

**AC MOTOR DRIVE REPLACEMENT – SWI-094**

PRODUCT      SEAKEEPER 4.5 through 40

**PURPOSE:**

To provide guidance in the removal and installation of the Seakeeper AC Motor Drive Box (MDB) and replacing the AC input cable. The scope includes adding coolant after installation of replacement Motor Drive. This document also discusses two types of AC Input cable glands found on Seakeepers (flat and round cable gland seals).

**PARTS REQUIRED:**

20216, Seakeeper Motor Drive Box with PFC Circuit Protection	Bulk Hose, (sized per model) (Optional)
40026, Worm Gear Hose Clamp, Size 06 (Qty 2)	Small bucket/bag (for glycol)
Absorbent rags or towels	Barbed Hose Plugs, (sized per model) (Qty 2)
50/50 glycol coolant	Teflon Based Thread Sealant
Hose Barb Caps, (sized per model) (Qty 2)	

**TOOLS REQUIRED:**

Ratchet Handle, 1/4" Drive	Socket, 10 mm, 1/4" Drive
Socket, 1/4 in., 1/4" Drive	Extension, 3 in., 1/4" Drive
Ratcheting Combination Wrench, 10 mm	Screwdriver, Phillips, #2
Screwdriver, Straight Slot, 1/4 in.	Utility Knife
Pinch Clamp or Side-cutting Pliers (Optional)	

**REFERENCES**

[SWI-107, Seakeeper Glycol Service](#)

**PRECAUTIONS**

1. **PERSONNEL SHOCK HAZARD EXISTS** in Motor Drive Box when flywheel rotating, or for up to 10 minutes after power removed.
2. **PERSONNEL INJURY MAY RESULT** from remote start capability if flywheel motor power available to Seakeeper during maintenance.

**CONTENTS**

[MDB Removal](#)

[MDB Installation](#)

[AC Input Cable Installation](#)

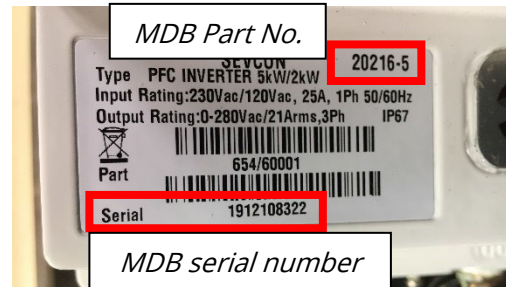
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**MDB REMOVAL:**

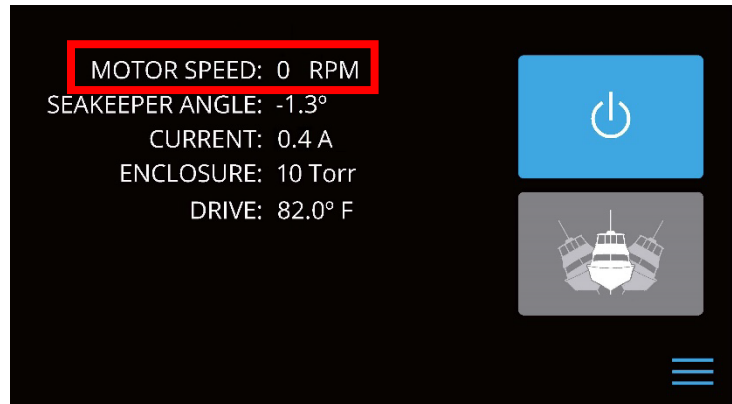
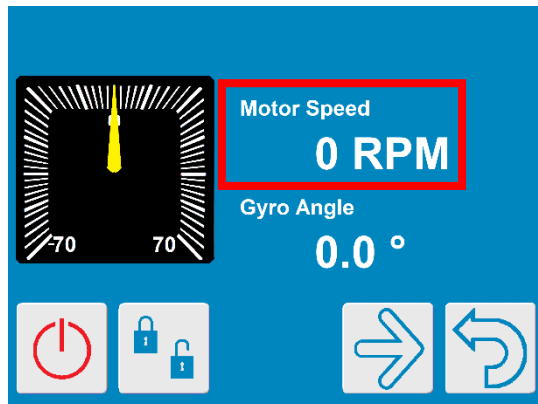
1. **IDENTIFY AND RECORD** existing Sevcon Motor Drive Box information:

- a. Seakeeper model number
- b. Seakeeper serial number
- c. Vessel information
- d. Sevcon MDB Part number
- e. Sevcon MDB Serial number

**DANGER!**

**PERSONNEL SHOCK HAZARD EXISTS within  
MDB if power applied to MDB OR flywheel is rotating.**

2. **CONFIRM** AC power breaker to Seakeeper is OFF.
3. **VERIFY** flywheel is at zero RPM at MFD app / display.



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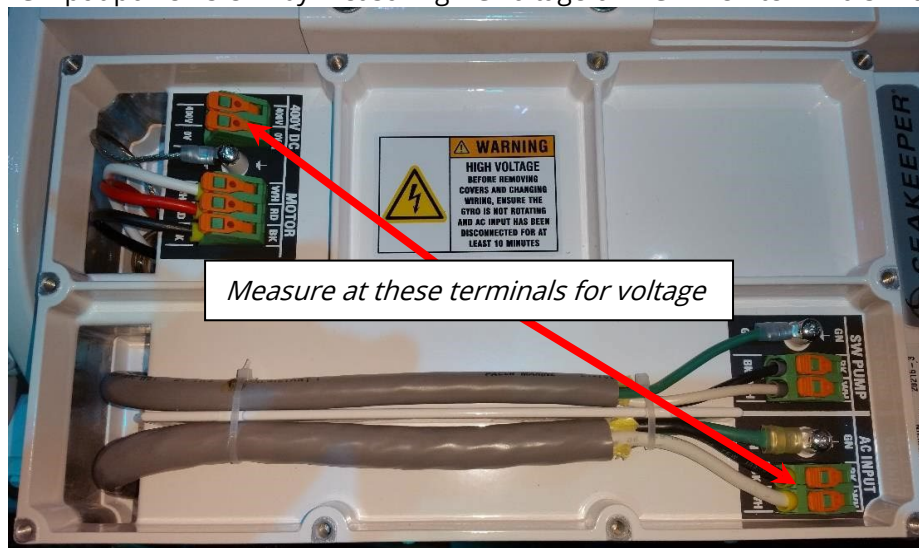


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4. **REMOVE** ten M4 screws holding MDB cover using #2 Phillips Screwdriver.
  - a. For Seakeeper 4.5 with insufficient clearance behind rear panel, [SEE Attachment 1](#).



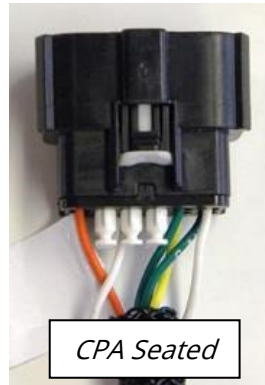
5. **PLACE** MDB cover and screws aside for re-use later.
6. **VERIFY** AC input power is OFF by measuring AC voltage on AC INPUT terminals with multimeter.



7. **VERIFY** no Voltage is present at 400V DC terminals with multimeter.

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8. **DISCONNECT** harness from MDB as follows:*Molex Connector**CPA**CPA Seated**CPA Unseated*

- CAREFULLY PULL** CPA (Connector Position Assurance) down.
- PRESS** on Locking Tab and pull connector away from Motor Drive Box.
- INSPECT** CPA, Locking Tab, and connector for damage.

**NOTE:** If Molex connector is damaged, reference Seakeeper Work Instruction [SWI-093 For Molex Connector Insertion and Removal](#) procedure.

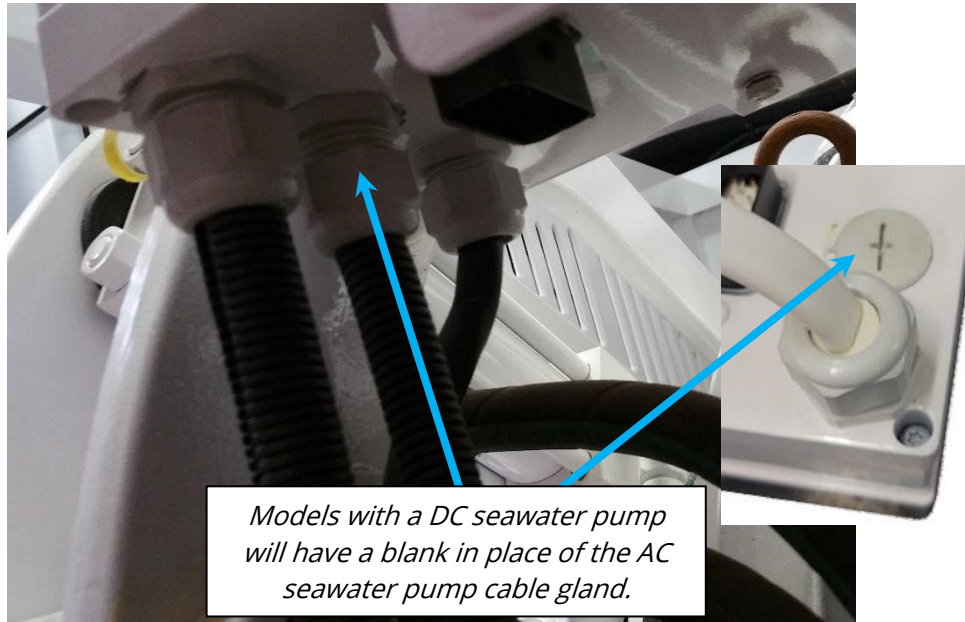
9. **DISCONNECT** all leads by lifting orange tabs and removing grounding screws.*Early Seakeeper 5 through 16, 26, and 35 MDB shown with SW PUMP cable**Seakeeper 4.5 through 18, and 40 MDB shown with no SW PUMP cable*

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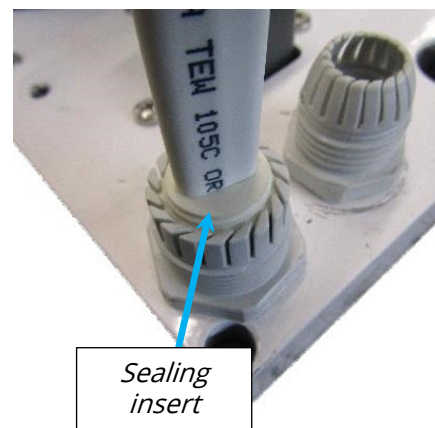


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10. **REMOVE** Cables from MDB as follows:



- REMOVE** nuts from cable glands **AND PULL** cables out of MDB.
- SET** rubber sealing inserts of cables aside for reuse, if needed.
- REINSTALL** grommet nuts on MDB.



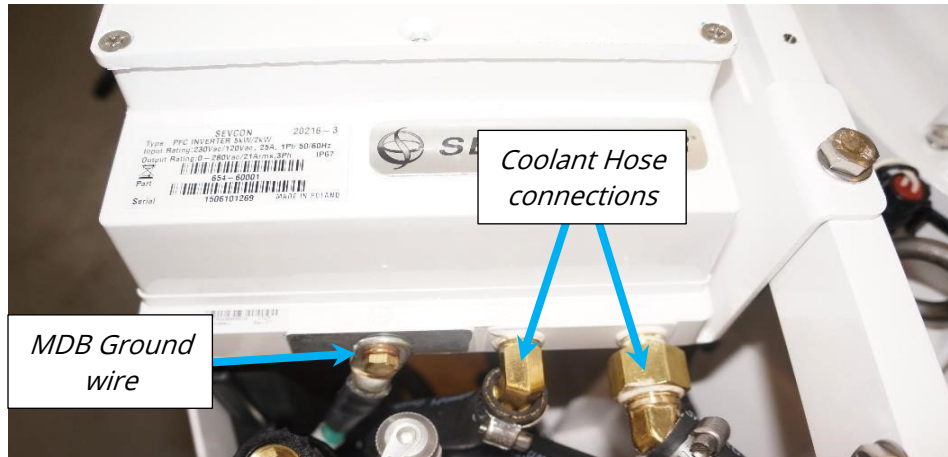
11. Using #2 Phillips Screwdriver, **INSTALL** MDB screws, removed in Step 4, to secure cover on removed Motor Drive Box.



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12. **DISCONNECT** two coolant hoses and grounding wire as follows:



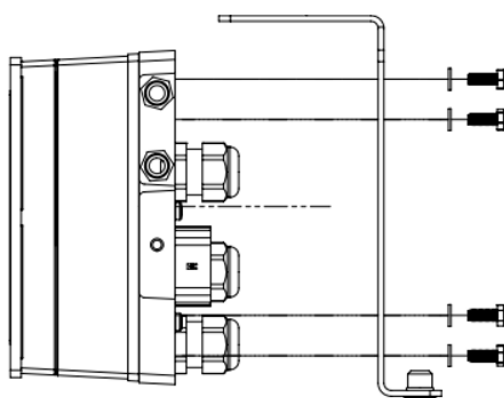
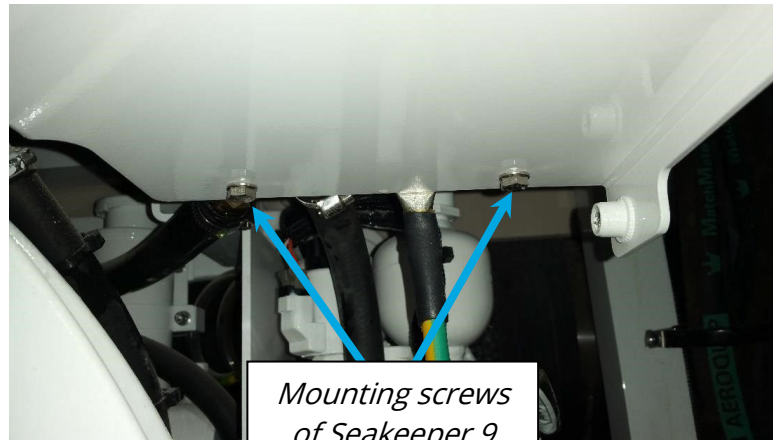
- a. **ENSURE** no coolant spills onto electrical components, as damage may result.
- b. **PLACE** small bucket/bag beneath coolant ports to collect glycol coolant spills.
- c. **USE** absorbent rags or towels to assist capturing any coolant that may spill.
- d. **LOOSEN** worm gear hose clamps with 1/4-in. driver or straight-slot screwdriver.
  - i. For Seakeeper 4.5 pinch clamps:
    1. **CUT** pinch clamps with side-cutting pliers.
    2. **PRY** remainder of clamp from hose.
- e. **REMOVE** hose ends without damaging them **OR REPLACE** hoses.
- f. **DRAIN** some of coolant in hoses into bucket/bag.
- g. **SEAL** glycol hose ends with plugs (or 3/8-in. bolts).
- h. **LIGHTLY TIGHTEN** worm-gear type hose clamps on hose ends.
- i. **CLEAN** any coolant spilled on Seakeeper.
- j. Using 10 mm wrench or socket, **REMOVE** grounding wire **AND NOTE** washer placement.

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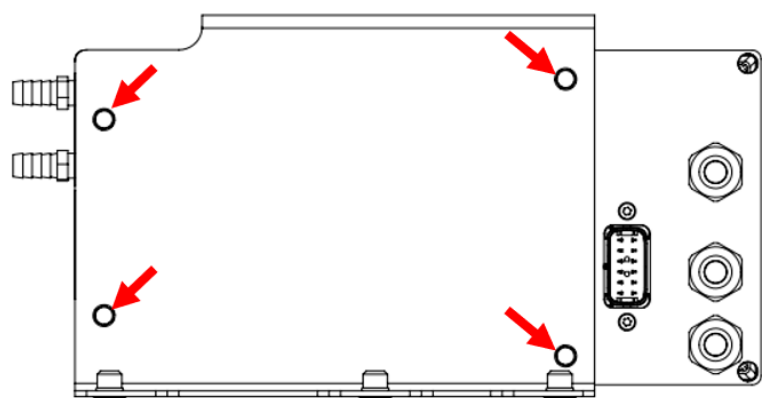


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13. **REMOVE** screws securing MDB to bracket (like below photos) using 10 mm socket.



MDB Side View



MDB Bottom View

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14. **REMOVE** MDB brass coolant line fittings:



- a. With removed MDB completely free, **PLACE** coolant ports over bucket/bag to drain all glycol from MDB internals.

**NOTE:**

Replacement MDB should contain proper fittings.

- b. **REMOVE** brass coolant line fittings **AND RETAIN** for future use, if needed.
- c. **WHEN** removed MDB free of glycol,  
**THEN INSTALL** caps in coolant ports (or similar plug material that can be readily removed).
- d. **WRITE** Seakeeper serial number and code/issue on painters' tape **AND ATTACH** to drive box.
- e. **PLACE** removed MDB in same shipping container from which replacement box was delivered, or similar, and secure packing material firmly to protect unit.
- f. **SEAL** container with packing tape for return shipment to Seakeeper using RA (return authorization) provided.



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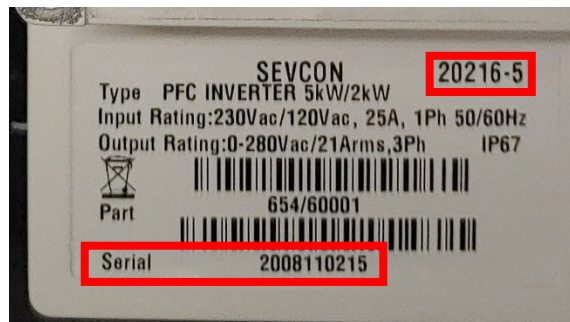
**MDB INSTALLATION:**

1. **IF** replacing MDB part number 20216-5, or earlier, with MDB part number 20216-6, or later, **OR** replacing 20216-6, or later, with MDB part number 20216-5, or earlier,

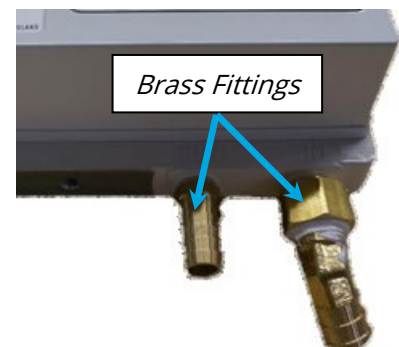
**THEN ENSURE** new GCM installed with MDB due to software differences.

**[NOTE:** A GCM can be reprogrammed if Seakeeper Service Tool app available.]

2. **IDENTIFY AND RECORD** following on Service Report Form:



- a. Replacement MDB Part number.
  - b. Replacement MDB Serial number.
3. **INSTALL** brass coolant fittings into replacement MDB [**N/A if already installed**]:
    - a. **CLEAN** threads on brass fittings.
    - b. **APPLY** Teflon tape or Teflon based thread sealant compound to brass fitting threads.
    - c. **INSTALL** fittings in original location and orientation into replacement MDB.



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4.    **APPLY** Loc-tite® 243 to threads of MDB mounting fasteners.
5.    **INSTALL** replacement MDB onto mounting bracket with fasteners using 10 mm socket.
6.    **VERIFY** cover is secure on replacement MDB to prevent coolant spillage on MDB internals.
7.    **RECONNECT** two coolant hoses onto hose barbs of replacement MDB:

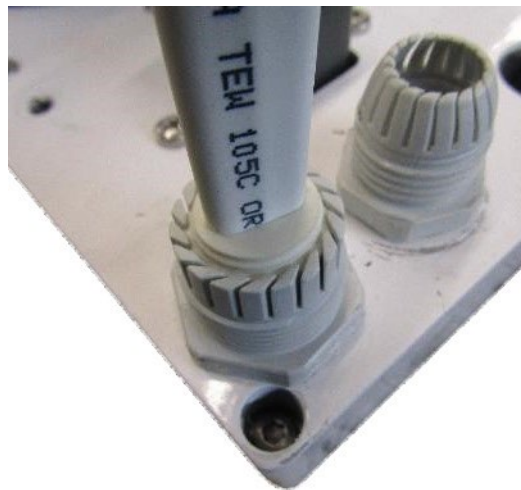
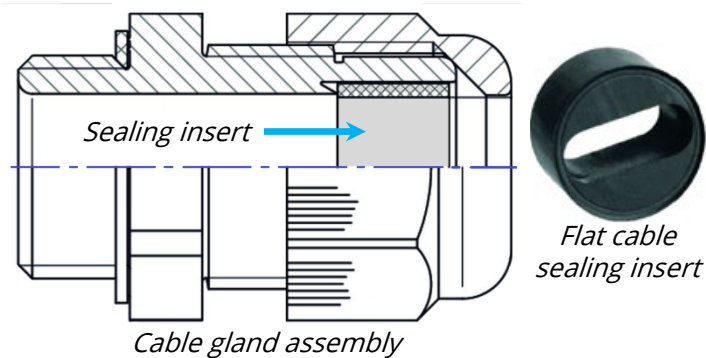


- a.    **LOOSEN** worm gear hose clamps **AND REMOVE** plugs from ends of glycol hoses.
  - b.    **CATCH** coolant spills in bucket/bag.
  - c.    **INSTALL** hoses onto replacement MDB.
  - d.    **PLACE** hose clamps into position over hose barbs and tighten with ¼-in. socket or straight-slot screwdriver. [Installing replacement ½" worm gear clamps on Seakeeper 4.5 is acceptable]
  - e.    **REINSTALL** ground wire and placing washers in original positions.
8.    **REMOVE** cover on replacement MDB.
    - a.    **ENSURE** any spilled glycol coolant has been cleaned up.
    - b.    **RETAIN** M4 screws of MDB cover for re-use later.

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9. **ROUTE** flywheel motor, AC Input and SW input (if applicable) cables through drive feedthrough grommet nuts then grommets w/rubber seals.
- a. **IF** round AC Input cable is routed from vessel AC panel **AND** replacement drive is provided by Seakeeper,  
**THEN REPLACE** flat cable gland seal with original motor drive, or Seakeeper-provided replacement, AC Input feedthrough round cable gland seal.



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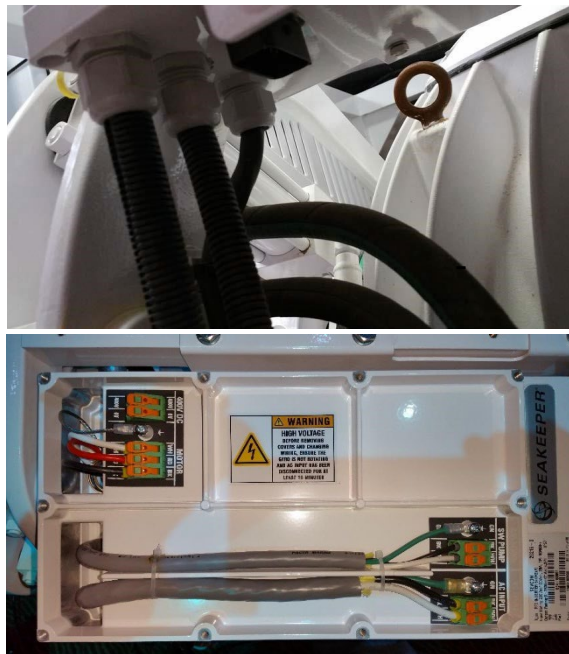
**NOTE:**

- Cables must fit perfectly in glands to prevent moisture intrusion.
- Seakeeper 4.5 through 18 and 40 models, with serial numbers below, do not use an AC SW Pump cable:
 

* 6/5-211-2771 and after	* 18/16-194-0001 and after
* 9/7HD-212-3388 and after	* 40-0001 and after

10. **RECONNECT** cables & leads:

- AC INPUT**
- SW PUMP** (if applicable) (0.410-in. O.D.)
- MOTOR**
- Ground termination**



11. **SECURE** cables by tightening drive feedthrough grommet nuts.
12. **CONNECT** AC MDB Molex wire harness connector.
13. **PLACE** cover on replacement MDB.

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**NOTE:**

Moisture intrusion may occur if torque specifications are not followed.

14. **TORQUE** MDB screws (saved from Replacement Step 5) to **19 in-lbs (2.2 Nm)**.
15. **RE-ENERGIZE** DC and AC power to Seakeeper.

**NOTE:**

Operations Manuals specify proper coolant fill levels for each model.

16. **FILL** coolant system to proper level per [SWI-107, Seakeeper Glycol Service](#).
17. **TEST** new MDB as follows:
  - a. From main screen, **VERIFY** no alarms are present.
  - b. **PRESS** POWER button.





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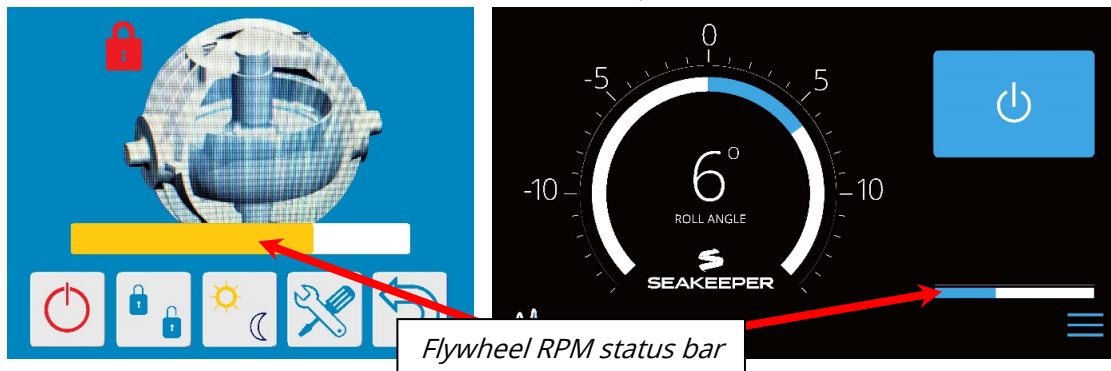
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Step 17 continued

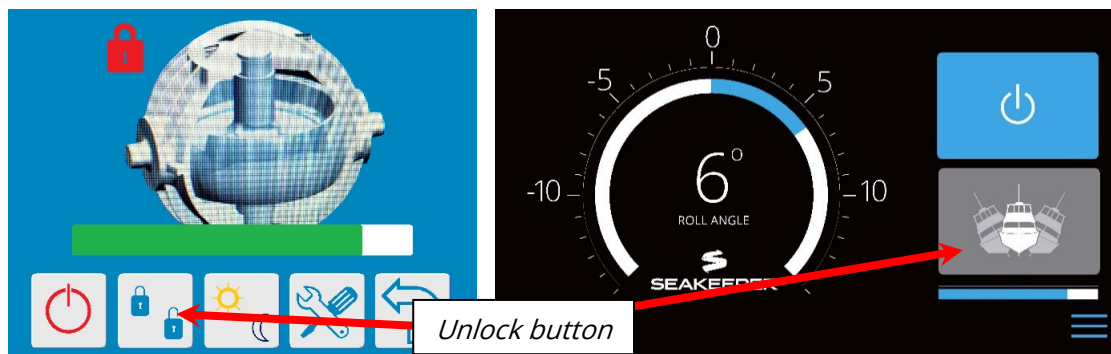
**NOTE:**

The Seakeeper should display status bar as RPM is building.

- c. **VERIFY** consistent rise in RPM with no alarms present.

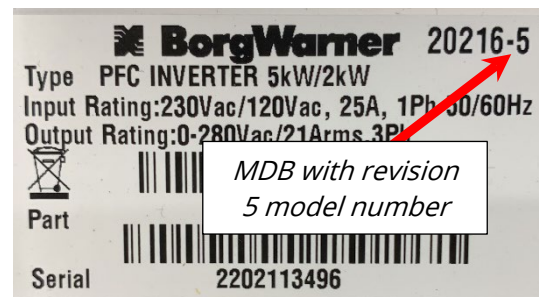


- d. For 3.5" display, once status bar turns green, unit can be unlocked.  
On MFD app / 5" display, once gray STABILIZE button appears, unit can be unlocked.



18. **SHIP** removed MDB to Seakeeper if model number is revision 4, or greater, as indicated after dash in the model number using RA (return authorization) provided.

- a. **IF** MDB is revision 3 or earlier,  
**THEN DISPOSE** of MDB per local ordinances.



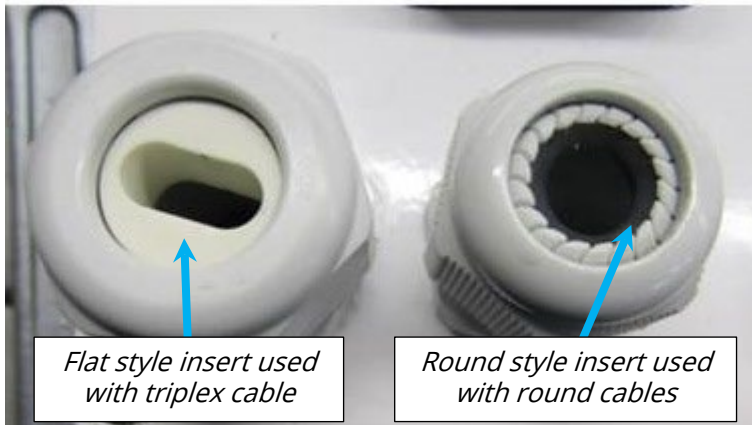
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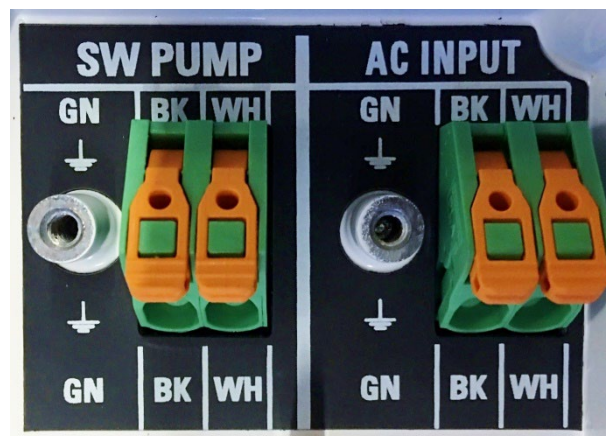
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### AC INPUT CABLE INSTALLATION

1. **REMOVE** gland nut from AC INPUT cable gland of MDB.
2. **INSERT** appropriate shaped sealing insert (to match the AC Input cable used) into housing.



3. **PLACE** gland nut over AC INPUT cable leads and onto cable.
4. **ROUTE** AC INPUT cable through cable gland housing into MDB.
5. At AC INPUT terminal, **RAISE** two orange tabs of terminal housing to receive cable crimps.



6. **REMOVE** AC INPUT terminal ground screw (labeled 'GN').

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7. **IF** installing customer-supplied cable,  
**THEN:**
  - a. **SEPARATE** three (3) conductors and strip ½" (13 mm) of insulation from end of each lead.



- b. **SLIDE** ferrules onto positive and neutral bare wire ends. [**ENSURE** all strands are inside metal sleeves.]
  - c. **OPEN** crimp tool and slide ferrule into tool opening.
  - d. **SQUEEZE** crimp tool until it is fully closed.
  - e. **REPEAT** for remaining conductor.
  - f. **INSTALL** size #8 terminal stud onto Ground (GN) wire.
  - g. Using a crimp tool, **CRIMP** terminal stud onto green ground wire
  - h. **PERFORM** pull test on each crimp installed.
8. **INSERT** black and white conductors in appropriate terminal positions **AND LOCK** crimps in position by pressing on orange tabs.

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9.     **INSTALL** green ground cable to ground post **AND SECURE** with screw through ring terminal of ground lead.



10.   **INSTALL** cable ties to secure AC INPUT cable to MDB.
11.   **THREAD** gland nut onto AC INPUT cable gland housing.



12.   **VERIFY** cable gland is completely secure and no void between cable and gland.

\*\*\*\*\* **END** \*\*\*\*\*

REVISION	DESCRIPTION OF CHANGES	APPROVED	DATE
3	Added AC input cable installation & triplex cable	T Messner	14JUN2022
4	Seakeeper 40 release	A Patricio	31MAR2023
5	Seakeeper 4.5 release	A Patricio	07SEP2023

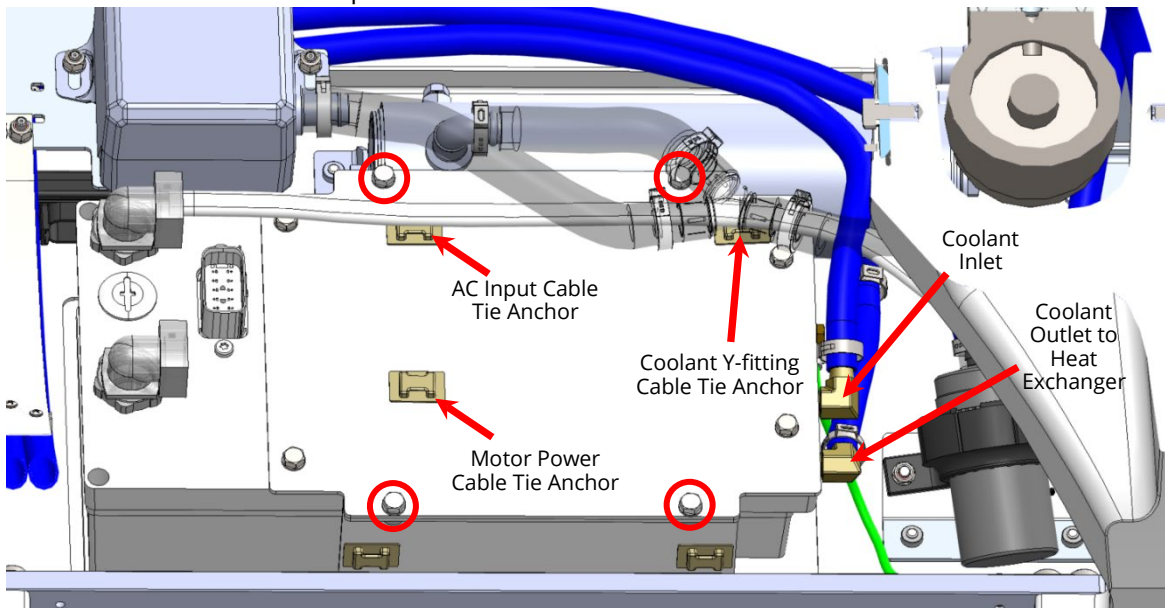
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**ATTACHMENT 1**

Removing Seakeeper 4.5 Motor Drive with insufficient clearance behind rear panel.

1. **CUT** cable ties at the AC Input and Motor Power cable tie anchors.



2. **CUT** cable tie at coolant hose Y-fitting on Motor Drive bracket.
3. **REMOVE** hose clamps of Motor Drive inlet and outlet hoses:
  - a. **IF** pinch clamps installed, **THEN:**
    - i. **CUT** clamps with side-cutting pliers.
    - ii. **REMOVE** clamp band **AND DISCARD** clamp.
4. **PLACE** liquid catch beneath coolant hoses of Motor Drive.
5. **REMOVE** hoses from Motor Drive brass, barbed fittings.
6. **CAP** ends of coolant hoses with ½ in. barbed hose plugs.
7. **CAP** Motor Drive brass, barbed fittings with ½ in. caps.
8. **REMOVE** four screws holding bracket and Motor Drive (circled in red above) with 10 mm socket/wrench.



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### ATTACHMENT 1 continued

9. **DISCONNECT** Motor Drive Molex connector of wire harness (see [Step 8](#) for details).
10. **DISCONNECT** ground cable from Motor Drive above coolant hose fittings with 10 mm socket.
11. **REMOVE** Motor Drive:
  - a. **REMOVE** two nuts holding coolant reservoir with 10 mm socket/wrench.
  - b. **PULL** Motor Drive toward sphere and up to access ten M4 screws of Motor Drive.
12. **REMOVE** ten M4 screws from Motor Drive cover.
13. **RETURN** to procedure [Step 6](#) **AND SKIP** non-applicable steps.

