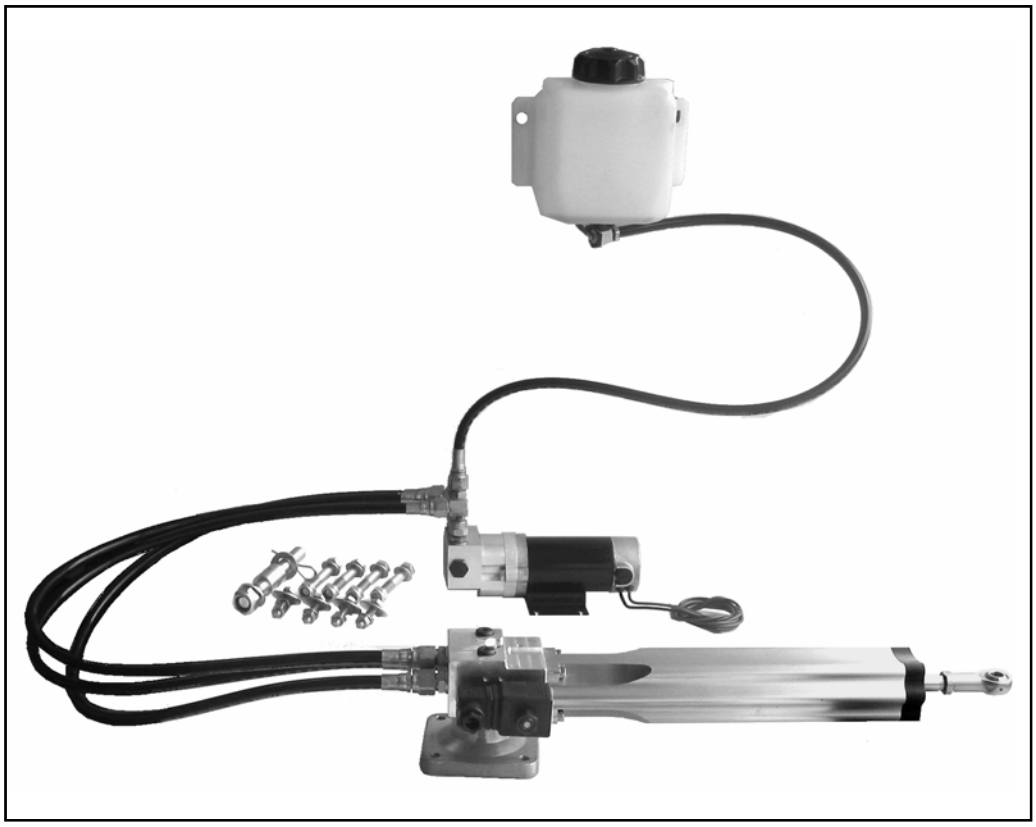
Hydraulic Projects



HS40*PLUS*

Marine Hydraulic Steering System
Installation and Service Instructions

Serial Number

“Engineering Excellence”

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.

Contents

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.

INTRODUCTION

Congratulations on the purchase of your Hydraulic Projects HS40*PLUS* Marine Hydraulic Steering System. It has been designed to give many years of trouble-free service providing the information and instructions contained within this manual are adhered to.

DESCRIPTION

'HS40*PLUS*' Hydraulic Steering Systems combine a hydraulic cylinder with clutch, reversing pump and reservoir in a compact installation.

A solenoid clutch is engaged to extend or retract the rod. The cylinder and its mounting are protected by integral relief valves. Overall adjustment is incorporated into the stroke of the cylinder. Nominal cylinder size and pump flow are indicated on the rating plate. Check the voltage shown is correct for the output of your autopilot.

Please do not disconnect any of the hoses, the system has been bled and tested prior to shipment.

Ensure you read and understand the special reservoir instructions on page 10 before commencing installation.

LOCATION

For marine applications these systems are designed for **'under deck'** installations only.

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

It must be mounted securely and on a surface that is able to withstand the high thrusts generated.

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

Any attitude of mounting may be used. Refer to the installation and technical data pages for further information.

DISMOUNTING THE UNIT FROM ITS BASE

The HS40*PLUS* cylinder features a quick-dismount base.

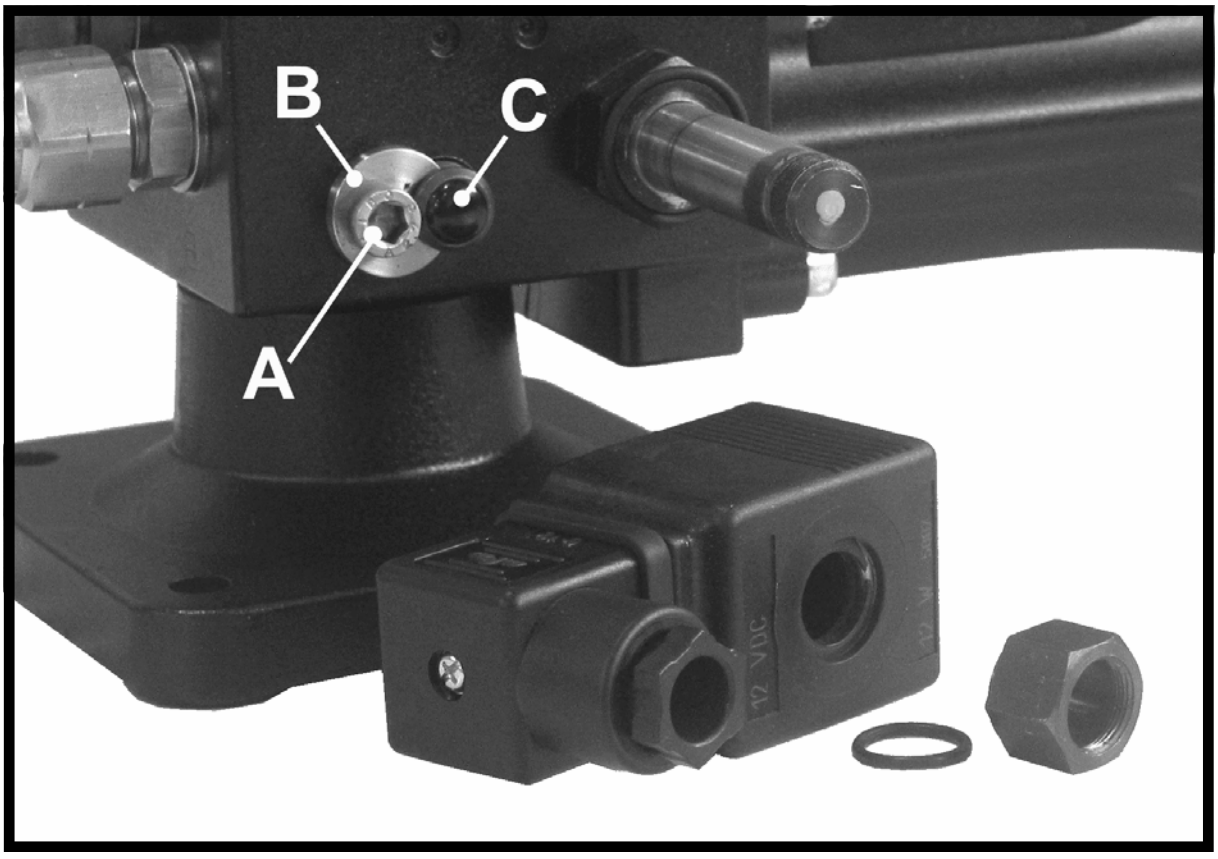
To remove the base from the unit first take off the coil which is secured by a 17mm A/F nut. Next undo and remove the Allen screw ‘A’ and the retaining plate ‘B’ . Withdraw the mounting pin ‘C’ which will release the base.

NOTE!

The pin is a close engineered fit and if it proves difficult to remove take off the plastic cap from the head of the pin and insert screw ‘A’ into it. It will then be possible to withdraw the pin using a pair of pliers or grips.

IMPORTANT!
Avoid damage to the pin

Assembly is a reversal of the removal process. Ensure the plastic cap is re-fitted to the pin upon completion.



MAINTENANCE & SERVICE

With a minimum of moving parts and top quality precision engineering the system will give many years of trouble free service if the following points are adhered to.

- Keep the cylinder rod free from damage.
- Avoid exposing the unit to salt water.

Perform the following tasks on a regular basis:

- Check the security of the mounting base and tiller bolt.
- Lubricate the mounting pin & rod end - use only a good quality marine grease that is compatible with nitrile seals.
- Examine all electrical connections.

Brushes

Inspect the motor brushes every 500 hours, or annually, for wear. Replacement motor brushes are available from your dealer. State the serial number of your unit when ordering.

Be sure to clean out all loose carbon before fitting new brushes.
If fluid has entered the motor, degrease the brush gear and commutator before running the unit, otherwise arcing will reduce brush life.

Motor

To remove the motor first turn the reservoir tap ’OFF’ to minimise oil loss. Undo and remove the two M8 bolts and washers and withdraw the motor. Be prepared to catch the small amount of oil that will drip from the seal housing when the motor is removed.

When refitting ensure that the coupling is in place and aligned with the motor drive tang.

Turn the reservoir tap back to ‘ON’ before operating.

Seals

Should service replacement seals be required, a kit is available from your nearest dealer under the following part code: HS40+sk.
State the serial number of your unit when ordering.

TECHNICAL DATA

Cylinder

Volume	293cc (Nominal)
Stroke	254mm
Adjustment	± 5mm (Refer page 17)

Performance

Maximum thrust (intermittent)	675 kg
Hard over time nominal HS40*plus* 10	13 sec
Hard over time nominal HS40*plus* 20	9 sec
Temperature rating minimum	-20ºc
Temperature rating maximum	+65ºc
Relief valve setting	62 bar
Back-drive at 12 sec Hard-over	7kg

Electrical

Motor voltage nominal	12 or 24v DC
Motor power	100 watt
Max current 12v 25% duty	22.5 A
Max current 24v 25% duty	11.2 A
Rotation	Reversing
Protection	IP44
Connection	1m Flying Lead 2 Core 2.5mm²
Ignition protection	BS EN 28846:1993
Clutch Coil power continuous	12 watt
Connection	DIN 43650
Orientation	Red lead Positive Cylinder Retracts

Oil

Recommended	Q8 Dynobear 10
Equivalent	Mineral based hydraulic Min. ISO VG10 Max. ISO VG40

TECHNICAL DATA

Ports

Pump	G1/4(BSP) parallel BS2779’73
Cylinder	G1/4(BSP) parallel BS2779’73

Hoses

Threads	5/8-18 SAE female swivel
Material	Brass
Type	Marine Steering Hose 1000 PSI Working Pressure 5/16” I/D
Length	1m

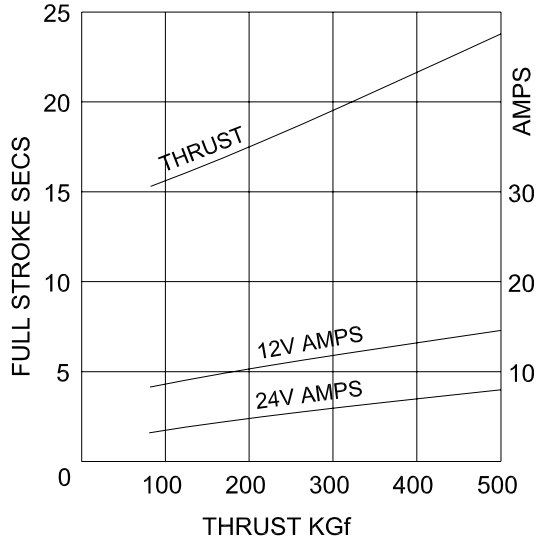
Materials

Body	Aluminium BS 1490
Cylinder rod	Chrome Plated Stainless Steel
Seals	Nitrile & PTFE
Body Protection	SP270

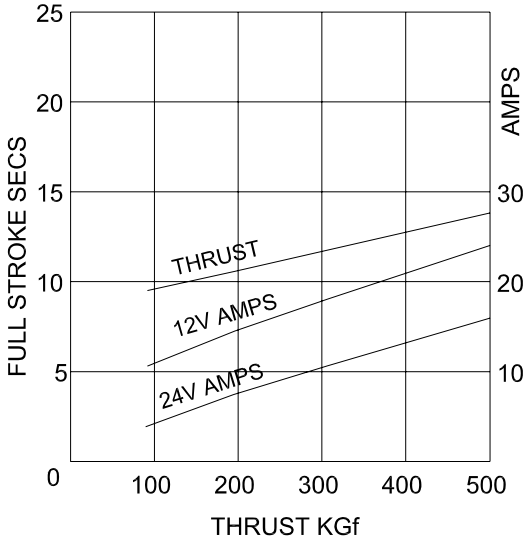
System Weight 11 kg Gross

TYPICAL PERFORMANCE

HS40*PLUS* 10 @25°c



HS40*PLUS* 20 @25°c



RESERVOIR PREPARATION

IMPORTANT!

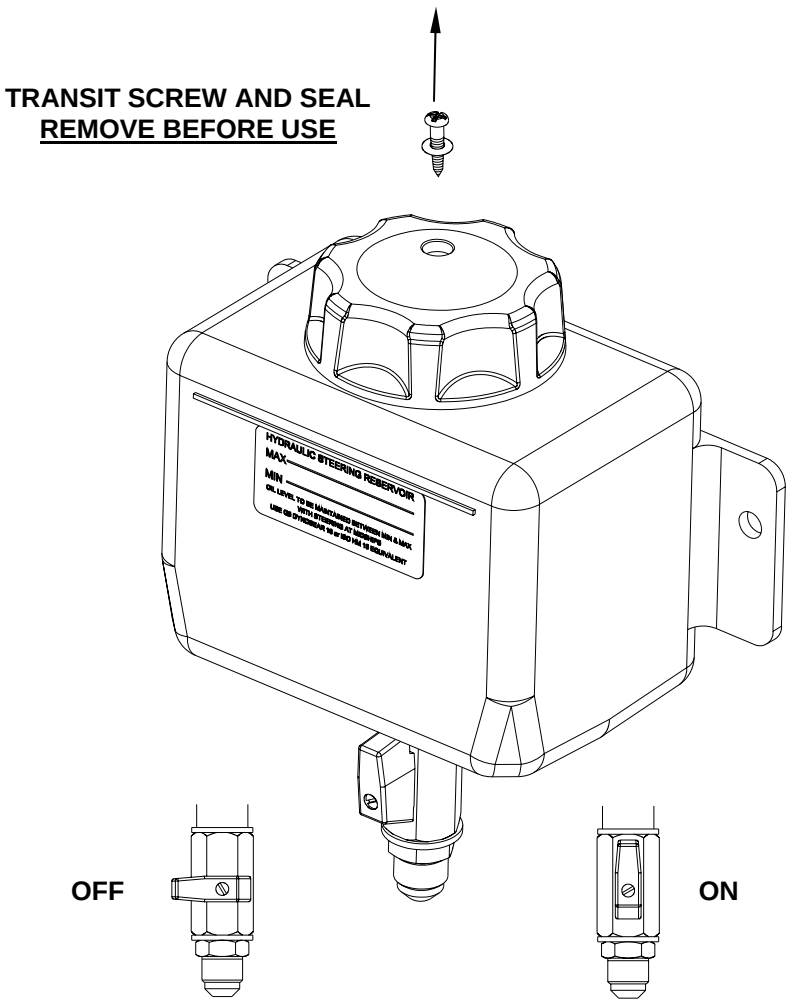
The reservoir is fitted with a special cap with a breather hole that is sealed for transit and must be opened before operation.

Do not attempt to move the cylinder rod before completing the following steps;

1) Mount the reservoir on a bulkhead as far above the pump and cylinder as possible using both the mounting holes provided.

2) Remove the transit screw and seal from the cap to open the breather. Retain for future use.

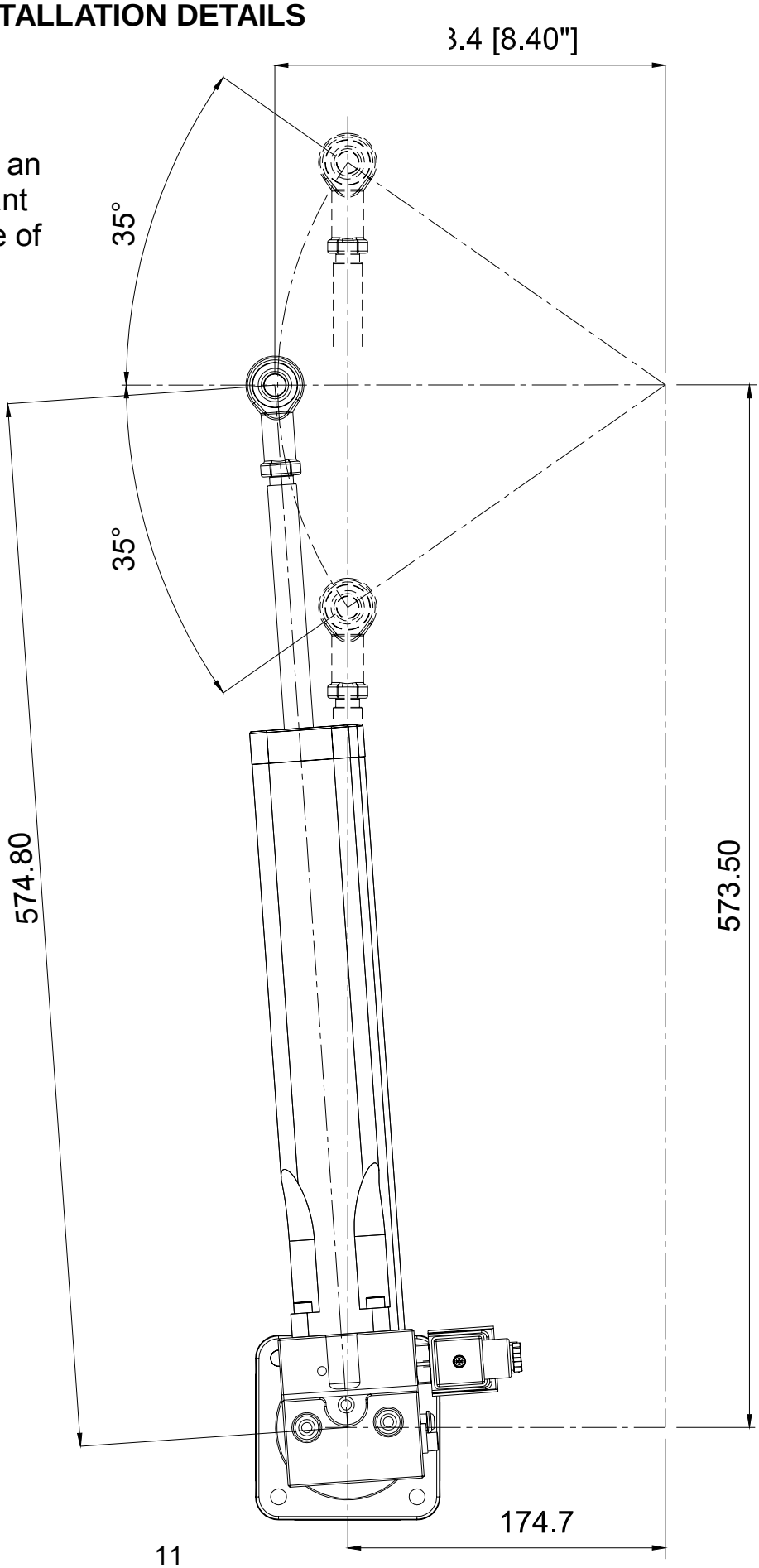
3) Turn the tap to the ‘ON’ position.



INSTALLATION DETAILS

QUADRANT

Typical installation for an 8.4” (214mm) quadrant with total rudder angle of 70deg.



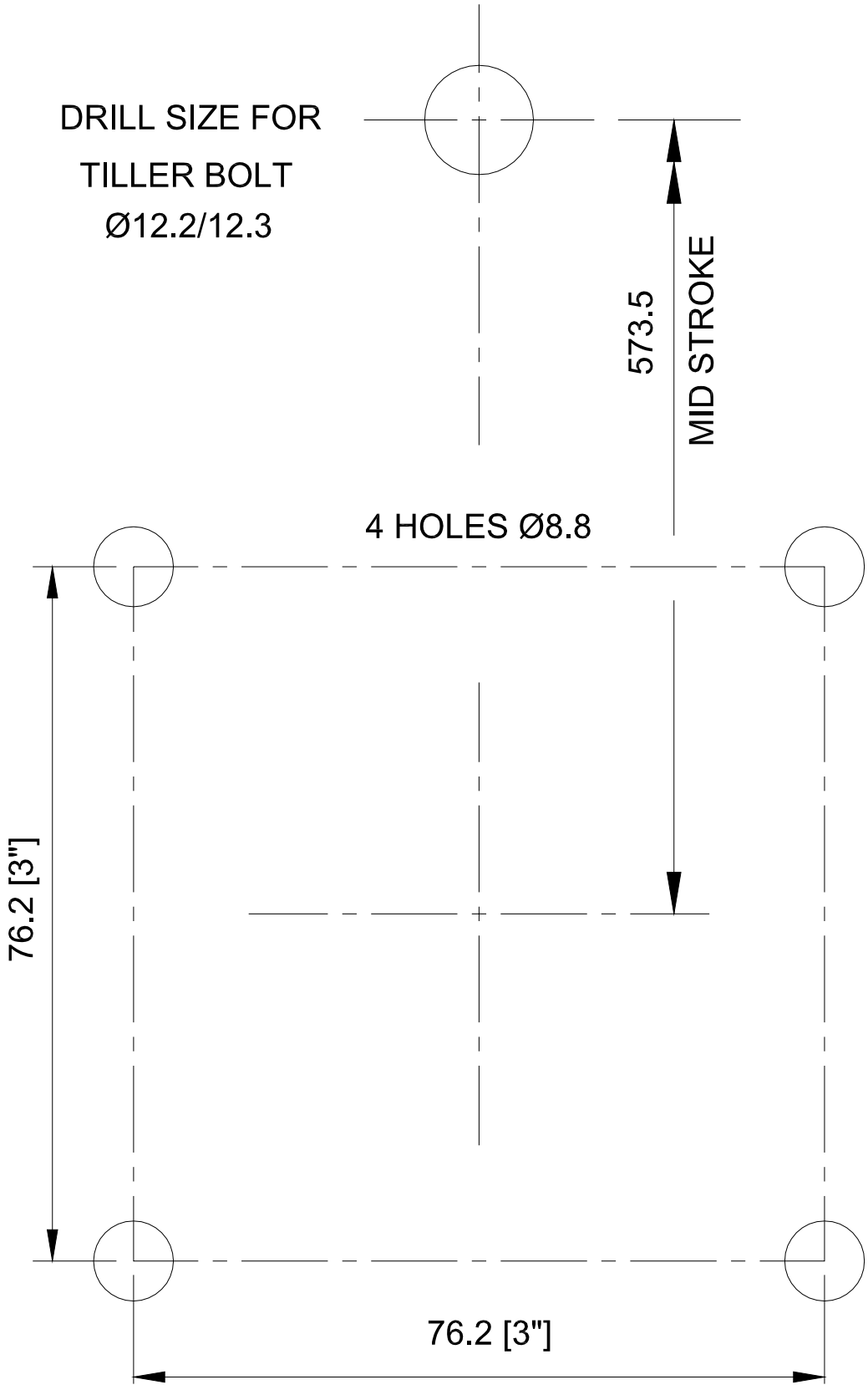
CONSIDERATIONS

Ensure that cylinder rod movement is limited by the Steering end-stops and not by the actuator.

Check that no part of the actuator fouls the structure of the vessel or quadrant throughout its full range if movement.

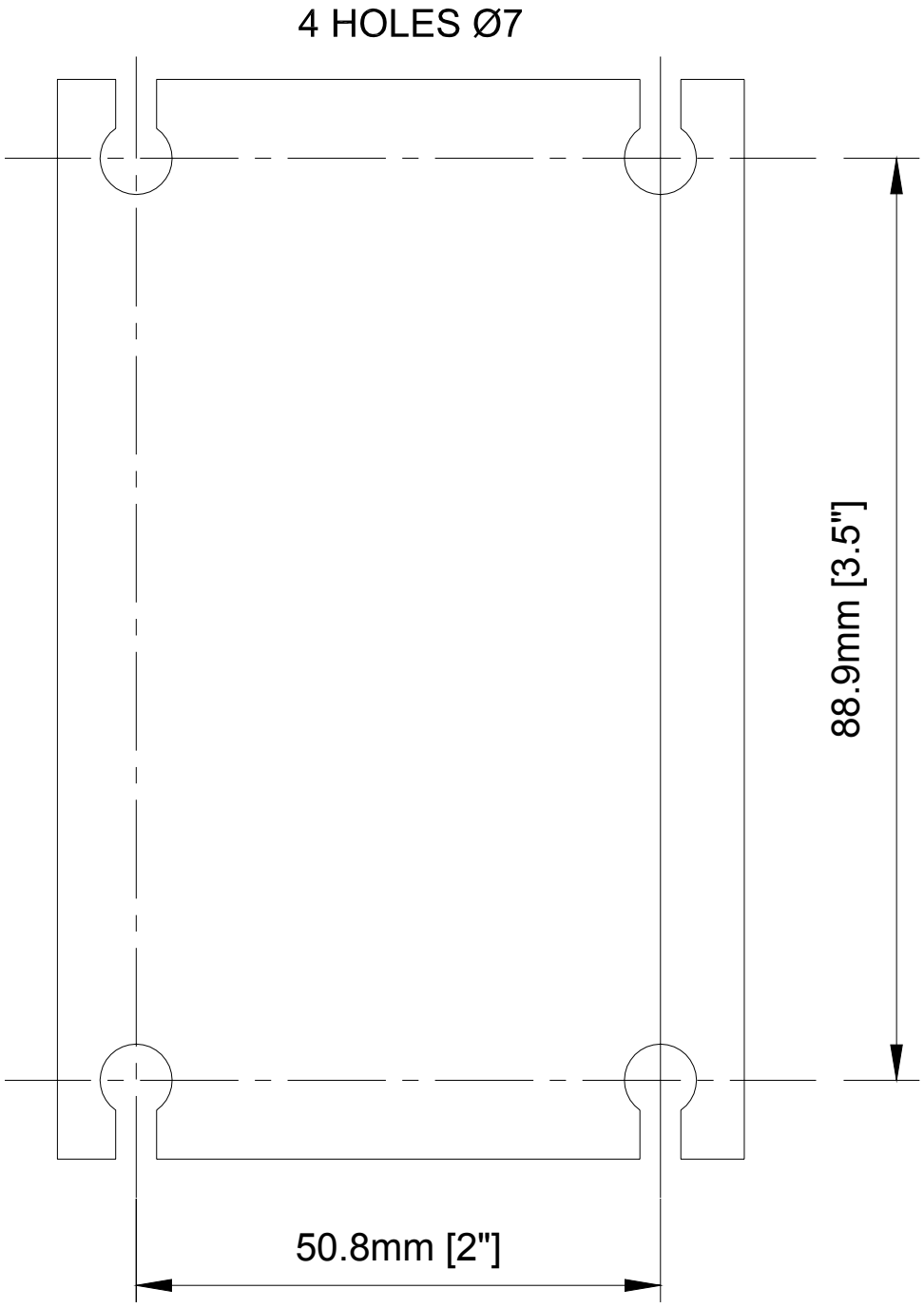
Allow sufficient clearance for removal of the mounting pin (Ref. page 6).

DIMENSIONS FOR CYLINDER MOUNTING FOOT
(NOT TO SCALE)

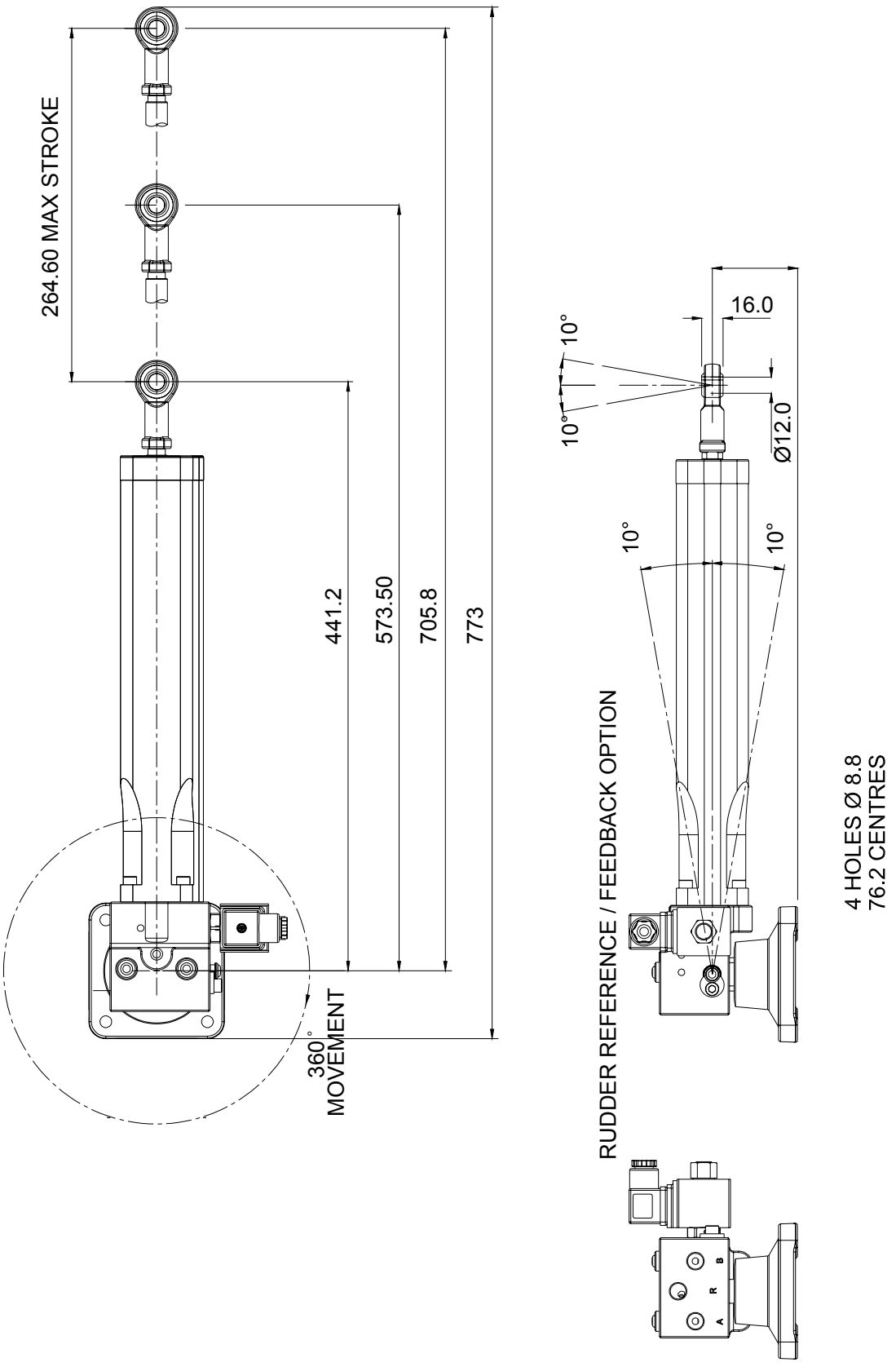


DIMENSIONS FOR PUMP MOUNTING FOOT
(NOT TO SCALE

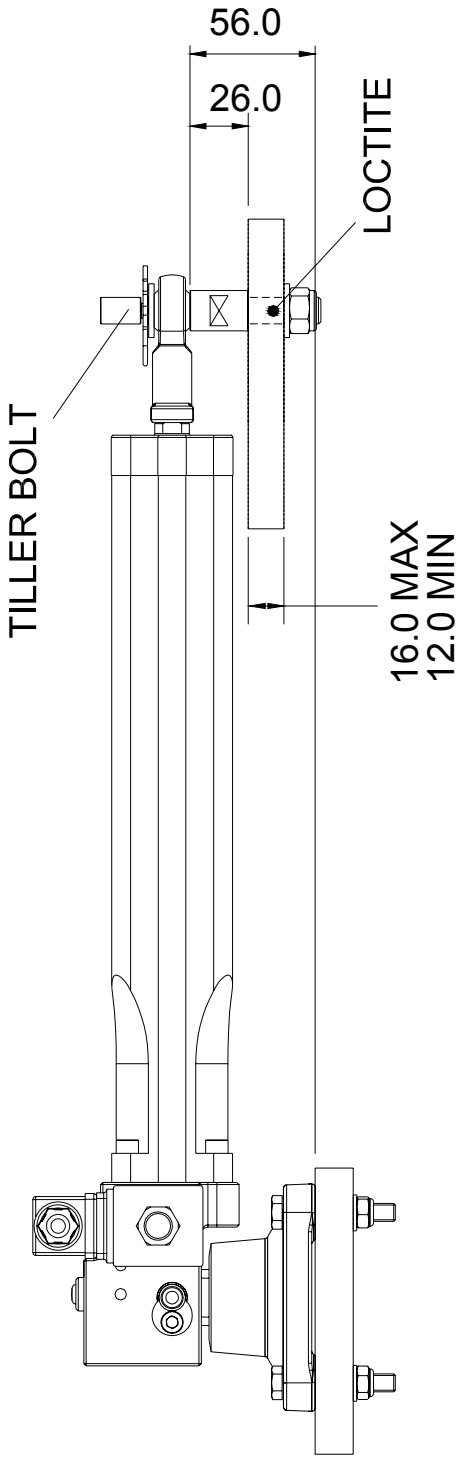
NOTE ORIENTATION OF FOOT TO PUMP
(REFER PAGE 16)



CYLINDER DIMENSIONS



TILLER BOLT



The tiller bolt supplied is suitable for a quadrant thickness of 12 to 16mm.

The tiller bolt mounting hole should be drilled Ø12.2 to 12.3mm.

An application of Loctite 638 or equivalent where shown is recommended.

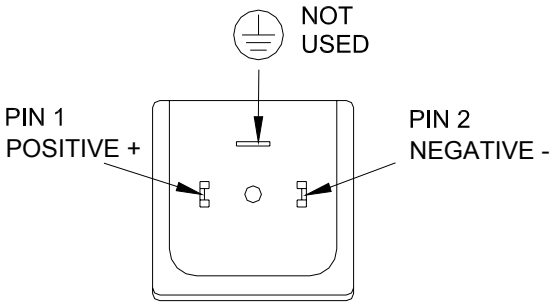
Tighten the M12 nut to 27Nm

MOUNTING FOOT

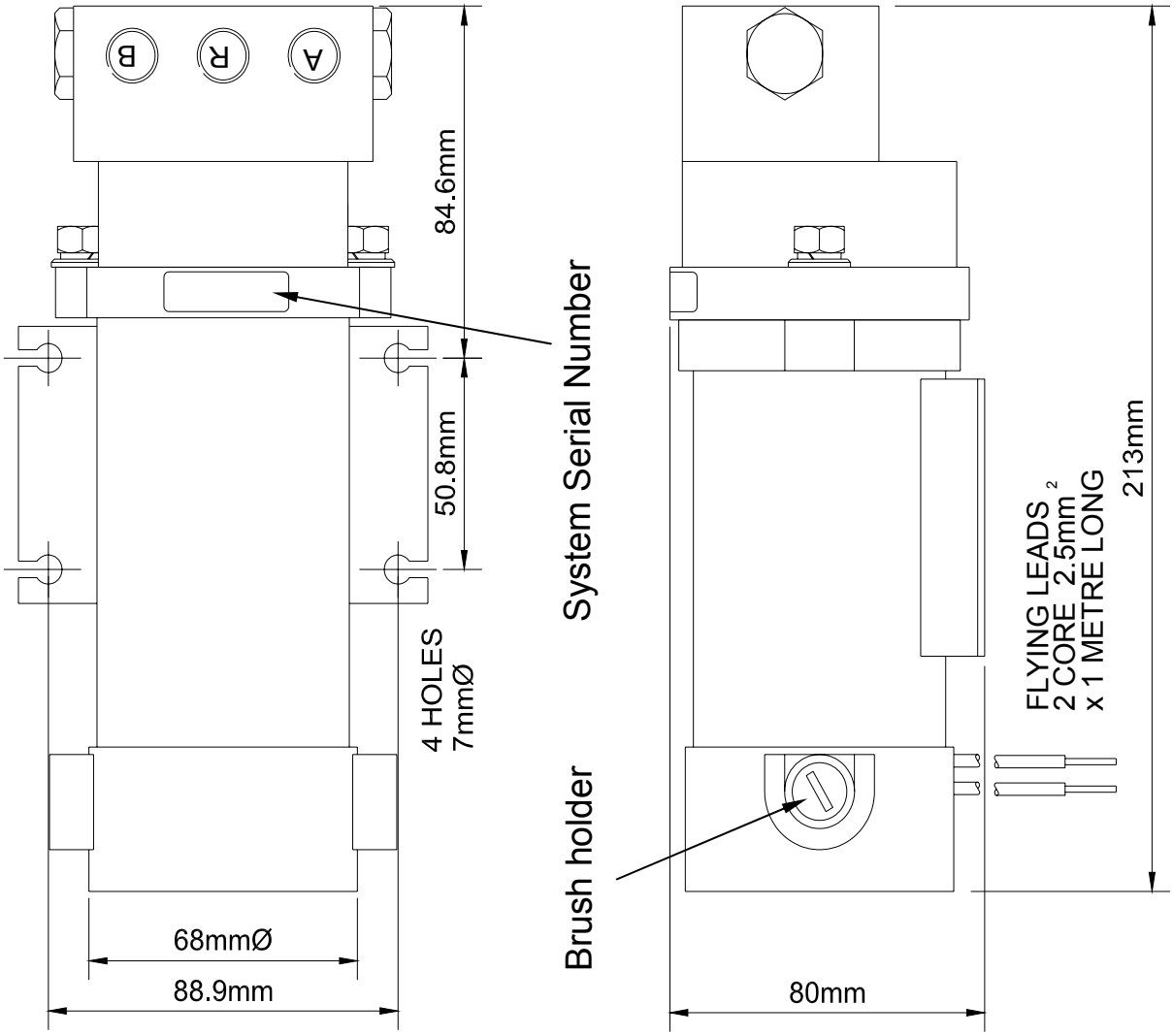
The four M8 nuts, bolts and washers supplied are suitable for mounting the actuator onto a surface of between 12mm and 24mm thick

Tighten the four M8 nuts to 17Nm

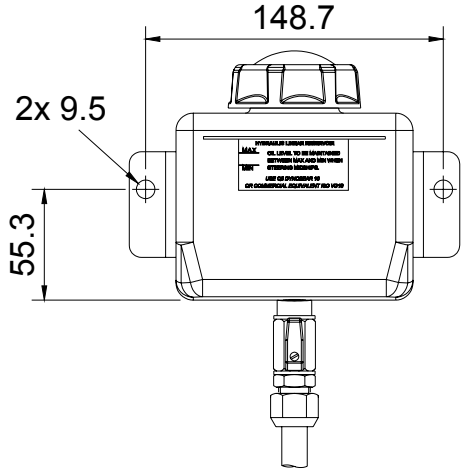
COIL CONNECTIONS



PUMP INSTALLATION



RESERVOIR INSTALLATION



BLEEDING THE SYSTEM

The system was filled and tested before despatch.
Only use this procedure if air has entered the system or if it has been dismantled.

KEEP CLEAR OF MOVING STEERING COMPONENTS AND LINKAGES AT ALL TIMES

Before commencing ensure the oil and any storage containers are clean and free of contamination.
Dispose of any waste oil responsibly.

1) Make sure the reservoir tap is set to ‘ON’ (ref. page 10).

2) Push the cylinder rod in so that it is fully retracted.

3) Fill the reservoir then slacken, but do not disconnect the reservoir hoses from the cylinder. Re-tighten once the oil emerges from the fittings. Ref page 8 for recommended oil.

4) Run the pump in order to direct flow to the cylinder ports.

5) Energise the cylinder solenoid and slowly pull the cylinder rod out until it is fully extended. Observe the oil level in the reservoir and top up if necessary - Note that the oil level will rise when the rod is retracted and may overflow. Fully retract the rod, again observing the oil level in the reservoir and topping up as needed. Repeat until no more air can be seen to be rising into the reservoir and the pump takes over. De-energise the solenoid.

6) To complete the bleeding, energise the cylinder solenoid again and run the pump in both directions to extend and retract the cylinder rod. Note that the cylinder may need manually assisting at first to purge any remaining air in the system.

7) Top up the reservoir if necessary to the level indicated.

FAULT FINDING

Under no circumstances dismantle the unit unless it is certain that the fault is internal. Doing so will allow air into the cylinder, requiring the unit to be bled.

Caution: Any damage to the cylinder rod will damage the seals and allow air into the cylinder / oil leaks.

1) Motor does not run

: check electrical connections.
: check autopilot output.
: check motor brushes.

2) Motor runs, but erratic or no cylinder rod movement

: check for clutch operation.
: check for air in the cylinder -obviated by external oil loss.
: check drive coupling (see page 7).

3) Excessive noise from the pump

: check the motor for damage.
: check for air in the cylinder -obviated by external oil loss.
: check drive coupling (see page 7).

GENERAL INFORMATION

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

Model Number: _____

Serial Number: _____

Date of Purchase: _____

Dealer: _____

_____

_____

_____

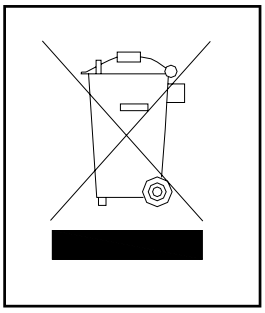
_____

_____

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 on the back cover.



ABOUT HYDRAULIC PROJECTS

Hydraulic Projects Ltd. was established in 1967 and designs and manufactures from its home in the South West of the United Kingdom. We offer a complete range of hydraulic marine steering components and hydraulic valves and ancillaries for the agricultural and mobile industries. Our in-house expertise and dedicated design team allow us to offer a unique service to our customers.

ISO 9001 CERTIFICATION

With ISO9001 certification for design and production and our reputation for technical support, you will find that Hy-Pro offers an ideal solution for all your hydraulic control requirements.

Certificate No. 11935

WEBSITE

Please visit our website **- www.hypro.co.uk** for details of the entire range.

CONTACT DETAILS

Address : Hydraulic Projects Limited
Dawlish Business Park
Dawlish
Devon
EX7 0NH
United Kingdom

Telephone: +44 (0)1626 863634

Fax : +44 (0)1626 866283

Email : enquiries@hypro.co.uk

Web : www.hypro.co.uk