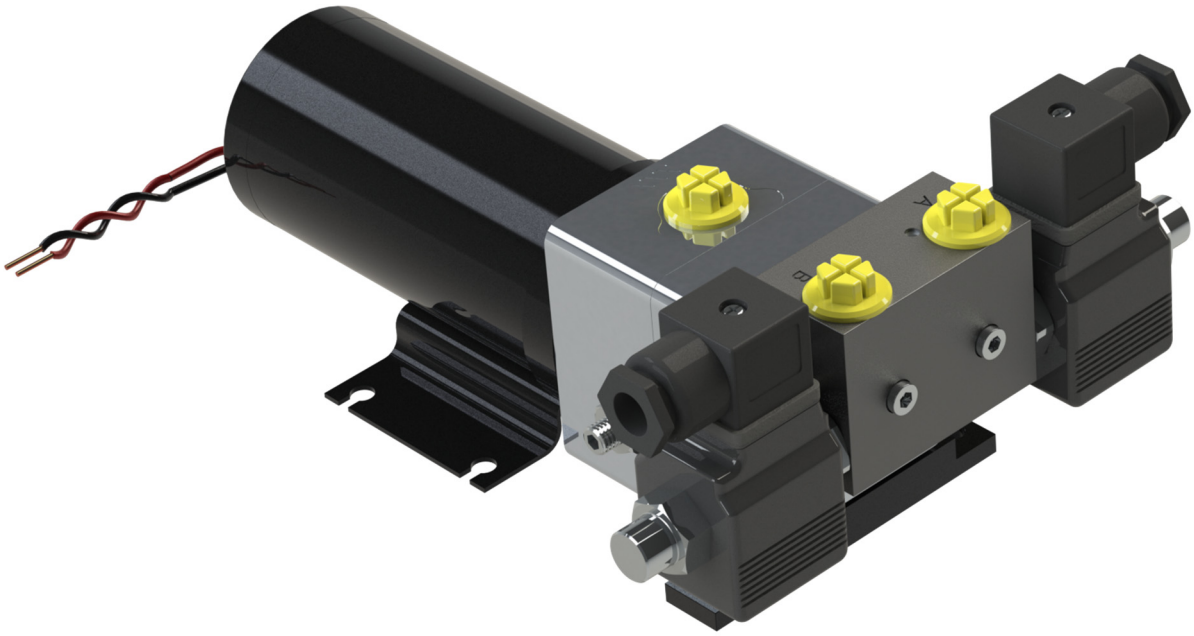
Hy-ProDrive
Marine Steering Technology



PC+ CONSTANT RUNNING PUMP

Marine Autopilot Hydraulic Pump
Installation and Service Instructions

Serial Number

The information in this manual was, to the best of our knowledge, correct when it went to press and Hydraulic Projects Ltd cannot be liable for any inaccuracies or omissions. There may also be differences between the specifications in the manual and the product as a result of ongoing development for which we accept no liability.

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IMPORTANT SAFETY INFORMATION

Failure to install and maintain this equipment in accordance with the instructions contained in this Manual could result in damage or injury.

This equipment must be installed and maintained by a person who is qualified to do so. This equipment is only for use with marine Auto pilots within the limitations stated in the following pages.

Auto pilot steering systems are navigational aids and the user must still maintain a permanent watch.

This equipment meets the latest EMC (Electromagnetic Compatibility) standards required for use in the recreational marine environment. In order to ensure conformance and to prevent interference with electronic systems the unit must be properly bonded to earth and the supply cables screened.

DO NOT FLASH TEST

Beware of hot motor and solenoid components and the risk of entrapment from moving parts.

DESCRIPTION

The "PC+" constant running type gear pumps are driven by 12 or 24 Volt DC permanent magnet motors . Flow reversal is achieved by switching a double acting solenoid valve. Incorporated in the design are pilot operated check valves that prevent the pump being back driven by the manual steering system.

Other features include compatibility with balanced or unbalanced cylinders and they can also be used with pressurised reservoir systems (max 3.5 bar).

An adjustable relief valve is fitted as standard.

Maximum flow output at no load is indicated on the rating plate. Check the voltage shown is correct for the output of your auto pilot.

LOCATION

These pumps are designed for 'under deck' installations only.

Excessive temperature, vibration and fumes in the atmosphere can drastically reduce motor brush life.

Mounting the unit on a flimsy surface can transmit and amplify undesirable noise.

As in common with other electrical equipment, contact with water and excessive humidity must be avoided.

Keep the cable and pipe work runs as short as practically possible.

Units must be mounted either horizontally, foot down or vertically - refer page 9

This unit must not be positioned in a confined area where there are inflammable gases.

INSTALLATION

All ports are G1/4 (BSP) parallel threaded.

Use only bonded rubber/metal washers to seal the fittings. Do not use tapered adapters, sealing compound or P.T.F.E tape.

Ports marked 'A' and 'B' are the service line connections to the ram, the pipe work and connections must be suitable for a 100 bar working pressure minimum rating.

The port marked 'R' is the reservoir or balance line. If used as a balance line it must be connected, through a continuous rise to the helm pump bottom connection.

Do not plug this port – damage and steering failure could result.

If used with pressurised reservoir type systems the pipe must be suitable for at least 7 bar.

Ensure that no dirt enters the system during the installation, be certain that all pipes and fittings are cleaned before connecting up.

HYDRAULIC FLUID

Good quality ISO VG10 to ISO VG42 hydraulic mineral oil is recommended, check the compatibility with the helm pump and ram manufacturers specifications and if it is suitable for use with nitrile rubber hydraulic seals. Refer page 9.

ELECTRICAL

Current limitation must be fitted - refer page 8.

COMMISSIONING

⚠ CAUTION! Be aware of the danger of moving linkages and the risk of entrapment during this procedure.

Bleed the system according to the helm pump manufacturers instructions. To aid clearing air from the electric pump please note the orientation of the hydraulic/electrical connections - See installation data Ref. page 6

The pump must not be run without oil.

The relief valve is set at 55 Bar and should not be adjusted unless the steering gear is designed to operate at a lower pressure.

TROUBLE SHOOTING

1) Motor does not run

: check electrical connections.
: check auto pilot output.
: check fuse / trip rating (Ref. page 8)

2) Motor runs, but no ram movement.

: check that the solenoid is operating.
: check motor rotation direction.
: check for air in system.
: check for incorrect hydraulic connections.
: check there is sufficient fluid in the system.
: check that the relief is set correctly.
: check the drive coupling between pump and motor.
: check if the pump has been dismantled and incorrectly assembled.

3) Excessive noise

: check for air in system.
: check the motor for damage.

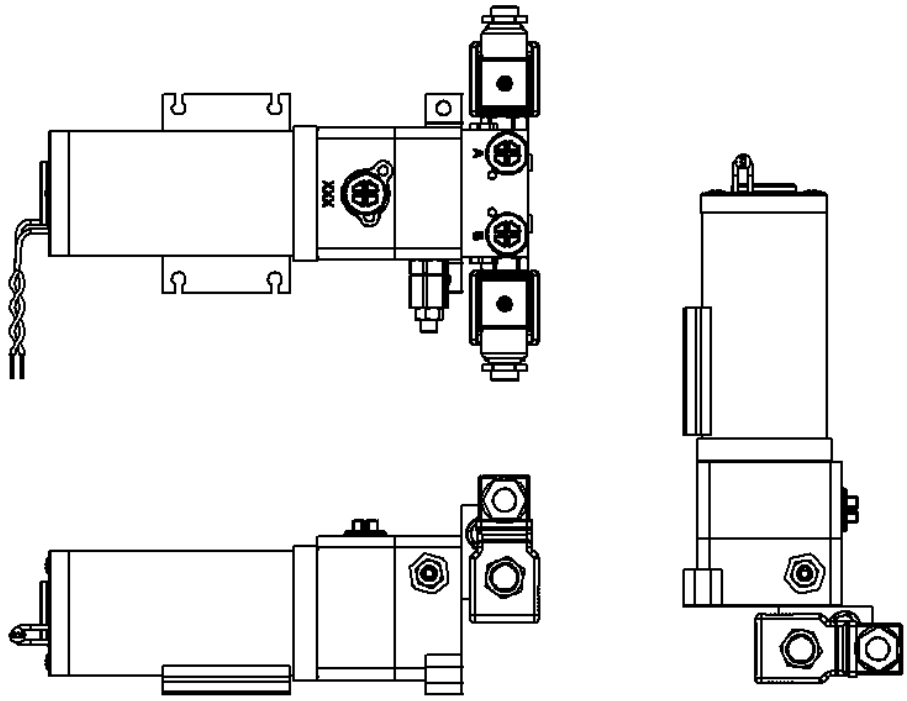
TECHNICAL DATA

Voltage	12 / 24 VDC			
	Typical amp-hour		Typical current	
Current	5 bar at 25% duty		Intermittent 55 bar max	
(Incl. coil)	12v	24v	12v	24v
PC+10	4.2	2.0	21.0	10.0
PC+15	4.4	2.2	22.0	12.0
PC+20	4.5	2.3	27.0	13.0
PC+25	4.7	2.4	36.0	16.5

Coils	12 VDC 24W 2.0A 24 VDC 24W 1.0A
Ingress Protection	IP67
EMC Protection	BS EN 60945:2002 (DC)
Ignition protection	BS EN 28846:1993
Ambient operating Temperature	-15 to +55 deg C
Max Pressure	55 bar (intermittent operation)
Reservoir line	2 bar Max
Ports	G1/4 (BSPP) Parallel A = Cylinder port B = Cylinder port R = Reservoir port
Rotation	Red lead to - positive

TECHNICAL DATA

Installation: Under deck, horizontal or vertical (motor-up)

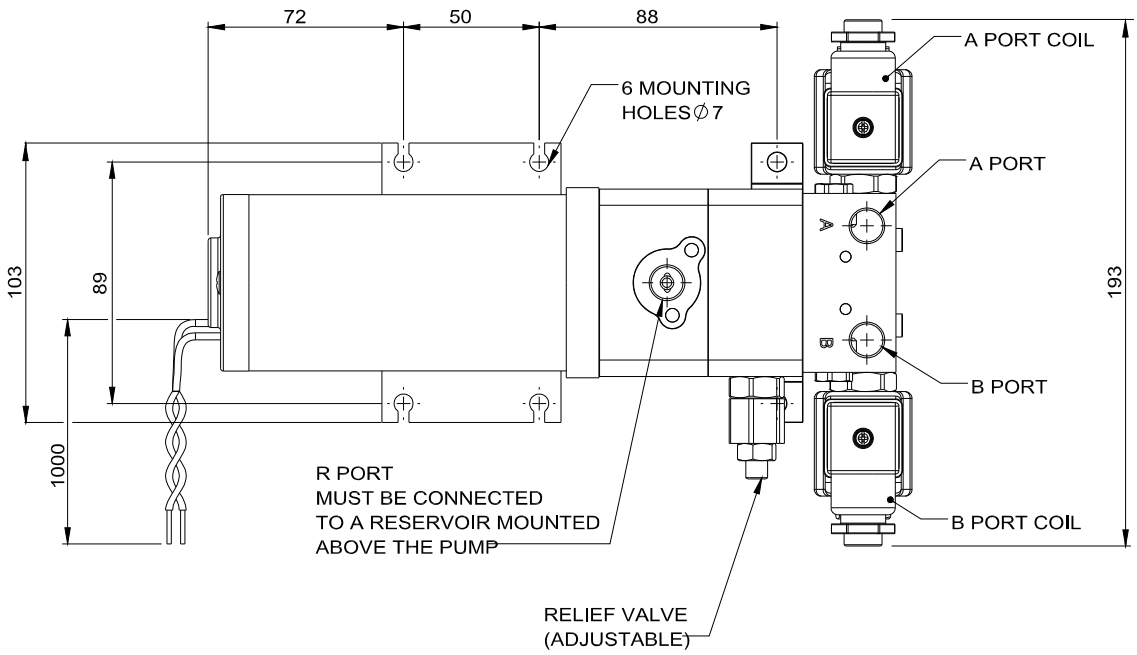


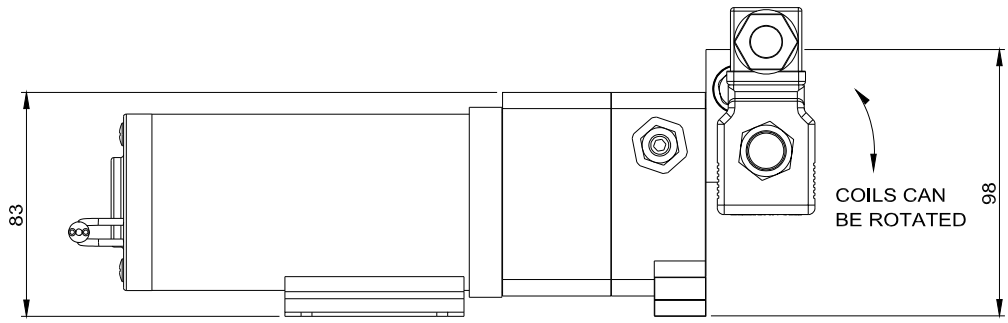
Hoses Suitable for working pressure 55 bar.
Minimum burst pressure 100 bar.

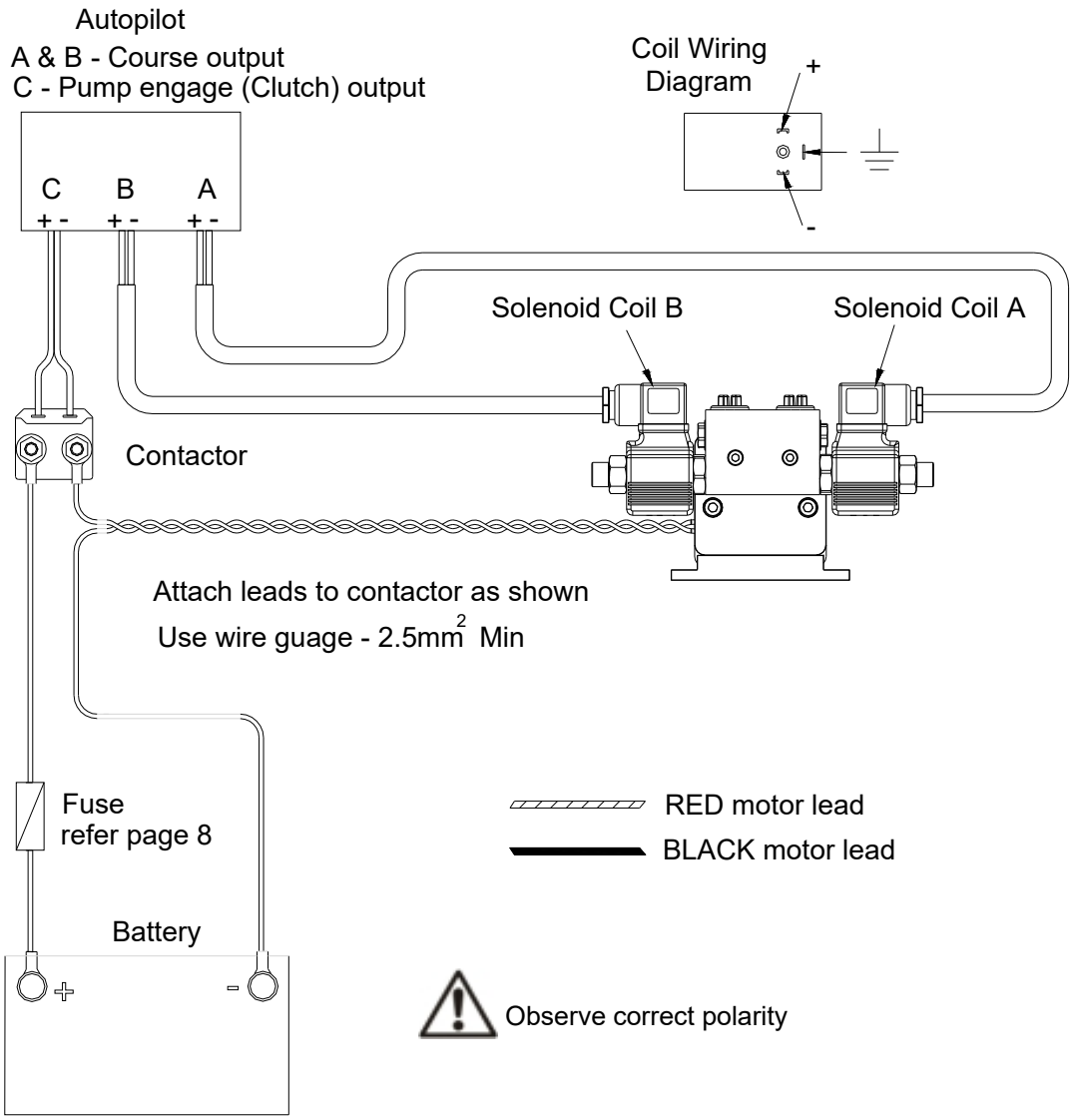
Fluid ISO VG10 to VG40 Hydraulic mineral fluid meeting ISO 6743-4 HV

The following commercial fluids are suitable.
Fuchs Renolin B15 HV1
Seastar HA5430

Weight: 5kg


72
50
88
6 MOUNTING
HOLES ∅ 7
A PORT COIL
A PORT
B PORT
B PORT COIL
103
89
1000
193
R PORT
MUST BE CONNECTED
TO A RESERVOIR MOUNTED
ABOVE THE PUMP
RELIEF VALVE
(ADJUSTABLE)


83
COILS CAN
BE ROTATED
98


Autopilot
A & B - Course output
C - Pump engage (Clutch) output
C
B
A
+ -
+ -
+ -
Coil Wiring Diagram
+
-
Solenoid Coil B
Solenoid Coil A
Contactor
Attach leads to contactor as shown
Use wire guage - 2.5mm2 Min
Fuse
refer page 8
Battery
RED motor lead
BLACK motor lead
Observe correct polarity

MAINTENANCE

1) Pump

With a minimum of moving parts and quality precision engineering the pump will give many years of trouble free service.

Should service replacement seals be required a kit is available.
Hy-ProDrive Part no. PC+sk.

2) Motor and coupling removal and replacement.

The long life motor is a non-serviceable item.

A new motor must be fitted in the event of motor failure, the brushes are not replaceable.

The motor can be removed (for replacement or coupling examination) from the pump head without fluid loss or air ingress into the hydraulic system.

Undo the two M6 (5mm AF Allen Key) socket head cap screws and remove the motor, coupling and water seal O ring.

If the coupling is worn or damaged please replace. Lubricate the slots with a small quantity of good quality grease.

If any hydraulic fluid is found in the coupling area the pump shaft seal must be replaced – see services kit for instructions.

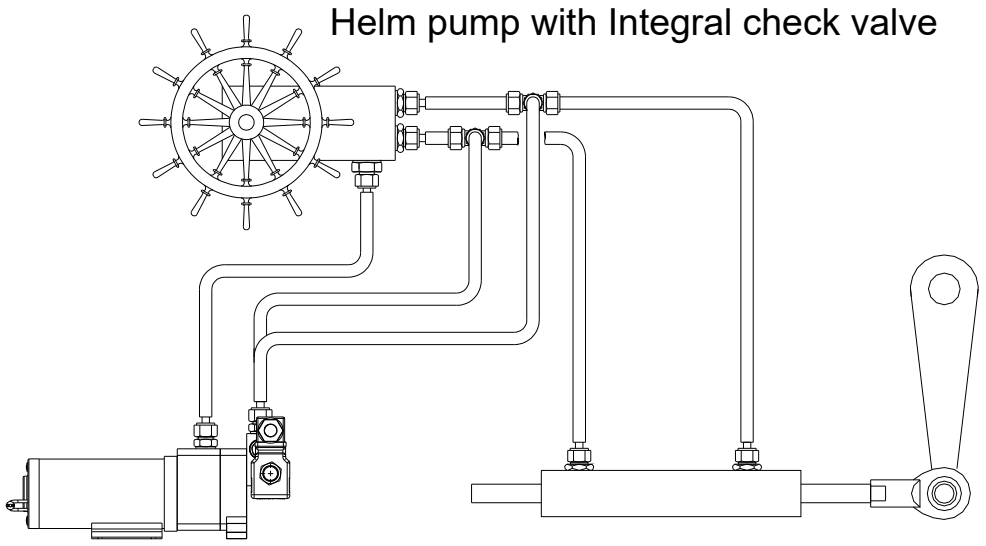
Reassemble by replacing the O ring, engage the coupling between the motor and pump shafts, ensure the motor locates correctly in the pump spigot, using a low strength thread locking compound replace and tighten the two M6 socket head cap screws (13.5 Nm).

Caution!

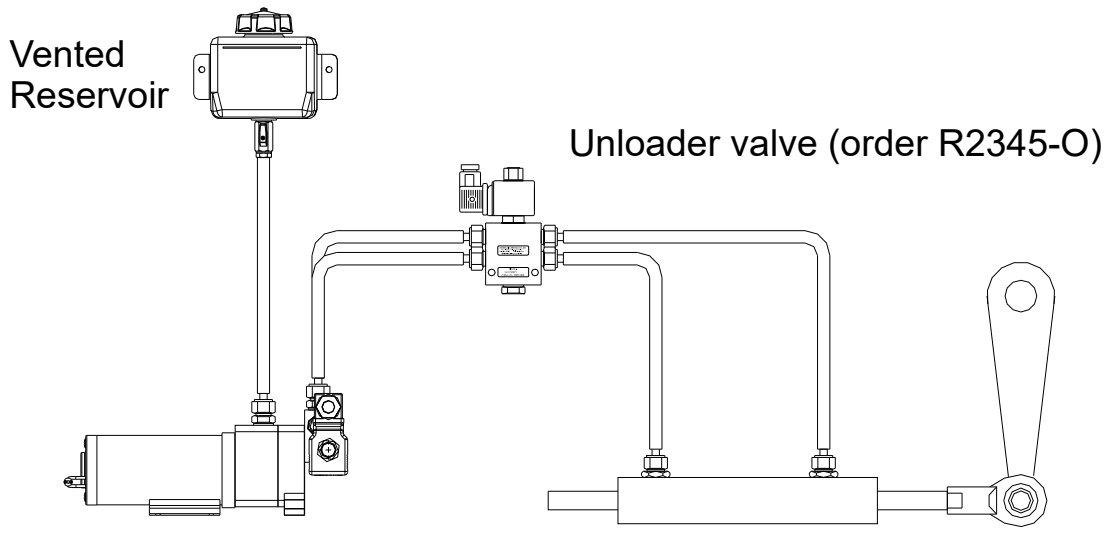
Keep all parts clean during dismantling and reassembly.

TYPICAL ARRANGEMENTS

Primary Steering



Secondary Steering



Keep this manual in safe place.
Quote the model and serial numbers in all correspondence.

Model Number: _____

Serial Number:: _____

Date of Purchase: _____

Dealer:: _____

_____

CONTACT DETAILS

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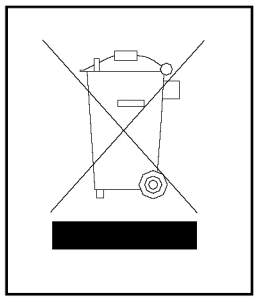
END OF LIFE DISPOSAL

Please dispose of End of Life items responsibly.

In the event that you are unable to use your nearest local authority civic amenity sites to recycle, units can be returned to us at the address above.



Our in-house design and technical teams offer the expertise and support expected of an established world-class manufacturer. Our customers, ranging from the agricultural, transport, rail, fishing, construction and industrial sectors, expect named personal support, excellent quality and a rapid service with full back-up…

….we aim to deliver in full.

Call us today to discuss a bespoke solution from our extensive range or simply for competitively priced spares.

Full technical details of our entire range are available to download from our website

www.hypro.co.uk