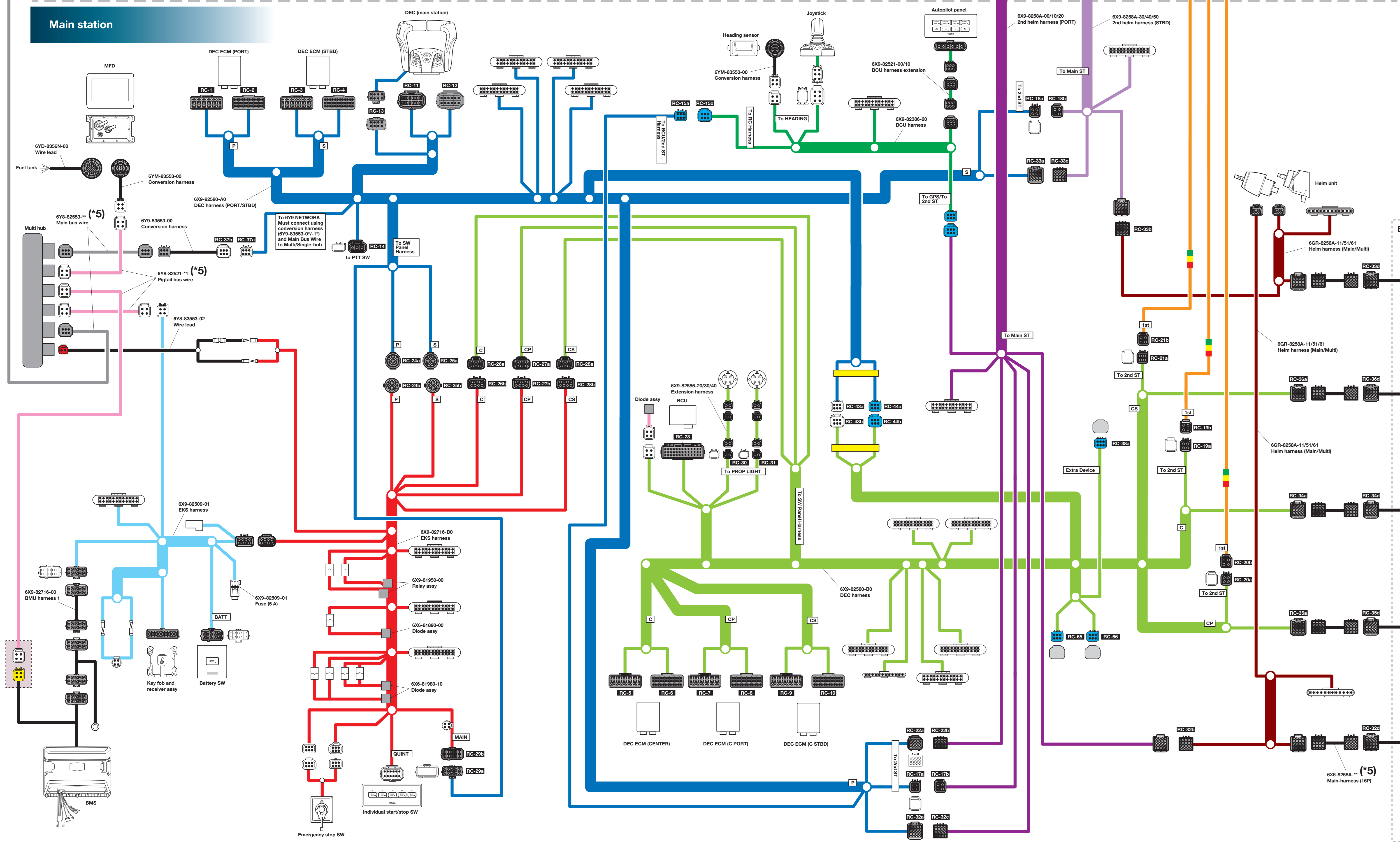
2nd station



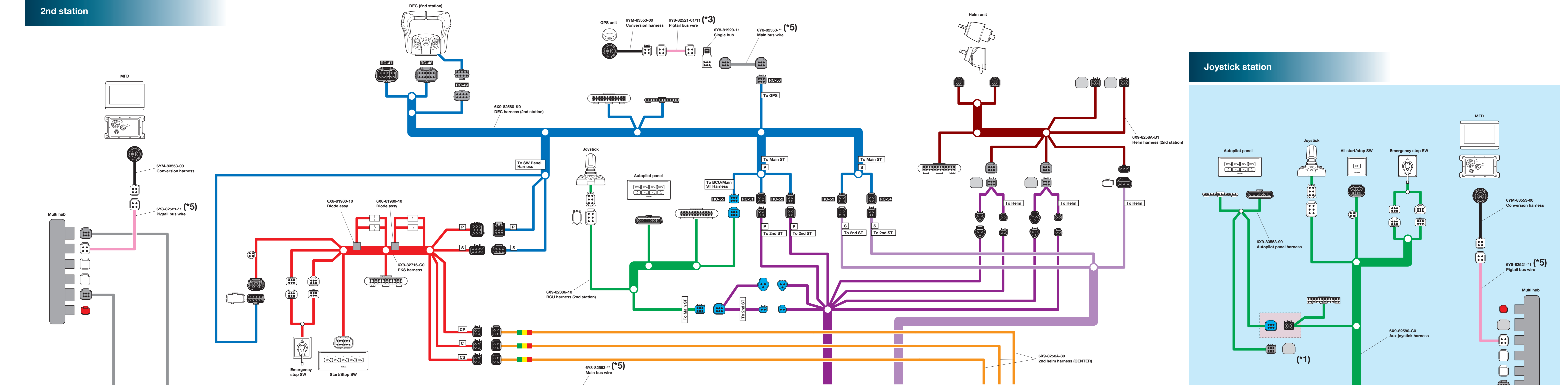
2nd station



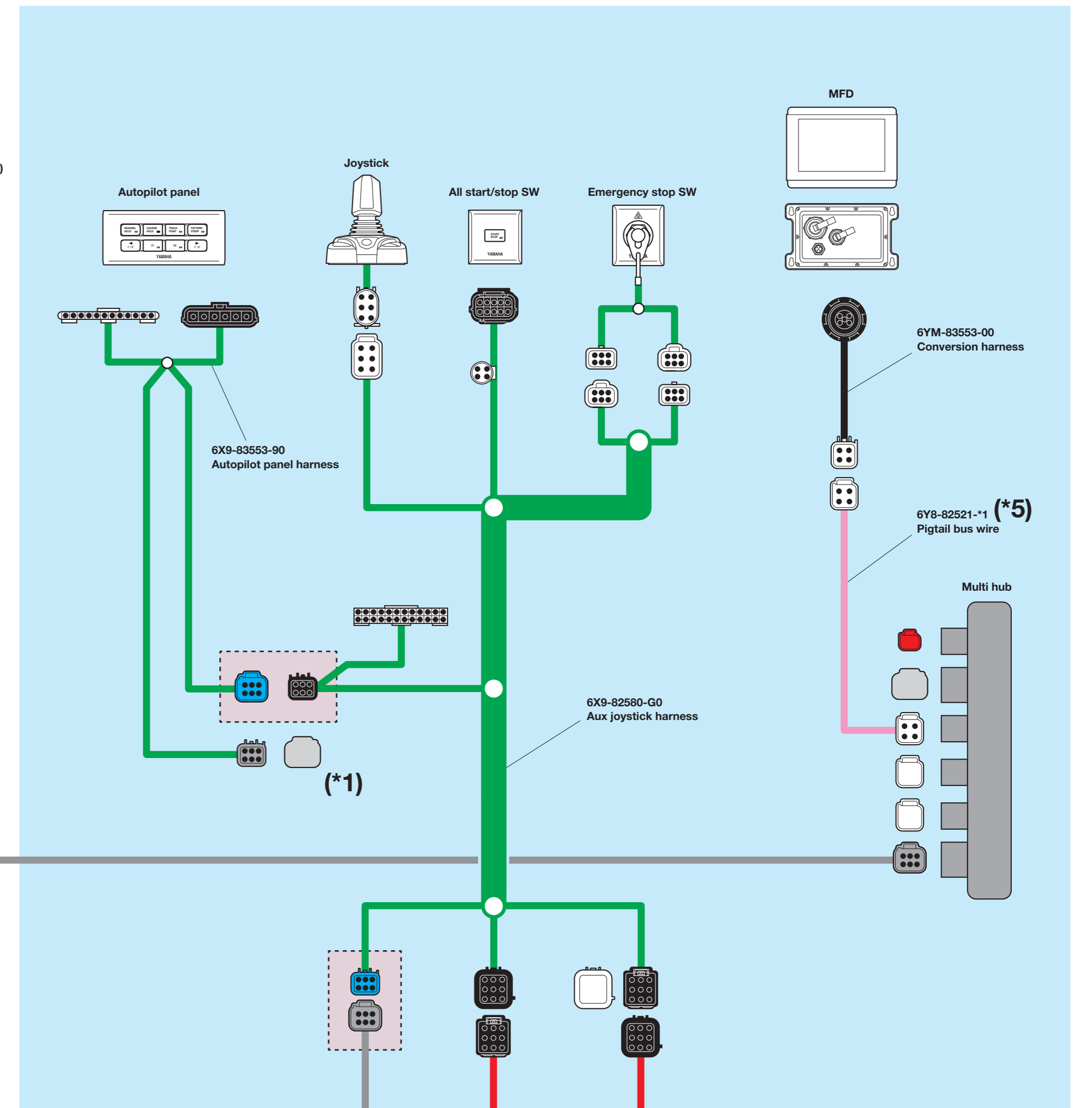
Main station



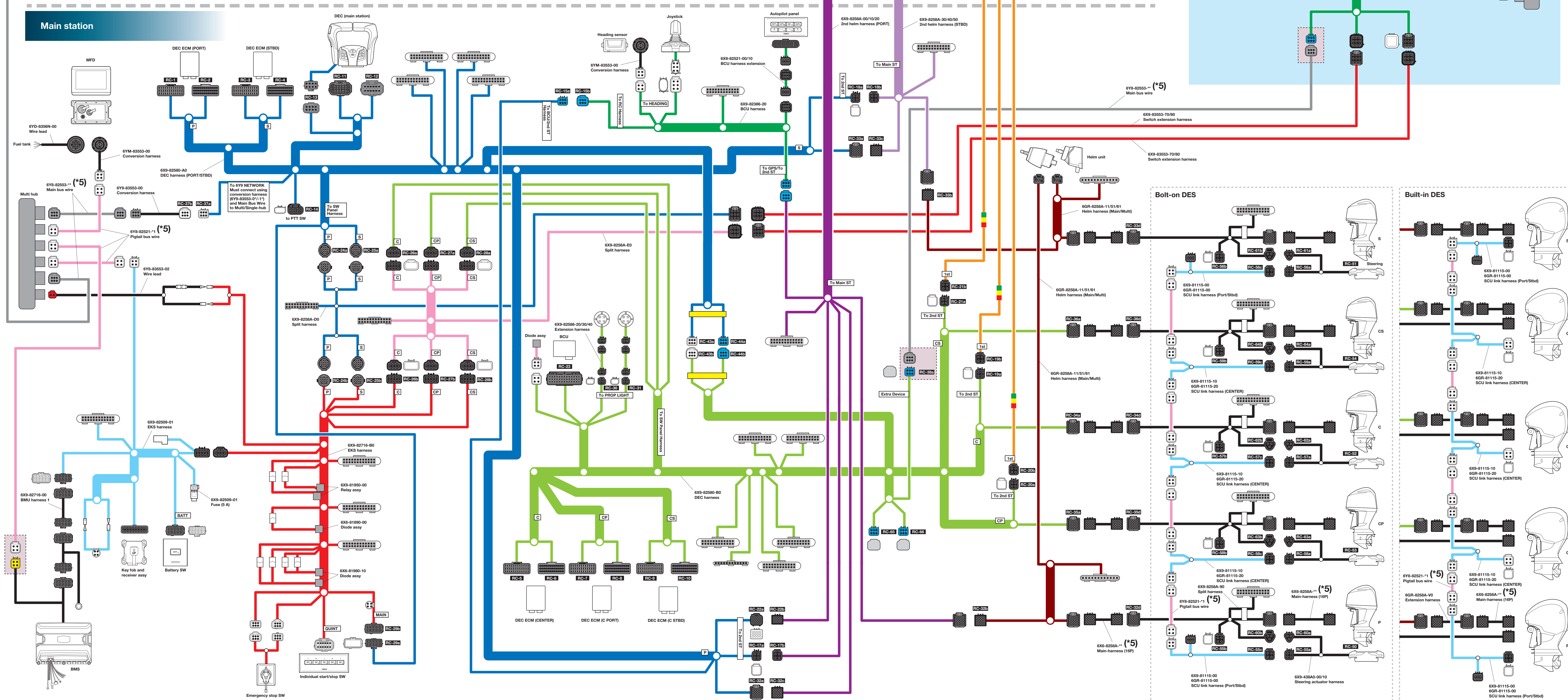
2nd station



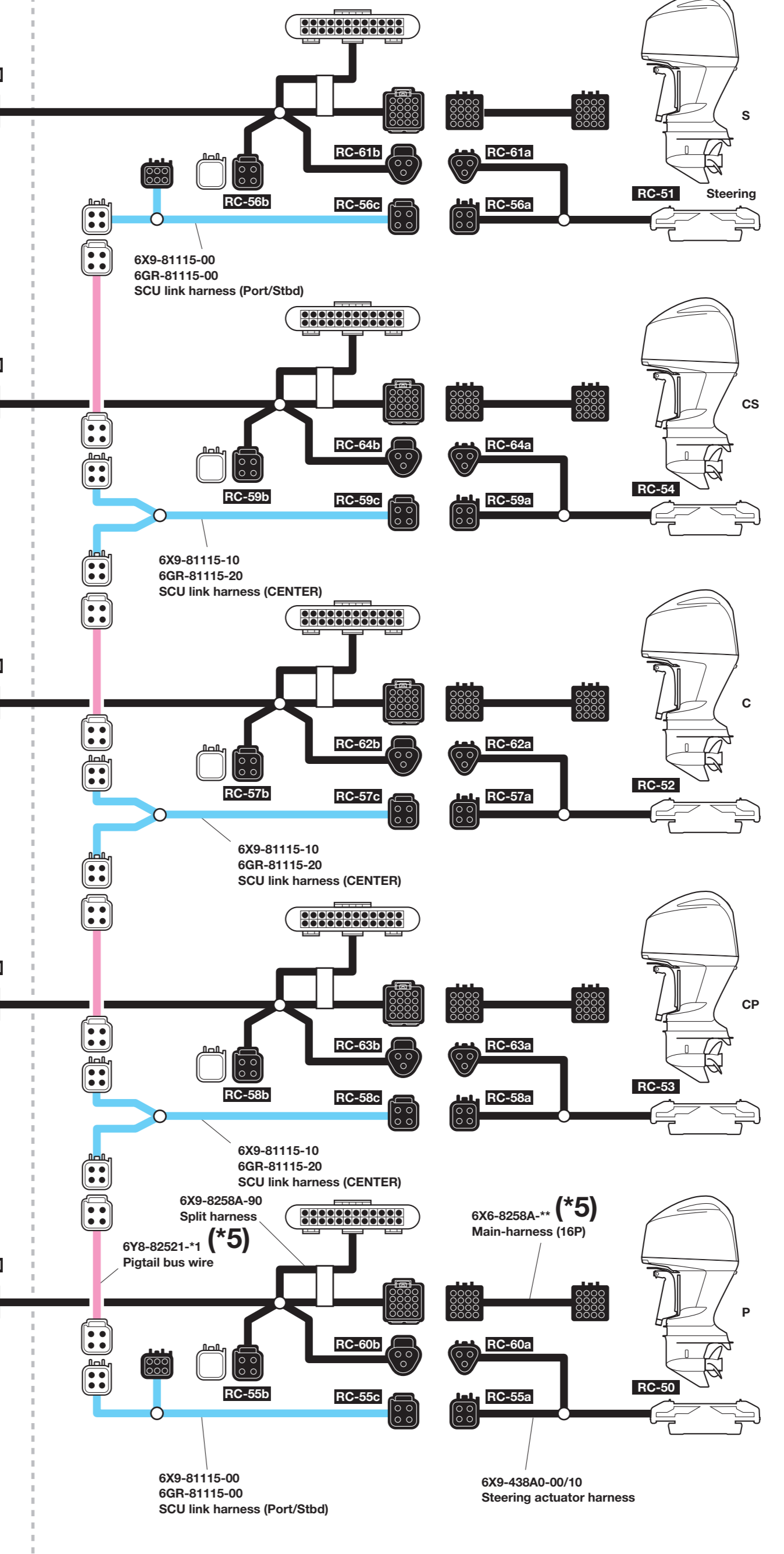
Joystick station



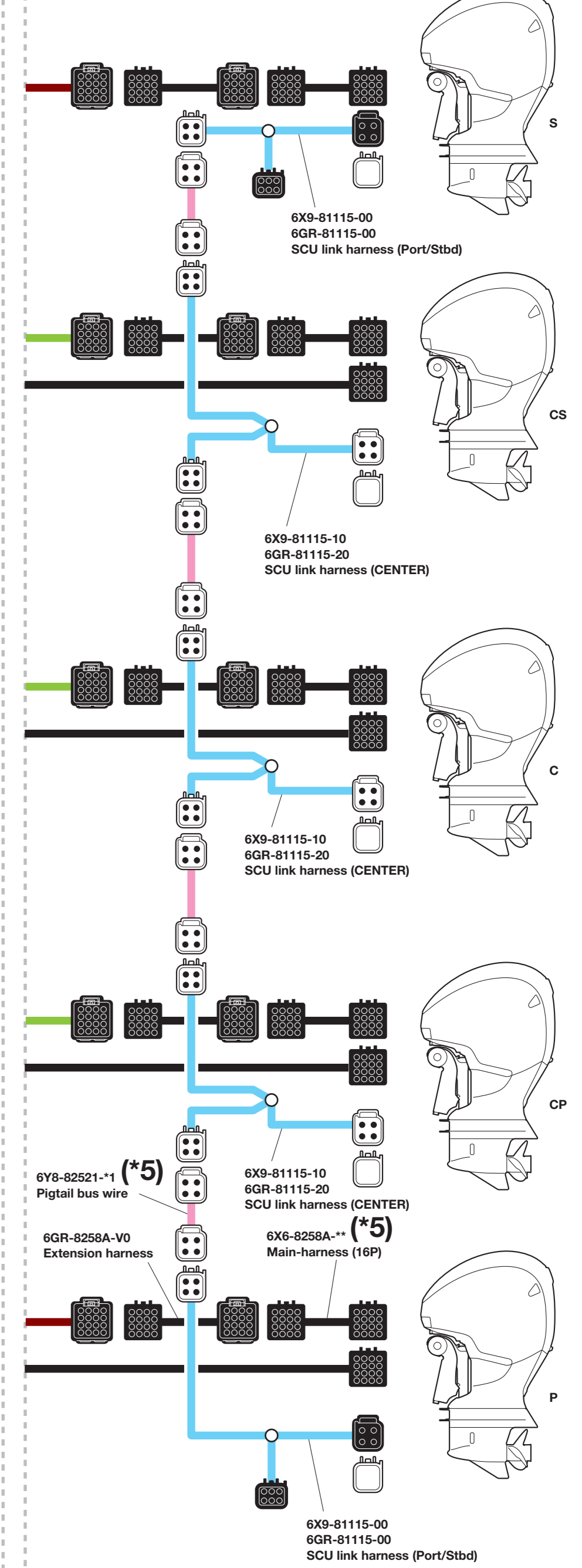
Main station



Bolt-on DES



Built-in DES



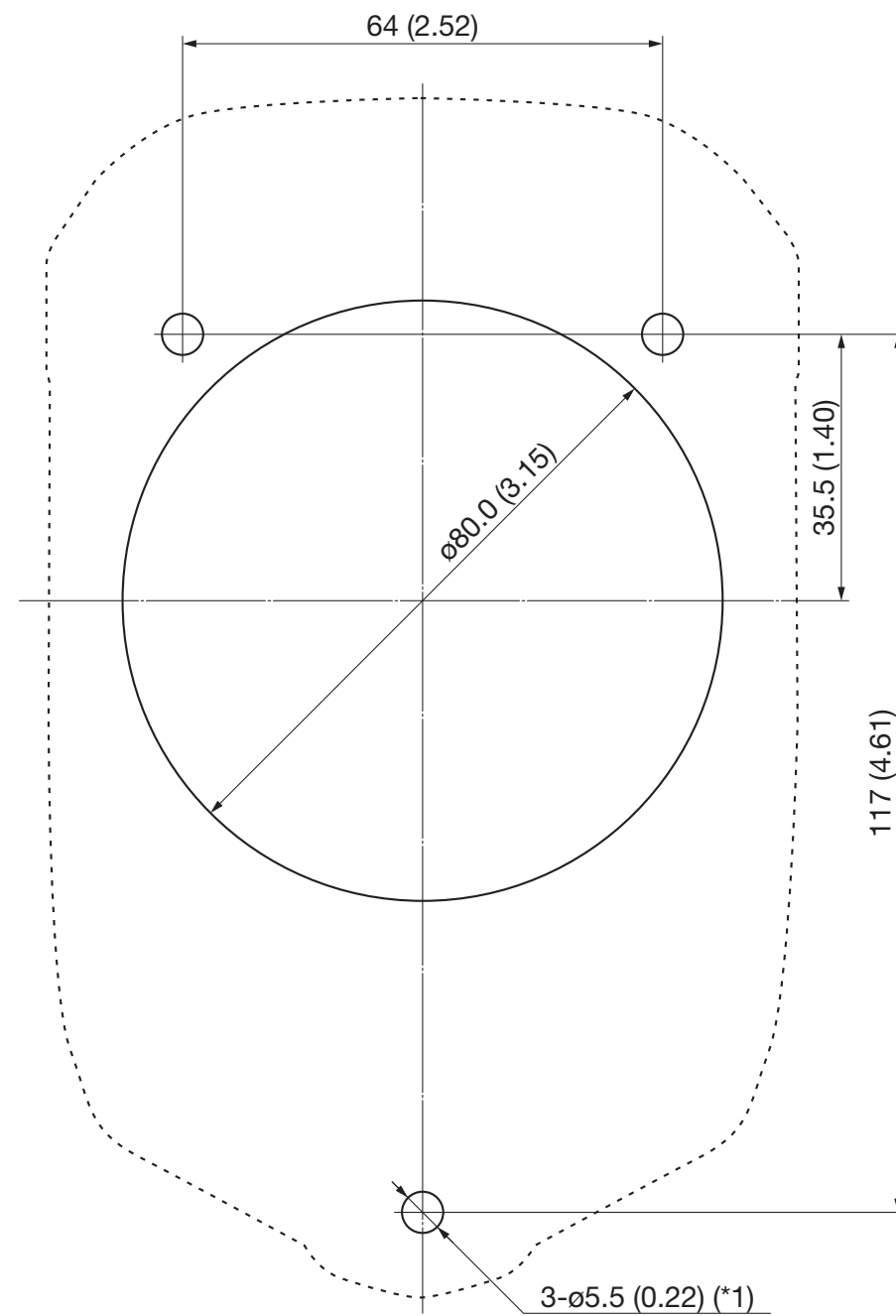
Appendix

TIP: _____
Each of the kits is packaged with an actual-size template.

Template (actual size)

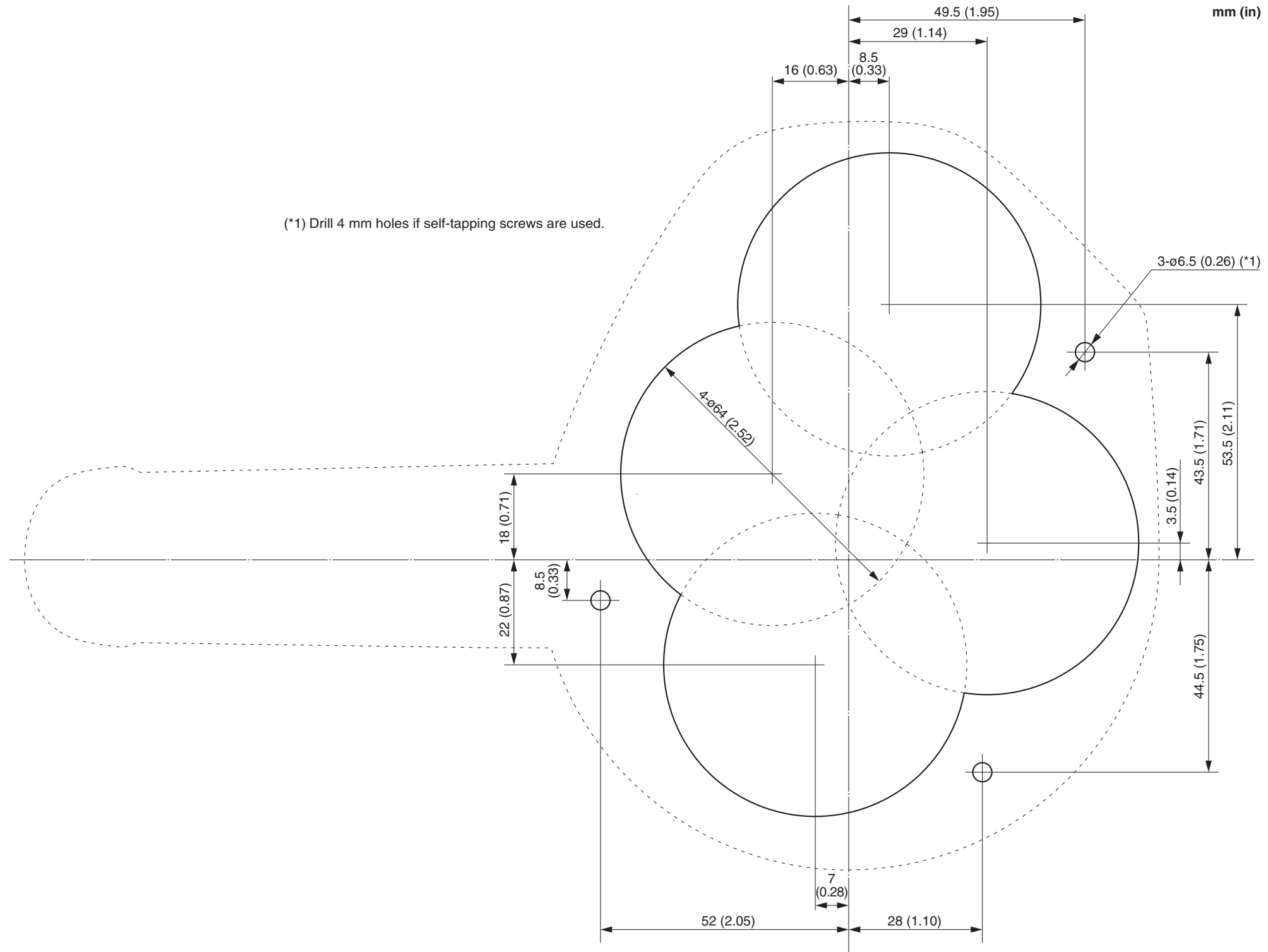
6X9 Digital Electronic Control

mm (in)

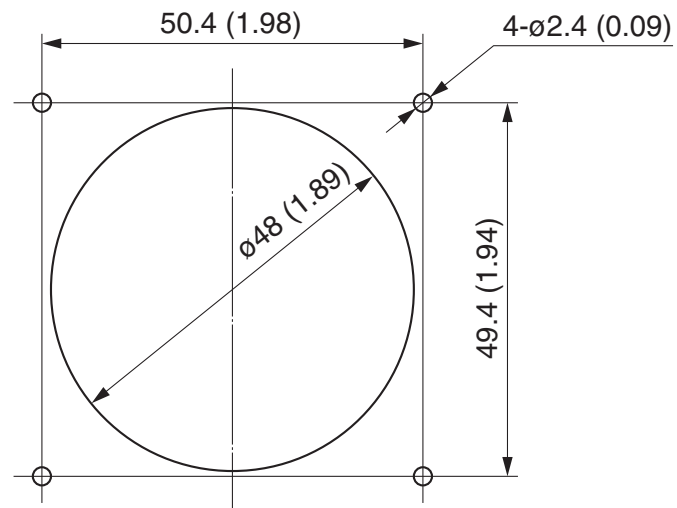


(*1) Drill 3.5 mm holes if self-tapping screws are used.

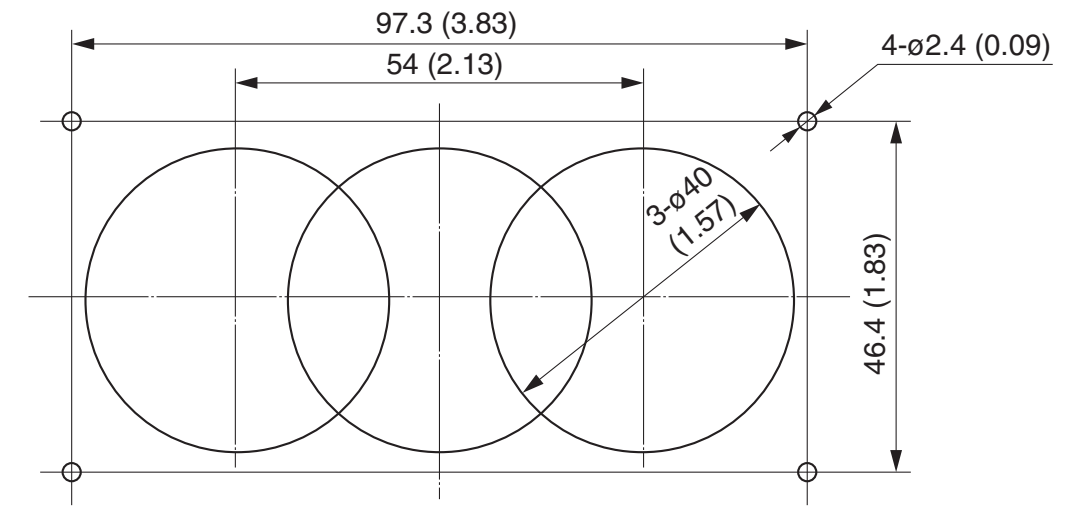
6X9 Flush side mount (DEC)



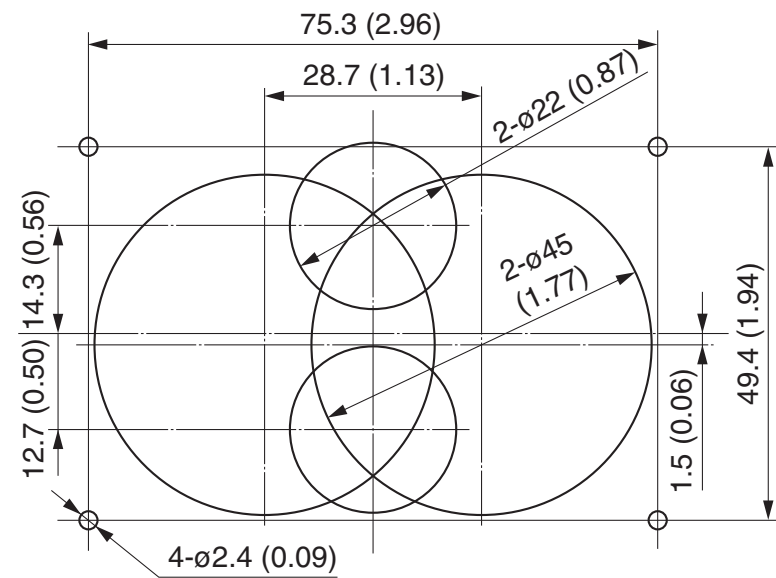
Power switch (Single engine application)



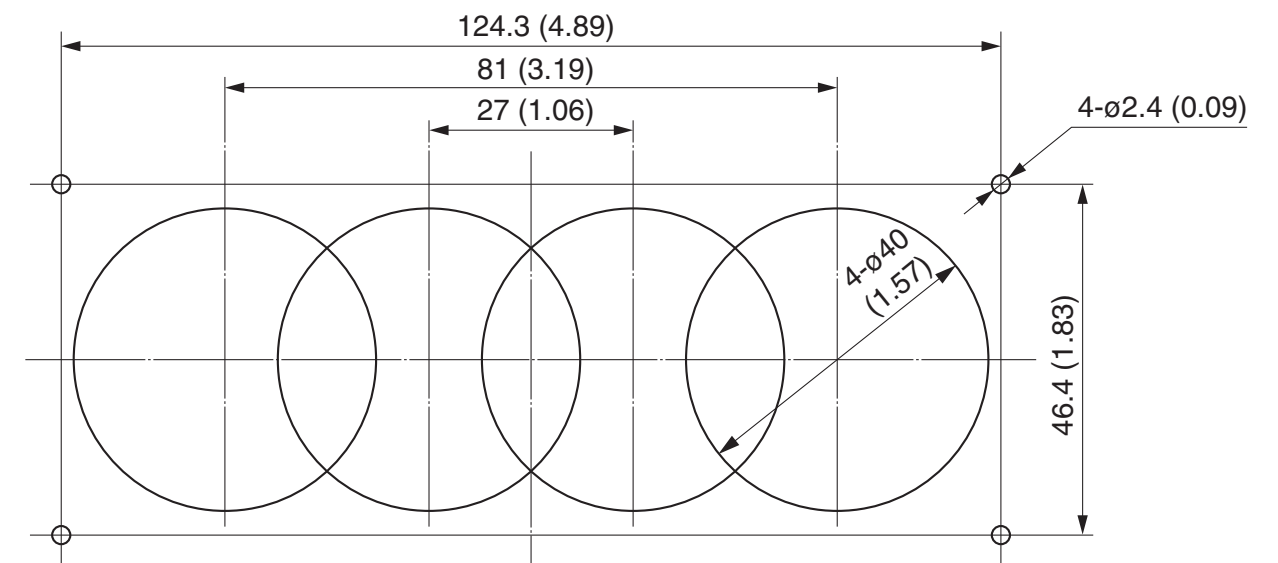
Start/stop switch (Triple engine application)



Power switch (Twin engine application/main station)



Start/stop switch (Quad engine application)



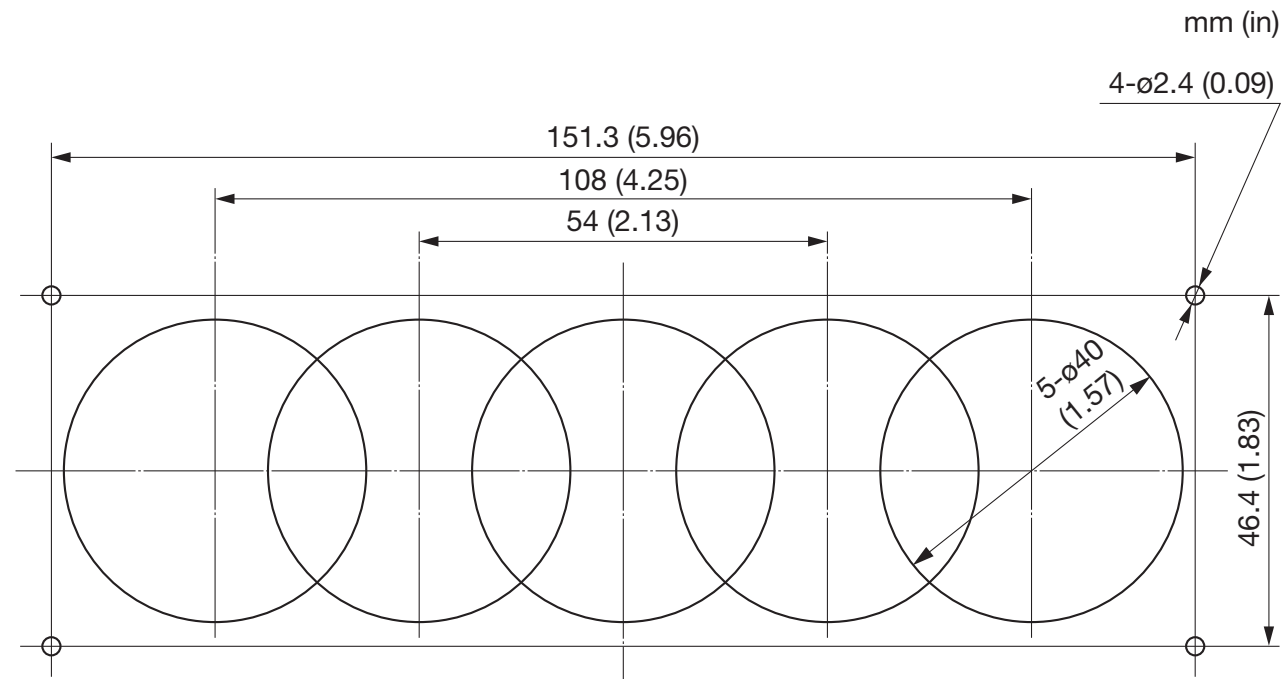
mm (in)

mm (in)

mm (in)

mm (in)

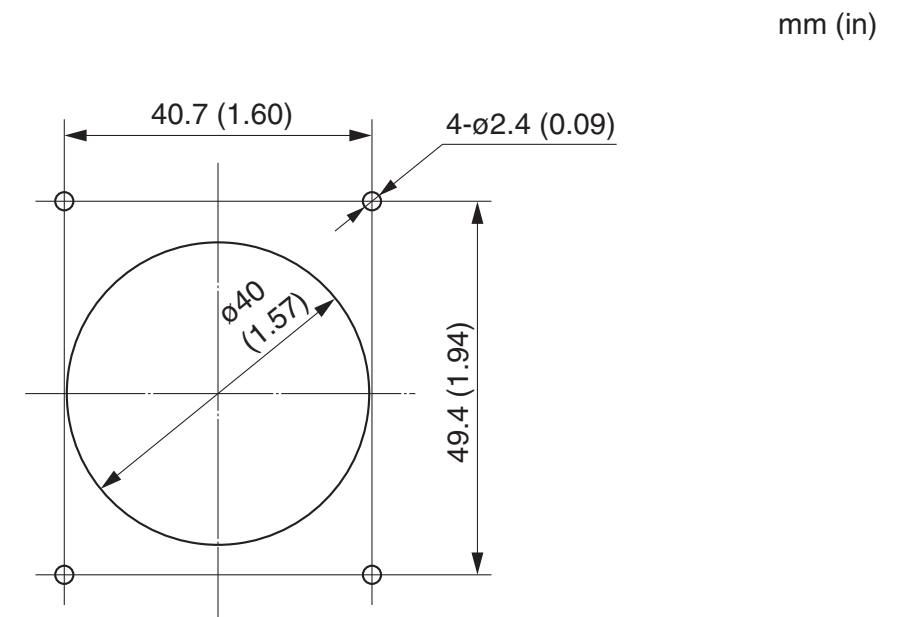
Start/stop switch (Quint engine application)



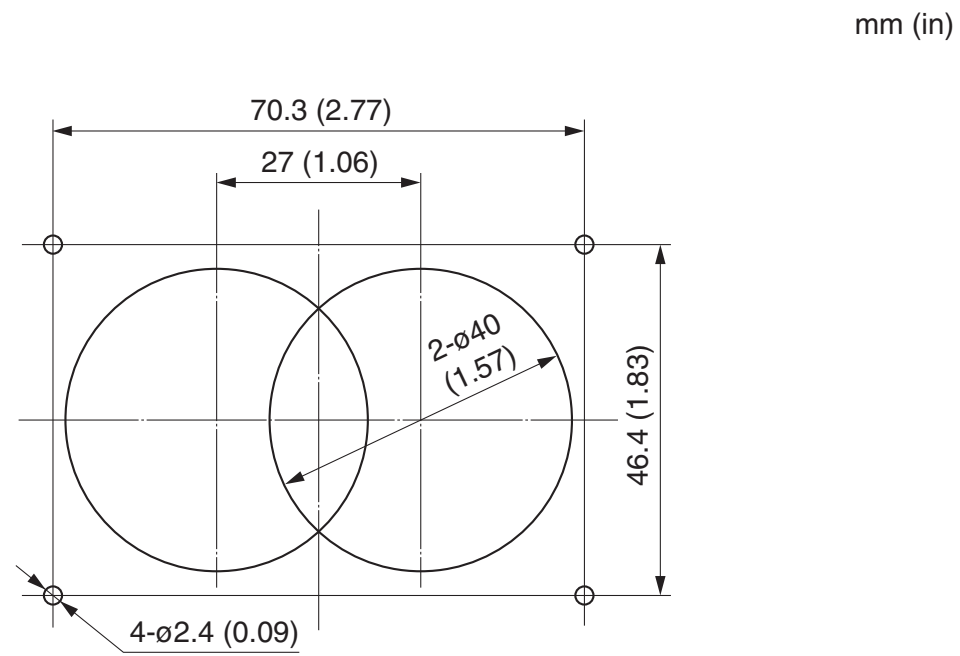
Engine shut-off switch

Start/stop switch (Single engine application)

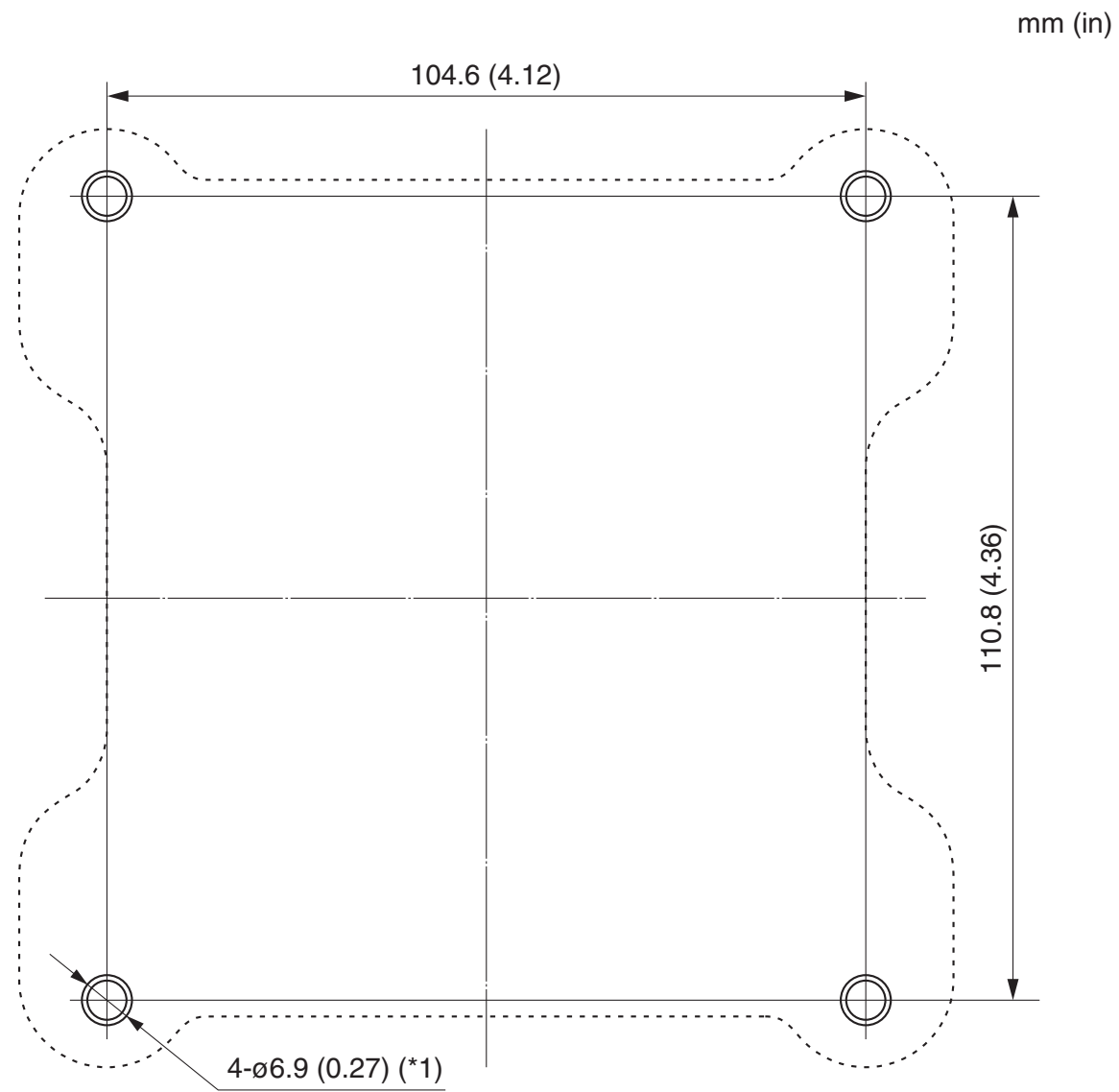
All start/stop switch (Twin/triple/quad/quint engine application)



Start/stop switch (Twin engine application/2nd station)

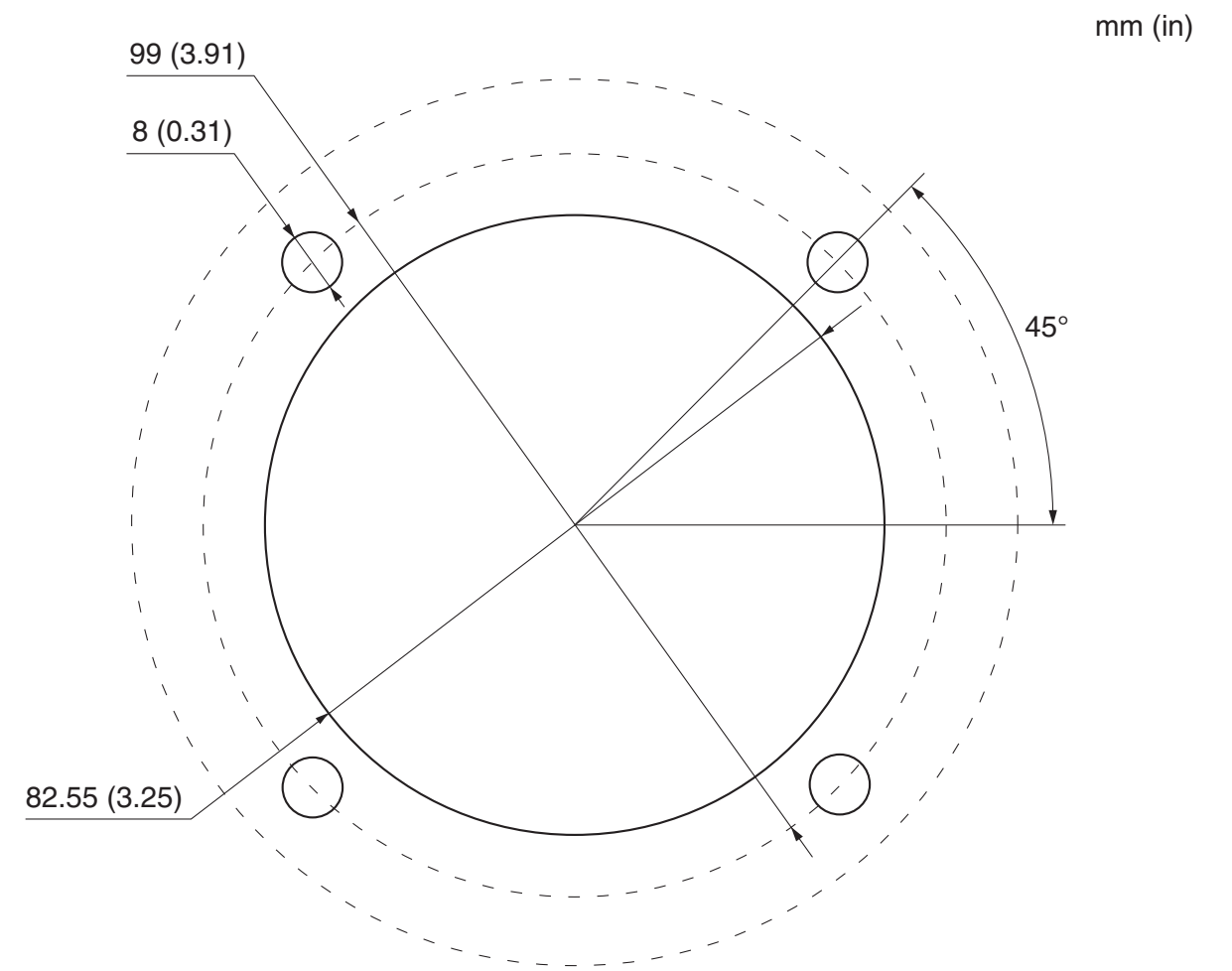


Keyless unit (receiver assy)

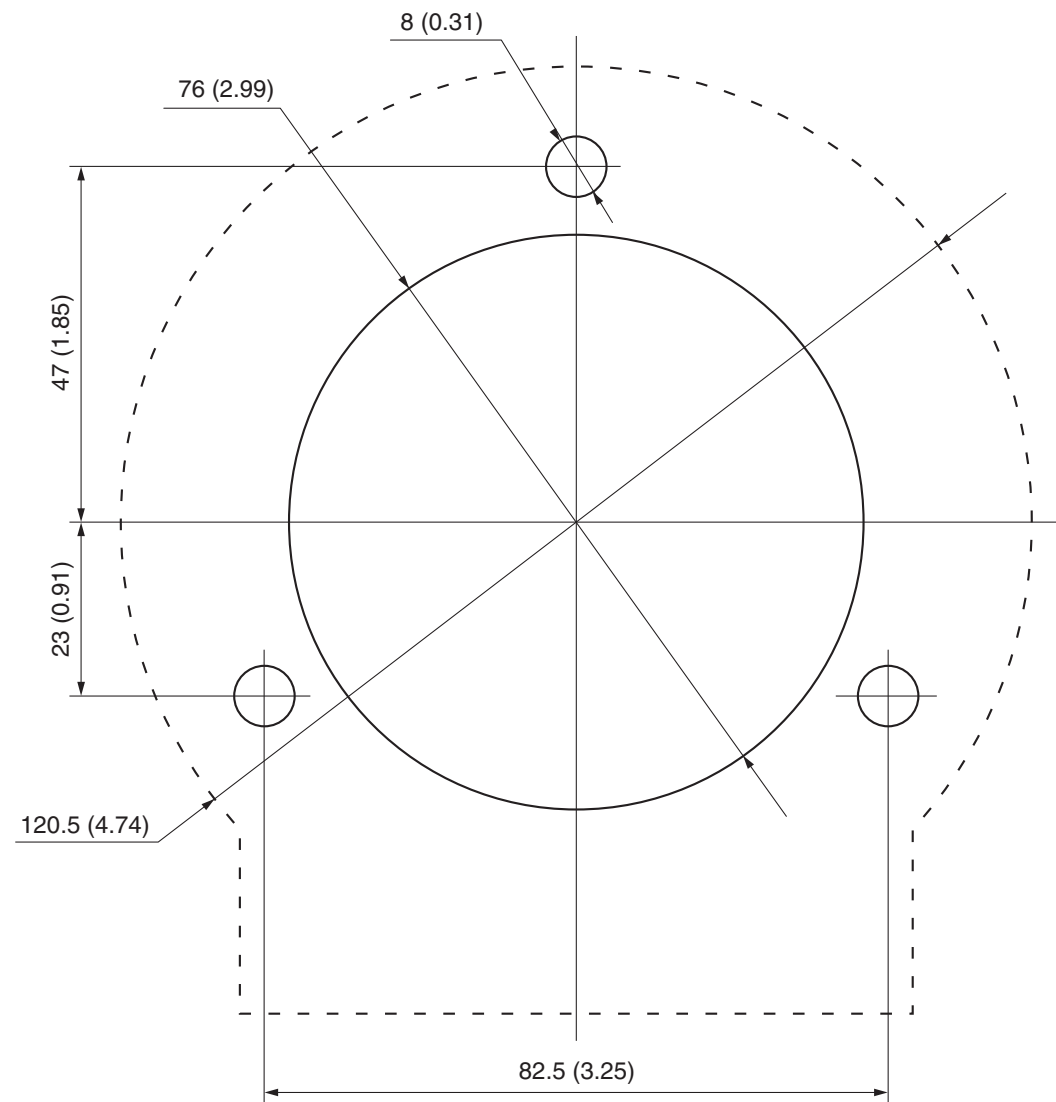


(*1) Drill 5.4 mm holes if self-tapping screws are used.

Helm unit

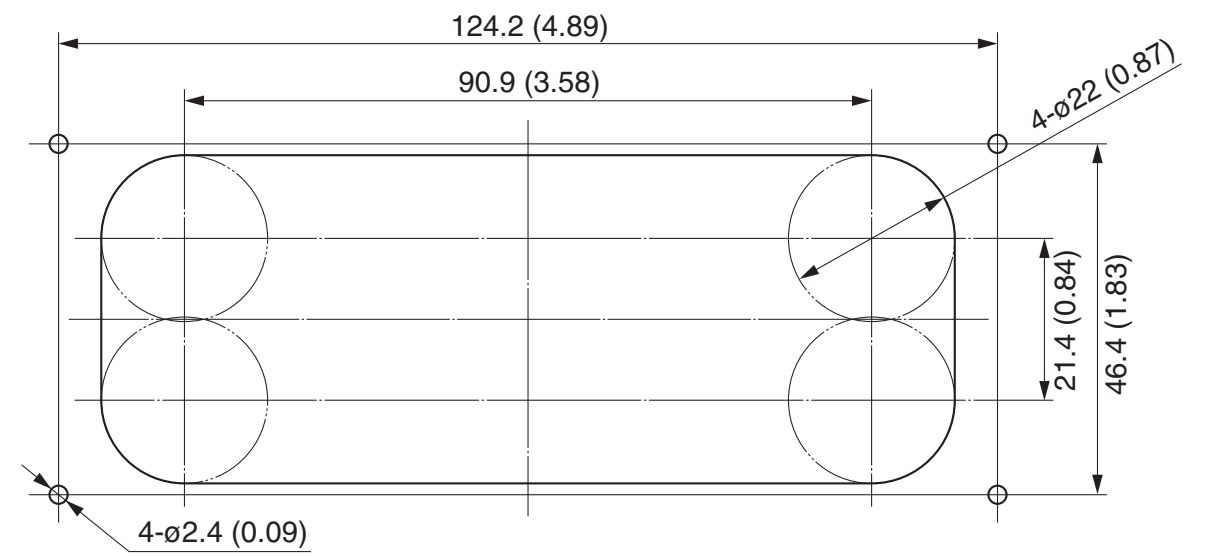


Tilt helm unit



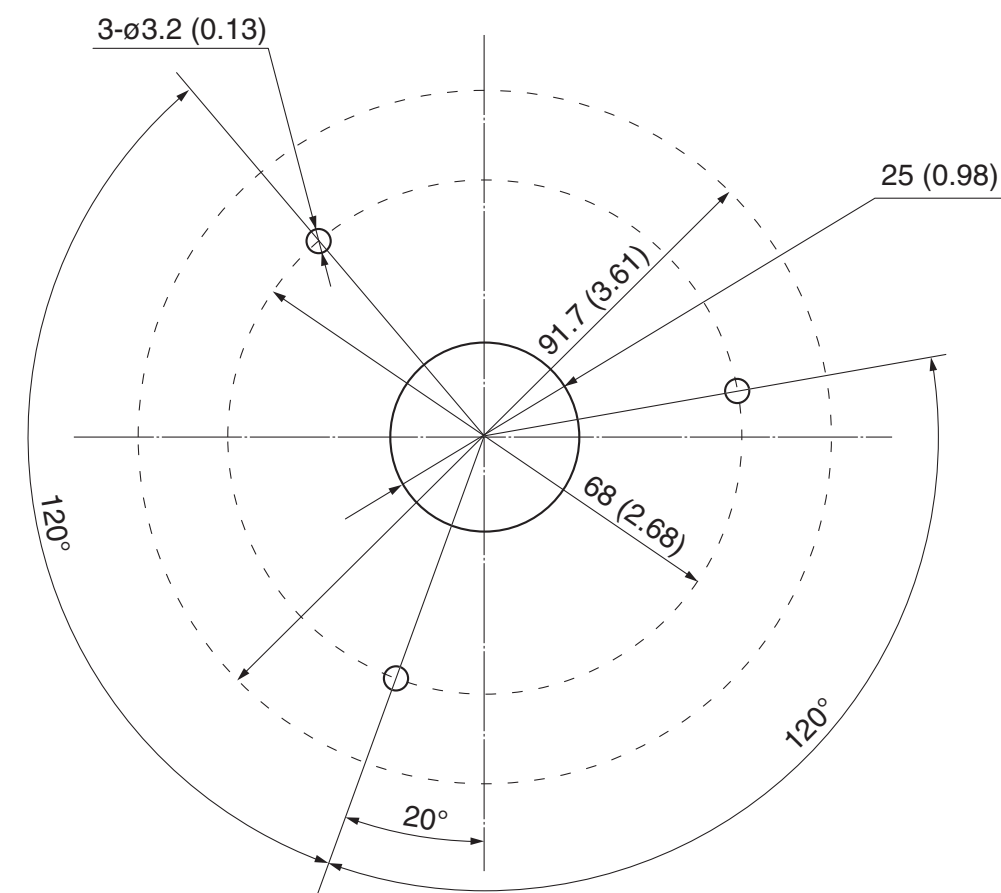
mm (in)

Autopilot panel



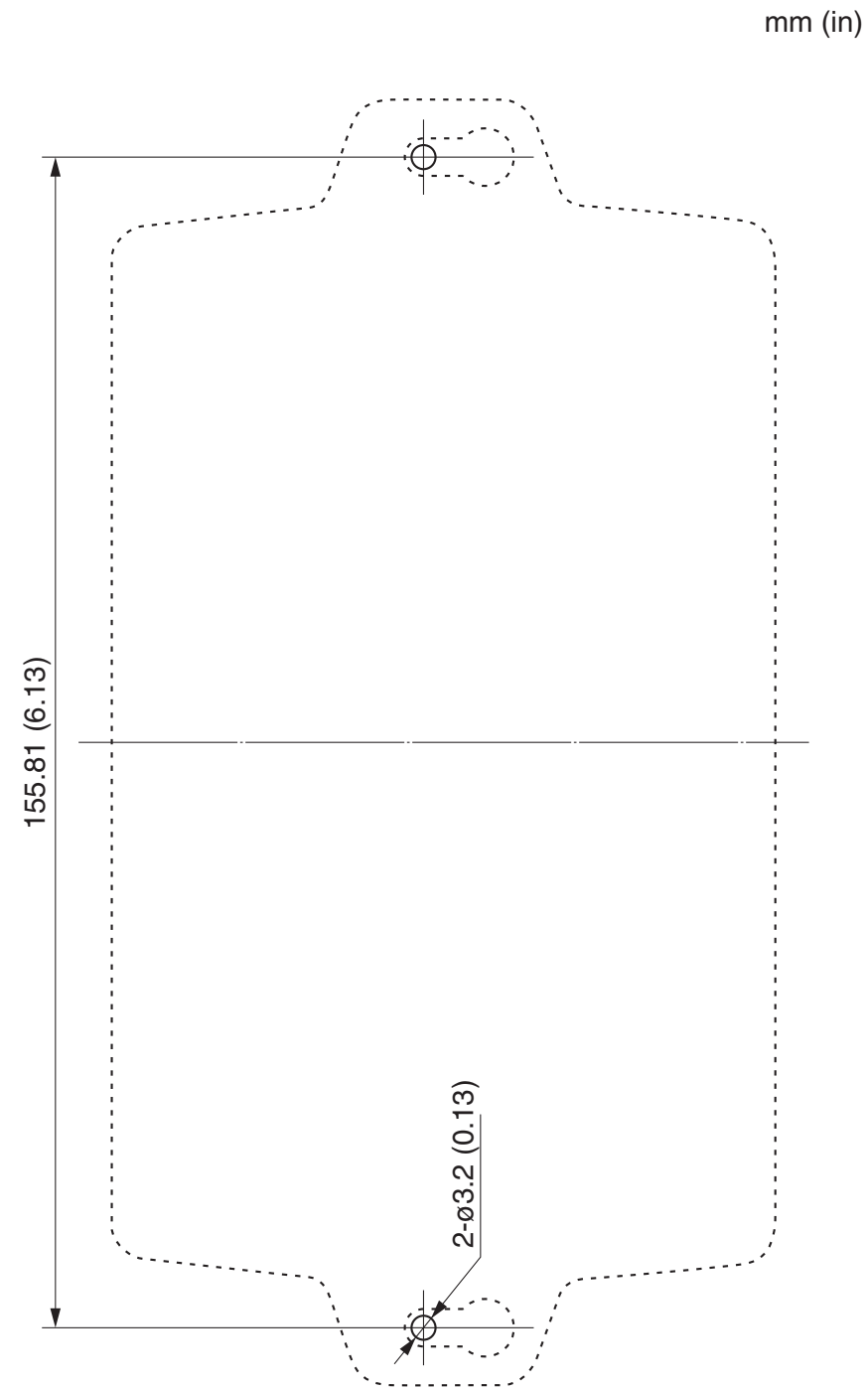
mm (in)

GPS unit



mm (in)

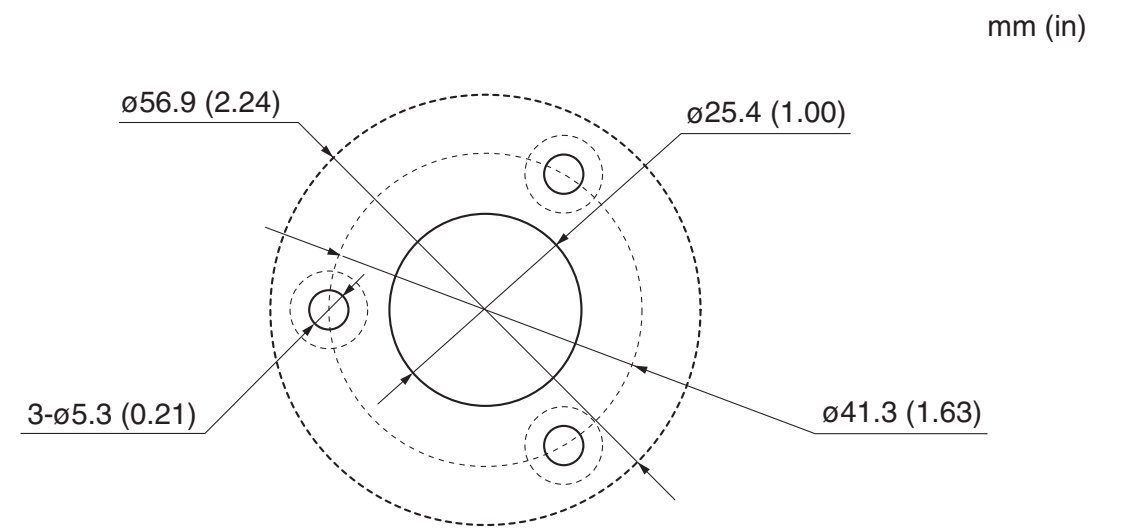
Heading sensor

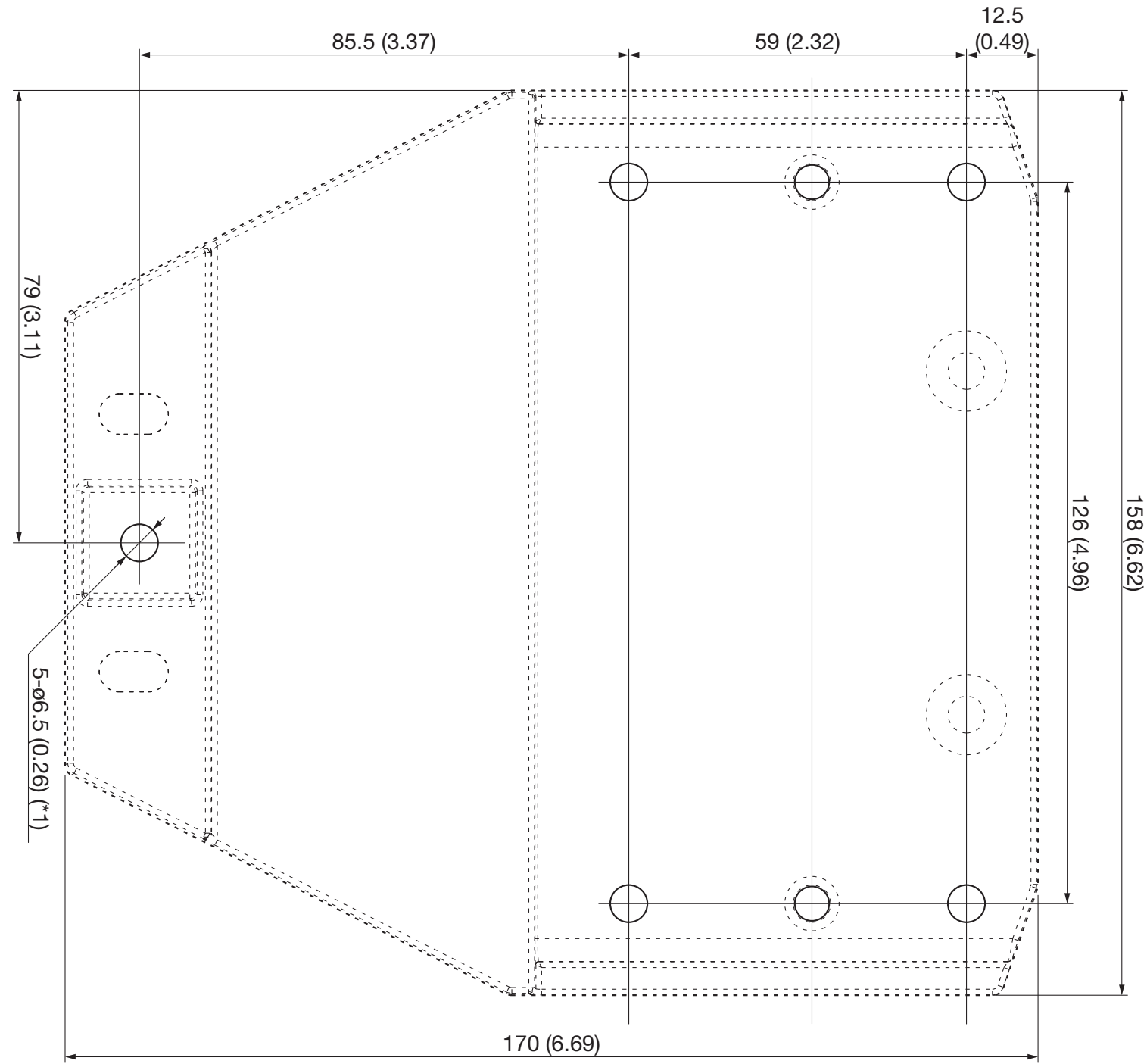


BCU

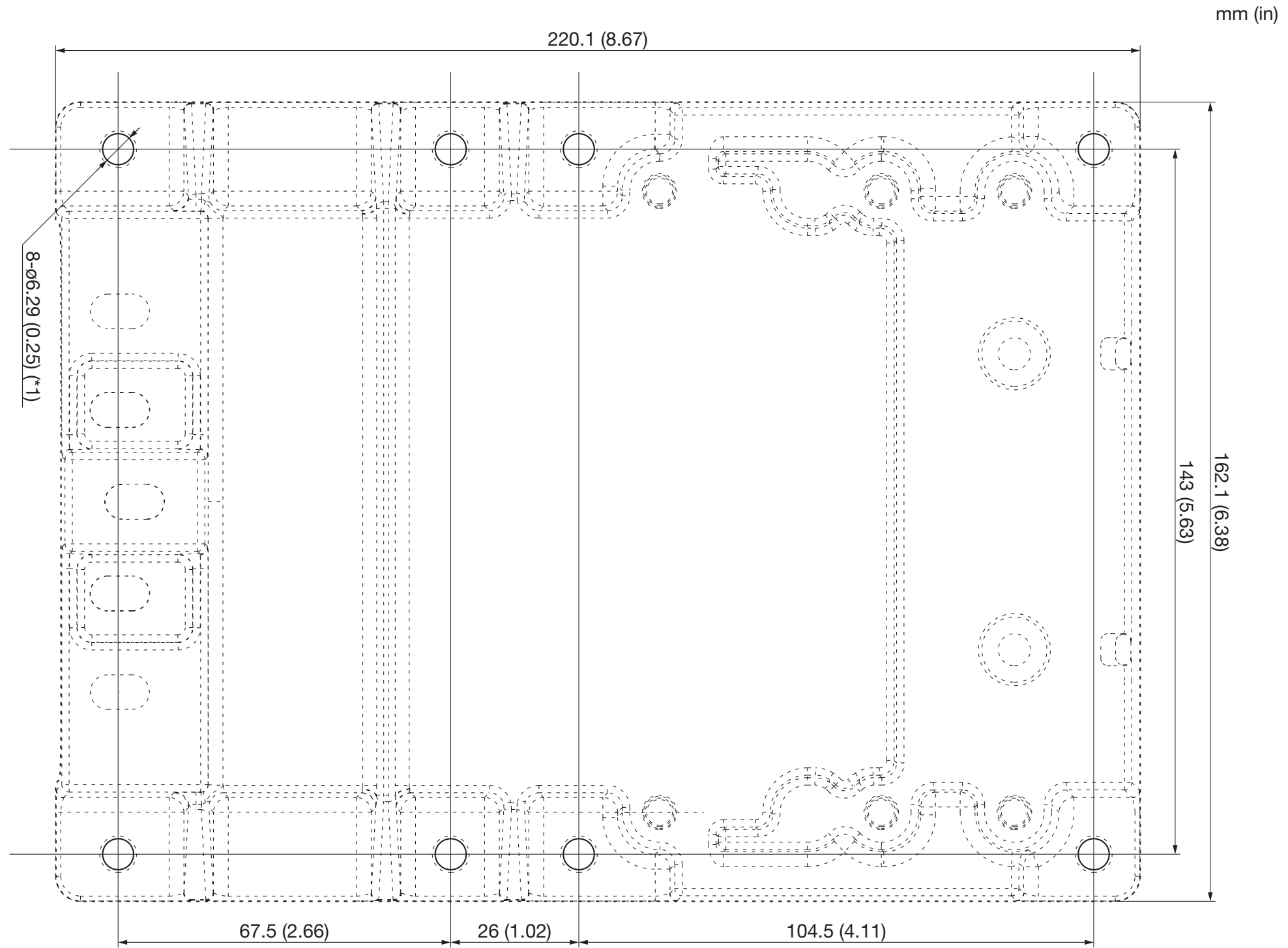


Bulkhead fitting





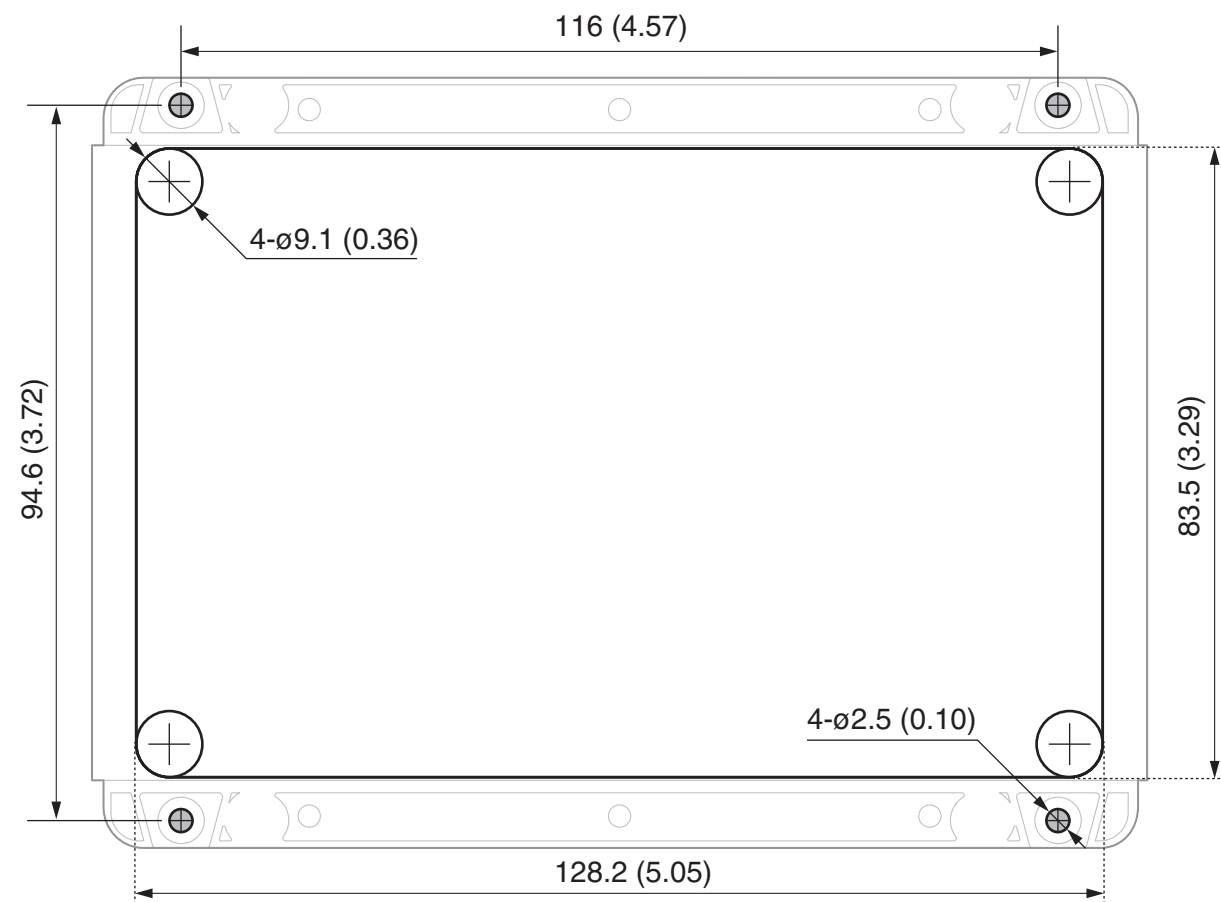
(*1) Drill 4 mm holes if self-tapping screws are used.



(*1) Drill 4 mm holes if self-tapping screws are used.

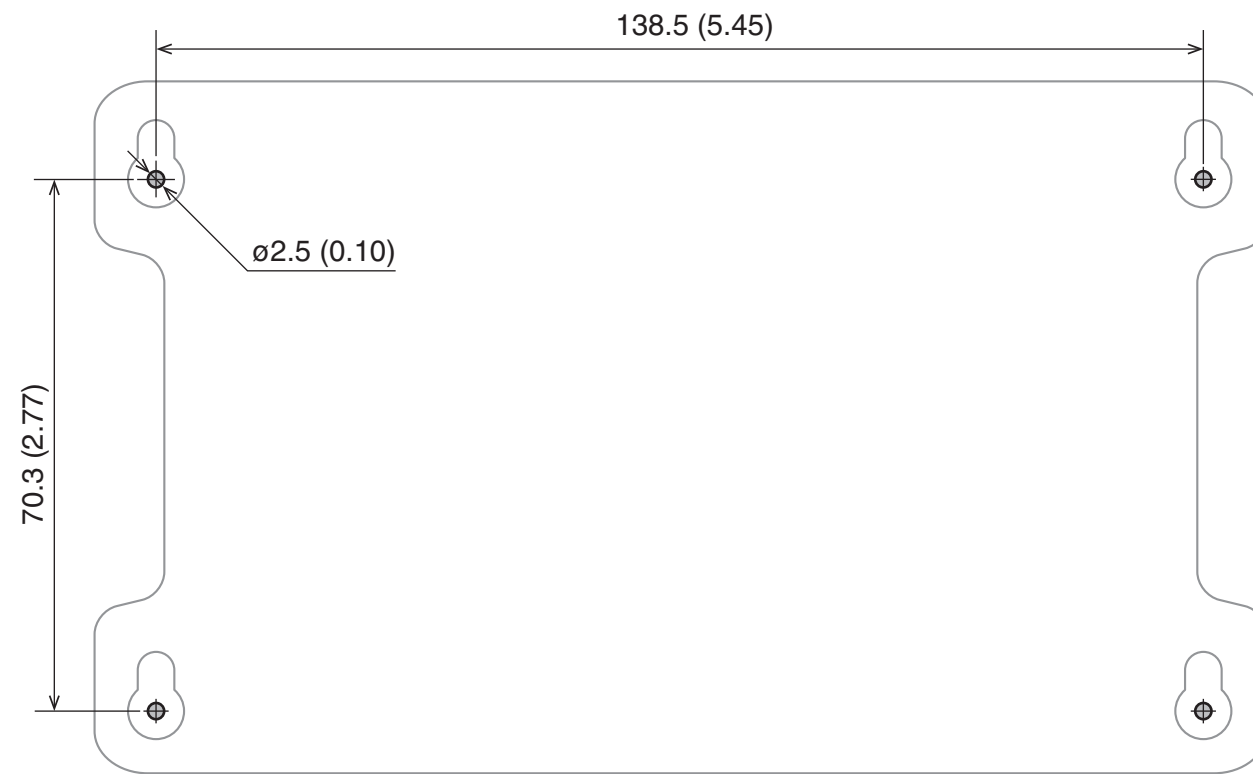
CL5 Display

mm (in)

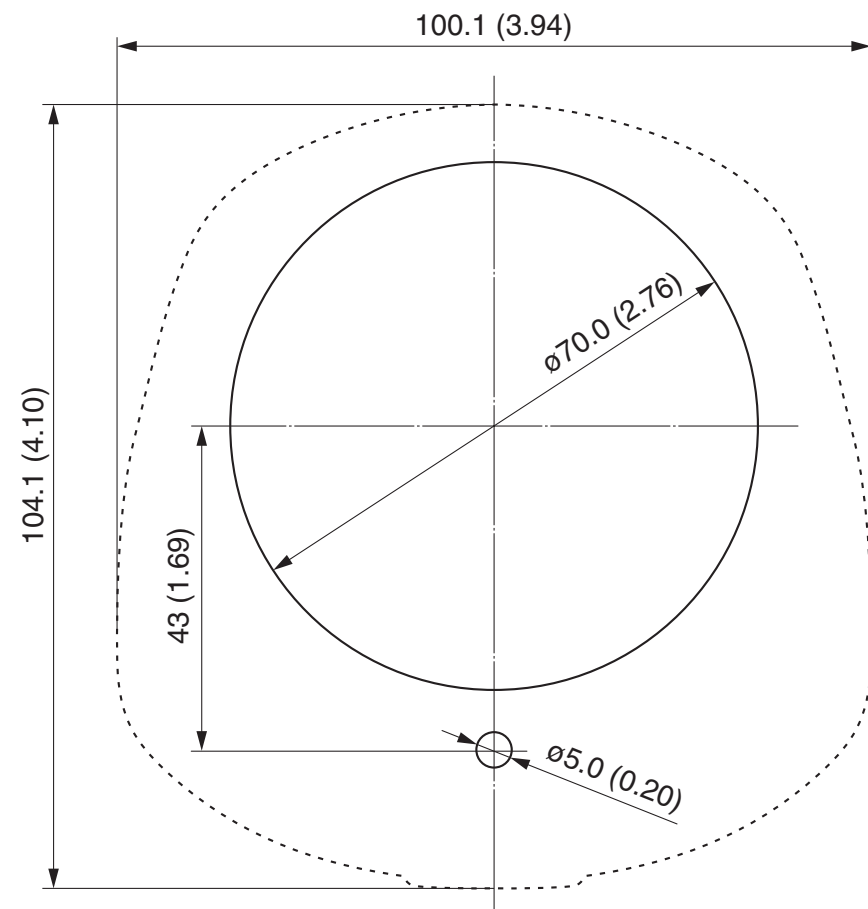


MFD Interface Type-1/Type-2

mm (in)

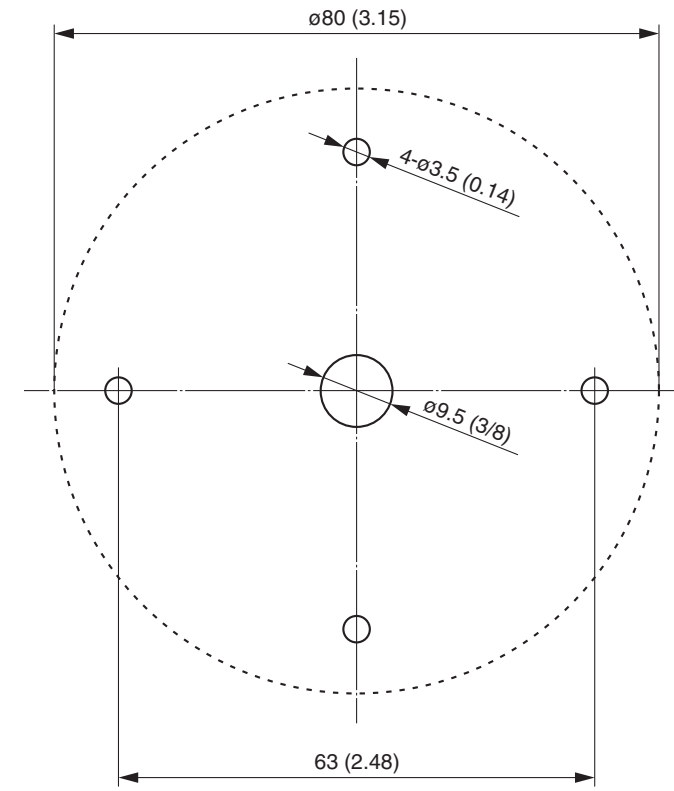


Joystick



mm (in)

Notification light



Thruster Driver

