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# User Manual

*Including Installation For Control Panels*

## POWER STEERING SYSTEMS MK. III
## ESPE600, ESPE700, ESPE1500


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# Contents



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MC_0020

**Failure to follow the considerations and precautions can cause serious injury, damage and will render all warranties given by Sleipner Motor as VOID.** MC_0411

## General Operation Consideration and Precaution Guidelines MC_0444

**For the electro-hydraulic power steering systems** MC_0697

**IN THE EVENT OF SHUTDOWN**
**Immediately reduce engine power to idle and go to the helm position with hydraulic backup.**

**When carrying out any servicing work on the Power Steering System or removal of the systems Oil Tank Filler Cap release the system pressure. (Invert the air pressure valve dust cover and press it against the top of the pressure valve)**

- Take time to adequate yourself with the power system components, operation and safety features.
- Should the helm pump warning light illuminate or the alarm sound, immediately reduce engine power to idle and go to the helm position with hydraulic back up (Lower helm on Flybridge boat).
- The power steering system can have two types of helm pumps installed - with or without hydraulic backup.
- The system will shut down immediately in the event of an unexpected major component failure related to the safe operation of the system. Oil or electric motor overheat conditions will activate the helm pump warning light and alarm sounder, the system will monitor the alarm condition for a further two minutes before system shut down. If the alarm condition is resolved within 2 minutes the system will continue to function normally.
- In the event of system shut down, the helm pump with hydraulic back up function will become the only operational helm (the electric only helm unit will not function) the steering system will function as normal but with an increased number of wheel turns accompanied by a heavier wheel feel. Do not continue to drive the boat at high speeds using the back up system.

Cylinder bypass:
To centralize the rudders, release valve locknut, open valve NV3 & NV4 (turn ccw until stop).The cylinder is now free and the rudders can be centralized. Return NV3 and NV4 to original closed position (cw until stop) and tighten valve locknut.

The Power steering system comprises four main components.

1. The System Unit, consists of the Electronic Control Unit (ECU), an Oil filter and a Valve Block integrated with the Oil Tank (Reservoir).

2. A Hydraulic Pump Unit, driven by an attached 24volt D.C. electric motor.

3. 2 x Helm Pumps

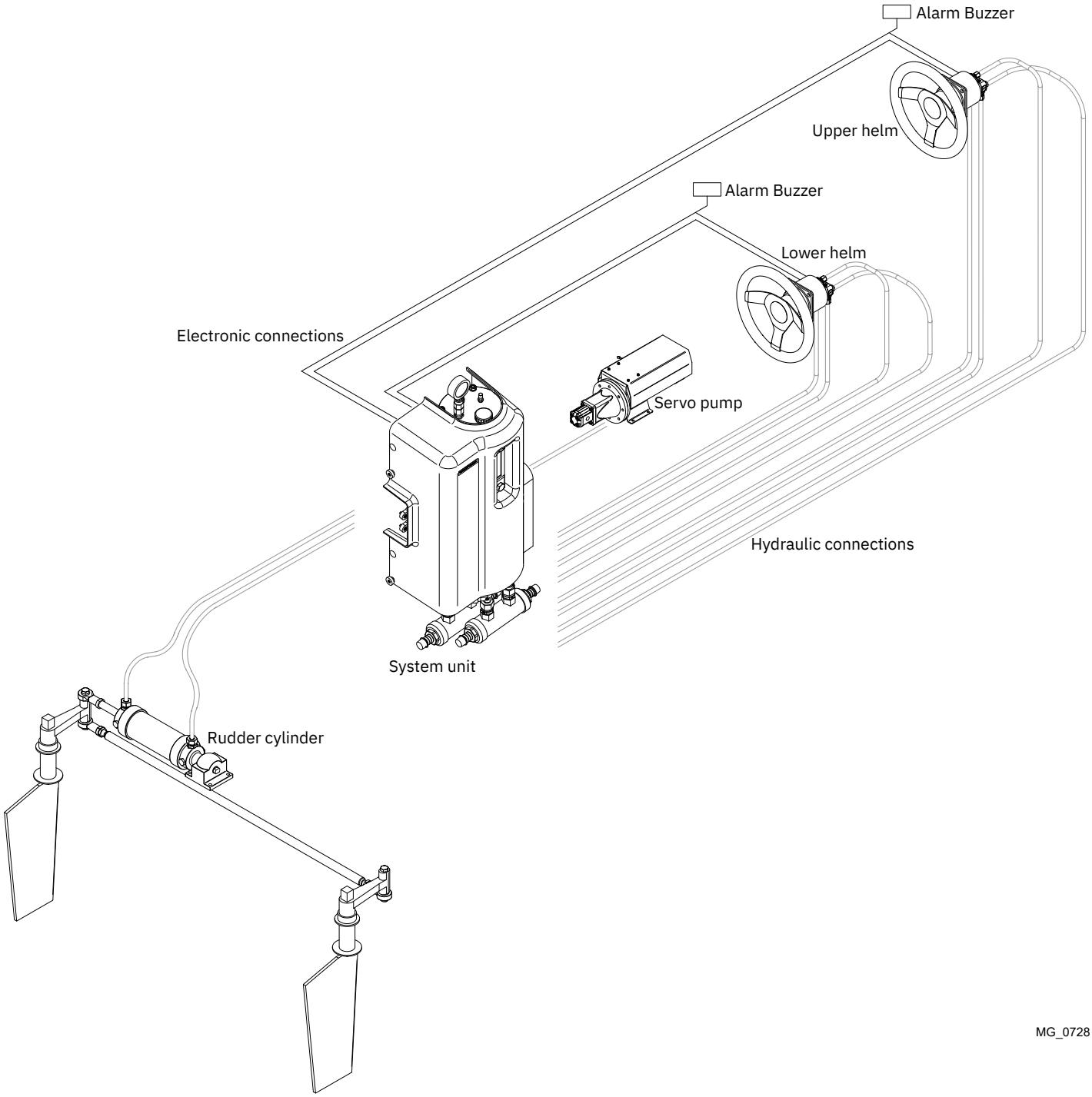
4. Hydraulic Cylinder(s)

The lower (primary) steering position helm has two functions:
a) It contains electronic sensors which transmit a signal to the ECU for normal Steering operation.

b) It acts as a Hydraulic Helm Pump (back-up) in the event of an ECU system shut down (NB, The number of wheel turns will increase from stop to stop during back up mode).

The upper/flybridge helm has electronic sensors that pulses signals to the ECU for normal Steering operation.

Both helms have a built in warning LED (Red). This will illuminate during an alarm condition.




MG_0728

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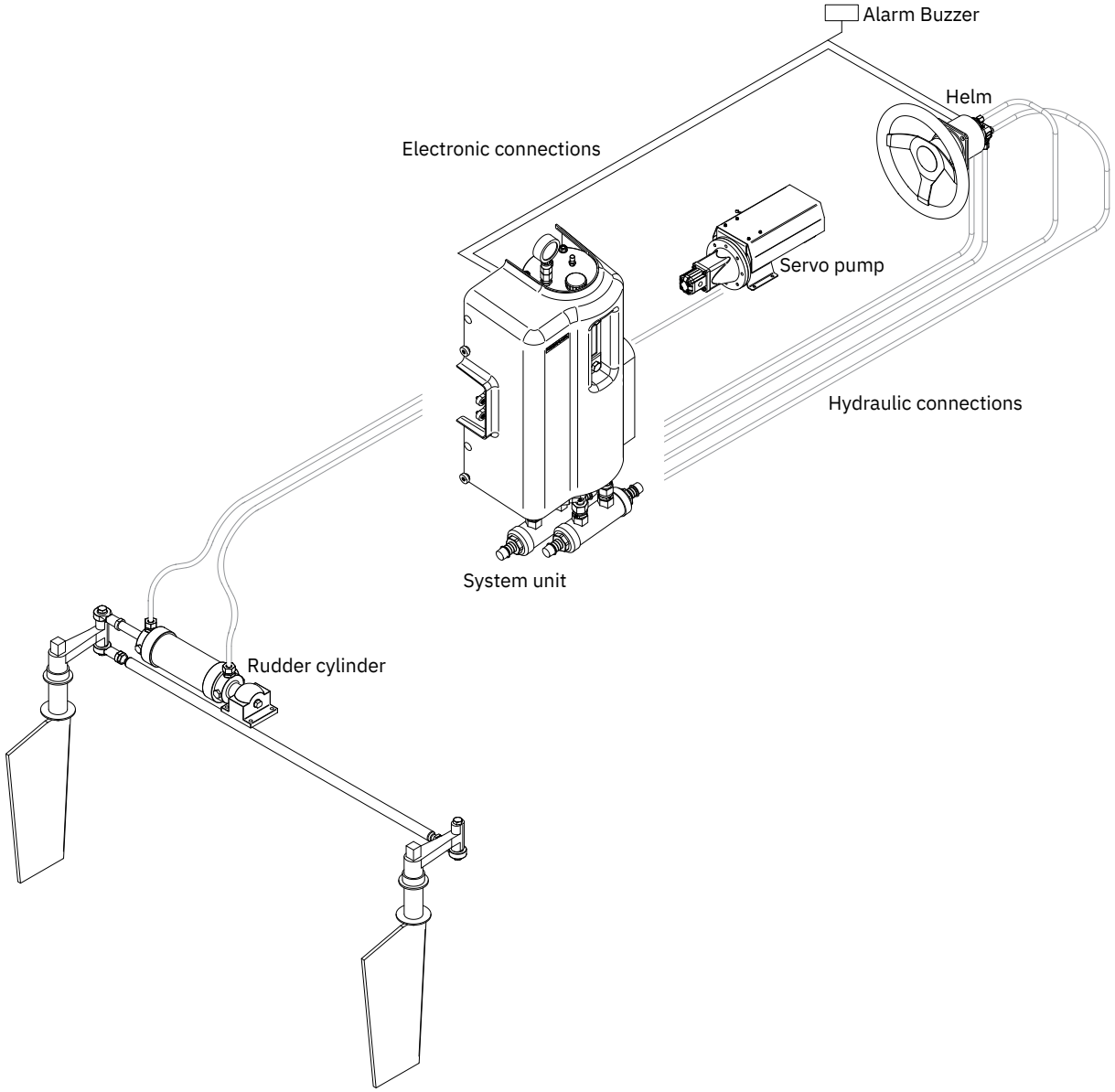
1. The System Unit, consists of the Electronic Control Unit (ECU), an Oil filter and a Valve Block integrated with the Oil Tank (Reservoir).
2. A Hydraulic Pump Unit, driven by an attached 24volt D.C. electric motor.
3. 1 x Helm Pumps
4. Hydraulic Cylinder(s)

The steering position helm contains electronic sensors which transmit a signal to the ECU for normal Steering operation.

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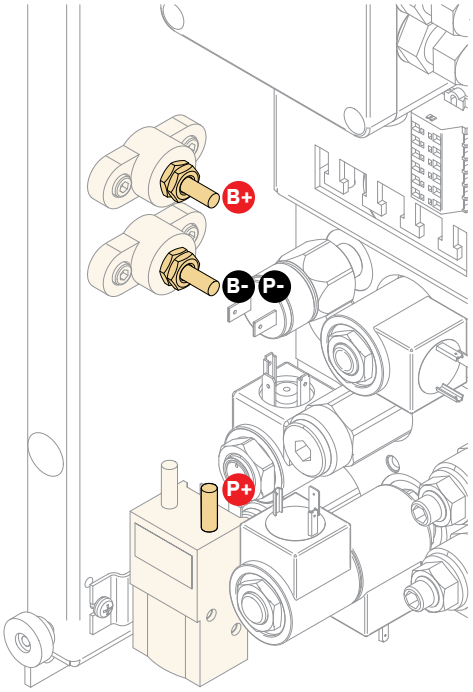
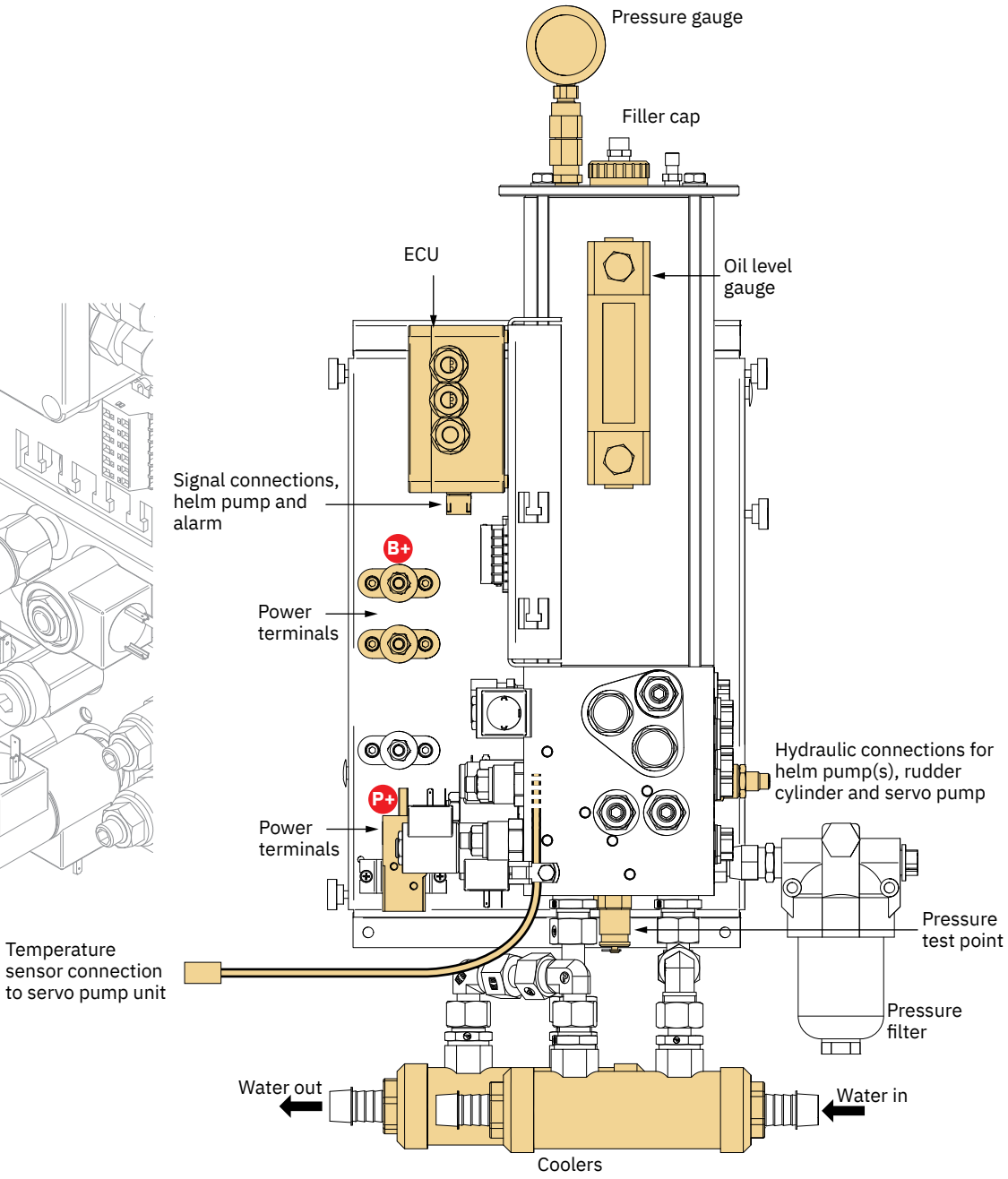
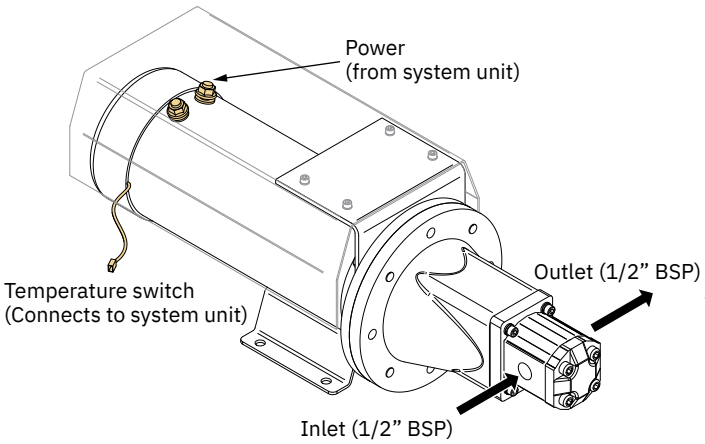
## System Unit Overview



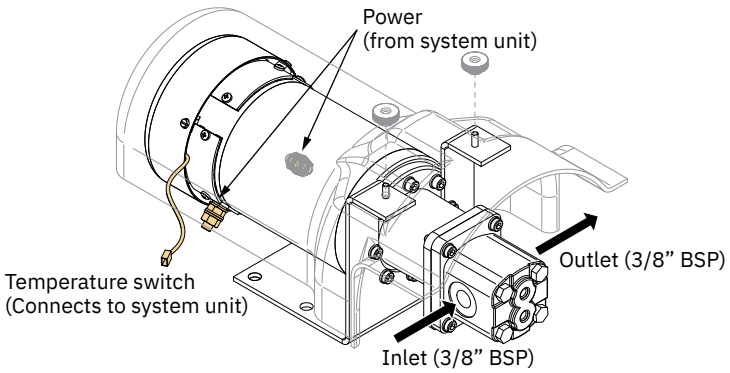




## Servo Pump Overview

**For ESPE 1500**




**For ESPE 600 & ESPE700**

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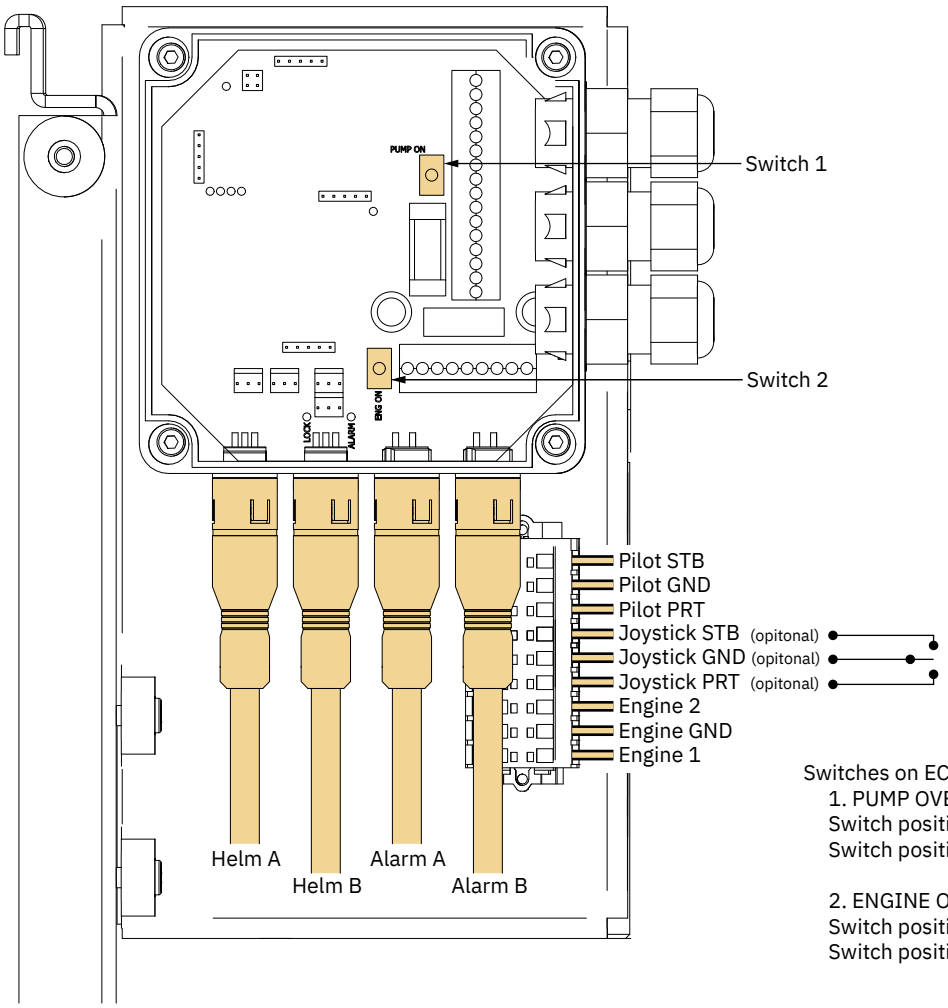
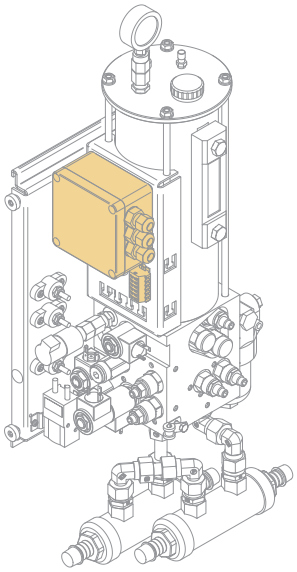
## ECU (Electronic Control Unit)



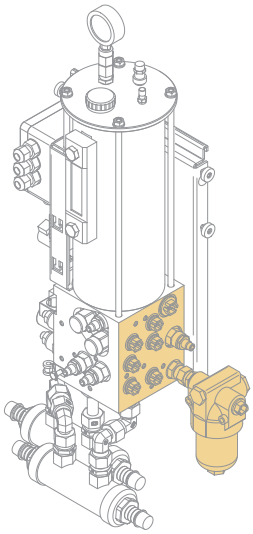



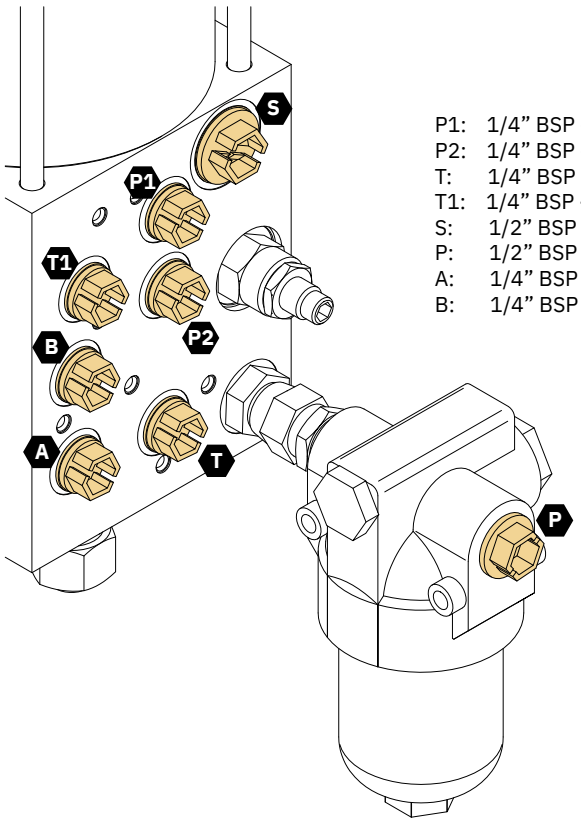
Switches on ECU

1. PUMP OVERRIDE SWITCH
   Switch position down - normal operation.
   Switch position up - override mode used for system air purging

2. ENGINE ON OVERRIDE SWITCH
   Switch position down - normal operation.
   Switch position UP - override mode used for system air purging

## System Unit Hydraulic Ports

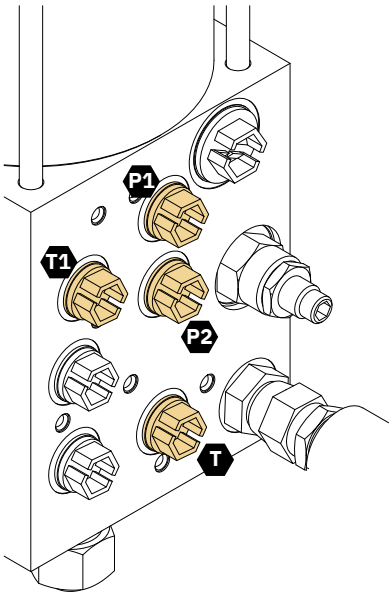





P1: 1/4” BSP - Helm pump pressure port A
P2: 1/4” BSP - Helm pump pressure port B
T: 1/4” BSP - Helm pump upper drain port
T1: 1/4” BSP - Helm pump lower drain port
S: 1/2” BSP - Servo pump, hydraulic inlet / suction
P: 1/2” BSP - Servo pump, hydraulic outlet / pressure
A: 1/4” BSP - Rudder cylinder stb feed / port return
B: 1/4” BSP - Rudder cylinder port feed / stb return

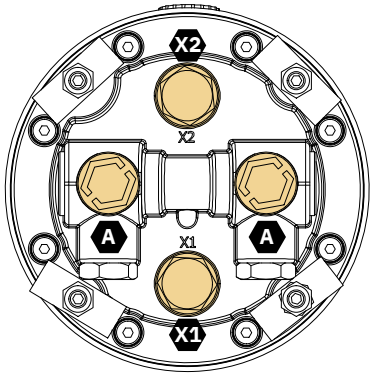
MG_0731

# Helm Pump - Hydraulic Connections



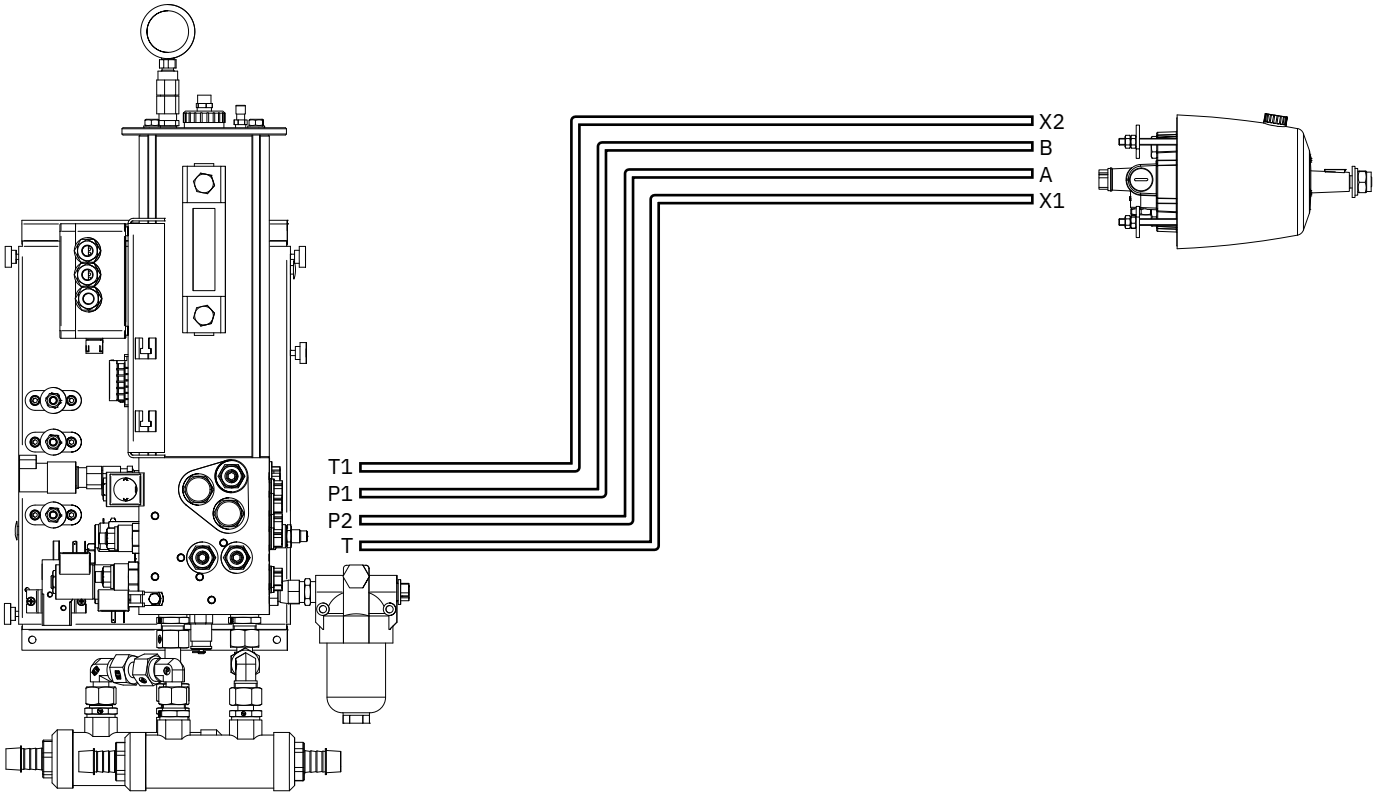

**System unit**

P1: 1/4” BSP - Helm pump pressure port A
P2: 1/4” BSP - Helm pump pressure port B
T: 1/4” BSP - Helm pump upper drain port
T1: 1/4” BSP - Helm pump lower drain port




**System unit**

A: 1/4” BSP - Helm pump pressure port A
B: 1/4” BSP - Helm pump pressure port B
X2: 1/4” BSP - Helm pump upper drain port
X1: 1/4” BSP - Helm pump lower drain port




MG_0731

**WARRING**
**Ensure that the Servo System (tank) Pressure is released before removing the Tank Filler Cap.**
**(See IMPORTANT USER PRECAUTIONS AND PROCEDURES)**

**Filling and bleeding procedure**

1. Fill the tank with hydraulic oil ISOVG-15 (DIN51524-3 HVLP specifications). Ensure that the oil is clean (use a filling filter).

2. Set Servo Unit valves to:
   NV1: Closed (turn CW to stop) NV3: Open (turn CCW to stop)
   NV2: Open (turn CCW to stop) NV4: Open (turn CCW to stop)

3. Switch 'ON' the main power to the Servo Unit.

4. Set the Ignition switch to "ON" or activate engine Override Switch to "UP" (Switch no.2), in the ECU Control Box.

5. Run the pump for 3 minutes by operating the Pump Override Switch (position "UP") (Switch no.1). If the oil level falls below the Level Gauge during bleeding, replenish the oil. **(NB: Larger yachts require several replenishments of the tank during bleeding.)**

6. Pressurize the tank to 1.5 bar with the supplied air pump (bicycle). Wait for 3 minutes.

7. Turn the steering wheel at the lower steering position (Helm hyd/electric Pump) 20 revolutions to Port, then 20 revolutions to Starboard.

8. Reset Servo Unit valves to their initial positions:
   NV1: Open (turn CCW to stop) NV2: Closed (turn CW to stop)
   NV3: Closed (turn CW to stop) NV4: Closed (turn CW to stop)

9. Deactivate Servo System By switching 'OFF' the Ignition Switch, Engine Override Switch (Switch no.2) and Pump Override Switch (Switch no.1). ***(NB: The steering system now will act as a normal hydraulic steering and will be heavier to operate.)***

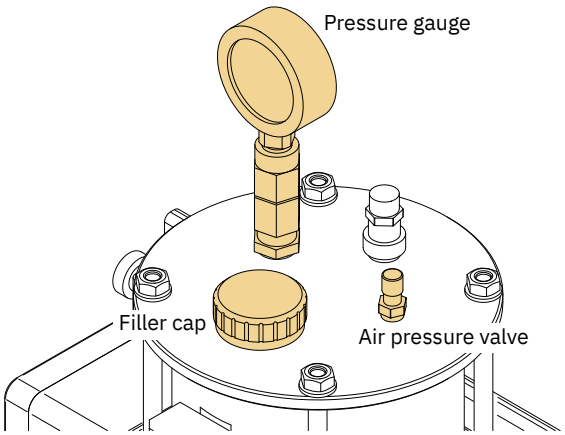
10. Finally, rotate the Steering Wheel to one of its end stops and hold with pressure against the stop, for approximately 5 sec. Carry out this procedure in the opposite direction. Repeat this procedure one more time in both directions.

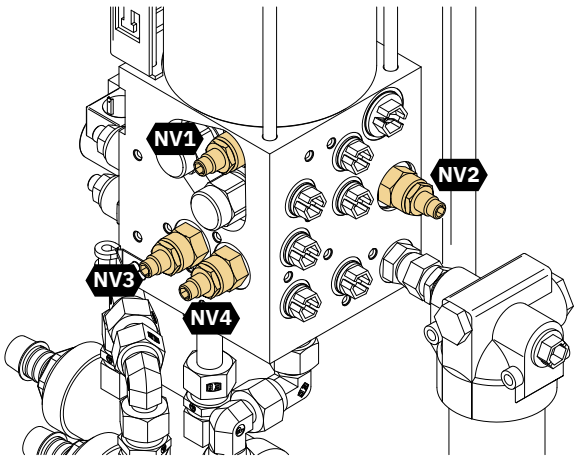
11. Check the system for signs of leakage.

12. Replenish oil to upper half of the oil level gauge.

13. Pressurize the tank to 1.5 bar with the supplied air pump (bicycle).

14. Both the Pump Override Switch and the Engine ON switch must be set in the "down" position during normal operations when the Main Engines are running.




MG_0732

**WARRING**
**Ensure that the Servo System (tank) Pressure is released before removing the Tank Filler Cap.**
**(See IMPORTANT USER PRECAUTIONS AND PROCEDURES)**

**Monthly:**

1. Check tank pressure ( Min: 1.25 Bar/18 PSI - Max. 2.0 Bar/29 PSI)

2. Check the oil level - visible in the upper half of the level gauge.

***(NB: If the system oil level is low, carry out the following:)***

3. Check thoroughly for system leakage & replenish as necessary.

**6th Monthly:**

1. Check hoses and connections/fittings for leakages.

2. Check hoses for damage (caused by sharp edges, hot surfaces etc).

3. Check that all bolts are tightened and secure.

4. Ensure that bearings and joints are lubricated and free to rotate

**Yearly/every third year:**

1. The Hydraulic Oil and Filter require replacing after the first years service, and then consequently every third year there after.

2. Check DC motor brush wear yearly

For further support, contact you dealer or other authorized service personnel.

| Fault Number | Fault Description | Helm Station | Version - MK1 / MK 2 (Possible Cause) | Version - MK3 (Possible Cause) | Check / Action / Comments |
|---|---|---|---|---|---|
| 1 | Steering stopped working, no alarms | | No power | No power | -Check Circuit Breaker<br>-Check voltage on B+/B- terminals |
| | | | Motor broken | Motor broken | Replace Motor |
| | | | Worn Brushes | | -ESPE 600/700 motor without fan, replace complete motor<br>-Other motors, replace brushes |
| | | | Motor Starter Relay broken | N/A (Will cause alarm) | Change Relay |
| | | | Loom ECU to relay broken | N/A (Will cause alarm) | |
| | | | Corrosion on motor relay spade terminals. | N/A (Will cause alarm) | |
| 2 | No end stop | Both helms: | Pressure switch adjustment | Pressure switch adjustment | Check end stop LED (orange) at PCB, adjust switch |
| | | | Broken pressure switch | Broken pressure switch | Replace switch |
| | | Lower helm only: | Pressure switch adjustment | Pressure switch adjustment | Check end stop LED (orange) at PCB, adjust switch |
| | | | Broken pressure switch | Broken pressure switch | Replace switch |
| | | | Lock valve sticking in open position | Lock valve sticking in open position | -Remove valve cartridge from main valve unit. -Connect 24V to coil and check spool movement. |
| | | | No oil in helm/system not pressurized | No oil in helm/system not pressurized | Refill, and run air purging procedure. |
| | | Upper helm only: | End stop brake broken | End stop brake broken | Connect 24V to brake connector, check brake, check loom |
| | | | Brake signal failure | Brake signal failure | |
| 3 | Bad performance, weak steering | | Worn Cylinder Piston Seals | Worn Cylinder Piston Seals | Replace Seals, or install new Cylinder. |
| | | | Worn hydraulic Pump | Worn hydraulic Pump | Replace Pump |
| 4 | Creeping Rudder | | Leaking load Holding Valves | Leaking load Holding Valves | Valves to be adjusted |
| | | | Leaking Cylinder Piston Seal | Leaking Cylinder Piston Seal | Replace Seals, or install new Cylinder. |
| 5 | Grey / White oil | | Water in oil | Water in oil | -Replace complete system<br>-Replace Cooler kit. NB! To be discussed. |
| 6 | Unstable steering, temporary failures no alarms. Grey/White oil | | Water in oil | Water in oil | -Replace complete system<br>-Replace Cooler kit. NB! To be discussed. |
| 7 | No steering, no alarms, no fall back to backup from lower helm. | | Sticking lock/bypass valve | Sticking lock/bypass valve | Water in oil, see pt. 5 - 6 |
| | | | Motor stopped, see fault no.1 | Motor stopped, see fault no.1 | Change complete Motor. |
| | | | Sticking rely | N/A (Will cause alarm) | Change relay<br>NB! Switch off circuit breaker for backup |
| 8 | No steering from Helm. Works fine from Pilot | | Missing signal from helm | Missing signal from helm | Check green/red signal input led on PCB. |
| 9 | Alarm during Prt only | | Valve coil broken | Valve coil broken | Check Coil resistance, to be 39,3Ω @20°C |
| | | | Connector failure or broken loom | Connector failure or broken loom | |
| 10 | Alarm during Stb only | | Valve coil broken | Valve coil broken | Check Coil resistance, to be 39,3Ω @20°C |
| | | | Connector failure or loom failure | Connector failure or loom failure | |
| 11 | Alarm, both Prt and Stb | | Servo valve coil broken | Servo valve coil broken | Check Coil resistance, to be 21,7Ω @20°C |
| | | | | Lock Valve Coil Broken | Check Coil resistance, to be 39,3Ω @20°C |
| | | | Connector failure or loom failure | Connector failure or loom failure | |
| | | | Relay failure | Relay failure | |

| Fault Type | Fault Description | Version - MK1 / MK 2 (Possible Cause) | Version - MK3 (Possible Cause) | Check / Action / Comments |
|---|---|---|---|---|
| 1 | Motor stops immediately | Coil failure, servo valve | Coil failure, servo valve | Check Coil resistance, to be 21,7Ω @20°C |
| | | Coil failure, directional valves | Coil failure, directional valves | Check Coil resistance, to be 39,3Ω @20°C |
| | | Loom failure | Coil failure, lock valve | Check Coil resistance, to be 39,3Ω @20°C |
| | | | Motor starter relay failure | |
| | | | Loom failure | |
| | | | Low voltage | Alarms < 18V |
| 2 | System continue working for 2 minutes. Motor stops if alarm situation is still present after 2 minutes | Oil temperature | Oil temperature | -Check Oil temperature and cooling.<br>-Check Sensor resistance, <130 Ω |
| | | Motor temperature | Motor temperature | Check Switch (NC)<br>Check Motor temp sticker. |

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# Installation Guide

**Failure to follow the considerations and precautions can cause serious injury, damage and will render all warranties given by Sleipner Motor as VOID.** MC_0411

## Responsibility of the Installer MC_0038

**The installer must read this document to ensure necessary familiarity with the product before installation.**

**Instructions in this document cannot be guaranteed to comply with all international and national regulations. It is the responsibility of the installer to follow all applicable international and national regulations when installing Sleipner products.**

**The recommendations given in this document are guidelines ONLY, and Sleipner strongly recommends that advice is obtained from a person familiar with the particular vessel and applicable regulations.**

**This document contains general installation instructions intended to support experienced installers. If you are not skilled in this type of work, please contact professional installers for assistance.**

**If required by local regulation, electrical work must be done by a licensed professional.**

**Appropriate health and safety procedures must be followed during installation.**

**Faulty installation of Sleipner products will render all warranties given by Sleipner Motor AS.**

**Ensure appropriate access to Sleipner products during installation planning for service, inspection and component replacement.**

## General Installation Consideration and Precaution Guidelines MC_0440

**For the electro-hydraulic power steering systems** MC_0700

- All hydraulic components must be installed in a clean environment to avoid contamination.
- All hose-ends and connection points should be sealed during the installation.
- Clean oil is of ultimate importance for reliable and trouble free operation in regards to all hydraulic systems.
- Ensure that all bolts and connections are tightened and secure.
- Use Hydraulic Oil ISO-VG-15 (DIN51524-3 HVLP specifications) ONLY.
- Keep all hoses and looms clear of sharp edges and hot surfaces.
- Hoses and looms must be secured adequately to prevent chaffing.
- Thoroughly purge system of air.
- Check for leaks.
- Operate the cylinder from end stop to end stop. Force the steering wheel 1/4 to 1/2 turn further to build up the pressure in the system. Check for leaks.

On completion of installation perform a full functional test of all components including alarm L.E.D. and sounders.

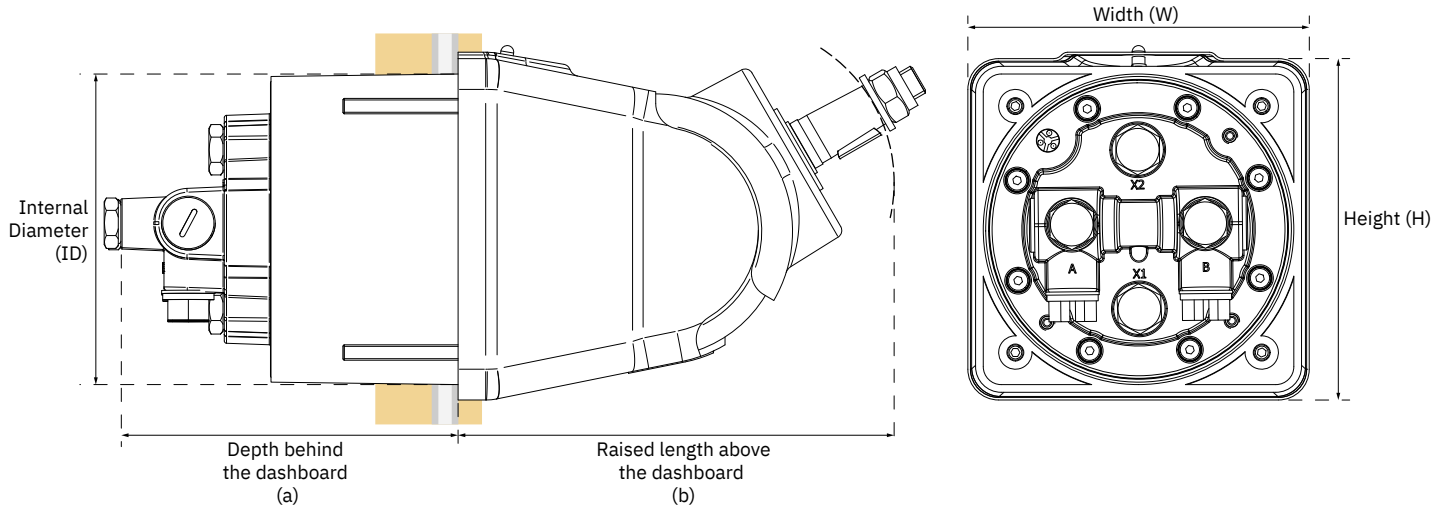
Sealing of Servo Steering System components

Only use the sealing components provided for the Servo Steering System by Steering-power. The use of any unauthorized loctites, sealing compounds or components not provided by Steering-power will disqualify warranty reclamation.

## Product Measurements

MC_0703

| Measurement code | Measurement description | 74085 mm | 74085 inch |
|---|---|---|---|
| H | Helm Panel Height | 133 | 5.2 |
| W | Helm Panel width | 133 | 5.2 |
| ID | Internal cut out diameter | 121 | 4.8 |
| (a) | Raised length above the dashboard | 131 | 5.2 |
| (b) | Depth behind the dashboard (not inc. cables) | 176 | 6.9 |

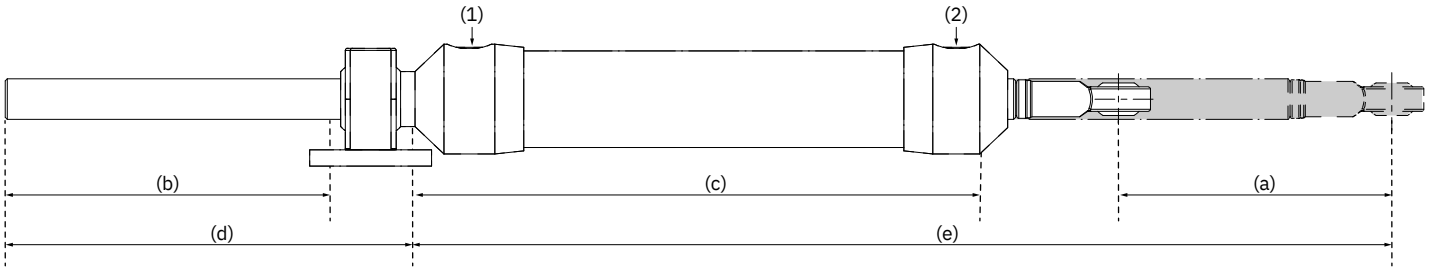



MG_0735

## Product Measurements

MC_0740

| Measurement code | Measurement description | 71140P190 mm | 71140P190 inch | 71220P190 mm | 71220P190 inch | 71220P220 mm | 71220P220 inch |
|---|---|---|---|---|---|---|---|
| a | Rod extension variable | 190 | 7.5 | 190 | 7.5 | 220 | 8.7 |
| b | Rod end to attachment hole | 155 | 6.1 | 158 | 6.2 | 180 | 7.1 |
| c | Attachment hole to cylinder end | 269 | 10.6 | 302 | 11.9 | 332 | 13.1 |
| d | Rod end to attachment hole | 204 | 8 | 207 | 8.1 | 237 | 9.3 |
| e | Attachment hole to max rod extension | 556.5 | 21.9 | 573.5 | 22.6 | 633.5 | 24.9 |
| 1 | Port | 1/4” BSP | 1/4” BSP | 3/8” BSP | 3/8” BSP | 3/8” BSP | 3/8” BSP |
| 2 | Port | 1/4” BSP | 1/4” BSP | 3/8” BSP | 3/8” BSP | 3/8” BSP | 3/8” BSP |




MG_0765

## System Unit & Servo Pump Installation

MC_0702

**Locate a suitable position to install the System Unit and Servo Pump Unit.**

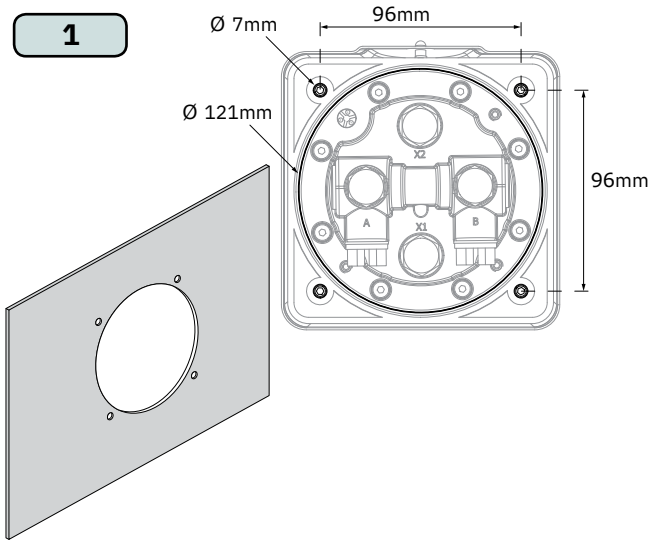
**Make sure that the selected mounting position is adequate to support the system unit (approx 25 kg) and servo pump (approx. 10 kg)**
**- Mount the system unit and servo pump.**

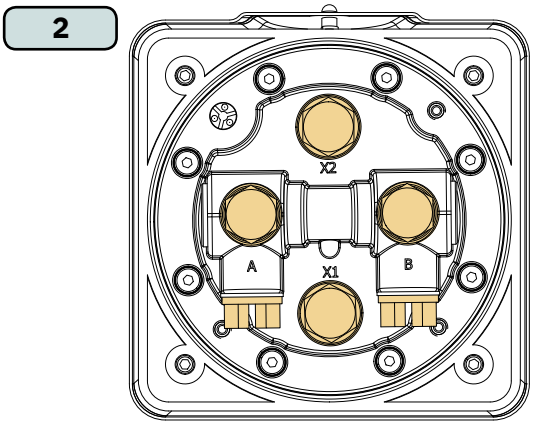
## Tilt Helm Pump Installation - Electric & Hydraulic Backup

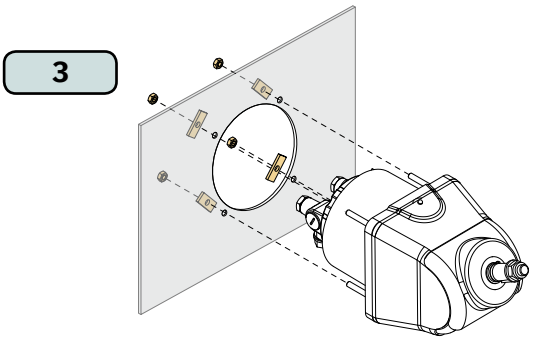
MC_0702

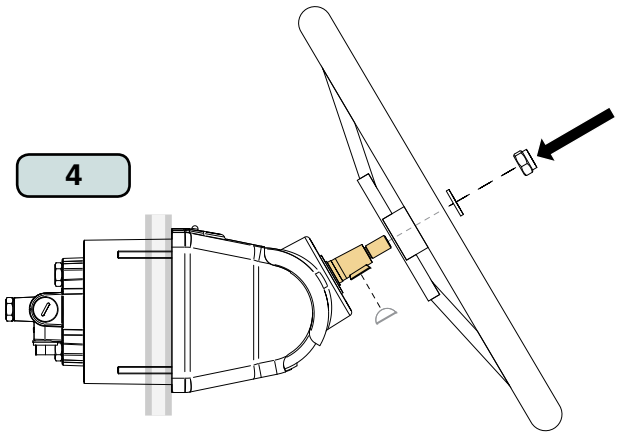
Ensure there is adequate space to install the Helm Pump, Steering Wheel, associated looms and hoses. Check they do not interfere with cables, wires or other components (See the helm pump dimensions)

1. Cut a hole (Ø121 mm), and drill the four 7 mm (5/16”) screw holes in accordance with the dimensions drawing.
2. Fit the helm fittings and connect the hydraulic hoses referring to the diagram on page 8.
3. Secure the helm pump using the washer and nuts (6mm).
4. Apply a thin layer of grease on the helm pump shaft & fit the steering wheel. Connect signal and alarm cables. Refer to page 19 (Twin helm boats) and page 20 (Single helm boats). Secure and fasten helm unit wiring to avoid wire and connector tension sharp obstacles and chaffing.
   ***(NB: Ensure “dummy” plug is fitted to the Helm B port on single helm boats.)***




MG_0736

**Helm Unit steering friction adjustment**
The steering friction setting has a pre-set standard value from manufacture. The friction can be adjusted to a preferred setting as follows:

a. Remove the plastic plug in the end cover using a Screwdriver.

b. Using a 2.5 mm Allen Key adjust as follows:
- Turning clockwise increases the friction
- Turning counter-clockwise reduces the friction
Check for desired friction after every ½ turn.

c. When satisfied with friction setting, re-fit the plastic plug.

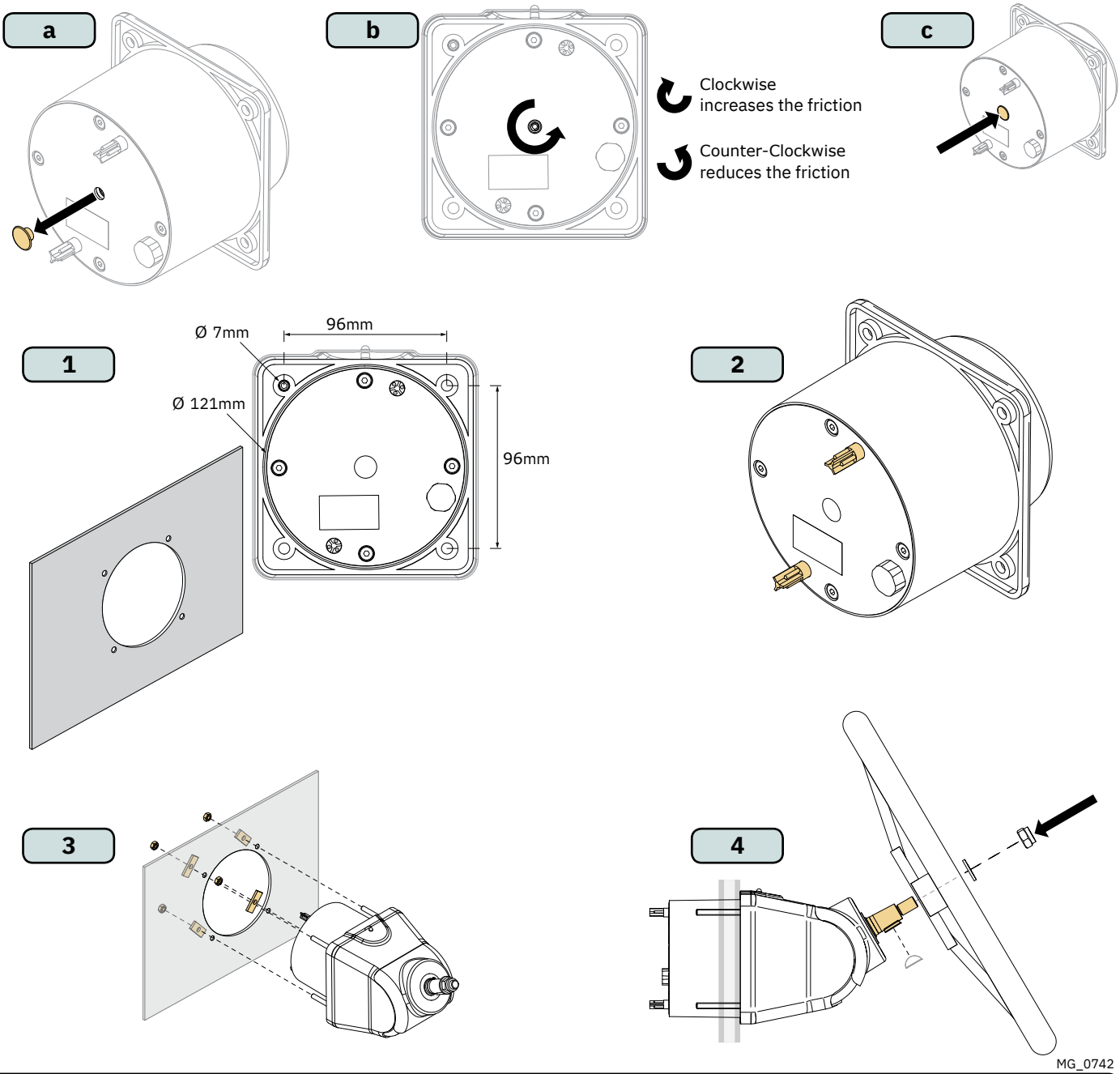
4. Ensure there is adequate space to install the Helm Pump, Steering Wheel, associated looms and hoses. Check that they do not interfere with cables, wires or other components (See the helm pump dimensions)

1. Cut a hole (Ø121 mm), and drill the four 7 mm (5/16”) screw holes in accordance with the dimensioned drawing.

2. Connect signal and alarm cables. Refer to page 19 (Twin helm boats) and page 20 (Single helm boats). Secure and fasten helm unit wiring to avoid wire and connector tension sharp obstacles and chaffing.
***(NB: Ensure “dummy” plug is fitted to the Helm B port on single helm boats.)***

3. Secure the helm pump using the washer and nuts (6mm).

4. Apply a thin layer of grease on the helm pump shaft & fit the steering wheel.




MG_0742

# Rudder Cylinder Installation

1. The Cylinder must be mounted on a solid, rigid surface, either directly to the hull, or using an suitable bracket. The Cylinder should be angled parallel to the transom (or to the tie bar on dual rudder installations), when the rudder is at one of its end stops.
   Ensure the cylinder stroke has been set to half full travel when the rudders are “dead ahead” , this ensures equal stroke in both directions.
   - The cylinder must be installed in a position where the stroke will be equal in both directions.

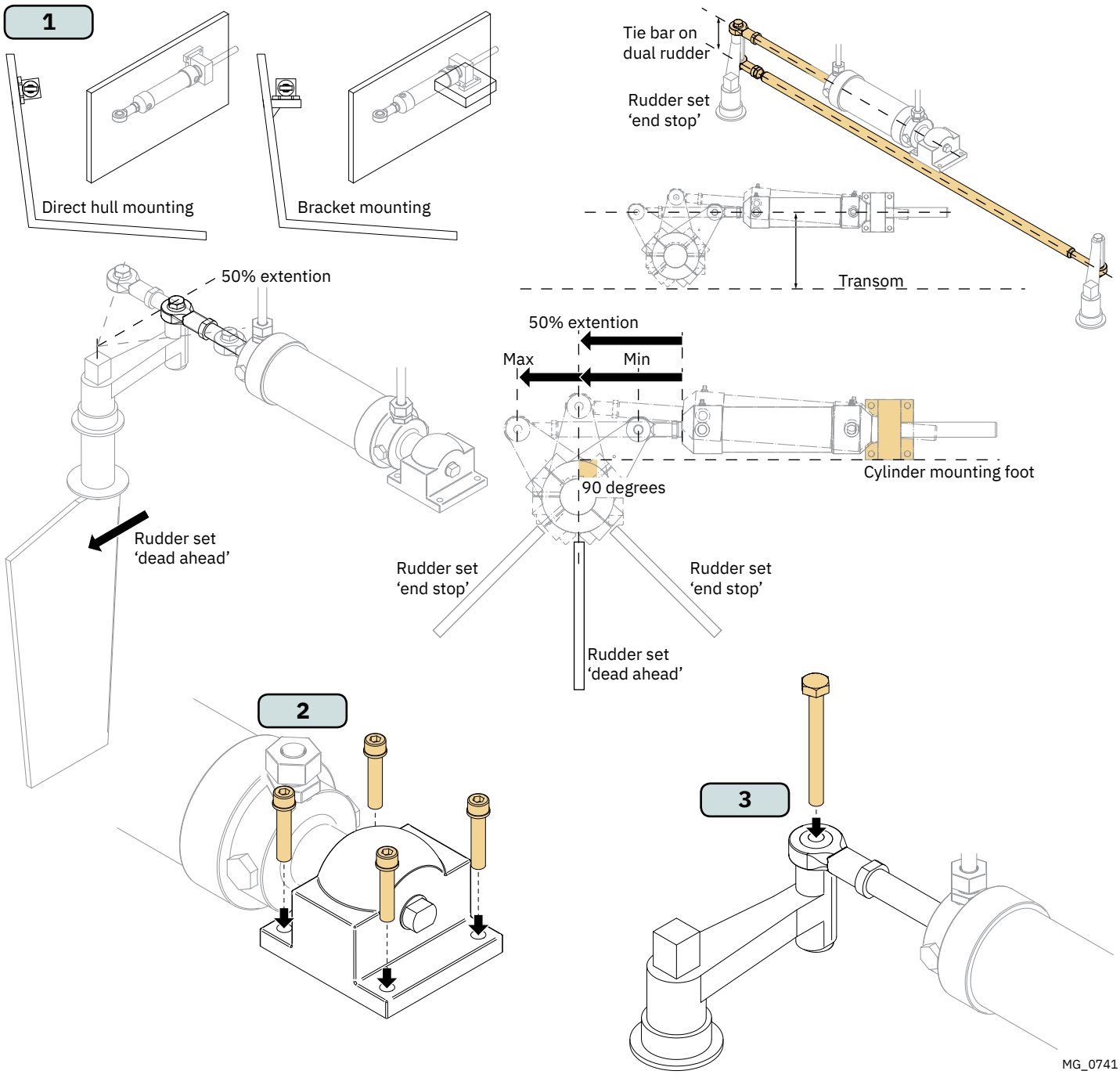
It is important that the cylinder mounting foot is installed 90 degrees to the tiller arm, when the rudder is in its centre position.

2. Secure the cylinder mounting foot with bolts, washers and Locknuts (i.e. Nyloc).

3. Connect the cylinders rod end to the tiller arm using the correct sized bolt.

4. Tighten the bolt.

5 . Connect the hydraulic hoses to the cylinder referring to schematics on page 13 and 17.



# Hydraulic Hose Installation

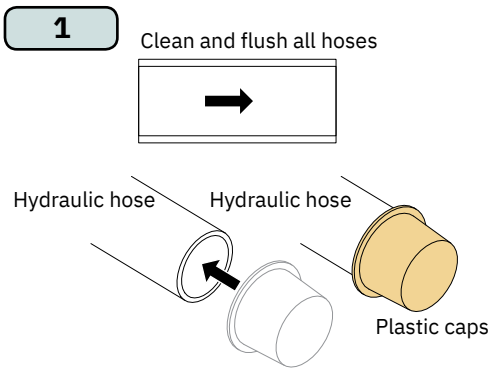
1. Clean and flush all hoses. Use plastic caps or tape to seal the hose ends before the hoses are installed.

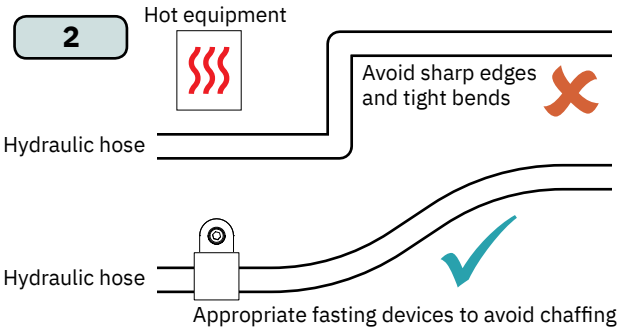
2. When routing the hoses, avoid restrictions, hot spots, sharp edges and tight bends (Rmin = 130 mm for 3/8" hose and 180 mm for ½" hose). Secure hoses with appropriate fastening devices to avoid chaffing.

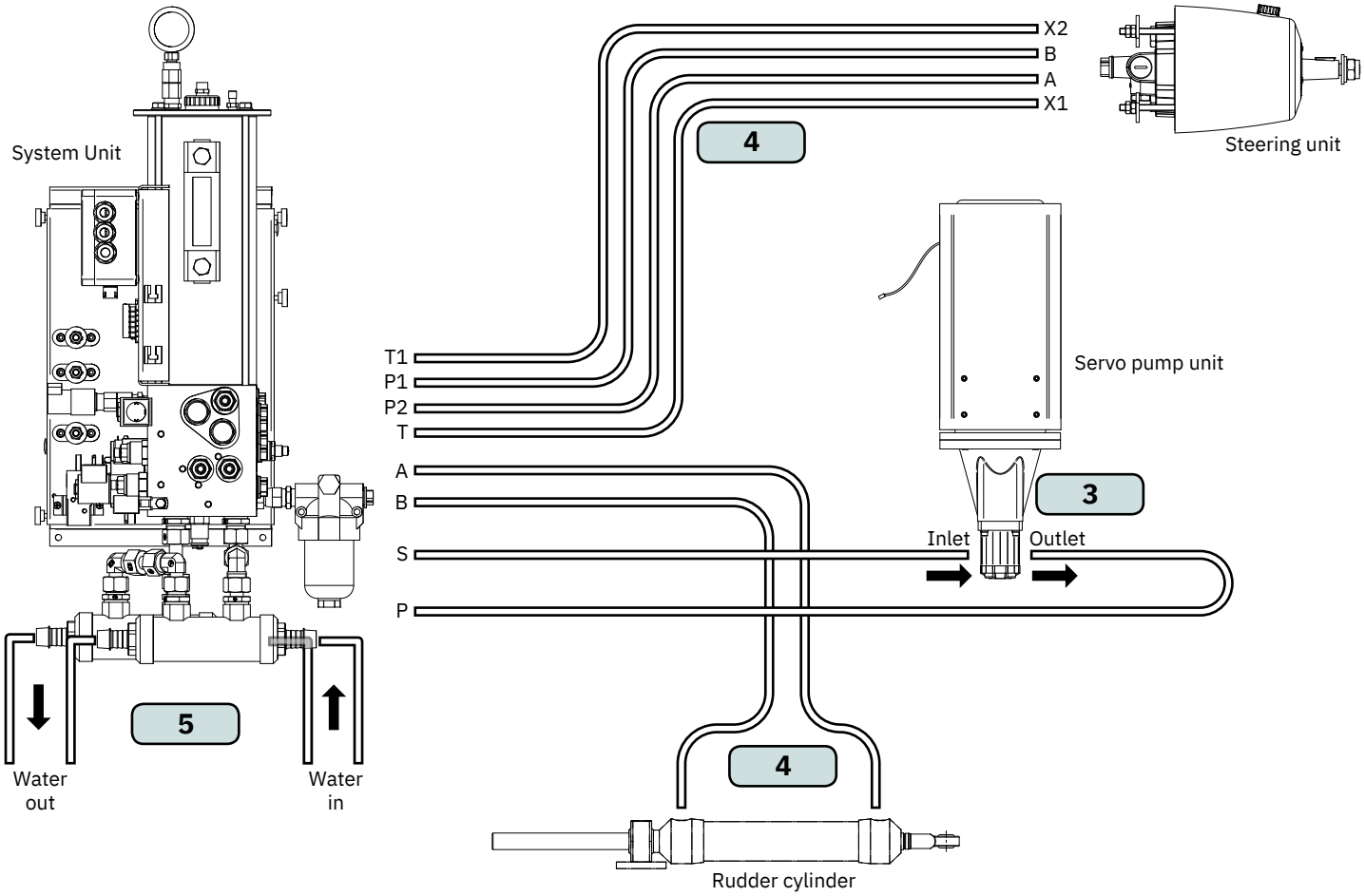
3. Connect the servo pump hydraulic inlet/ suction hose to hydraulic port S on the system unit. Connect servo pump hydraulic outlet/pressure hose to hydraulic port P (filter) on system unit. Please refer to drawing on page 7 for hydraulic port layout on the system unit.

4. Connect the hoses to the helm pump and the cylinder according to drawing on page 7 and 17.
***(NB: The Hoses can be connected either vertically or horizontally into the helm pump.)***

5. Connect the cooling water inlet/ outlet hoses to the engine cooling system. Ensure that the hoses are installed in accordance with this manuals paragraph "Hose Installation".



# Power Supply and Signal Lead Connection

1. Connect the temperature sensor leads to the system unit (external contacts). Connect the power leads from (B-,P-) to Servo Pump (-), and (P+) on system unit external relay to (+) on Servo Pump.

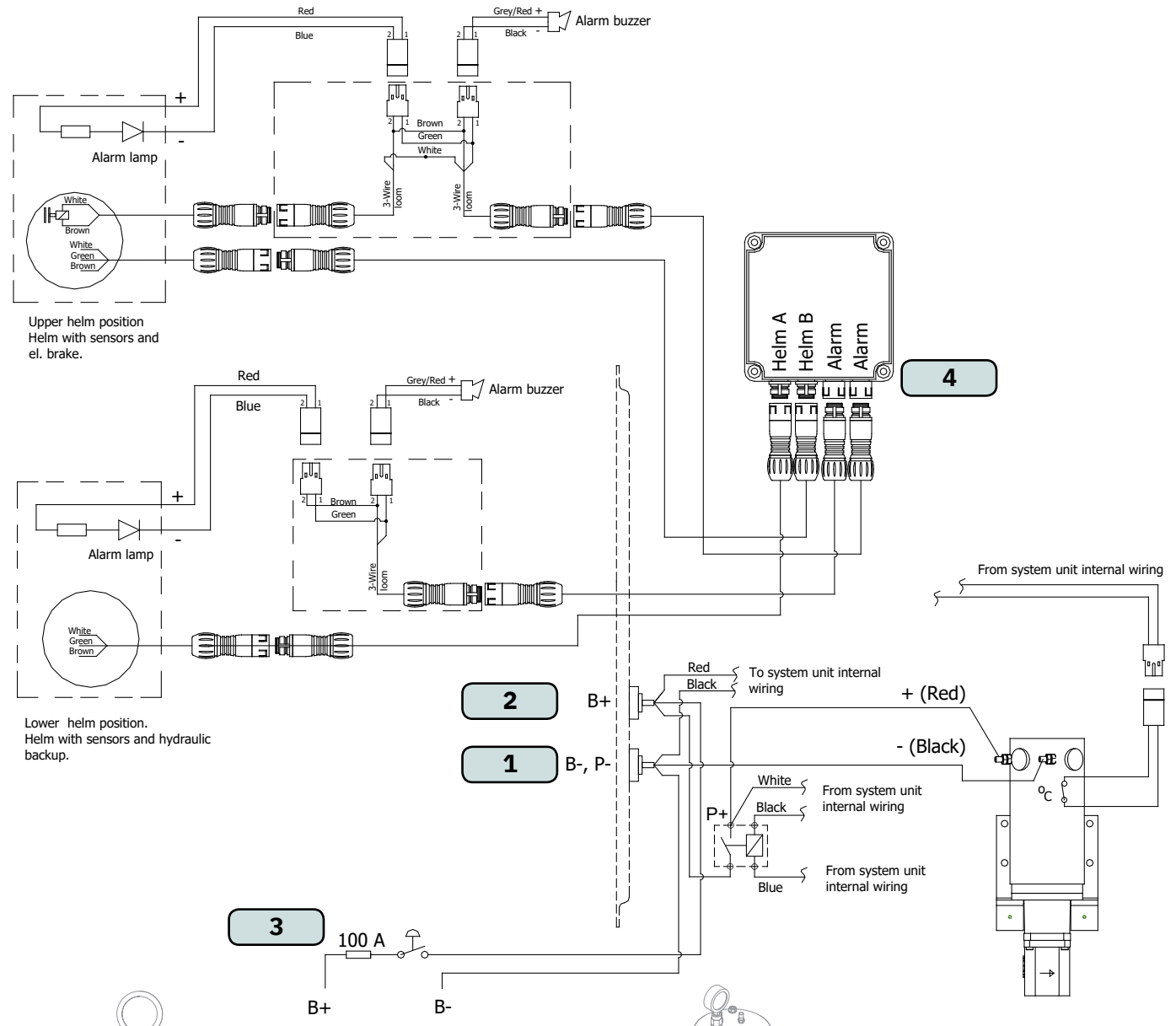
2. Connect battery power (24V DC) to the System Unit power terminals (positive cable to (B+) terminal and negative to (B-) terminal & torque load to 17Nm)

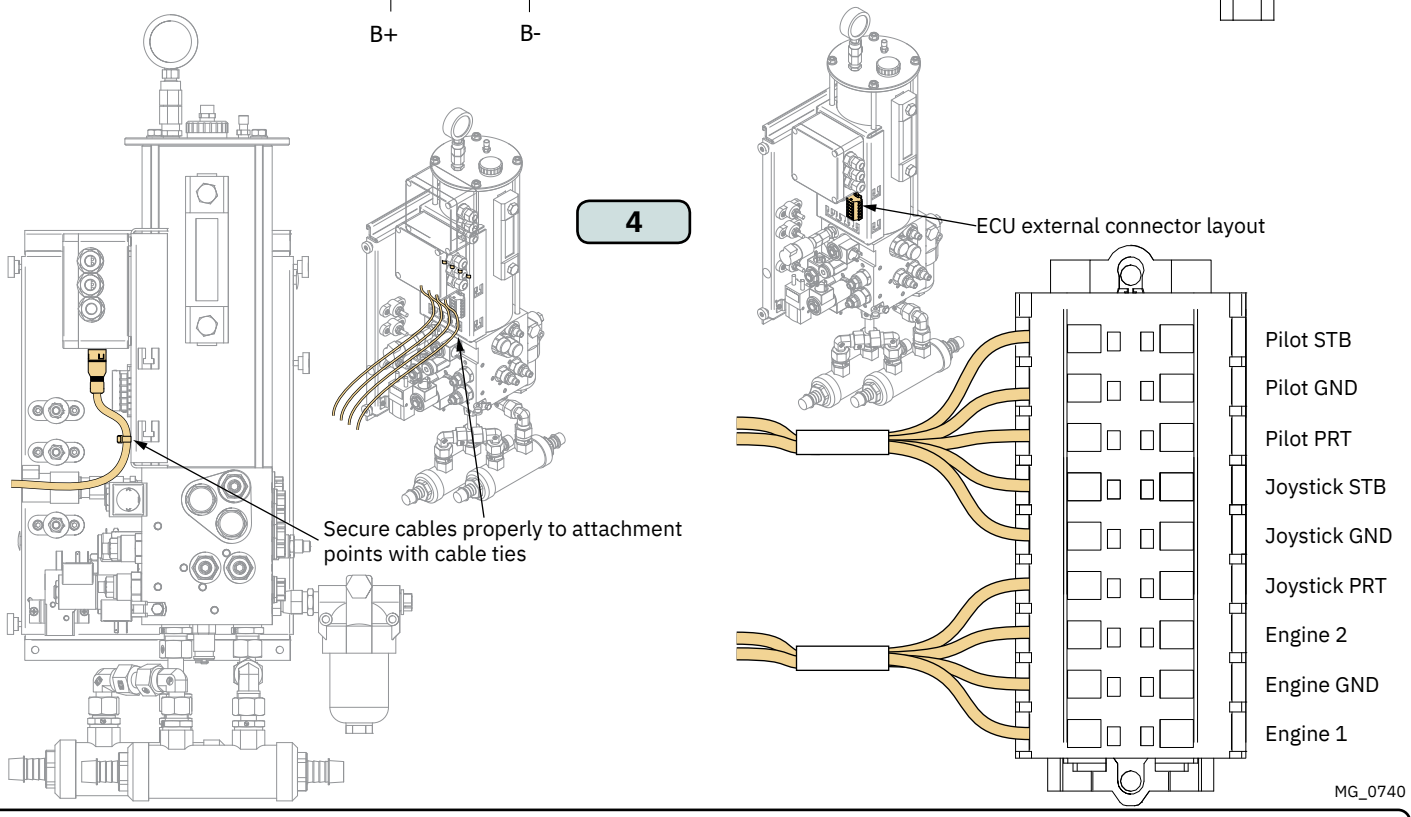
3. A 100 Amp fuse must be installed in proximity of the batteries on the positive cable run, to protect the system from damage from possible short circuiting.

For schematic drawings , see page 19 (Twin helm) & page 20 (Single helm).

4. Connect the “Motor On” and Pilot Signal electrical looms to the external terminal block mounted on the System Unit.

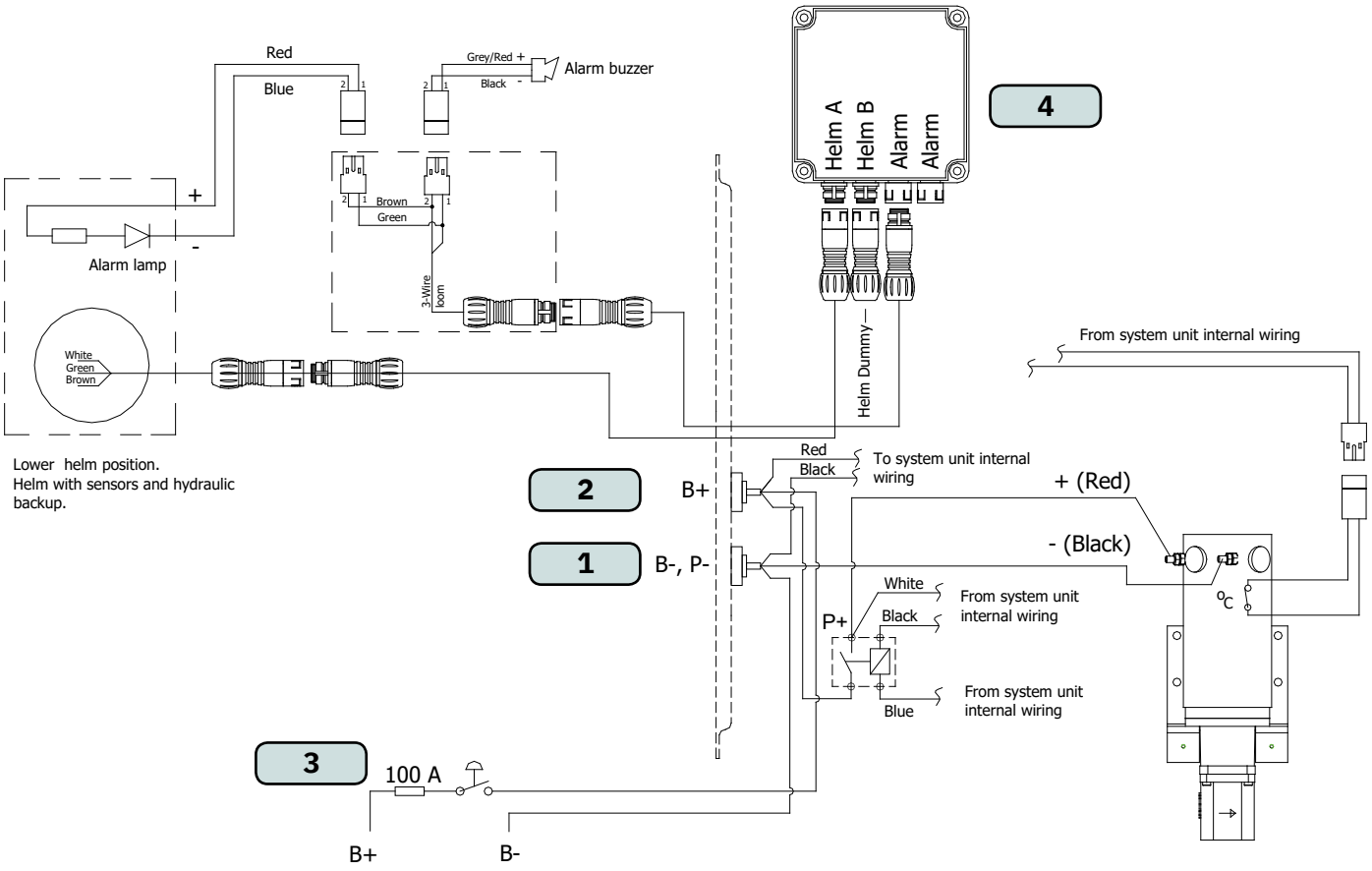
# Power Supply and Lead Connection Diagram - Flybridge Yachts (Twin Helm)

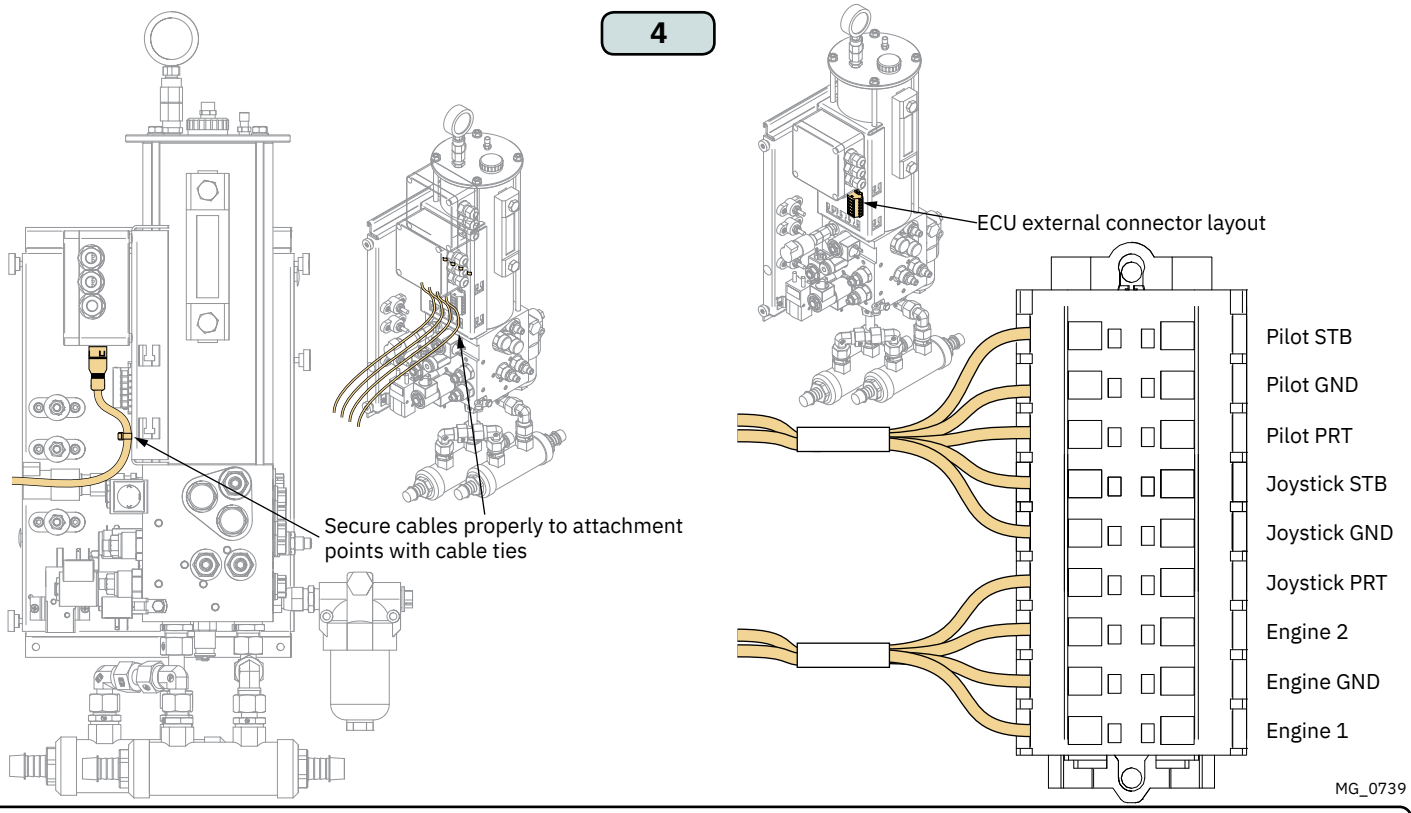


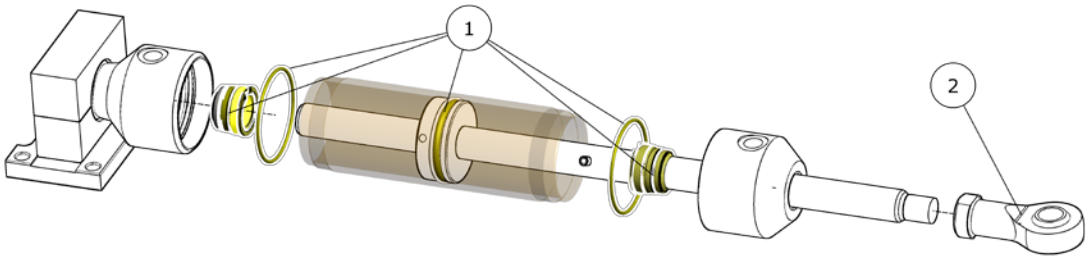

MG_0740

# Power Supply and Lead Connection Diagram - Non Flybridge Yachts (Single Helm)

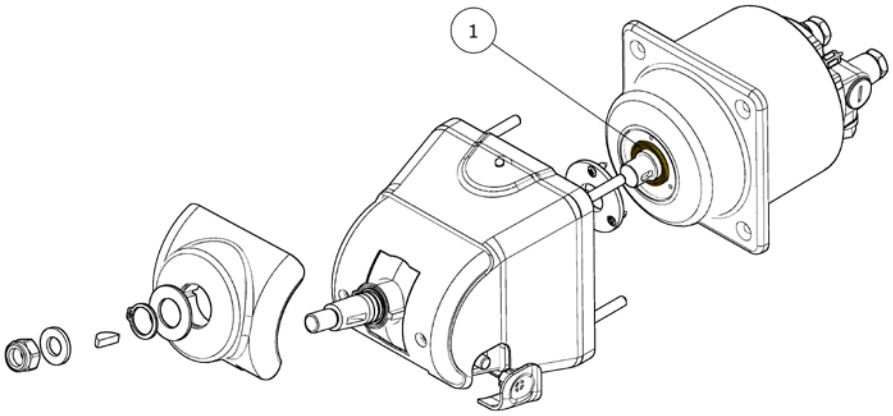


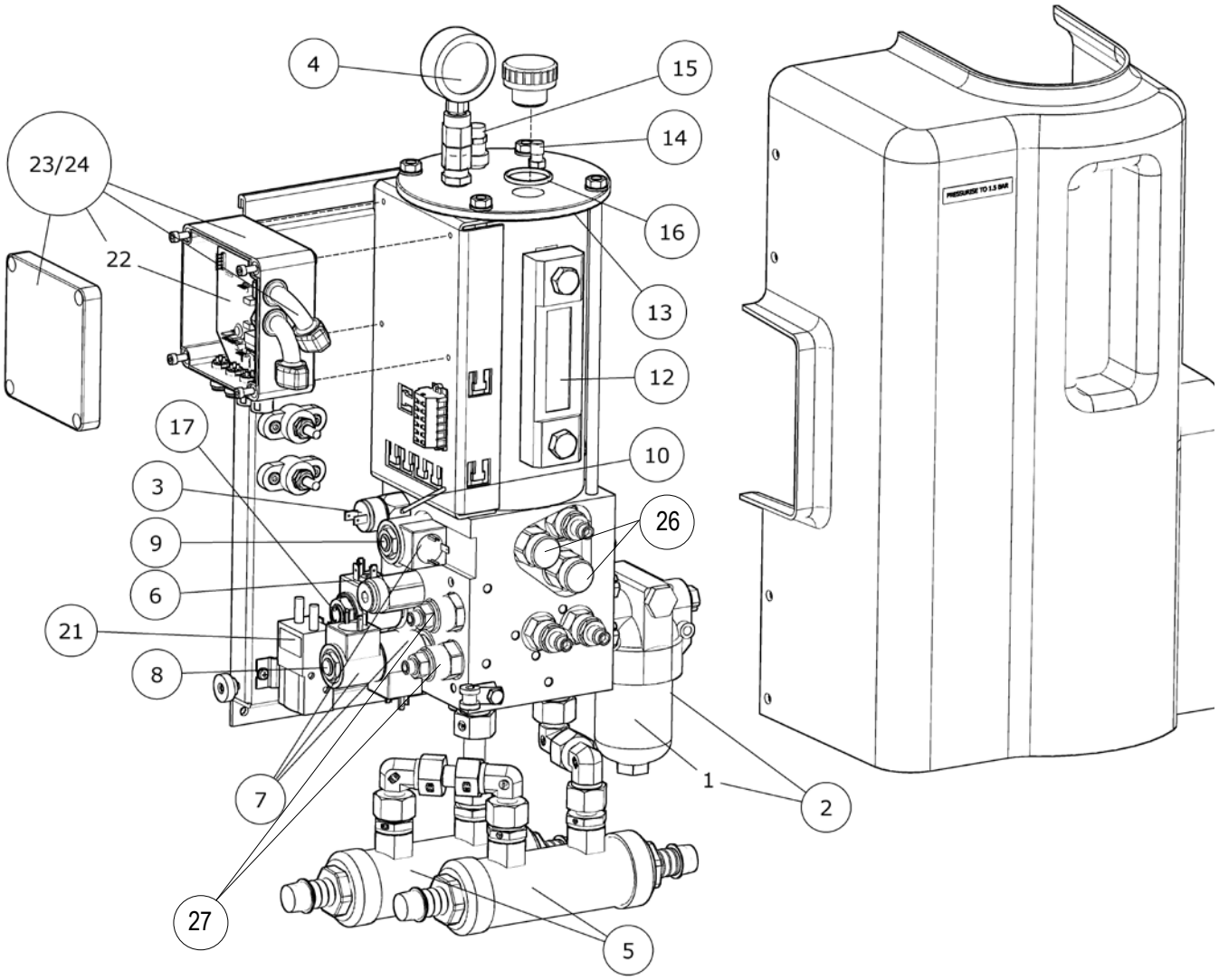



| | Steering Cylinders | 71140P190 | 71220P190 | 71220P220 |
|---|---|---|---|---|
| 1 | Seal kit | 75140 | 75220 | 75220 |
| 2 | Rod-end | 73051 | 73051 | 73051 |

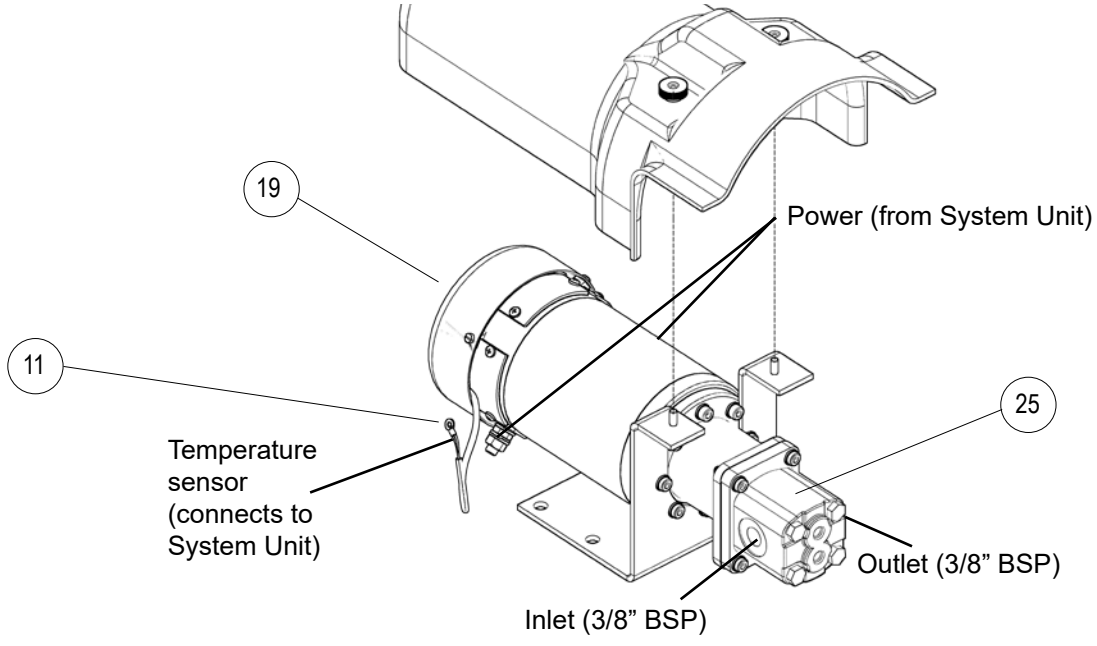



| | Helms | 74085 | 74087B |
|---|---|---|---|
| 1 | Shaft seal helm | 74008 | NA |



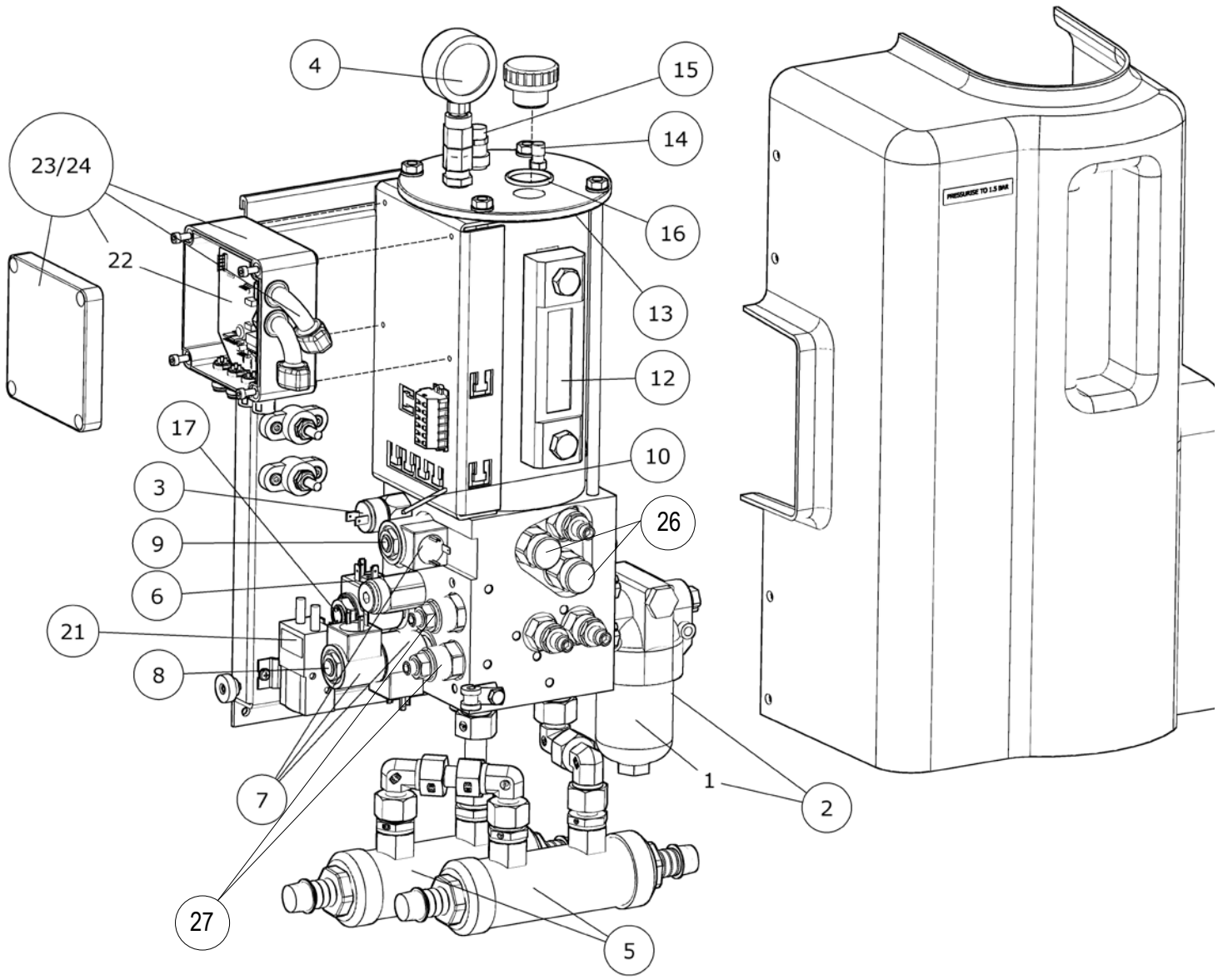



## Servo pump unit

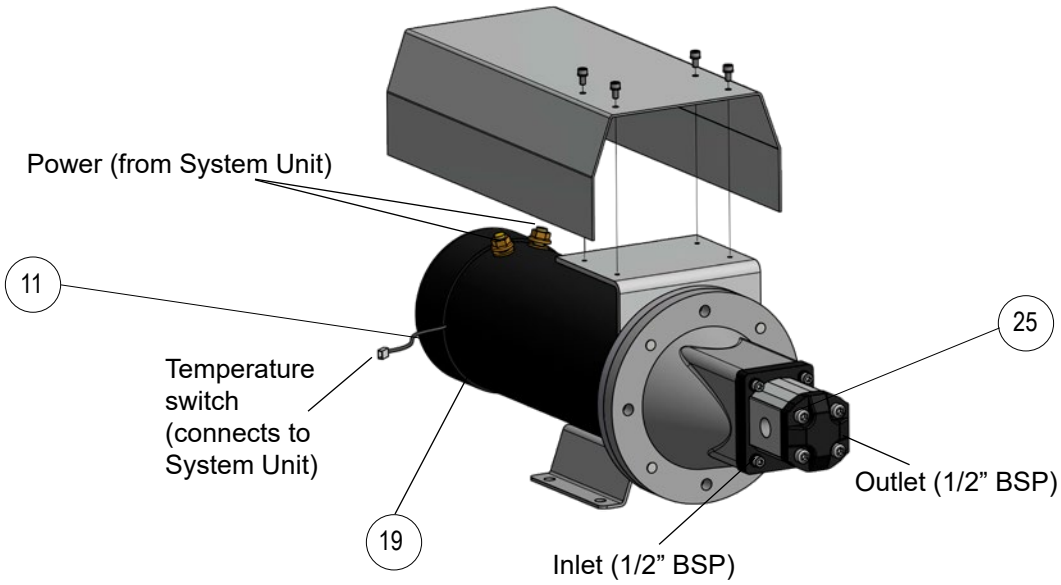


| | | ESPE600 | ESPE700 |
|---|---|---|---|
| 1 | Filter element | 74283 | 74283 |
| 2 | Complete filter | 74091 | 74091 |
| 3 | Pressure switch | 74310-KIT | 74310-KIT |
| 4 | Pressure gauge | 74227 | 74227 |
| 5 | Cooler kit | 74065-2 | 74065-2 |
| 6 | Coil servo/prop. Valve | 74265 | 74265 |
| 7 | Coil dir. control valves and lock/bypass valve | 74266 | 74266 |
| 8 | Valve cartridge, directional control valve | 74263 | 74263 |
| 9 | Valve cartridge, lock/bypass valve | 74262 | 74262 |
| 10 | Temp sensor tank | 74231 | 74231 |
| 11 | Temp switch motor | 74274 | 74274 |
| 12 | Sight Glass/Level Gauge | 74320 | 74320 |
| 13 | O-rings tank cover | 74219 | 74219 |
| 14 | Air filler valve | 74076 | 74076 |
| 15 | Tank pressure relief valve | 74223 | 74223 |
| 16 | O-ring oil filler plug | 74216 | 74216 |
| 17 | Valve cartridge, servo valve | 74260 | 74261 |
| 18 | Pump/motor unit | 74000 | 74000 |
| 19 | DC motor* | 74370-R-S | 74370-R-S |
| 19.1 | Brush kit** | 74369 | 74369 |
| 20 | Cover for pump/motor unit | 74220A | 74220A |
| 21 | Motor starter relay | 6 8877 | 6 8877 |
| 22 | ECU Circuit board MK3 | 74294-600 | 74294-700 |
| 23 | ECU complete with harness MK2-MK3*** | 74291-MK2-3-600 | 74291-MK2-3-700 |
| 24 | ECU complete with harness MK1-MK3**** | 74291-MK1-3-600 | |
| 25 | Gear pump | 72350/GR230021-L | 72350/GR230021-L |
| 26 | Helm insulation valves | 74303 | 74303 |
| 27 | Load holding valves | 74302 | 74302 |

* New cover 74220A required
** For motor type with fan
*** Upgrade kit for systems delivered up to Spring 2008. S/N and picture required.
**** Upgrade kit for systems delivered 2006/early 2007. S/N and picture required.




## Servo pump unit



| | | ESPE1500 |
|---|---|---|
| 1 | Filter element | 74283 |
| 2 | Complete filter | 74091 |
| 3 | Pressure switch | 74310-KIT |
| 4 | Pressure gauge | 74227 |
| 5 | Cooler kit | 74065-2 |
| 6 | Coil servo/prop. valve | 74265 |
| 7 | Coil dir. control valves and lock/bypass valve | 74266 |
| 8 | Valve cartridge, directional control valve | 74263 |
| 9 | Valve cartridge, lock/bypass valve | 74262 |
| 10 | Temp sensor tank | 74231 |
| 11 | Temp switch motor | 74274 |
| 12 | Sight Glass/Level Gauge | 74320 |
| 13 | O-rings tank cover | 74219 |
| 14 | Air filler valve | 74076 |
| 15 | Tank pressure relief valve | 74223 |
| 16 | O-ring oil filler plug | 74216 |
| 17 | Valve cartridge, servo valve | 74261 |
| 18 | Pump/motor unit | 74282 |
| 19 | DC motor | 74272-S |
| 19.1 | Brush kit | 73996 |
| 19.2 | Spring kit | 73996-S |
| 20 | Cover for pump/motor unit | 74276 |
| 21 | Motor starter relay | 74278 |
| 22 | ECU Circuit board MK3 | 74294-1500 |
| 23 | ECU complete with harness MK2-MK3** | 74291-MK2-3-1500 |
| 24 | ECU complete with harness MK1-MK3*** | N/A |
| 25 | Gear Pump | 74256 |
| 26 | Helm insulation valves | 74303 |
| 27 | Load holding valves | 74302 |

** Upgrade kit for systems delivered up to Spring 2008. S/N and picture required.

*** N/A

## Service and Support

MC_0024

**Find your local professional dealer from our certified worldwide network for expert service and support. visit our website www.sleipnergroup.com/support**

## Product Spare Parts and Additional Resources

MC_0024

**For additional supporting documentation, we advise you to visit our website www.sleipnergroup.com and find your Sleipner product.**

## Warranty statement

MC_0024

1. Sleipner Motor AS (The "Warrantor") warrants that the equipment (parts, materials, and embedded software of products) manufactured by the Warrantor is free from defects in workmanship and materials for purpose for which the equipment is intended and under normal use and maintenance service (the "Warranty").
2. This Warranty is in effect for two years (Leisure Use) or one year (Commercial and other Non-leisure Use) from the date of delivery/purchase by the end user, with the following exceptions;
   (a) For demonstration vessels, or vessels kept on the water, the dealer is considered as the end user from 6 months after their launch of the vessel;
   (b) The warranty period starts no later than 18 months after the first launch of the vessel.
   Please note that the boat manufacturer and dealer must pay particular attention to correct maintenance and service both by the products manuals as well as general good practice for the location the boat is kept in the period the boat is in their care. In cases where the 6 and 18 months grace periods for boat builders and dealers are passed, it is possible to obtain a full warranty upon inspection and approval of the warrantor or such representative.
3. Certain parts, classified as wearable or service parts, are not covered by the warranty. A failure to follow the required maintenance and service work as described in the product manual render all warranty on parts or components directly or indirectly affected by this void. Please also note that for some parts, time is also a factor separately from actual operational hours.
4. This Warranty is transferable and covers the equipment for the specified warranty period.
5. The warranty does not apply to defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically designed as waterproof.
6. In case the equipment seems to be defective, the warranty holder (the "Claimant") must do the following to make a claim:
   (a) Contact the dealer or service centre where the equipment was purchased and make the claim. Alternatively, the Claimant can make the claim to a dealer or service centre found at www.sleipnergroup.com. The Claimant must present a detailed written statement of the nature and circumstances of the defect, to the best of the Claimant's knowledge, including product identification and serial nbr., the date and place of purchase and the name and address of the installer. Proof of purchase date should be included with the claim, to verify that the warranty period has not expired;
   (b) Make the equipment available for troubleshooting and repair, with direct and workable access, including dismantling of furnishings or similar, if any, either at the premises of the Warrantor or an authorised service representative approved by the Warrantor. Equipment can only be returned to the Warrantor or an authorised service representative for repair following a pre-approval by the Warrantor's Help Desk and if so, with the Return Authorisation Number visible postage/shipping prepaid and at the expense of the Claimant.
7. Examination and handling of the warranty claim:
   (a) If upon the Warrantor's or authorised service Representative's examination, the defect is determined to result from defective material or workmanship in the warranty period, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense. If, on the other hand, the claim is determined to result from circumstances such as described in section 4 above or a result of wear and tear exceeding that for which the equipment is intended (e.g. commercial use of equipment intended for leisure use), the costs for the troubleshooting and repair shall be borne by the Claimant;
   (b) No refund of the purchase price will be granted to the Claimant, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. In the event that attempts to remedy the defect have failed, the Claimant may claim a refund of the purchase price, provided that the Claimant submits a statement in writing from a professional boating equipment supplier that the installation instructions of the Installation and Operation Manual have been complied with and that the defect remains.
8. Warranty service shall be performed only by the Warrantor, or an authorised service representative, and any attempt to remedy the defect by anyone else shall render this warranty void.
9. No other warranty is given beyond those described above, implied or otherwise, including any implied warranty of merchantability, fitness for a particular purpose other than the purpose for which the equipment is intended, and any other obligations on the part of the Warrantor or its employees and representatives.
10. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives based on this Warranty for injury to any person or persons, or damage to property, loss of income or profit, or any other incidental, consequential or resulting damage or cost claimed to have been incurred through the use or sale of the equipment, including any possible failure or malfunction of the equipment or damages arising from collision with other vessels or objects.
11. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country.

## Patents

MC_0024

At Sleipner we continually reinvest to develop and offer the latest technology in marine advancements. To see the many unique designs we have patented visit our website www.sleipnergroup.com/patents

**Learn more about our products at www.sleipnergroup.com**

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