Autopilot drive solutions for hydraulic steering

OCTOPUS PRODUCTS - A WORLD LEADER IN THE DESIGN AND MANUFACTURE OF

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OCTOPUS PROFESSIONAL SOLUTIONS

PROFESSIONAL DISTRIBUTOR
Our innovative product range gives professional distributors / dealers the opportunity to offer the best solutions to their customers which gives added value to the installation and service supplied.

BOAT BUILDERS
Our highly experienced team can assist with solutions to boat builder production requirements including lean manufacturing techniques, and supply complete installation packs including all required parts and accessories.

AUTOPILOT MANUFACTURERS
Our highly experienced team can offer Autopilot manufacturers our personalized business model, where we provide engineering, prototyping and production support that is specifically designed to meet their needs, resulting in significant cost savings, increased reliability and innovation.

WHY OCTOPUS?
• Over 25 years experience designing and producing cutting-edge autopilot drive solutions
• Complete product solutions for all boat types (leisure & commercial) up to 120ft in length
• Unique drive designs for simple installation
• Integrated units, versatile and easy to install
• Customized products, compatible with all major autopilot brands
• We are committed to continuous product development and improvement
• 2 year warranty

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Contents of this Brochure are based on the latest information available at the time of publication. CMP/Octopus assumes no responsibility for the accuracy of the information contained herein. Product specifications are subject to change without notice.

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Hydraulic constant running pumps

SUITE FOR SMALL COMMERCIAL VESSELS AND LARGE YACHTS

POWER AND CONTROL - FULLY INTEGRATED
Octopus Constant Running pumps are used in larger, heavy duty hydraulic steering systems where normal reversing pumps cannot be used. The precision pump includes an inbuilt hydraulic fluid reservoir and a tandem center solenoid control valve. Available with AC or DC motors.

PUMP SELECTION
The pump selected must match the size of the vessel’s steering ram and the power supply capability of the autopilot must also be considered. For optimum autopilot performance the pump should be able to drive the rudder hardover from lock to lock within 13-15 seconds. The drive flow rate should be approximately four times that of the steering ram volume.

CRA PUMPSETS
• For steering cylinders up to 60cu in (1000cc)
• CRA pumps deliver over 500psi (35 bar) and are very economical, typically drawing under 150 watts
• DC models: 12v, 24v or 32v
• Wide flow range - units available with max flow rates from 0.5gpm (2000 cc/min) up to 1gpm (4000 cc/min) with adjustable flow control and dual speed options
• As the solenoids only draw 12watts, the pump can be driven directly from the autopilot course computer without a relay, significantly reducing installation costs
• Inbuilt shut off valves mean the pump can be removed for servicing without draining the steering system

CRA PUMPSET ORDER CODE

Voltage (VV) Options (O)
02 - 120vdc/min (0.5gpm) + Basic Unit
03 - 300gpm/min (1.5gpm)
04 - 4000cc/min (1.5gpm)
11 - 110v/220v AC
12 - 12v DC
24 - 24v DC
16 - 440v/575v AC
22 - 220v/440v/575v AC

eg CRA02-12-F-R = 2000cc/min, 12v with flow control & relief valve

CRB PUMPSETS
• For steering cylinders up to 200cu in (3500cc)
• Available as a simple pump unit, a motor and reservoir combination to replace an engine driven pump or fitted with a direction solenoid valve
• DC models: 12v, 24v or 32v
• AC models: 110/220v single phase
• Wide flow range - units available with max flow rates from 1gpm (4000 cc/min) up to 3.5gpm (13,000 cc/min) with adjustable flow control and dual speed options
• Adjustable pressure relief valve (100 - 1200psi)
• Inbuilt pressure gauge
• Heavy-duty ball bearing electric motors
• Long life mechanical seal between motor and pump
• Large capacity reservoir for cool running in all climates
• Inbuilt shut off valves mean the pump can be removed for servicing without draining the steering system

CRB PUMPSET ORDER CODE

Voltage (VV) Options (O)
02 - 12v DC
04 - 4000cc/min (1.00gpm)
06 - 6000cc/min (1.50gpm)
08 - 8000cc/min (2.00gpm)
11 - 110v/220v AC
12 - 12v DC
24 - 24v AC
32 - 32v DC
44 - 440v/575v AC
60 - 600v/1000v AC
115 - 110v/220v AC
220 - 220v/440v/575v AC

eg CRB06-11S-22-T = 6000cc/min, 110/220v single phase with 220v AC solenoid, two speed with flow control

ACCESSORIES

OCTUSUK9
Constant Flow Regulator Valve. This regulator valve runs with an engine driven pump, and is usually fitted to commercial boats that require a constant hydraulic flow for use with a steering cylinder for an autopilot. Please refer to our website or contact us for the possible different versions available.

Octopus Marine
www.octopusmarine.ca
www.octopuseurope.com

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Hydraulic constant running pumps

**HIGH PERFORMANCE, LOW POWER CONSUMPTION**

**POWERFUL** - Suitable for steering cylinders up to 200cu in (3500cc)

**ECONOMICAL** - High performance, low power consumption, compact design

**FULLY INTEGRATED DESIGN** - No complicated external pipes or fittings to break or leak

**power & reliability**

whenever you need it

### AUTOPILOT DRIVE UNITS

- A range of professional hydraulic steering solutions for power and sailboats
- Designed and built to the highest standards
- Proven reliability and performance, with thousands of installations worldwide
- Patented piston pump offers pinpoint accuracy, high power and low consumption
- Multiple configurations ideal for installations with limited below deck space
- Compatible with all major brand autopilot systems

#### HYDRAULIC LINEAR DRIVES

Octopus linear drives are available with a huge range of stroke and pump sizes. Standard drives are available with the pump either mounted on the ram or separately. The LAU custom solutions offer 8 different configurations to suit virtually all installations.  

See pages 4 - 7

#### HYDRAULIC REVERSING PUMPS

Featuring a patented piston pump design which offers twice the power of competitor’s models, but with half the consumption, Octopus reversing pumps are suitable for steering rams sizes from 150cc to 500cc, with pinpoint accuracy and adjustable flow rates.  

See pages 8 & 9

#### CONSTANT RUNNING PUMPS

Constant Running Pumps are used in larger, heavy duty hydraulic steering systems where normal reversing pumps cannot be used. The precision pump includes an inbuilt hydraulic fluid reservoir and a tandem center solenoid control valve. 

See pages 10 & 11
**POWERFUL, EFFICIENT DRIVES FOR SAILBOATS**

- **RELIABLE** - Only three moving parts, increasing reliability
- **EFFICIENT** - Three times more efficient, half the battery consumption
- **TIME SAVING** - Rudder feedback option mounts directly on drive
- **ADJUSTABLE FLOW RATE** - Configure performance to suit your vessel

---

**HYDRAULIC REVERSING PUMPS**

**PROFESSIONAL SOLUTIONS FOR HYDRAULICALLY STEERED BOATS**

- **TWICE THE POWER**
  
  The unique Octopus piston pump delivers over twice the hydraulic output per watt of input than a standard hydraulic gear pump.

- **HALF THE CONSUMPTION**
  
  Gear pumps leak oil between the gears, while a piston (such as used in car engines) does not. This means the piston pump will place the cylinder ram exactly where it is required, positioning the rudder accurately. This gives far sharper steering, reducing unnecessary course corrections meaning battery consumption on Octopus pumps is up to half that of other pumps.

- **PINPOINT ACCURACY**
  
  Leading autopilot manufacturers choose Octopus pumps for their non RFB pilot systems which do not have a Rudder Feedback unit. Previously, slop in the system caused by gear leakage meant that a Rudder Feedback unit was necessary to tell the pilot the exact rudder position. As Octopus pumps will always bring the ram back to the required position the Rudder Feedback unit is not required, which also greatly simplifies installation.

- **SAVE ON INSTALLATION COSTS**
  
  A professional installation should always have a method of isolating the pump from the steering system - Octopus pumps feature inbuilt shut off valves in the pump manifold.

- **ADJUSTABLE FLOW RATE**
  
  A pump that does not have variable flow (unless dedicated to a range of cylinders such as our fixed 0.8L pump) will be operating too fast or too slow in 90% of cases. Autopilot manufacturers get around this problem by adjusting the output to the pump to compensate, which either forces the pump to operate for longer periods of time which increases power consumption and wear on the pumps, or it will operate at high pressure for short periods of time - also putting unnecessary strain and wear on the system.

Octopus Variable Flow Reversing Pumps precisely control the speed of the ram, reducing unnecessary battery consumption, pressure, strain and wear on the hydraulic system.

---

**GETTING THE BEST STEERING PERFORMANCE FOR THE BOAT**

The flow rate of the pump can be set to get the best ‘hard over time’ (cylinder ram speed) for the particular boat. There is a simple equation to calculate the hard over time:

\[
\text{HARDOVER TIME} = \text{CYLINDER (RAM) CAPACITY} \times \frac{60}{\text{FLOW RATE}}
\]

**EXAMPLE**

A boat has a 200cc steering cylinder (ram) and a 12 volt system. So either the OCTAF1012 or the OCTAF1212 would be suitable (see table below left). For this example we are using the OCTAF1212 which has a minimum flow rate of 600cc/min and a maximum flow rate of 1200cc/min.

- **MIN HARDOVER TIME**: 200 x 60 = 12 sec
- **MAX HARDOVER TIME**: 200 x 60 = 20 sec

The flow rate on the pump can be adjusted so that the hard over time is between 10 & 20 seconds - select which is most suitable for this particular boat.
hydraulic reversing pumps

THE BENEFITS OF AN OCTOPUS REVERSING PUMP

RELIABLE - Patented piston pump technology with only three moving parts
TWICE THE POWER - Delivers over twice the hydraulic output per watt of input
HALF THE CONSUMPTION - Accurate ram positioning means fewer course corrections
ADJUSTABLE FLOW RATE - Configure performance to suit your vessel
EASY SERVICING - Shut off valves allow removal without draining steering system

pinpoint accuracy...
...maximum performance

hydraulic linear drives

SUITABLE FOR BOATS UP TO 100FT (30.5M) - 64,000LBS (29,000KG)

PATENTLY BETTER
Octopus offer a full range of powerful, low current consumption hydraulic linear drives designed for long passage making. An independent comparison by the University of British Columbia* showed that Octopus piston pumps are three times more efficient than a gear pump and can be expected to halve the battery consumption when compared to a competitor’s unit, therefore doubling the effective range of the autopilot on one battery charge.

The drives are available either with the pump mounted on the cylinder or mounted separately.

* To see the full report visit www.octopuseurope.com

ADJUSTABLE FLOW RATE
A linear drive that does not have variable flow (unless dedicated to a range of yachts) will be operating either too quickly or too slowly in 90% of cases. Autopilot manufacturers get around this problem by adjusting the output to the pump to compensate. However, this either forces the pump to operate for longer periods of time which increases power consumption and wear on the parts, or the pump will operate at high pressure for short periods of time - also putting unnecessary strain and wear on the system.

Octopus variable flow reversing pumps precisely control the speed of the ram, reducing battery consumption, pressure, strain and wear on the hydraulic system.

http://www.octopusmarine.ca
http://www.octopuseurope.com
LAU hydraulic linear drives (custom solutions)

SMALL SPACE? THINK BIG!
GREATER FLEXIBILITY - 8 configurations allows you to choose the best for each boat
EASY TO SUPPLY, EASY TO SPECIFY - Available in kit form
LOW POWER CONSUMPTION - High precision technology halves battery consumption
QUIET OPERATION - Separate pumpset can be located for maximum noise suppression
HALF THE DRAG - 50% less backdrive friction when steering manually

POWERFUL DRIVES FOR TIGHT SPACES
The fixed design of traditional hydraulic linear drives means that there often isn’t enough room by the rudder, forcing you to settle for a less powerful alternative. Octopus LAU drives set you free from this limitation - the multiple configurations offer professional installers the versatility to pick the correct fitting combination to get the job done in a tight space - no more settling for second best!

TWICE THE FEEL ON THE WHEEL
Any helmsperson knows that feedback from the wheel is essential to efficiently steer a sailboat. The drawback to traditional hydraulic linear drives was the friction from backdriving the steering ram, which often killed this vital feedback. Not any more - the unique configuration of the LAU drives means 50% less drag than other drives, giving the benefit of more feel on the steering wheel.

MAXIMUM PERFORMANCE
Variable flow pumps professionally set the ram speed to ensure the performance is fine tuned to suit the exact steering characteristics of the yacht.

EASY TO SERVICE
The pumpset has inbuilt shutoff valves, recommended on all professional hydraulic installations - no more bleeding the system each time the pump is removed!

STANDARD HOSE LENGTH 6ft (2M)
Custom lengths available.

LAU hydraulic linear drives specification

FOUR DRIVE VERSIONS FOR YACHTS UP TO 80FT, 20 TONS
Each with eight possible configurations or in universal kit form:

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Custom lengths available.

Choose the best mounting option and include the relevant two letter code at the end of the part no. eg OCTAF1212LAU12FA.

FRONT MOUNTED BP VALVE & RESERVOIR OPTIONS

REAR MOUNTED BP VALVE & RESERVOIR OPTIONS

Drives

Order Codes

Features

Performance

Yacht Selection

<table>
<thead>
<tr>
<th>Drives</th>
<th>Order Codes</th>
<th>Average / Max Current</th>
<th>Features</th>
<th>Performance</th>
<th>Yacht Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>102LAU</td>
<td>2 - 6A / 10A</td>
<td>12V</td>
<td>38mm</td>
<td>500cc / 1.5 litres/min</td>
<td>178mm / 7in</td>
</tr>
<tr>
<td>122LAU</td>
<td>2 - 6A / 10A</td>
<td>24V</td>
<td>38mm</td>
<td>500cc / 1.5 litres/min</td>
<td>305mm / 12in</td>
</tr>
<tr>
<td>202LAU</td>
<td>6 - 8 / 22A</td>
<td>12V</td>
<td>45mm</td>
<td>600cc / 1.8 litres/min</td>
<td>228mm / 9in</td>
</tr>
<tr>
<td>222LAU</td>
<td>3 - 4A / 10A</td>
<td>24V</td>
<td>45mm</td>
<td>600cc / 1.8 litres/min</td>
<td>305mm / 12in</td>
</tr>
<tr>
<td>202LAU</td>
<td>6 - 8 / 22A</td>
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<td>305mm / 12in</td>
</tr>
</tbody>
</table>

Choose the best mounting option and include the relevant two letter code at the end of the part no. eg OCTAF1212LAU12FA.
**LAU hydraulic linear drives** (custom solutions)

**SMALL SPACE? THINK BIG!**

**GREATER FLEXIBILITY** - 8 configurations allows you to choose the best for each boat

**EASY TO SUPPLY, EASY TO SPECIFY** - Available in kit form

**LOW POWER CONSUMPTION** - High precision technology halves battery consumption

**QUIET OPERATION** - Separate pumpset can be located for maximum noise suppression

**HALF THE DRAG** - 50% less backdrive friction when steering manually

---

**FIGHT THE WHEEL...**

**...or make life easy**

---

**POWERFUL DRIVES FOR TIGHT SPACES**

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Variable flow pumps professionally set the ram speed to ensure the performance is fine tuned to suit the exact steering characteristics of the yacht.

**EASY TO SERVICE**

The pumpset has inbuilt shutoff valves, recommended on all professional hydraulic installations - no more bleeding the system each time the pump is removed!

**STANDARD HOSE LENGTH 6ft (2M)**

Custom lengths available.

---

**LAU hydraulic linear drives specification**

**FOUR DRIVE VERSIONS FOR YACHTS UP TO 80FT, 20 TONS**

Each with eight possible configurations or in universal kit form:

**FRONT MOUNTED BP VALVE & RESERVOIR OPTIONS**

<table>
<thead>
<tr>
<th>Order Codes</th>
<th>FEATURES</th>
<th>PERFORMANCE</th>
<th>YACHT SELECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Variable</td>
<td>Max Motor</td>
<td>Max Laden</td>
</tr>
<tr>
<td></td>
<td>Flow Rate</td>
<td>Torque</td>
<td>Displacement</td>
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<td></td>
<td>12 - 14 sec</td>
<td>750Nm</td>
<td>11,000Kg</td>
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<td>14 - 16 sec</td>
<td>1,200Nm</td>
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<td>16 - 18 sec</td>
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<td>45MM</td>
<td>600cc</td>
<td>50Kg</td>
</tr>
<tr>
<td>202LAU9</td>
<td>45MM</td>
<td>600cc</td>
<td>50Kg</td>
</tr>
<tr>
<td>202LAU12</td>
<td>45MM</td>
<td>600cc</td>
<td>50Kg</td>
</tr>
</tbody>
</table>

**REAR MOUNTED BP VALVE & RESERVOIR OPTIONS**

Choose the best mounting option and include the relevant two letter code at the end of the part no. eg OCTAF1212LAU12FA.
THE BENEFITS OF AN OCTOPUS REVERSING PUMP

RELIABLE - Patented piston pump technology with only three moving parts
TWICE THE POWER - Delivers over twice the hydraulic output per watt of input
HALF THE CONSUMPTION - Accurate ram positioning means fewer course corrections
ADJUSTABLE FLOW RATE - Configure performance to suit your vessel
EASY SERVICING - Shut off valves allow removal without draining steering system

only three moving parts!

pinpoint accuracy... ...maximum performance

The drives are available either with the pump mounted on the cylinder or mounted separately.
* To see the full report visit www.octopuseurope.com

ADJUSTABLE FLOW RATE
A linear drive that does not have variable flow (unless dedicated to a range of yachts) will be operating either too quickly or too slowly in 90% of cases. Autopilot manufacturers get around this problem by adjusting the output to the pump to compensate. However, this either forces the pump to operate for longer periods of time which increases power consumption and wear on the parts, or the pump will operate at high pressure for short periods of time also putting unnecessary strain and wear on the system.

Octopus variable flow reversing pumps precisely control the speed of the ram, reducing battery consumption, pressure, strain and wear on the hydraulic system.

SUITABLE FOR BOATS UP TO 100FT (30.5M) - 64,000LBS (29,000KG)

PATENTLY BETTER
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\[
\text{HARDOVER \ TIME} = \frac{\text{CYLINDER (RAM) \ CAPACITY}}{\text{FLOW RATE}} \times 60
\]

**EXAMPLE**
A boat has a 200cc steering cylinder (ram) and a 12 volt system. So either the OCTAF1012 or the OCTAF1212 would be suitable (see table below left). For this example we are using the OCTAF212 which has a minimum flow rate of 600cc/min and a maximum flow rate of 1200cc/min:

- **MIN HARDOVER TIME**: 200 x 60 = 10 sec 1200
- **MAX HARDOVER TIME**: 200 x 60 = 20 sec 600

The flow rate on the pump can be adjusted so that the hard over time is between 10 & 20 seconds - select which is most suitable for this particular boat.
Hydraulic constant running pumps

**HIGH PERFORMANCE, LOW POWER CONSUMPTION**

- **POWERFUL** - Suitable for steering cylinders up to 200 cu in (3500 cc)
- **ECONOMICAL** - High performance, low power consumption, compact design
- **FULLY INTEGRATED DESIGN** - No complicated external pipes or fittings to break or leak

**POWER & RELIABILITY** whenever you need it

---

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---

**SEE PAGES**

- 4 - 7: HYDRAULIC LINEAR DRIVES
- 8 & 9: HYDRAULIC REVERSING PUMPS
- 10 & 11: CONSTANT RUNNING PUMPS
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OCTOPUS PRODUCTS

HYDRAULIC REVERSING PUMPS

• Large capacity reservoir for cool running in all climates
• Long life mechanical seal between motor and pump
• Heavy-duty ball bearing electric motors
• Inbuilt pressure gauge
• Adjustable pressure relief valve (100 - 1200psi)

CRB PUMPSET ORDER CODE

CRB FF - VV - P - F - R

 eg CRA02-12-F-R 2000cc/min, 12v with flow control & relief valve

CRB PUMPSET ORDER CODE

CBR FF - VVV - SS - O

 eg CBRO6-11S-22-C 6000cc/min, 110/220v single phase with 220v AC solenoid, two speed with flow control

SAFETY IN identities

HYDRAULIC STEERING SYSTEMS

PUMP SELECTION
The pump selected must match the size of the vessel’s steering ram and the power supply capability of the autopilot must also be considered. For optimum autopilot performance the pump should be able to drive the rudder hardover from lock to lock within 13-15 seconds. The drive flow rate should be approximately four times that of the steering ram volume.

CRA PUMPS
• For steering cylinders up to 60cu in (1000cc)
• CRA pumps deliver over 500psi (35 bar) and are very economical, typically drawing under 150 watts
• DC models: 12v, 24v or 32v
• Wide flow range - units available with max flow rates from 0.5gpm (2000 cc/min) up to 1gpm (4000 cc/min) with adjustable flow control and dual speed options
• As the solenoids only draw 12 watts, the pump can be driven directly from the autopilot course computer without a relay, significantly reducing installation costs
• Inbuilt shut off valves mean the pump can be removed for servicing without draining the steering system

CRB PUMPS
• For steering cylinders up to 200cu in (3500cc)
• Available as a simple pump unit, a motor and reservoir combination to replace an engine driven pump or fitted with a direction solenoid valve
• DC models: 12v, 24v or 32v
• AC models: 110v or 220v single phase
• Wide flow range - units available with max flow rates from 1gpm (4000 cc/min) up to 3.5gpm (13,000 cc/min) with adjustable flow control and dual speed options
• Adjustable pressure relief valve (100 - 1200psi)
• Inbuilt pressure gauge
• Heavy-duty ball bearing electric motors
• Long life mechanical seal between motor and pump instead of a lip seal, which wears a groove in the shaft
• Large capacity reservoir for cool running in all climates

ACCESSORIES

www.octopusmarine.com
www.octopusmarine.ca

Octopus UK

www.octopusmarine.com
www.octopusmarine.eu

Constant Flow Regulator Valve. This regulator valve runs with an engine driven pump and is usually fitted to commercial boats that require a constant hydraulic flow for use with a steering cylinder for an autopilot. Please refer to our website or contact us for the possible different versions available.

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