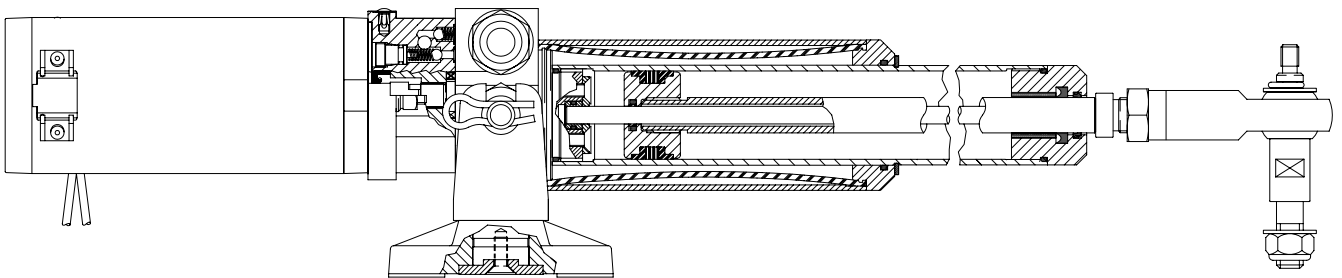


# Hydraulic Projects Ltd.

Engineering Quality and Manufacturing Excellence

## Owners Manual

Serial Number



### 'ML40' Marine Linear Actuator Installation and Service Instructions

ML/1

## CONTENTS

Page	
3	<u>Important Information</u>
4 - 5	<u>Installation and Service Guide</u> Description - Pump Size - Location Hydraulic Connections Hydraulic Fluid Commissioning - Trouble Shooting Service - Brushes
6	<u>Technical Data</u>
7	<u>Installation Details</u>
8	<u>Installation Options</u>

## 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 autopilots within the limitations stated in the following pages.
- Autopilot 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. Incorrect installation could affect conformance and result in interference with electronic systems. DO NOT FLASH TEST.
- Most of the motors we supply comply with ISO 8846 'Small Craft - Electrical Devices - Protection Against Ignition Of Surrounding Flammable Gases'. Non-compliant units should not be sited in confined areas where there are flammable gases. Check the Technical Data pages before installation.
- Beware of the hot motor and solenoid components and the risk of entrapment from moving parts.
- This equipment is fitted with relief valves and, when the unit is over-stressed, the cylinder will move causing involuntary movement of the steering gear.

## MANUAL CONTENTS

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.

# Hydraulic Projects Ltd.

Engineering Quality and Manufacturing Excellence

## DESCRIPTION

'ML' Linear actuators combine a hydraulic cylinder, pump, motor, clutch and reservoir in one compact unit. A solenoid clutch is engaged to extend or retract the rod. The cylinder and its mounting are protected by integral relief valves.

## PUMP AND CYLINDER SIZE

Nominal pump flow and cylinder size are indicated on the rating plate. Check the voltage shown is correct for the output of your autopilot.

## LOCATION

For marine applications these actuators 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.

## COMMISSIONING

The actuators are pre-filled and ready to use, no preparation is required prior to commissioning.

**CAUTION!** Be aware of the danger of moving linkages and the risk of entrapment during set-up.

## TROUBLE SHOOTING

Under no circumstances remove the motor or other components from 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 for which special tools are needed. See 'Servicing'.

Caution: Any damage to the piston rod will damage its seals and allow air into the cylinder.

### 1) Motor does not run

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

### 2) Motor runs, but erratic or no piston movement

- : check for solenoid operation
- : check for air in the cylinder - obviated by external oil loss.

### 3) Excessive noise from the pump

- : check the motor for motor damage.
- : check for air in the cylinder - obviated by external oil loss.

# Hydraulic Projects Ltd.

Engineering Quality and Manufacturing Excellence

## SERVICE

This linear actuator is a product of innovation and top quality precision engineering and will give many years of trouble free service. Should service replacement seals be required, a kit is available from your nearest dealer under the following part code;

'ML40-SK' (Covers all types of ML40 linear actuator).

Special tooling is required to bleed the actuator. This is available under the following part code:

'R3681' (Includes full instructions).

## BRUSHES

Inspect the motor brushes every 500 hours, or annually, for wear.

Replacement motor brushes are available from your dealer. Be sure to clean out all loose carbon before fitting new brushes. If fluid has entered the motor, degrease the commutator otherwise arcing will reduce brush life.

Caution: Removal of the motor will allow air to enter the cylinder. This will require the unit to be bled for which special tools are required. See 'SERVICE'.

# Hydraulic Projects Ltd.

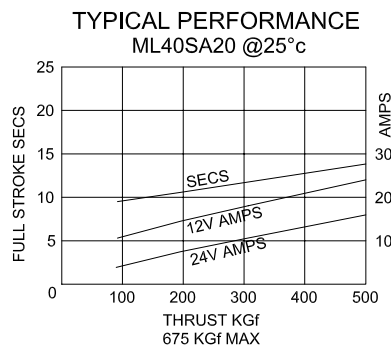
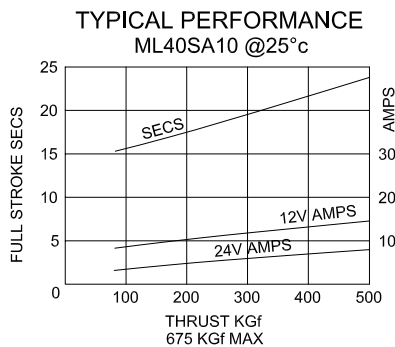
Engineering Quality and Manufacturing Excellence

## TECHNICAL DATA ML40SA10 - ML40SA20

AMBIENT TEMPERATURE:	-20°C TO +55°C	
SUPPLY VOLTAGE:	ML40SA1012 - 12 VOLT ML40SA1024 - 24 VOLT ML40SA2012 - 12 VOLT ML40SA2024 - 24 VOLT	
MOTOR ENCLOSURE:	IP44 TOTALLY ENCLOSED FOR UNDER DECK INSTALLATION	
BRUSHES:	EXTERNAL, REPLACEABLE	
RELIEF VALVES:	INTERNAL, PRE-SET TO 62 BAR	
UNLOADER VALVE:	12 WATTS	
MOTOR RATING 12V :	25% DUTY CYCLE	22.5 AMPS
100W	50% DUTY CYCLE	17.5 AMPS
	100% DUTY CYCLE	12.5 AMPS
MOTOR RATING 24V :	25% DUTY CYCLE	11.5 AMPS
100W	50% DUTY CYCLE	8.5 AMPS
	100% DUTY CYCLE	6.5 AMPS
ORIENTATION:	RED LEAD POSITIVE- ROD EXTENDS	
PAINT FINISH:	BLACK 'MIOGARD'	
SERVICING:	SEAL KIT PART NO. ML40SK BLEEDING KIT REQUIRED - PART NO. R3681	
EMC PROTECTION:	BS EN 60945:2002 (DC)	
IGNITION PROTECTION:	BS EN 28846:1993	
WEIGHT:	8.0 KG	

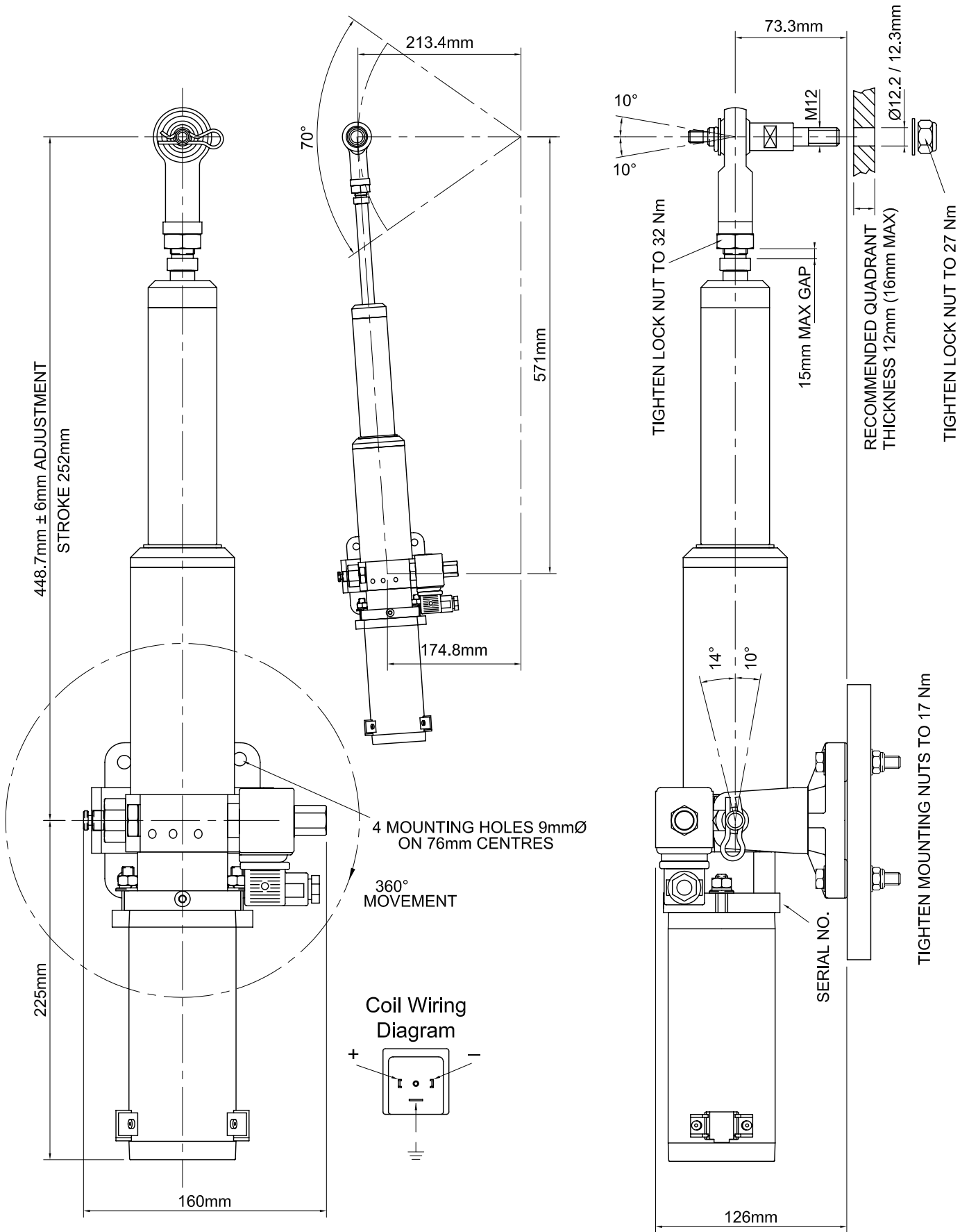
PART NOS.	ML40SA10 12 ML40SA10 24
-----------	----------------------------

PART NOS.	ML40SA20 12 ML40SA20 24
-----------	----------------------------



# Hydraulic Projects Ltd.

Engineering Quality and Manufacturing Excellence



# Hydraulic Projects Ltd.

Engineering Quality and Manufacturing Excellence

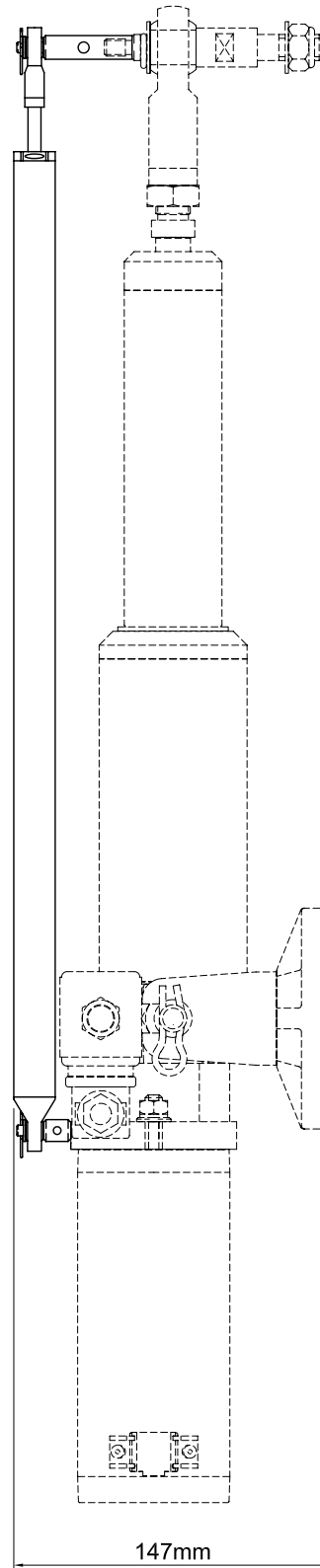
## TECHNICAL DATA ML40-F

### FEEDBACK TRANSDUCER

MECHANICAL STROKE:	329mm
ELECTRICAL STROKE:	325mm
TOTAL RESISTANCE:	1000 OHMS/INCH
INDEPENDANT LINEARITY:	$\pm 0.15\%$
POWER RATING:	6.5 WATTS TOTAL
ENCLOSURE:	IP66
CONNECTIONS:	RED = VOLTAGE IN YELLOW = VOLTAGE OUT BLACK = GROUND

### WARNING

- 1) DO NOT TEST USING AN OHMMETER ON Rx1 SCALE OR OTHER CURRENT DEVICES
- 2) ZERO SIDE LOAD RECOMENDED TO ACHIEVE MAXIMUM LIFE





Hydraulic Projects Ltd  
Dawlish Business Park  
Dawlish  
Devon  
EX7 0NH  
U.K

Tel. +44 (0) 1626 863634  
Fax. +44 (0) 1626 866283  
Email: [enquiries@hypro.co.uk](mailto:enquiries@hypro.co.uk)  
Website: [www.hypro.co.uk](http://www.hypro.co.uk)