INSTALLATION

MM15475 - 521 & 522 Control Head Assemblies , Installation Manual

MARINE PROPULSION SYSTEMS

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REVISIONS LIST

Revision	Date	Revision Description
-	4/7/03	Transfer Panel Template 12134 revised to A.
A	11/18/03	Revised Sections: 3-1, 3-4, 4-5.1, Figure 4-5.
B	4/06	Bringing entire Manual up to current ZF Fromatting Standards.

MM15475-1 THEORY OF OPERATION

The Model 521 and 522 Assemblies (hereafter referred to as Assembly or Assemblies) are offered as an accessory for MicroCommander, ClearCommand, and CruiseCommand Propulsion Control Systems.

The Assembly mounts to the inside and the sides of a vessel control console with a separate transfer panel on top of the console, with or without a Junction Box mounted inside the console.

MM15475-1-1 Features:

- Command of the vessel's main engine speed and direction (command depends on the System)
- Station-in-Command Indication
- Push Button Station Transfer
- Audible System Status Indication
- Adjustment of Detent Crispness
- Adjustment of Lever Friction

MM15475-1-2 Assembly Configurations

Table 1: Assembly Part Number List

DESCRIPTION	SINGLE	TWIN
Aluminum Control Head lever and Flange. (Material List A)	521-4	522-4
Aluminum Control Head lever and Flange. (Material List B)	521-4B	522-4B
Chrome Control Head lever and Flange. (Material List A)	521-5	522-6
Chrome Control Head lever and Flange. (Material List B)	521-5B	522-5B

The Assemblies are supplied as a complete packages, including everything listed in Table 2: and Table 3:. Material List "B" can be used for retrofit of existing 511/512 Series Assemblies, or as a new installation.

Table 2: Assembly Material List A

DESCRIPTION	SINGLE	TWIN
Control Head with lever and flange	1	2
Transfer Panel (includes lights, buzzer, and transfer button)	1	1
Processor to Transfer Panel Wire Harness (Single or Double Ended Plug)	1	2
One Installation Manual (MM15475)	1	1

Table 3: Assembly Material List B

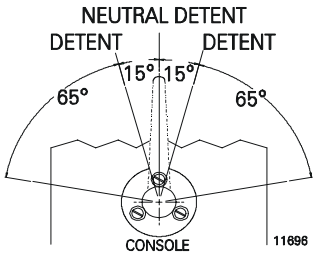
DESCRIPTION	SINGLE	TWIN
Control Head with lever and flange	1	2
Transfer Junction Box	1	1
Transfer Button, LEDs, and Sound Transducer (Customer Provided).	1	1
Processor to Transfer Junction Box Wire Harness (Single or Double Ended Plug)	1	2
One Installation Manual (MM15475)	1	1

All options interface as an additional Remote Station with the MicroCommander, ClearCommand, or CruiseCommand Processor. An unused Station is required on the Processor to add these ZF Marine Electronics Model Control Heads.

MM15475-2 OPERATOR INSTRUCTIONS

MM15475-2-1 Operation

Figure 1: Control Head Lever Range



The Assembly Control Head has three detents; Astern, Neutral, and Ahead. Refer to Figure 1:.

Refer to the MicroCommander, ClearCommand, or CruiseCommand Manual for further explanation of System Control Head Operation.

MM15475-2-2 Station Transfer

A) The Station-in-Command Control Head levers may be left in any operating position. Move to the new Assembly Station.

B) Ensure the Assembly Control Head levers are in the Neutral Detent at the Station taking command.

C) To take command, depress the Transfer Button on the Transfer Panel at the Station taking command.

D) The Station-in-Command red indicator on the Transfer Panel will light; indicating command has been transferred to the new Station-in-Command.

NOTE: For Twin Screw Systems, both Port and Starboard red indicator lights must be lit.

E) Within 1 second position the Assembly Control Head levers to match the existing speed and direction commanded by the previous Station-in-Command.

MM15475-3 PLAN THE INSTALLATION

MM15475-3-1 Tools Required For Installation

MicroCommander/ClearCommand connection requires:

- Anti-static Wrist Strap
- Wire cutter, stripper, crimper (Recommend Thomas & Betts WT-2000)
- Wago Tool (required only for "loose" component option)

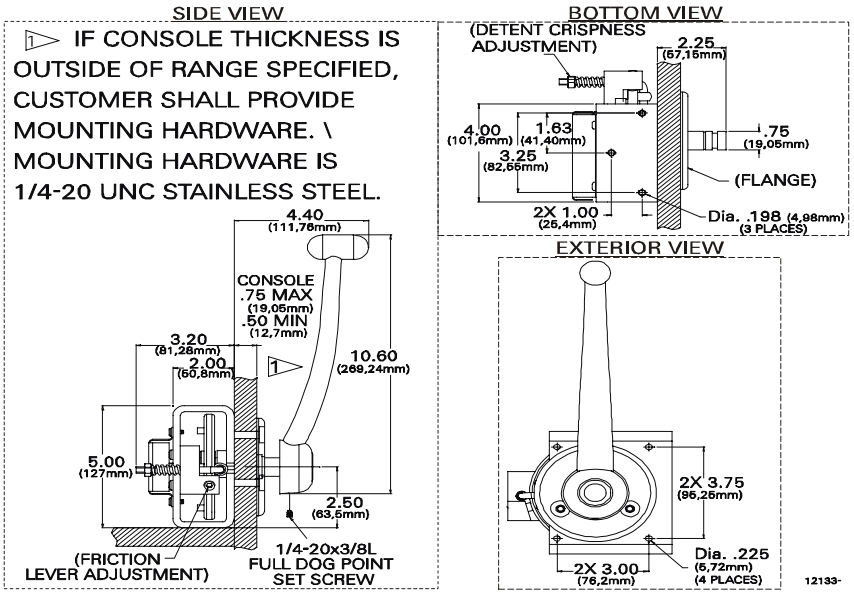
MicroCommander/ClearCommand pluggable, and CruiseCommand does not require any tools for connections.

Transfer Panel/Junction Box requires:

- Screwdriver – med. Phillips #2
- Screwdriver – med. straight slot
- Screwdriver – small straight slot
- Saber Saw
- Drills – 7/8 inch (22,23mm) and 7/16 inch (11,11mm)
- Drill Index
- Drill Motor

MM15475-3-2 Control Head

Figure 2: Views and Dimensions of Control Head



The Control Heads are designed to mount on a vertical surface of a console, with only the Control Head input shaft and lever exposed through the console (See Figure 2:).

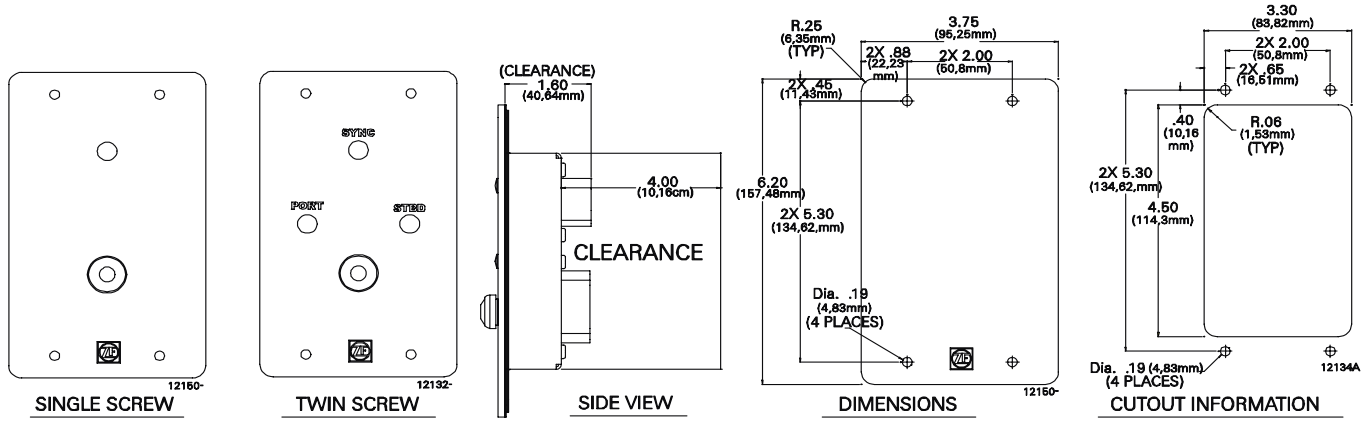
The Control Head input shaft is factory centered to Neutral. The Control Head may be mounted in any orientation inside the Console. The lever may be placed on the splined input shaft in any position to allow the Neutral Detent to be where required.

MM15475-3-3 Transfer Panel

MM15475-3-3.1 Considerations

- Transfer Panel is spray proof, but must not be immersed.
- Locate on the console.
- Locate in area of console where it is accessible for electrical connections.
- Refer to Figure 3: for dimensions

Figure 3: Transfer Panel Views and Dimensions



MM15475-3-4 Assembly with Junction Box: Transfer Button and LED

Supplied by the Installer:

- Transfer Button which is a normally open momentary button; Kit #00340 .
- LEDs which are operated by 5 Volts DC, 15mA maximum current; two Red #10013, one Green #10915.

Wiring between the Transfer Junction Box and the Transfer Button and LEDs should be supplied by the shipyard or installer.

MM15475-3-5 Junction Box

- Junction Box is spray proof, but must not be immersed.
- Locate inside or near the console.
- Locate in any area where it is accessible for electrical connections.
- The Junction Box can be mounted in any attitude.
- Do not mount the Junction Box on, or in, any location that will subject it to excessive vibration.
- Locate Junction Box away from heat sources. Allow 4 feet (1,2m) of clearance, or more, between the Junction Box and such heat sources.
- Refer to Figure 4: for dimensions

Figure 4: Junction Box Dimensions

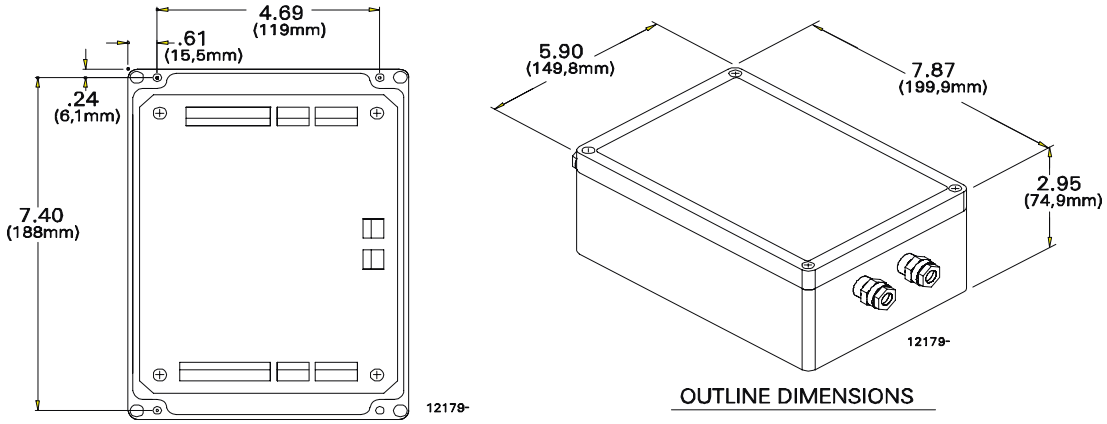
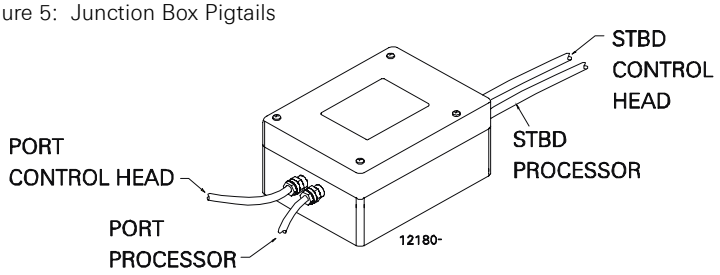


Figure 5: Junction Box Pigtails



The Junction Box is provided with pigtail connections to:

- Port and Starboard Control Heads
- Port and Starboard Actuators/Processors

Refer to Figure 5:

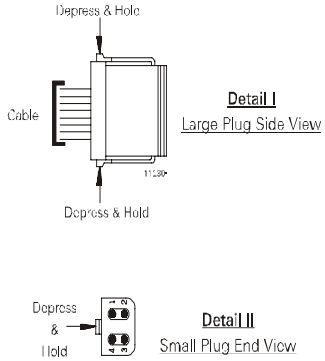
MM15475-3-6 Engine Stop Switch

It is mandatory for an Engine Stop Switch to be located at each Station.

CAUTION: An Engine Stop Switch at each Station is an absolute requirement. Refer to CFR 46, Sec.62.35-5 and ABYC P-24.5.8.

MM15475-3-7 Wire Harness

Figure 6: Harness Plug



Harnesses available from ZF Marine Electronics, LLC.

13557-X Wire Harness (Single End Plug)
14261-X Wire Harness (Double Ended Plug)

The above Cable Harnesses use one or both of the plug connector types detailed in Figure 6:.

When connecting the plugs, ensure that the release button or buttons are depressed and held until plug is fully connected or disconnected.

Connecting or disconnecting plugs without depressing and holding the release button or buttons will damage the plug.

MM15475-4 INSTALLATION

MM15475-4-1 Control Head Mounting

NOTE:

For 521 installations, the Control Head must be mounted as a Starboard lever, and then connected to the corresponding Starboard connector on the Transfer Panel or pigtail on the Junction Box.

For 522 installations, insure the Control Head Unit labeled right hand (Starboard) is to the right side of the console and the Control Head Unit labeled left hand (Port) is to the left side of the console.

- The Control Head may be rotated to any position inside the console to conform to individual space limitations.
- Before shipping, the Control Head input shaft is centered to Neutral.
- Consider the location of the lever friction adjustment set screw and detent crispness adjustment nut for accessibility before mounting. (Refer to Figure 2:, page MM15475-1-3)

There are two options for mounting of the Control Head Unit:

1 Flange Mounting (Figure 7:)
2 Shelf Mounting (Figure 8:)

Figure 7: Control Head Flange Mounting

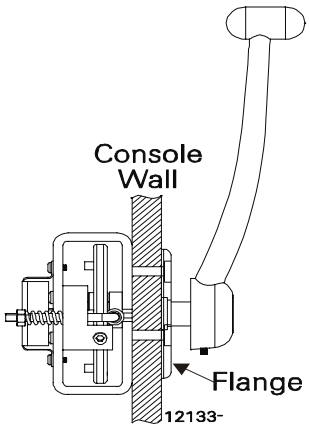
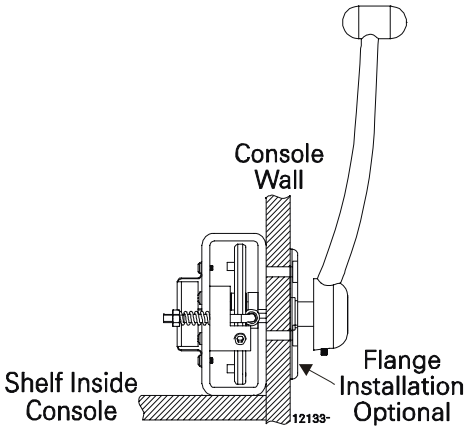


Figure 8: Control Head Shelf Mounting



MM15475-4-1.1 Flange Mounting

A) When the Control Head position within the console has been determined, drill the input shaft hole using Dwg 12173 Flange Template provided in Appendix A.

B) Confirm the position of the input shaft hole.

C) Mark flange mounting screw holes using Dwg 12173 Flange Template supplied in Appendix A. Drill holes.

- If the console wall thickness exceeds .75 inches (19.1mm) one of the following needs to be performed: longer mounting screws (insure that screws do not contact components) or a recess needs to be routed out to reduce the console wall thickness.
- If the console wall thickness is less than .50 inches (12,7mm), the installer shall provide mounting hardware (insure that screws do not contact components). Mounting hardware is 1/4 - 20 UNC stainless steel.

D) Mount Control Head and Flange using screws supplied with the Control Head.

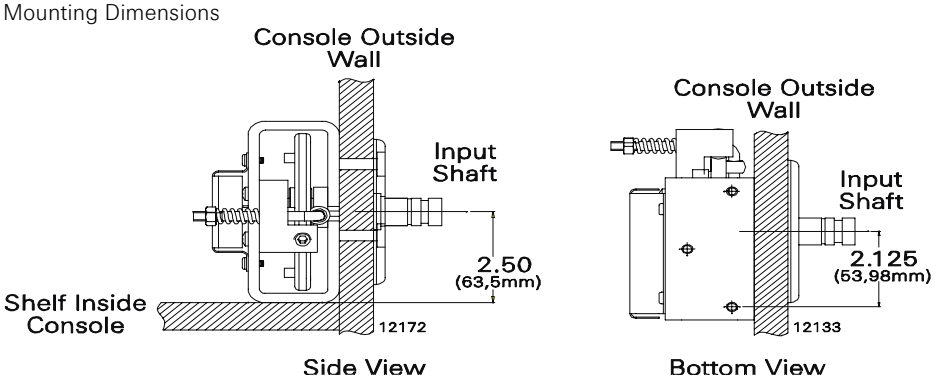
MM15475-4-1.2 Shelf Mounting

A) Determine the position of the Control Head within the console.

B) Use Dwg 12172 Control Head Bottom Face Mounting Template supplied in Appendix A to mark the mounting screw holes on the shelf inside the console.

C) Refer to Figure 9: and confirm the location of the input shaft hole.

Figure 9: Shelf Mounting Dimensions



D) Drill the shelf mounting screw holes.

E) Confirm the position of the input shaft hole using Dwg 12173 Flange Template supplied in Appendix A and then drill.

- If the console shelf thickness exceeds .75 inches (19.1mm) one of the following needs to be performed: longer mounting screws (insure that screws do not contact components) or a recess needs to be routed out to reduce the console shelf thickness.
- If the console shelf thickness is less than .50 inches (12,7mm), the installer shall provide mounting hardware (insure that screws do not contact components). Mounting hardware is 1/4 - 20 UNC stainless steel.

F) The use of the Flange is optional with this type of mounting. If flange is to be used, mark flange mounting screw holes using Dwg 12173 Flange Template supplied in Appendix A. Drill holes.

G) Mount Control Head to the shelf using the screws supplied with the Control Head.

H) Mount the Flange using the screws supplied with the Control Head.

MM15475-4-1.3 Lever Mounting

A) Apply silicone sealant or other suitable anti-corrosion gel between splines of shaft and lever during installation.

B) Slide the Control Head lever onto the splined input shaft so that the lever is in the position required for Neutral Detent.

C) Apply silicone sealant or other suitable anti-corrosion gel between threads of set screw and lever during installation.

D) Once the lever is positioned correctly for Neutral, tighten the Full Dog Point Set Screw. Refer to Figure MM15475 3-2:, page MM15475 3MM15475 3-3, for location of set screw.

E) Ensure that the Control Head lever will not move axially on the input shaft.

MM15475-4-2 Control Head Harness Cable

Run the electric cable that is connected to the Control Head to the Transfer Panel connector or Junction Box pigtail. Install each cable so it is protected from physical damage.

CAUTION: When installing the electric cable, support the cables using clamps or straps not more than 18 inches (0,5m) apart, unless contained in a conduit.

MM15475-4-3 Transfer Panel Mounting

CAUTION: When installing the electric cable, support the cables using clamps or straps not more than 18 inches (0,5m) apart, unless contained in a conduit.

Refer to Figure 3:, page MM15475-1-3, for size of cut out and mounting holes for the Transfer Panel. Refer to Appendix A - Dwg 12134A Transfer Panel Template.

A) Use the template supplied in Appendix A and make cut outs per Dwg 12134A Transfer Panel Template.

B) Secure Panel to the console using 3/16 inch diameter stainless steel screws (installer provided).

C) Plug the Control Head harnesses to the Transfer Panel.

MM15475-4-4 Transfer Junction Box Mounting

A) Measure and drill four corner screw holes. Refer to (Figure 4:, page MM15475-1-4).

B) Remove the four screws holding the Junction Box cover. Retain the screws in a safe place.

C) Remove the Junction Box cover.

D) Mount the Junction Box with the four screws provided.

E) Replace the Junction Box cover with the four screws removed in Step B).

CAUTION: When not working on the Transfer Junction Box, keep the cover in place to prevent damage to circuits.

MM15475-4-5 Assembly with Junction Box: Transfer Button and LED

Refer to Section MM15475 3-4 for requirements.

MM15475-4-5.1 Mounting

Wiring between the Transfer Junction Box and the Transfer Button and LEDs should be supplied by the shipyard or installer.

Make connections and mounting as recommended by the manufacturers of the Transfer Button and LEDs.

Run the cables to the Junction Box.

CAUTION: When installing the electric cable, support the cables using clamps or straps not more than 18 inches (0,5m) apart, unless contained in a conduit.

MM15475-4-5.2 Connections at Junction Box

A) Remove four screws holding the Junction Box cover. Retain the screws in a safe place.

B) Remove the Junction Box cover

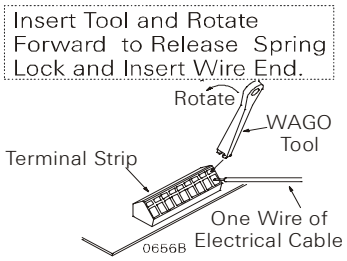
C) Disconnect the existing Transfer Panel pigtail connections.

D) Loosen the Transfer Panel watertight cable grip on the Junction Box and remove the pigtail. Discard.

E) Run the electric cable through the watertight connector on the Junction Box.

F) Strip the PVC jacket and shielding back approximately 2 inches (50,8mm).

Figure 10: WAGO Tool



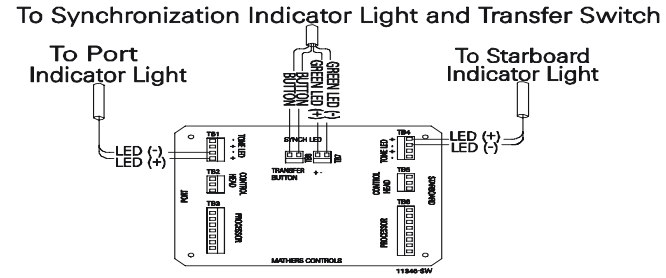
G) Stagger the wire lead lengths to match the Transfer Junction Box Terminal Strip. Refer to Figure 10:. Wire leads must not touch frame.

H) Strip the wire 3/8 inch (9,5mm) on each lead.

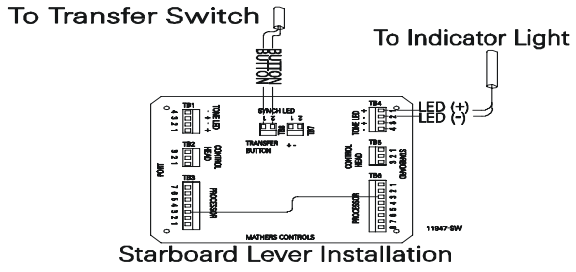
I) Use the WAGO Tool supplied with the Transfer Junction Box to depress the spring lock for the individual wire connections to the terminal strip. (Refer to Figure 10:)

J) Make electric cable connections to the terminals in the Transfer Junction Box as shown in Figure 11:.

Figure 11: Junction Box Connections for OPTIONAL Transfer Button and LEDs



DUAL LEVER INSTALLATION OF PN: 522-4B OR 522-5B



SINGLE LEVER INSTALLATION OF PN: 521-4B OR 521-5B

K) When connections to the Junction Box are complete, tighten the watertight cable grip on Junction Box and replace the watertight cover.

MM15475-4-6 Processor Connections

There are two types of connections at the Processor:

1. Terminal (Single End Plug): Processors that do not have a Remote Station connector or pigtail.
2. Harness (Double Ended Plug) Processors that have available either a Station connector or pigtail.

Determine the harness required for connection to this vessel's ZF Marine Electronics Control System. Follow the appropriate Section.

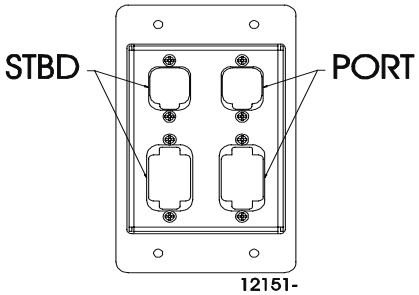
MM15475-4-6.1 Transfer Panel or Junction Box Double Ended Plug Harness Connections

NOTE:

TWIN SCREW: Ensure the Transfer Panel/Junction Box Port cable connects to the Port Processor and that the Starboard cable connects to the Starboard Processor.

SINGLE SCREW: Ensure the Transfer Panel/Junction Box cable is connected to the Starboard connector or pigtail of the Transfer Panel/Junction Box.

Figure 12: Twin Screw Transfer Panel Harness Connectors



A) Plug the Port or Starboard Harness into the appropriate connector on the back of the Transfer Panel or the appropriate pigtail on the Junction Box (Refer to Figure 12:, page MM15475-1-8)

B) Label both ends of the electric cable with Port or Starboard.

C) Install the Harness between the Transfer Panel/Junction Box and the corresponding Processor. Install each cable so it is protected from physical damage.

CAUTION: When installing the electric cable, support the cables using clamps or straps not more than 18 inches (0,5m) apart, unless contained in a conduit.

D) Plug into the corresponding MicroCommander/ClearCommand Station pigtail or CruiseCommand Station connector.

NOTE:
The Transfer Panel/Junction Box may be connected on any unused Station pigtail on MicroCommander/ ClearCommand, or any unused Station Connector on CruiseCommand.
Ensure connection of the Transfer Panel/Junction Box on both Port and Starboard Processor are the **SAME NUMBERED** Station Pigtail/Connector.
A plug is required in any unused Station Connector on the CruiseCommand Processor.

MM15475-4-6.2 Transfer Panel or Junction Box Single End Plug Harness Connections

NOTE:
TWIN SCREW: Ensure the Transfer Panel/Junction Box Port cable connects to the Port Processor and that the Starboard cable connects to the Starboard Processor.
SINGLE SCREW: Ensure the Transfer Panel/Junction Box cable is connected to the Starboard connector or pigtail of the Transfer Panel/Junction Box.

A) Plug the Port or Starboard Harness into the appropriate connector on the back of the Transfer Panel (Refer to Figure 12:) or the appropriate pigtail on the Junction Box (Refer to Figure 5:, page MM15475-1-4)

B) Label both ends of the electric cable with Port or Starboard.

C) Install the Harness between the Transfer Panel/Junction Box and the corresponding Processor. Install each cable so it is protected from physical damage.

CAUTION: When installing the electric cable, support the cables using clamps or straps not more than 18 inches (0,5m) apart, unless contained in a conduit.

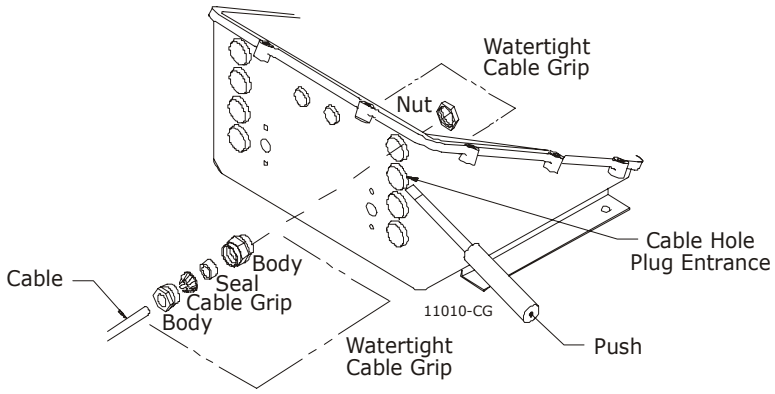
D) Remove the Processor cover.

E) Connect an anti-static wrist strap to your person, and the ground connector to the Processor frame.

CAUTION: When not working on the Processor, keep the cover in place to prevent damage to circuits.

F) Install a watertight cable grip on the Processor. (Refer to Figure 13:)

Figure 13: Processor Watertight Cable Grip Installation



G) Strip the PVC jacket and shielding back approximately 3 inches (75mm).

NOTE:
Port Connection ONLY - *Cut off the Violet wire flush with the end of the PVC cover.*
Starboard Connection*: If Synchronization Option is used, connect as indicated by the System Manual. If Synchronization Option not used, bend the Violet wire out of the wire bundle and wrap, or otherwise compact it; secure with tape for possible use in the future.*

CAUTION: Stagger wire lead length to match the Station terminal strip. Wire leads must not touch frame.

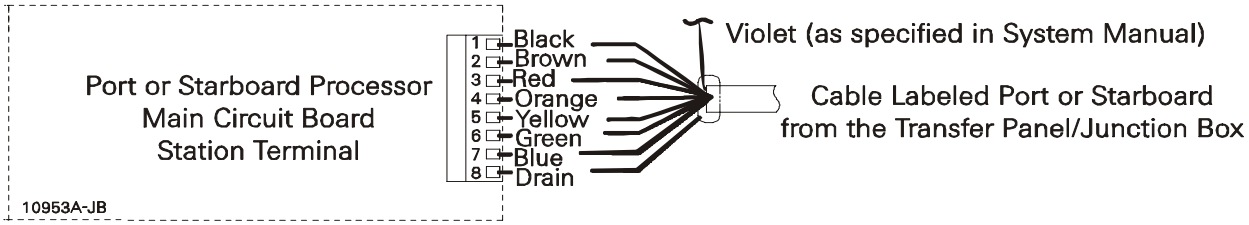
H) Strip the wire 3/8-inch (9,5mm) on each lead.

NOTE: A WAGO Tool is taped to the relay on the circuit board in each Actuator/Processor.

I) Use a WAGO tool to depress the spring lock for the individual wire connection to the terminal strip. Refer to Figure 10:, page MM15475-1-7.

J) Connect colors as shown on Figure 14:.

Figure 14: Typical Connections at Processor



K) Connect the shielding drain wire (bare wire) to Terminal 8 on the terminal strip.

CAUTION: The shielding drain wire MUST NOT touch any other components.

L) Feed through a little slack cable, and tighten the cable grip on the cable.

M) Replace Actuator/Processor cover.

MM15475-5 ADJUSTMENTS

Control Head lever friction is adjustable by turning the friction adjustment set screw. (See Figure 2:, page MM15475-1-3)

Detent crispness is adjustable by turning the detent adjustment nut. (See Figure 2:, page MM15475-1-3)

If Neutral Detent is not correct reinstall the lever following steps in Section MM15475-4-1.3, page MM15475-1-6.

No other adjustments are required.

MM15475-6 MAINTENANCE

MM15475-6-1 Control Head

Check wear on friction and rubbing surfaces yearly. Adjust friction as required.

MM15475-6-2 Transfer Panel

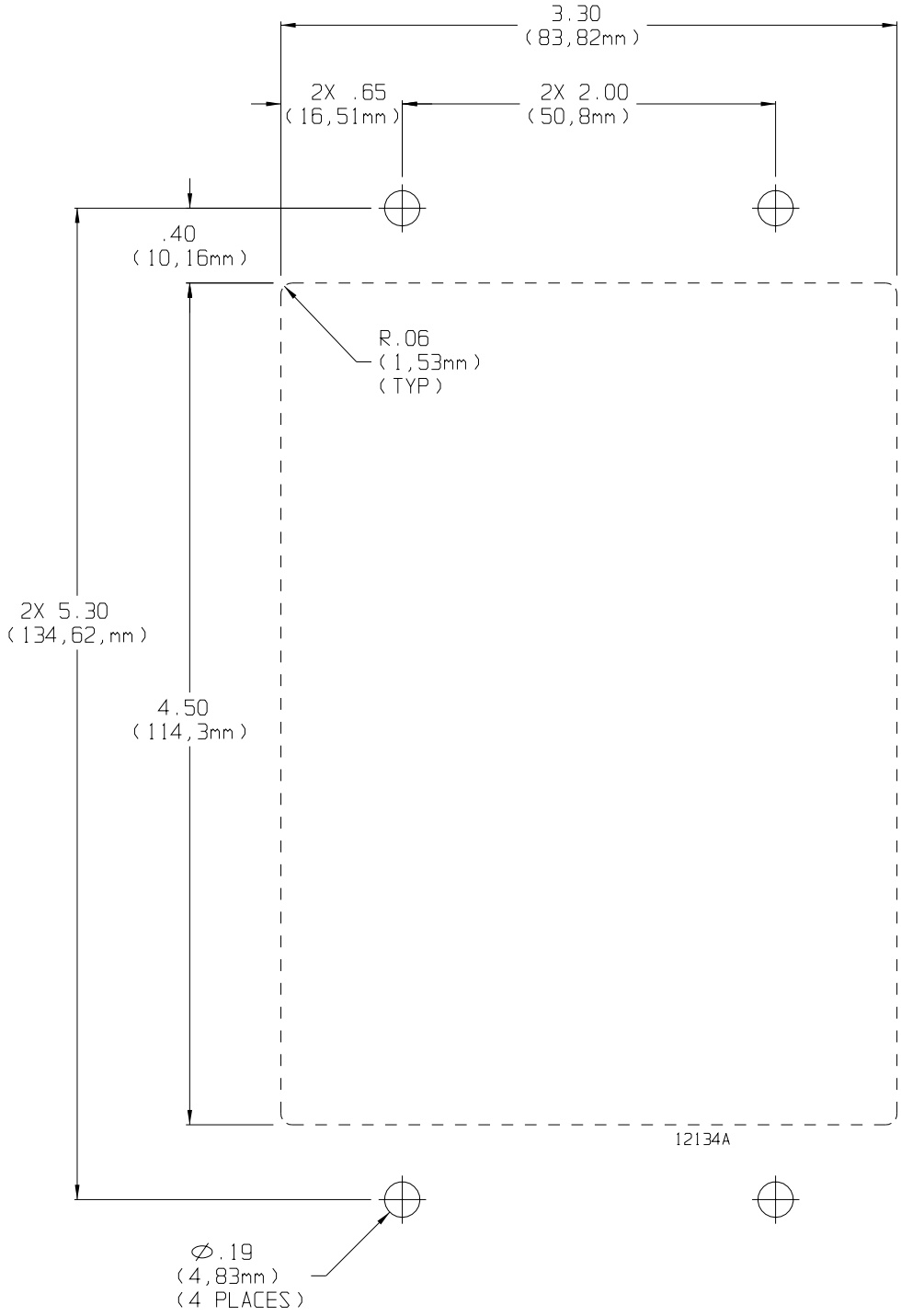
There is no maintenance required

MM15475-6-3 Transfer Junction Box

There is no maintenance required.

APPENDIX A

Dwg 12134A Transfer Panel Template

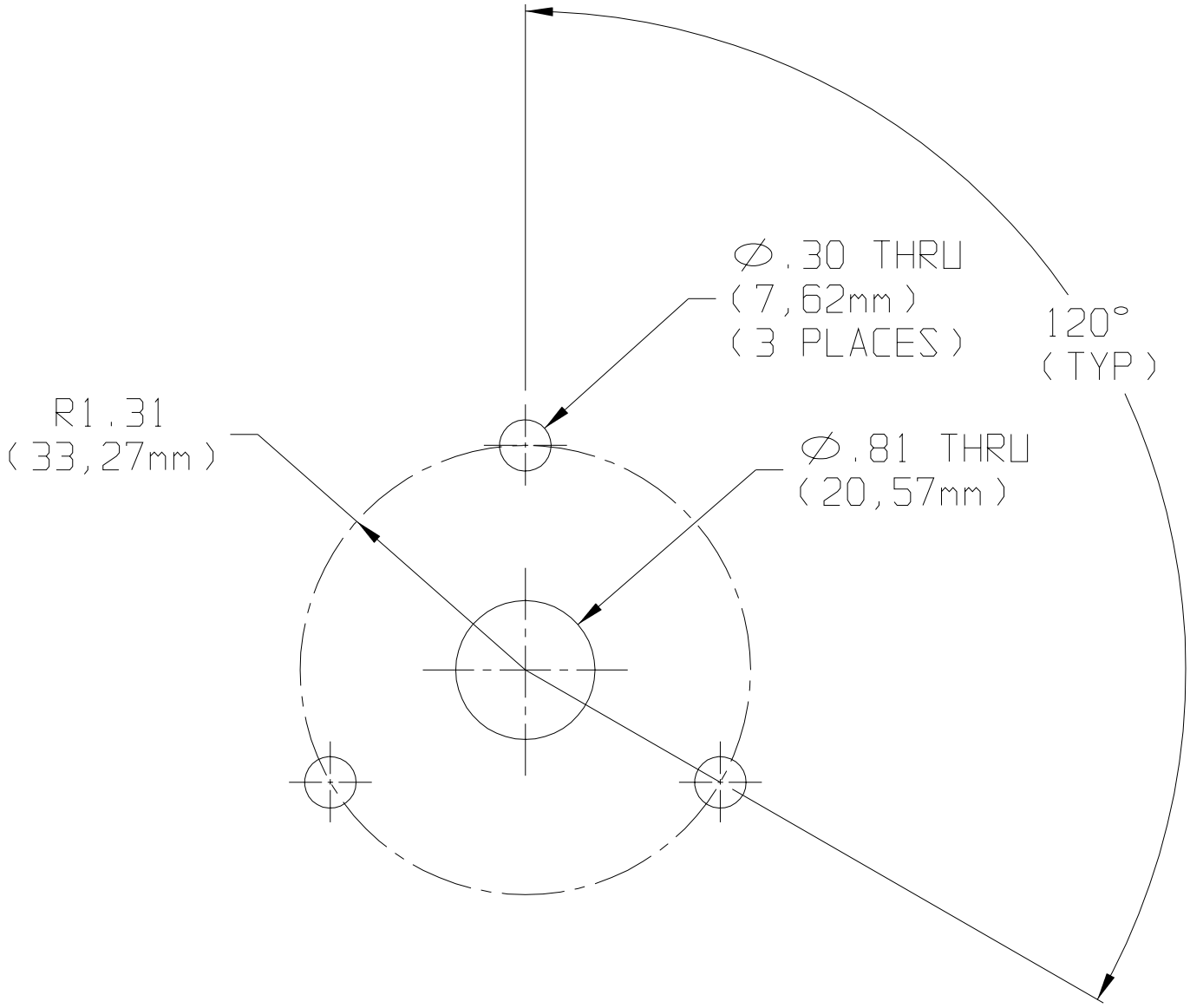


PN: 522-X STATION PANEL CUTOUT INFORMATION

SCALE: 1/1

WARNING: Note that the dimensions are out of scale, pay attention to properly size the cut out before use !

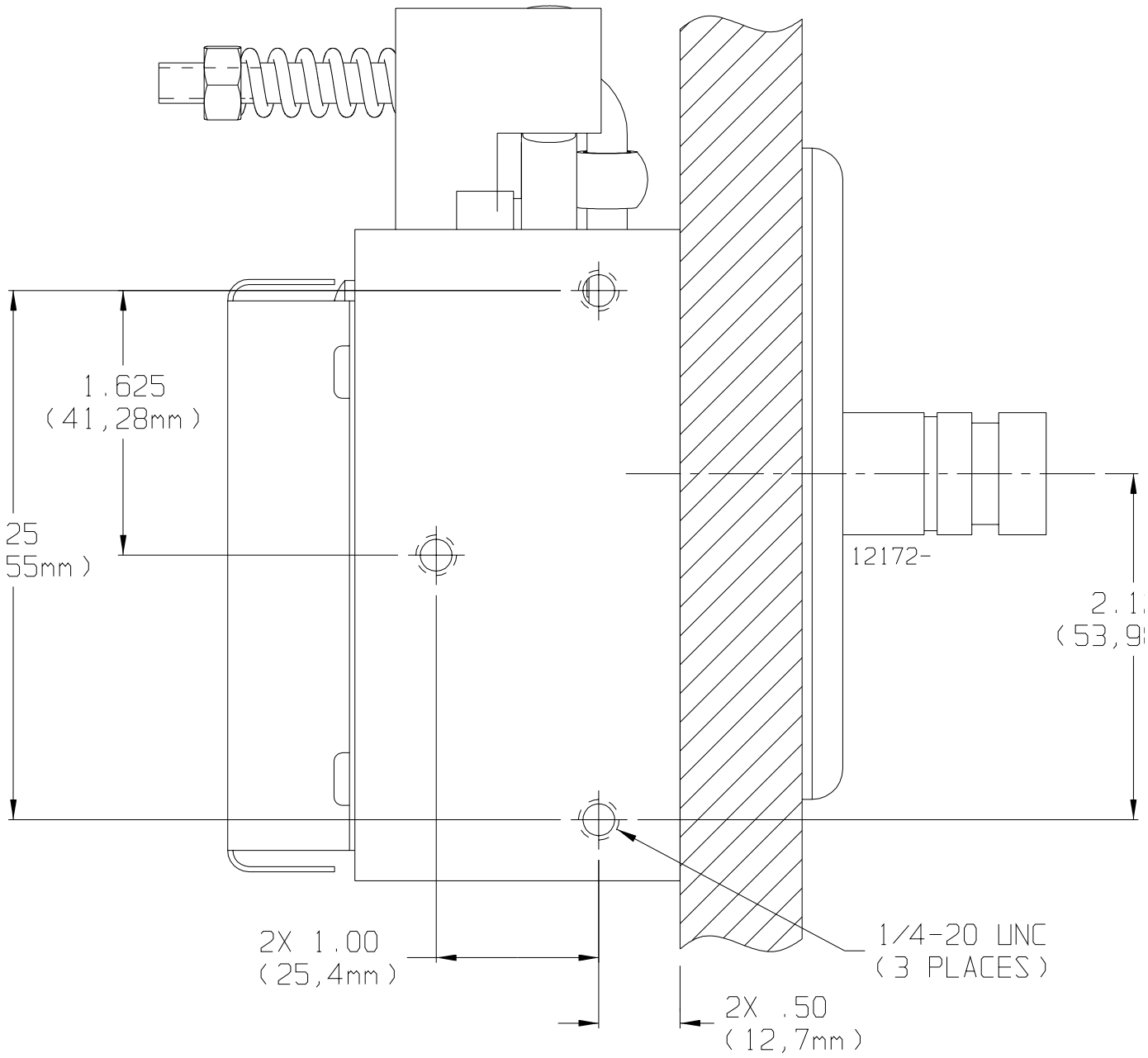
Dwg 12173 Flange Template



522-X FLANGE TEMPLATE

SCALE: 1/1 12173-

Dwg 12172 Control Head Bottom Face Mounting Template

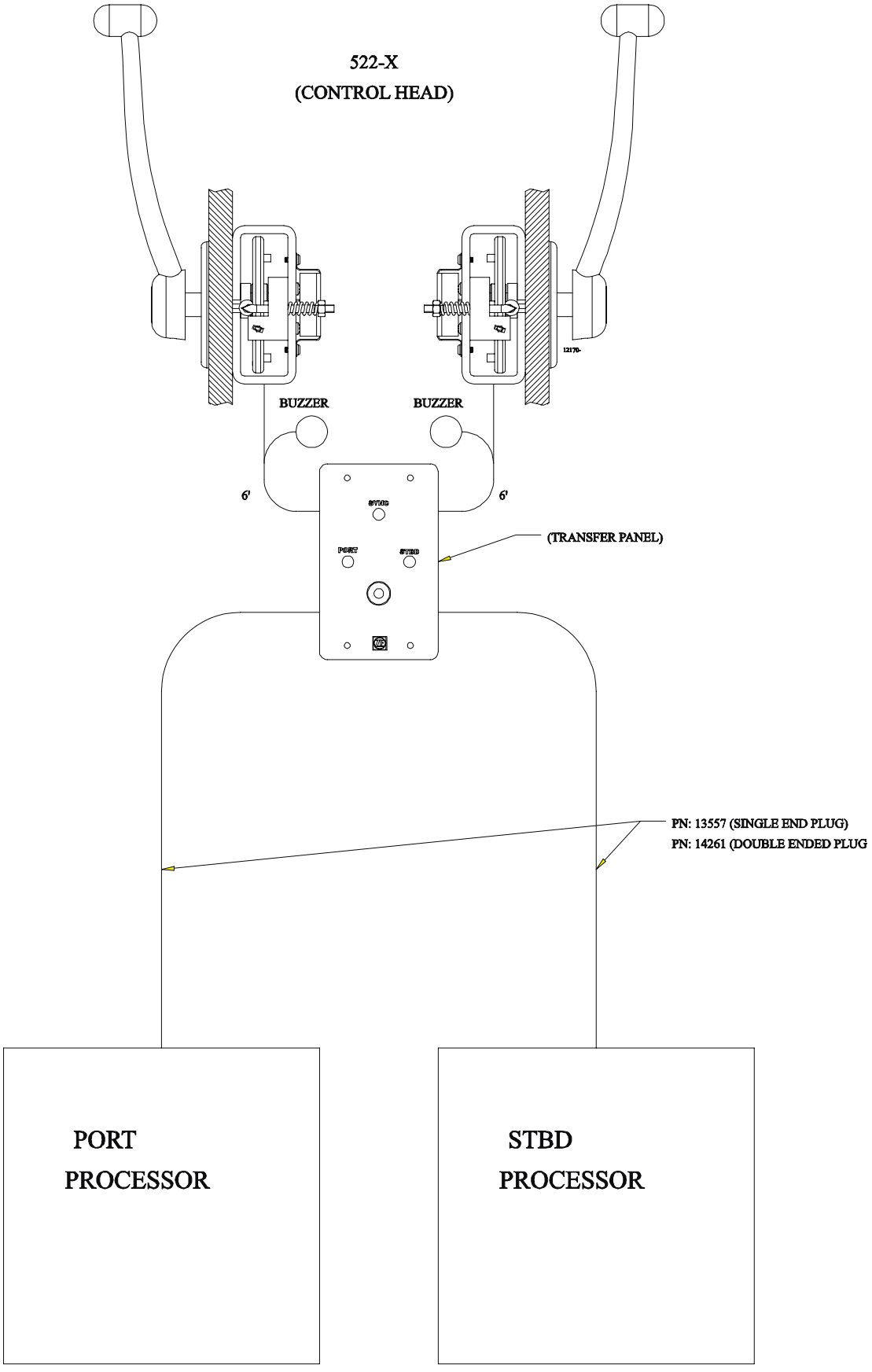


22-X BOTTOM FACE MOUNTING TEMPLATE

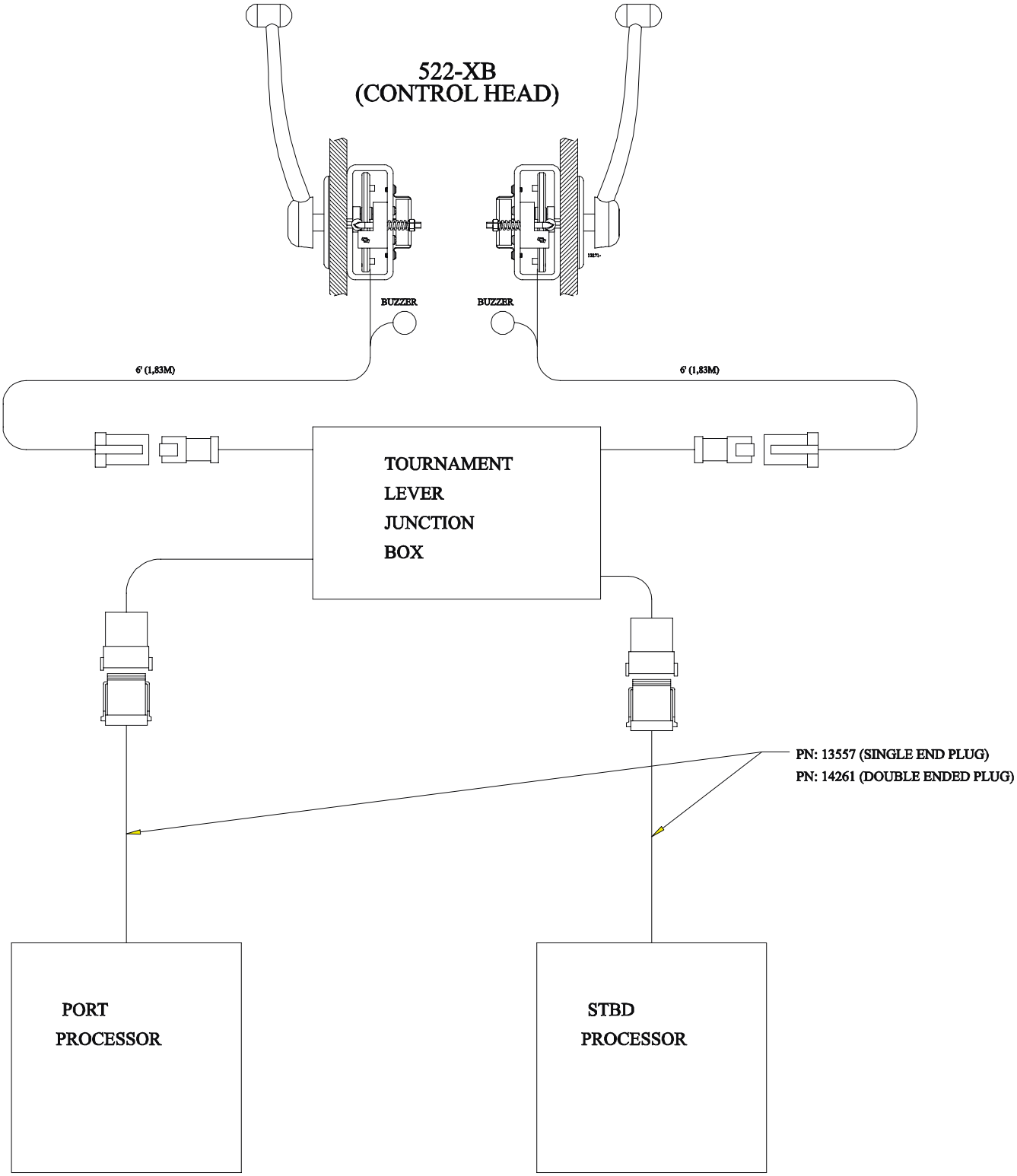
SCALE: 1/1

APPENDIX B

Drawing 12170 -Twin Screw Single Station without Junction Box



Drawing 12171 -Twin Screw Single Station with Junction Box



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