Hy-ProDrive
Marine Steering Technology

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Marine Autopilot Hydraulic Steering Components

Hydraulics Engineering Quality and Manufacturing Excellence

Who are we?

Since 1967 Hydraulic Projects has been designing and manufacturing hydraulic marine autopilot steering equipment and hydraulic control valves from our UK base. With our own in-house design team using the latest 3d software and CNC machines, we control the complete process from initial concept through manufacture, assembly and test. We guarantee the product is manufactured to the very highest quality and delivered on time.

What do we do?

We manufacture range of marine autopilot hydraulic steering equipment. Additionally, we produce a large range of hydraulic directional control valves supplemented by ancillary valves such as pilot check, service line relief's etc. We can also tailor our designs to suit your requirements.

Who are our customers?

Our marine equipment is used by the worlds leading autopilot manufacturers. You will find our valves on a vast range of equipment from recovery vehicles to refuse wagons, industrial jigs and fixtures, agricultural machinery, construction and plant equipment, boat winches and many other applications.

Now what do you do?

Just look through this catalogue or browse our web site – www.hypro.co.uk –for your Motion control requirements. Or call us to discuss your needs and we will be happy to help you choose the right product for your application.

So how can we help you?

Our contact details are shown on the back cover of this catalogue and our dedicated sales team are waiting to take your call.

Ordering

We are happy to accept orders by phone, fax email or post. Please use the catalogue order codes where possible. If you can't see what you want in the catalogue please contact us as our range goes beyond what is printed here. Please check and confirm availability of items before ordering.

Shipping

We use a national carrier for most orders or 1st class post for smaller items where appropriate. Alternatively you may arrange your own collection but there will be a small packing charge.

Payment

Payment can be made by credit/debit card, cheque or bank transfer. New accounts are strictly on a profoma basis. Credit accounts are available on application and subject to the usual credit checks.

Important information

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A copy of our full terms and conditions is available on request or alternatively can be viewed or downloaded from our website.

Contents

PR+ REVERSING ELECTRO-HYDRAULIC POWER UNIT

Backed with over 30 years of continuous development the new PR+ range of reversing pumps presents the ultimate in quiet and smooth operation. Unlike noisy piston pump designs the precision gear form delivers smooth flow in all conditions and with minimal noise. Now with IP67 motors that have a 4000 hour brush life these latest generation of Hy-ProDrive power units are the best available.

Description

A permanent magnet DC motor driven precision gear pump available with a range of flows from 0.6 to 2.5 L/min. Each pump is fitted with zero-leakage pilot check valves for positive locking of steering cylinders.

The two service ports and reservoir port are positioned at the front of the pump. The threads are G1/4 (BSP) parallel. There is an optional second reservoir port on the top face accessed via a removable plug. If top mounted ports are preferred a kit is available to provide this option.

Relief valves to limit the maximum pressure generated are available as a further option.

The motors are maintenance free with internal brushes giving typically a 4000+ hour life. The front and rear bearings are sealed ball races for smooth and quiet operation. They have an Ingress Protection rating of IP67. They have a nominal output of 100W with a 50W option on the 12V PR+10 pumps.

The pumps are sealed on the driven gear journal allowing the motor to be removed without air entering or oil loss from the hydraulic circuit.

Application

Designed specifically for the marine autopilot market they are used by the worlds leading autopilot manufacturers. They can be used with balanced or unbalanced cylinders and are suitable for use in pressurized reservoir systems.

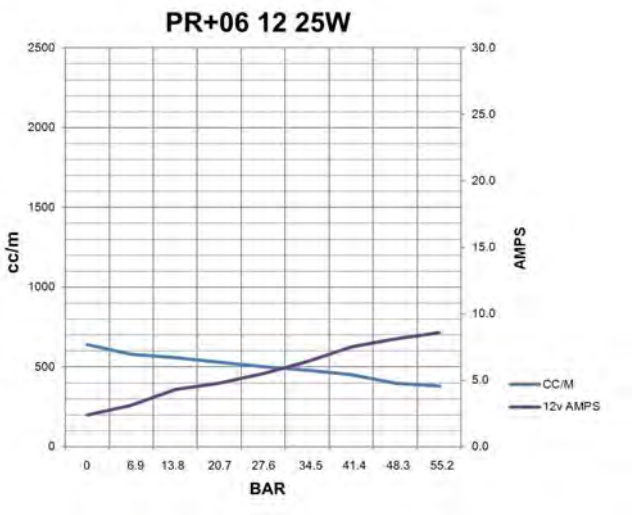
See page 9 for a selection guide for matching the drives to hydraulic steering cylinders.

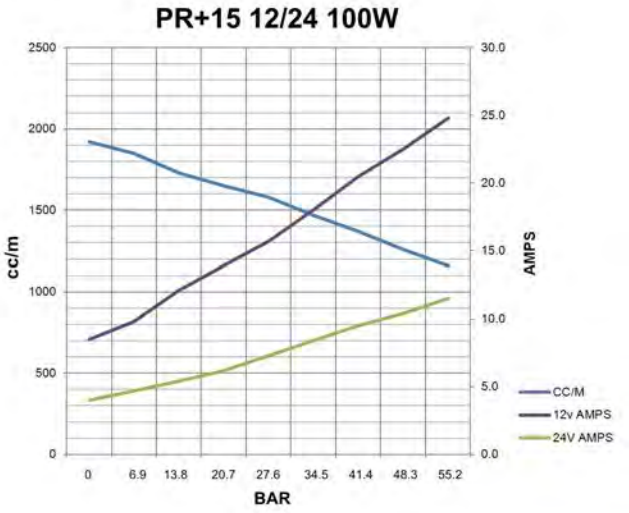
Features

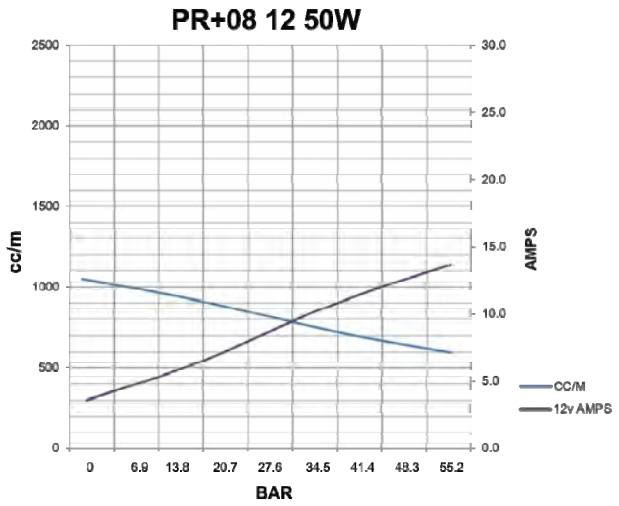
Quiet and smooth operation
Low power consumption.
Zero back drive check valves.
6 flow options
100W motors
50W motor on PR+08
12 and 24V DC motor options.
Relief Valve option.
Port position options.
Compact.
Easy installation.
G1/4 (BSP) parallel ports
NPTF and M10 adapter kits available
Service kits available.
Cylinders and hose kits supplied to suit.
Fully compliant to the Recreational Craft Directive
Supplied with EU Declaration of Conformity

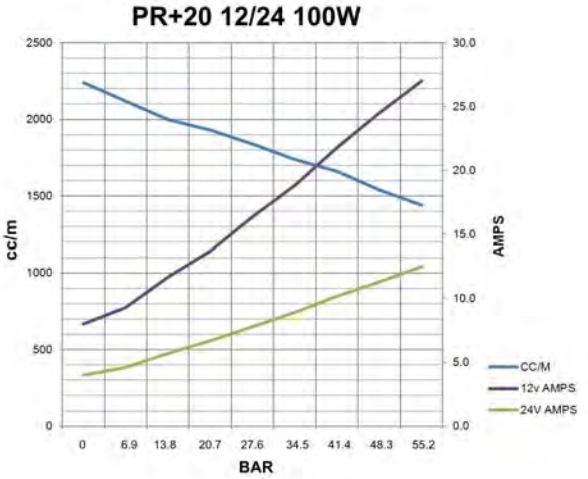
Performance Graphs

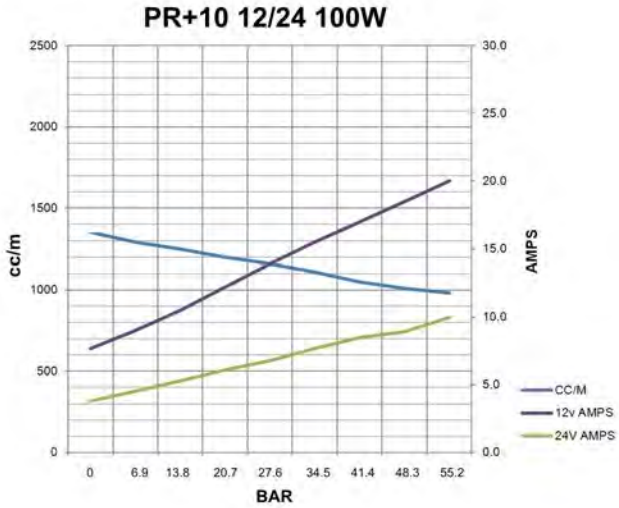
Typical performance
ATF (40 cSt @40ºC) @ 25ºC

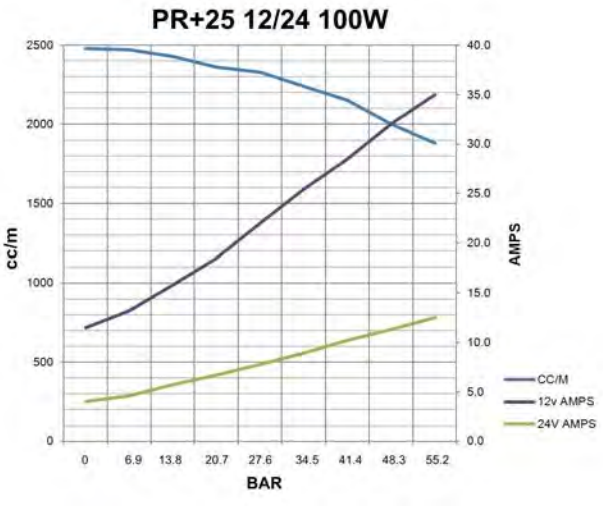








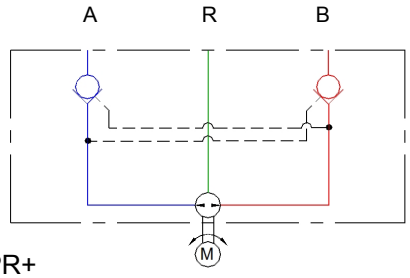




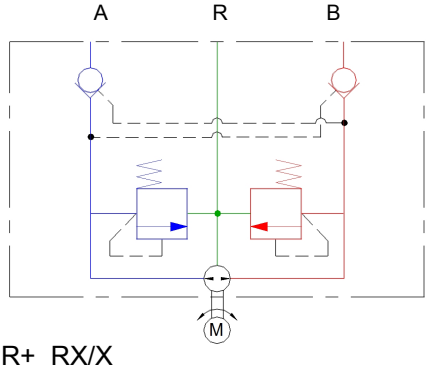
Technical data

Voltage	12 / 24 VDC			
Current	Typical amp-hour 5 bar at 25% duty 12V 24V		Typical current Intermittent 55 bar max 12V 24V	
PR+06 25W	0.9A	-	9.0A	-
PR+08 50W	1.3A	-	14.0A	-
PR+10 100W	2.2A	1.0A	19.0A	9.0A
PR+15 100W	2.4A	1.2A	24.0A	11.0A
PR+20 100W	2.5A	1.3A	25.0A	12.0A
PR+25 100W	2.7A	1.4A	34.0A	15.5A
Ingress protection	IP67			
EMC protection	BS EN 60945:2002			
Ignition protection	BS EN 28846:1993			
Ambient operating temperature	-15 to +55 deg C			
Max pressure reservoir line	55 bar (intermittent operation) 2 bar max			
Ports	G1/4 (BSPP) Parallel A = cylinder port B = cylinder port R = reservoir port			
Orientation	Red lead to positive - pressure to A port Black lead to positive - pressure to B port			
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			
Weight	3.0 kg			
Port adaptor torque	27Nm (20 lb/ft)			

Circuit Diagrams

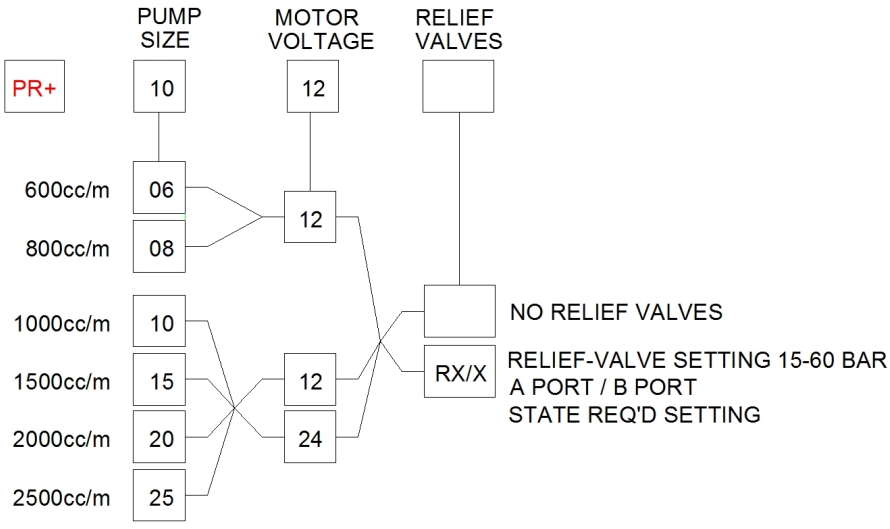


PR+

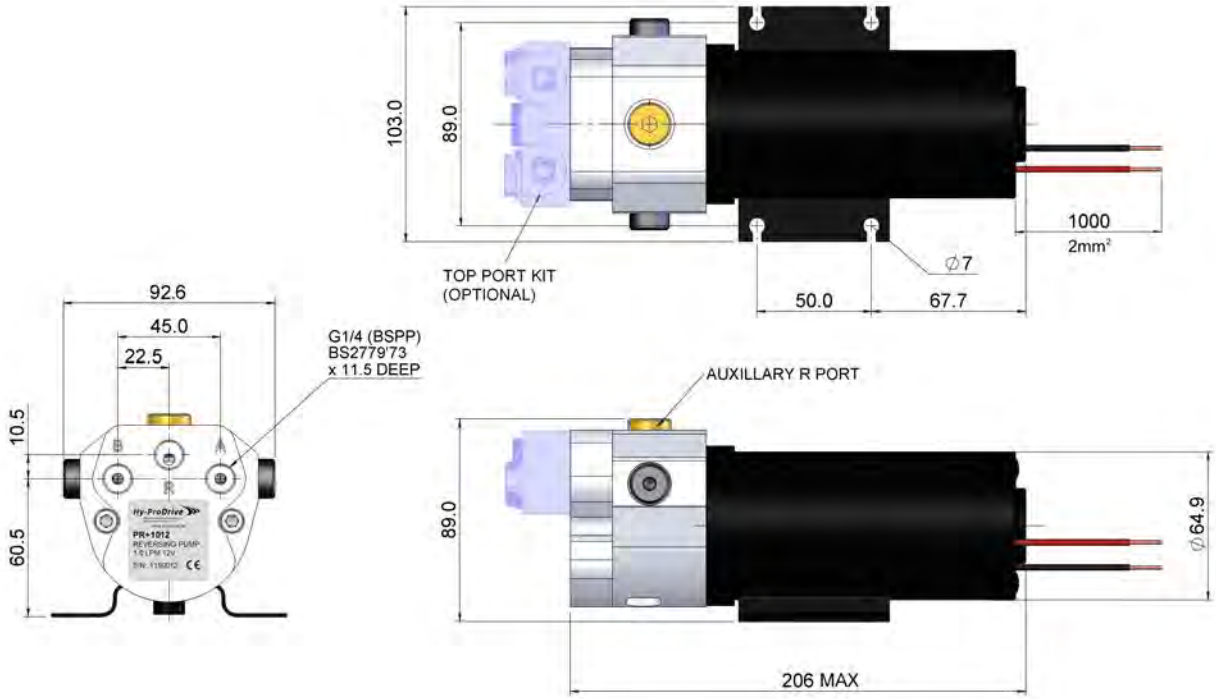


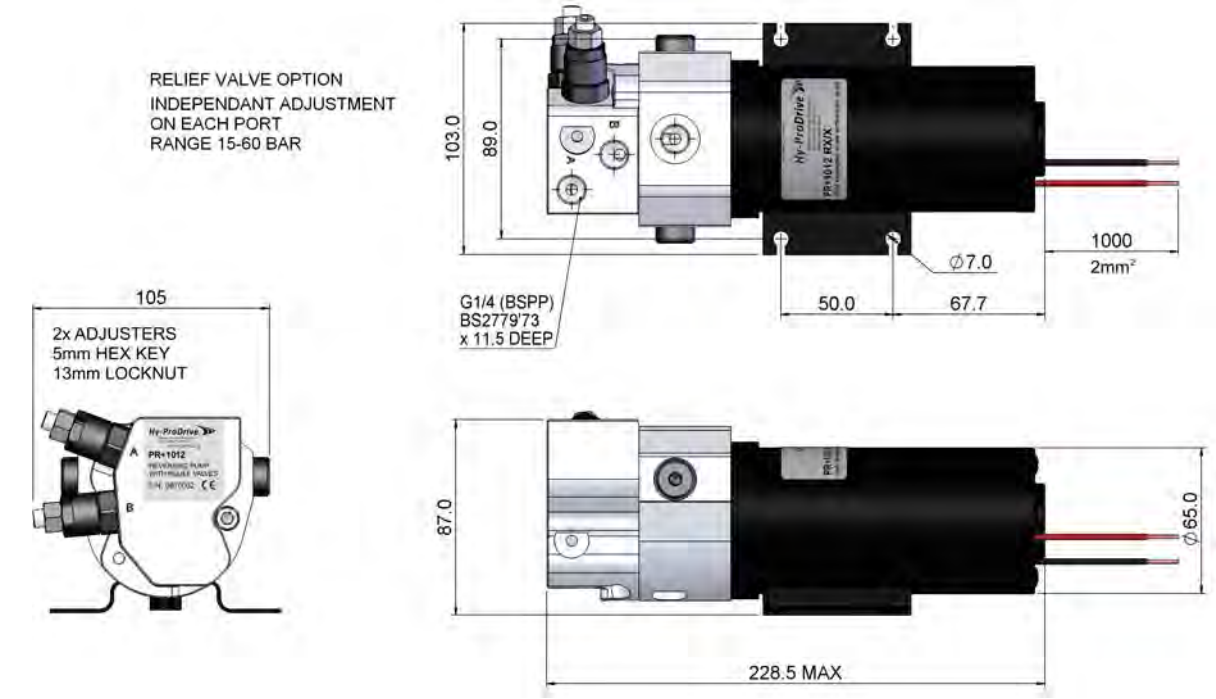
PR+ RX/X

Order Code



Installation
Dimensions

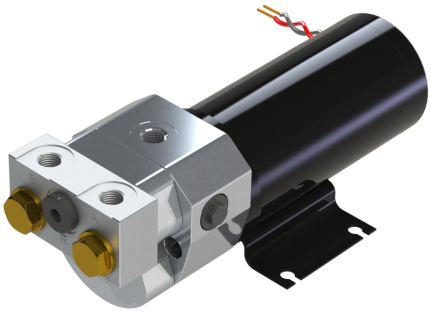




Spares and Accessories

PR+ Top Port Adaptor Kit

Where space is limited or when replacing an existing top ported pump an easy-fit adaptor kit is available for the Hy-ProDrive PR+ pump range.
The kit fits all sizes of PR+ reversing pump.



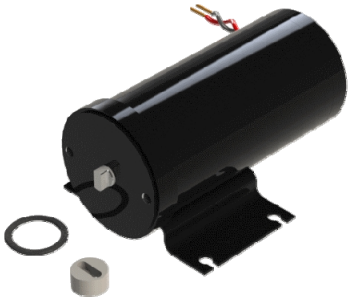
Order Code

R4516

Replacement Motor Kits

The motors fitted to the PR+, ML+40 and HS+ systems are rated to IP67 and sealed for life*.
When the time comes for replacement the complete motor is changed. They can be replaced in-situ with no loss of oil or allowing air into the system.
The kits come complete with spare face seal, coupling and bolts.

* 4000+ hours in average use.



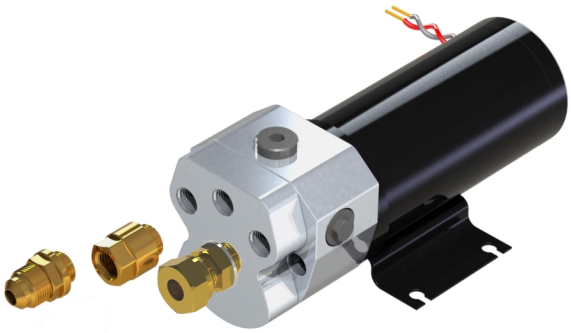
Order Code

R4510-sk 12 100	PR+10 12 PR+15 12 PR+20 12 PR+25 12	HS+40 10 12 HS+40 20 12 HS+50 25 12
R4510-sk 24 100	PR+10 24 PR+15 24 PR+20 24 PR+25 24	HS+40 10 24 HS+40 20 24 HS+50 25 24
R4510-sk 12 25	PR+06 12	
R4510-sk 12 50	PR+08 12	

R4510-sk 12 100 X	ML+40 10 12 ML+40 20 12
R4510-sk 24 100 X	ML+40 10 24 ML+40 20 24
R4510-sk 12 50 X	ML+40 15 12 50 200

PR+ Port Thread Adaptor Kits

Special adaptors are available in sets of 3 Including all necessary seals to convert from the standard G1/4 port to 5/8 SAE , 1/2” NPTF or 3/8 Hose. Other sizes can be made on request.



Order Code

R2377-58	G1/4 MALE TO 5/8 SAE MALE (45° FLARE)
R2377-N	G1/4 MALE TO 1/4 NPTF FEMALE
R2377-38	G1/4 MALE TO 3/8 HOSE FEMALE (WITH OLIVE)

Drive Selection

It is important to select the correct size pump as it directly influences the ability of the autopilot to steer the vessel.

An autopilot drive will need to give a compatible Hard Over to Hard Over time to suit the vessel type (Or as specified by the autopilot manufacturer).

The HO to HO may be faster on lightweight planing craft / yachts and slower on displacement power boats / long keel or heavy yachts.

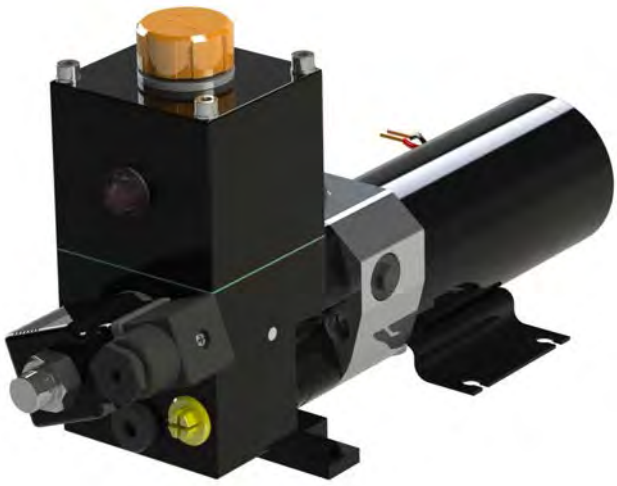
Note if the pump is too large, the vessel may over steer and will use more power, too small and the autopilot may struggle to maintain a course.

To use the table below you will need to know the volume of your steering cylinder. Select the HO to HO you require. Follow the column down until you approximately match your cylinder volume. Then select the pump on that row.
Note if your cylinder has a smaller volume, it will have a faster HO to HO. If it is larger, it will have a slower HO to HO.

“ HO to HO**”** Is the time that the pump takes to drive the rudder from full port to full starboard. “Dock side” (no flow over the rudder).

Cylinder Volume (cc)		**HO to HO (Seconds)**						
		6 to 8	**8 to 10**	**10 to 12**	**12 to 14**	**14 to 16**	**16 to 18**	**18 to 20**
75		PR+06						
100		PR+08	PR+06	PR+06				
125		PR+10	PR+08		PR+06			
150		PR+15	PR+10	PR+08		PR+06		
175		PR+15		PR+10	PR+08		PR+06	
200		PR+20	PR+15	PR+10	PR+10	PR+08		PR+06
225		PR+20	PR+15		PR+10		PR+08	
250		PR+20		PR+15		PR+10		PR+08
275		PR+25	PR+20	PR+15			PR+10	
300	MC40	PR+25	PR+20		PR+15		PR+10	
325		PR+25	PR+20		PR+15			PR+10
350			PR+25	PR+20		PR+15		
375			PR+25	PR+20		PR+15		
450				PR+25	PR+20			PR+15
475				PR+25		PR+20		PR+15
500	MC50				PR+25	PR+20		
525					PR+25	PR+20		
550					PR+25		PR+20	
575					PR+25		PR+20	
600						PR+25	PR+20	
625						PR+25		PR+20
650						PR+25		PR+20
675							PR+25	
700							PR+25	
725							PR+25	
750								PR+25

PR+ RU REVERSING ELECTRO-HYDRAULIC POWER UNIT WITH RESERVOIR AND SOLENOID UNLOADER



Description

The PR+RU incorporates the proven PR+ reversing pump and motor range but with an integral reservoir and solenoid unloader valve.

Complete with pilot check valves this compact unit can be used where the vessel has a mechanical primary steering and an autopilot stand-alone secondary hydraulic drive is required. With just two hose connections, uniquely the unit can be used with balanced or unbalanced cylinders*. The unloader solenoid coil is switched by the course computer clutch connection to engage and disengage the drive. By design the very low back drive loads preserve the feel of the helm when steering by hand. The reservoir allows for extreme heel angles without any fluid loss and the IP67 motor and solenoid ensure no water ingress problems.

In the event of primary mechanical steering failure the system can be used as emergency steering with the autopilot.

Manufactured from corrosion resistant marine grade materials the unit can be easily serviced and the motor changed with just two bolts and no fluid loss or air ingress into the system.

With the option of omitting the unloader valve the unit can be used in other hydraulic applications such as hatch, window and bathing platforms with the check valves locking the hydraulic cylinder in place.

*maximum differential volume 50 cc.

Application

When connected to a secondary steering cylinder it forms a compact linear drive.

See page 9 for a selection guide for matching the drives to hydraulic steering cylinders.

Features

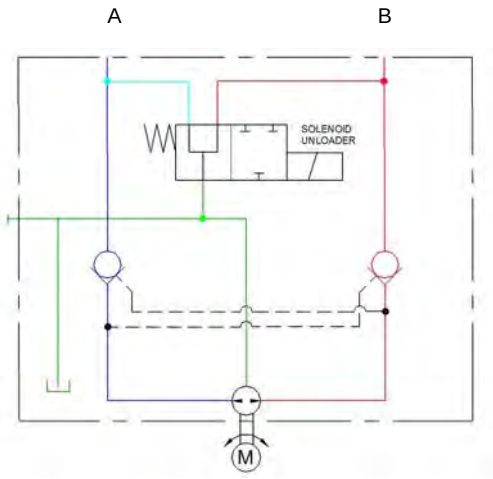
Quiet and smooth operation
Low power consumption.
Zero back drive check valves.
6 flow options
100W motors
50W motor on PR+08
25W motor on PR+06
12 and 24v DC options.
Compact size.
Easy installation.
External oil level indicator
G1/4 (BSP) ports (with NPTF adapter kits available).
Service kits available.
Cylinders and hose kits supplied to suit.

Technical data

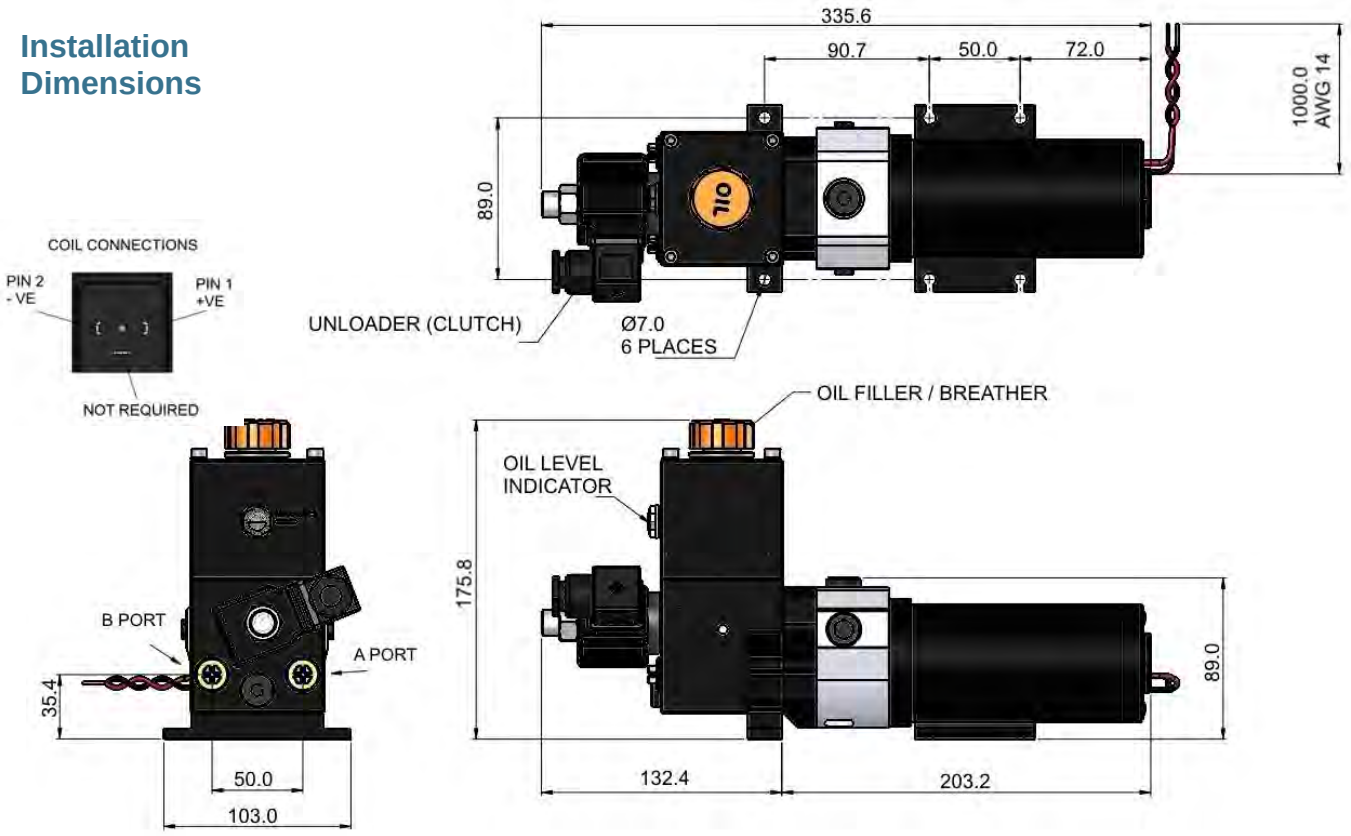
Reservoir capacity	Volume min: 63cc Volume mid: 107cc Volume max: 150cc
Max differential volume (unbalanced cylinder)	50cc
Clutch coil	12/24V 12W
Coil connection	DIN 43650 (4-9mm lead) IP67
Weight	4.5kg

Refer page 6 for all other technical data.

Circuit Diagram



Installation Dimensions



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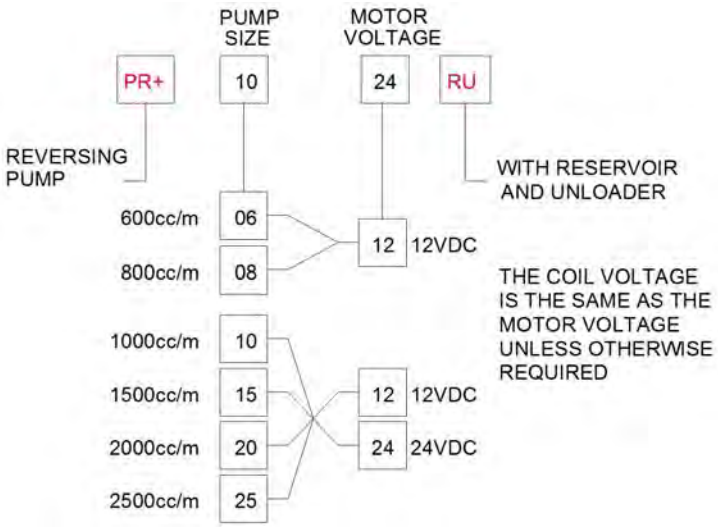


PC CONSTANT RUNNING ELECTRO-HYDRAULIC POWER UNIT

Manufactured specifically for marine autopilot steering applications the versatile PC constant running power units use a heavy-duty fan cooled motor coupled to optional pump sizes to deliver up to 4.5 L/min. Designed to be used for heavy duty applications on larger yachts or commercial craft these units come
fitted with pressure compensated flow controls, relief valve and cylinder check valves as standard.

Description

Once the hard-over time has been set via the speed control, the steering action is achieved by switching a damped heavy duty double acting solenoid valve. The motor and precision gear pump are protected by a pre-set relief valve, and check valves with toughened components positively lock the steering on course. A stainless steel clamp retains the stove enameled steel oil reservoir, and inside is a large capacity replaceable 15 micron return line filter to maintain system cleanliness. A heavy duty motor starting relay is also supplied, as are the rubber noise absorbing mounts.

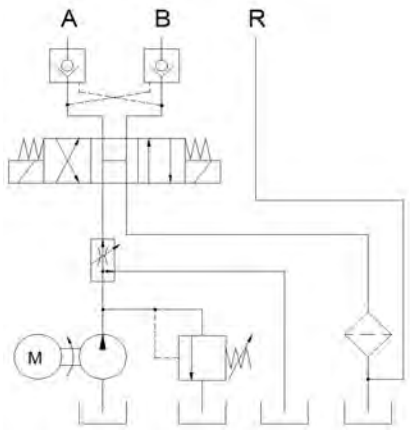
Application

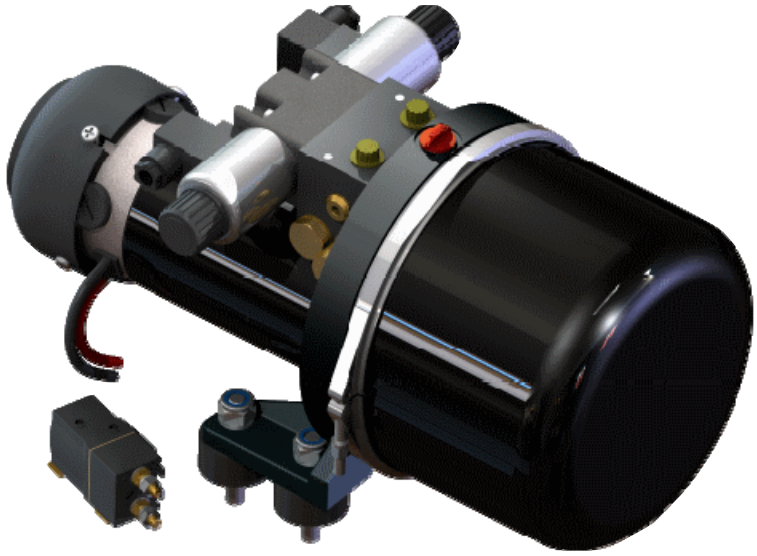
Designed and developed specifically for marine autopilot applications in the commercial and larger pleasure boat market the PC can be used with single or twin ram systems. The design of the unit also makes it compatible with unbalanced rams and pressurized reservoir type systems.

Features

Heavy duty fan cooled motor
12V & 24V options.
Low power consumption.
Flow output options
Integral speed control
Integral relief valve
Quiet operation.
Compact construction.
Replaceable brushes.
Service kits.
Easy installation.
Cylinder and hose kits supplied to suit.
Industrial Spec. Motor Relay included.
EMC protection

Circuit Diagram





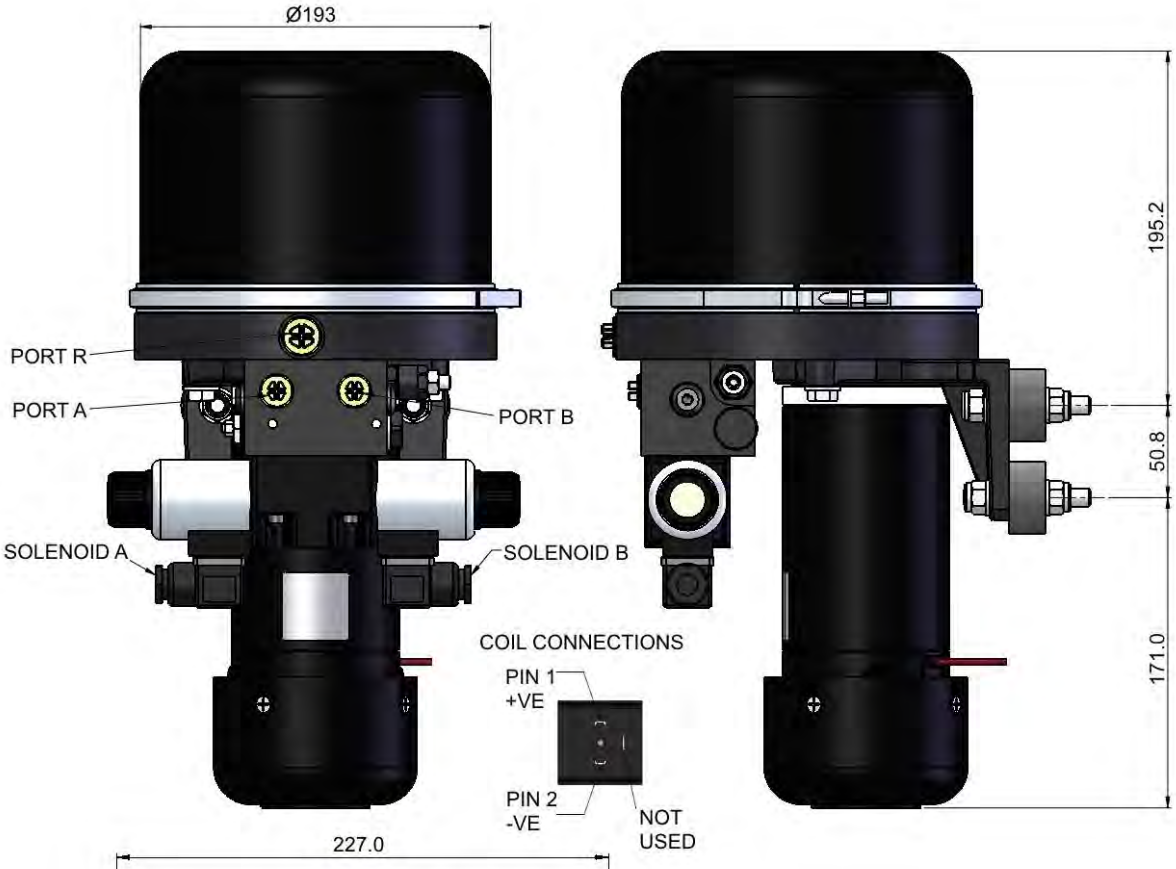
Technical Data

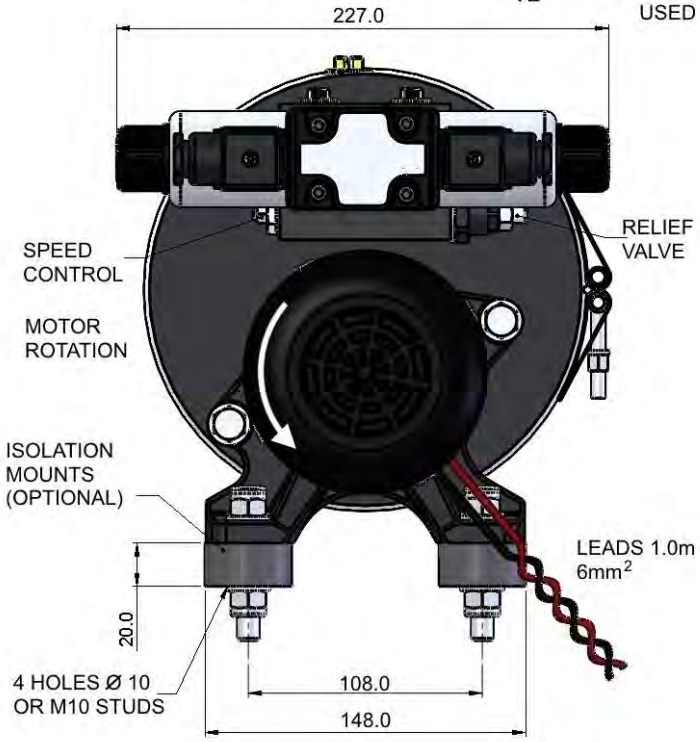
Voltage	12 / 24VDC	
Pump output	Refer order codes.	
Ambient operating temperature	-15 to +55 deg C	
Motor voltage nominal	12Vdc	24Vdc
Motor output watts	405W	440W
Max continuous current	24A	12.5A

Ingress protection IP44
(Suitable only for ‘under-deck’, dry environment mounting.)

EMC protection	BS EN 60945:2002
Relief valve setting	58 bar
Orientation	Solenoid A Pump to A port Solenoid B Pump to B port
Coils	12/24V 31W
Coil connection	DIN 43650 (6-8mm cable)
Relay Coil	12/24V 12W
Relay Rating	80A
Fluid	ISO VG10 to VG40 hydraulic mineral fluid to ISO 6743-4 HV
Reservoir capacity	4 litres
Reservoir max pressure	3.5 bar max
Weight	12 Kg

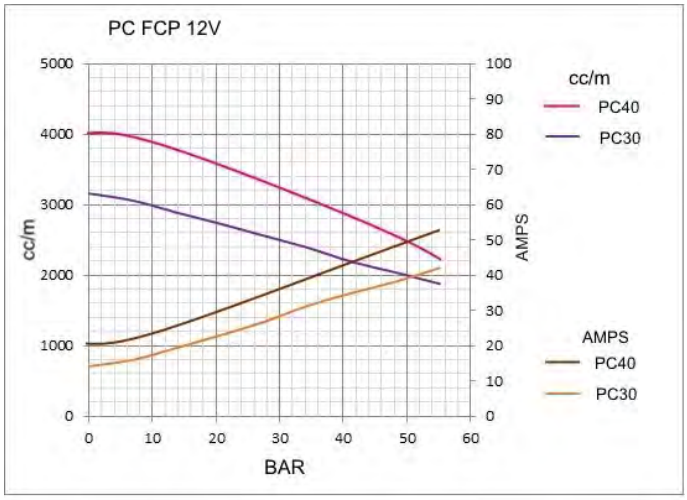
Installation Details

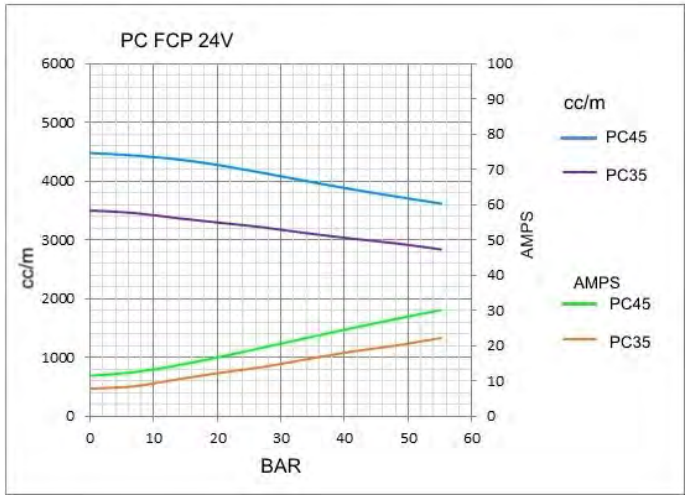




Performance Graphs

Typical Performance
ATF (40 cSt @40ºC) @ 25ºC





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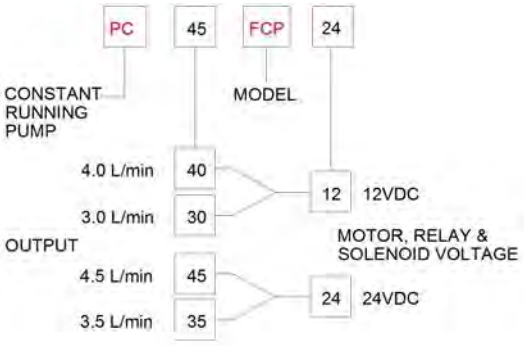
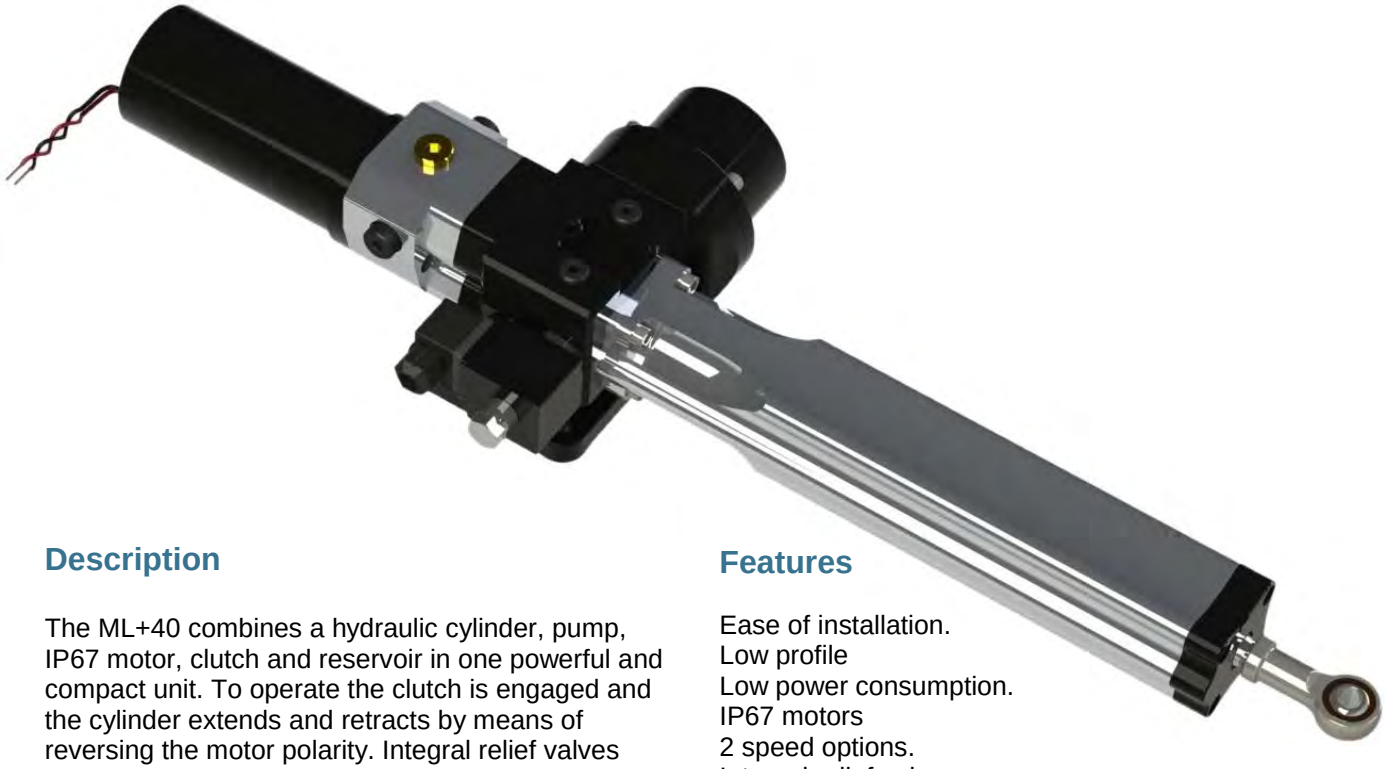


ML+40 ELECTRO-HYDRAULIC SECONDARY STEERING LINEAR ACTUATOR

The ML+40 Electro Hydraulic Linear Actuator combines all the elements of an hydraulic circuit in one compact unit. Designed for ease of installation, the unit is supplied with a quick release mounting, tiller bolt and fitting kit.
An optional rudder reference/feedback unit can be mounted directly onto the actuator. Integral relief valves protect the unit and its mountings from being overloaded.



Description

The ML+40 combines a hydraulic cylinder, pump, IP67 motor, clutch and reservoir in one powerful and compact unit. To operate the clutch is engaged and the cylinder extends and retracts by means of reversing the motor polarity. Integral relief valves protect the unit and its mounting from rudder strikes etc. and anti-cavitation valves are also incorporated to allow full stroke speeds of up to 2 seconds when back-driven by the helm.

Designed for ease of servicing with a motor that can be removed from the unit without affecting the hydraulic circuit.

A full range of spares, seal kits and servicing tools are available.

The ML+40 is supplied pre-filled and ready to install.

Application

Ruggedly designed specifically for the marine auto-pilot market where they are widely used on sailboats and power craft with displacement or fast planing hulls. They are ideal where space is limited as there is no separate pipe-work or reservoirs to fit.
The unit can be mounted in any attitude.

Features

Ease of installation.
Low profile
Low power consumption.
IP67 motors
2 speed options.
Integral relief valves.
Low maintenance.
User serviceable.
Quick release mounting.
12 or 24v DC option.
Service kits available.
Low back-drive
Marine environment protective finish.
Interchangeable with ML40

Linear Feedback Transducer

A high quality analog linear feedback transducer / rudder reference is available as either a retro-fit kit or can be supplied assembled onto the ML+40
It mounts directly on top of the cylinder giving a compact installation with no extra linkages required.

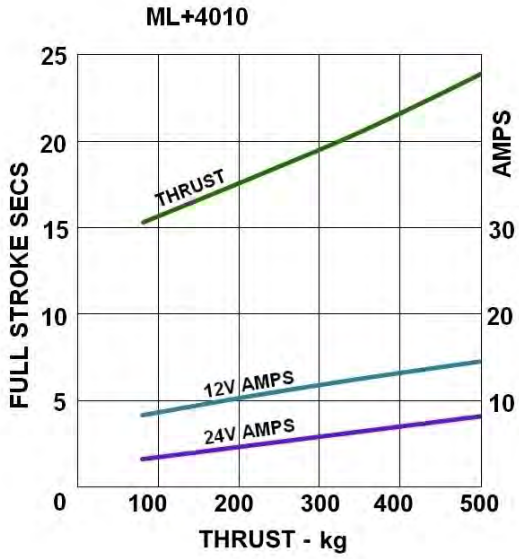
It comes complete with fitting kit which includes all fixings and quick release fasteners.

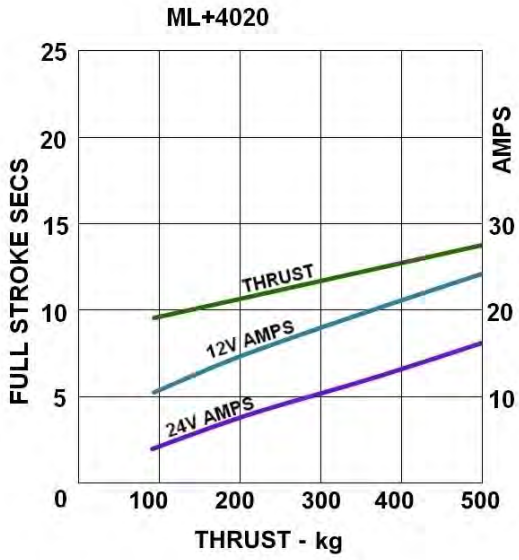
Order Code

ML+40-F

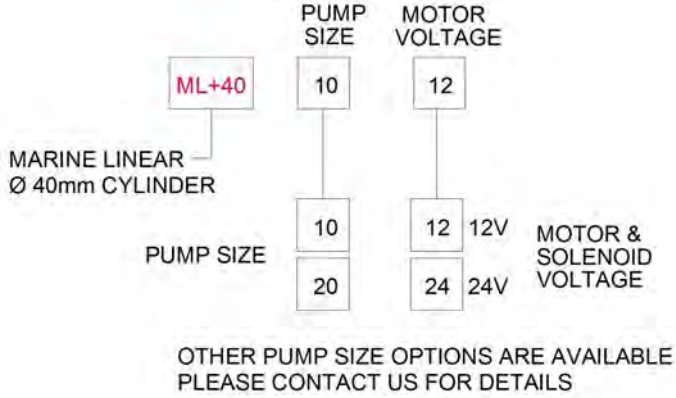
Performance Graphs

Typical Performance
ISO VG10 @ 25ºC

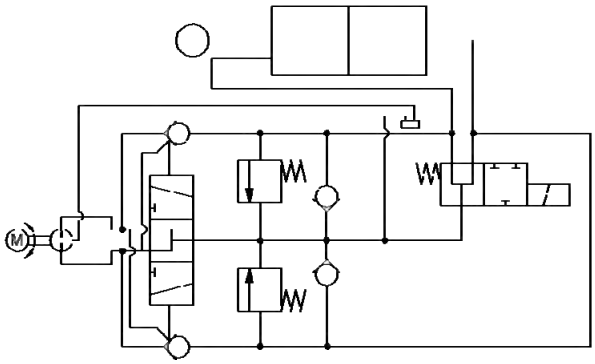




Order Code



Circuit Diagram

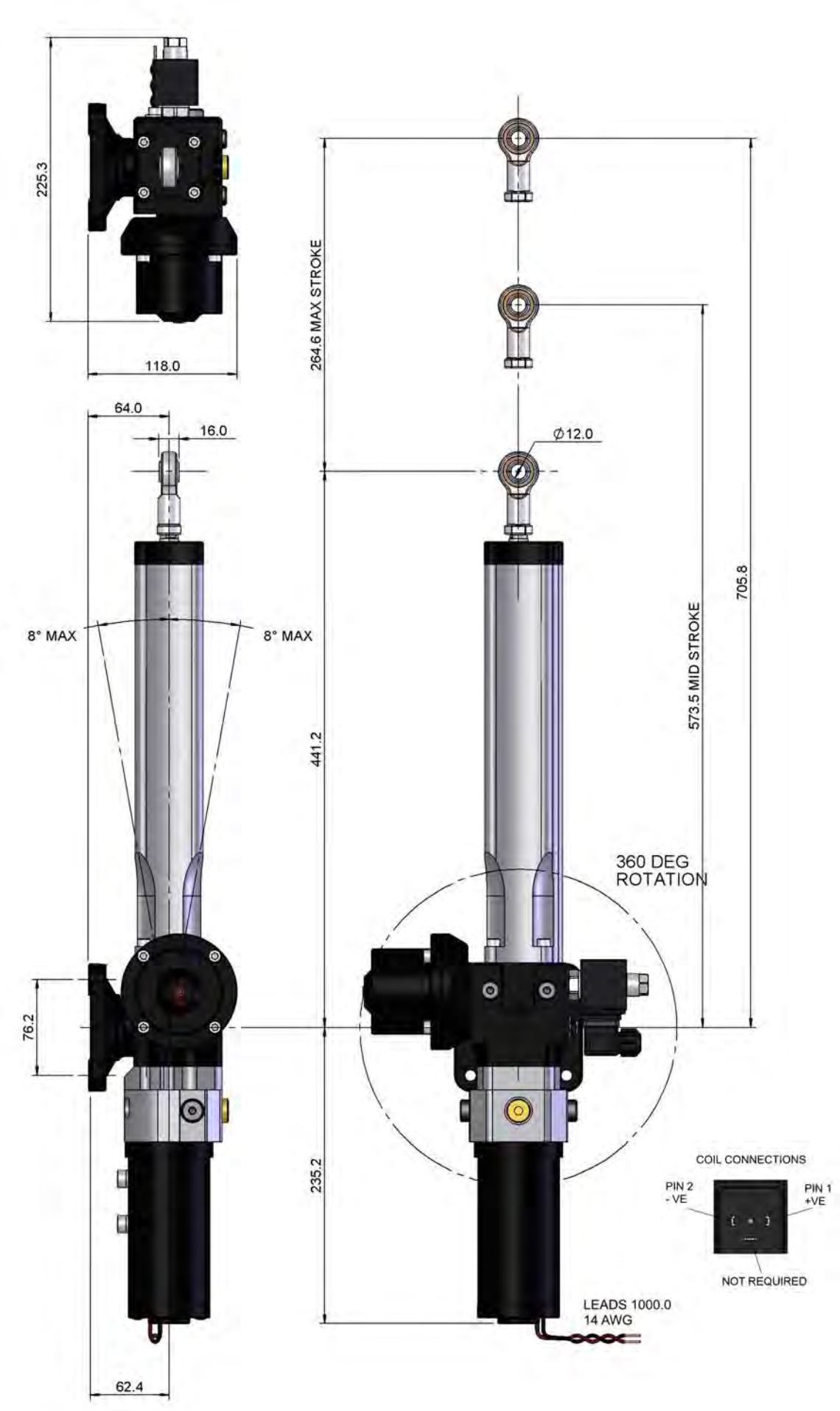


Technical Data

Voltage	12 / 24 VDC			
Current	Typical Amp-hour 60kg at 25% duty		Typical Current Intermittent 650kg	
	12V	24V	12V	24V
ML+4010	2.0A	1.0A	19.0A	9.0A
ML+4020	2.5A	1.3A	25.0A	12.0A

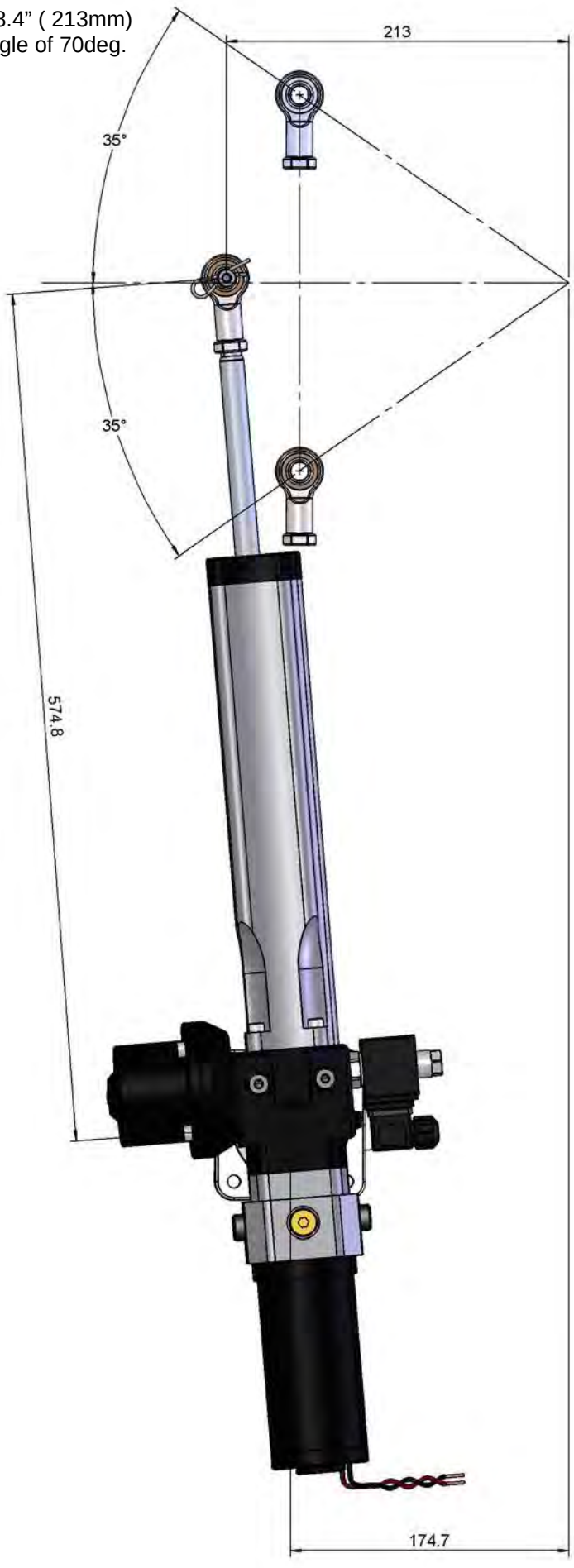
Full stroke time	12 / 24V (no load)
ML+4010	13 seconds
ML+4020	9 seconds
Volume (average)	300cc
Ingress protection	IP67
EMC protection	BS EN 60945:2002
Ignition protection	BS EN 28846:1993
Ambient operating Temperature	-15 to + 55 deg C
Max Operating Thrust	703kg (intermittent)
Relief valve setting	62 bar (795kg)
Orientation	Red lead to positive - Extend Black lead to positive - Retract
Clutch coil	12/24V 12W
Clutch connection	DIN 43650 (4-9 mm lead) IP67
Fluid	ISO VG10 to VG40 hydraulic mineral fluid to ISO 6743-4 HV
Weight	8 kg
Feedback Transducer	
Ingress Protection	IP66
Lead	1.0m
Resistance	11.0kΩ

Installation Details



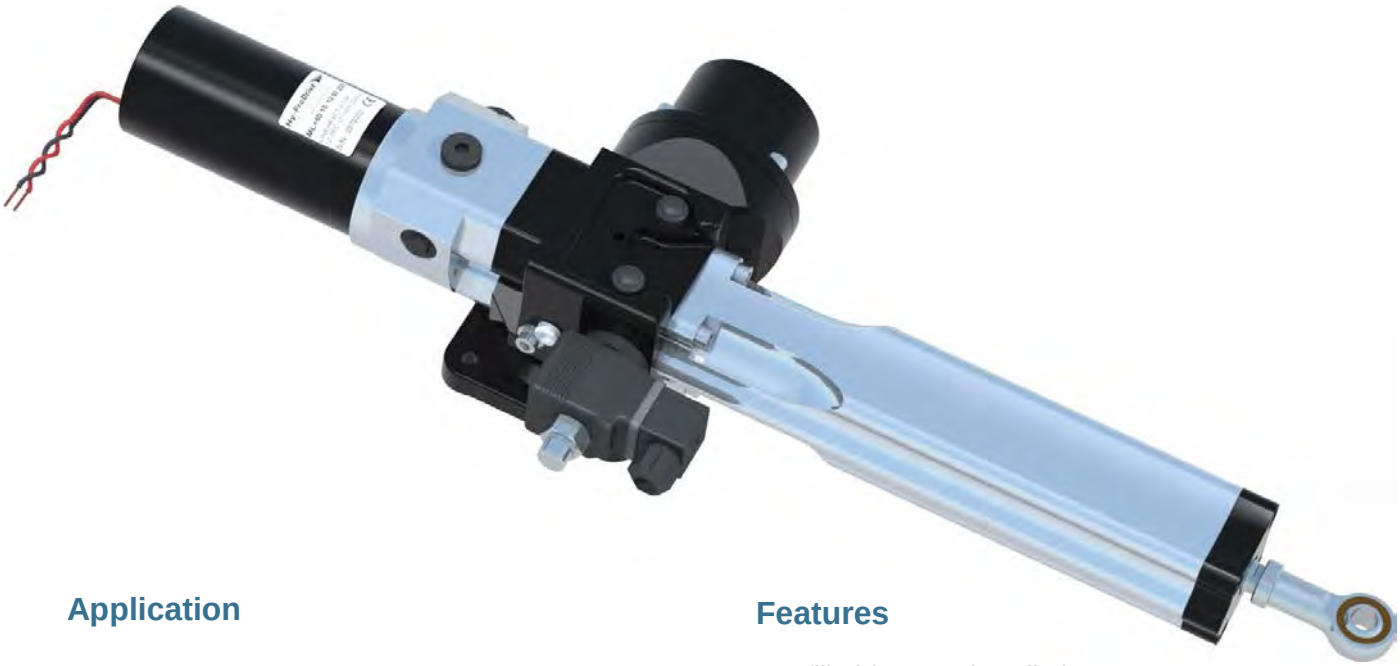
Quadrant

Typical installation for an 8.4” (213mm) radius with total rudder angle of 70deg.



ML+40-8 COMPACT ELECTRO-HYDRAULIC SECONDARY STEERING LINEAR ACTUATOR

The ML+40-8 Compact Electro Hydraulic Linear Actuator is a shorter stroke version of the standard ML+40. It has been specifically designed for smaller vessels.



Application

This new compact unit is designed for smaller or lighter yachts with space restrictions and lower thrust requirements. Depending on vessel weight, sail plan and rudder forces the new actuator is suitable for sailing yachts of up to 45 feet (15 m).

Description

The ML+40-8 at full extension is only 840mm long allowing it to be mounted in tighter confines than the standard ML+40.

It combines our 1.5 L/min pump and 50w motor which develops up to 350kg of thrust whilst typically drawing only 14 amps. This allows it to be used with smaller course computers making this an economical solution for the smaller vessel.

The compact actuator comes with all the advantages of its larger stable-mate the ML+40. All the elements (pump, cylinder and reservoir) of a hydraulic circuit come together in one compact unit. It also contains integral relief valves to protect from rudder strikes etc. and anti-cavitation valves as standard.

It comes supplied with a special quick release mounting and M12 tiller bolt along with all the necessary fasteners and fixings.

The ML+40-8 has an environmental protection rating of IP67 and conforms to BS EN 60945 for EMC and BS EN 28846 for ignition protection.

Features

Pre-filled for easy installation
Low profile
Compact length
Low power consumption
Environmental protection to IP67
Integral relief and anti-cavitation valves.
Quick release mounting.
Low back-drive
Marine environment protective finish.
Low maintenance.
User serviceable.
Service kits & spares available.

Linear Feedback Transducer

A high quality analog linear feedback transducer / rudder reference is available as either a retro-fit kit or can be supplied assembled onto the ML+40-8 It mounts directly on top of the cylinder giving a compact installation with no extra linkages required.

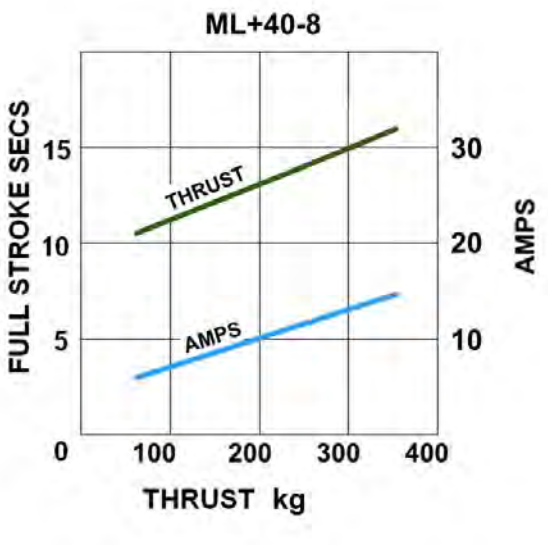
It comes complete with fitting kit which includes all fixings and quick release fasteners.

Order Code

ML+40-F8

Performance Graph

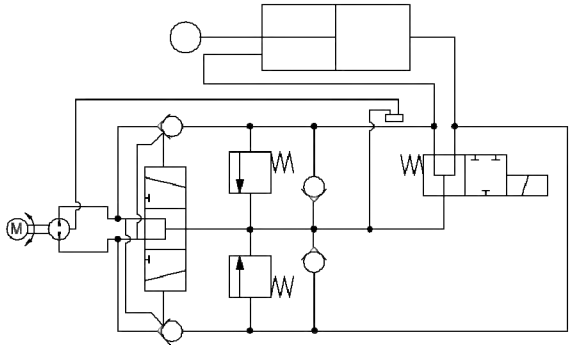
Typical Performance
ISO VG10 @ 25ºC



Order Code

ML+40 15 12 50 200

Circuit Diagram



Technical Data

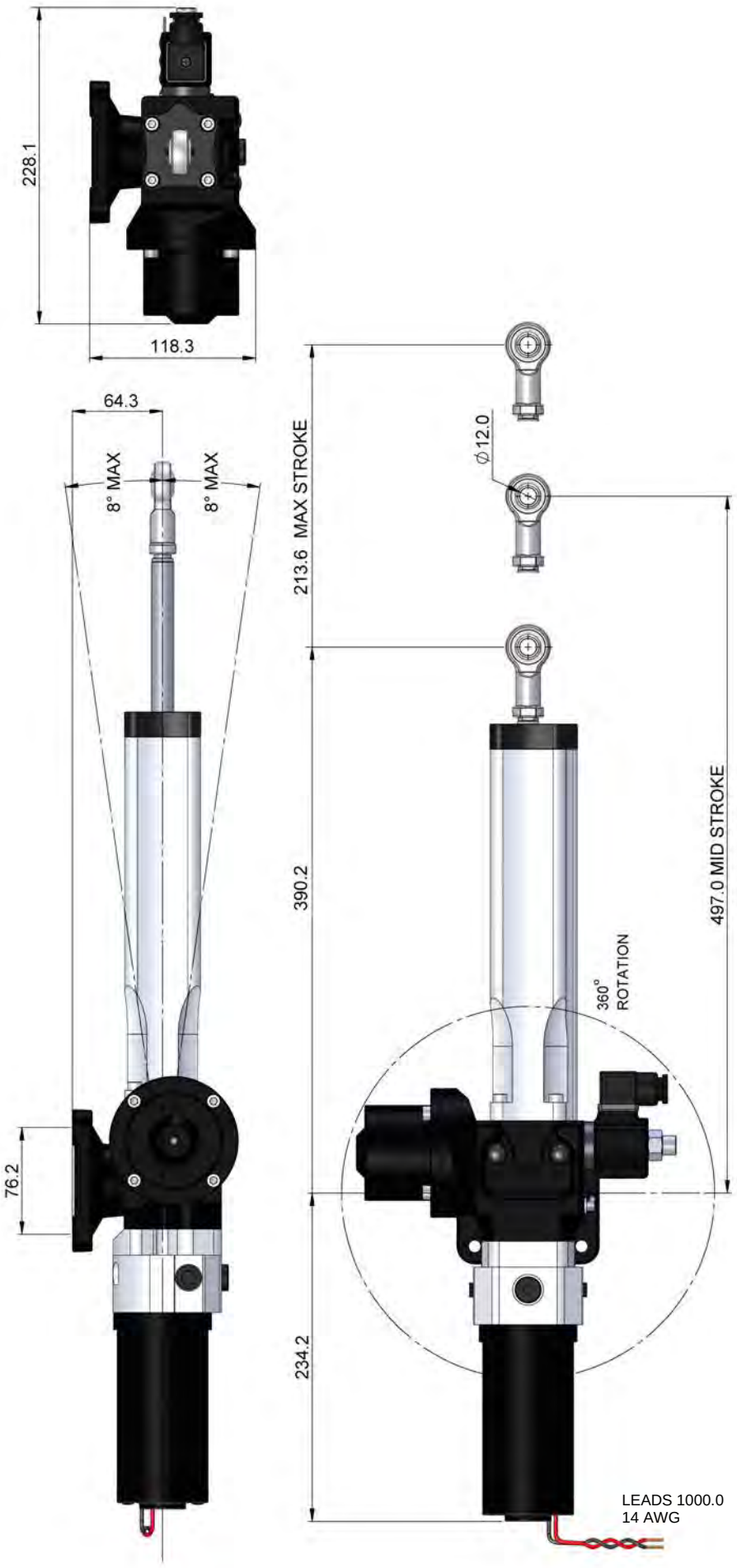
Voltage 12 VDC

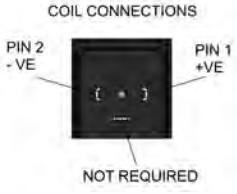
	Typical Amp-hour 60 kg at 25% duty	Typical Current intermittent 350 kg
Current	1.3 A	14.0 A

Full stroke time (no load) 12 seconds

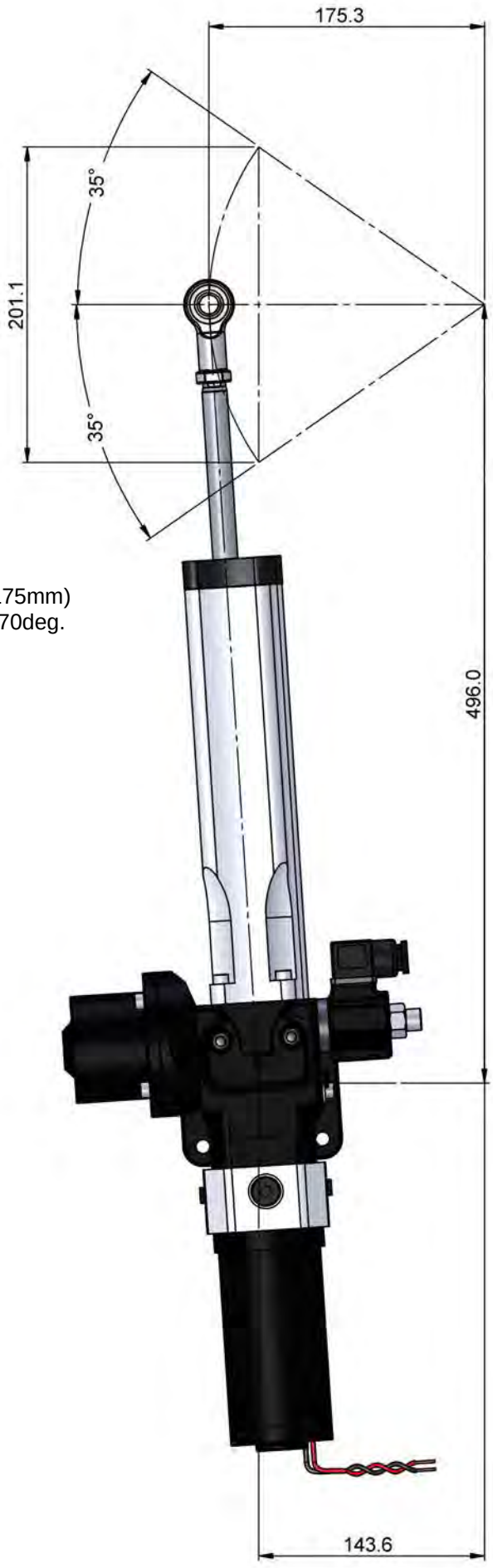
Volume (average)	234cc
Ingress protection	IP67
EMC protection	BS EN 60945:2002
Ignition protection	BS EN 28846:1993
Ambient operating temperature	-15 to + 55 deg C
Max operating thrust	350 kg (intermittent)
Orientation	Red lead to positive - Extend Black lead to positive - Retract
Clutch coil	12V 12W
Clutch connection	DIN 43650 (4-9mm lead) IP67
Fluid	ISO VG10 to VG40 hydraulic mineral fluid to ISO 6743-4 HV The following commercial fluids are suitable: Fuchs Renolin B 15 HV1 Seastar HA5430
Weight	7.5 kg
Feedback Transducer	
Ingress Protection	IP66
Lead	1.0m
Resistance	9.0kΩ

Installation Details





Quadrant



Typical installation for an 6.9” (175mm) radius with total rudder angle of 70deg.

HS+40 ELECTRO-HYDRAULIC SECONDARY STEERING SYSTEM

The HS+40 hydraulic steering systems are designed specifically for marine secondary steering applications. They combine a hydraulic cylinder with clutch, reversing pump and reservoir in a compact installation. The solenoid clutch disengages the hydraulic circuit allowing manual mechanical steering to be used in conjunction with the hydraulic system.

Description

A pre-filled hydraulic system comprising a cylinder with clutch, pump and reservoir.
The cylinder is free to float until the solenoid clutch is engaged, the reversing pump is then used to extend and retract it. Integral relief valves protect the installation from damage.

Application

Designed specifically for the marine autopilot market where they can be used on sailboats and power-craft with displacement and fast planing hulls. The pumps and cylinders can be matched to give the hard-over times and thrusts to suit the application.
Further combinations using our 5 reversing pump sizes are also possible. Please refer to our data sheet PR-d for details of the reversing pump range.

Features

Shorter than conventional cylinders.
Integral solenoid bypass valve and relief valves.
Fully serviceable.
Quiet operation.
A number of pump sizes with 12V or 24V options.
Marine environment protected (under-deck).
Low power consumption.
Fitting kit included.
Low back-drive.
Quick release mounting.
Low profile.

Technical Data

Voltage	12 / 24 VDC			
Current	Typical Amp-hour 60kg at 25% duty		Typical current intermittent 650kg	
	12V	24V	12V	24V
HS+4010	2.0A	1.0A	19.0A	9.0A
HS+4020	2.5A	1.3A	25.0A	12.0A

Full stroke time	12 / 24 VDC (No load)	
	HS+4010	13 seconds
	HS+4020	9 seconds
Ingress protection	IP67	
EMC protection	S EN 60945:2002	
Ignition Protection	BS EN 28846:1993	
Ambient operating temperature	-15 to + 55 deg C	
Max thrust	703kg (Intermittent)	
Relief valve setting	62 bar (795kg)	
Orientation	Red lead to positive - Extends Black lead to positive - Retracts	
Clutch coil	12W	
Clutch connection	DIN 43650 (4-9mm lead) IP67	
Fluid	ISO VG10 to VG40 hydraulic mineral fluid to ISO 6743-4 HV	
Weight	11kg	
Feedback Transducer		
Ingress Protection	IP66	
Lead	1.0m	
Resistance	11.0kΩ	

Linear Feedback Transducer

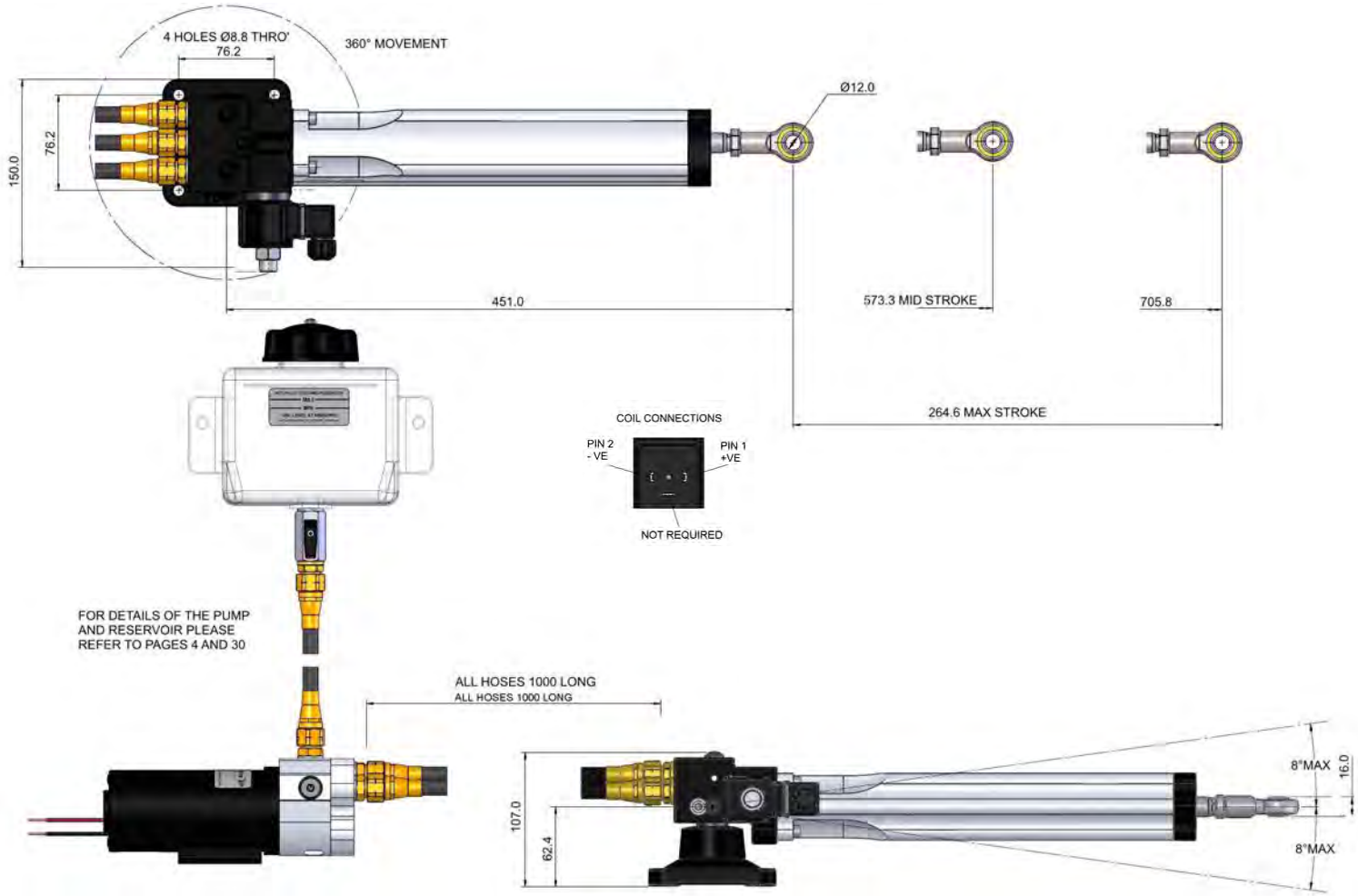
A high quality analog linear feedback transducer / rudder reference is available as either a retro-fit kit or can be supplied assembled onto the HS+40
It mounts directly on top of the cylinder giving a compact installation with no extra linkages required.

It comes complete with fitting kit which include all fixings and quick release fasteners.

Order Code

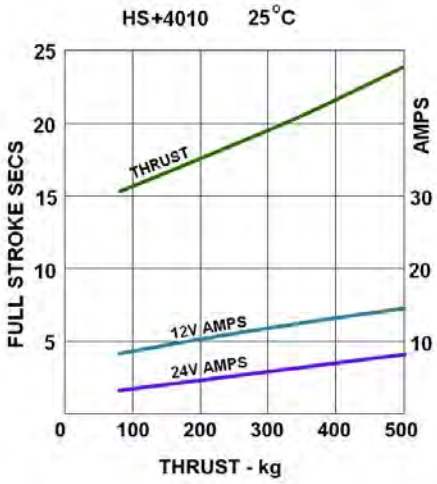
HS+40-F

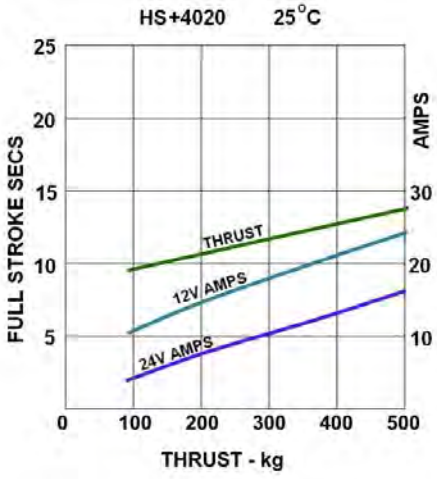
Installation Dimensions



Performance Graphs

Typical Performance
ISO VG10 @ 25ºC





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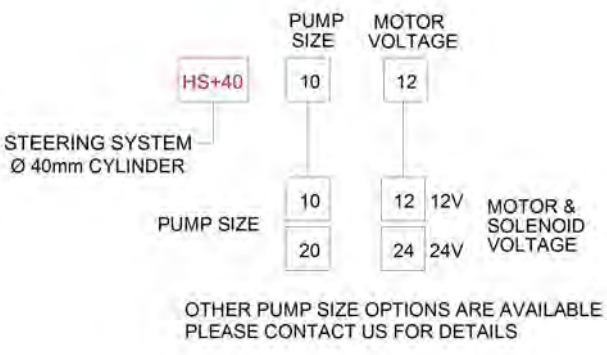
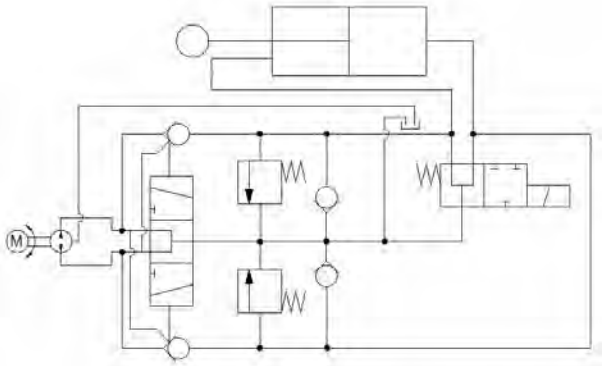


Circuit Diagram



HS+50 ELECTRO-HYDRAULIC SECONDARY STEERING SYSTEM

The HS+ hydraulic steering systems are designed specifically for marine secondary steering applications. They are available with either a 2.5lpm reversing pump or a number of sizes of PC pump. The systems are protected from rudder strikes by integral relief valves. A solenoid clutch is also fitted so

Description

The hydraulic steering systems comprise of a compact cylinder which includes the relief valves and solenoid clutch, a reversing or constant running pump, marine hoses, fittings and a reservoir. The system comes filled ready for installation. A choice of pump sizes can be selected with single or twin cylinders to give a range of hard-over times and thrusts.

Application

Designed specifically for the marine autopilot market where they can be used on sailboats and power-craft with displacement and fast planing hulls. The pumps and cylinders can be matched to give the hard-over times and thrusts to suit the application.

Features

Pre-filled ready to fit.
Installation kit included.
Shorter than conventional cylinders.
Quiet operation.
Low maintenance.
Low power consumption.
Integral solenoid bypass valve.
Integral relief valves.
Marine environment protected (under deck)
Fully serviceable.
12 or 24V options.
Reversing or Constant Running pump options.
Adjustable or non adjustable rod-ends
Twin opposed cylinder option.

Technical Data

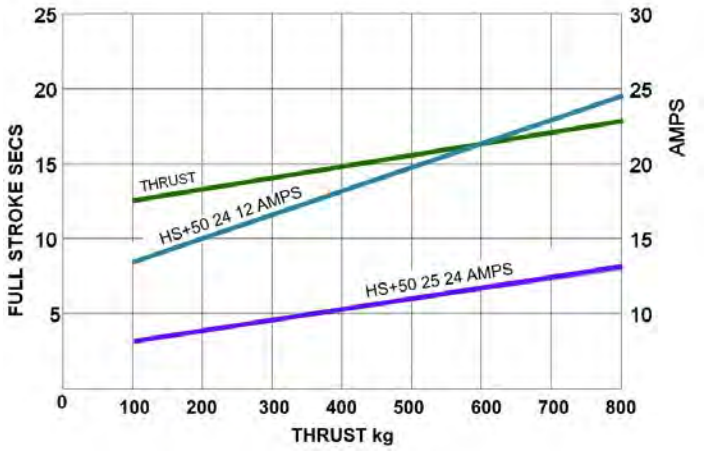
Voltage 12 / 24 VDC

Current	Typical Amp-hour 92kg at 25% duty		Typical current intermittent 1016kg	
	12v	24v	12v	24v
HS+50	2.7A	1.4A	34.0A	15.5A
HS+50S	2.7A	1.4A	34.0A	15.5A

Full stroke time	12 / 24 VDC (No load)	
	HS+50 25	13 seconds
Ingress protection	IP67	
EMC protection	S EN 60945:2002	
Ignition protection	BS EN 28846:1993	
Ambient operating Temperature	-15 to + 55 deg C	
Max operating thrust	1080kg (Intermittent)	
Relief valve setting	62 bar (1080kg)	
Orientation	Red lead to positive - Extends Black lead to positive - Retracts	
Clutch coil	12W	
Clutch connection	DIN 43650 (4-9 mm cable) IP67	
Fluid	ISO VG10 to VG40 hydraulic mineral fluid to ISO 6743-4 HV	
Weight	14 kg	
Feedback Transducer		
Ingress Protection	IP66	
Lead	1.0m	
Resistance	13.0kΩ	

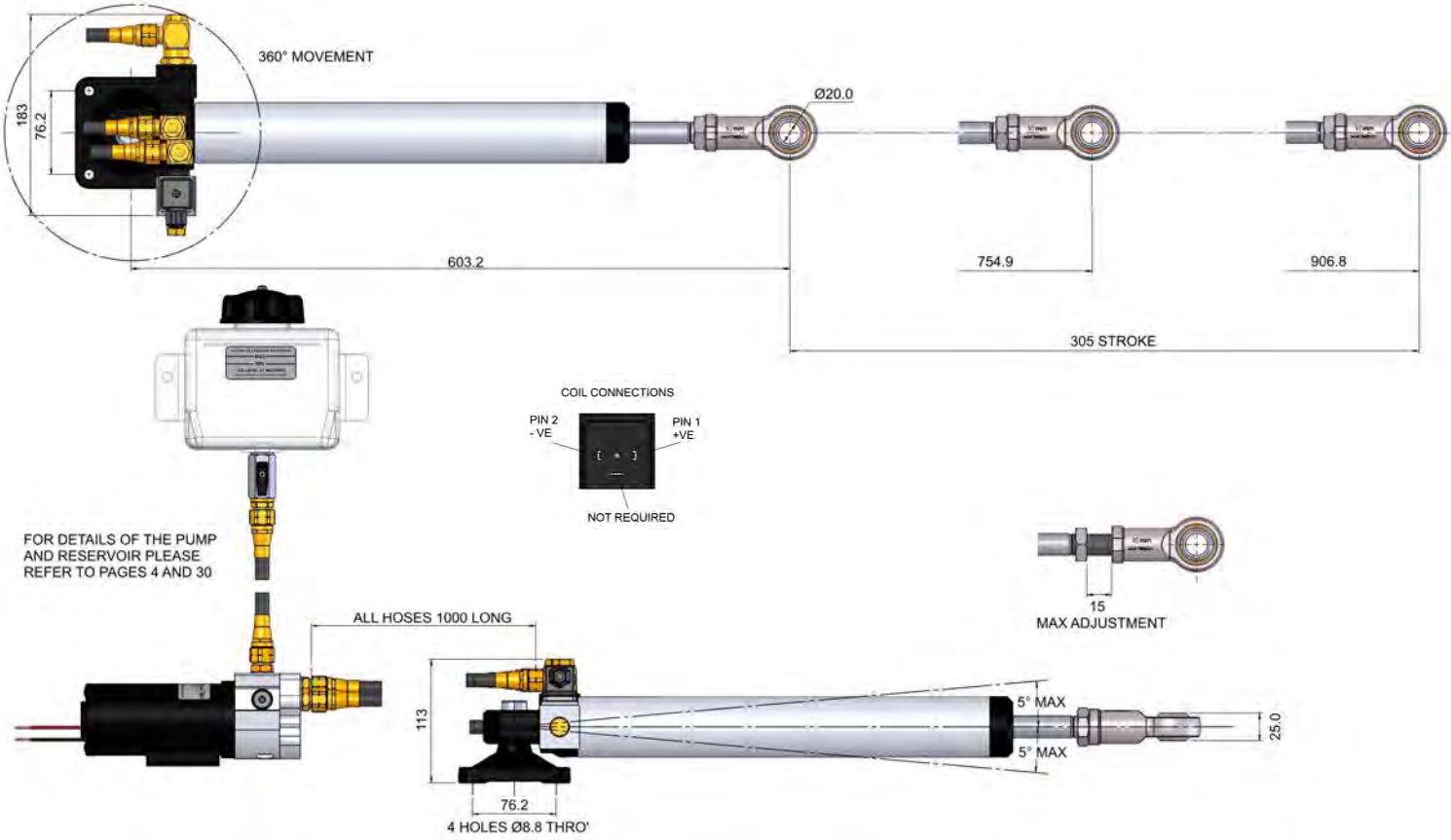
Performance Graph

Typical Performance
ISO VG10 @ 25ºC



HB0003 07

Installation Details

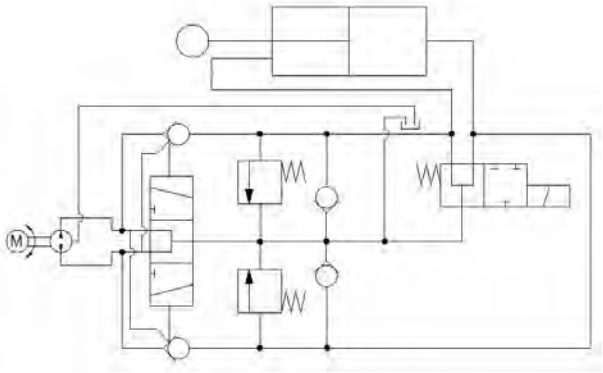


Linear Feedback Transducer

A high quality analog linear feedback transducer / rudder reference is available as either a retro-fit kit or can be supplied assembled onto the HS+50. It mounts directly on top of the cylinder giving a compact installation with no extra linkages required.

It comes complete with fitting kit which includes all the mounting clamp, extended tiller bolt and quick release fasteners.

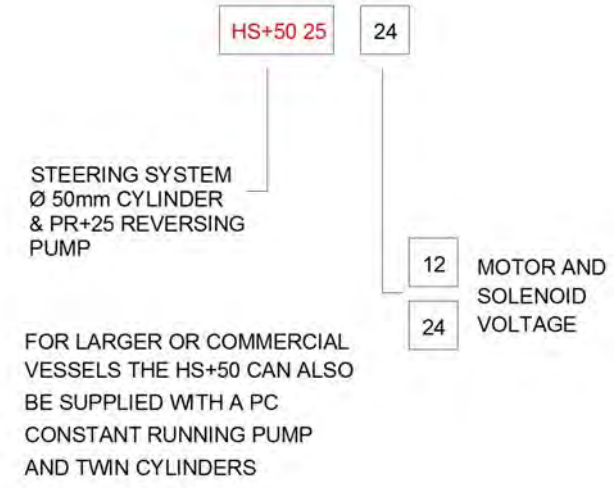
Circuit Diagram



Order Code

HS+50-F

Order Code

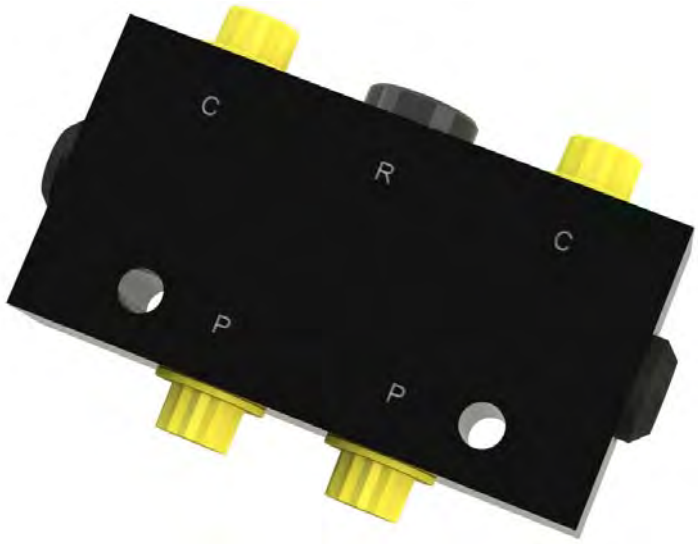


MARINE AUTOPILOT PILOT OPERATED CHECK VALVE

The marine autopilot pilot operated check valve is a line mounted valve that is used to lock steering cylinders. The G1/4 valve can also be used when a helm pump is without check valves or to prevent the autopilot pump back driving the helm wheel.

Description

This G1/4 (BSPP) in-line check valve is designed to close the ‘C’ ports until a pilot pressure is applied to the ’P’ ports in order to move the check valve piston and so open the port. The body is made from anodized aluminium for protection against the harsh marine environment whilst the internal components are made from hardened and toughened steel for extended life.



Application

Designed to be used to positively lock steering cylinders or to prevent the back drive of the helm steering wheel by the autopilot pump should the helm pump not have check valves.

It is designed for use with both balanced and unbalanced cylinders. Where an unbalanced cylinder is used the additional ‘R’ port is connected to the helm pump reservoir bottom port.

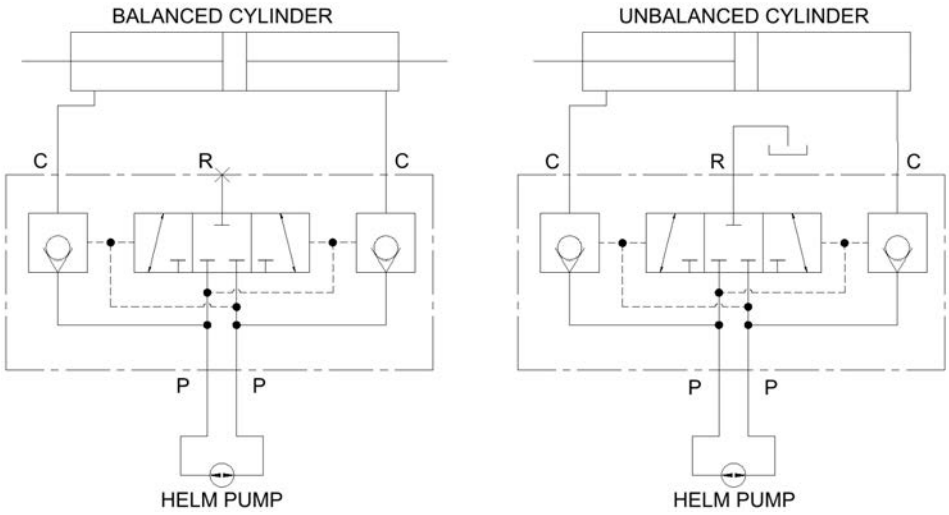
Features

Positive locking of the cylinder.
Hardened check piston.
Toughened check seats.
High grade chromium balls.
Suitable for balanced and unbalanced cylinders.
Mounting holes.
Port identification.
Anodised aluminium

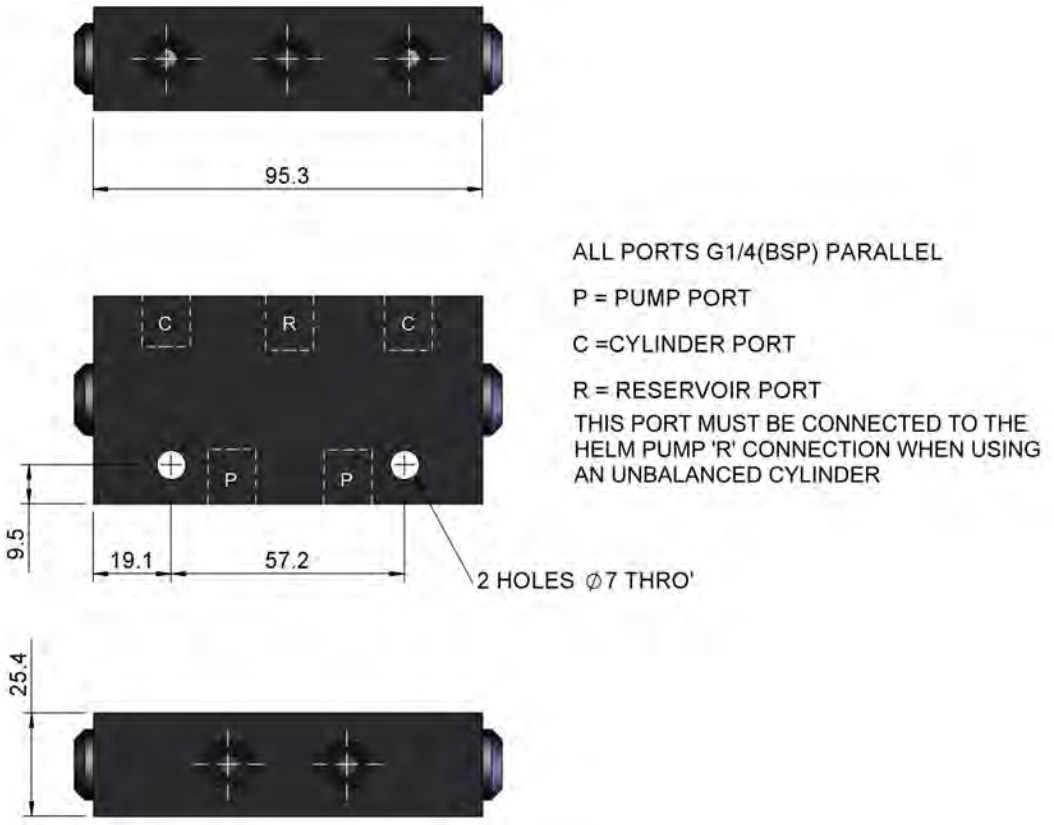
Technical Data

Rated flow	4.5 l/min
Maximum pressure	72 bar
Pilot ratio	2.25:1
Port size	G1/4 (BSPP)
Ambient operating Temperature	-15 to + 55 deg C
Fluid	ISO VG10 to VG40 hydraulic mineral fluid to ISO 6743-4 HV
Weight	0.31 Kgs

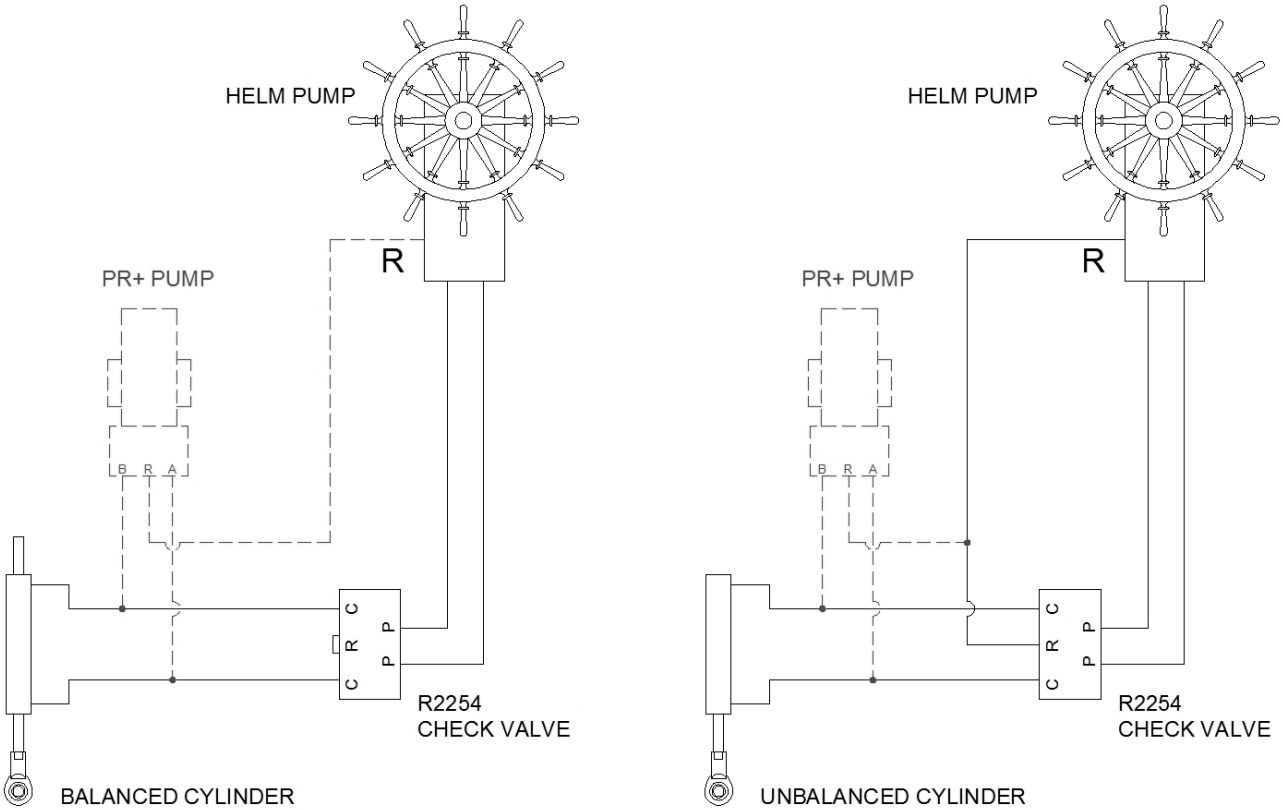
Circuit Diagram



Installation Details



Installation Diagram



Order Code

R2254

MARINE AUTOPILOT SECONDARY STEERING CYLINDER UNLOADER VALVE

The Autopilot Cylinder Unloader valve is a line mounted valve that is used to bypass the hydraulic steering cylinder to enable the boat to be steered manually. The solenoid operated valve is connected to the 'clutch' connection of an autopilot. It is available in 12 and 24 Vdc and can be used in systems up to 72 bar. It can be used with balanced and unbalanced cylinders.

Description

The normally open solenoid operated unloader valve is a compact line mounted G1/4 (BSPP) ported manifold. The low power consumption 12 watt coils are available in 12 and 24Vdc variants. With an anodized body and an IP67 rating this valve has been designed for the harsh marine environment.

Application

Designed to be used in autopilot steering applications, this valve is used to bypass the auto pilot hydraulic steering cylinder so that manual steering can be used. It can be used with balanced cylinders or by connecting the 'R' port to the reservoir with unbalanced cylinders. The design has been optimized to enable the coil to be energized for extended periods of time.

Features

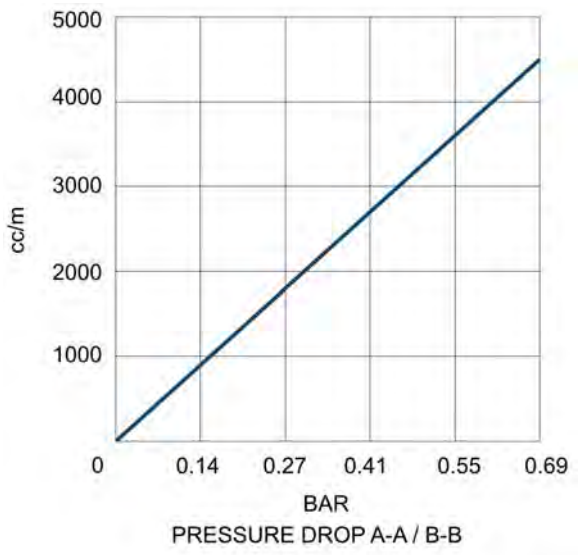
Marine environment protected
Compact .
12 or 24Vdc variants.
Low power consumption.
Used for balanced/unbalanced cylinders.
Line mounted.
Long energizing capacity.

Technical Data

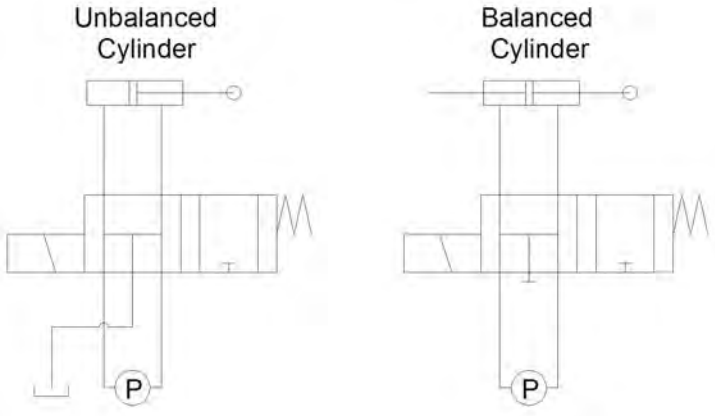
Voltage	12 / 24 VDC
Power	12W
Rated Flow	4.5 l/min
Maximum pressure	72 bar
Ambient operating temperature	-15 to + 55 deg C
Protection	IP67
Cable Ø (not supplied)	4-9mm
Fluid	ISO VG10 to VG40 hydraulic mineral fluid to ISO 6743-4 HV
Weight	0.66 Kg

Performance Graphs

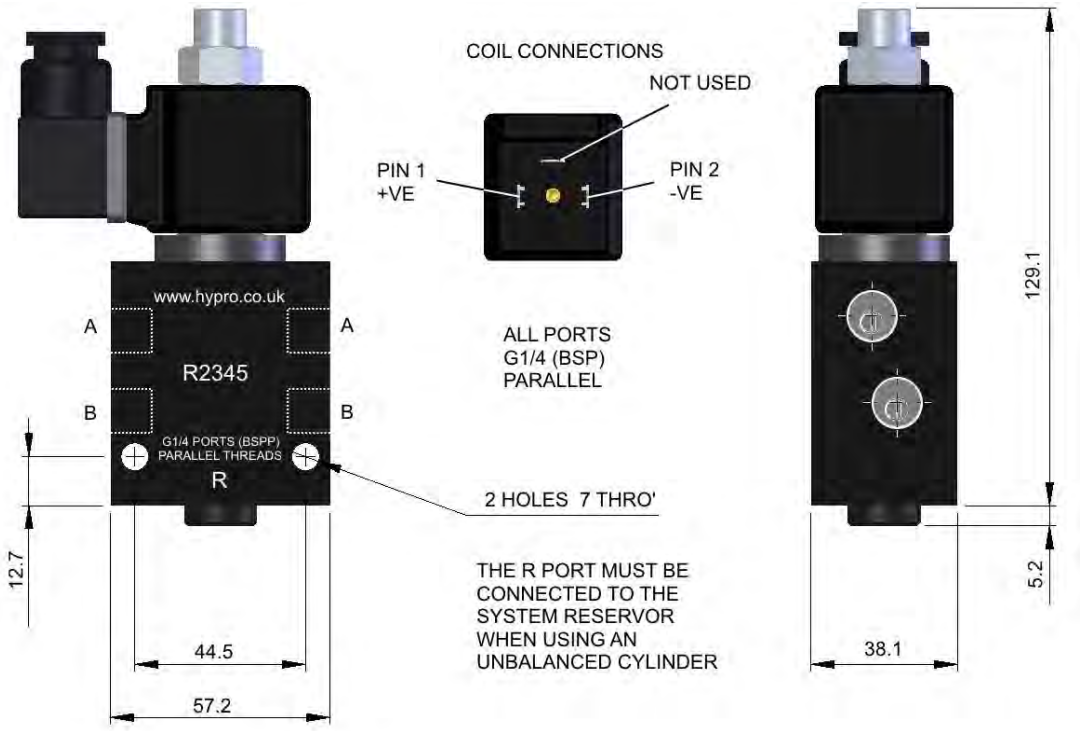
Typical performance
ATF (40 cSt @40ºC) @ 25ºC



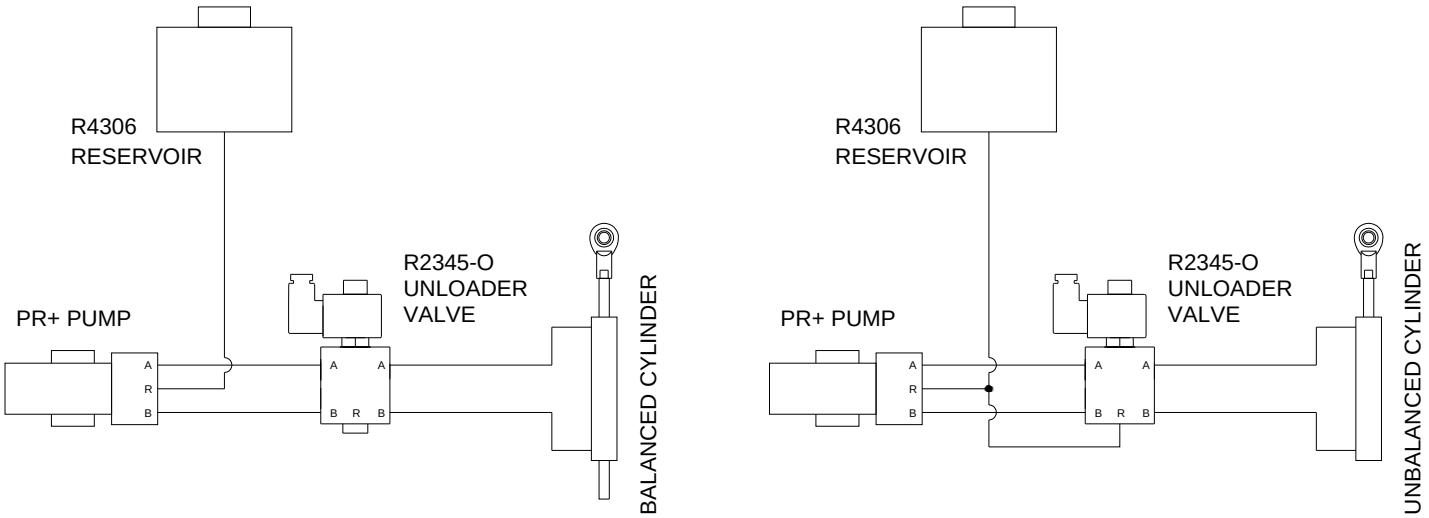
Circuit Diagram



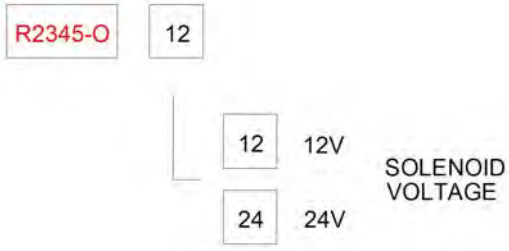
Installation Details



Installation Diagram



Order Code



R4306 HYDRAULIC STEERING FLUID RESERVOIR

Specifically developed for hydraulic steering systems this robust reservoir comes complete with marine grade isolator tap, tethered filler / breather cap and a pick up that allows extreme heel angles without spillage or air ingress into the system. Manufactured from high-density translucent polyethylene for 'at a glance' checking of fluid level.

Technical Data

Capacity

Maximum	0.94 Litre
Recommended	0.70 Litre
(ref. 70º heel angle)	

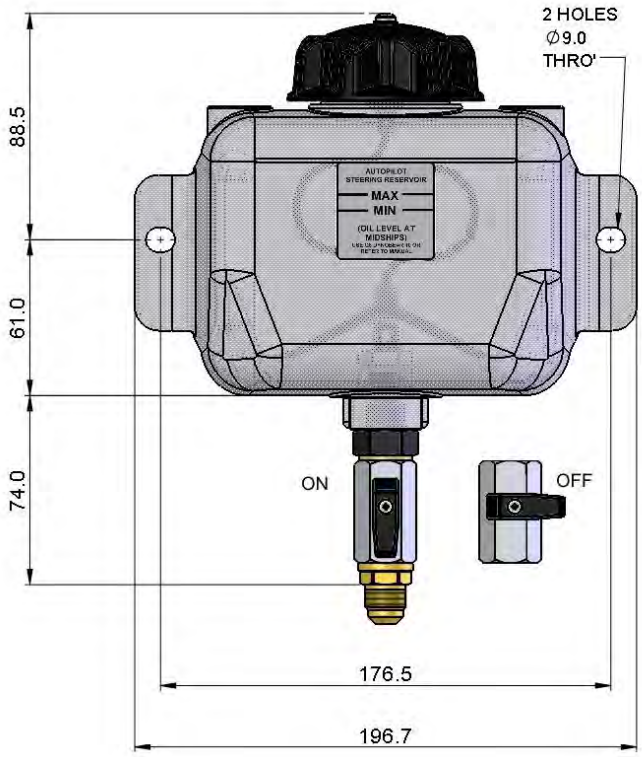
Performance

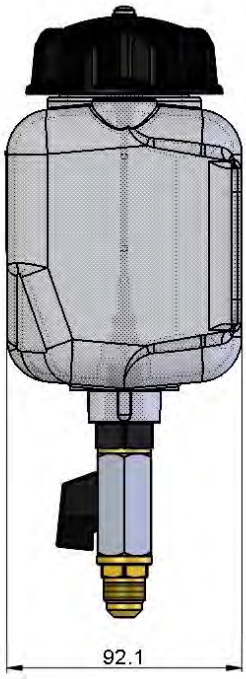
Temp min	-20ºc
Temp max	+55ºc

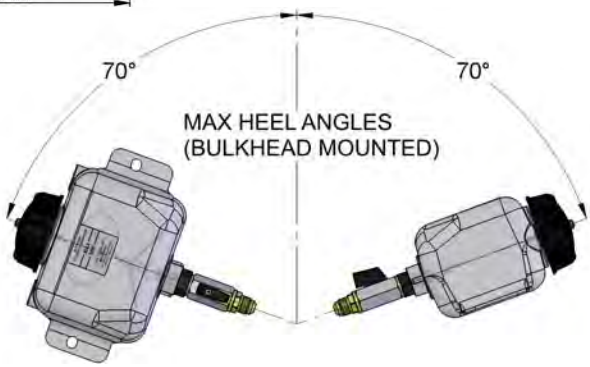
Materials

Body	HDPE
Tap	Chrome plated brass
Fittings	Brass
Seals	Nitrile
Weight empty	0.48kg
Connection	5/8 SAE male 45° flare (G1/4 BSPP male option available)
Compatible Fluids	Mineral based hydraulic

Installation Details







Order Code

R4306

SPARES AND ACCESSORIES

Marine Steering Fluid

HyProDrive Marine Steering Fluid contains special additives which reduces friction by more than 25% when compared to conventional oils. The additive eliminates stick slip and judder that sometimes occurs in hydraulic systems. Gives outstanding low wear performance. Use in all of our marine products. Supplied in1.0 Litre containers.

Order Code

016519

Marine Steering Hoses

Specialised marine hose assemblies which feature low volumetric expansion for fast response and advanced polymer materials for flexibility with long-life in corrosive marine conditions. The end fittings are all brass construction with 5/8 SAE female 45° flare threads. Available in any length.

Order Code

016615 **1.0**

Length (metres)

Solenoid Unloader Cartridges

NO (normally open) solenoid cartridges complete with either 12VDC or 24VDC 12W coil. To suit all HyProDrive Linear Actuators, Steering systems and Unloader Valves.

They are also direct replacements for the older R3760, R3880 and R4048 cartridges (square coils).

Order Code

R4112-aO **12**

VOLTAGE **12**

24

Legacy Motor Brushes

Spare motor brushes to suit our older models of pumps, actuators and systems are available. Please see our website for details:

www.hypro.co.uk

Useful Data

Cylinder Volume

Cylinder Area x Stroke - Rod Area x Stroke

HO to HO (secs)

$$\frac{\text{Cylinder volume (cc)} \times 60}{\text{Pump flow (cc)}}$$

Pressure

1 bar = 14.5 psi

Cubic inches to Cubic centimeters

$in^3 \times 16.4 = cm^3$

Cubic centimeters to Cubic inches

$cm^3 \times 0.061 = in^3$

Hy-ProDrive
Marine Steering Technology

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About Hydraulic Projects

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

ISO 9001:2008
URS UKAS QUALITY MANAGEMENT 043-A
Certificate No. 11935

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