



# *HyDrive* HD Series

HYDRAULIC STEERING FOR LEISURE  
& COMMERCIAL POWER & SAIL

[WWW.HYDRIVE.COM.AU](http://WWW.HYDRIVE.COM.AU)



## THE HYDRIVE DIFFERENCE

HyDrive Engineering Pty Ltd began manufacturing hydraulic boat steering equipment in South Australia in 1966 and since that time, has been one of the world leaders in boat steering technology. The largest manufacturer in the Southern Hemisphere, HyDrive boasts sales of more than 600,000 units around the world.

HyDrive's huge market in small boat steering systems has led to increased production facilities, expansion of extensive quality control and testing procedures, and considerable investment in product design and development.

The range of steering has increased dramatically over the past 50 years with emphasis on the growing requirement for more efficient and powerful steering equipment to handle larger vessels, and increased horsepower on smaller vessels.

HyDrive has a product range suitable for leisure and commercial vessels, both power and sail from 5 metres to over 100 metres.

### High Performance and Australian Made

- HyDrive manufacture using only optimum materials for exposure to harsh marine environments.
- Safety margins on our equipment exceed the requirements of Marine Survey Societies.
- Each product you purchase has been fully tested - we do not batch test.
- HyDrive will constantly strive to provide cutting-edge technology.
- Full support through HyDrive's worldwide dealer network.



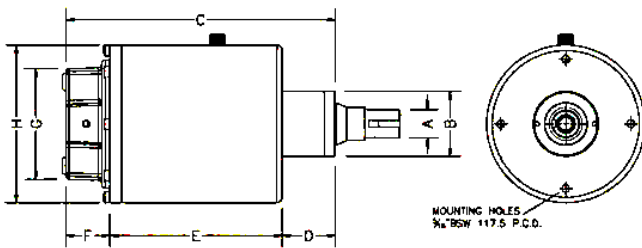


# HYDRIVE HEAVY DUTY SERIES HELM UNITS

- HyDrive's 2000 Series helms have proven their performance over the last 50 years. The unique anti-wear porting design has been retained in the HD series, making them the most durable and efficient pump in their class.
- The HD Series helms are available in a wider range of displacements to meet the increasing demand for larger manual hydraulic steering systems.
- Designed for use with the HyDrive HD Series cylinders, multiple steering stations are simple to install, and offer a range of torques from 100KgM to over 2600KgM making them suitable for most vessels up to 50 Metres.



- Model 103 - 105  
These helms are supplied with fittings to suit 1/2" copper tubing only.
- Model 103 Helm units are supplied with 3/4" taper shafts as standard. Parallel shafts are available as an option.
- Model 104 and 105 units are supplied with 1" Parallel shafts as standard. 3/4" taper shafts are available as an option on model 104 only.
- Model 106 - 107 These helms are supplied with 1" parallel shafts and fittings to suit 5/8" diameter copper tubing only.
- Model 103 to 107 do not have in-built lock valves. When used in dual stations they require the use of lock valves to prevent counter-rotation. Should feed-back be required on one or both stations, one of the manual or electric locking options should be used.  
(See section on feedback options)



## DISPLACEMENTS

- Model 103 - 2.00cu ins (35cc) per rev
- Model 104 - 2.6 cu ins (43cc) per rev
- Model 105 - 5.2 cu ins (86cc) per rev
- Model 106 - 7.5 cu ins (125cc) per rev
- Model 107 - 10 cu ins (165cc) per rev

MODEL	A	B	C	D	E	F	G	H
103	T	59	244	48	156	40	102	144
104	P	59	244	48	156	40	102	144
105	P	59	244	48	156	40	102	144
106	P	59	276	48	182	46	112	170
107	P	59	276	48	182	46	112	170

T=3/4" dia TAPER(1"per ft) SHAFT -3/4 X 3/16" WOODRUFF KEY  
P=1"dia PARALLEL SHAFT - 1/4" X 1" SQUARE KEY

## Manual Emergency Steering for Power Assisted Systems

The HyDrive HD Series helm units are ideally suited for use with large power steering systems and can provide emergency manual backup steering at working pressures up to 1000psi. These helms install into the power steering circuit and are isolated by means of 3-way ball valves until required in order to maintain total system integrity. For emergency use, they are fully compatible with most hydraulic fluids used in power-assisted systems.

## HD Series Cylinders

This range of cylinders are designed and constructed exclusively for use on boat steering equipment, and are made from the finest marine-grade materials available. They feature 316 stainless steel piston rods (not hard-chromed), high tensile bronze and brass end-caps and mounting brackets, and fully articulated attachments for the most durable performance.

The HD150, 175, 200 and 250 model cylinders are supplied with a spherical rod-end for attachment to the tiller arm and include a heavy duty stainless steel pin and nut set. The unique rod-end is made entirely from bronze and stainless steel, greased through the centre for maximum wear protection, and is fully wear adjustable. The huge HD400 cylinders are supplied with an all-stainless steel spherical rod end with in-built lubrication.

The perfect match for the HD Series helm units, HyDrive cylinders are available in a range of sizes and strokes to cater to a wide range of rudder torque capacities for all types of vessels, power or sail, leisure or commercial.



**CYLINDER CAPACITY, TILLER LENGTH and TORQUES**

**HELM TURNS HO/HO FOR VARIOUS CYLINDERS**

Cylinder Model	Stroke inches	Tiller inches	Torque KgM	Volume cc's	Helm 103	Helm 104	Helm 105	Helm 106	Helm 107
150-9	9	8.0	107	172	4.9	4.0	2.0	1.4	1.0
150-9 x 2	9	8.0	215	344	10	8	4	3	2
150-12	12	10.7	143	229	6.5	5.3	2.7	1.8	1.4
150-12 x 2	12	10.7	286	458	13	11	5	4	3
175-10	10	8.9	185	296	8.4	6.9	3.4	2.4	1.8
175-10 x 2	10	8.9	369	591	17	14	7	5	4
175-12	12	10.7	221	355	10.1	8.2	4.1	2.8	2.1
175-12 x 2	12	10.7	443	709	20	16	8	6	4
200-12	12	10.7	289	463	13.2	10.8	5.4	3.7	2.8
200-12 x 2	12	10.7	578	927	26	22	11	7	6
200-15	15	13.4	362	579	16.5	13.5	6.7	4.6	3.5
200-15 x 2	15	13.4	723	1158	33	27	13	9	7
250-12	12	10.7	506	811	23.2	18.9	9.4	6.5	4.9
250-12 x 2	12	10.7	1012	1622	46	38	19	13	10
250-15	15	13.4	633	1014	29.0	23.6	11.8	8.1	6.1
250-15 x 2	15	13.4	1265	2027	58	47	24	16	12
400-12	12	10.7	1326	2124	60.7	49.4	24.7	17.0	12.9
400-12 x 2	12	10.7	2651	4247	121	99	49	34	26





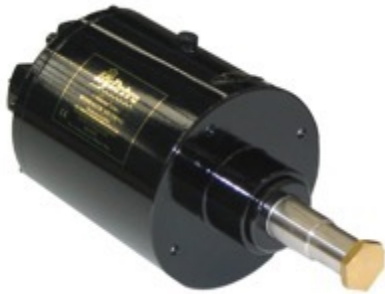
## YACHT AND CATAMARAN STEERING

### Yacht Steering with feedback

HyDrive introduce an Evolution in Yacht Steering.

Simple installation with hydraulic tubing that can be run literally anywhere on the boat - no more straight line cables, pulleys, or sheaves.

- Instant movement - No slack
- Fully compatible with hydraulic autopilots
- Totally Manual - no power required
- Ease of fitting to wind-vanes



### The ultimate for yacht feedback

The unique oil balanced design make these HyDrive's HD helm units the ultimate for yacht steering feed-back to the wheel.

The efficiency of the design means that even small loads can be sensed at the wheel, giving the "feel" of mechanical steering with all the safety and advantages of hydraulics.

(See previous page for torque specifications & turns ratios)



### Catamaran steering without a Tie-Rod

HyDrive is recognised as the market leader in hydraulic steering for catamarans, both power and sail, inboard or outboard, and is the specialist in fluid-link steering systems.

Fluid-Link is the term for two independent cylinders connected via a simple valve and controlled by the helm unit like any standard steering. The valve allows the cylinders to be aligned to each other, and synchronisation is maintained by the quality of the cylinders and seals themselves.

While a mechanical tie-rod is the most reliable system, on many power and sailing cats this is impossible to achieve.

A Fluid-Link therefore is the perfect solution offering fast, responsive, and reliable steering.

All hydraulic circuits of this type will eventually fall out of synchronisation; however, the high quality bore finish and seal design of a HyDrive unit will offer maximum performance before realignment may be necessary.

Precision, quality and intelligent design  
are the keys to this evolution in steering

## Feedback options for sailboats

Many yacht sailors prefer to maintain a high degree of feedback, or feel, from their steering systems and traditionally this has been limited to cable steering. Now, with the range of HD Steering units, this is fully achievable with hydraulics.

In some instances however, feedback can be a disadvantage for either an autopilot, or for pure comfort in heavy conditions.

HyDrive offer the following accessories:

### ELECTRIC BY-PASS

With Dual Stations or Single Stations fitted with HYDRAULIC autopilots, the helms (pumps) require isolation from each other to prevent motoring each other under pressure and failing to steer the boat accurately. The FEEDBACK-DS12V (for 12vDC or FEEDBACK-DS24V for 24Vdc) unit incorporates a dual lock valve for isolation of the two stations. This lock valve is automatic and does not prevent normal operation of the steering. Simply turning the wheel operates the valve and the steering functions normally. When you stop rotating the wheel the valve self-locks and prevents the helm from being motored under pressure. In effect this then removes ALL feedback.

To allow feedback, the unit has twin by-pass solenoids which divert the oil flow around the valve to the main steering helm unit and gives that station full feel. The valve can be activated by either a separate switch, or, if fitted to an autopilot, will turn off the feedback every time the pilot is turned ON. Switching the pilot OFF returns feed-back to the steering wheel.

### MODELS AVAILABLE FOR SINGLE STATIONS

Where someone wants the option of turning feel ON or OFF on the system, there is a similar model available for single stations. The Part Number FEEDBACK-SS12V or FEEDBACK-SS24V is smaller and more compact than the dual unit.

### MANUAL CONTROL OF FEEDBACK

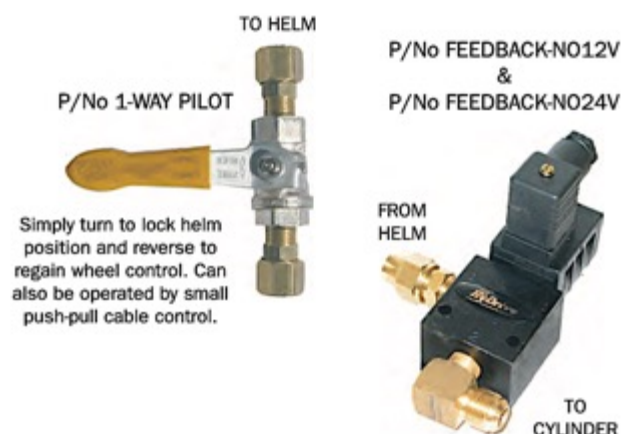
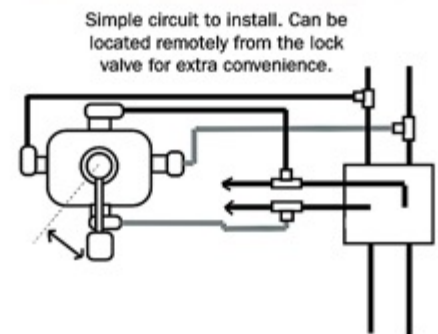
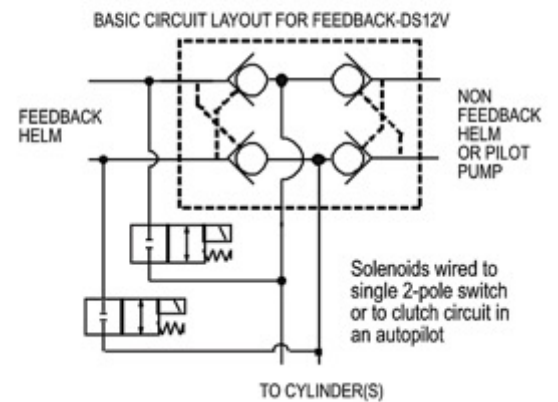
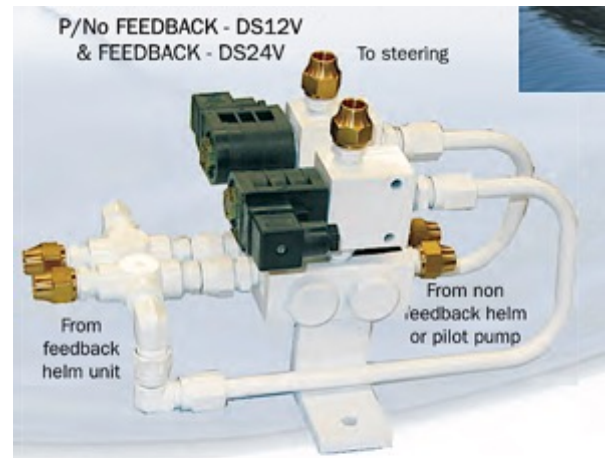
Where optional feedback is required, there is a manually operated alternative to the electric powered solenoid. This valve by-passes the Dual Station lock valve or Single Station lock valve in the same way as the electric version above. Part Number "FEEDBACK" can be mounted remotely from the lock valve, making it easier to operate from the helm position.

### MANUAL LOCKING OF HELM

If an autopilot is fitted, and where feel is required at ALL the time, by installing a single manual valve in ONE of the cylinder lines, you can lock the helm unit and prevent it from being turned. This not only prevents the autopilot from moving the helm, but also the steering wheel - just like a brake. This is a popular option where feel is to be retained at all times; however, the ability to lock the wheel for a spell is essential. Simple to fit, it needs to be placed where it can be easily operated. Alternatively, it can be activated by a push-pull cable unit.

### ELECTRIC LOCKING OF HELM

An electric version of the same principle is available. Part No FEEDBACK-NO12V (12Volt DC) and FEEDBACK-NO24V (24Volt DC) valves can lock one single line to the helm with the flick of a switch and is very simple to install.





## REMOTE BY-PASS VALVES FOR FLUID-LINK CATAMARANS

For larger vessels where manual activation of the manual by-pass valves (CatN8, 330C etc) are difficult, a remotely activated 12 or 24VDC bypass valve can be fitted. This allows alignment by the simple flick of a switch, and is adjusted by using the steering wheel and rudder angle indicators.

Valves come with blank female ports, and fittings are an additional cost. Valves need to be correctly selected to fit the tubing used in the installation.

## LINEAR DRIVE CYLINDERS

The same valve with a NORMALLY OPEN configuration can be used to allow hydraulic linear drive cylinders to float when not being used by an autopilot.

## AUTOPILOT ISOLATION VALVES

The 2-WAY PILOT is used to isolate the pilot pump from the main steering lines, and the 1-WAY PILOT is used to isolate the balance line. These two valve types are essential to maintain manual steering in the event of pilot pump failure or service.

## LOCK VALVES

The 331C lock valve is a single double acting lock valve designed to prevent load motoring the helm unit. This should be used where the autopilot has a lock valve of it's own, or to eliminate feedback from a highly active rudder.

The 318C lock valve is a dual double acting lock valve and should be used on all dual station installations using 103-107 helm units, unless feedback is required (see feedback options).

These valves are available with various fittings and kits to make dual station installations very simple.

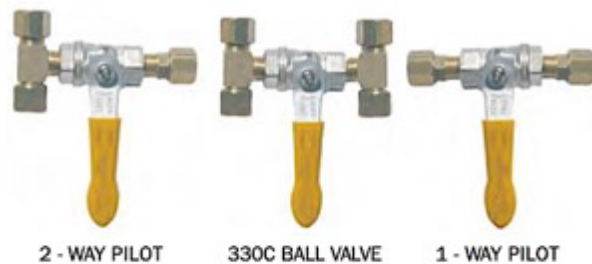
## EXPANSION TANK KIT

Where the combination of helm size, tubing size, and run length result in a large oil volume in the system, it may be necessary to fit an expansion tank - particularly in areas where there is a large variation in temperature. This tank can be fitted to any of the model 103-107 helm units, and is usually located behind the console, out of sight - either higher or lower than the helm unit - eliminating any problems due to oil expansion.

## OTHER FITTINGS

HyDrive provides a wide range of fittings to help make your installation complete. The chrome brass bulkhead fittings are a perfect solution to pass through fibre glass transoms and engine wells.

Copper, steel, and stainless steel tubing, and matching fittings - are also available.



A range of fittings is available.