



11 INDUSTRY DRIVE
PALM COAST, FL 32137
PHONE 877.900.7278
FAX 386.445.1122

INSTALLATION INSTRUCTIONS

ADD ON INSIDE COMPONENTS USING SAGINAW SHUTTLE VALVE

1. Modifying Mercury shuttle valve

Located at the end of the Mercury directional priority valve are two external steel hydraulic lines. Remove these lines from the priority valve end only and then cut the lines at the cylinder end leaving approximately 3/4" of exposed steel line remaining.

2. Installation of shuttle valve fittings and cylinder balance hose

On the now exposed shuttle valve directional ports, install the two new adapter fittings provided in kit number (135-1070). Also provided is a 6" hose to loop between and connect the two previously cut steel lines once the cylinder is fully cycled and purged of all fluid.

3. Internal hose installation

Now the internal hoses can be installed according to the proper routing referenced in the following assembly print drawings:

Single Bravo/Single Cylinder Add On System (assembly drawing 137-9251S)

Single Bravo/Dual Cylinder Add On System (assembly drawing 137-9252S)

Dual Bravo/Dual Cylinder Add On System (assembly drawing 137-9253S)

Space Saver Single Bravo/Single Cylinder Add-On System (assembly drawing 137-9513S)

Space Saver Single Bravo/Dual Cylinder Add-On System (assembly drawing 137-9514S)

Space Saver Dual Bravo/Dual Cylinder Add-On System (assembly drawing 137-9515S)

IMPORTANT: The Left (port) and the Right (starboard) hose fittings exiting the Mercury shuttle valve are not marked. The upper fitting is the right or starboard hose and the lower fitting is the left or port hose as shown in the exploded section of the plumbing diagram. If these hoses are plumbed backwards, the system will want to slam to one side when the power steering engine is started. Upon initial start up it is suggested you have a firm grip on the steering wheel in case this situation occurs. If the wheel wants to pull in one direction these two hoses, need to be reversed.

Once the hose installation is complete, fill the power steering reservoir with either GM high performance power steering fluid or Valvoline synthetic power steering fluid and proceed with the proper bleeding process.

BRAVO END CAP & ATTACHMENT HARDWARE

1. Stock Bravo end cap removal

Remove the three retaining bolts attaching the stock upper rear cap to the back of the upper gear housing. It may be necessary to loosen the top cap bolts to achieve this. A certain amount of oil loss may occur during this process. Be sure to pay special attention to the neutral detent spring and plunger that must be placed into the new steering end cap upon installation.

2. Steering cap stud installation

Studs are provided to replace the three stock rear cap attachment bolts previously used. The two shorter studs are to be installed on the two top holes while the longer one is



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intended for the center bottom hole. Upon installation, apply red loctite to the threads before installing the three new studs.

3. **Steering end cap installation**

Upon installation of the new stainless steel steering end cap assembly it is important that the spring and neutral detent plunger from the old end cap is installed properly. Use a multi-purpose lubricant on the new o-ring/gasket and place the end cap over the newly installed studs. Once properly seated, using the nuts and washers provided, evenly torque the end cap to 30-35 ft. lbs.

General

Once the new end cap is installed, re-torque the top cap if it was loosened upon installation 30-35 ft. lbs. **Very Important** to check sterndrive oil level before operation!

STERNDRIVE WING PLATE

1. Installation of the Space saver stern drive rear steering mount plate requires initial removal of the stern drives from the gimbal housing. Removal of the (6) 7/16" outdrive retaining nuts will allow the out drive to be pulled away from the gimbal housing. Gently slide the stern drive away from the gimbal housing a few inches to expose the forward / reverse shift cable and connector. Spread the jaws of the connector apart to release the stern drive from the cable.
2. Next, remove the top four (4) out drive mounting studs. The two (2) upper studs on each side must be removed and replaced with the new four (4) extended length-mounting studs provided with your steering system. Use Loctite (RED) thread sealer (sold separately) upon re-installation of the new extended length mounting studs
3. After installation of the new extended length mounting studs has been completed re-install the stern drive onto the four (4) new and two (2) existing mounting studs now the stainless steel washers and nuts can be re-installed on the lower original mounting studs to hold the stern drive secure while installing the Space Saver wing plate. Next install the Mayfair stern drive cylinder mounting wing plate onto the four (4) upper extended length studs that you just installed. The wing plate should have the cylinder mounting bolt heads facing up with the locking nuts on the bottom side of the wing plate assembly. Lastly install the stainless steel flat washers onto the six (6) mounting studs as well as the appropriate nylon lock style nuts and torque all of the nuts to O.E.M specifications

STERNDRIVE STEERING CYLINDERS with WING PLATE or END CAP

1. **Attaching the clevis to steering end cap or wing plate**

Install steering cylinders to the Space Saver wing plate with proper provided mounting fasteners.

Extend steering cylinder to ½ of the cylinders allowable stroke so that the hydraulic inlet/outlet ports are facing upward and so that the transom mounting bracket is horizontal to the transom assembly.

Position the stern drive gear housing so that it is straight ahead, fore and, aft and trim the out drive to its normal operating position. This can be achieved by positioning or aligning



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the propeller shaft parallel to the bottom of the boat.

2. Drilling transom for bracket

Next hold the steering cylinder mounting bracket against the transom of the boat maintaining a horizontal parallel mounting plane to the crankshaft centerline. At this point use the transom mounting plate and drilling template to identify and mark the location of the mounting holes that will be drilled in the next step. Refer to the drilling template for approximate distances in inches. It may be helpful to use masking tape to reference the transom mounting plate location. A certain amount of variance is tolerated when necessary.

Steering cylinder mounting flange area on the transom must flat, level, and solid. Always confirm that this area is free of any internal deterioration or dry rot. Next check the inside of the transom to make sure the area is free of any obstructions and proceed to drill the appropriate mounting holes.

The steering cylinder transom mounting bracket can be used as the template when drilling 3/8" mounting holes. Make sure and use a proper sealing material (3M 5200 sealant) when fastening the steering cylinder to the transom.

BLEEDING AIR FROM POWER STEERING SYSTEM

Before filling the system with fluid check all hose connections for tightness and proper routing according to the plumbing diagrams referenced below:

Full Hydraulic, Single Bravo/Single Cylinder (assembly print drawing 137-9201)
Full Hydraulic, Single Bravo/Dual Cylinder (assembly print drawing 137-9202)
Full Hydraulic, Dual Bravo/Dual Cylinder (assembly print drawing 137-9203)

Fill reservoir tank 3/4 full with GM high performance power steering fluid or Valvoline synthetic power steering fluid.

IMPORTANT: Keep reservoir tank at least half full during the bleeding process to prevent air being reintroduced into the system.

The engine containing the power steering pump must be run to properly bleed the system. Check all hose and fitting connections for any leaks while running the engine at an idle. Keep the reservoir tank 1/2 full at all times during the bleeding process. Begin to cycle the steering wheel slowly from side to side until you start to feel a hard lock out. Repeat this process until a deliberate stop occurs in both directions.

To check if the system is bled properly, align the sterndrive in the straight-ahead position and turn the engine off. Go behind the boat and manually try to move the sterndrive back and forth. If the cylinder rods move in and out, there is still air in the system. If a "slight" amount of air remains in the system this should be eliminated after the boat is run.

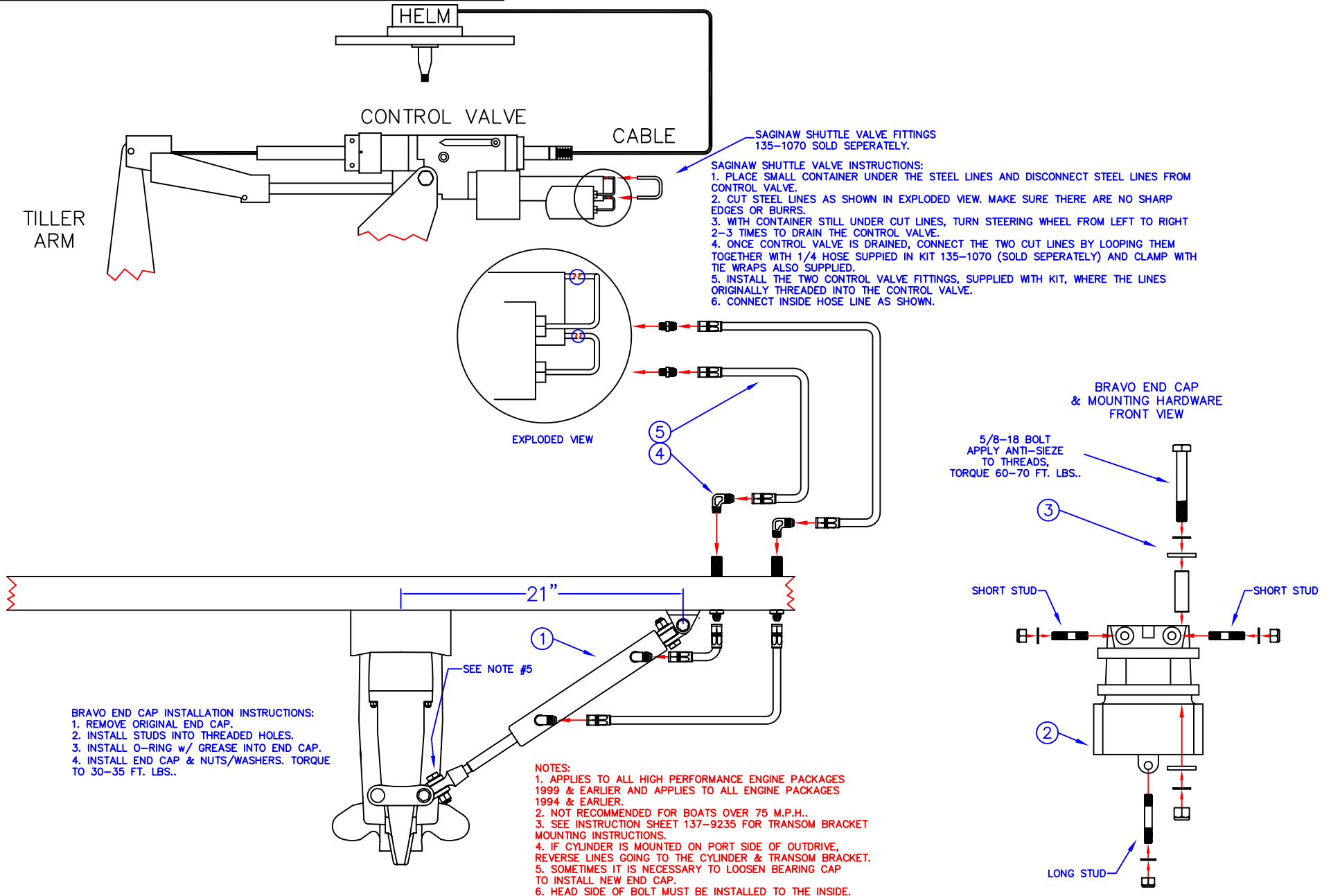
HARDIN MARINE

PART NUMBER: 137-9251S

REVISION: A

DESCRIPTION:
SINGLE BRAVO/SINGLE CYLINDER ADD ON STEERING SYSTEM
(SAGINAW SHUTTLE VALVE SYSTEM)

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	137-9254	COMPLETE 9" STEERING CYLINDER ASSEMBLY
2	1	137-9255	BRAVO END CAP KIT
3	1	137-9256	STEERING CYL. TO END CAP BOLT KIT
4	2	137-9347	FITTING, -6 AN x 1/4 NPT - 90° - BRASS
5	2	137-9233	INSIDE HOSE, 22" LONG



SAGINAW SHUTTLE VALVE FITTINGS
135-1070 SOLD SEPERATELY.

SAGINAW SHUTTLE VALVE INSTRUCTIONS:
1. PLACE SMALL CONTAINER UNDER THE STEEL LINES AND DISCONNECT STEEL LINES FROM CONTROL VALVE.
2. CUT STEEL LINES AS SHOWN IN EXPLODED VIEW. MAKE SURE THERE ARE NO SHARP EDGES OR BURRS.
3. WITH CONTAINER STILL UNDER CUT LINES, TURN STEERING WHEEL FROM LEFT TO RIGHT 2-3 TIMES TO DRAIN THE CONTROL VALVE.
4. ONCE CONTROL VALVE IS DRAINED, CONNECT THE TWO CUT LINES BY LOOPING THEM TOGETHER WITH 1/4 HOSE SUPPLIED IN KIT 135-1070 (SOLD SEPERATELY) AND CLAMP WITH TIE WRAPS ALSO SUPPLIED.
5. INSTALL THE TWO CONTROL VALVE FITTINGS, SUPPLIED WITH KIT, WHERE THE LINES ORIGINALLY THREADED INTO THE CONTROL VALVE.
6. CONNECT INSIDE HOSE LINE AS SHOWN.

BRAVO END CAP INSTALLATION INSTRUCTIONS:
1. REMOVE ORIGINAL END CAP.
2. INSTALL STUDS INTO THREADED HOLES.
3. INSTALL O-RING w/ GREASE INTO END CAP.
4. INSTALL END CAP & NUTS/WASHERS. TORQUE TO 30-35 FT. LBS..

NOTES:
1. APPLIES TO ALL HIGH PERFORMANCE ENGINE PACKAGES 1999 & EARLIER AND APPLIES TO ALL ENGINE PACKAGES 1994 & EARLIER.
2. NOT RECOMMENDED FOR BOATS OVER 75 M.P.H..
3. SEE INSTRUCTION SHEET 137-9235 FOR TRANSOM BRACKET MOUNTING INSTRUCTIONS.
4. IF CYLINDER IS MOUNTED ON PORT SIDE OF OUTDRIVE, REVERSE LINES GOING TO THE CYLINDER & TRANSOM BRACKET.
5. SOMETIMES IT IS NECESSARY TO LOOSEN BEARING CAP TO INSTALL NEW END CAP.
6. HEAD SIDE OF BOLT MUST BE INSTALLED TO THE INSIDE.

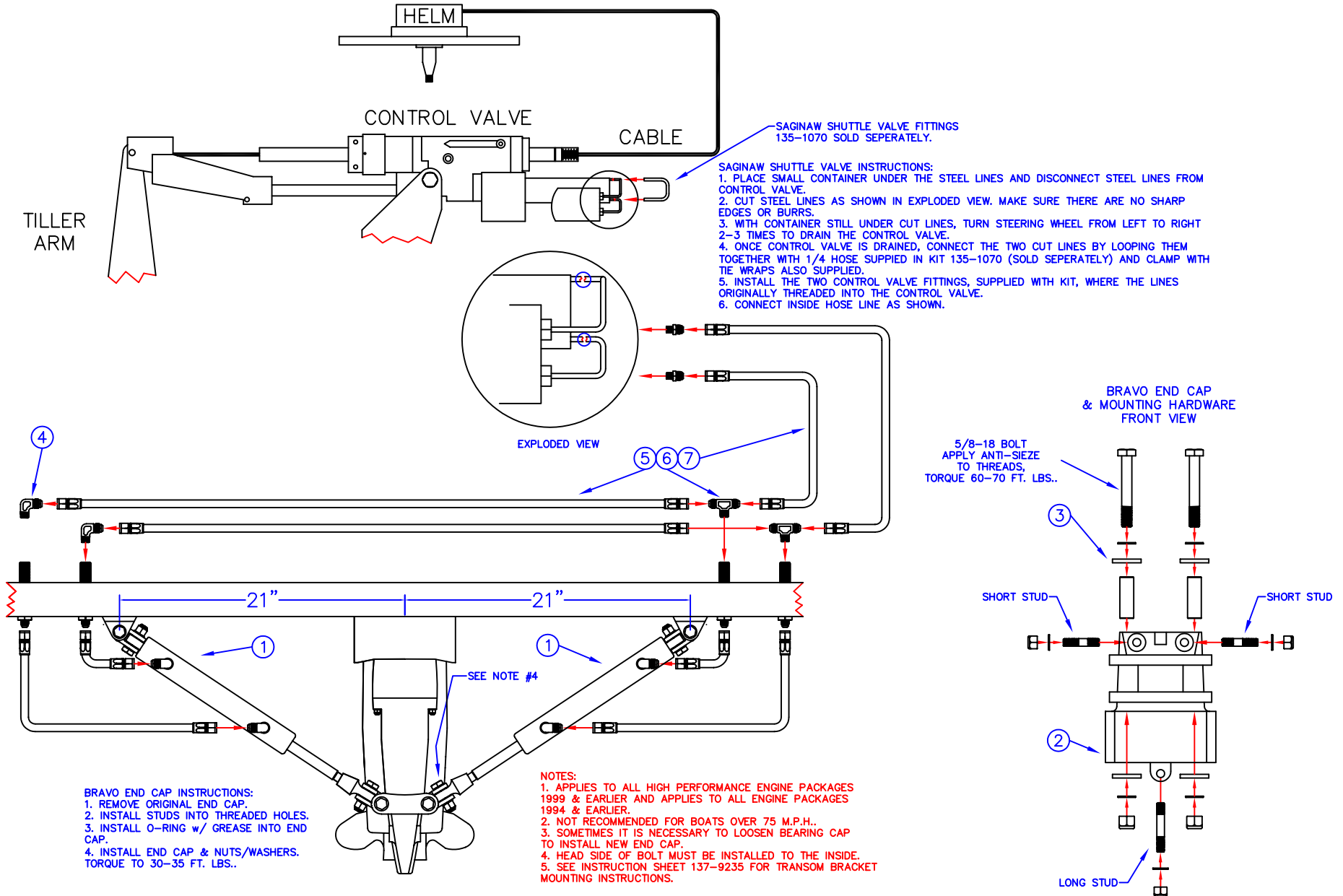
HARDIN MARINE

PART NUMBER: 137-9252S

REVISION: B

DESCRIPTION:
SINGLE BRAVO/DUAL CYLINDER ADD ON STEERING SYSTEM
(SAGINAW SHUTTLE VALVE SYSTEM)

ITEM	QTY.	PART NO.	DESCRIPTION
1	2	137-9254	COMPLETE 9" STEERING CYLINDER ASSEMBLY
2	1	137-9255	BRAVO END CAP KIT
3	2	137-9256	STEERING CYL. TO END CAP BOLT KIT
4	2	137-9347	FITTING, -6 AN x 1/4 NPT - 90° - BRASS
5	2	137-9241	INSIDE HOSE, 63" LONG
6	2	137-9346	FITTING, 1/4 NPT x -6 AN x -6 AN - TEE - BRASS
7	2	137-9233	INSIDE HOSE, 22" LONG



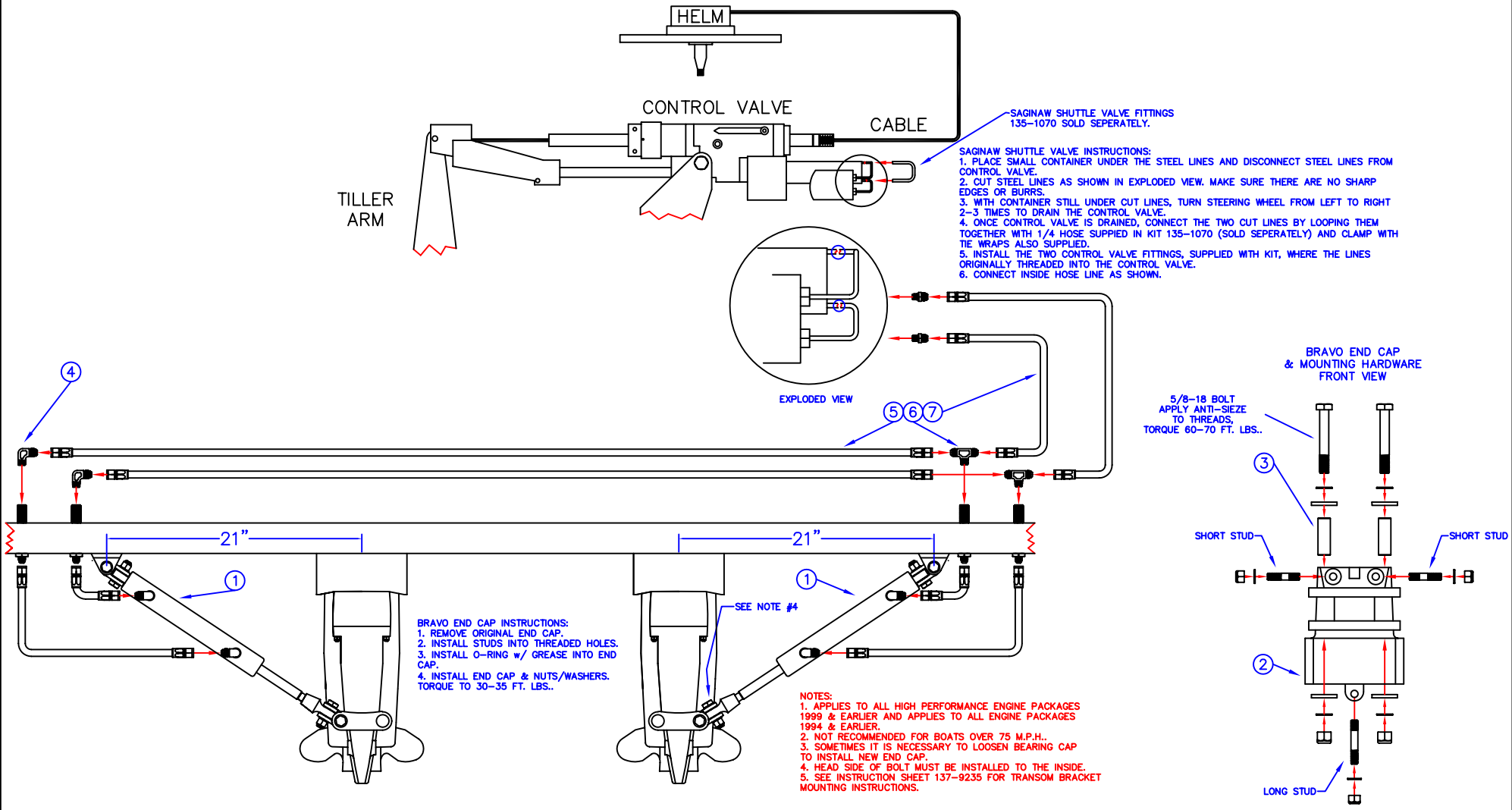
HARDIN MARINE

PART NUMBER: 137-9253S

REVISION: B

DESCRIPTION:
DUAL BRAVO/DUAL CYLINDER ADD ON STEERING SYSTEM
(SAGINAW SHUTTLE VALVE SYSTEM)

ITEM	QTY.	PART NO.	DESCRIPTION
1	2	137-9254	COMPLETE 9" STEERING CYLINDER ASSEMBLY
2	2	137-9255	BRAVO END CAP KIT
3	2	137-9256	STEERING CYL. TO END CAP BOLT KIT
4	2	137-9347	FITTING, -6 AN x 1/4 NPT - 90° - BRASS
5	2	137-9241	INSIDE HOSE, 63" LONG
6	2	137-9346	FITTING, 1/4 NPT x -6 AN x -6 AN - TEE - BRASS
7	2	137-9233	INSIDE HOSE, 22" LONG

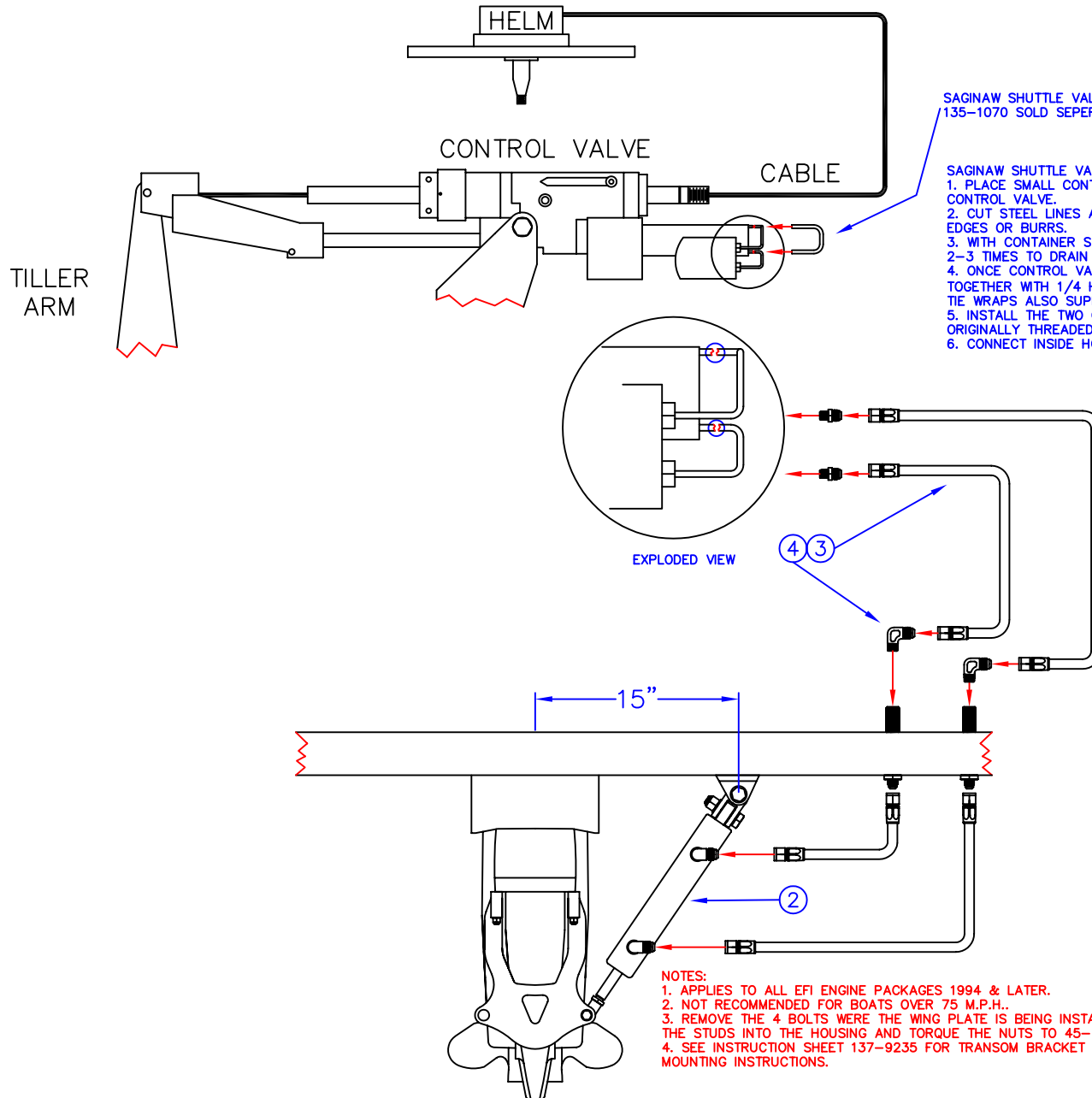


HARDIN MARINE

PART NUMBER: 137-9513S

DESCRIPTION:
SINGLE BRAVO/SINGLE CYLINDER SPACE SAVER ADD ON STEERING SYSTEM (SAGINAW SHUTTLE VALVE SYSTEM)

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	137-9503	SINGLE BRAVO SPACE SAVER WING PLATE
2	1	137-9458	7" SPACE SAVER STEERING RAM
3	2	137-9347	FITTING, -6 AN x 1/4 NPT - 90° - BRASS
4	2	137-9233	INSIDE HOSE, 22" LONG



SAGINAW SHUTTLE VALVE FITTINGS
135-1070 SOLD SEPERATELY.

- SAGINAW SHUTTLE VALVE INSTRUCTIONS:
1. PLACE SMALL CONTAINER UNDER THE STEEL LINES AND DISCONNECT STEEL LINES FROM CONTROL VALVE.
 2. CUT STEEL LINES AS SHOWN IN EXPLODED VIEW. MAKE SURE THERE ARE NO SHARP EDGES OR BURRS.
 3. WITH CONTAINER STILL UNDER CUT LINES, TURN STEERING WHEEL FROM LEFT TO RIGHT 2-3 TIMES TO DRAIN THE CONTROL VALVE.
 4. ONCE CONTROL VALVE IS DRAINED, CONNECT THE TWO CUT LINES BY LOOPING THEM TOGETHER WITH 1/4 HOSE SUPPLIED IN KIT 135-1070 (SOLD SEPERATELY) AND CLAMP WITH TIE WRAPS ALSO SUPPLIED.
 5. INSTALL THE TWO CONTROL VALVE FITTINGS, SUPPLIED WITH KIT, WHERE THE LINES ORIGINALLY THREADED INTO THE CONTROL VALVE.
 6. CONNECT INSIDE HOSE LINE AS SHOWN.

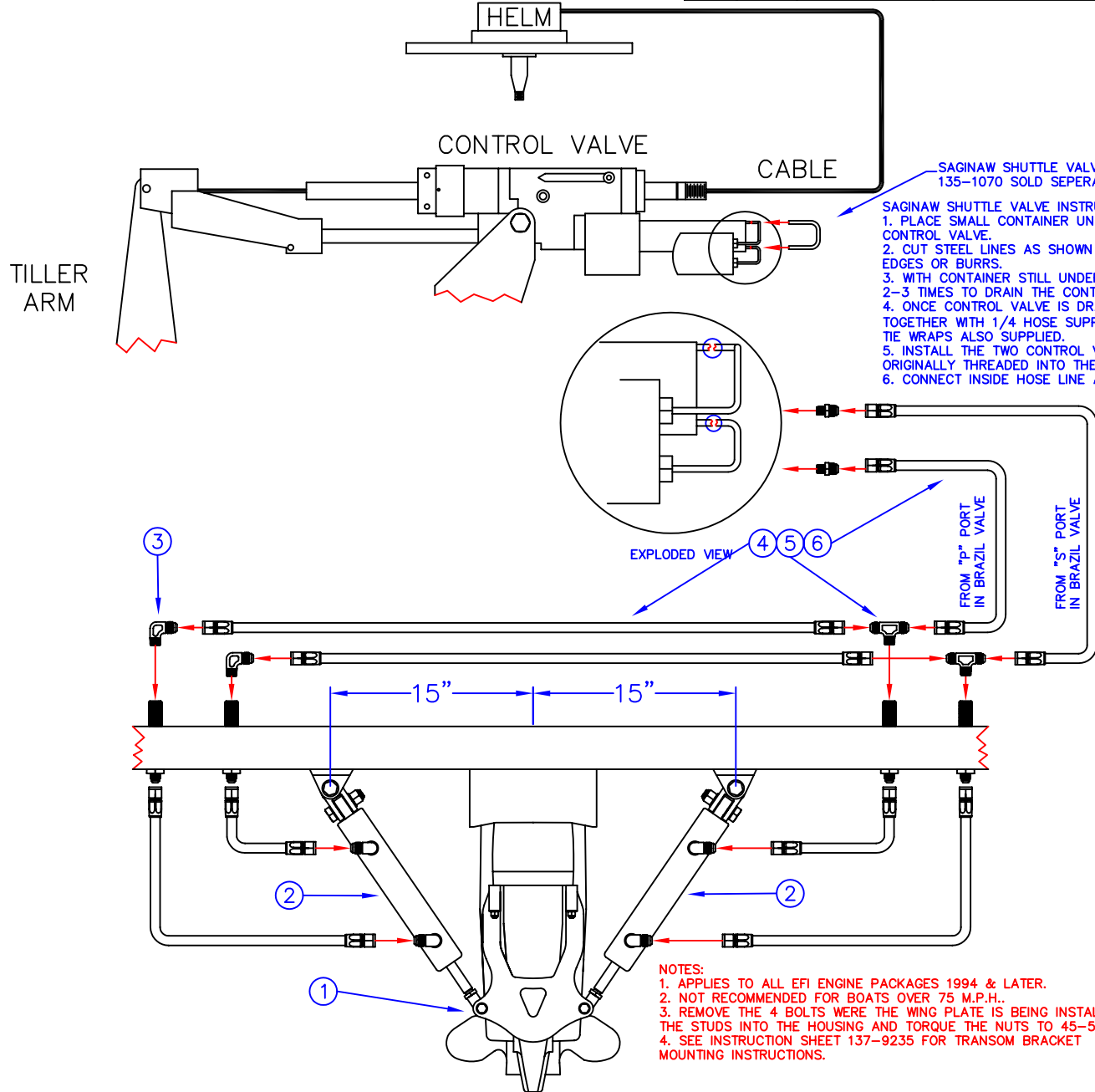
- NOTES:
1. APPLIES TO ALL EFI ENGINE PACKAGES 1994 & LATER.
 2. NOT RECOMMENDED FOR BOATS OVER 75 M.P.H..
 3. REMOVE THE 4 BOLTS WERE THE WING PLATE IS BEING INSTALLED. LOCTITE THE STUDS INTO THE HOUSING AND TORQUE THE NUTS TO 45-50 FT. LBS..
 4. SEE INSTRUCTION SHEET 137-9235 FOR TRANSOM BRACKET MOUNTING INSTRUCTIONS.

HARDIN MARINE

PART NUMBER: 137-9514S

DESCRIPTION:
SINGLE BRAVO/DUAL CYLINDER SPACE SAVER ADD ON STEERING SYSTEM (SAGINAW SHUTTLE VALVE SYSTEM)

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	137-9503	SINGLE BRAVO SPACE SAVER WING PLATE
2	2	137-9458	7" SPACE SAVER STEERING RAM
3	2	137-9347	FITTING, -6 AN x 1/4 NPT - 90° - BRASS
4	2	137-9241	INSIDE HOSE, 63" LONG
5	2	137-9346	FITTING, 1/4 NPT x -6 AN x -6 AN - TEE - BRASS
6	2	137-9233	INSIDE HOSE, 22" LONG



SAGINAW SHUTTLE VALVE FITTINGS
135-1070 SOLD SEPERATELY.

- SAGINAW SHUTTLE VALVE INSTRUCTIONS:
1. PLACE SMALL CONTAINER UNDER THE STEEL LINES AND DISCONNECT STEEL LINES FROM CONTROL VALVE.
 2. CUT STEEL LINES AS SHOWN IN EXPLODED VIEW. MAKE SURE THERE ARE NO SHARP EDGES OR BURRS.
 3. WITH CONTAINER STILL UNDER CUT LINES, TURN STEERING WHEEL FROM LEFT TO RIGHT 2-3 TIMES TO DRAIN THE CONTROL VALVE.
 4. ONCE CONTROL VALVE IS DRAINED, CONNECT THE TWO CUT LINES BY LOOPING THEM TOGETHER WITH 1/4 HOSE SUPPLIED IN KIT 135-1070 (SOLD SEPERATELY) AND CLAMP WITH TIE WRAPS ALSO SUPPLIED.
 5. INSTALL THE TWO CONTROL VALVE FITTINGS, SUPPLIED WITH KIT, WHERE THE LINES ORIGINALLY THREADED INTO THE CONTROL VALVE.
 6. CONNECT INSIDE HOSE LINE AS SHOWN.

- NOTES:
1. APPLIES TO ALL EFI ENGINE PACKAGES 1994 & LATER.
 2. NOT RECOMMENDED FOR BOATS OVER 75 M.P.H..
 3. REMOVE THE 4 BOLTS WERE THE WING PLATE IS BEING INSTALLED. LOCTITE THE STUDS INTO THE HOUSING AND TORQUE THE NUTS TO 45-50 FT. LBS..
 4. SEE INSTRUCTION SHEET 137-9235 FOR TRANSOM BRACKET MOUNTING INSTRUCTIONS.

HARDIN MARINE

PART NUMBER: 137-9515S

DESCRIPTION:
DUAL BRAVO/DUAL CYLINDER SPACE SAVER ADD ON STEERING SYSTEM (SAGINAW SHUTTLE VALVE SYSTEM)

ITEM	QTY.	PART NO.	DESCRIPTION
1	2	137-9504	DUAL BRAVO SPACE SAVER WING PLATE
2	2	137-9458	7" SPACE SAVER STEERING RAM
3	2	137-9347	FITTING, -6 AN x 1/4 NPT - 90° - BRASS
4	2	137-9241	INSIDE HOSE, 63" LONG
5	2	137-9346	FITTING, 1/4 NPT x -6 AN x -6 AN - TEE - BRASS
6	2	137-9233	INSIDE HOSE, 22" LONG

