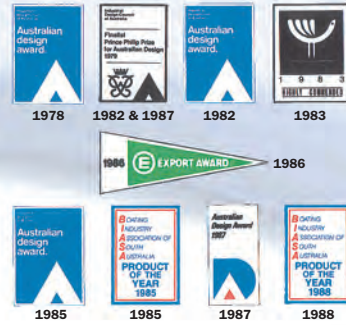




**HyDrive**  
**HD Series**

**HYDRAULIC STEERING  
FOR PLEASURE & COMMERCIAL  
POWER AND SAIL**



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, extensive quality control and testing procedures, and considerable investment in product design and development.

The range of steering has increased dramatically over the past 20 years with considerable emphasis being placed on the growing need for more efficient and powerful steering equipment to handle larger vessels, and larger horsepower on smaller vessels. Now, HyDrive has a product range which caters to all types of vessels from 5 metres to over 100 metres.

The pedigree of HyDrive steering systems includes a host of accolades and awards for design excellence over the years, including 4 Australian Design Awards, 2 Prince Phillip Prize Finalists, Premier's Award for design excellence, 2 Boating Industry Association awards for innovation, and several other commendations. Whilst this may mean little to a customer, it actually reflects the constant striving for performance and excellence that has made HyDrive a leader in the field of boat steering equipment.

**What you expect from a HyDrive product.**

- You can expect that HyDrive manufacture their products using only optimum materials for exposure to the harsh marine environment.
- You can expect that safety margins on our equipment exceed the requirements of Marine Survey Societies.
- You can expect that each product you purchase has been fully tested - we do not batch test.
- You can expect that HyDrive will constantly strive to provide cutting-edge technology and offer you the most reliable equipment available on the market.
- You can expect to be fully supported quickly and efficiently by our worldwide warranty network.

**You can expect the steering unit to exceed your expectations.**

For further information and the name of your nearest distributor, contact:-

**HyDrive Engineering Pty Ltd**

59 Wingfield Road, Wingfield  
 South Australia 5013  
 Int Tel +61 8 82431633  
 Int Fax +61 8 84457938  
 Email: [sales@hydrive.com.au](mailto:sales@hydrive.com.au)  
 Website: [www.hydrive.com.au](http://www.hydrive.com.au)



# HYDRIVE ADMIRAL HD SERIES HELM UNITS

*Helm Units*

**Intelligent and efficient internal design ensures optimum performance and maximum durability under the most extreme conditions.**



**INBOARDS • COMMERCIAL**

HyDrive has released a new range of manual helm units with increased capacity, incorporating some of the unique design features that made the “2000 Series” helm units the most awarded steering design in marine history.

The 2000 Series helms have proven their performance over the last 37 years and have received 5 awards for design excellence. The unique anti-wear porting design has been retained in the new HD series, making them arguably the most durable and efficient pump in their class.

The HD Series helms with an increased efficiency rating of around 30%, are also available in a wider range of displacements to meet the increasing demand for larger manual hydraulic steering systems.

The new models are fully interchangeable with the older HyDrive models, and due to new technology used, the helm units are more compact in size than their predecessors.

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.

- **Stainless steel shafts**
- **Fully chromate-converted aluminium housing, coated in polyurethane for maximum corrosion resistance**
- **Fully pressure-compensated for wear resistance**
- **High pressure rating**
- **High safety factors**
- **Designed for use with HyDrive ULTRA-15 hydraulic fluid**

## Model 103 - 105

These helms are supplied with fittings to suit 1/2” copper tubing only.

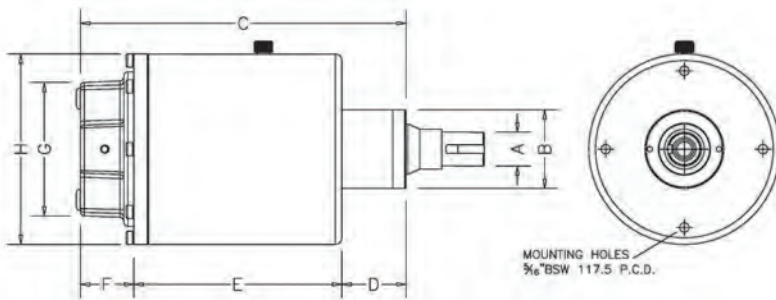
**Model 103** Helm units are supplied with 3/4” taper shafts as standard. Parallel shafts are available as an option.

**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)



**Model 103,104,105,106 &107 HELM PUMP DIMENSIONS**

MODEL	A	B	C	D	E	F	G	H
103	T	59	303	48	156	40	102	143
104	P	59	303	48	156	40	102	143
105	P	59	303	48	156	40	102	143
106	P	59	334	48	182	46	112	170
107	P	59	334	48	182	46	112	170

T = 3/4" dia TAPER( 1" per ft) SHAFT - 3/4"x3/16" WOODRUFF KEY  
 P = 1" dia PARALLEL SHAFT - 1/4"x1" SQUARE KEY

## 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

## 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

*HD Series*

## HD Series Cylinders - The Pride of the Fleet

This superb 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.



### RUDDER TORQUES TO 2600 KgM

HD150, 175 & 200 Cylinder Type

HD250 Cylinder Type

HD400 Cylinder Type

Bronze/Stainless Spherical Rod-end assembly complete with s.s mounting bolt and lock nuts.

### 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

HD Series Cylinders are manufactured to the highest standards and safety margins. They meet all requirements of International Survey Societies, CE, ABYC & NMMA



# YACHT AND CATAMARAN STEERING

## Steering

### Yacht steering WITH feedback

CATAMARANS • SAILBOATS

Many traditional sailors have resisted changing to hydraulic steering due to a loss of feel or feedback common with many of the hydraulic systems on the market.

With the introduction of the new Admiral HD Series helm units, HyDrive introduce an Evolution in Yacht Steering.

As a result of years of intense research and development, HyDrive Hydraulic steering offers huge advantages for sailing boats :-

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
- Safety and reliability that only hydraulics can offer.  
(You trust hydraulics to stop you safely in your car)
- Cost savings on expensive quadrants (Overall costs on a complete hydraulic system will most likely work out considerably less that of an equivalent cable system of equal quality and power)



HD Series  
Model 106 - 107



HD Series  
Model 103 - 105

### The ULTIMATE for Yacht feedback

The new improved performance and unique oil balanced design make these helm units the ultimate for yacht steering where feed-back to the wheel is required. 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)

**Precision, quality and intelligent design are the keys to this revolution in steering.**



Fluid - Link systems can be handled by any of our HD or Admiral Series systems.



### Catamaran steering WITHOUT a Tie - Rod

HyDrive is now 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 most cats this is impossible to achieve. A Fluid-Link therefore offers the perfect solution to a major problem, and gives fast, responsive, and reliable steering.

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

# FEED BACK OPTIONS FOR SAILBOATS

*Feedback*

Many yacht sailors prefer to maintain a high degree of feed-back, or feel, from their steering systems and traditionally this has been limited to cable steering. Now, with the new Admiral 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. The following accessories are available.

## 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

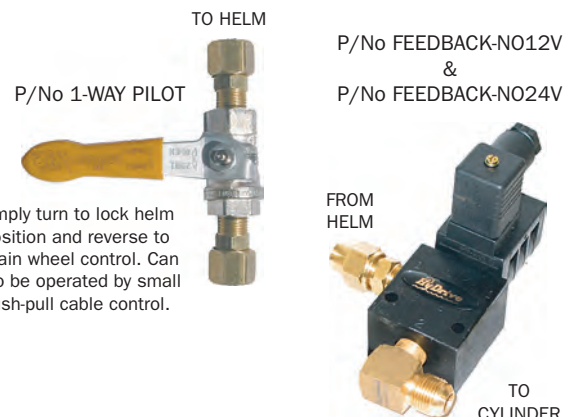
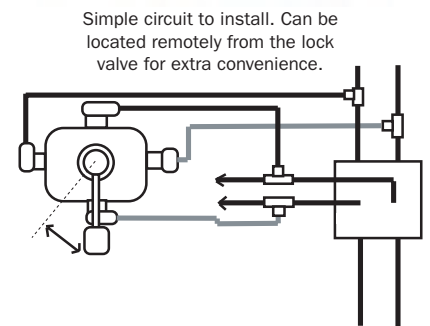
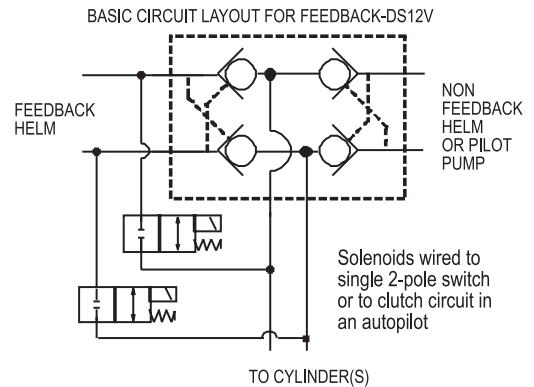
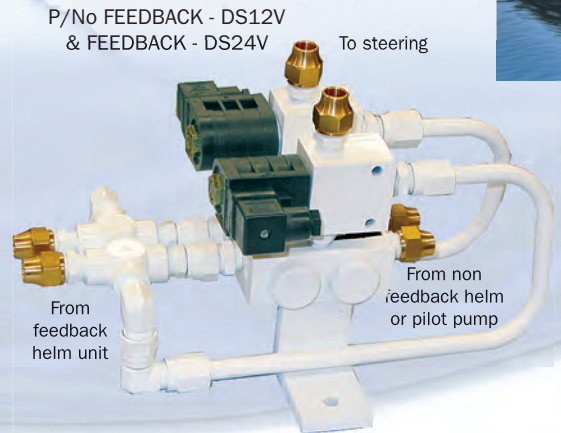
Where optional feedback is required, there is a manually operated alternative to the electric powered solenoid. This valve by-passes the Dual Station lock valve or Single Station lock valve in the same way as the electric version above. Part Number "**FEEDBACK**" can be mounted remotely from the lock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

## MANUAL LOCKING OF HELM

If an autopilot is fitted, and where feel is required 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 quite popular where feel is to be retained at all times, but 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. P/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.



## WHICH UNIT WILL FIT MY BOAT?

*Which one?*

### For Outboards or Sterndrives

GENERAL INFORMATION

For outboard steering selection, the most important requirement is the amount of room available either side of the outboard motor. Unless you have a pair of very large horsepower motors, any of the kits, from the Sportkit to the powerful OBKIT1 using the 210BH cylinder, can steer your boat. The ultimate decision comes down to a combination of personal preference, your budget, and the amount of engine-well space available. The drawings on the rear page provide you with the minimum space required for each type of cylinder. Please ensure that the measurement is taken at the narrowest section of your engine well - particularly with tapered wells, as the cylinder tilts down with the motor. Keep in mind however, that for some boats which have plenty of available space, or have the motors mounted on pods, the OBKIT1 using the 210BH cylinder may be the most practical for installation to allow for boarding ladders, ski-ropes, or other obstacles.

### For Outboards or Sterndrives

Selection of steering for inboard rudders is not as simple as for outboard or sterndrive powered vessels. Each rudder design has its own characteristics which are affected by vessel speed, propeller diameter/pitch, horsepower, tunnels, nozzles etc and this makes selection a matter of calculation, rather than selecting one model to suit all. There is a questionnaire available from our website (or your dealer) which, when completed and forwarded to us, or your HyDrive supplier, gives all information required to calculate the rudder torques on your vessel. Keep in mind that there is no single formula which can take all types of vessel into account.. We need more information than simply the rudder dimensions, to give you peace of mind that the unit recommended will perform safely and correctly.

### Contents of a KIT

Each standard Admiral Kit comes in a single carton with the following items:-

- Admiral Series Model 401 Helm
- 2 litres HyDrive ULTRA-15 fluid
- 15 metres ( 50ft) high pressure 3/4" od hydraulic tubing\*
- Installation Instructions
- All fittings to suit
- Bleeder Kit
- The Cylinder type of your choice

In short - you get everything except a steering wheel. What could be simpler. No complicated part numbers - just a simple KIT number.

\* MERCKIT & VOLVOKIT do not include tubing

### Dual Stations

Multiple stations are very simple to install and provide the helmsman with instant and light control from any number of steering positions. Ideal for fly bridge, rear deck, or tuna tower consoles, complete Dual Station Kits which include lock valves and all other fittings are available to make your installation very simple indeed.

### Autopilots

Admiral Series helm units are designed for use with hydraulic autopilots, and have in-built lock valves and balance-line ports to ensure simple and economic installation. The HD Series helm units are also designed for use with hydraulic autopilots and require the fitting of external lock valves (Part No 331C or 318C) to isolate the helm from the pilot pump unit. (See also section on Feedback Options for Sailboats)

### Catamarans

If you have inboards, outboards, sterndrives or jets, HyDrive has a fluid-link circuit design that will allow your steering to operate without mechanical tie-rods. (See previous page on Catamarans)

### Installation

Installation of HyDrive steering equipment is very simple. From the minute you open the box and begin to read the comprehensive instructions, you will find the system has been designed to be installed by even the most inexperienced boating enthusiast without any hydraulic knowledge. Everything you need is included, right down to the nuts, bolts, and loctite.

### Warranty

HyDrive Admiral series units are warranted for a period of 2 years from date of sale. (All Sportkit cylinders and complete steering systems on commercial vessels limited to 12 months)



**OBKIT1** Complete kit featuring the **211 BH** cylinder



# ACCESSORIES

*Accessories*

## 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.



BYPASS - NC12V  
BYPASS - NC24V  
For use with  
Catamarans

BYPASS - NO12V  
BYPASS - NO24V  
For use with  
Linear Drives

## 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.



Part No - RAI

## 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.



2 - WAY PILOT

330C BALL VALVE

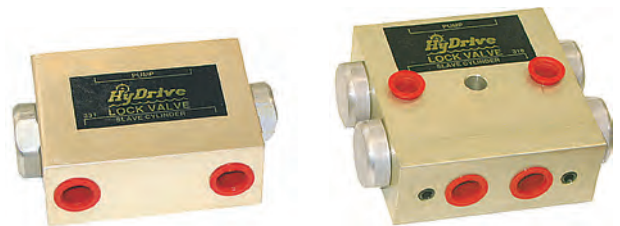
1 - WAY PILOT

## 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.



331 LOCK VALVE

318 LOCK VALVE

## 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.



BULKHEAD FITTINGS



EXPANSION KIT



## 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.



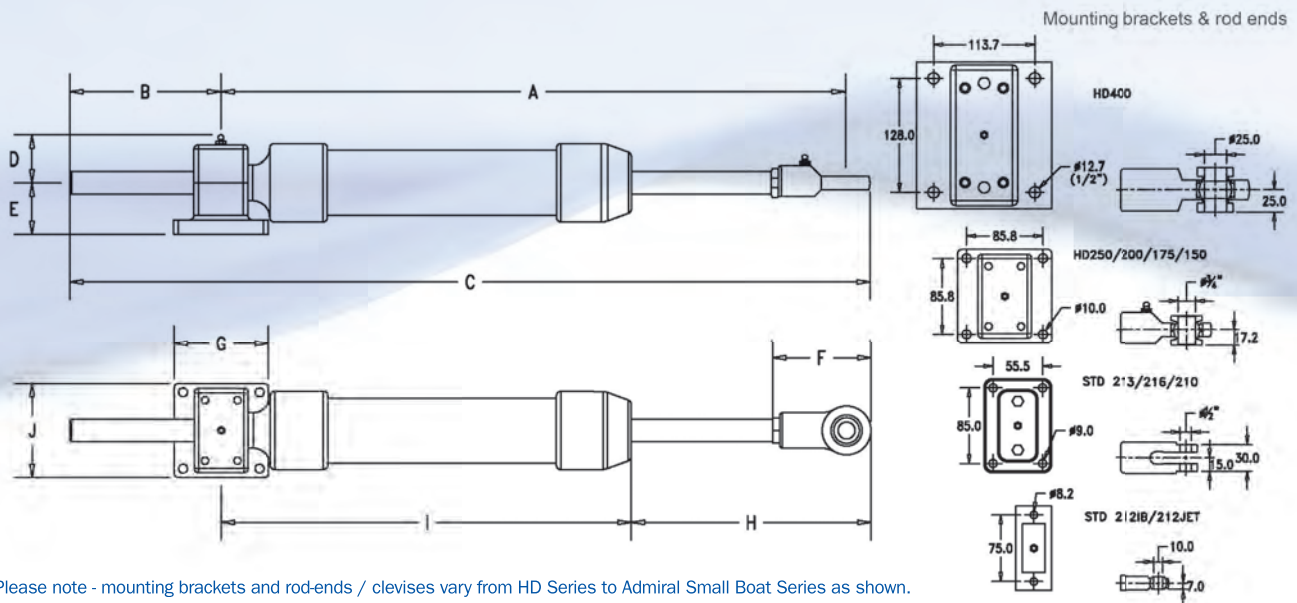
A range of fittings is available.

ACCESSORIES





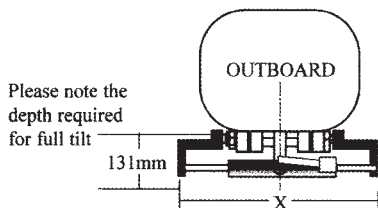
# HD SERIES CYLINDER DIMENSIONS



Please note - mounting brackets and rod ends / clevises vary from HD Series to Admiral Small Boat Series as shown.

MODEL	STROKE	A	B	C	D	E	F	G	H	I	J
212JET	104	356	74	442	35.5	37	64	40	120	250	95
212STD	182	469	111	594	35.5	37	64	40	157	326	95
210STD	204	527	121	661	41	47	95	76	210	330	106
216STD	204	527	121	661	41	47	95	76	210	330	106
213STD	204	527	121	661	41	47	95	76	205	335	106
HD150-9	229	547	149	750	57.5	58	111	106	231	370	106
HD150-12	305	688	187	902	57.5	58	111	106	268	447	106
HD175-10	254	611	161	799	57.5	58	111	106	242	396	106
HD175-12	305	687	187	902	57.5	58	111	106	268	447	106
HD200-12	305	687	187	902	57.5	58	111	106	268	447	106
HD200-15	381	802	225	1054	57.5	58	111	106	306	523	106
HD250-12	305	703	187	918	57.5	58	111	106	268	463	106
HD250-15	381	818	225	1070	57.5	58	111	106	306	539	106
HD400-12	305	864	205	1106	75	85	161	152	342	561	165

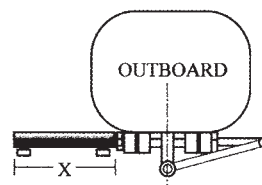
## OUTBOARD AND STERNDRIVE CYLINDER DIMENSIONS



Clearance requirements for the following cylinder types

"X" =

- 210BH - 615mm (24")
- 211BH - 540mm (21")
- 212BH - 492mm (19.4")
- 411BH - 540mm (21")



Clearance requirements for the following cylinder types

"X" =

- 210T - 540mm (21.2")
- 210TSE - 330mm (13")
- 212T - 315mm (12.4")

Model	A	B	C	D	E	F	G	H	I	J	K
212	15.25" (388)	18.75" (476)	22.25" (565)	7" (178)	7.625" (194)	2.75" (70)	-	3" (76)	3.75" (95)	1.5" (38)	1.5" (38)
210, 213,216,	16.5" (419)	20.75" (527)	24.5" (622)	8" (203)	9.25" (235)	3.25" (82.5)	2.1" (55)	3.3" (85)	4.25" (108)	3" (76)	2" (50)

### TORQUE OUTPUT AND TURNS DETAILS

KIT Number	Cylinder	Used for	Turns Ho/Ho	Torque	Cylinder Volume
OBKIT1*	211BH	Outboards	5.4	85KgM	154cc
OBKIT1-HP	210BH	Outboards	5.4	85KgM	154cc
BOSUNKIT-1	411BH	Outboards	5.4	85KgM	154cc
OBKIT2	210T	O/B & S/Drive	5.4	85KgM	154cc
OBKIT3	210T	O/B & S/Drive	5.4	85KgM	154cc
PROKIT	212BH	Outboards	4.5	80KgM	135cc
SPORTKIT	212T	O/B & S/Drive	3	40KgM	78cc
SPORTKIT2	212	Inboards & Jets	3	40KgM	68cc
IBKIT1	210	Inboards & Jets	5.4	85KgM	154cc
IBKIT2	210SE	Inboards & Jets	5.4	85KgM	154cc
IBKIT3	216	Inboards	4.5	80KgM	137cc
IBKIT4	213	Inboards	6	110KgM	175cc

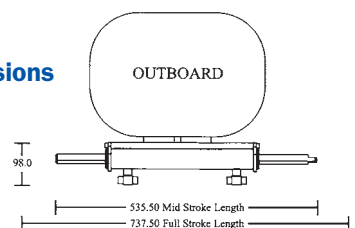
\*Designate model OBKIT-H for HONDA outboards.

\*\*Note: Some other kits are available for specialist installations.

All kits use Model 401 Helms as standard. Model 402 helms can be substituted if desired, reducing turns Ho/Ho by approx. 1 turn.

POWERKIT-12 Torque figures are the same as those of the manual systems shown.

### 216FM Dimensions



QUITE SIMPLY THE BEST