Figure 13: Dual Control Head with Two TSCH
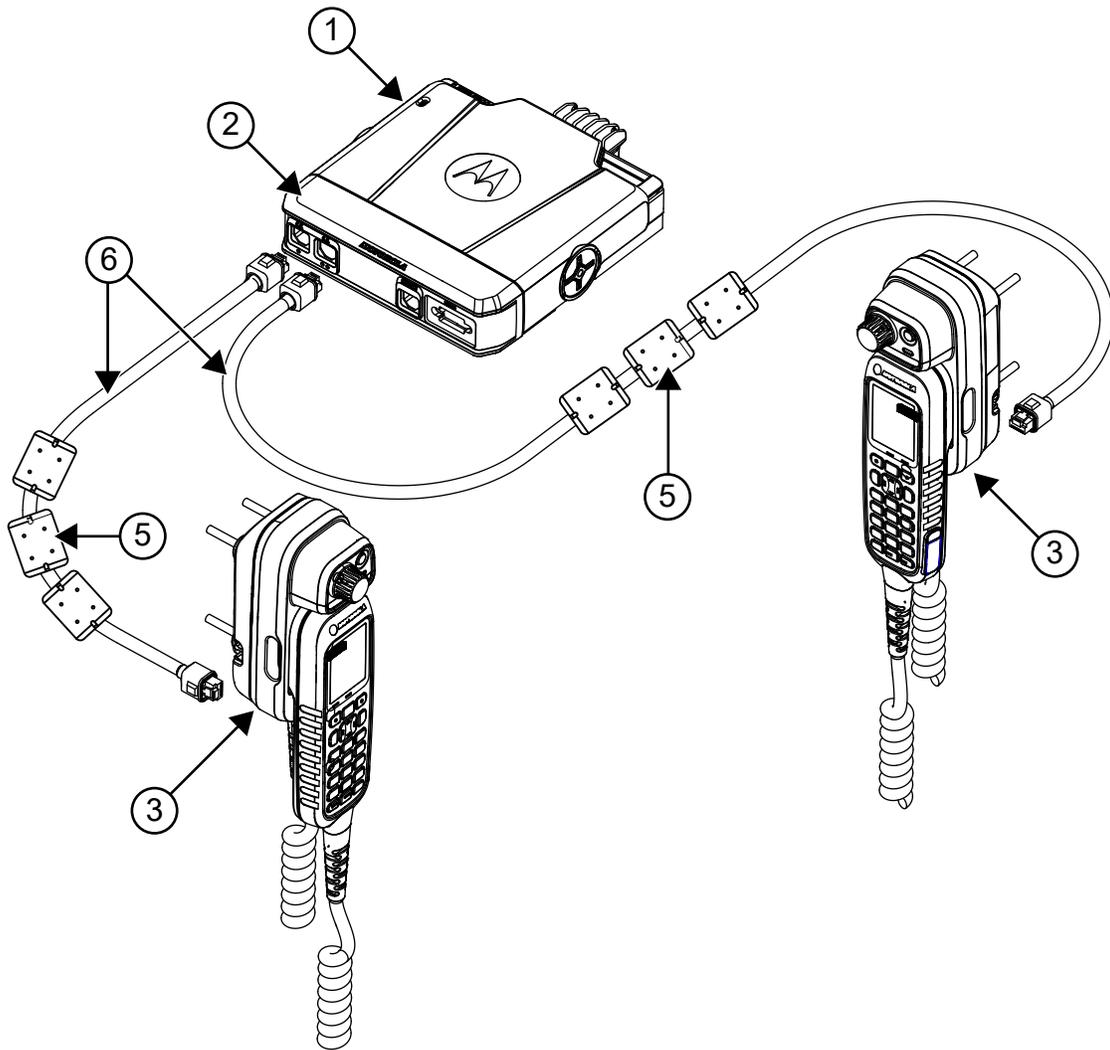
Figure 14: Dual Control Head with a Combination of IP54 or IP67 RECH, and TSCH
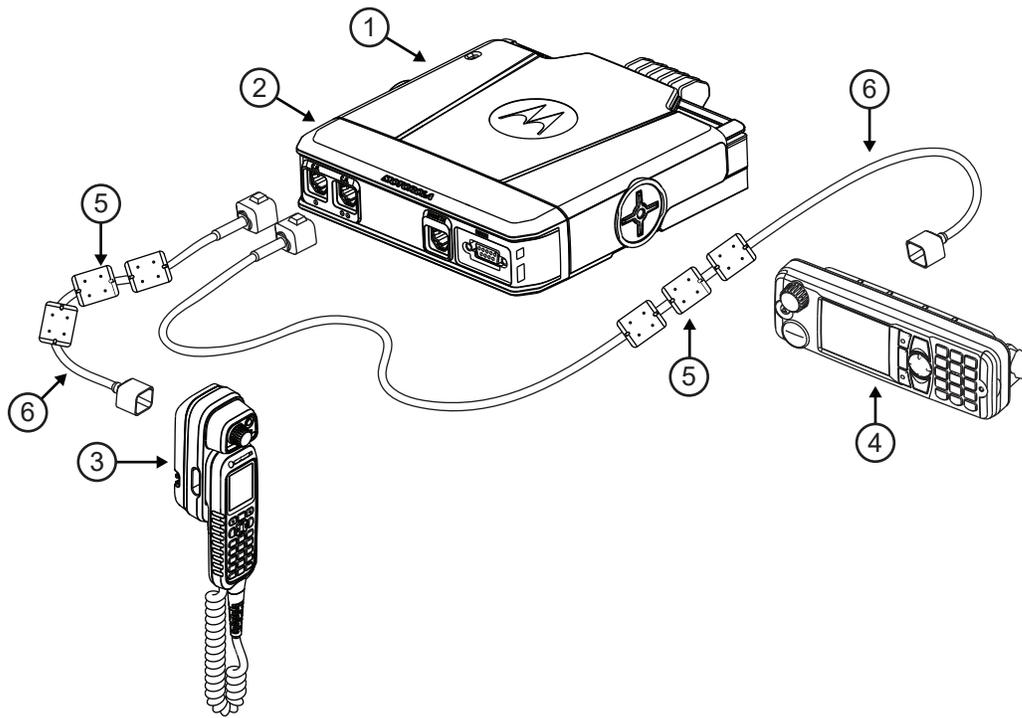

Figure 15: Multi-Radio Control Installation with IP54 or IP67 RECH
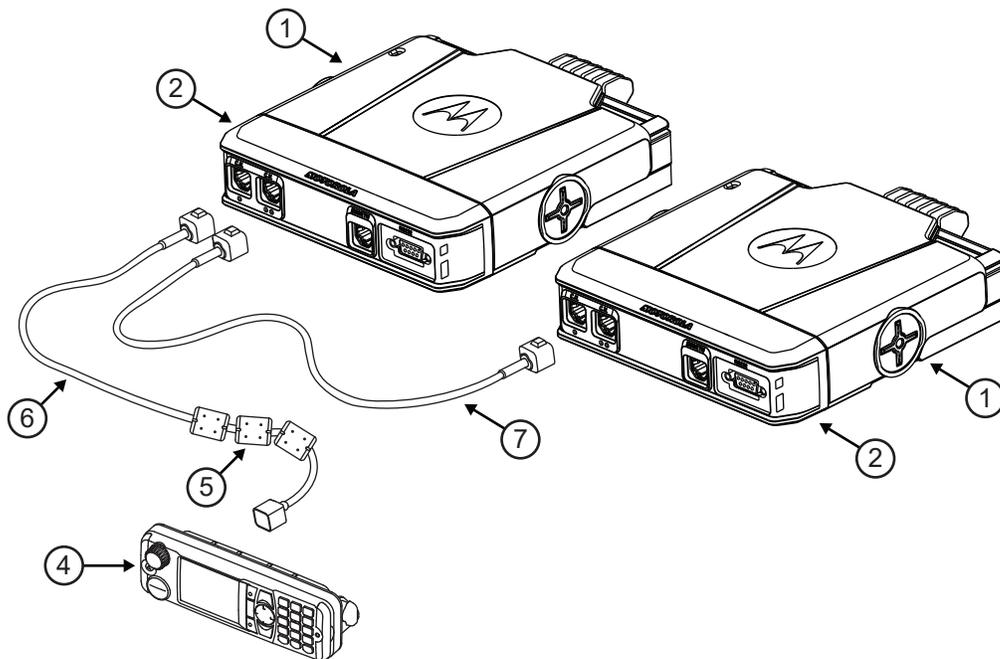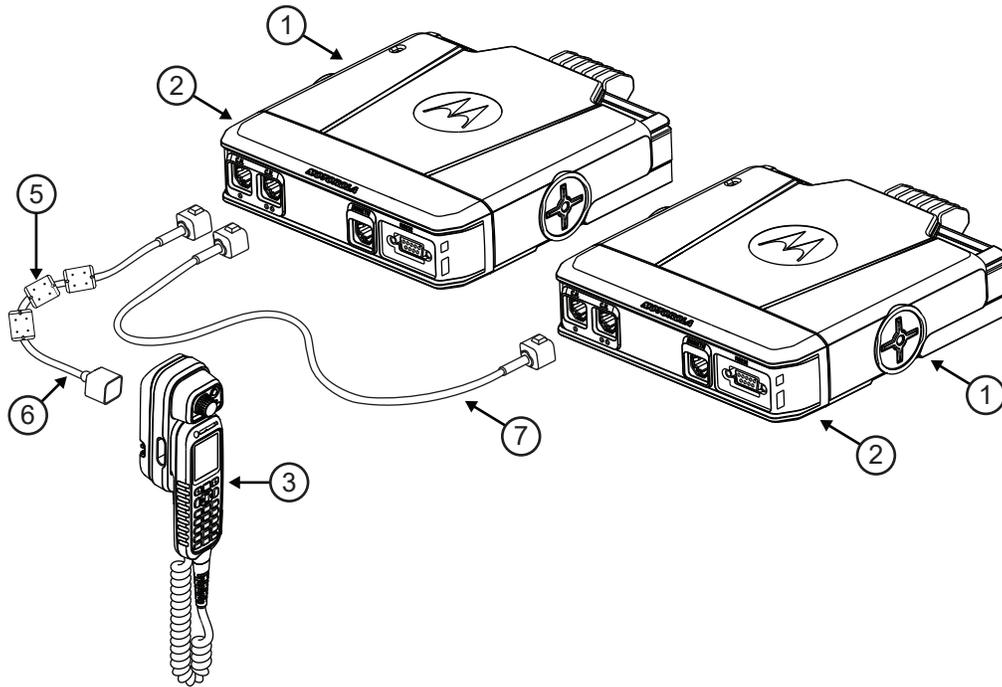
Figure 16: Multi-Radio Control Installation with TSCH

⚠️ **IMPORTANT:** If you enter a message on one control head, all buttons except the Emergency button is disabled on the other control head. You can turn off your radio using the Power Off button of the inactive control head.

📝 **NOTE:** For Multi-Radio Control installations, the Emergency Hot Mic and Ambience Listening functions require a Visor Microphone to connect to the rear of each radio.

Table 42: Configurations – Graphics Description

Annotation	Description
1	Transceiver
2	Dual Remote Expansion Head – PMLN8597_
3	Telephone Style Control Head (TSCH)
4	Remote Ethernet Control Head (RECH) – IP54 or IP67
5	Ferrite Clamps – 91012044001
6	Remote RJ50 Ethernet Cable or IP67 RECH RJ50 Ethernet Cable
7	Mobile to Mobile Ethernet Cable, 3 m – PMKN4177_

3.3.1
Ethernet Cables

⚠️ **WARNING:** Dual Remote Expansion Head (DREH) is only compatible with Ethernet Control Heads. Do not combine Ethernet Control Head with non-Ethernet Control Head. Also, ensure use of proper Ethernet cables to connect the DREH with Telephone Style Control Head (TSCH), IP54 or IP67 Remote Ethernet Control Head (RECH) or to another DREH. If not connected properly, the transceiver can be damaged.

Table 43: Ethernet Cables

Item	Part Number
RJ50 Ethernet Cable, 3 m (IP67 RECH)	PMKN4320_
RJ50 Ethernet Cable, 5 m (IP67 RECH)	PMKN4321_
RJ50 Ethernet Cable, 7 m (IP67 RECH)	PMKN4322_
RJ50 Ethernet Cable, 10 m (IP67 RECH)	PMKN4323_
RJ50 Ethernet Cable, 15 m (IP67 RECH)	PMKN4324_
RJ50 Ethernet Cable, 40 m (IP67 RECH)	PMKN4325_
Remote Ethernet Cable, 3 m	PMKN4141_
Remote Ethernet Cable, 0.5 m	PMKN4280_
Remote Ethernet Cable, 5 m	PMKN4140_
Remote Ethernet Cable, 7 m	PMKN4139_
Remote Ethernet Cable, 10 m	PMKN4138_
Remote Ethernet Cable, 12 m	PMKN4136_
Remote Ethernet Cable, 15 m	PMKN4146_
Remote Ethernet Cable, 40 m	PMKN4135_
TETRA Mobile to Mobile Ethernet Cable, 0.5 m	PMKN4176_
TETRA Mobile to Mobile Ethernet Cable, 3 m	PMKN4177_
TETRA Mobile to Mobile Ethernet Cable, 7 m	PMKN4178_

Figure 17: RJ50 Ethernet Cable for IP67 RECH (PMKN4320_, PMKN4321_, PMKN4322_, PMKN4323_, PMKN4324_, and PMKN4325_)
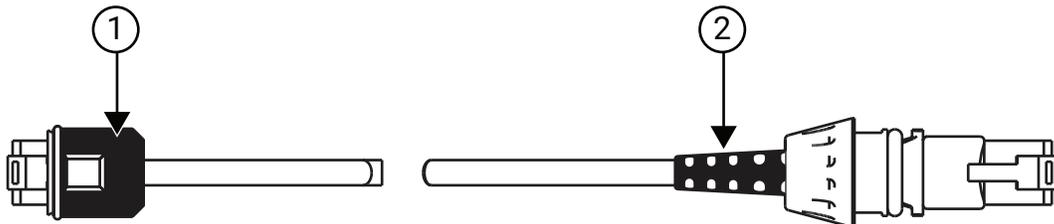
Table 44: Associated Components

Number	Description
1	Dust Cap Rubber (blue color)
2	Strain Relieve (blue color)

Figure 18: Remote RJ50 Ethernet Cable (PMKN4280_, PMKN4141_, PMKN4140_, PMKN4139_, PMKN4138_, PMKN4136_, and PMKN4146_)
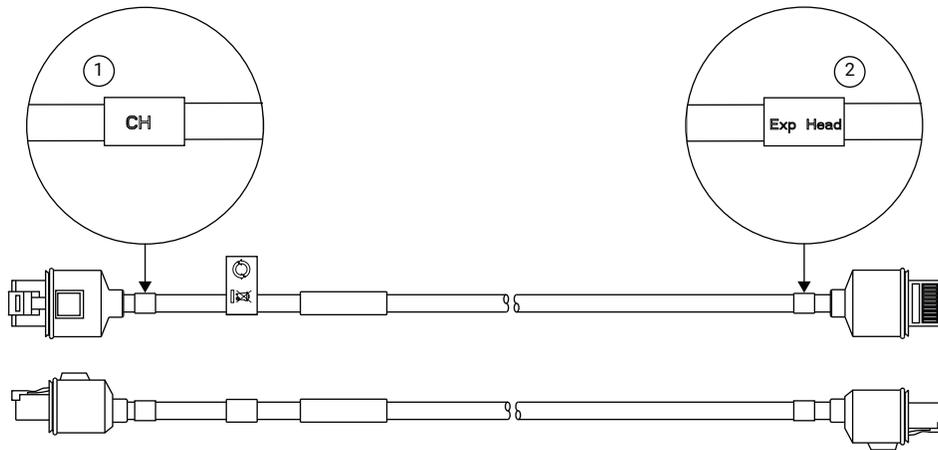

Figure 19: Remote Ethernet Cable, 40 m (PMKN4135_)

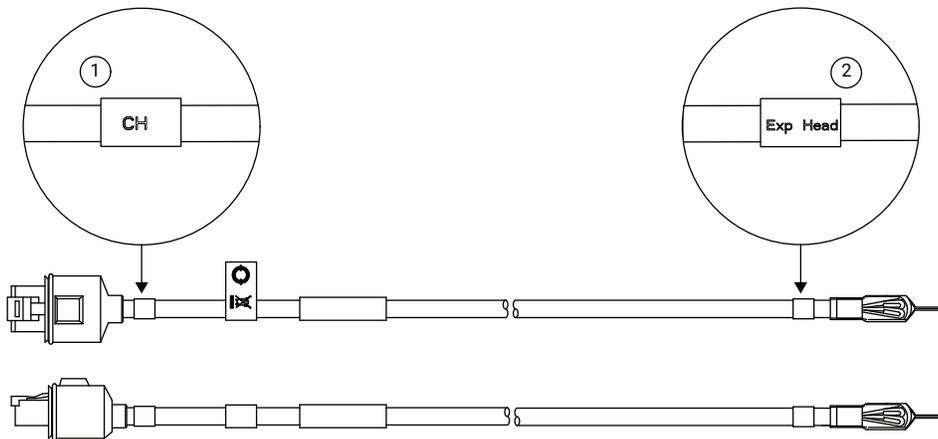Table 45: Associated Components

Annotation	Description
1	CH mark 📝 **NOTE:** Requires three (3) Ferrite Clamps, Part Number PMLN6488_. Manually install all Ethernet cables. Install clamps on the CH end of the cable with two turns of wire around each clamp.
2	Exp Head mark

Figure 20: Mobile to Mobile Ethernet Cable (PMKN4176_, PMKN4177_, and PMKN4178_)
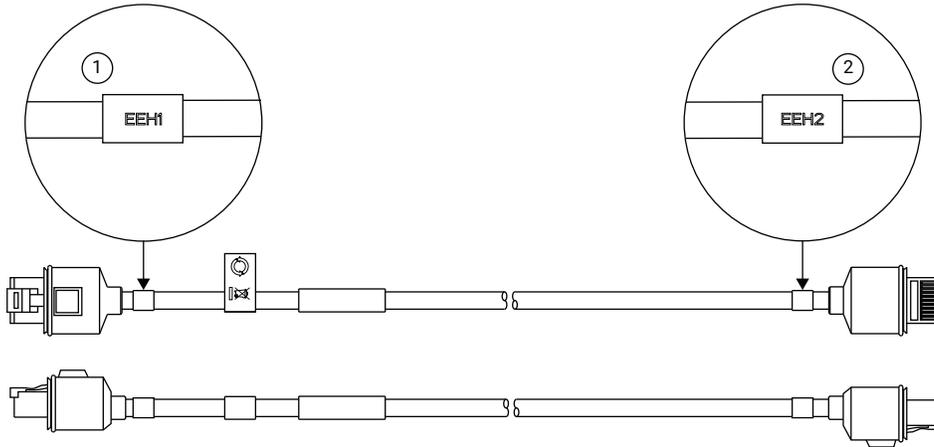
Table 46: Associated Components

Annotation	Description
1	Ethernet Expansion Head (EEH1) mark
2	Ethernet Expansion Head (EEH2) mark

⚠️ **WARNING:** Use the 'Exp Head', 'EEH1', 'EEH2', and 'CH' marks to ensure that the Ethernet Cables are correctly connected.

📝 **NOTE:** For PMKN4135_, the open-end wire at the "CH" end shall be terminated with the in-box RJ50 plug based on the Ethernet Cable Pin Diagram. After routing the transceiver to the Control Head, use a 10P10C Crimping Tool to crimp the RJ50 plug to the open end of the cable.

3.3.2
Installing the IP67 Ethernet Cable

Procedure:

1. Before inserting the cable to the RJ50 socket, rotate and align the lock cap.

   Ensure the two markings on the lock cap face up, aligning with the RJ50 contact plane.

2. Connect the 10-pin RJ50 connector to the RJ50 socket of the IP67 Remote Ethernet Control Head (RECH).

   Ensure that the pin contact faces up. Push in until the lock cap flushes with the IP67 RECH back housing.

3. Turn the lock cap in a clockwise direction to secure the cap to the back housing.

4. Connect the other side of the RJ50 connector to the RJ50 socket on the remote expansion head.

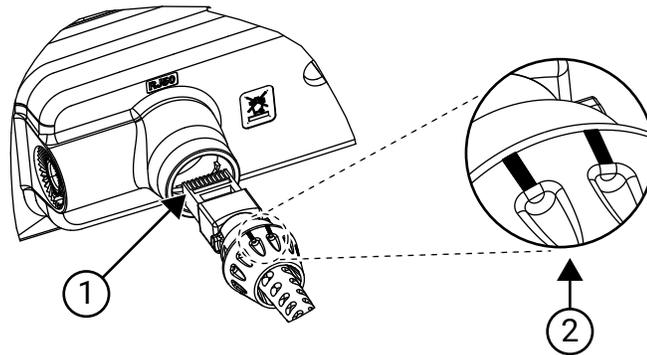Figure 21: Connecting the RJ50 Connector to the IP67 RECH

Table 47: Associated Components

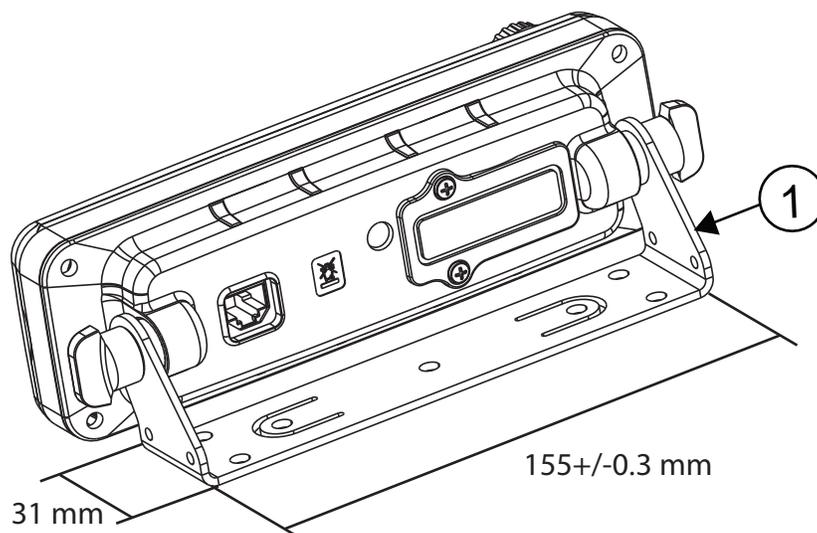| Number	Item	Description
1	Pin Contact	Ensure that pin contact faces upwards.
2	Seal Lock Cap	Seal lock cap marking must always face upwards.

3.3.3
Installing the RECH onto the Remote Mount Trunnion

Procedure:

1. Slide the IP54 or IP67 Remote Ethernet Control Head (RECH) onto the mounting trunnion until it snaps into place.

2. Tighten the wing screws at both sides of the trunnion. After a few turns, tilt the control head for an optimum view of the display. Then, complete the tightening of the screws.

Figure 22: IP54 or IP67 RECH Installation with Remote Mount Trunnion

155+/-0.3 mm

31 mm

Number	Description
1	Remote Mount Trunnion Kit (PMLN4912_)

3.3.4
Installing the RECH in a DIN Mount Bracket

Procedure:

1. Slide the IP54 or IP67 Remote Ethernet Control Head (RECH) onto the DIN Mount Bracket until it snaps into place.

2. Tighten the screws at both sides of the DIN Mount Bracket.

   Figure 23: IP54 or IP67 RECH Installation with DIN Mount Bracket

   155+/-0.15 mm

   76.5 mm
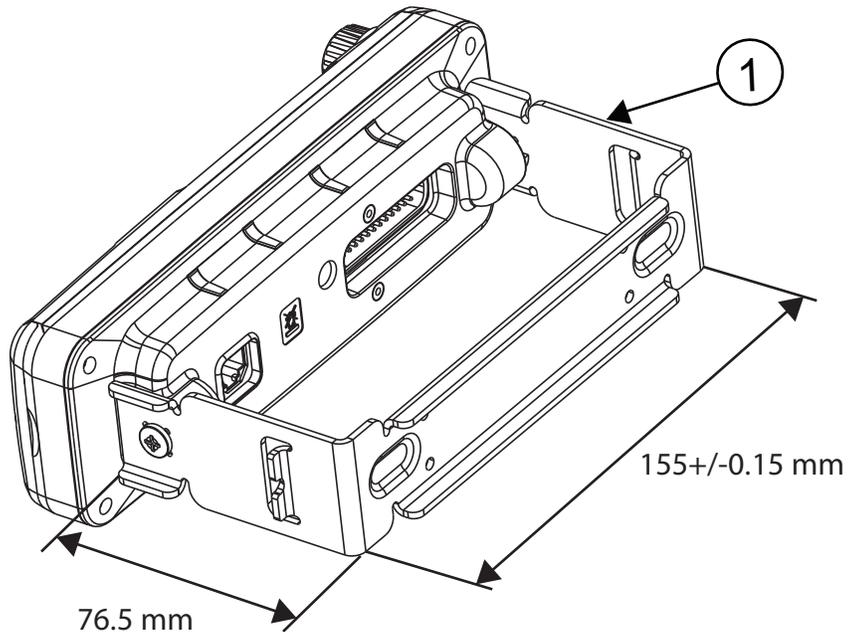
Number	Description
1	DIN Mount Bracket Kit (PMLN5093_)

3.3.5
Inserting the IP54 RECH with the DIN Mount Bracket into the DIN Frame

Procedure:

1. Insert the DIN frame into the DIN Mount Bracket, and retain it by bending back the relevant fixing tabs.

2. If necessary, use all six tabs to secure the frame.

> **NOTE:**
> The tabs are easily bent back by twisting a large flat-bladed screwdriver into the slot behind the tabs.

> For a more secure installation, secure the top and rear of the frame with screws.

> Use the demount tool as an aid for both mounting and demounting.

Figure 24: IP54 RECH Installation with DIN Mount Bracket into the DIN Frame
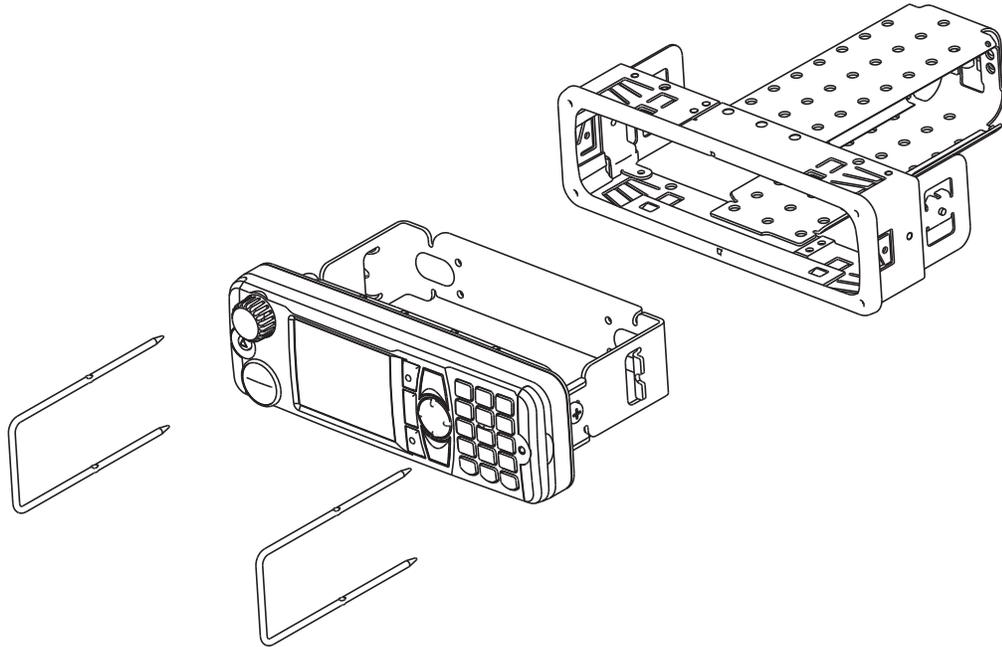
3.3.6
# Inserting the IP67 RECH with the DIN Mount Bracket into the DIN Frame

Procedure:

1. Remove the plastic bezel by unlocking the plastic latches from the DIN frame using a flat head screw driver.

2. Attach the set of compliance pads to the rear housing of the IP67 Remote Ethernet Control Head (RECH).

> **NOTE:** One PMLN5098A kit contains two pieces of compliance pads.

Figure 25: Compliance Pads Attachment
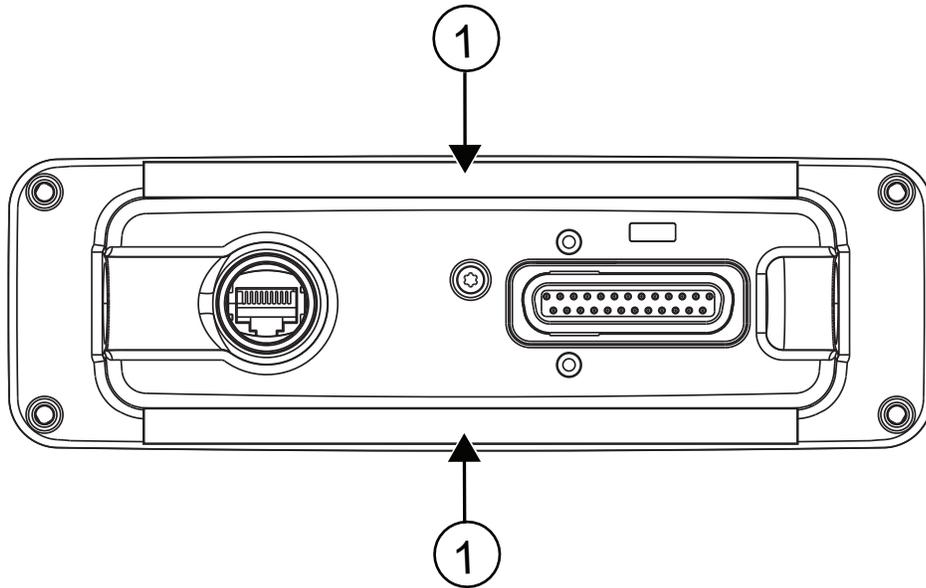
Table 48: Associated Component

Number	Description	Part Number
1	Compliance pad	PMLN5098A

3. Insert the DIN frame without the plastic bezel into the DIN Mount Bracket, and retain it by bending back the relevant fixing tabs.

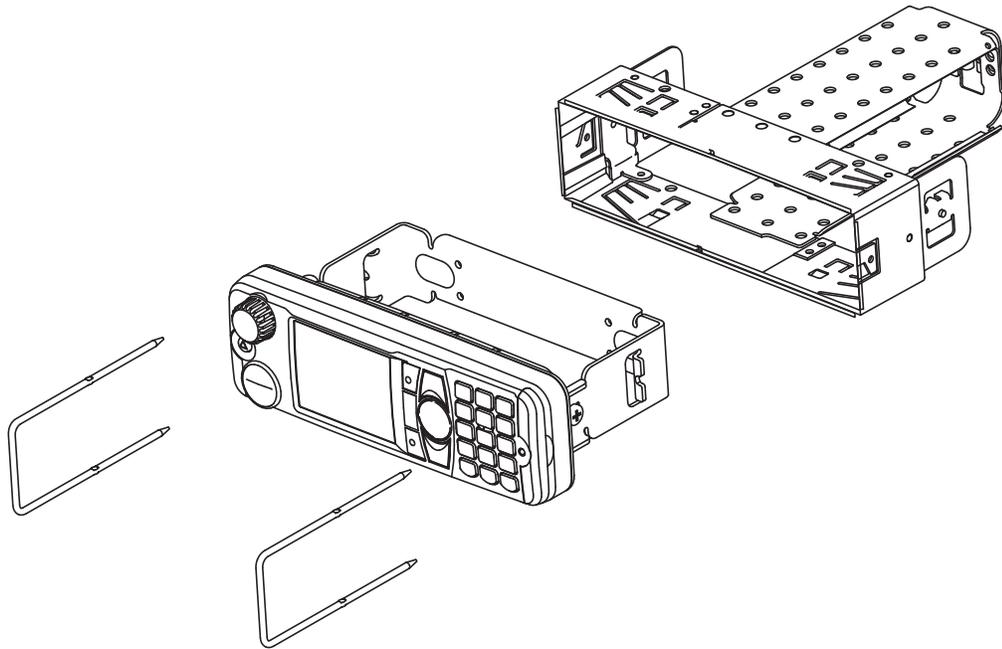**4.** If necessary, use all six tabs to secure the frame.

> **NOTE:**
> The tabs are easily bent back by twisting a large flat-bladed screwdriver into the slot behind the tabs.
>
> Use the demount tool as an aid for both mounting and demounting.

Figure 26: IP67 RECH Installation with DIN Mount Bracket into the DIN Frame without Plastic Bezel

3.3.7
Accessories Expansion Cable

The Accessories Expansion Cable allows your radio to have extra accessories using the Mobile Microphone Port (MMP).

Figure 27: Accessories Expansion Cable with the Mobile Microphone Port (MMP)
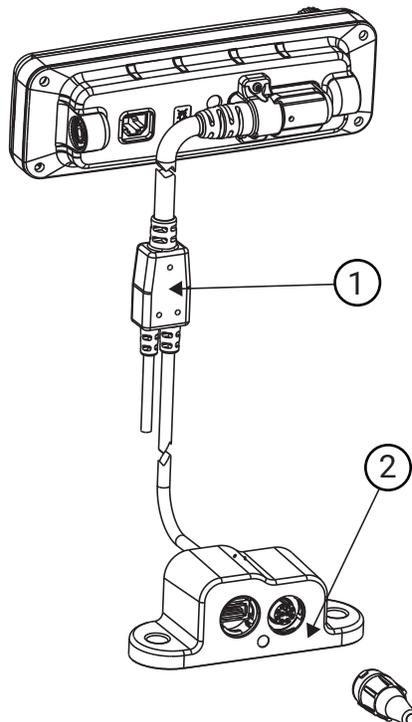
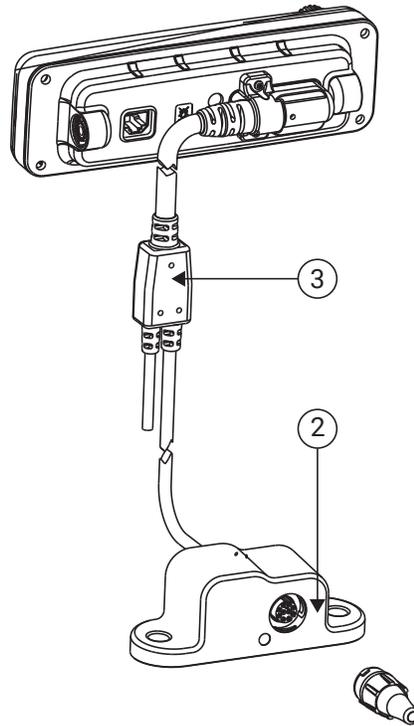**Figure 28: Accessories Expansion Cable with the Mobile Microphone Port (MMP)**

Table 49: Associated Components

Number	Description
1	Accessories Expansion Cable PMKN4029_/PMKN4056_ (IP54 RECH)
2	Mobile Microphone Port (MMP)
3	Accessories Expansion Cable PMKN4429_/PMKN4456_ (IP67 RECH)

3.3.8

Installing the Accessories Expansion Cable

The following steps are applicable to both IP54 Remote Ethernet Control Head (RECH) and IP67 RECH.

Procedure:

1. Plug in the Accessories Expansion Cable to the DB25 Port of the RECH.

2. To secure the Accessories Expansion Cable in place, tighten the screws at the DB25 connector.

3. Mount the Mobile Microphone Port (MMP) or USB port module to a surface. To fix the module securely, tighten the two screws on both sides of the module.

   NOTE: For more information on the connector pin functions of the Accessories Expansion Cable and the Mobile Microphone Port (MMP) or USB Port Module, see Accessories Expansion Cable on page 120.

3.3.9

Extra Accessories for the IP54 or IP67 Remote Ethernet Control Head, and Telephone Style Control Head

The Accessories Expansion Y-Cable (PMKN4133_ for IP54 Remote Ethernet Control Head (RECH), or PMKN4333_ for IP67 RECH) allows you to connect extra accessories.

Figure 29: Accessories Expansion RECH Y-Cable

Table 50: Associated Components

Number	Item	Description
1	Remote Ethernet Control Head with the cable connected by the DB25 Connector	-
2	Ferrite Clamp (91012044002)	Manual installation is required. Clamps are installed with 2-turns of wire around the clamp.
3	Fuse of 2 A (6580283E03)	-
4	Label for Y-cable power rating	-
5	Ground Wire and External Power Wire, Input supply 12 V/24 V: 2 A	The connections correspond to P4 and P5, as detailed in Remote Ethernet Control Head Y-Cable (Accessories Expansion Cable) on page 125, which provides the Pin Diagram of Cable PMKN4133. P4 is the 12/24 V positive DC supply input and P5 is Ground. This supply is for the Audio Power Amplifier and is required to connect a Loudspeaker to the RECH. This is the only Power connection that allows 12 V or 24 V operation, all other Power supplies must be 12 V.
6	Speaker Wires	The connections correspond to P6 detailed in Remote Ethernet Control Head Y-Cable (Accessories Expansion Cable) on page 125 and correspond to the Loudspeaker output of the RECH. The Audio Amplifier that supplies this output requires an independent DC Supply. Refer to Number 2. The use of connector kit PMLN6487_ allows a plug-and-play installation of the associated Loudspeakers such as RSN4002_.
7	Free-end Wires	When used during installation, heat-shrink wrap unused wires to prevent shorting. These connections correspond to P3, as detailed in Remote Ethernet Control Head Y-Cable (Accessories Expansion Cable) on page 125. These connections provide multiple functions including Hands Free Microphone (HF1 and HF2). These two inputs are individually screened and include a common drain-Ground, PTT1 and PTT2, Power On, Rear Audio, and the available GPIO lines. The use of the IIMPRES Visor Microphone RMN5054_, also requires the One Wire bus connection provided on this cable.
8	Rear GCAI Connector	The connections correspond to P2 detailed in Remote Ethernet Control Head Y-Cable (Accessories Expansion Cable) on page 125 and this connector is the 10 -Pin Rear GCAI Accessory connector that enables compatible Accesso-

Number	Item	Description
		ries such as the RMN5107_ Fist Microphone to be connected to the rear of the Control Head.
9	Ferrite Clamp (91012044003)	Manual installation is required. Clamps are installed with 2-turns of wire around the clamp.

NOTE:

See Connectors and PIN Assignment on page 98 for wiring and pin out information.

Manual installation is required. Clamps are fixed with 2-turns of wire.

The Accessories Expansion (Telephone Style Control Head) TSCH Y-Cable (PMKN4134_) allows you to connect extra accessories.
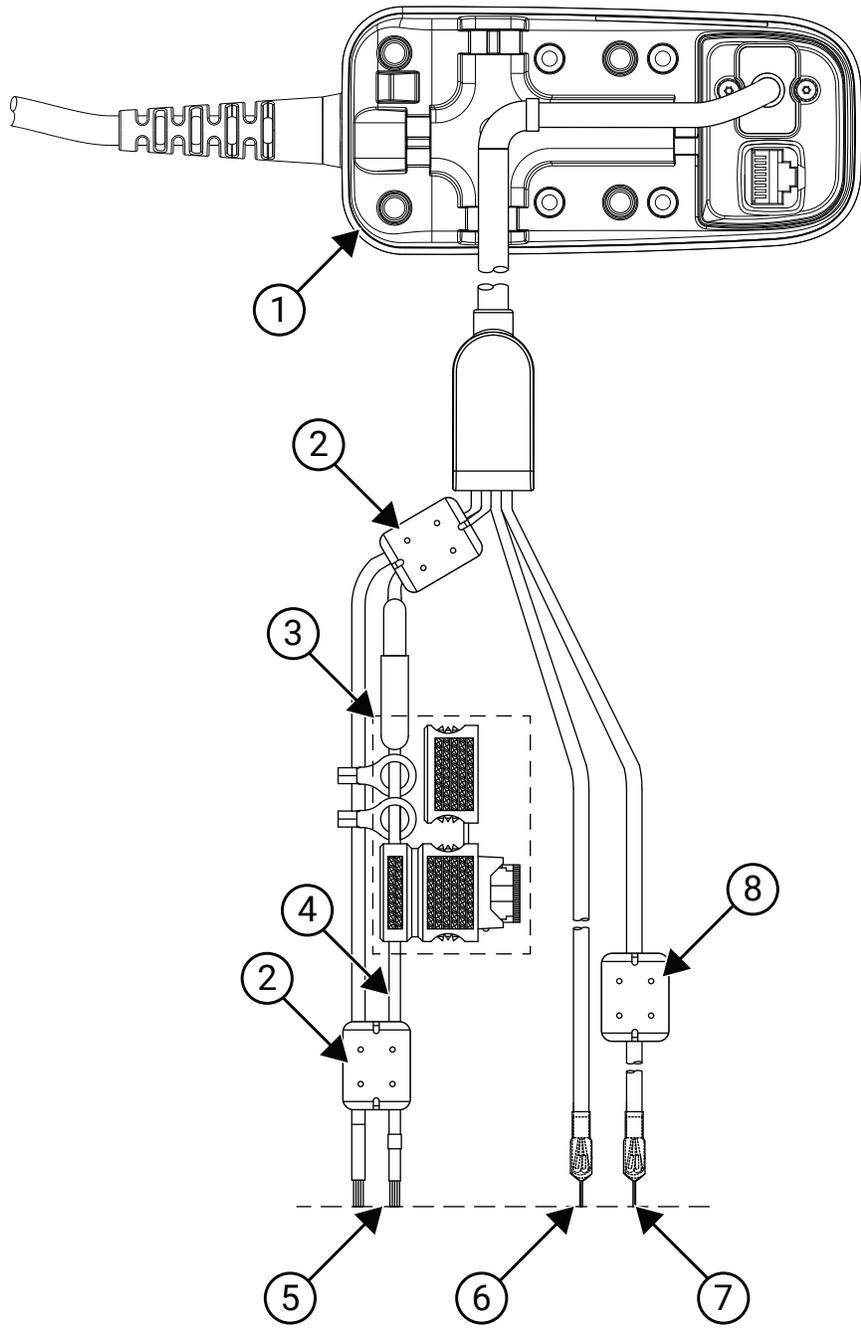
Figure 30: Accessories Expansion TSCH Y-Cable

Table 51: Associated Components

| Number	Item	Description
1	Telephone Style Control Head	-
2	Ferrite Clamp (91012044002)	Manual installation is required. Clamps are installed with 2-turns of wire around the clamp.

Number	Item	Description
3	Fuse of 2 A (CP000122A01)	-
4	Label for Y-cable power rating	-
5	Ground Wire and External Power Wire, Input supply 12 V/24 V: 2 A	The connections correspond to P3 and P4, detailed in Telephone Style Control Head Y-Cable (Accessories Expansion Cable) on page 126, which provides the Pin Diagram of PMKN4134_. P3 is the 12 V or 24 V positive DC supply input and P4 is the Ground. This supply is for the Audio Power Amplifier and is required to connect a Loudspeaker is to the TSCH. Note that this is the only Power connection allowing 12 V or 24 V operation. All other Power supplies must be 12 V.
6	Speaker Wires	The connections correspond to P5 detailed in Telephone Style Control Head Y-Cable (Accessories Expansion Cable) on page 126 and correspond to the Loudspeaker output of the TSCH. The Audio Amplifier, which supplies this output, requires an independent DC Supply. Refer to Number 2. The use of connector kit PMLN6487_ allows a plug-and-play installation of the associated Loudspeakers such as RSN4002_.
7	Free-end Wires	When used during installation, heat-shrink wrap unused wires to prevent shorting. These connections correspond to P2, as detailed in Telephone Style Control Head Y-Cable (Accessories Expansion Cable) on page 126. These connections provide multiple functions including Hands Free Microphone PTT1 and PTT2, and Emergency. The use of IMPRES Visor Microphone RMN5054_ also requires the One Wire bus connection provided on this cable.
8	Ferrite Clamp (91012044003)	Manual installation is required. Clamps are installed with 2-turns of wire around the clamp. For easier installation on Free-end wires, remove the insulation jacket.

NOTE: Do not overtorque the TSCH Y-cable screw. Recommended screw torque is 2.0+/-0.1 lb-in.
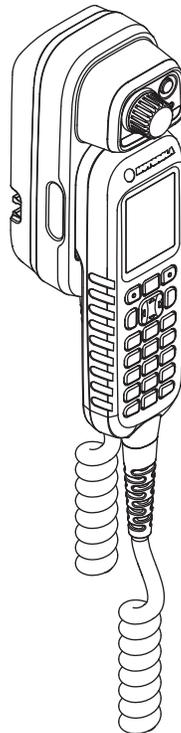
3.3.10
Telephone Style Control Head

The Ethernet Style Handset can be installed both horizontally and vertically. When installing the telephone style control head, consider the wide viewing angle of the color display and the best direction to disengage the handset from the cradle.

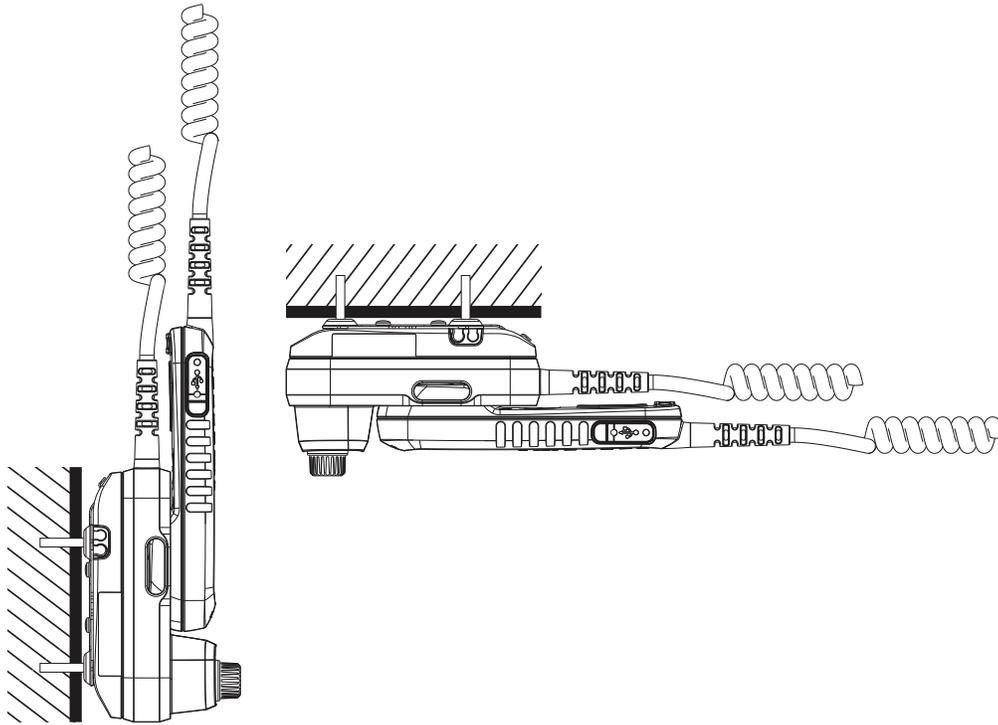**Figure 31: Telephone Style Control Head (TSCH) Cradle**
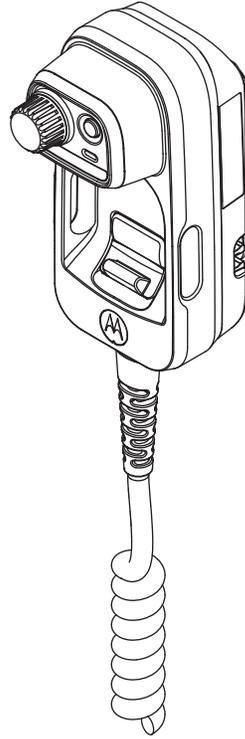
Figure 32: Telephone Style Control Head Handset and Cradle

⚠️ **IMPORTANT:** Do not install the TSCH in the following ways.

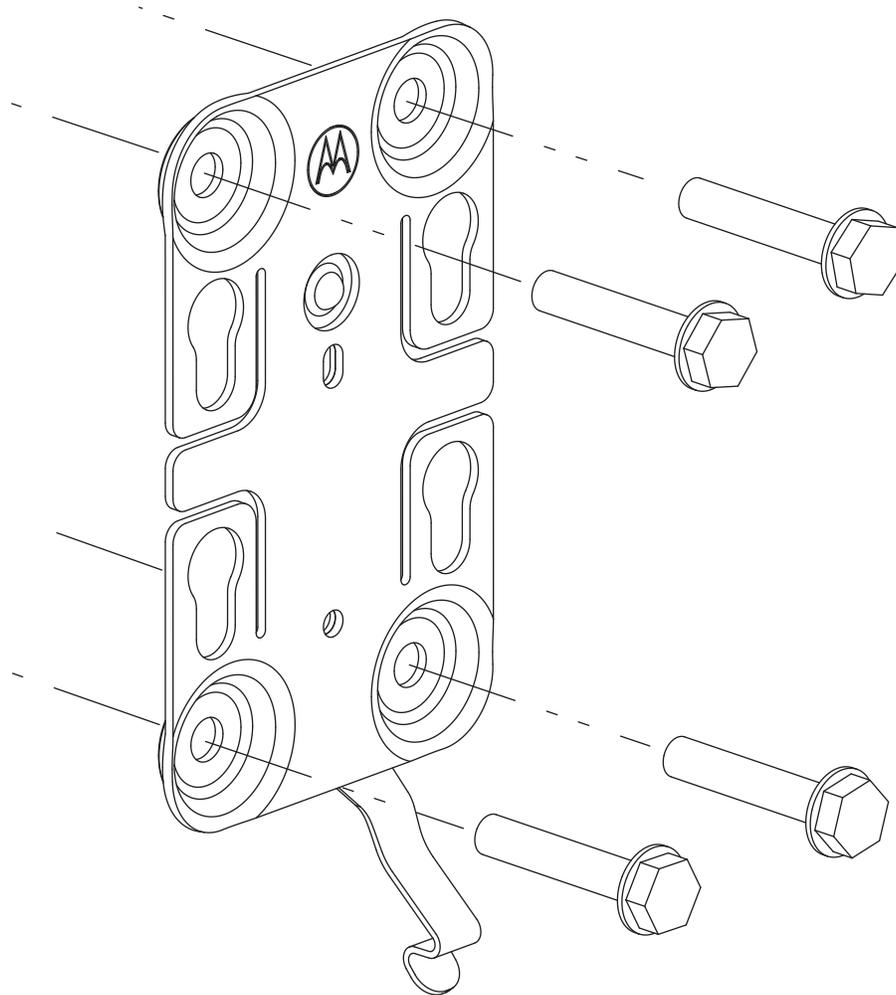**Figure 33: Telephone Style Control Head Unsupported Installation**

3.3.10.1
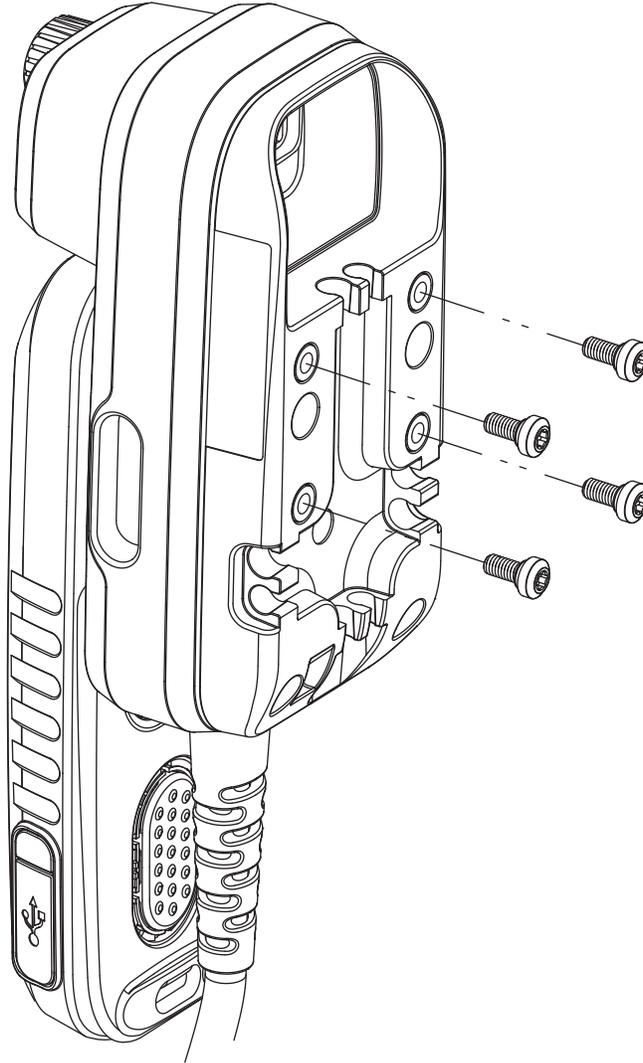## Mounting TSCH Cradle onto Slim Bracket

Procedure:

1. Place the bracket on the intended location. Tighten the four screws (0312002B14) to the screw holes.
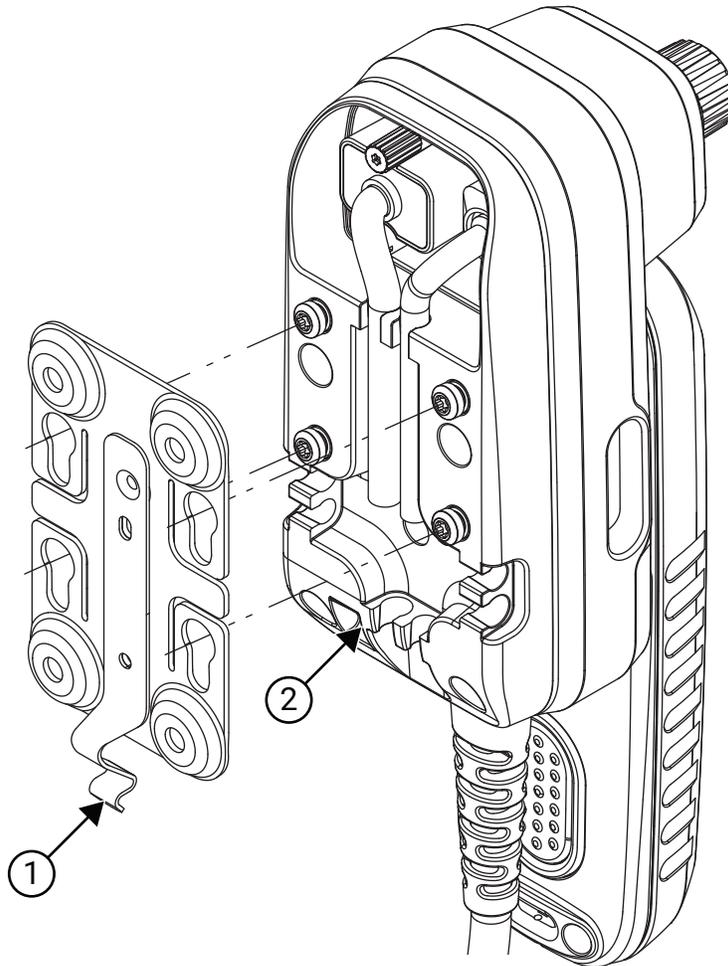
Figure 34: Slim Bracket

2. Align the four screws (03012069001) to the Telephone Style Control Head (TSCH) cradle. Tighten the screws with a 5 lbf in. (0.5649 Nm) screw torque.

Figure 35: TSCH Cradle Rear View

3. Screw the four screws to the keyholes on the bracket. Slot the TSCH cradle onto the Slim Bracket.

Figure 36: TSCH Cradle Rear View with Slim Bracket

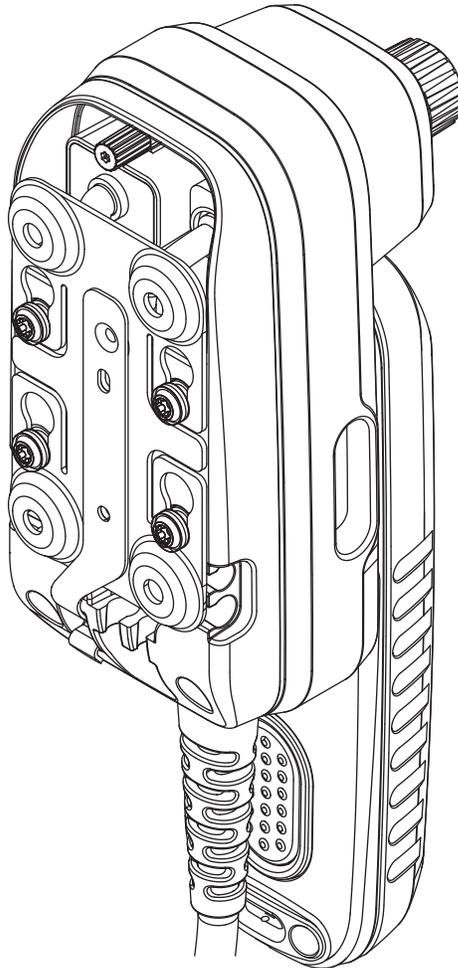Table 52: Associated Components

Label	Description
1	Bracket Hook
2	TSCH Cradle Locking Slot

4. Pull down the TSCH cradle until the Bracket Hook is fully engaged to the TSCH Cradle Locking Slot.

Figure 37: TSCH Cradle Rear View with Attached Slim Bracket

3.4
Databox Expansion Head Installation

This section describes the installation of the Databox Expansion Head for your radio. Ensure that the battery terminals are removed or the transceiver is turned off during the whole installation.

3.4.1
Databox Expansion Head Radio without Control Head

The Databox Expansion Head can be used without a control head.

This configuration allows the use of your radio without any control head, allowing your radio to be turned on using the ignition switch.

The packet data or Short Data Service (SDS) using AT commands are available from the 9-pin subD connector (PEI), and from the Accessory Connector through the USB cable at the same time.

The Remote Push-to-Talk (PTT) can be connected using the 26-pin rear connector. Only one talkgroup is available, and that talkgroup is the first item on the configuration tool list.

3.4.2
Data Box Radio

This configuration allows you to control the Transceiver Box without Control Head through the Peripheral Equipment Interface (PEI). For example, a personal computer, laptop, console, and so forth. You can either use AT Commands that is recommended, or the TNP1 protocol from a Control Terminal.

In this configuration, the Control Terminal is a substitute for the Control Head. The Data Terminal is connected to the 9-pin socket of the Databox Expansion Head using the RS232 cable, or to the 26-pin accessory connector using the USB cable.

Figure 38: Data Box Radio Interface
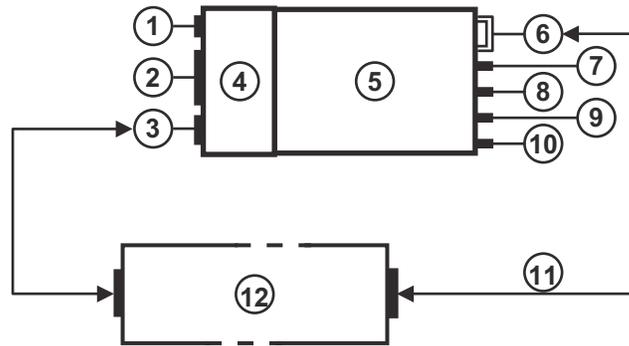
Table 53: Associated Components

Number	Description
1	Ethernet Connector (RJ50)
2	25-pin subD Connector (female)
3	9-pin subD Connector (female)
4	Databox Expansion Head
5	Terminal Transceiver Box
6	Accessory Connector (26-pin)
7	Power Connector
8	SMA Wi-Fi/Bluetooth Connector
9	SMA GNSS Connector
10	BNC RF Antenna Connector
11	USB Cable
12	Data Terminal (can be connected either from the front or the back of the Terminal Transceiver Box)

3.4.3
## Databox Expansion Head with Third-Party Control Head

In this configuration, your radio supports two Control and Data Terminals in parallel. Both support AT Commands for Control and Data. See *AT Commands Programmer`s Guide*).

The Peripheral Equipment Interface (PEI) is used to transfer data between the Mobile Terminal and External Terminal. The PEI interface is available on both RS232 and USB physical layers depending on your radio configuration. In the Dash/Desk mount, or remote mount with no Expansion Head, your radio provides the PEI using either 5-wire RS232, or USB at 26-pin Accessory Connector. When Expansion Head is connected, your radio supports PEI through both 9-pin SubD (RS232) at Expansion Head, and 26-pin Accessory Connector (USB).

The Databox Expansion Head can be used with a virtual head on a Personal Computer (PC) or a third-party control head.

This configuration allows the controlling of the Transceiver Box with a Control Terminal such as a PC, laptop, or console. In this configuration, the Control Terminal is a substitute for the Control Head.

Figure 39: Configuration with Two Control and Data Terminals
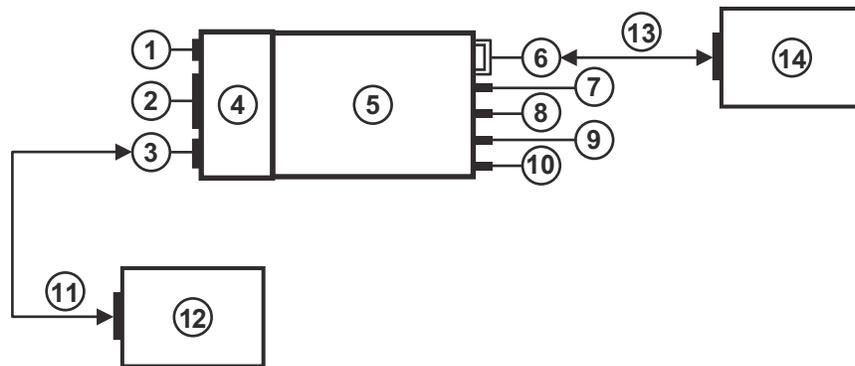
Table 54: Associated Components

| Number	Description
1	Ethernet Connector (RJ50)
2	Connector (female) 25-pin SubD
3	9-pin subD Connector (female), 8-Wire RS232 PEI Interface
4	Databox Expansion Head
5	Terminal Transceiver Box
6	Accessory Connector (26-pin)/USB 2.0
7	Power Connector
8	SMA Wi-Fi/Bluetooth Connector
9	SMA GNSS Connector
10	BNC RF Antenna Connector
11	RS232 PEI Connection
12	Control and Data Terminal using RS232
13	USB 2.0 Cable for PEI and Programming
14	Control and Data Terminal using USB 2.0

3.5
MXM600 with IP67 Remote Control Head

Motorola Solutions provides standard IP67 installation kits for a range of applications such as motorcycle, boat, and fire truck water pump area.
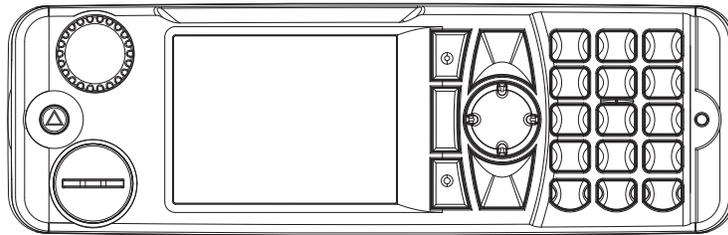
The keypad labeling of the control head varies according to the specific customer or country requirements. See Table 15: Control Heads on page 27.

MXM600 is compatible with two types of Remote Control Heads:

Figure 40: Comparison of RECH Types
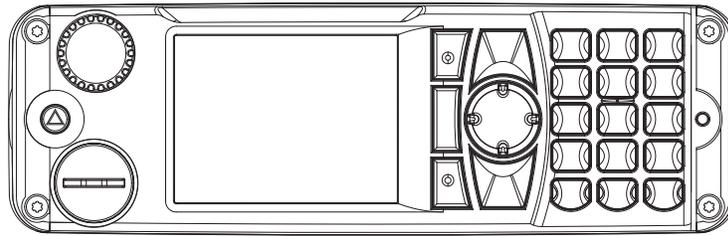
IP67 RECH

IP54 RECH

Table 55: Compatibility of IP67 Control Heads

Control Head	Description
IP67 RECH	Compatible with all MXM600 Single Remote Expansion Head (SREH), Dual Remote Expansion Head (DREH), and Databox Expansion Head (DEH). Only use Ethernet IP67 remote cable. See Mechanical Parts List for IP67 Remote Mount Installation on page 82.
TELCO IP67 Control Head (Legacy)	Only compatible with PMLN4904_. Only use TELCO cables. See Mechanical Parts List for IP67 Remote Mount Installation on page 82.

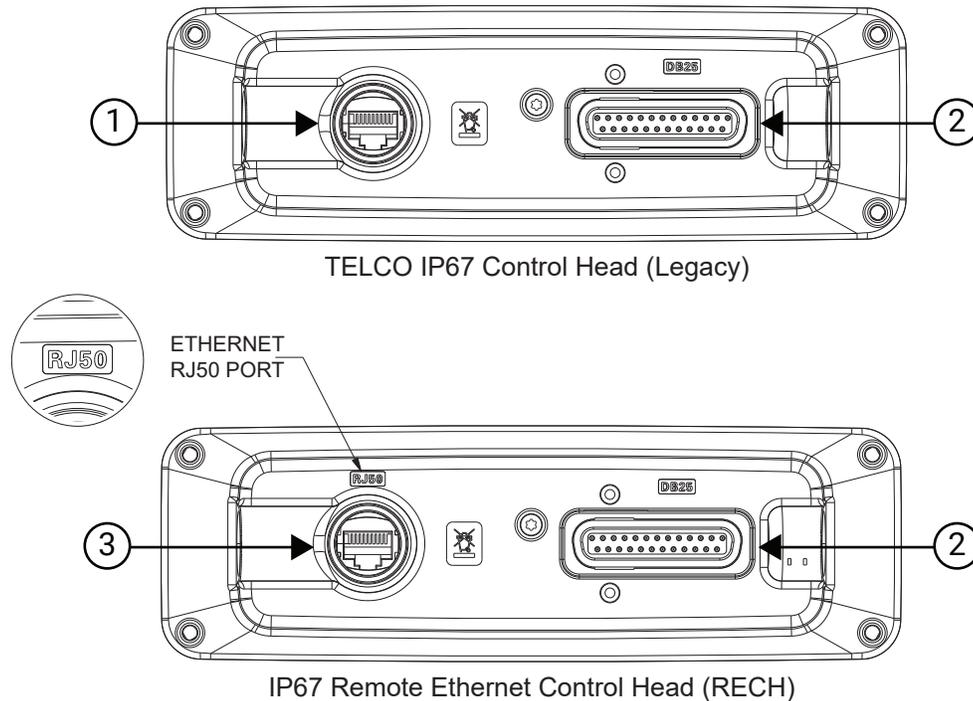**Figure 41: Differentiation Between TELCO IP67 Control Head and IP67 RECH**

TELCO IP67 Control Head (Legacy)

IP67 Remote Ethernet Control Head (RECH)

Table 56: Associated Components

Number	Description
1	10-Pin TELCO Connector
2	25-Pin DB25 Connector
3	Ethernet RJ50 Connector

3.5.1
Installing IP67 Remote Ethernet Control Head in a Motorcycle

> **NOTE:**
> Only persons who are competent and able to ensure that the complete installation fulfills regulatory requirements, such as ElectroMagnetic Compatibility (EMC) are allowed to plan the installation.

Ensure that the distance from the antenna location on the transceiver enclosure is at least 30 cm or 1 ft to the motorcycle operator in compliance with RF Energy Safety standards. To ensure that human exposure to radio frequency electromagnetic exposure is within the guidelines referenced in this document, transmit only when bystanders are at least 90 cm or 3 ft from the motorcycle.

Prerequisites:
Ensure that the transceiver box is turned off during installation.