HYDRAULIC STEERING SYSTEMS

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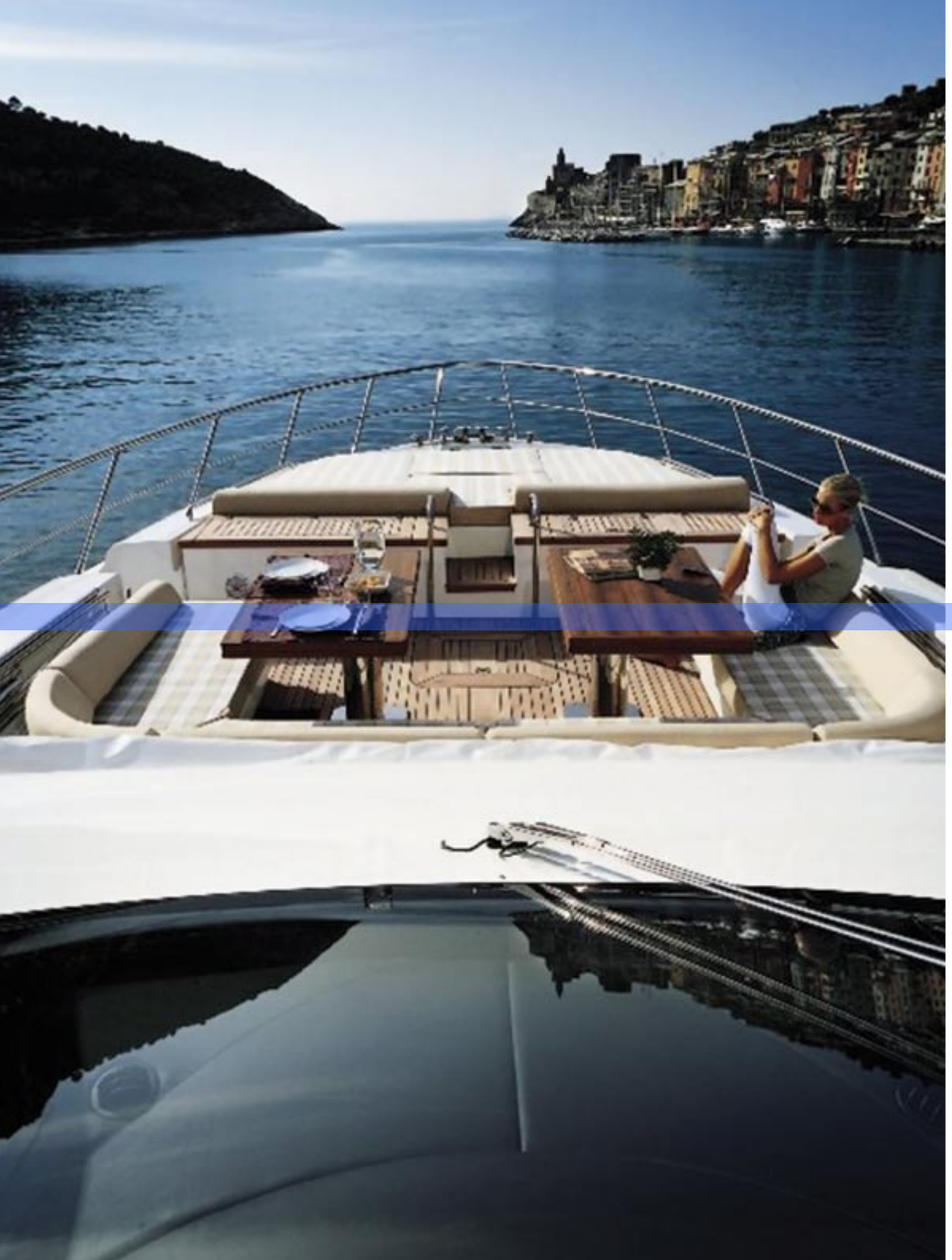

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All B.C.S. products cannot be installed on racing boats without B.C.S. previous authorization.

After nearly 50 years of activity, BCS is a leading company in the production and world wide distribution of high quality marine hydraulic equipment. The ability to satisfy the most demanding requirements has brought B.C.S. to a more important role in the marine industry, supplying the shipyards and other vessel manufacturers either its high-quality products or excellent technical support.

From the start of hydraulic steering production, B.C.S. has greatly increased its products range through the years and is now able to offer a wide choice of systems that cover different application fields.
The BCS product line includes **complete shaft lines** for boats up to 40 meters; **trim tab systems** made of either stainless steel or aluminum; **bow- and stern-thrusters,** both electric and hydraulic; **electro-hydraulic gangways** and **side ladders** for big applications, as well as a large variety of **stainless steel hydraulic actuators** and **multi-function electro-hydraulic power units** to satisfy the most demanding applications on board. The recent acquisition of BCS by Twin Disc gives the opportunity of a new growth consolidating further on its position on the market.

Headquarters and production plants of B.C.S. Srl

BCS: quality at service of the marine industry.

The B.C.S. **hydraulic steering** is a perfect synthesis of high quality materials, modern design and state-of-the-art technical solutions, offering a wide variety of possible configurations and insuring performance and durability.
The new line of hydraulic cylinders and helm pumps can handle many different applications, from outboard steering to inboard systems. They are suitable for either the small/medium pleasure boats or the larger commercial applications.
Since the global marketplace demands total customer satisfaction, B.C.S. has a **Technical Department**, and a reliable **Service Team**, that are available for advice on special applications and/or trouble shooting no matter the customer's location. In addition to state-of-the-art production technologies, a team of specialized technicians is able to follow and solve the various and difficult situations occurring on board. They can also support our customer's many needs, from concept of the project, through electronic design, prototype development, workshop and field testing, production, assembly, installation and repair, if requested.

From the concept to the project: care for design, prototype development, field testing, for the product definition.

RINA UCINA

Today, B.C.S. is an established industrial organization using the most up to date production principles and CISQ-EQ certified by Registro Italiano Navale (RINA) according to the requirements of the Standards **UNI EN ISO 9001:2000, Certificate n. 441/96/S.**
All the management and production processes of the company, from the material research and the design of new products, to the planning of the production cycles, checking tests and shipping management, undergo the constant verification of the quality criteria in order to guarantee to the BCS customers:
- a high and constant quality level;
- modern and reliable management procedures;
- constant checking at all levels and actions to maintain and increase the quality levels.

To certify such a high product quality and guaranteed production procedures, the **CE mark** can be found on all our pump and cylinder range.
All the B.C.S. steering components are built with high precision systems and tooling and meet the requirements of the best International Standards and the most important survey authorities, such as **Rina, Lloyd's Register of Shipping, American Bureau of Shipping , Bureau Veritas, etc...**
Certificates for specific applications with the above Certification Authorities are available upon request.
All the materials used for BCS products are corrosion resistant and suitable to work in a marine environment.

COMPOSITION AND WORKING PRINCIPLE

In order to get the best control with the minimum effort, the steering system must match the specific vessel's requirements.
A standard steering system in its basic composition just counts three major elements such as:

- **hydraulic helm pump (1)** of the axial piston type, which pumps oil into the system each time the steering wheel is turned. The pump is provided with a non return (lock) valve to prevent any movement of the rudder or the outboard engine when the pump is not controlled, and with a relief valve to protect the steering system from any sudden and excessive pressure increase;
- **hydraulic cylinder (2),** which is the real rudder actuator and, therefore, determines the power of the system. It is extremely important to select the right cylinder model suitable for the torque required (see page 28-46-68 for the selection of the cylinder);

The pump and the cylinder are connected together by means of:

- **rigid or flexible hoses (3)** suitable for hydraulic applications and sized according to the pump displacement. The rigid piping guarantees the best steering performances, but it is also possible to use flexible hose for rudder torque not higher than 290 Kg/m (24.675 in/lb)

To satisfy different needs, or adapt to specific solutions, this basic configuration can be integrated with many other steering components such as:

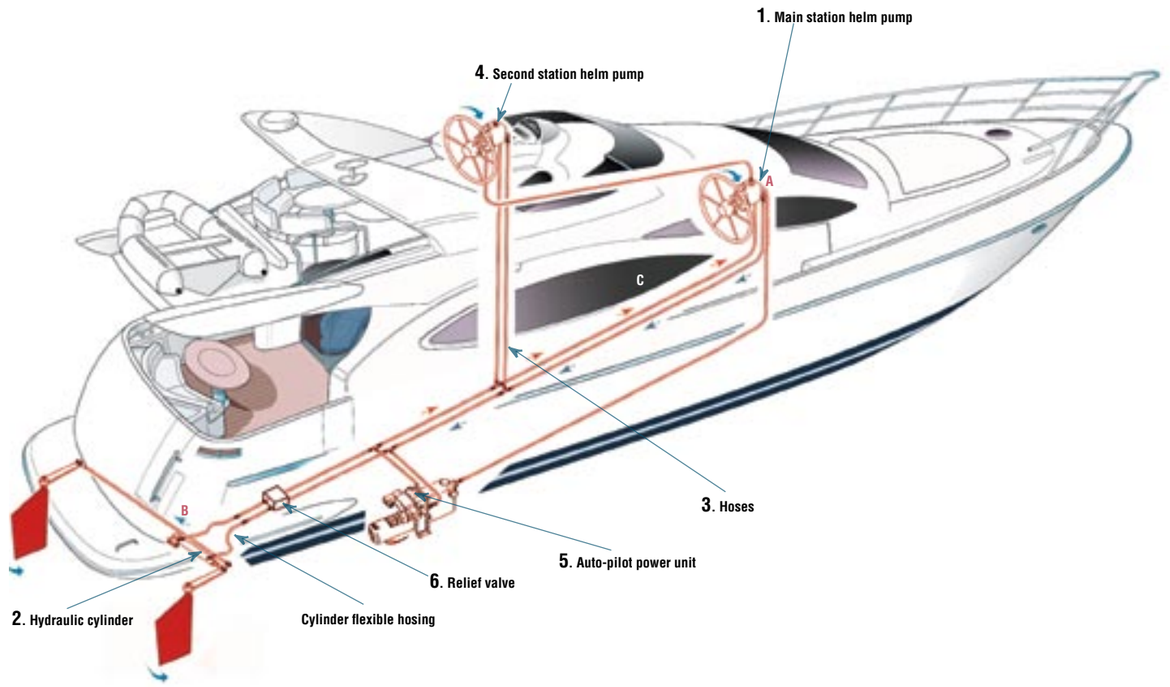
- **hydraulic helm pumps for additional control stations (4);**
- **auto-pilot power unit (5),** available in a wide range of displacements for combination with steering cylinders having a volume up to 3900 cc;
- **many types of valve or accessories (6)** (see the section "Steering Accessories" on page 78)

The working principle of the basic steering system is very simple:

A. Turning the steering wheel in the direction desired sends an oil flow from the helm pump to the steering cylinder.
B. This flow, which enters the cylinder, moves the piston, as well as the rod connected to the tiller arm, thus causing the rudder to rotate.
C. Oil displaced from the opposite side of the cylinder flows back to the helm pump.
D. To rotate the rudder in the opposite direction, simply turn the helm pump the other way.

N.B.: In case of dual station, the oil cap of the pilot house shall be closed. If a power unit with automatic filling is installed both caps shall be closed.

HYDRAULIC STEERING SYSTEMS



The steering system is of crucial importance for every boat, as it determines its maneuverability, ease of control and reliability.
It is very important to choose the model and configuration that best satisfy the boat requirements and the user's needs.
Below is a list of the necessary steps to select the most suitable system, either for boats equipped with outboard engines **(A),** or for boats equipped with inboard engines **(B).** In the next pages is an order guide to help you in the selection of the different steering components and indicative suggestions on how to size them.

A. BOATS EQUIPPED WITH **OUTBOARD ENGINES**

1. Determine the number of outboard engines the boat has;
2. Determine the total power of the engines (i.e.: horsepower) remembering that:
   - If there are two engines with the **SAME** rotation direction it is necessary to **ADD** their powers;
   - If there are two **COUNTER-ROTATING** engines, it is only necessary to consider the **power of ONE** engine.

Example:
With **1 engine** of 300 Hp ..... total power **300 Hp**
With **2 engines** of 150 Hp with the **same rotation** direction .... total power **300 Hp**
With **2 engines** of 150 Hp with **opposite rotation** direction ..... total power **150Hp**

B. BOATS EQUIPPED WITH **RUDDERS** WHOSE MAX SPEED IS **BELOW 30 KNOTS**

1. Calculate the required **rudder torque** (i.e.: Kgm or in/lb) according to the formula given on the next page, keeping in mind that the max rudder torque of a boat depends on some important factors such as:
   - the boat max speed;
   - the dimensions and shape of the rudder;
   - the rudder compensation surface.

HOW TO SELECT THE SUITABLE SYSTEM

2. Determine the **number of rudders** so as to get the total rudder torque.

N.B. An important factor for the choice of the steering cylinder is the type of hull (i.e.: **planing** or **displacement**) as it has an influence on the vessel speed:
- **Planing** hull:
  The hull max speed normally **exceeds** 18 knots
- **Displacement** hull:
  The hull max speed normally **DOES NOT exceed** 18 knots.

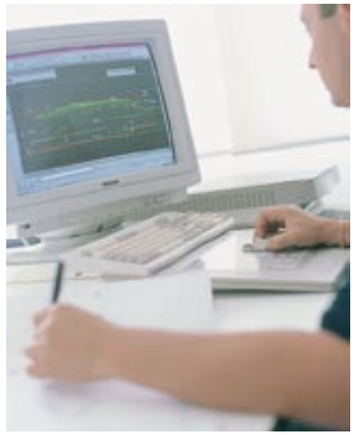
Once the max engine power or rudder torque has been calculated and the most suitable steering cylinder has been selected, you just have to determine the size of the hydraulic helm pump, whose choice depends on the following options:

A. the total number of wheel turns lock-to-lock (*);
B. the number of the control stations;
C. the helm pump mounting configuration (**frontal, intermediate, rear** or **tilt** mounting).

(*) NOTE: the total number of the wheel turns lock-to-lock depends on the cylinder volume and the helm displacement (to get the number divide the cylinder volume by the helm pump displacement).

The necessary effort on the steering wheel is inversely proportional to the total number of wheel turns lock-to-lock. Therefore:
- **less wheel turns** lock-to-lock result in **more wheel effort** on the steering wheel;
- **more wheel turns** lock-to-lock result in **less wheel effort** on the steering wheel.

ATTENTION! In case a helm pump with a higher displacement is chosen in order to decrease the total wheel turns lock-to-lock (within the limitations indicated on the tables), it is necessary to install a wheel with a bigger diameter.

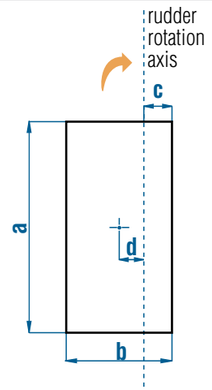


Formula for the calculation of the rudder torque for each rudder with an angle of 35°

a = rudder height in **meters**
b = rudder beam in **meters**
c = compensation distance in **meters**
d = arm = distance between the rudder axis and pressure point
S = Force
V = max speed in knots
A = total area in square meters=(axb)

d = (0,372 x b) - c
S = 8,16 x V2 x A

Mt = rudder torque in Kgm = S x d



Example:

a = 1,10 meter
b = 0,65 meter
c = 0,21 meter
v = 18 Knots

p = (0,371x0,65)-0,21 = 0,03
A = 1,10x0,65=0,71 meter

S = 8,16 x 324 x 0,71 = 1.877,12

Mt = 1.877,12x0,03 = **56,31 kgm**

NOTE: In case the vessel is equipped with two rudders the total torque will be:

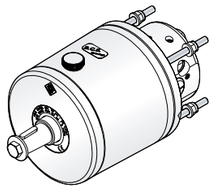
Mt = 2 x 56,31 = **112,62 Kgm**

HELM PUMPS

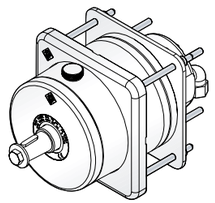
Completely re-designed, the new line of B.C.S. helm pumps has a range of models in different displacements, as well as a variety of configurations and mounting options. A compact design with minimal helm protrusion is one of the main features of this axial-piston pump, which has been specifically designed to respond to different drive conditions and ensure smooth and light control.
The B.C.S. steering helm is made of a high strength cast aluminum housing that is corrosion and abrasion resistant. It is also supplied with a lock valve, which prevents any possible rudder feedback, while a relief valve protects the steering components from over-pressure.
BCS steering helms are available in different mounting configurations that allow the pump to be installed at various positions on the console. The BASIC version, which is normally mounted outside on the dash surface and with the steering shaft perpendicular to it, can be combined with different mounting kits allowing the helm protrusion to be reduced or even disappear behind the dash.
A TILT mechanism is available for BCS steering helms for a more comfortable driving position. (mounting angles other than 90 degrees)

Main Features of the BCS Steering Helms:

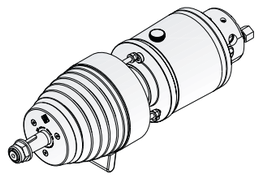
- Compact design
- Wide range of displacements: 20cc – 25cc – 30cc – 35cc – 42cc
- Great variety of mounting configurations: FRONT, INTERMEDIATE, REAR and with TILT
- Built-in lock valve to prevent any rudder feedback
- Built-in relief valve to protect the system from over-pressure
- Cast aluminium housing for a high resistance to corrosion
- Pump shaft with ABYC 3/4 taper
- Easy installation
- Built according to quality criteria and CE approved
- Provided with elbow fittings of 1/4" NPT for 3/8" hose (For 42 cc helm pump and d. 1/2" hose, too)
- Provided with no-bleeder cap for possible additional control station.



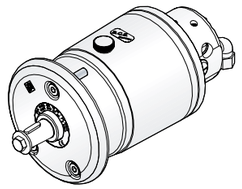
Frontal Mount Helm
(Basic Helm)



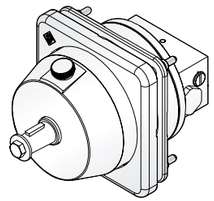
Basic Helm
+ Intermediate Mount Kit



Helm with Tilt



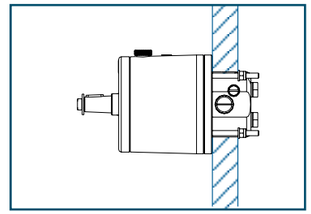
Basic Helm
+ Rear Mount Kit



Helm with fixed
Intermediate flange

HELM PUMPS **20cc - 30cc - 42cc**
• FRONTAL MOUNTING - BASIC HELM

Mounting configuration
Frontal mounting



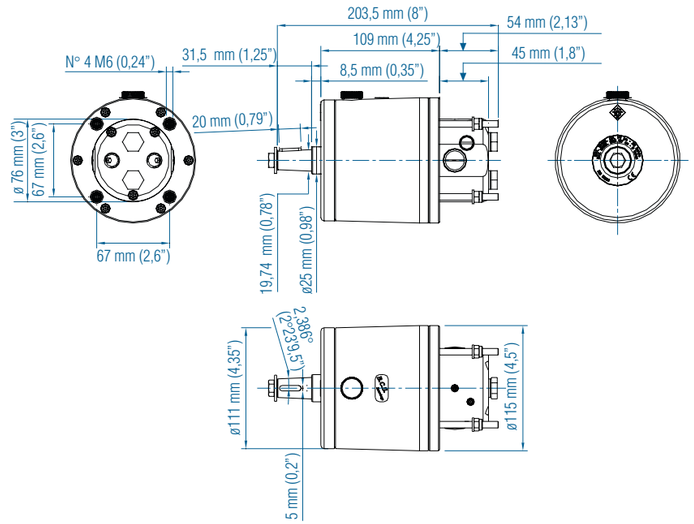
Order Guide

HELM PUMP		
Model	**Displacement**	**Code**
P20BAP	20 cc/rev 1.22 cu.in/rev	**21173**
P30BAP	30 cc/rev 1.83 cu.in/rev	**21174**
P42BAP	42cc/rev 2.56 cu.in/rev	**21175**

Frontal Mounting Helms - Technical specifications

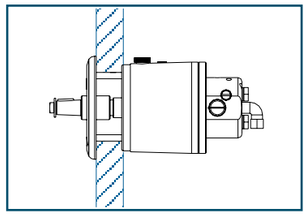
Model	Mounting Configuration	Non return valve	Relief valve	Displacement	Nr. of pistons	Relief valve setting pressure	Fittings included	Min. wheel	Max. wheel	Weight
P20BAP	Frontal	Yes	Yes	20 cc/rev 1.22 cu.in/rev	5	70 bar 1000 psi	1/4"NPT - 3/8" O.D.	350 mm 13,78 in.	711 mm 28 in.	2.6 Kg 5.8 lb
P30BAP	Frontal	Yes	Yes	30 cc/rev 1.83 cu.in/rev	5	70 bar 1000 psi	1/4"NPT - 3/8" O.D.	350 mm 13,78 in.	711 mm 28 in.	3.0 Kg 6.7 lb
P42BAP	Frontal	Yes	Yes	42 cc/rev 2.56 cu.in/rev	7	70 bar 1000 psi	1/4"NPT - 3/8" O.D. 1/4"NPT - 1/2" O.D.	450 mm 17,72 in.	711 mm 28 in.	3.0 Kg 6.7 lb

NOTE: The BCS 20cc-30cc-42cc helm pumps are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.



HELM PUMPS **20cc - 30cc - 42cc**
• REAR MOUNTING

Mounting configuration
Rear mounting



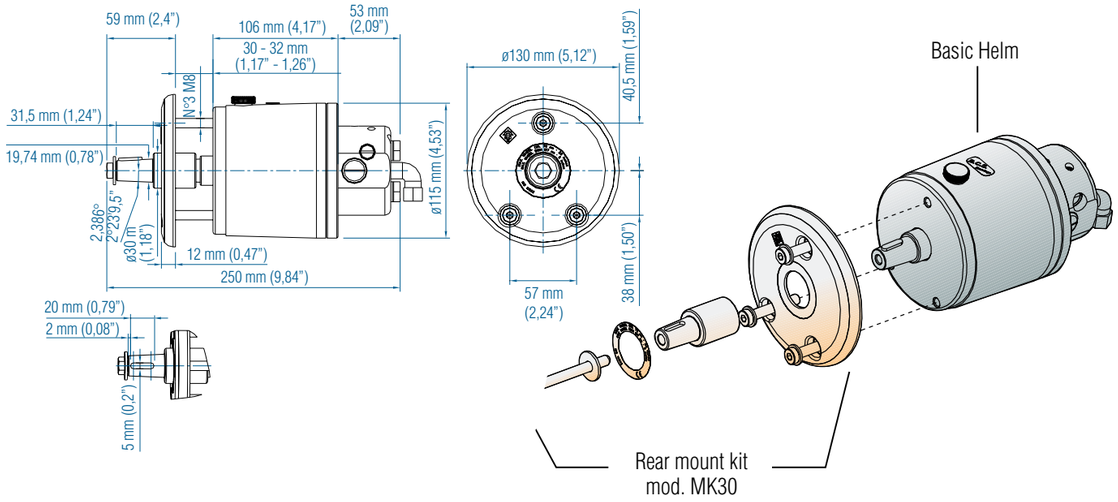
Order Guide

HELM PUMP		
Model	**Displacement**	**Code**
P20BAP + Kit MK30	20 cc/rev 1.22 cu.in/rev	**21173+16198**
P30BAP + Kit MK30	30 cc/rev 1.83 cu.in/rev	**21174+16198**
P42BAP + Kit MK30	42 cc/rev 2.56 cu.in/rev	**21175+16198**

Rear Mounting Helms - Technical specifications

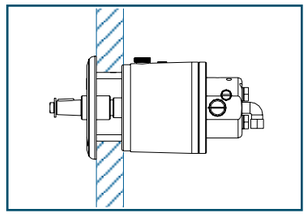
Model	Mounting Configuration	Non return valve	Relief valve	Displacement	Nr. of pistons	Relief valve setting pressure	Fittings included	Min. wheel	Max. wheel	Weight
P20BAP + MK30	Rear	Yes	Yes	20 cc/rev 1.22 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	711 mm 28 in.	2.6 Kg 5.8 lb
P30BAP + MK30	Rear	Yes	Yes	30 cc/rev 1.83 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	711 mm 28 in.	3.0 Kg 6.7 lb
P42BAP + MK30	Rear	Yes	Yes	42 cc/rev 2.56 cu.in/rev	7	70 bar 1000 psi	1/4”NPT - 3/8” O.D. 1/4”NPT - 1/2” O.D.	450 mm 17,72 in.	711 mm 28 in.	3.0 Kg 6.7 lb

NOTE: The BCS 20cc-30cc-42cc helm pumps are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.
NOTE: For this pump model it is suggested the purchase of the filling kit mod. K100 (oil filling kit code 18599). See the “Steering Accessories” section on page 79.



HELM PUMPS **20cc - 30cc - 42cc**
• REAR MOUNTING

Mounting configuration
Rear Mounting



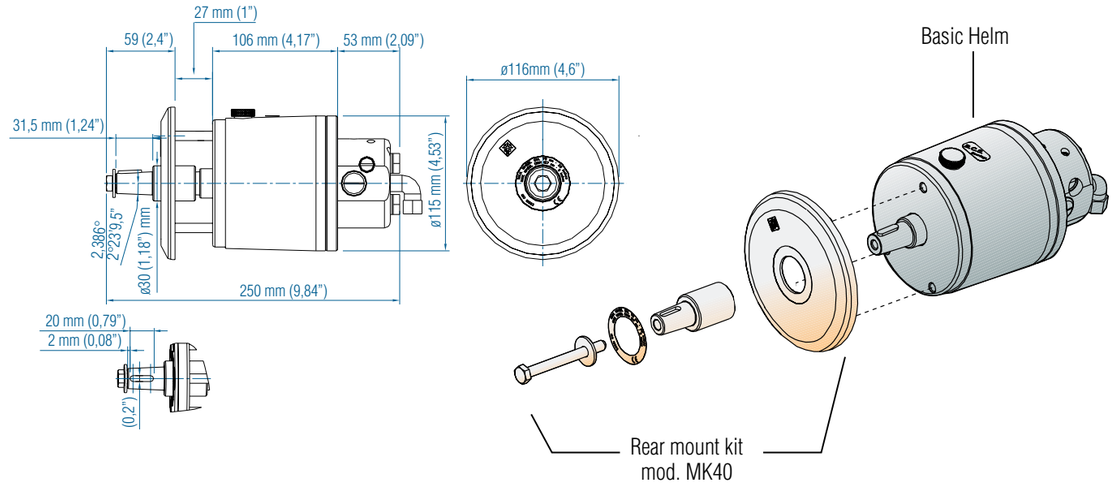
Order Guide

HELM PUMP		
Model	**Displacement**	**Code**
P20BAP + Kit MK40	20 cc/rev 1.22 cu.in/rev	**21173+24855**
P30BAP + Kit MK40	30 cc/rev 1.83 cu.in/rev	**21174+24855**
P42BAP + Kit MK40	42 cc/rev 2.56 cu.in/rev	**21175+24855**

Rear Mounting Helms - Technical specifications

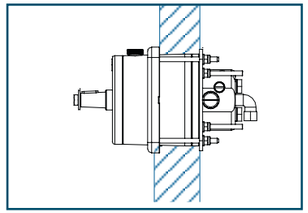
Model	Mounting Configuration	Non return valve	Relief valve	Displacement	Nr. of pistons	Relief valve setting pressure	Fittings included	Min. wheel	Max. wheel	Weight
P20BAP + MK40	Intermediate	Yes	Yes	20 cc/rev 1.22 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	711 mm 28 in.	2.6 Kg 5.8 lb
P30BAP + MK40	Intermediate	Yes	Yes	30 cc/rev 1.83 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	711 mm 28 in.	3.0 Kg 6.7 lb
P42BAP + MK40	Intermediate	Yes	Yes	42 cc/rev 2.56 cu.in/rev	7	70 bar 1000 psi	1/4”NPT - 3/8” O.D. 1/4”NPT - 1/2” O.D.	450 mm 17,72 in.	711 mm 28 in.	3.0 Kg 6.7 lb

NOTE: The BCS 20cc-30cc-42cc helm pumps are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.
NOTE: For this pump model it is suggested the purchase of the filling kit mod. K100 (oil filling kit code 18599). See the “Steering Accessories” section on page 79.



HELM PUMPS **20cc - 30cc - 42cc**
• INTERMEDIATE MOUNTING

Mounting configuration
Intermediate Mounting



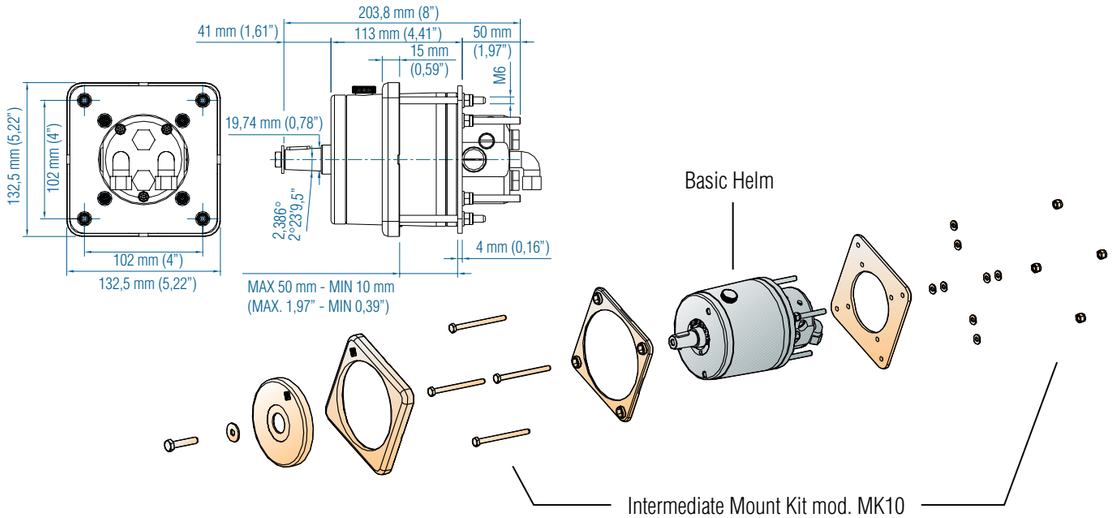
Order Guide

HELM PUMP		
Model	**Displacement**	**Code**
P20BAP + Kit MK10	20 cc/rev 1.22 cu.in/rev	**21173+16199**
P30BAP + Kit MK10	30 cc/rev 1.83 cu.in/rev	**21174+16199**
P42BAP + Kit MK10	42 cc/rev 2.56 cu.in/rev	**21175+16199**

Intermediate Mounting Helms - Technical specifications

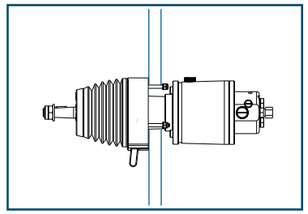
Model	Mounting Configuration	Non return valve	Relief valve	Displacement	Nr. of pistons	Relief valve setting pressure	Fittings included	Min. wheel	Max. wheel	Weight
P20BAP + MK10	Intermediate	Yes	Yes	20 cc/rev 1.22 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	711 mm 28 in.	2.6 Kg 5.8 lb
P30BAP + MK10	Intermediate	Yes	Yes	30 cc/rev 1.83 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	711 mm 28 in.	3.0 Kg 6.7 lb
P42BAP + MK10	Intermediate	Yes	Yes	42 cc/rev 2.56 cu.in/rev	7	70 bar 1000 psi	1/4”NPT - 3/8” O.D. 1/4”NPT - 1/2” O.D.	450 mm 17,72 in.	711 mm 28 in.	3.0 Kg 6.7 lb

NOTE: The BCS 20cc-30cc-42cc helm pumps are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.



HELM PUMPS **20cc - 30cc - 42cc**
• MOUNTING WITH SPORT TILT

Mounting configuration
Mounting with Sport Tilt



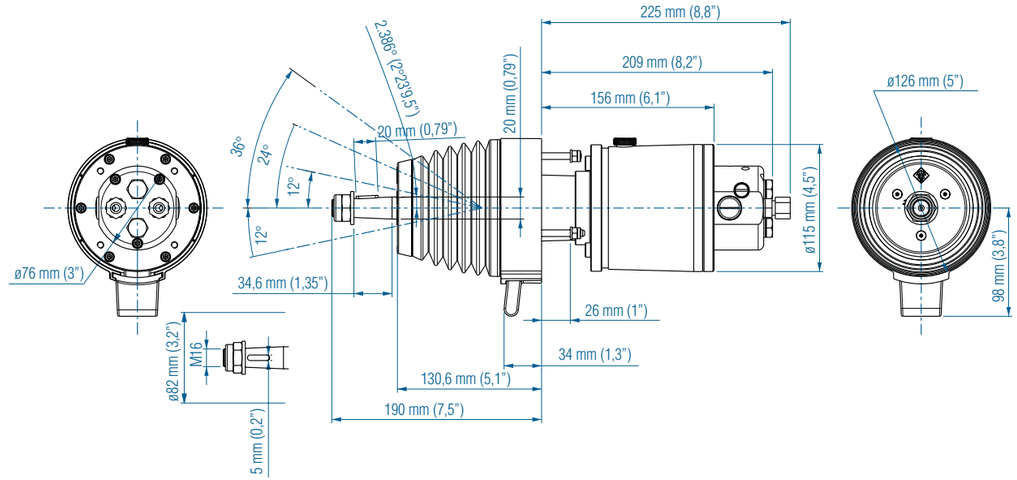
Order Guide

HELM PUMP		
Model	**Displacement**	**Code**
P20TSP	20 cc/rev 1.22 cu.in/rev	**25726**
P30TSP	30 cc/rev 1.83 cu.in/rev	**25727**
P42TSP	42 cc/rev 2.56 cu.in/rev	**25728**

Helms with SPORT TILT - Technical specifications

Model	Mounting Configuration	Non return valve	Relief valve	Displacement	Nr. of pistons	Relief valve setting pressure	Fittings included	Min. wheel	Max. wheel	Weight
P20TSP	Tilt	Yes	Yes	20 cc/rev 1.22 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	508 mm 20 in.	3.9 Kg 8.6 lb
P30TSP	Tilt	Yes	Yes	30 cc/rev 1.83 cu.in/rev	5	70 bar 1000 psi	1/4”NPT - 3/8” O.D.	350 mm 13,78 in.	508 mm 20 in.	3.9 Kg 8.6 lb
P42TSP	Tilt	Yes	Yes	42 cc/rev 2.56 cu.in/rev	7	70 bar 1000 psi	1/4”NPT - 3/8” O.D. 1/4”NPT - 1/2” O.D.	450 mm 17,72 in.	508 mm 20 in.	3.9 Kg 8.6 lb

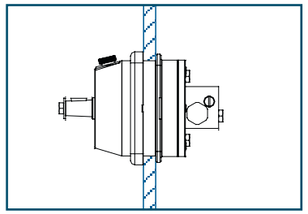
NOTE: The BCS 20cc-30cc-42cc helm pumps are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.
NOTE: For this pump model it is suggested the purchase of the filling kit mod. K100 (oil filling kit code 18599). See the “Steering Accessories” section on page 79.



HELM PUMPS **25cc - 35cc - 42cc**

• MOUNTING WITH FIXED INTERMEDIATE FLANGE

Mounting configuration
Mounting with fixed intermediate Flange

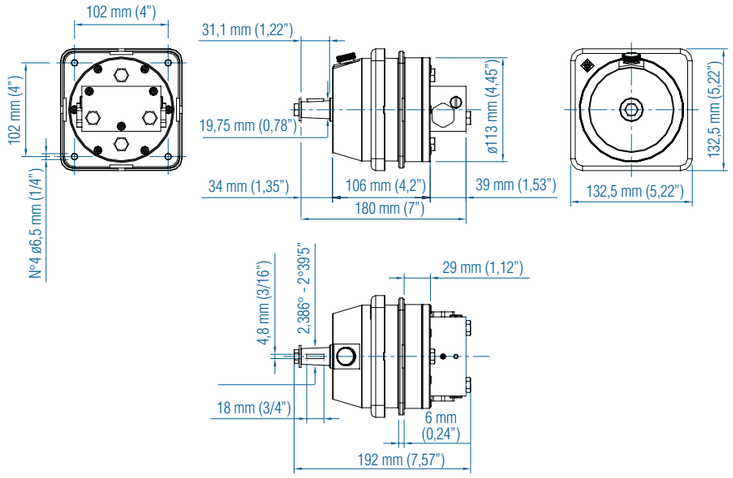


Order Guide

HELM PUMP		
Model	**Displacement**	**Code**
P25FLY	25 cc/rev 1.5 cu.in/rev	**20915**
P35FLY	35 cc/rev 2.11 cu.in/rev	**20916**
P42FLY	42 cc/rev 2.56 cu.in/rev	**20917**

Helms with fixed intermediate Flange - Technical specifications

Model	Mounting Configuration	Non return valve	Relief valve	Displacement	Nr. of pistons	Relief valve setting pressure	Fittings included	Min. wheel	Max. wheel	Weight
P25FLY	Intermediate	Yes	Yes	25 cc/rev 1.5 cu.in/rev	5	70 bar 1000 psi	1/4"NPT - 3/8" O.D.	350 mm 13,78 in.	711 mm 28 in.	4.8 Kg 10.6 lb
P35FLY	Intermediate	Yes	Yes	35 cc/rev 2.11 cu.in/rev	7	70 bar 1000 psi	1/4"NPT - 3/8" O.D.	350 mm 13,78 in.	711 mm 28 in.	4.8 Kg 10.6 lb
P42FLY	Intermediate	Yes	Yes	42 cc/rev 2.56 cu.in/rev	7	70 bar 1000 psi	1/4"NPT - 3/8" O.D. 1/4"NPT - 1/2" O.D.	450 mm 17,72 in.	711 mm 28 in.	4.8 Kg 10.6 lb



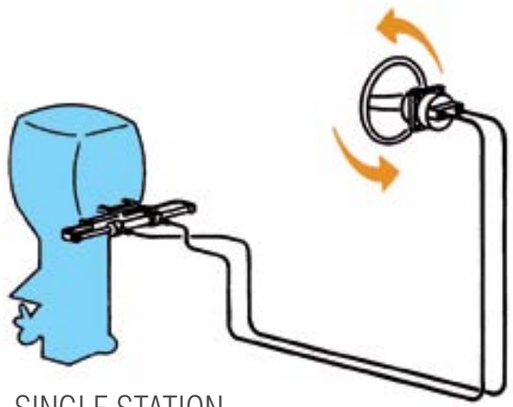
Main Features of the BCS
outboard front mounting cylinder:

- Elegant and compact design that fits most splashwells
- Hard chromed stainless steel piston rod
- Balanced frontal mounting cylinder
- Suitable for single and twin engine applications
- Suitable for outboards up to 150 hp for the model OB-108 and 300 hp for the model OB-133 (600hp if combined with counter-rotating outboard engines) with a max speed of 60 kts.
- Combined with BCS helms, tubing, fittings and oil provides a complete package of easy installation
- Meets ABYC Standards
- CE approved

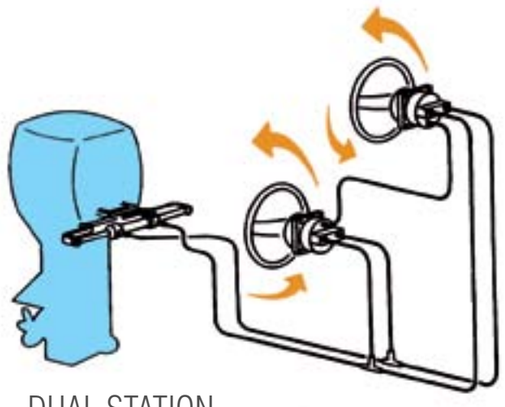
OUTBOARD CYLINDERS - FRONT MOUNTING

More reliable and comfortable than a mechanical steering, the BCS outboard steering is the best answer to your needs of 'CONTROL' and 'COMFORT' at the same time.
Built with no compromises of quality, BCS outboard steering can be adapted to the different mounting configurations to cover any outboard application.
Suitable for single and multiple outboards up to 300 hp (600 hp with combined counter-rotating engines), the BCS outboard steering is the ideal solution for runabouts, cruisers, and inflatables, with either single or dual engine; as well as work, commercial or rescue boats, which normally require high performances in severe service conditions.

Elegant and with a compact design, the BCS Outboard Steering Cylinders are suitable for most splash-well configurations.
The balanced front mounting cylinders allow the engine a full and free movement with minimum dimensions (check the minimum required dimensions on the bottom of this page).
They are built with high-quality materials using exacting production standards and are suitable to work in a marine environment.
They can be combined with a wide range of accessories, such as helm pumps, hoses in the necessary length, inch fittings and hydraulic oil for a complete steering package.



SINGLE STATION



DUAL STATION

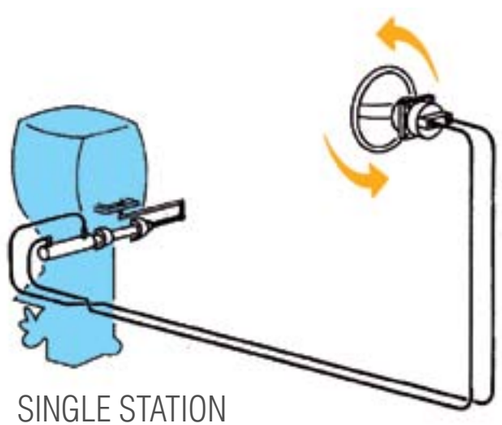
Outboard Cylinders

Main Features of the BCS
outboard side mounting cylinder:

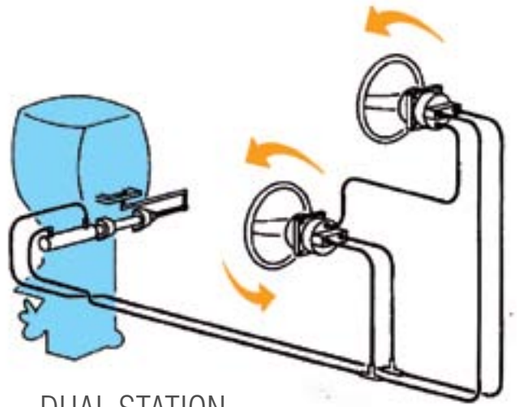
- Compact design and reduced dimensions for low splashwells
- Suitable for mounting with threaded engine tilt tubes
- Hard chromed stainless steel piston rod
- Balanced cylinder
- Suitable for single or multiple engine configurations
- Suitable for outboard engines up to 300 hp (600 hp with combined counter-rotating outboards) with a max speed of 60 kts.
- Combined with BCS helms, tubing,inch fittings and oil provides a complete package of easy installation
- Meets ABYC Standards
- CE approved

OUTBOARD CYLINDERS - SIDE MOUNTING

The BCS side mounting outboard cylinders represent the best alternative to either mechanical steering or the frontal mounting cylinders especially where the splashwell is not very deep.
It is suitable for outboard engines up to 300 hp (600 hp with combined counter-rotating outboards) for a max. speed of 60 kts.
It can be combined with the BCS steering helms (inch tubing and fittings, hydraulic oil,)for a complete package of easy installation.



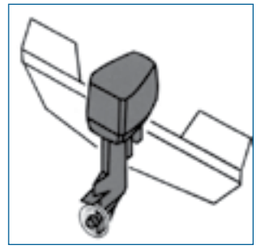
SINGLE STATION



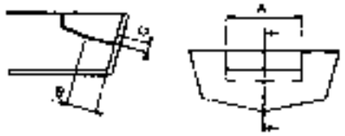
DUAL STATION

FRONT MOUNTING OUTBOARD CYLINDERS

• CYLINDER MOD. **OB-108**

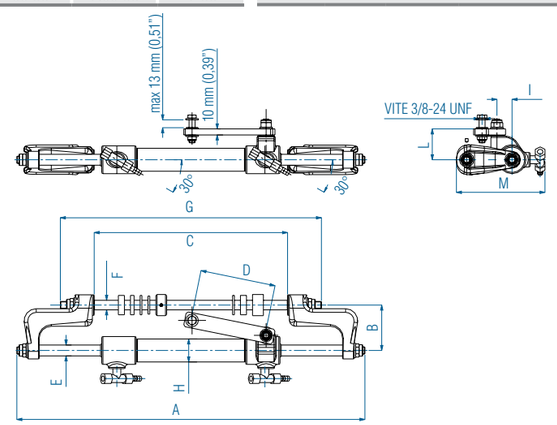


Dimensions A+B+C

MINIMUM SPLASHWELL DIMENSIONS				
				
Cylinder Model	**Number of engines**	**A**	**B**	**C**
OB-108	**1**	609,6 mm	203 mm	153 mm
		24 in.	7.99 in.	6.02 in.
	2	1219,2 mm	203 mm	178 mm
		48 in.	7.99 in.	7 in.
OB-133	**1**	698,5 mm	203 mm	153 mm
		27.5 in.	7.99 in.	6.02 in.
	2	1397 mm	203 mm	178 mm
		55 in.	7.99 in.	7 in.

TECHNICAL DETAILS						
Model	**Code**	**Stroke**	**Force at 70 bar / 1000 psi**	**Volume**	**Engine power**	**Max speed**
OB-108	**19304**	197.0mm	385 Kgf	108 cc	150 Hp	85 Km/h
		7.75 in	848 lbf	6.6 cu.in	110 Kw	45 kts
OB-133	**20932**	241.3 mm	385 Kgf	133 cc	300 Hp	110 Km/h
		9.5 in	848 lbf	8.1 cu.in	221 Kw	60 kts

NOTE: The front mounting cylinders mod. OB-108 and OB-133 are not suitable for installations where the boat max speed exceeds 85 km/h (45 kts) for mod. OB-108 and 110 Km/h (60 kts) for mod. OB-133 and for any application on racing boats



DIMENSIONS											
Model	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**L**	**M**
OB-108	576 mm	75 mm	320 mm	125 mm	18 mm	15,8 mm	432 mm	38 mm	25mm	51 mm	146,5 mm
	22.67 in.	2.95 in.	12.59 in.	4.92 in.	0.70 in.	0.62 in.	17 in.	1.49 in.	0.98 in.	2 in.	7.76 in.
OB-133	667.3 mm	75 mm	317.3 mm	147 mm	18 mm	15.8 mm	430 mm	38 mm	25 mm	51 mm	147 mm
	26,27 in.	2,95 in.	12.49 in.	5.7 in.	0.70 in.	0.62 in.	16.92 in.	1.49 in.	0.98 in.	2.0 in.	5.78 in.

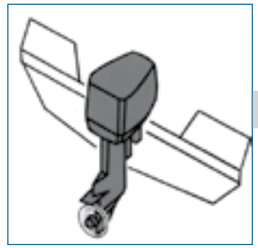
Order Guide

System description	Components	Model	Code	Q.ty	Components	Model	Code	Q.ty
Single Engine/Single Cylinder	**System OB1 / Wheel turns 5,4**				**System OB2 / Wheel turns 4,3**			
 Application up to: **150 Hp max**	Front mounting cylinder	**OB-108**	**19304**	1	Front mounting cylinder	**OB-108**	**19304**	1
	Basic steering helm	**P20BAP**	**21173**	1	Flanged steering helm	**P25FLY**	**20915**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	1	Hose Kit	**SH…**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	2	Hydraulic oil	**VG22**	**21334**	2
	In case of additional station add:				In case of additional station add:			
	Basic steering helm	**P20BAP**	**21173**	1	Flanged steering helm	**P25FLY**	**20915**	1
	Fittings kit		**23376**	1	Fittings kit		**23376**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	1	Hose Kit	**SH…**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1
	System OB3 / Wheel turns 4,4				**System OB4 / Wheel turns 5,3**			
 Application up to: **300 Hp max**	Front mounting cylinder	**OB-133**	**20932**	1	Front mounting cylinder	**OB-133**	**20932**	1
	Basic steering helm	**P30BAP**	**21174**	1	Flanged steering helm	**P25FLY**	**20915**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	1	Hose Kit	**SH…**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	2	Hydraulic oil	**VG22**	**21334**	2
	In case of additional station add:				In case of additional station add:			
	Basic steering helm	**P30BAP**	**21174**	1	Flanged steering helm	**P25FLY**	**20915**	1
	Fittings kit		**23376**	1	Fittings kit		**23376**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	1	Hose Kit	**SH…**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1
Double Engine/Single Cylinder	**System OB3 / Wheel turns 4,4**				**System OB5 / Wheel turns 3,8**			
 Application up to: **450 Hp max** (non-counter rotating engines) Application up to: **600 Hp max** (counter rotating engines)	Front mounting cylinder	**OB-133**	**20932**	1	Front mounting cylinder	**OB-133**	**20932**	1
	Basic steering helm	**P30BAP**	**21174**	1	Flanged steering helm	**P35FLY**	**20916**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	1	Hose Kit	**SH…**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	2	Hydraulic oil	**VG22**	**21334**	2
	Tie bar	Supplied by engine manufacturer	Not available		Tie bar	Supplied by engine manufacturer	Not available	1
	In case of additional station add:				In case of additional station add:			
	Basic steering helm	**P30BAP**	**21174**	1	Flanged steering helm	**P35FLY**	**20916**	1
	Fittings kit		**23376**	1	Fittings Kit		**23376**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	1	Hose Kit	**SH…**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1
Double Engine/Double Cylinder	**System OB6 / Wheel turns 3,2**				**System OB7 / Wheel turns 3,2**			
 Application up to: **600 Hp max** (counter rotating engines)	Front mounting cylinder	**OB-133**	**20932**	2	Front mounting cylinder	**OB-133**	**20932**	2
	Basic steering helm	**P42BAP**	**21175**	1	Steering helm	**P42FLY**	**20917**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	2	Hose Kit	**SH…**	See on page 80-81 for codes	2
	Hydraulic oil	**VG22**	**21334**	3	Hydraulic oil	**VG22**	**21334**	3
	Tie bar	Supplied by engine manufacturer	Not available	1	Tie bar	Supplied by engine manufacturer	Not available	1
	In case of additional station add:				In case of additional station add:			
	Basic steering helm	**P42BAP**	**21175**	1	Flanged steering helm	**P42FLY**	**20917**	1
	Fittings kit		**23376**	1	Fittings kit		**23376**	1
	Hose Kit	**SH…**	See on page 80-81 for codes	1	Hose Kit	**SH…**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1

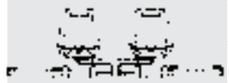
NOTE: For Kit of hoses and fittings please see on page 80 and following.

SIDE MOUNTING OUTBOARD CYLINDER

• CYLINDER MOD. **OB-163SY**



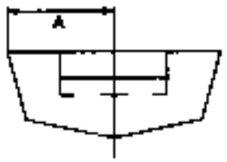
Order Guide

System description	Components	Model	Code	Q.ty	Components	Model	Code	Q.ty
Single Engine/Single Cylinder	**System OB8 / Wheel turns 6,6 / 8,1**				**System OB9 / Wheel turns 5,3 / 6,5**			
 Application up to: **300 Hp max**	Side mounting cylinder	**OB-163SY**	**20928**	1	Side mounting cylinder	**OB-163SY**	**20928**	1
	Basic steering helm	**P20BAP**	**21173**	1	Flanged steering helm	**P25FLY**	**20915**	1
	Hose Kit	**SH...**	See on page 80-81 for codes	1	Hose Kit	**SH...**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	3	Hydraulic oil	**VG22**	**21334**	3
	In case of additional station add:				In case of additional station add:			
	Basic steering helm	**P20BAP**	**21173**	1	Flanged steering helm	**P25FLY**	**20915**	1
	Fittings kit		**23376**	1	Fittings kit		**23376**	1
	Hose Kit	**SH...**	See on page 80-81 for codes	1	Hose Kit	**SH...**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1
Double Engine/Single Cylinder	**System OB10 / Wheel turns 4,4 / 5,4**				**System OB11 / Wheel turns 3,8 / 4,7**			
 Application up to: **300 Hp max** (non-counter rotating engines) Application up to: **600 Hp max** (counter rotating engines)	Side mounting cylinder	**OB-163SY**	**20928**	1	Side mounting cylinder	**OB-163SY**	**20928**	1
	Basic steering helm	**P30BAP**	**21174**	1	Flanged steering helm	**P35FLY**	**20916**	1
	Hose kit	**SH...**	See on page 80-81 for codes	1	Hose kit	**SH...**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	3	Hydraulic oil	**VG22**	**21334**	3
	Tie bar	supplied by engine manufacturer	Not available	1	Tie bar	supplied by engine manufacturer	Not available	1
	In case of additional station add:				In case of additional station add:			
	Basic steering helm	**P30BAP**	**21174**	1	Flanged steering helm	**P35FLY**	**20916**	1
	Fittings kit		**23376**	1	Fittings kit		**23376**	1
	Hose Kit	**SH...**	See on page 80-81 for codes	1	Hose Kit	**SH...**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1
Double Engine/Double Cylinder	**System OB12 / Wheel turns 3,1 / 3,8**				**System OB13 / Wheel turns 3,1 / 3,8**			
 Application up to: **600 Hp max** (non counter rotating engines)	Side mounting cylinder	**OB-163SY**	**20928**	2	Side mounting cylinder	**OB-163SY**	**20928**	2
	Basic steering helm	**P42BAP**	**21175**	1	Flanged steering helm	**P42FLY**	**20917**	1
	Hose Kit	**SH...**	See on page 80-81 for codes	2	Hose Kit	**SH...**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	3	Hydraulic oil	**VG22**	**21334**	2
	Tie bar	supplied by engine manufacturer	Not available	1	Tie bar	supplied by engine manufacturer	Not available	1
	In case of additional station add:				In case of additional station add:			
	Basic steering helm	**P42BAP**	**21175**	1	Flanged steering helm	**P42FLY**	**20917**	1
	Fittings kit		**23376**	1	Fittings kit		**23376**	1
	Hose Kit	**SH...**	See on page 80-81 for codes	1	Hose Kit	**SH...**	See on page 80-81 for codes	1
	Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1

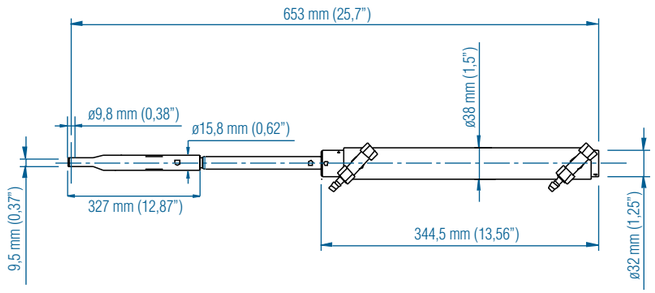
NOTE: For Kit of hoses and fittings please see on page 80 and following.

Dimensions

MINIMUM SPLASHWELL DIMENSIONS



Cylinder Model	Number of engines	A
OB-163SY	1	530mm 20,8 in.



TECHNICAL DETAILS

Model	Code	Stroke	Force at 70 bar/1000 psi	Volume	Engine power	Max. speed
OB-163SY	**20928**	203.0 mm	455 - 562 Kgf	132.11 - 163.34 cc.	300 Hp	85 Km/h
		8.0 in	1003 -1238 lbf	8.05 - 9.97 cu.in	221 Kw	45 kts

NOTE: The side mounting cylinder mod. OB-163SY is not suitable for installations where the boat max speed exceeds 110 Km/h (60 kts) and for any application on racing boats.

OUTBOARD STEERING KITS

The outboard steering kit mod. **F150** (code **21706**) is composed of:

P25FLY Helm pump with fixed intermediate flange

OB-108 Frontal mounting outboard steering cylinder

VG22 Hydraulic oil - 2 lt. bottle

The steering kit mod. **F150** does not include:

SH Hose Kit.
Specify the required hose length when placing the order.
The kit consists of a pair of flexible hoses provided with pre-assembled fittings on both ends. To choose the required model see pages 80-81.

OUTBOARD STEERING KITS

The outboard steering kit mod. **F300** (code **25220**) is composed of:

P25FLY Helm pump with fixed intermediate flange

OB-133 Frontal mounting outboard steering cylinder

VG22 Hydraulic oil - 2 lt. bottle

The steering kit mod. **F300** does not include:

SH Hose Kit.
Specify the required hose length when placing the order.
The kit consists of a pair of flexible hoses provided with pre-assembled fittings on both ends. To choose the required model see pages 80-81.

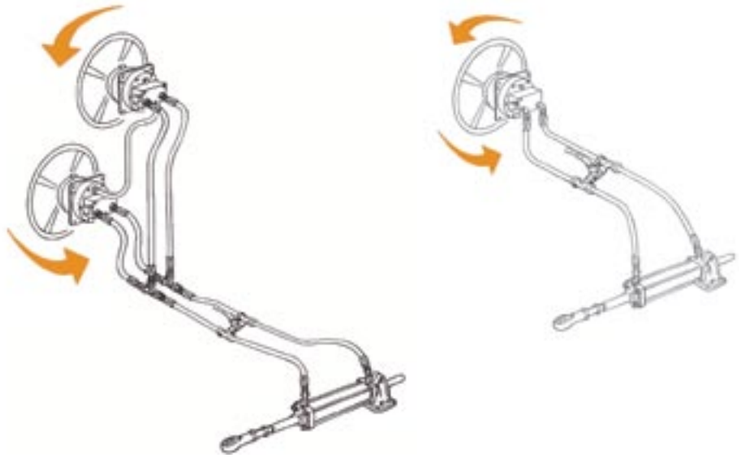
The steering system is of crucial importance for every boat, as it determines its maneuverability, ease of control and reliability. Therefore, it is very important to choose the model and configuration that best satisfy the boat requirements and the user's needs.
In the catalogue introduction section (see pages 10-11) is a guide for system selection and the calculation of the max rudder torque, while the next pages assist in the selection and the order of steering components.
For any questions or for further details, please contact the BCS Technical Dept., who can offer all the necessary support in system selection based on experience from years of direct work in the field.
Every component of the BCS inboard steering is built with exacting precision and high quality materials to meet international standards. Specific certificates are available on request from the major classification bodies, such as **RINA, American Bureau of Shipping, Lloyd's Register of Shipping, Bureau Veritas, etc.**
The BCS inboard cylinders are available either in anodized aluminum or brass versions.
The piston rod is made of stainless steel to ensure a longer, trouble-free life and to prevent rust or corrosion problems.

The ball joint is available in the most popular market sizes.
The cylinder base moves both horizontally, to follow the complete cylinder arch, and vertically, to follow and adapt to any excursion of the tiller arm.
Every cylinder is supplied with Tee fittings provided with bleeders and with all the connection fittings needed.
All the materials used for the production of the BCS inboard steering cylinders are suitable for applications in the marine environment, even with high salt conditions.

INBOARD STEERING SYSTEMS

Main Features of the BCS Inboard Cylinders:

- Compact design and simple profile
- Available in a wide variety of volumes and strokes for an extraordinary flexibility of applications
- Provided with bleeders
- Piston rod in stainless steel
- Base moving either horizontally or vertically
- High resistance to corrosion
- Built according to ABYC Standards and CE approved



Application guide according to boat length and type

Boat length LOA	System to order							
	Planing Hull				Displacement Hull			
	1 Engine		2 Engines		1 Engine		2 Engines	
	Pleasure	Working	Pleasure	Working	Pleasure	Working	Pleasure	Working
Up to 8mt / 26ft	1	2	1	2	1	2	1	2
8 - 9,8mt / 26 - 32ft	1	2	1	2	2	3	2	3
9,8 - 11,6mt / 32 - 38ft	2	3	2	3	3	4	2	3
11,6 - 13,4mt / 38 - 44ft	3	4	2	4	4	6	3	5
13,4 - 15,3mt / 44 - 50ft	7	7	4	5	6	7	5	6
15,5 - 16,8mt / 50 - 55ft	8	9	5	6	7	8	7	8
16,8 - 18mt / 55 - 60ft	8	9	6	7	8	8	8	8
18 - 19,8mt / 60 - 65ft	/	/	8	/	8	9	8	9
19,8 - 21mt / 65 - 70ft	/	/	8	/	9	9	9	10
21 - 22,8mt / 70 - 75ft	/	/	9	/	10	11	10	11
22,8 - 24,3mt / 75- 80ft	/	/	9	/	10	11	10	11
over 24,3 mt/ 80ft	For boat lengthes over 24,3 mt/ 80 ft please contact our technical department to check applications suggested on systems 12-13-14							

WARNING! The above suggestions shall be intended as merely INDICATIVE. To check the proper application the required max torque must be calculated. If the required information is not available please contact our authorized dealer or service center and submit boat length, maximum speed and rudder dimensions.

WARNING! For displacement boats,hull speed normally does not exceed 18 knots.
For planing boats, the above steering systems are suggested for boat speeds under 30 knots.

CYLINDER		System to order
Mod.	Code	
CTA40U	15649	System 1 (see pag. 29)
CTA65U CTA75U	12677 15763	System 2 (see pag. 30-31)
CTA80U CTY100	12682 20921	System 3 (see pag. 32-33)
CTB110U CTB130U	12687 12691	System 4 (see pag. 33-34)
CTB145U	12694	System 5 (see pag. 35)
CTC200	12695	System 6 (see pag. 47)
CTC230	12698	System 7 (see pag. 48)
CTC300	12701	System 8 (see pag. 49)
CTC400 CTD310	15697 15698	System 9 (see pag. 50)
CTD450	15699	System 10 (see pag. 51)
CTE600	15700	System 11 (see pag. 52)
CTE900	15701	System 12 (see pag. 53)
CTE1200	15702	System 13 (see pag. 54)
CTF1600	15703	System 14 (see pag. 55)

Steering effort

LIGHT NORMAL HEAVY

SYSTEM 1

ALUMINIUM Cylinder			
Components	Model	Code	Q.ty
Cylinder	**CTA40U**	**15649**	1
Helm pump	Choose the pump model according to the desired wheel turns number in the table here below		1
Hose kit	**SH**...**	See on pages 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	3
By-Pass	Choose the by-pass model according to the Pump-Cylinder combination in the table here below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on page bottom)	1
Second station fittings kit		**23376**	1
Hose kit	**SH**...**	See on pages 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	1
In case of auto-pilot installation please add:			
Auto-pilot power unit	Choose auto-pilot power unit model on the Selection Guides on pages 61-64-65		1
Auto-pilot fittings kit		**23377**	1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder according to the wished number of wheel turns lock-to-lock.
NOTE: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P25FLY
Cod. 20915(*)

P35FLY
Cod. 20916(*)

P42FLY
Cod. 20917(*)

CYLINDER

CTA40U
Cod. / Part # 15649

N. of wheel turns: **4,6**
Min. hose size: 5/16" I.D. (**)
Tiller: 153 mm - 6,02 in.
Angle: 35° + 35°
Torque: 57,83 Kgm - 5028 in/lb
Min. wheel diam.: 350 mm-13,77 in.
By-Pass: cod. 23186

N. of wheel turns: **3,3**
Min. hose size: 5/16" I.D. (**)
Tiller: 153 mm - 6,02 in.
Angle: 35° + 35°
Torque: 57,83 Kgm - 5028 in/lb
Min. wheel diam.: 350 mm-13,77 in.
By-Pass: cod. 23186

HELM PUMP

P20BAP
Cod. 21173(*)

P30BAP
Cod. 21174(*)

P42BAP
Cod. 21175(*)

CYLINDER

CTA40U
Cod. / Part # 15649

N. of wheel turns: **5,8**
Min. hose size: 5/16" I.D. (**)
Tiller: 153 mm - 6,02 in.
Angle: 35° + 35°
Torque: 57,83 Kgm - 5028 in/lb
Min. wheel diam.: 350 mm-13,77 in.
By-Pass: cod. 23186

N. of wheel turns: **3,9**
Min. hose size: 5/16" I.D. (**)
Tiller: 153 mm - 6,02 in.
Angle: 35° + 35°
Torque: 57,83 Kgm - 5028 in/lb
Min. wheel diam.: 350 mm-13,77 in.
By-Pass: cod. 23186

Rudder torque calculated at the working pressure of 70 bar (1000 psi)
(*) For more details, see the "FLANGED HELMS" section on page 18 and the "BASIC HELM" section on page 13 and following to choose the desired mounting configuration
(**) See on page 80-81 to choose the preferred kit. Flexible hose can be used up to a max length of 15 mt - 45' between pump and cylinder

SYSTEM 2

ALUMINIUM CYLINDER			
Components	**Model**	**Code**	**Q.ty**
Cylinder	**CTA65U** **CTA75U**	**12677** **15763**	1
Helm pump	Choose the pump model according to the desired wheel turns number in the table here below		1
Hose Kit	**SH**...**	See on pages 80-81 for codes	1
Hydraulic Oil	**VG22**	**21334**	3
By Pass	Choose the by-pass model according to the Pump-Cylinder combination in the table here below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on page bottom)	1
Second station fittings kit		**23376**	1
Hose kit	**SH**...**	See on page 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	1
In case of auto-pilot installation please add:			
Auto-pilot power unit****	Choose auto-pilot power unit model on the Selection Guides on pages 61-64-65		1
Auto-pilot fittings kit		**23377******	1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder according to the wished number of wheel turns lock-to-lock.
NOTE: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

	HELM PUMP		
	 **P20BAP Cod. 21173(*)**	 **P30BAP Cod. 21174(*)**	 **P42BAP Cod. 21175(*)**
CYLINDER			
 **CTA65U Cod. / Part # 12677**		N. of wheel turns: **5,6** Min. hose size: 5/16" I.D. (**) Tiller: 153 mm - 6,02 in. Angle: 35° + 35° Torque: 83,81 Kgm - 7287 in/lb Min. wheel diam: 350 mm-13,77 in. By-Pass: cod. 23186	
 **CTA75U Cod. / Part # 15763**		N. of wheel turns: **6,3** Min. hose size: 5/16" I.D. (**) Tiller : 175 mm - 6,89 in. Angle: 35° + 35° Torque: 94,17 Kgm - 8188 in/lb Min. wheel diam: 350 mm-13,77 in. By-Pass: cod. 23186	

Rudder torque calculated at the working pressure of 70 bar (1000 psi)
(*) For more details, see the "FLANGED HELMS" section on page 18 and the "BASIC HELM" section on page 13 and following to choose the desired mounting configuration
(**) See on page 80-81 to choose the preferred kit. Flexible hose can be used up to a max length of 15 mt - 45° between pump and cylinder
(****) In case an auto-pilot with power unit filling is installed, the fitting kit is code 23376**

Inboard Steering Systems

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder according to the wished number of wheel turns lock-to-lock.
NOTE: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

	HELM PUMP		
	 **P25FLY Cod. 20915(*)**	 **P35FLY Cod. 20916(*)**	 **P42FLY Cod. 20917(*)**
CYLINDER			
 **CTA65U Cod. / Part # 12677**	N. of wheel turns: **6,7** Min. hose size: 5/16" I.D. (**) Tiller : 153 mm - 6,02 in. Angle: 35° + 35° Torque: 83,81 Kgm - 7287 in/lb Min. wheel diam: 350 mm-13,77 in. By-Pass: cod. 23186	N. of wheel turns: **4,8** Min. hose size: 5/16" I.D. (**) Tiller: 153 mm - 6,02 in. Angle: 35° + 35° Torque: 83,81 Kgm - 7287 in/lb Min. wheel diam: 350 mm-13,77 in. By-Pass: cod. 23186	
 **CTA75U Cod. / Part # 15763**	N. of wheel turns: **7,5** Min. hose size: 5/16" I.D. (**) Tiller: 175 mm - 6,89 in. Angle: 35° + 35° Torque: 94,17 Kgm - 8188 in/lb Min. wheel diam: 350 mm-13,77 in. By-Pass: cod. 23186	N. of wheel turns: **5,4** Min. hose size: 5/16" I.D. (**) Tiller: 175 mm - 6,89 in. Angle: 35° + 35° Torque: 94,17 Kgm - 8188 in/lb Min. wheel diam: 350 mm-13,77 in. By-Pass: cod. 23186	

Rudder torque calculated at the working pressure of 70 bar (1000 psi)
(*) For more details, see the "FLANGED HELMS" section on page 18 and the "BASIC HELM" section on page 13 and following to choose the desired mounting configuration
(**) See on page 80-81 to choose the preferred kit. Flexible hose can be used up to a max length of 15 mt - 45° between pump and cylinder
(****) In case an auto-pilot with power unit filling is installed, the fitting kit is code 23376**

SYSTEM 3

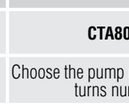
BRASS CYLINDER				ALUMINIUM CYLINDER			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTY100**	**20921**	1	Cylinder	**CTA80U**	**12682**	1
Helm pump	Choose the pump model according to the desired wheel turns number in the table here below		1	Helm pump	Choose the pump model according to the desired wheel turns number in the table here below		1
Hose kit	**SH**…**	See on page 80-81 for codes	1	Hose kit	**SH**…**	See on page 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	3	Hydraulic oil	**VG22**	**21334**	3
By-Pass	Choose the by-pass model according to the Pump-Cylinder combination in the table here below		1	By-Pass	Choose the by-pass model according to the Pump-Cylinder combination in the table here below		1
In case of additional station add:							
Second station helm pump	Same pump model as above	(see table on page bottom)	1	Second station helm pump	Same pump model as above	(see table on page bottom)	1
Second station fittings kit		**23376 or 23418*****	1	Second station fittings kit		**23376 or 23418*****	1
Hose kit	**SH**…**	See on page 80-81 for codes	1	Hose kit	**SH**…**	See on page 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	1	Hydraulic oil	**VG22**	**21334**	1
In case of auto-pilot installation please add:							
Auto-pilot power unit****	Choose auto-pilot power unit model on the Selection Guides on pages 61-64-65		1	Auto-pilot power unit****	Choose auto-pilot power unit model on the Selection Guides on pages 61-64-65		1
Auto-pilot fittings kit****		**23377 or 23373*****	1	Auto-pilot fittings kit****		**23377 or 23373*****	1

PUMP-CYLINDER COMBINATION

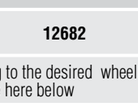
It is possible to choose the combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.
NOTE: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P25FLY
Cod. 20915(*)



P35FLY
Cod. 20916(*)



P42FLY
Cod. 20917(*)

CYLINDER

CTY100
Cod. / Part # 20921

N. of wheel turns: **6,3**
Min. hose size: 5/16" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle: 35° + 35°
Torque: 110,87 Kgm - 9640 in/lb
Min. wheel diam: 350 mm-13,77 in.
By-Pass: cod. 23186

N. of wheel turns: **5**
Min. hose size: 5/16" - 3/8" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle: 35° + 35°
Torque: 110,87 Kgm - 9640 in/lb
Min. wheel diam: 450 mm-17,71 in.
By-Pass: cod. 23186 - 23480***

CTA80U
Cod. / Part # 12682

N. of wheel turns: **6,1**
Min. hose size: 5/16" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle: 35° + 35°
Torque: 107,36 Kgm - 9335 in/lb
Min. wheel diam: 350 mm-13,77 in.
By-Pass: cod. 23186

N. of wheel turns; **5,1**
Min. hose size: 5/16" - 3/8" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle : 35° + 35°
Torque: 107,36 Kgm - 9335 in/lb
Min. wheel diam: 450 mm-17,71 in.
By-Pass: cod. 23186 - 23480***

PUMP-CYLINDER COMBINATION SYSTEM 3

It is possible to choose the combination between pump and cylinder according to the desired number of wheel turns lock-to-lock.
NOTE: the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P20BAP
Cod. 21173 (*)

P30BAP
Cod. 21174 (*)

P42BAP
Cod. 21175 (*)

CYLINDER

CTY100
Cod. / Part # 20921

N. of wheel turns: **7,4**
Min. hose size: 5/16" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle: 35° + 35°
Torque: 110,87 Kgm - 9640 in/lb
Min. wheel diam: 350 mm-13,77 in.
By-Pass: cod. 23186

N. of wheel turns: **5**
Min. hose size: 5/16" - 3/8" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle: 35° + 35°
Torque: 110,87 Kgm - 9640 in/lb
Min. wheel diam: 450 mm-17,71 in.
By-Pass: cod. 23186 - 23480***

CTA80U
Cod. / Part # 12682

N. of wheel turns: **7,2**
Min. hose size: 5/16" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle: 35° + 35°
Torque: 107,36 Kgm - 9335 in/lb
Min. wheel diam: 350 mm-13,77 in.
By-Pass: cod. 23186

N. of wheel turns: **5,1**
Min. hose size: 5/16" - 3/8" I.D. (**)
Tiller: 200 mm - 7,87 in.
Angle: 35° + 35°
Torque: 107,36 Kgm - 9335 in/lb
Min. wheel diam: 450 mm-17,71 in.
By-Pass: cod. 23186 - 23480***

Rudder torque calculated at the working pressure of 70 bar (1000 psi)
(*) For more details, see the "FLANGED HELMS" section on page 18 and the "BASIC HELM" section on page 13 and following to choose the desired mounting configuration
(**) See on page 80-81 to choose the preferred kit. With 42cc pumps and hose length over 8 mt - 24' it is suggested to use 3/8" I.D. flexible hose with 1/2" fittings. Flexible hose can be used up to a max length of 15 mt - 45'
(***) It is suggested for combination with 42cc helm pump if the total length between pump and cylinder exceeds 8 mt - 24'
(****) In case an auto-pilot power unit with automatic filling is installed, the fitting kits are respectively the code 23376-23418.**

SYSTEM 4

BRASS CYLINDER			
Components	**Model**	**Code**	**Q.ty**
Cylinder	**CTB110U** **CTB130U**	**12687** **12691**	1
Helm pump	Choose the pump model according to the wished wheel turns number in the table on the next page		1
Hose kit	**SH**…**	See on page 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	3
By-Pass	Choose the by-pass model according to the Pump-Cylinder Combination in the table on the next page		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on next page)	1
Second station fittings kit		**23418**	1
Hose kit	**SH**…**	See on page 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	1
In case of auto-pilot installation please add:			
Auto-pilot power unit****	Choose auto-pilot power unit model on the Selection Guides on pages 61-64-65		1
Auto-pilot fittings kit		**23373******	1

PUMP-CYLINDER COMBINATION SYSTEM 4

		HELM PUMP		
	It is possible to choose the combination between pump and cylinder according to the wished number of wheel turns lock-to-lock. **NOTE:** the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock: • less wheel turns, MORE effort • more wheel turns, LESS effort **NOTE**: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.	 **P25FLY** **Cod. 20915 (*)**	 **P35FLY** **Cod. 20916 (*)**	 **P42FLY** **Cod. 20917 (*)**
CYLINDER	 **CTB110U** **Cod. / Part # 12687**			N. of wheel turns: **6,7** Min. hose size: 5/16" - 3/8" I.D. (**) Tiller: 153 mm - 6,02 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. By-Pass: 23480
	 **CTB130U** **Cod. / Part # 12691**			N. of wheel turns: **7,7** Min. hose size: 5/16" - 3/8" I.D. (**) Tiller: 180 mm - 7 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. By-Pass: cod. 23480

PUMP-CYLINDER COMBINATION

		HELM PUMP		
		 **P20BAP** **Cod. 21173 (*)**	 **P30BAP** **Cod. 21174 (*)**	 **P42BAP** **Cod. 21175 (*)**
CYLINDER	 **CTB110U** **Cod. / Part # 12687**			N. of wheel turns: **6,7** Min. hose size: 3/8" I.D. (**) Tiller: 153 mm - 6,02 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. By-Pass: cod. 23480
	 **CTB130U** **Cod. / Part # 12691**			N. of wheel turns: **7,7** Min. hose size: 3/8" I.D. (**) Tiller: 180 mm - 7 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. By-Pass: cod. 23480

Rudder torque calculated at the working pressure of 70 bar (1000 psi)

(*) For more details, see the "FLANGED HELMS" section on page 18 and the "BASIC HELM" section on page 13 and following to choose the desired mounting configuration

(**) See on page 80-81 to choose the preferred kit. With 42cc pumps and hose length over 8 mt - 24' it is suggested to use 3/8" I.D. flexible hose with 1/2" fittings. Flexible hose can be used up to a max length of 15 mt - 45'

(****) In case an auto-pilot power unit with automatic filling is installed, the fitting kit is code 23418.**

SYSTEM 5

BRASS CYLINDER			
Components	**Model**	**Code**	**Q.ty**
Cylinder	**CTB145U**	**12694**	1
Helm pump	Choose the pump model according to the wished wheel turns number in the table here below		1
Hose kit	**SH**…**	See on page 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	3
By Pass	Choose the by-pass model according to the Pump-Cylinder combination in the table here below		1
In case of additional station add:			
Second station helm pump	Same pump model as above	(see table on page bottom)	1
Second station fittings kit		**23418**	1
Hose kit	**SH**…**	See on page 80-81 for codes	1
Hydraulic oil	**VG22**	**21334**	1
In case of auto-pilot installation please add:			
Auto-pilot power unit****	Choose auto-pilot power unit model on the Selection Guides on pages 61-64-65		1
Auto-pilot fittings kit		**23373****	1

PUMP-CYLINDER COMBINATION

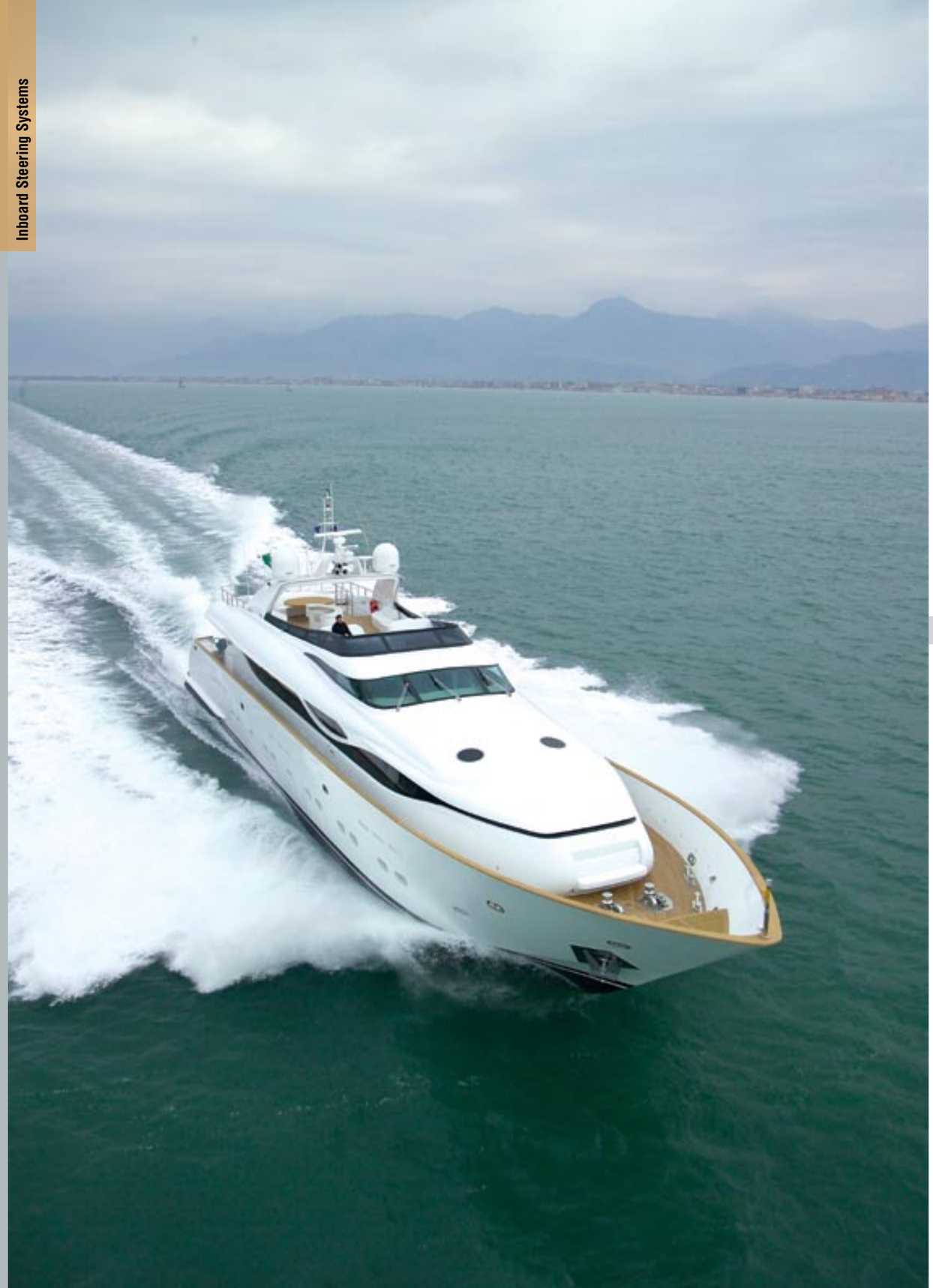
		HELM PUMP		
	It is possible to choose the combination between pump and cylinder according to the wished number of wheel turns lock-to-lock. **NOTE:** the requested effort on the steering wheel is inversely proportional to the wheel turns number lock-to-lock: • less wheel turns, MORE effort • more wheel turns, LESS effort **NOTE**: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.	 **P20BAP** **Cod. 21173 (*)**	 **P30BAP** **Cod. 21174 (*)**	 **P42BAP** **Cod. 21175 (*)**
CYLINDER	 **CTB145** **Cod. / Part # 12694**			N. of wheel turns: **8,6** Min. hose size: 3,8" I.D. (**) Tiller: 200 mm - 7,8 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. By-Pass: cod. 23480
		HELM PUMP		
		 **P25FLY** **Cod. 20915 (*)**	 **P35FLY** **Cod. 20916 (*)**	 **P42FLY** **Cod. 20917 (*)**
CIYLINDER	 **CTB145** **Cod. / Part # 12694**			N. of wheel turns: **8,6** Min. hose size: 3,8" I.D. (**) Tiller: 200 mm - 7,8 in. Angle: 35° + 35° Torque: 140,85 Kgm - 12247 in/lb Min. wheel diam: 450 mm-17,71 in. By-Pass: cod. 23480

Rudder torque calculated at the working pressure of 70 bar (1000 psi)

(*) For more details, see the "FLANGED HELMS" section on page 18 and the "BASIC HELM" section on page 13 and following to choose the desired mounting configuration

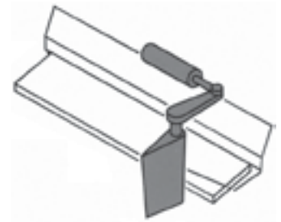
(**) See on page 80-81 to choose the preferred kit. With 42cc pumps and hose length over 8 mt - 24' it is suggested to use 3/8" I.D. flexible hose with 1/2" fittings. Flexible hose can be used up to a max length of 15 mt - 45'

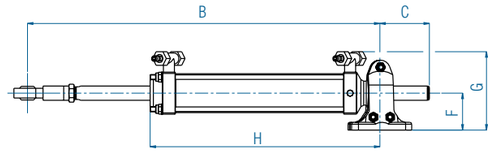
(****) In case an auto-pilot power unit with automatic filling is installed, the fitting kit is code 23418.**



INBOARD STEERING CYLINDERS

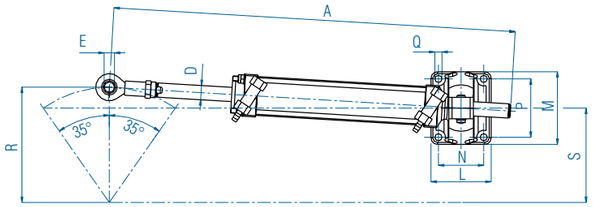
- SERIES **CTA**





Main Features of the Cylinders Series CTA

- Cylinder body in **anodized aluminium**
- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 115 and 215cc
- Supplied with bleeders
- Meet ABYC Standards



Technical specifications

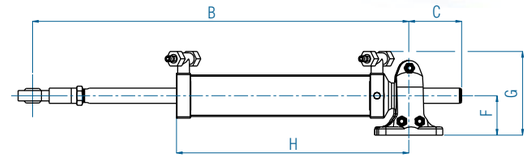
DIMENSIONS																
Model	**Stroke**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**
CTA40U	178 mm	555 mm	459 mm	96 mm	14 mm	19,05 mm	35 mm	86 mm	298 mm	62 mm	90 mm	40 mm	73 mm	8,5 mm	153 mm	127 mm
	7.0 in.	21.85 in.	18 in.	3.78 in	0.55 in.	3/4 in.	1.38 in.	3.39 in.	11.73 in.	2.44 in.	3.54 in.	1.57 in.	2.87 in.	0.33 in.	6.0 in.	5.0 in.
CTA65U	178 mm	586 mm	495 mm	91 mm	20 mm	19,05 mm	40 mm	91 mm	305 mm	60 mm	125 mm	40 mm	105 mm	8,5 mm	153 mm	127 mm
	7.0 in.	23 in.	19.49 in.	3.58 in.	0.79 in.	3/4 in.	1.57 in.	3.58 in.	12.0 in.	2.36 in.	4.92 in.	1.57 in.	4.13 in.	0.33 in.	6.0 in.	5.0 in.
CTA75U	200 mm	630 mm	528 mm	102 mm	20 mm	19,05 mm	40 mm	91 mm	327 mm	60 mm	125 mm	40 mm	105 mm	8,5 mm	175 mm	143 mm
	7.87 in.	24.8 in.	20.79 in.	4.0 in.	0.79 in.	3/4 in.	1.57 in.	3.58 in.	12.87 in.	2.36 in.	4.92 in.	1.57 in.	4.13 in.	0.33 in.	6.89 in.	5.6 in.
CTA80U	228 mm	690 mm	573 mm	117 mm	20 mm	19,05 mm	40 mm	91 mm	355 mm	60 mm	125 mm	40 mm	105 mm	8,5 mm	200 mm	164 mm
	9.0 in.	27.16 in.	22.56 in.	4.61 in.	0.79 in.	3/4 in.	1.57 in.	3.58 in.	13.98 in.	2.36 in.	4.92 in.	1.57 in.	4.13 in.	0.33 in.	7.87 in.	6.5 in.

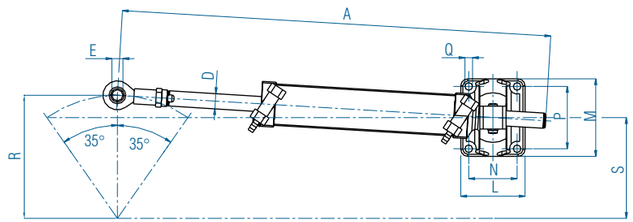
TECHNICAL DETAILS									
Model	**Code**	**Stroke**	**Rudder Torque**	**Thrust at 70 bar 1000 psi**	**Volume**	**Tiller**	**Angle**	**Fittings**	**Weight**
CTA40U	**15649**	178 mm	57.83 Kgm	455 Kgf	115.7 cc	153 mm	35°+35°	1/4" NPT - 3/8" O.D.	2,2 Kg
		7.0 in	5008 in/lb	1002 lbf	7.1 cu.in	6 in.			4,85 lb
CTA65U	**12677**	178 mm	83.81 Kgm	659.4 Kgf	167.68 cc	153 mm	35°+35°	1/4" NPT - 3/8" O.D.	2,6 Kg
		7.0 in	7257 in/lb	1453 lbf	10.23 cu.in	6 in.			5,73 lb
CTA75U	**15763**	200 mm	94.17 Kgm	659.4 Kgf	188.4 cc	175 mm	35°+35°	1/4" NPT - 3/8" O.D.	3,0 Kg
		7.78 in	8155 in/lb	1453 lbf	11.5 cu.in	6.9 in.			6,61 lb
CTA80U	**12682**	228 mm	107.36 Kgm	659.4 Kgf	214.78 cc	200 mm	35°+35°	1/4" NPT - 3/8" O.D.	3,2 Kg
		9.0 in	9297 in/lb	1453 lbf	13.11 cu.in	7.8 in.			7,05 lb

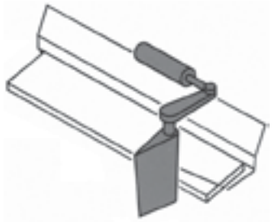
NOTE: The inboard cylinders mod CTA are not suitable for installations on racing boats.
The cylinders mod. CTA are provided with inch fittings. Version with metric fittings are also available. Please specify when placing the order.

Inboard Steering Systems

INBOARD STEERING CYLINDERS
• SERIES **CTY**







Main Features of the Cylinders Serie CTY

- Cylinder body in **brass**
- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 98 and 378cc
- Supplied with bleeders
- Meet ABYC sandards

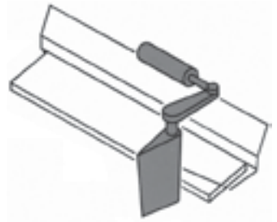
Technical specifications

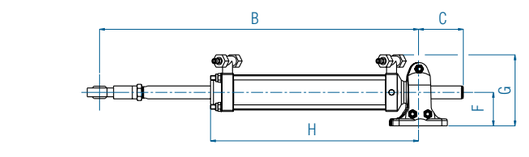
DIMENSIONS																
Model	**Stroke**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**
CTY100	228 mm	694 mm	578 mm	116 mm	19 mm	15,88 mm	40 mm	70 mm	377 mm	60 mm	125 mm	40 mm	105 mm	8,5 mm	198 mm	162 mm
	9.0 in.	27.32 in.	22.75 in.	4.56 in.	0.75 in.	0.62 in.	1.57 in.	2.76 in.	14.84 in.	2.36 in.	4.92 in.	1.58 in.	4.13 in.	0.33 in.	7.79 in.	6.38 in.

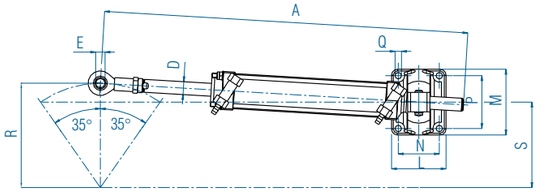
TECHNICAL DETAILS									
Model	**Code**	**Stroke**	**Rudder Torque**	**Thrust at 70 bar - 1000 psi**	**Volume**	**Tiller**	**Angle**	**Fittings**	**Weight**
CTY100	**20921**	228 mm	110,87 kgm	682 Kgf	222 cc	200 mm	35°+35°	1/4" NPT - 3/8" O.D.	5,6 Kg
		9.0 in.	9601 in/lb	1503 lbf	13.47 cu.in	7.8 in.			12,3 lbs

NOTE: The inboard cylinders mod CTY are not suitable for installations on racing boats.

INBOARD STEERING CYLINDERS
• SERIES **CTB**







Main Features of the Cylinders Serie CTB

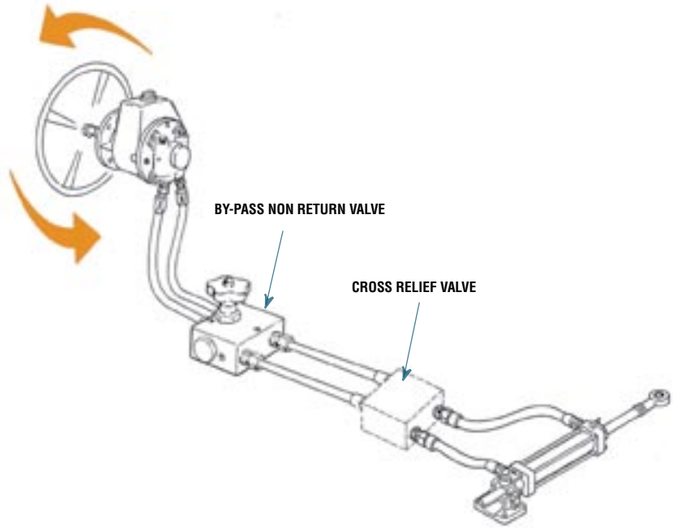
- Cylinder body in **brass**
- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 281 and 360cc
- Supplied with bleeders
- Meet ABYC standards

Technical specifications

DIMENSIONS																
Model	**Stroke**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**
CTB110U	178 mm	585 mm	521 mm	64 mm	22 mm	19,05 mm	57 mm	121 mm	329 mm	93 mm	112 mm	70 mm	90 mm	11 mm	153 mm	127 mm
	7.0 in.	22.99 in.	20.51 in.	2.52 in.	0.87 in.	3/4 in.	2.24 in.	4.76 in.	12.95 in.	3.66 in.	4.40 in.	2.75 in.	3.54 in.	0.43 in.	6.0 in.	5.0 in.
CTB130U	204 mm	622 mm	545 mm	77 mm	22 mm	16 mm	57 mm	121 mm	355 mm	93 mm	112 mm	70 mm	90 mm	11 mm	180 mm	147 mm
	8.0 in.	24.45 in.	21.46 in.	3.03 in.	0.87 in.	0.63 in.	2.24 in.	4.76 in.	13.98 in.	3.66 in.	4.40 in.	2.75 in.	3.54 in.	0.43 in.	7.08 in.	5.78 in.
CTB145U	228 mm	685 mm	596 mm	89 mm	22 mm	19,05 mm	57 mm	121 mm	379 mm	93 mm	112 mm	70 mm	90 mm	11 mm	200 mm	164 mm
	9.0 in.	26.93 in.	23.46 in.	3.5 in.	0.87 in.	3/4 in.	2.24 in.	4.76 in.	14.92 in.	3.66 in.	4.40 in.	2.75 in.	3.54 in.	0.43 in.	7.87 in.	6.5 in.

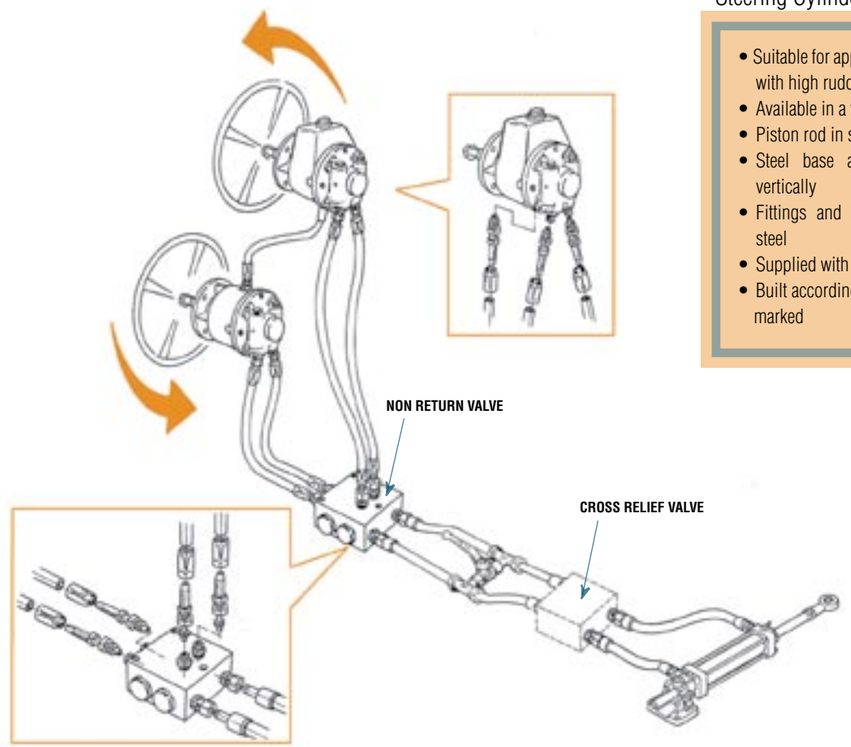
TECHNICAL DETAILS									
Model	**Code**	**Stroke**	**Rudder Torque**	**Thrust at 70 bar - 1000 psi**	**Volume**	**Tiller**	**Angle**	**Fittings**	**Weight**
CTB110U	**12687**	178 mm	140.85 Kgm	1108 Kgf	281.77 cc	153 mm	35°+35°	3/8 " NPT - 1/2" O.D.	8,6 Kg
		7 in.	12197 in/lb	2442 lbf	17.19 cu.in	6 in.			18,95 lb
CTB130U	**12691**	204 mm	161.42 Kgm	1108 Kgf	322.93 cc	180 mm	35°+35°	3/8 " NPT - 1/2" O.D.	8,8 Kg
		8 in.	13978 in/lb	2442 lbf	19.71 cu.in	7 in.			19,40 lb
CTB145U	**12694**	228 mm	180.41 Kgm	1108 Kgf	360.92 cc	200 mm	35°+35°	3/8 " NPT - 1/2" O.D.	9,4 Kg
		9 in.	15623 in/lb	2442 lbf	22 cu.in	7.8 in.			20,72 lb

NOTE: The inboard cylinders mod CTB are not suitable for installations on racing boats.
The cylinders mod. CTB are provided with inch fittings. Version with metric fittings are also available. Please specify when placing the order.



Main features of BCS 'Heavy Duty' Helm Pumps

- Axial piston helm pumps
- Helm shaft in stainless steel for the maximum resistance and the best performances
- Available in several displacements: 63cc, 89cc, 105cc, 151cc, 191cc
- Available with extra oil tank
- Built with high quality materials to ensure long and trouble-free work even in the toughest service conditions
- Multiple control station can be easily installed
- Built according to quality criteria and approved CE
- Complying with **ABYC** standard requirements.
- Designed to satisfy the requirements of the most important international Survey Authorities such as **RINA, Lloyd's Register of shipping, American Bureau of Shipping, Bureau Veritas, etc..**



Main Features of Heavy Duty Inboard Steering Cylinders

- Suitable for application on commercial boats even with high rudder torques
- Available in a wide range of volumes and strokes
- Piston rod in stainless steel
- Steel base adjustable either horizontally or vertically
- Fittings and ball joints available in stainless steel
- Supplied with bleeders
- Built according to **ABYC** Standards and CE marked

HEAVY DUTY INBOARD STEERING SYSTEMS

It is crucial for the steering system to perfectly suit the vessel type and its main characteristics. BCS has developed a complete line of "Heavy Duty" steering components that are designed specifically for fishing or commercial boats and thus require much higher work loads and performance.
The complete range includes several models of steering helm pumps, built with materials and techniques to be extremely robust, and a wide selection of hydraulic cylinders, designed to satisfy the highest requirements of reliability and long, trouble-free service.
There is also a selection of steering accessories which install easily to complete the system. These make it safe (even in severe service conditions) for the user to maintain control with the maximum steering comfort.
Every component of this range is built and tested to meet the toughest tests and satisfy the strictest Standards of international Survey Authorities such as **RINA, Lloyd's Register of Shipping, American Bureau of Shipping, Bureau Veritas,** etc., who can also release specific certificates on request.

'Heavy duty' Helm Pumps

The "Heavy Duty" helm pumps are available in displacements from 63cc, 89cc, 105cc, 151cc to 191cc.
The 63cc and 89cc helm pumps are also available with or without an extra oil tank. In the single station steering system it is suggested to install the helm pump with extra oil tank, while with a dual station system it is suggested to install a classic helm pump on the lower station and a helm pump with extra tank on the upper station.
The 105cc, 151cc and 191cc helm pumps are all provided with extra oil tank.

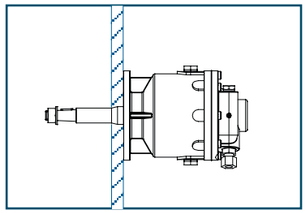
The helm body is made of aluminum and the shaft is made of stainless steel. High resistance seals are tested for long life and heavy working cycles.
Every pump is painted to withstand even highly saline marine environments. The high quality materials used for these helm pumps and the state-of-the-art production technologies resulted from years of direct experience ensure an excellent performance with very low friction and a quick and precise response.
This series of helm pumps is not provided with built-in non return and relief valves; so, these accessories shall be selected and ordered separately to complete the steering system. In addition the fittings kit is available in several sizes to satisfy the different mounting configurations. They shall be selected and ordered separately. (see page 82)

'Heavy duty' Steering Cylinders

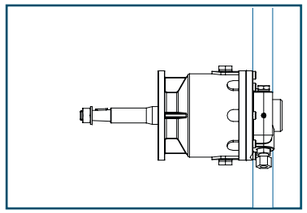
All BCS 'Heavy Duty' inboard steering cylinders are built with stainless steel piston rod for high corrosion resistance.
The cylinder body is painted with paints suitable to work in a marine environment.
Ball joints are available in the most popular sizes for the market and, as for the previous series, a stainless steel version can be supplied on request.
The cylinder base can adjust either horizontally, to follow the complete arc of the cylinder, or vertically, in order to adapt to any tiller excursion.
Each cylinder is provided with Tee fittings with bleeders as well as the necessary fittings for hose connection.

HEAVY DUTY HELM PUMPS
• MOD. **P63T - P89T**

Mounting configuration
Rear mounting



Mounting configuration
Frontal mounting



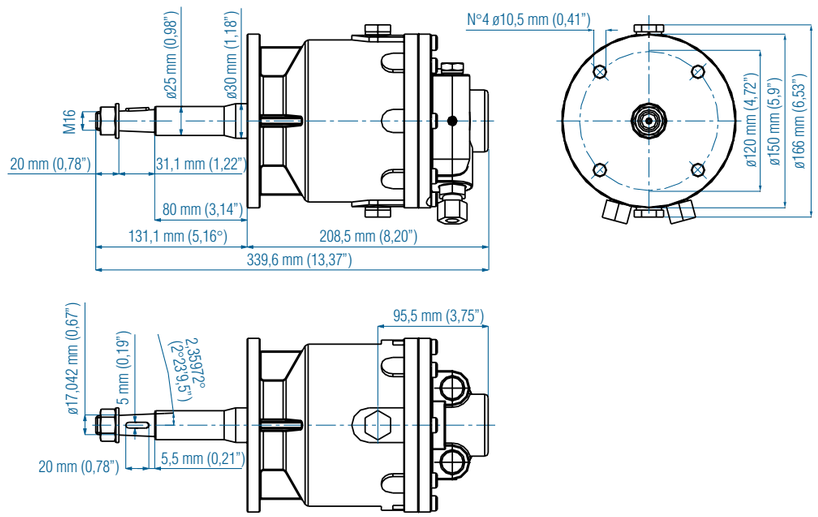
Order Guide

HEAVY DUTY HELM PUMPS		
Model	**Displacement**	**Code**
P63T	63 cc/rev	**13996**
	3.84 cu.in/rev	
P89T	89 cc/rev	**14003**
	5.5 cu.in/rev	

Heavy Duty Helm Pumps - Technical details

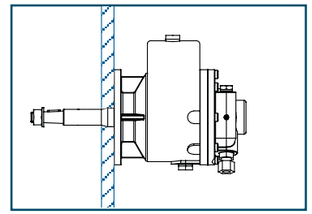
Model	Mounting	Non return valve	Relief valve	Displacement	N. of pistons	Fittings provided	Min.wheel diameter	Max wheel diameter	Weight
P63T	Rear and Front	No	No	63 cc/rev	5	/	700 mm	1016 mm	8,7 Kg
				3.84 cu.in/rev			27,56 in.	40 in.	19.2 lb
P89T	Rear and Front	No	No	89 cc/rev	7	/	700 mm	1016 mm	8,9 Kg
				5.5 cu.in/rev			27,56 in.	40 in.	20.0 lb

NOTE: Available with metrical fittings only.

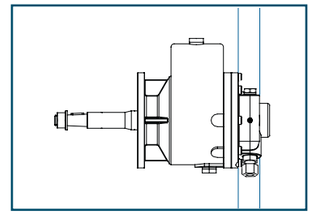


HEAVY DUTY HELM PUMPS
• MOD. **P63S - P89S WITH OIL TANK**

Mounting configuration
Rear mounting



Mounting configuration
Frontal mounting



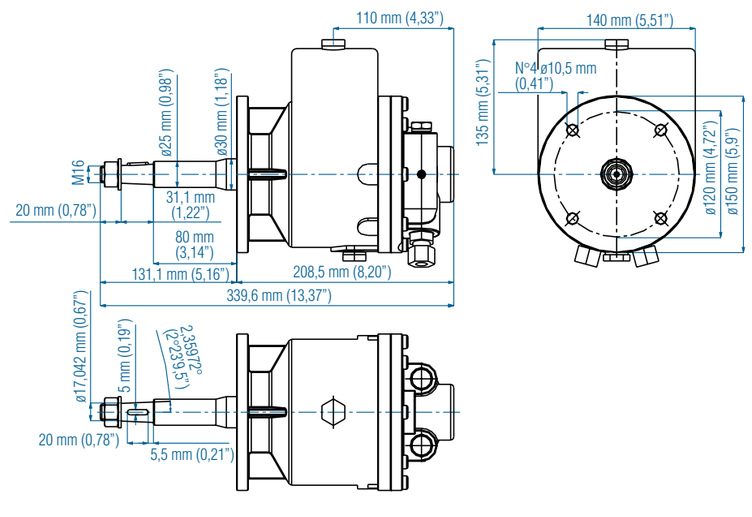
Order Guide

HEAVY DUTY HELM PUMPS		
Model	**Displacement**	**Code**
P63S	63 cc/rev	**13995**
	3.84 cu.in/rev	
P89S	89 cc/rev	**14002**
	5.5 cu.in/rev	

Heavy Duty Helm Pumps with oil tank - Technical details

Model	Mounting	Non return valve	Relief valve	Displacement	N. of pistons	Fittings provided	Min.wheel diameter	Max wheel diameter	Weight
P63S	Rear and Front	No	No	63 cc/rev	5	/	700 mm	1016 mm	9,3 Kg
				3.84 cu.in/rev			27,56 in.	40 in.	20.5 lb
P89S	Rear and Front	No	No	89 cc/rev	7	/	700 mm	1016 mm	9,5 Kg
				5.5 cu.in/rev			27,56 in.	40 in.	21.0 lb

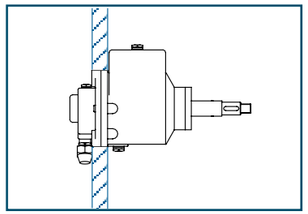
NOTE: Available with metrical fittings only.



HEAVY DUTY HELM PUMPS

- MOD. **P105 - P151 - P191 WITH OIL TANK**

Mounting configuration
Frontal mounting



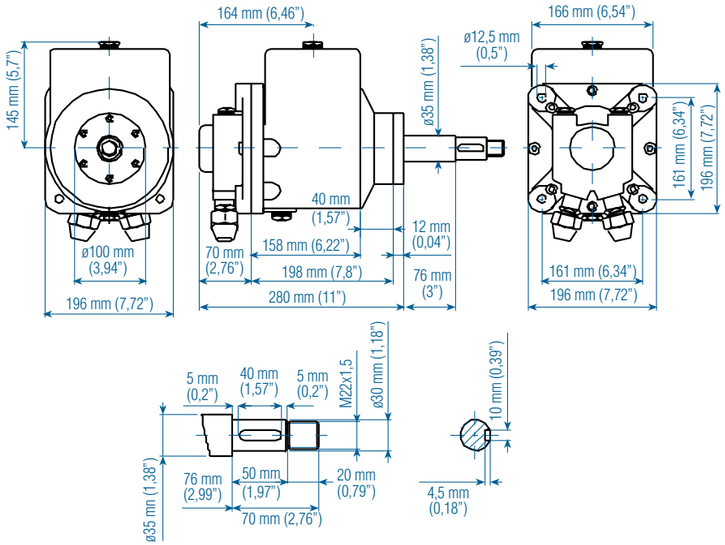
Order Guide

HEAVY DUTY HELM PUMPS		
Model	**Displacement**	**Code**
P105	105 cc/rev	**14052**
	6,4 cu.in/rev	
P151	151 cc/rev	**14082**
	9,2 cu.in/rev	
P191	191cc/rev	**14084**
	11,7 cu.in/rev	

Heavy Duty Helm Pumps with oil tank - Technical details

Model	Mounting	Non return valve	Relief valve	Displacement	N. of pistons	Fittings provided	Min.wheel diameter	Max wheel diameter	Weight
P105	Rear	No	No	105 cc/rev	5	G1/2”-18 mm O.D.	1000 mm	1220 mm	21,5 Kg
				6,4 cu.in/rev			39,37 in.	48 in.	47,39 lb
P151	Rear	No	No	151 cc/rev	7	G1/2”-18 mm O.D.	1000 mm	1220 mm	23,2 Kg
				9,2 cu.in/rev			39,37 in.	48 in.	51,14 lb
P191	Rear	No	No	191 cc/rev	7	G1/2”-18 mm O.D.	1000 mm	1220 mm	24,5 Kg
				11,7 cu.in/rev			39,37 in.	48 in.	54,00 lb

NOTE: Available with metrical fittings only.



HEAVY DUTY INBOARD STEERING SYSTEMS
• ORDER GUIDE

Boat length LOA	System to order							
	Planing Hull				Displacement Hull			
	1 Engine		2 Engines		1 Engine		2 Engines	
	Pleasure	Working	Pleasure	Working	Pleasure	Working	Pleasure	Working
11,6 - 13,4mt / 38 - 44ft	3	4	3	4	4	6	3	5
13,4 - 15,3mt / 44 - 50ft	7	7	4	5	6	7	5	6
15,5 - 16,8mt / 50 - 55ft	8	9	5	6	7	8	7	8
16,8 - 18mt / 55 - 60ft	8	9	6	7	8	8	8	8
18 - 19,8mt / 60 - 65ft	/	/	8	/	8	9	8	9
19,8 - 21mt / 65 - 70ft	/	/	8	/	9	9	9	10
21 - 22,8mt / 70 - 75ft	/	/	9	/	10	11	10	11
22,8 - 24,3mt / 75- 80ft	/	/	9	/	10	11	10	11
over 24,3 mt/ 80ft	For boat lengthes over 24,3 mt/ 80 ft please contact our technical department to check applications suggested on systems 12-13-14							

WARNING! The above suggestions shall be intended as merely INDICATIVE. To check the proper application the required max torque must be calculated. If the required information is not available please contact our authorized dealer or service center and submit boat length, maximum speed and rudder dimensions.

WARNING! For displacement boats,hull speed normally does not exceed 18 knots.
For planing boats, the above steering systems are suggested for boat speeds under 30 knots.

Cylinder		System to order
Model	Code	
CTC200	12695	System 6 (See on page 47)
CTC230	12698	System 7 (See on page 48)
CTC300	12701	System 8 (See on page 49)
CTC400 CTD310	15697 15698	System 9 (See on page 50)
CTD450	15699	System 10 (See on page 51)
CTE600	15700	System 11 (See on page 52)
CTE900	15701	System 12 (See on page 53)
CTE1200	15702	System 13 (See on page 54)
CTF1600	15703	System 14 (See on page 55)

Steering effort

LIGHT NORMAL HEAVY

SYSTEM 6

SINGLE-station steering system				DOUBLE-station steering system			
Components	Model	Code	Q.ty	Components	Model	Code	Q.ty
Cylinder	**CTC200**	**12695**	1	Cylinder	**CTC200**	**12695**	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	**P63S**	**13995**	1	Main station pump	**P63T**	**13996**	1
Second station pump	/	/	/	Second station pump	**P63S**	**13995**	1
Pump fittings kit		**14359 or 14360****	2	Pump fittings kit		**23492 or 23493****	1
Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm**	/	/	Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm**	/	/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P63T
Cod. 13996 (*)

P63S
Cod. 13995 (*)

CYLINDER

CTC200
Cod. / Part # 12695

N. of wheel turns: **7,9**
Min. hose size: Copper tube d.e. 12 mm x 1 mm or Copper tube d.e. 14 x 1**
Tiller: 175 mm / 6.9 in.
Angle: 35° + 35°
Torque: 249,93 Kgm / 21643 in/lb
Min. wheel diam: 700 mm - 27,56 in.

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information
(**) To be used when the hose length between pump and cylinder exceeds 15 mt. - 45'

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P63	1	**14359** x 2 Q.ty			**23500**	**15707**		Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	1		**14360** x 2 Q.ty		**23501**	**17672**		Copper tube d.e. 14 x 1 mm	> 15 mt - 45'
	2	**23492**		**15708**	**23500**		**16968**	Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	2		**23493**	**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	> 15 mt - 45'

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 7

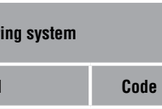
SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTC230**	**12698**	1	Cylinder	**CTC230**	**12698**	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	**P63S**	**13995**	1	Main station pump	**P63T**	**13996**	1
Second station pump	/	/	/	Second station pump	**P63S**	**13995**	1
Pump fittings kit		**14359 or 14360****	2	Pump fittings kit		**23492 or 23493****	1
Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm**	/	/	Suggested min. hose size	Copper tube d.e.12 x 1 mm or Copper tube d.e. 14 x 1 mm**	/	/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P63T
Cod. 13996 (*)



P63S
Cod. 13995 (*)

CYLINDER

CTC230
Cod. / Part # 12698

N. of wheel turns: **7,9**
Min. hose size.: Copper tube d.e. 12 mm x 1 mm or Copper tube d.e. 14 x 1**
Tiller: 175 mm / 6.9 in.
Angle: 35° + 35°
Torque: 249,93 Kgm / 21643 in/lb
Min. wheel diam: 700 mm - 27,56 in.

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information
(**) To be used when the hose length between pump and cylinder exceeds 15 mt. - 45'

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P63	1	**14359** x 2 Q.ty			**23500**	**15707**		Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	1		**14360** x 2 Q.ty		**23501**	**17672**		Copper tube d.e. 14 x 1 mm	> 15 mt - 45'
	2	**23492**		**15708**	**23500**		**16968**	Copper tube d.e. 12 x 1 mm	< 15 mt - 45'
	2		**23493**	**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	> 15 mt - 45'

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 8

SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTC300**	**12701**	1	Cylinder	**CTC300**	**12701**	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	**P63S or P89S**	**13995 or 14002**	1	Main station pump	**P63T or P89T**	**13996 or 14003**	1
Second station pump	/	/	/	Second station pump	**P63S or P89S**	**13995 or 14002**	1
Pump fittings kit		**14360 or 14361****	2	Pump fittings kit		**23493 or 23452****	1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Fittings kit for auto-pilot	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P63T
Cod. 13996 (*)

P63S
Cod. 13995(*)

P89T
Cod. 14003 (*)

P89S
Cod. 14002 (*)

CYLINDER

CTC300
Cod. / Part # 12701

N. of wheel turns: **11,9**
Copper tube d.e.14 x 1 mm
Copper tube d.e.18 x 1,5 mm**
Tiller: 260 mm / 10,24 in.
Angle: 35° + 35°
Torque: 374,89 Kgm / 32465 in/lb
Min. wheel diam: 700 mm - 27,56 in.

N. of wheel turns: : **8,4**
Copper tube d.e.14 x 1 mm
Copper tube d.e.18 x 1,5 mm**
Tiller : 260 mm / 10,24 in.
Angle: 35° + 35°
Torque: 374,89 Kgm / 32465 in/lb
Min. wheel diam: 700 mm - 27,56 in.

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information
(**) To be used when the hose length between pump and cylinder exceeds 15 mt. - 45'

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P63	1	**14360** x 2 Q.ty			**23501**	**17672**		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		**14361** x 2 Q.ty		**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	**23493**		**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		**23452**		**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P89	1	**14360** x 2 Q.ty			**23501**	**17672**		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		**14361** x 2 Q.ty		**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	**23493**		**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		**23452**		**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 9

SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTC400 or CTD310**	**15697 or 15698**	1	Cylinder	**CTC400 or CTD310**	**15697 or 15698**	1
Flexible hoses for cylinder	Included	**/**	2	Flexible hoses for cylinder	Included	**/**	2
Main station pump	**P63S or P89S**	**13995 or 14002**	1	Main station pump	**P63T or P89T**	**13996 or 14003**	1
Second station pump	**/**	**/**	/	Second station pump	**P63S or P89S**	**13995 or 14002**	1
Pump fittings kit		**14360 or 14361****	2	Pump fittings kit		**23493 or 23452****	1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Fittings kit for auto-pilot	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P63T
Cod. 13996 (*)

P63S
Cod. 13995(*)

P89T
Cod. 14003(*)

P89S
Cod. 14002(*)

CYLINDER

CTC400
Cod. / Part # 15697

N. of wheel turns: **15,9**
Copper tube d.e.14x1 mm or Copper tube d.e.18x1,5 mm**
Tiller: 350 mm / 13,78 in.
Angle: 35° + 35°
Torque: 400 Kgm / 34780 in/lb
Min. wheel diam: 700 mm - 27,56 in.

N. of wheel turns: **11,2**
Copper tube d.e.14x1 mm or Copper tube d.e.18x1,5 mm**
Tiller: 350 mm / 13,78 in.
Angle: 35° + 35°
Torque: 400 Kgm / 34780 in/lb
Min. wheel diam: 700 mm - 27,56 in.

CTD310
Cod. / Part # 15698

N. of wheel turns: **13,4**
Copper tube d.e.14x1 mm or Copper tube d.e.18x1,5 mm**
Tiller: 175 mm / 6,88 in.
Angle: 35° + 35°
Torque: 422 Kgm / 36693 in/lb
Min. wheel diam: 700 mm - 27,56 in.

N. of wheel turns: **9,5**
Copper tube d.e.14x1 mm or Copper tube d.e.18x1,5 mm**
Tiller : 260 mm / 10,24 in.
Angle : 35° + 35°
Torque: 422 Kgm / 36693 in/lb
Min. wheel diam: 700 mm - 27,56 in.

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information
(**) To be used when the hose length between pump and cylinder exceeds 15 mt. - 45'

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P63	1	**14360** x 2 Q.ty			**23501**	**17672**		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		**14361** x 2 Q.ty		**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	**23493**		**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		**23452**		**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P89	1	**14360** x 2 Q.ty			**23501**	**17672**		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		**14361** x 2 Q.ty		**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	**23493**		**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		**23452**		**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 10

SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTD450**	**15699**	1	Cylinder	**CTD450**	**15699**	1
Flexible hoses for cylinder	Included	**/**	2	Flexible hoses for cylinder	Included	**/**	2
Main station pump	**P89S or P105**	**14002 or 14052**	1	Main station pump	**P89T or P105**	**14003 or 14052**	1
Second station pump	**/**	**/**	/	Second station pump	**P89S or P105**	**14002 or 14052**	1
Pump fittings kit		**14360 or 14361****	2	Pump fittings kit	See table on page bottom		1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Fittings kit for auto-pilot	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P89T
Cod. 14003 (*)

P89S
Cod. 14002 (*)

P105
Cod. 14052 (*)

CYLINDER

CTD450
Cod. / Part # 15699

N. of wheel turns **14,2**
Copper tube d.e.14 x 1 mm or
Copper tube d.e.18 x 1,5 mm**
Tiller: 260 mm / 10,24 in.
Angle: 35° + 35°
Torque: 633 Kgm / 55040 in/lb
Min. wheel diam: 700 mm-27,56 in.

N. of wheel turns **14,2**
Copper tube d.e.14 x 1 mm or
Copper tube d.e.18 x 1,5 mm**
Tiller: 260 mm / 10,24 in.
Angle: 35° + 35°
Torque: 633 Kgm / 55040 in/lb
Min. wheel diam: 700 mm-27,56 in.

N. of wheel turns **12,1**
Copper tube d.e.14 x 1 mm or
Copper tube d.e.18 x 1,5 mm**
Tiller : 260 mm / 10,24 in.
Angle : 35° + 35°
Torque: 633 Kgm / 55040 in/lb
Min. wheel diam: 1000 mm-39,37in.

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information
(**) To be used when the hose length between pump and cylinder exceeds 15 mt. - 45'

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P89	1	**14360** x 2 Q.ty			**23501**	**17672**		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		**14361** x 2 Q.ty		**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	**23493**		**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		**23452**		**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P105	1	Included			**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	Any length
	2	**23518**			**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	Any length

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 11

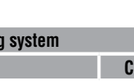
SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTE600**	**15700**	1	Cylinder	**CTE600**	**15700**	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	**P89S** **P105** **P151** **P191**	**14002** **14052** **14082** **14084**	1	Main station pump	**P89T** **P105** **P151** **P191**	**14003** **14052** **14082** **14084**	1
Second station pump	/	/	/	Second station pump	**P89S** **P105** **P151** **P191**	**14002** **14052** **14082** **14084**	1
Pump fittings kit		**14360** **or** **14361****	2	Pump fittings kit	See table on page bottom		1
Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/	Suggested min. hose size	Copper tube d.e.14 x 1 mm or Copper tube d.e.18 x 1,5 mm**		/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Fittings kit for auto-pilot	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

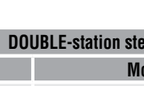
HELM PUMP

P89T
Cod. 14003 (*)

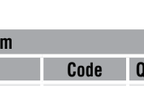


P89S
Cod. 14002 (*)

P105
Cod. 14052 (*)

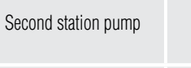


P151
Cod. 14082 (*)



P191
Cod. 14084 (*)

CYLINDER



CTE600
Cod. / Part # 15700

N. of wheel turns: **14,8**
Copper tube d.e.14 x 1 mm
or Copper tube d.e.18 x 1,5 mm**
Tiller : 175 mm / 6,89 in.
Angle: 35° + 35°
Torque: 660 Kgm / 57387 in/lb
Min. wheel diam:
700 mm - 27,56 in.

N. of wheel turns: **12,6**
Copper tube d.e.14 x 1 mm or
Copper tube d.e.18x1,5 mm**
Tiller: 175 mm/ 6,89 in.
Angle: 35° + 35°
Torque: 660 Kgm / 57387 in/lb
Min. wheel diam:
1000 mm - 39,37 in.

N. of wheel turns **8,7**
Copper tube d.e.14 x 1 mm
or Copper tube d.e.18x1,5 mm**
Tiller: 175 mm/ 6,89 in.
Angle: 35° + 35°
Torque: 660 Kgm / 57387 in/lb
Min. wheel diam:
1000 mm - 39,37 in.

N. of wheel turns **6,9**
Copper tube d.e.14 x 1 mm
or Copper tube d.e.18x1,5 mm**
Tiller: 175 mm/ 6,89 in.
Angle: 35° + 35°
Torque: 660 Kgm / 57387 in/lb
Min. wheel diam:
1000 mm - 39,37 in.

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information
(**) To be used when the hose length between pump and cylinder exceeds 15 mt. - 45'

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P89	1	**14360** x 2 Q.ty			**23501**	**17672**		Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	1		**14361** x 2 Q.ty		**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
	2	**23493**		**23513**	**23501**		**12134**	Copper tube d.e. 14 x 1 mm	< 15 mt - 45'
	2		**23452**		**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	> 15 mt - 45'
P105 P151 P191	1	Inlcuded			**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	Any length
	2	**23518**			**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	Any length

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 12

SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTE900**	**15701**	1	Cylinder	**CTE900**	**15701**	1
Flexible hoses for cylinder	Included	/	2	Flexible hoses for cylinder	Included	/	2
Main station pump	**P105** **P151** **P191**	**14052** **14082** **14084**	1	Main station pump	**P105** **P151** **P191**	**14052** **14082** **14084**	1
Second station pump	/	/	/	Second station pump	**P105** **P151** **P191**	**14052** **14082** **14084**	1
Pump fittings kit	Included	/	/	Pump fittings kit		**23518**	1
Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/	Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Fittings kit for auto-pilot	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P105
Cod. 14052 (*)

P151
Cod. 14082(*)

P191
Cod. 14084 (*)

CYLINDER

CTE900
Cod. / Part # 15701

N.of wheel turns: **18,8**
Copper tube d.e.18 x 1,5 mm
Tiller: 260 mm / 10,24 in.
Angle: 35° + 35°
Torque: 989 Kgm / 85993 in/lb
Min. wheel diam: 1000 mm-39,73 in.

N.of wheel turns: **13,1**
Copper tube d.e.18 x 1,5 mm
Tiller : 260 mm / 10,24 in.
Angle : 35° + 35°
Torque: 989 Kgm / 85993 in/lb
Min. wheel diam: 1000 mm-39,73 in.

N.of wheel turns: **10,4**
Copper tube d.e.18 x 1,5 mm
Tiller: 260 mm / 10,24 in.
Angle : 35° + 35°
Torque: 989 Kgm / 85993 in/lb
Min. wheel diam: 1000 mm-39,73 in.

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P105 P151 P191	1	Included			**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	Any length
	2	**23518**			**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	Any length

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 13

SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTE1200**	**15702**	1	Cylinder	**CTE1200**	**15702**	1
Flexible hoses for cylinder	Included	**/**	2	Flexible hoses for cylinder	Included	**/**	2
Main station pump	**P151** **P191**	**14082** **14084**	1	Main station pump	**P151** **P191**	**14082** **14084**	1
Second station pump	**/**	**/**	/	Second station pump	**P151** **P191**	**14082** **14084**	1
Pump fittings kit	Included	**/**	/	Pump fittings kit		**23518**	1
Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/	Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Fittings kit for auto-pilot	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

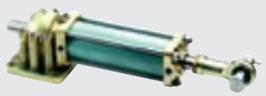
P151
Cod. 14082 (*)

N. of wheel turns: **17,5**
Copper tube d.e.18 x 1,5 mm
Tiller: 350 mm / 13,78 in.
Angle: 35° + 35°
Torque: 1318 Kgm / 114601 in/lb
Min. wheel diam: 1000 mm - 39,37 in.

P191
Cod. 14084 (*)

N. of wheel turns: **13,8**
Copper tube d.e.18 x 1,5 mm
Tiller: 350 mm / 13,78 in.
Angle: 35° + 35°
Torque: 1318 Kgm / 114601 in/lb
Min. wheel diam: 1000 mm - 39,37 in.

CYLINDER



CTE1200
Cod. / Part # 15702

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P151 **P191**	1	Included			**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	Any length
	2	**23518**			**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	Any length

For additional information on the fittings kit see the section on page 83 and 84

SYSTEM 14

SINGLE-station steering system				DOUBLE-station steering system			
Components	**Model**	**Code**	**Q.ty**	**Components**	**Model**	**Code**	**Q.ty**
Cylinder	**CTF1600**	**15703**	1	Cylinder	**CTF1600**	**15703**	1
Flexible hoses for cylinder	Included	**/**	2	Flexible hoses for cylinder	Included	**/**	2
Main station pump	**P191**	**14084**	1	Main station pump	**P191**	**14084**	1
Second station pump	**/**	**/**	/	Second station pump	**P191**	**14084**	1
Pump fittings kit	Included	**/**	/	Pump fittings kit		**23518**	1
Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/	Suggested min. hose size	Copper tube d.e.18 x 1,5 mm		/
Hydraulic oil	**VG22**	**21334**	4	Hydraulic oil	**VG22**	**21334**	4
See on page bottom for by-pass and valve selection according to pump type and tube length							
In case of auto-pilot installation please add:							
Auto-pilot power unit	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1	Fittings kit for auto-pilot	Choose auto-pilot power unit model on the selection guides on pages 61-64-65		1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort
NOTE: Increasing the wheel diameter within the specified limitations, the requested effort is reduced.

HELM PUMP

P191 Cod. 14084 (*)

N. of wheel turns: **20,2**
Copper tube d.e.18 x 1,5 mm
Tiller: 350 mm / 13,78 in.
Angle: 35° + 35°
Torque: 1928 Kgm / 167640 in/lb
Min. wheel diam: 1000 mm - 39,37 in.

CYLINDER

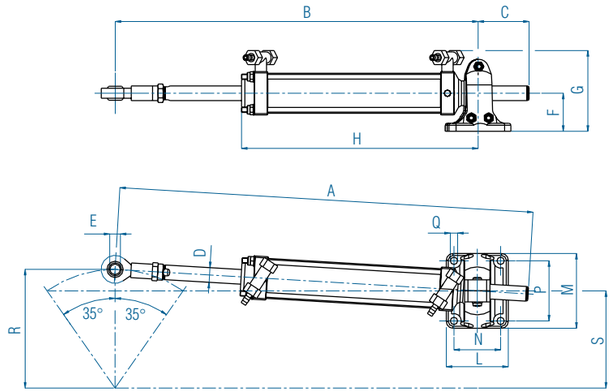
CTF1600
Cod. / Part # 15703

Max rudder torque calculated at a working pressure of 70 bar / 1000 psi
(*) See the specific section "HEAVY DUTY PUMPS" on page 42 for more information

Pump	N. of stations	Kit Fittings Code		Valve and By-Pass code				Type and length of copper tube between pump and cylinder	
		< 15 mt - 45'	> 15 mt - 45'	Non return valve	Relief valve	Non return valve By-Pass	Manual By-Pass		
P191	1	Included			**23503**	**15709**		Copper tube d.e. 18 x 1,5 mm	Any length
	2	**23518**			**23503**	**15709** x 2 Q.ty		Copper tube d.e. 18 x 1,5 mm	Any length

For additional information on the fittings kit see the section on page 83 and 84

INBOARD HEAVY DUTY CYLINDERS
• SERIES **CTC**



Main Features of the Cylinders Series CTC

- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 500 and 1000cc
- Supplied with bleeders
- Meet ABYC Standards

Technical specifications

DIMENSIONS

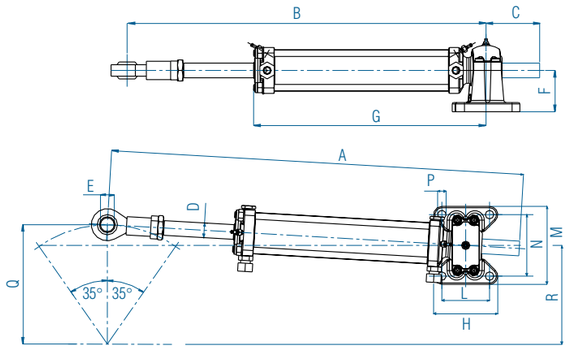
Model	Stroke	A	B	C	D	E	F	G	H	L	M	N	P	Q	R	S
CTC200	200 mm	733 mm	607 mm	127 mm	28 mm	25 mm	55 mm	133 mm	385 mm	100 mm	140 mm	72 mm	112 mm	11 mm	175 mm	143 mm
	7.87in.	28.86 in.	23.9 in.	5.0 in.	1.10 in.	0.98 in.	2.17 in.	5,25 in.	16.16 in.	3.94 in.	5.51 in.	2.83 in.	4.41 in.	0.43 in.	6.89 in.	5.6 in.
CTC230	228 mm	789 mm	649 mm	141 mm	28 mm	25 mm	55 mm	133 mm	413 mm	100 mm	140 mm	72 mm	112 mm	11 mm	200 mm	164 mm
	9.0 in.	31.0 in.	25.55 in.	5.55 in.	1.10 in.	0.98 in.	2.17 in.	5,25 in.	16.26 in.	3.94 in.	5.51 in.	2.83 in.	4.41 in.	0.43 in.	7.87 in.	6.5 in.
CTC300	300 mm	933 mm	757 mm	177 mm	28 mm	25 mm	55 mm	133 mm	485 mm	100 mm	140 mm	72 mm	112 mm	11 mm	260 mm	215 mm
	11.81 in.	36.73 in.	29.8 in.	6.97 in.	1.10 in.	0.98 in.	2.17 in.	5,25 in.	19.09 in.	3.94 in.	5.51 in.	2.83 in.	4.41 in.	0.43 in.	10.24 in.	8.5 in.
CTC400	400 mm	1133 mm	907 mm	227 mm	28 mm	25 mm	55 mm	133 mm	585 mm	100 mm	140 mm	72 mm	112 mm	11 mm	350 mm	286 mm
	15.75 in.	44.61 in.	35.71 in.	8.94 in.	1.10 in.	0.98 in.	2.17 in.	5,25 in.	23.0 in.	3.94 in.	5.51 in.	2.83 in.	4.41 in.	0.43 in.	13.78 in.	11.3 in.

TECHNICAL DETAILS

Model	Code	Stroke	Rudder Torque	Thrust at 70 bar - 1000 psi	Volume	Tiller	Angle	Fittings	Weight
CTC200	**12695**	200 mm	249.93 Kgm	1750 Kgf	500 cc	175 mm	35°+35°	G1/2" - d.12mm	13,2 Kg
		7.87 in.	21643 in/lb	3857 lbf	30.5 cu.in	6.9 in.			29,10 lb
CTC230	**12698**	228 mm	284.92 Kgm	1750 Kgf	570 cc	200 mm	35°+35°	G1/2" - d.12mm	15,3 Kg
		9 in.	24674 in/lb	3857 lbf	34.78 cu.in	7.8 in.			33,73 lb
CTC300	**12701**	300 mm	374.89 Kgm	1750 Kgf	750 cc	260 mm	35°+35°	G1/2" - d.12mm	17,7 Kg
		11.81 in.	32465 in/lb	3857 lbf	45.77 cu.in	10.2 in.			39,02 lb
CTC400	**15697**	400 mm	499.85 Kgm	1750 Kgf	1000 cc	350 mm	35°+35°	G1/2" - d.12mm	20,0 Kg
		15.75 in.	43287 in/lb	3857 lbf	61.02 cu.in	13.7 in.			44,1 lb

NOTE: The inboard cylinders mod CTC are not suitable for installations on racing boats
The cylinders mod CTC are provided with flexible hoses type SAE100 R1

INBOARD HEAVY DUTY CYLINDERS
• SERIES **CTD**



Main Features of the Cylinders Series CTD

- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 844 and 1266 cc
- Supplied with bleeders
- Meet ABYC Standards

Technical specifications

DIMENSIONS

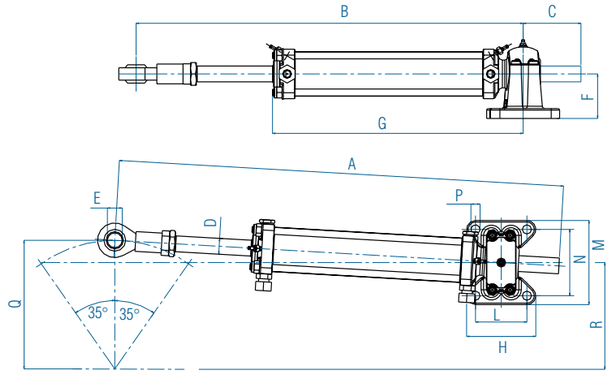
Model	Stroke	A	B	C	D	E	F	G	H	L	M	N	P	Q	R
CTD310	200 mm	700 mm	633 mm	67 mm	32 mm	30 mm	90 mm	410 mm	140 mm	104 mm	170 mm	134 mm	18,5 mm	175 mm	143 mm
	7.87in.	27.55 in.	24.92 in.	2.63 in.	1.25 in.	1.18 in.	3.54 in.	16.14 in.	5.51 in.	4.09 in.	25.4 in.	5.27 in.	0.72 in.	6.88 in.	5.62 in.
CTD450	300 mm	900 mm	783 mm	117 mm	32 mm	30 mm	90 mm	510 mm	140 mm	104 mm	170 mm	134 mm	18,5 mm	260 mm	215 mm
	11.81 in.	35.43 in.	30.82 in.	4.60 in.	1.25 in.	1.18 in.	3.54 in.	20.07 in.	5.51 in.	4.09 in.	25.4 in.	5.27 in.	0.72 in.	10.20 in.	8.44 in.

TECHNICAL DETAILS

Model	Code	Stroke	Rudder Torque	Thrust at 70 bar - 1000 psi	Volume	Tiller	Angle	Thread	Weight
CTD310	**15698**	200 mm	421 Kgm	2954 Kgf	844 cc	175 mm	35°+35°	1/2"	23 Kg
		7.87 in.	36459 in/lb	6510 lbf	51,50 cu.in	6.9 in.			50,70 lb
CTD450	**15699**	300 mm	633 Kgm	2954 Kgf	1266 cc	260 mm	35°+35°	1/2"	25,6 Kg
		11.81 in.	54818 in/lb	6510 lbf	77,25 cu.in	10.2 in.			56,43 lb

NOTE: The inboard cylinders mod CTD are not suitable for installations on racing boats
The cylinders mod CTD are provided with flexible hoses type SAE100 R1

INBOARD HEAVY DUTY CYLINDERS
• SERIES **CTE**



Main Features of the Cylinders Series CTE

- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 844 and 1266 cc
- Supplied with bleeders
- Meet ABYC standards

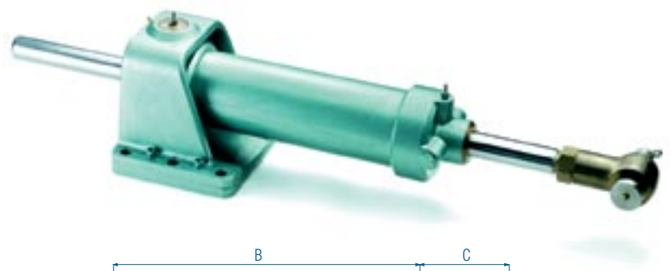
Technical specifications

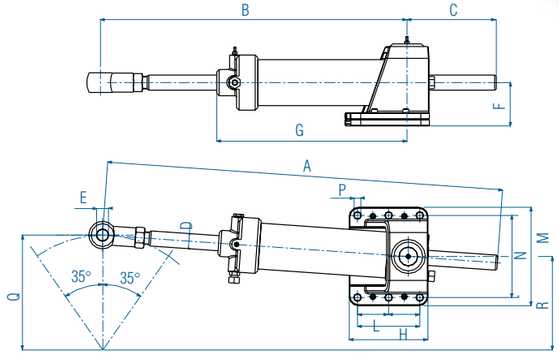
DIMENSIONS															
Model	**Stroke**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**L**	**M**	**N**	**P**	**Q**	**R**
CTE600	200 mm	735 mm	695 mm	40 mm	40 mm	35 mm	102 mm	450 mm	182 mm	143 mm	198 mm	160 mm	18,5 mm	175 mm	143 mm
	7.87in.	28.93 in.	27.36 in.	1.57 in.	1.57 in.	1.37 in.	4.01 in.	17.71 in.	7.16 in.	5.62 in.	7.79 in.	6.29 in.	0.72 in.	6.88 in.	5.62 in.
CTE900	300 mm	935 mm	845 mm	90 mm	40 mm	35 mm	102 mm	555 mm	182 mm	143 mm	198 mm	160 mm	18,5 mm	260 mm	215 mm
	11.81 in.	36.81 in.	33.26 in.	3.54 in.	1.57 in.	1.37 in.	4.01 in.	21.85 in.	7.16 in.	5.62 in.	7.79 in.	6.29 in.	0.72 in.	10.20 in.	8.44 in.
CTE1200	400 mm	1135 mm	995 mm	140 mm	40 mm	35 mm	102 mm	650 mm	182 mm	143 mm	198 mm	160 mm	18,5 mm	350 mm	286 mm
	15.75 in.	44.68 in.	37.59 in.	5.51 in.	1.57 in.	1.37 in.	4.01 in.	25.59 in.	7.16 in.	5.62 in.	7.79 in.	6.29 in.	0.72 in.	13.77 in.	11.25 in.

TECHNICAL DETAILS									
Model	**Code**	**Stroke**	**Rudder Torque**	**Thrust at 70 bar - 1000 psi**	**Volume**	**Tiller**	**Angle**	**Thread**	**Weight**
CTE600	**15700**	200 mm	659 Kgm	4616 Kgf	1318 cc	175 mm	35°+35°	1/2"	38,5 Kg
		7.87 in.	57069 in/lb	10173 lbf	21598 cu.in	6.9 in.			85 lb
CTE900	**15701**	300 mm	988 Kgm	4616 Kgf	1978 cc	260 mm	35°+35°	1/2"	38,8 Kg
		11.81 in.	85560 in/lb	10173 lbf	32413 cu.in	10.2 in.			85,5 lb
CTE1200	**15702**	400 mm	1318 Kgm	4616 Kgf	2637 cc	350 mm	35°+35°	1/2"	42,0 Kg
		15.75 in.	114138 in/lb	10173 lbf	43213 cu.in	13.7 in.			92,6 lb

NOTE: The inboard cylinders mod CTE are not suitable for installations on racing boats
The cylinders mod CTE are provided with flexible hoses type SAE100 R1

INBOARD HEAVY DUTY CYLINDERS
• SERIES **CTF**





Main Features of the Cylinders Series CTF

- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 844 and 1266 cc
- Supplied with bleeders
- Meet ABYC standards

Technical specifications

DIMENSIONS															
Model	**Stroke**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**L**	**M**	**N**	**P**	**Q**	**R**
CTF1600	400 mm	1205 mm	935 mm	270 mm	46 mm	36 mm	130 mm	580 mm	240 mm	190 mm	300 mm	250 mm	20,5 mm	350 mm	286 mm
	15.75 in.	47.44 in.	36.81 in.	10.62 in.	1.81 in.	1.41 in.	5.11 in.	22.83 in.	9.44 in.	7.48 in.	11.81 in.	9.84 in.	0.80 in.	13.77 in.	11.25 in.

TECHNICAL DETAILS									
Model	**Code**	**Stroke**	**Rudder Torque**	**Thrust at 70 bar - 1000 psi**	**Volume**	**Tiller**	**Angle**	**Thread**	**Weight**
CTF1600	**15703**	400 mm	1928 Kgm	6750 Kgf	3857 cc	350 mm	35°+35°	1/2"	78,8 Kg
		15.75 in.	166964 in/lb	14850 lbf	235,27 cu.in	13,77 in.			173,72 lb

NOTE: The inboard cylinders mod CTF are not suitable for installations on racing boats
The cylinders mod CTF are provided with flexible hoses type SAE100 R1

The automatic pilot and other electronic navigation systems are more popular today on every type of vessel, even smaller ones. Since these modern technologies are more and more sophisticated it is necessary for the equipment to be able to exchange information and work together to guarantee safe navigation.

It is from this need that BCS has developed a complete range of auto-pilot power units that represent the best interface for your auto-pilot.
Thanks to thirty years experience and relentless technical research, the BCS auto-pilot power unit range can give very simple solutions in terms of working principle and installation, but extremely reliable, precise performance.

It is possible to choose among several types of units:

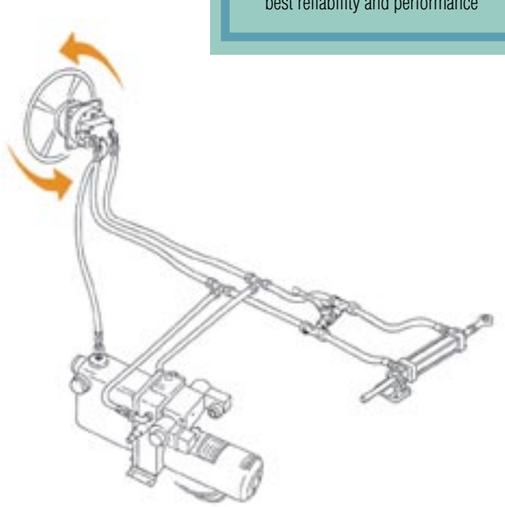
- SOLENOID - VALVE POWER UNITS
- SOLENOID - VALVE POWER UNITS WITH AUTOMATIC FILLING
- REVERSIBLE POWER UNITS

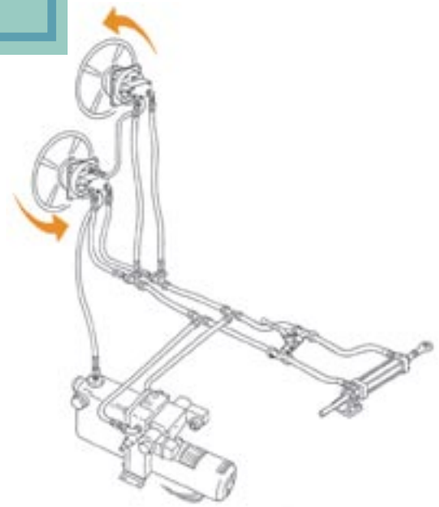
Each one of the types above is fully described in a dedicated section in this catalogue. Please check the different tables for the products characteristics and technical details.
For the choice of the most suitable unit it is necessary to have the steering cylinder volume, from which the actuation time is calculated and the suitable model selected.

AUTO-PILOT POWER UNITS

Main Features:

- Reduced dimensions
- Great variety of models for any kind of application
- Availability of **reversible and solenoid-valve Power Units**
- Steering automatic filling device available on certain models for an easier and faster bleeding
- Interface with any auto-pilot
- High quality materials and components for the best reliability and performance

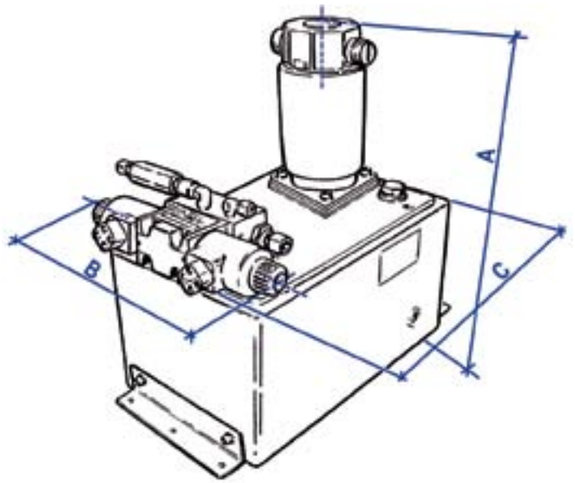




AUTO-PILOT SOLENOID-VALVE POWER UNITS WITH AUTOMATIC FILLING DEVICE

• MOD. **C03RAU - C04RAU**

This is a special innovative version of the auto-pilot power unit with solenoid valves. This model has all the main features of the range which supply a safe and precise interface for the automatic pilot, but also is equipped with a special device that allows the **automatic filling of the steering system.**
The installation and working principle of these units are exactly the same as traditional units, but this additional device **circulates oil automatically in the steering hoses as soon as the unit is switched on, allowing any air remaining in the system to go out through the designed bleeders.**
In this way, the troublesome bleeding procedure becomes much easier and quicker (and nearly automatic) if the unit has not been used for some time. The steering wheel is turned occasionally from port to starboard and vice-versa.
The unit composition and its main features are exactly the same as for the normal solenoid-valve power units described in the previous sectior



Main Features

- Available in two models for application with steering cylinders having a volume up to 500cc
- Safe and precise interface with any automatic pilot
- Very compact design and reduced dimensions
- Supplied with solenoid-valves electro-magnetically actuated
- Special device for the steering automatic filling
- Easy and fast steering bleeding

Technical specifications and applications

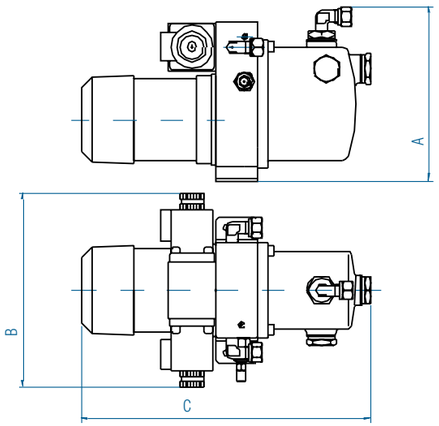
DIMENSIONS			
Model	**A**	**B**	**C**
CO3RAU	370 mm	230 mm	240 mm
	14,56 in.	9 in.	9,44 in.
CO4RAU	370 mm	230 mm	380 mm
	14,56 in.	9 in.	14,96 in.

TECHNICAL DETAILS AND APPLICATIONS											
Model	**Code**	**Typical cylinder application**	**BCS cylinder application**	**Application time in sec.**	**Displacement**	**Setting pressure**	**Max power consumption**	**Therm protection**	**Motor nominal power**	**Tank capacity**	**Weight ***
CO3RAU 12V	**23338**	130-360 cc	**CTA65U**	12,2	816 cc/min.	50 bar	11 A	16 A	125 W	7 lt	10 Kg-20,04 lb
			CTA75U	13,8							
			CTA80U	15,8							
CO3RAU 24V	**12552**	7,93-21,96 cu.in.	**CTY100**	16,3	49,77 cu.in.	725 psi	6 A	10 A		427 in.cu	10,5 Kg-23,14 lb
			CTB110U	20,7							
CO4RAU 12V	**23339**	360-500 cc	**CTB130U**	10	1940 cc/min.	50 bar	26 A	32 A	150 W	12 lt	15 Kg-33,06 lb
			CTB145U	11,2							
			CTC200	15,4							
CO4RAU 24V	**12569**	21,96-30,5 cu.in.	**CTC300**	23,2	118,34 cu.in	725 psi	13 A	16 A		732 in.cu	15,5 Kg-34,16 lb

NOTE: The auto-pilot power units are provided with inch fittings. Versions with metric fittings are also available please specify when placing the order.
(*) Weight is intended without oil

AUTO-PILOT POWER UNITS WITH SOLENOID-VALVES

• MOD. **C01NU - C03NU**



Main Features:

- Wide range of models with different displacements to satisfy any application
- Safe and precise interface with any auto-pilot
- Very compact design
- Supplied with electro-magnetically actuated solenoid valves

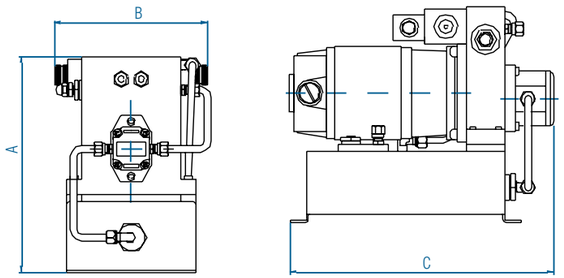
The BCS **range of auto-pilot power units with solenoid valves** includes several models with different characteristics and displacements to satisfy a wide application field on any type of boat.
The system's major components are an electric motor, a hydraulic pump, an oil tank and an electro-magnetically actuated valve group.
The unit dimensions allow installation in small, narrow areas, and the installation is very easy and fast.
To select the most suitable model, first verify the steering cylinder volume and then select the suggested model on our ORDER GUIDE on page 64
For any special application, please contact a specialized installer or dealer for help in the product selection.

Technical specifications

DIMENSIONS			
Model	**A**	**B**	**C**
CO1NU	160 mm	185 mm	285 mm
	6,30 in.	7,28 in.	11,22 in.
CO2NU	160 mm	185 mm	285 mm
	6,30 in.	7,28 in.	11,22 in.
CO2/3NU	185 mm	185 mm	360 mm
	7,28 in.	7,28 in.	14,17 in.
CO3NU	185 mm	185 mm	360 mm
	7,28 in.	7,28 in.	14,17 in.

NOTE: The auto-pilot power units are provided with inch fittings. Versions with metric fittings are also available please specify when placing the order.

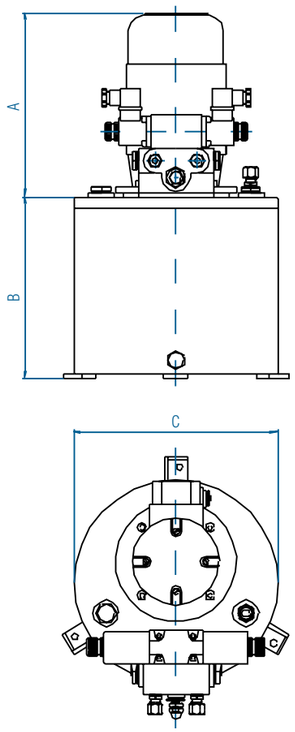
• MOD. **C04 - C04/5**



Technical specifications

DIMENSIONS			
Model	**A**	**B**	**C**
CO4	270 mm	200 mm	310 mm
	10,63 in.	7.8 in.	12,20 in.
CO4/5	270 mm	200 mm	310 mm
	10,63 in.	7.8 in.	12,20 in.

• MOD. **C07 - C016**



NOTE: The auto-pilot power units are provided with inch fittings. Versions with metric fittings are also available please specify when placing the order.

DIMENSIONS			
Model	**A**	**B**	**C**
CO7	230 mm	230 mm	270 mm
	9,06 in.	9,06 in.	10,63 in.
CO8	230 mm	230 mm	270 mm
	9,06 in.	9,06 in.	10,63 in.
CO9	240 mm	310 mm	350 mm
	9,45 in.	12,20 in.	13,78 in.
CO10	230 mm	230 mm	270 mm
	9,06 in.	9,06 in.	10,63 in.
CO11	240 mm	310 mm	350 mm
	9,45 in.	12,20 in.	13,78 in.
CO12	240 mm	310 mm	350 mm
	9,45 in.	12,20 in.	13,78 in.
CO13	240 mm	360 mm	350 mm
	9,45 in.	14,17 in.	13,78 in.
CO14	300 mm	360 mm	350 mm
	11,81 in.	14,17 in.	13,78 in.
CO15	300 mm	360 mm	350 mm
	11,81 in.	14,17 in.	13,78 in.
CO16	300 mm	360 mm	350 mm
	11,81 in.	14,17 in.	13,78 in.

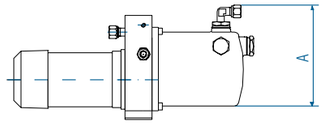
Technical details and applications of solenoid-valve auto-pilot power units

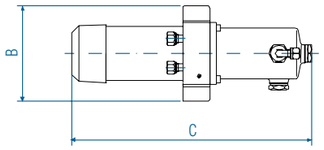
TECHNICAL DETAILS AND APPLICATIONS											
Model	**Code**	**Typical cylinder application**	**BCS cylinder application**	**Application time in sec.**	**Displacement**	**Setting pressure**	**Max power consumption**	**Therm protection**	**Motor nominal power**	**Tank capacity**	**Weight***
CO1NU 12V	**21313**	70 - 100 cc	/	depending on the cylinder volume	360 cc/min	50 bar	7 A	10 A	60 W	0,55 lt	6.5 Kg
CO1NU 24V	**21314**	4.27 - 6.1 cu.in			21.97 cu.in/min	725 psi	4.5 A	10 A		33,56in.cu	14.33 lb
CO2NU 12V	**21315**	115 - 130 cc	**CTA40U**	14,5	480 cc/min	50 bar	9.4 A	10 A	60 W	0,55 lt	6.5 Kg
CO2NU 24V	**21316**	6.1 - 7.93 cu.in			29.30 cu.in/min	725 psi	6 A	10 A		33,56in.cu	14.33 lb
CO2/3NU 12V	**21317**	130 - 220 cc	**CTA65U** **CTA75U**	14 15,6	720 cc/min	50 bar	16 A	20 A	100 W	0,95 lt	8.5 Kg
CO2/3NU 24V	**21318**	7.93 - 13.42 cu.in	**CTA80U**	17,9	43.95 cu.in/min	725 psi	10 A	16 A		57,97in.cu	18.73 lb
CO3NU 12V	**21319**	220 - 360 cc	**CTY100** **CTB110U**	10,9 13,8	1220 cc/min	50 bar	18 A	20 A	100 W	0,95 lt	8.5 Kg
CO3NU 24V	**21320**	13.42 - 21.96 cu.in	**CTB130U** **CTB145U**	15,8 17,7	74.48 cu.in/min	725 psi	12 A	16 A		57,97in.cu	18.73 lb
CO4 12V	**12559**	360 - 500 cc	**CTC200**	16	1860 cc/min	45 bar	18 A	20 A	150 W	3,0 lt	14 Kg
CO4 24V	**11342**	21.96 - 30.5 cu.in	**CTC230**	18	113.55 cu.in/min	652 psi	10 A	16 A		183in.cu	30.86 lb
CO4/5 12V	**12555**	500 - 570 cc	**CTC200**	12,3	2440 cc/min	45 bar	20 A	25 A	150 W	3,0 lt	14 Kg
CO4/5 24V	**12556**	30.50 - 34.77 cu.in	**CTC230** **CTC300**	14 18,4	148.96 cu.in/min	652 psi	12 A	16 A		183in.cu	30.86 lb
CO7 24V	**12581**	500 - 570 cc	**CTC300**	21	2100 cc/min	55 bar	/	/	300 W	12,0 lt	25 Kg
		30.50 - 34.77 cu.in			128.20 cu.in/min	797 psi	18 A	20 A		732in.cu	55.11 lb
		570 - 750 cc			2850 cc/min	55 bar	/	/		12,0 lt	25 Kg
CO8 24V	**12582**	34.77 - 45.75 cu.in	**CTC300**	15,7	173.99 cu.in/min	797 psi	21 A	25 A	300 W	732in.cu	55.11 lb
CO9 24V	**12584**	750 - 1000 cc	**CTC400** **CTD310**	16,6 14	3600 cc/min	55 bar	/	/	550 W	25,0 lt	40 Kg
		45.75 - 61.00 cu.in			219.78 cu.in/min	797 psi	21 A	25 A		1525in.cu	88.18 lb
CO10 24V	**12497**	1000 - 1200 cc	**CTC400** **CTD310**	13 10,9	4650 cc/min	55 bar	/	/	300 W	12,0 lt	40 Kg
		61.00 - 73.3 cu.in			283.88 cu.in/min	797 psi	30 A	32 A		732in.cu	88.18 lb
CO11 24V	**12499**	1200 - 1250 cc	**CTD450**	16,3	4650 cc/min	55 bar	/	/	550 W	25,0 lt	40 Kg
		73,28 - 76,27 cu.in			283.88 cu.in/min	797 psi	35 A	40 A		1525in.cu	88.18 lb
CO12 24V	**12500**	1250 - 1350 cc	**CTE600**	14,6	5400 cc/min	55 bar	/	/	550 W	25,0 lt	40 Kg
		76,27 - 82,38 cu.in.			329.4 cu.in/min	797 psi	35 A	40 A		1525in.cu	88,18 lb
CO13 24V	**12502**	1350 - 1750 cc	**CTE600**	11	7200 cc/min	55 bar	/	/	550 W	32,0 lt	43 Kg
		82,38 - 106,79 cu.in.			439.2 cu.in/min	797 psi	40 A	50 A		1952in.cu	94,80 lb
CO14 24V	**12503**	1250 - 1350 cc	**CTE600**	12,5	6300 cc/min	55 bar	/	/	1100 W	32,0 lt	43 Kg
		76,27 - 84,38 cu.in.			384.3 cu.in/min	797 psi	55 A	63 A		1952in.cu	94,80 lb
CO15 24V	**12504**	1750 - 2000 cc	**CTE900**	13	9150 cc/min	55 bar	/	/	1100 W	32,0 lt	43 Kg
		106,79 - 122 cu.in.			558.15 cu.in/min	797 psi	55 A	63 A		1952in.cu	94,80 lb
CO16 24V	**12507**	2000 - 3900 cc	**CTE1200** **CTF1600**	13,3 19,5	11850 cc/min	55 bar	/	/	1100 W	32,0 lt	43 Kg
		122 - 238 cu.in			722.85 cu.in/min	797 psi	65 A	80 A		1952in.cu	94,80 lb

NOTE: (*) Weight is intended without oil

REVERSIBLE AUTO-PILOT POWER UNITS

• MOD. **C01R - C04R**





Four different models of reversible power units are available for auto-pilot application with steering cylinders having a volume up to 500cc. They have the same performances as the solenoid-valve units, ensuring a precise and reliable interface with the auto-pilot software, but with a lower electrical consumption. These are suggested for all applications where the power consumption is critical, and must be as low as possible.

The unit is composed basically of a reversible electric motor, a reversible hydraulic pump, an oil tank and a filter group. Their dimensions have been reduced, allowing installation in very narrow places.
For the selection of the optimum system, please determine the steering cylinder volume and then choose the suggested model in our ORDER GUIDE here below.

Main Features

- Available in four models for steering cylinder volumes up to 500cc
- Precise and reliable interface with the auto-pilot
- Compact design and reduced dimensions
- Very low electric consumption

Technical specifications and applications

DIMENSIONS			
Model	**A**	**B**	**C**
CO1RU	160 mm / 6,30 in.	155 mm / 6,10 in.	285 mm / 11,22 in.
CO2RU	160 mm / 6,30 in.	155 mm / 6,10 in.	285 mm / 11,22 in.
CO3RU	185 mm / 7,28 in.	155 mm / 6,10 in.	360 mm / 14,17 in.
CO4NRU	185 mm / 7,28 in.	155 mm / 6,10 in.	360 mm / 14,17 in.

TECHNICAL DETAILS AND APPLICATIONS											
Model	**Code**	**Typical cylinder application**	**BCS cylinder application**	**Application time in sec.**	**Displacement**	**Setting pressure**	**Max power consumption**	**Therm protection**	**Motor nominal power**	**Tank capacity**	**Weight***
CO1RU 12V	**21305**	70 - 100 cc	/	dipende dal volume del cilindro	360 cc/min	50 bar	7 A	10 A	80 W	0.55 lt	6.5 Kg
CO1RU 24V	**21306**	4.27 - 6.1 cu.in			21.97 cu.in	725 psi	4.5 A	10 A		33,56 in.cu	14,33 lb
CO2RU 12V	**21307**	115 - 130 cc	**CTA40U**	14,5	480 cc/min	50 bar	8,5 A	10 A	80 W	0.55 lt	6.5 Kg
CO2RU 24V	**21308**	6.1 - 7.93 cu.in			29.30 cu.in	725 psi	4,5 A	10 A		33,56 in.cu	14,33 lb
CO3RU 12V	**21309**	130 - 360 cc	**CTA65U** **CTA75U** **CTA80U** **CTY100** **CTB110U** **CTB130** **CTB145U**	10,5 11,7 13,4 13,8 17,6 20,18 22,5	960 cc/min	50 bar	10 A	16 A	125 W	0.95 lt	8.5 Kg
CO3RU 24V	**21310**	7.93 - 13.42 cu.in			58.56 cu.in	725 psi	7 A	10 A		33,56 in.cu	18,73 lb
CO4NRU 12V	**21311**	360 - 500 cc	**CTC200**	15,6	1920 cc/min	50 bar	22 A	25 A	150 W	0.95 lt	8.5 Kg
CO4NRU 24V	**21312**	21.96 - 30,5 cu.in	**CT230**	17,8	117.12 cu.in	725 psi	11 A	16 A		33,56 in.cu	18,73 lb

NOTE: The auto-pilot power units are provided with inch fittings. Versions with metric fittings are also available please specify when placing the order.
(*) Weight is intended without oil

POWER-ASSISTED INBOARD STEERING SYSTEMS

Maximum comfort with the minimum effort and extreme simplicity of installation are the reasons that make the BCS power-assisted steering second to none!
Extremely innovative in concept and working principle, the BCS power-assisted steering system is the ultimate solution for those, who do not compromise in cruising enjoyment and pleasure and demand a safe and reliable steering system.
Today's yachts achieve speeds of over 30 Knots and with uncertain cruising conditions make navigation a more difficult challenge in terms of either physical effort or strong instability and thus a loss of control. The BCS solution guarantees a prompt responsiveness and total control with just 3,5 wheel turns lock-to-lock.
With a very compact design, this power-assisted steering boasts a reduced number of components (3 vs. 6-7 in other brands), thus resulting in a system which is **incredibly easy to install as well as to service.**
The hydraulic helm pump is of the classic BCS range, available in all the displacements and the mounting configurations in the best BCS tradition (see Helm pump Section on page 12 for the model selection).

The steering cylinder, available either with anodized aluminum body (for applications up to 45'), or with a brass body for heavier applications, has the servo cylinder mounted directly to the main cylinder. This results in an extremely simple design with reduced dimensions for an easy installation in very narrow spaces.

The main characteristic that makes the BCS power-assisted steering different from the competitor's system is that it is completely independent from the vessel's main engines and all power needed is provided by a single electro-hydraulic power unit.
Extremely compact, the latter has all the valves necessary for either the servo system or for steering safety (non return valves, relief valves etc.). It also includes an **interface for the auto-pilot and a special device for the system automatic filling** (see description of the working principle for this device at the section "Auto-pilot power units with automatic filling").
In order to ensure the best safety and total boat control in emergency conditions, the BCS steering system **automatically** turns into **a manual system** if there is any problem with the power unit.

Main Features of the Power-Assisted Steering System:

- Extremely innovative concept and working principle
- Effortless navigation comfort in any condition
- High quality, safety and reliability
- Prompt responsiveness and total control in just 3.5 turns lock-to-lock (this number can be varied)
- Easy and fast installation with just three major components (3 elements of the basic system vs. 6-7 elements in other brands)
- Strong reduction of installation time (over 30% in comparison with competitors steering)
- Totally INDEPENDENT from the vessel propulsion system
- Cooling system is NOT necessary
- Supplied with interface for the auto-pilot
- Supplied with a special device for automatic filling of the system
- Bleeding procedure much easier and faster
- Steering helm pump available in 5 displacements and four mounting configurations
- Provided with automatic manual back-up steering
- Simplified service and/or repair procedures (no compressor is required on board as the system is not pressurized)
- Limited number of spare parts
- CE Approved helm pumps and cylinders
- Meets ABYC standards

WORKING PRINCIPLE

The BCS power-assisted steering is totally independent of the vessel propulsion system and uses an electro-hydraulic power unit to provide all the power needed.
The rest of the steering system consists of an axial piston helm pump and a power assisted cylinder, which already has the servo cylinder fixed to its body.

1. Turning the steering wheel in the desired direction, an oil flow is sent from the helm pump to the small servo cylinder mounted on the main one.

2. This flow which enters the cylinder makes the piston move and the pressure resulting from that is used to open a distributor placed on the electro-hydraulic power unit.

3. As the distributor opens, an oil flow reaches the main cylinder moving the piston as well as the rod connected to the tiller arm. This causes the rudder to rotate.

4. Oil displaced from the opposite side of the main cylinder flows back to the helm pump.

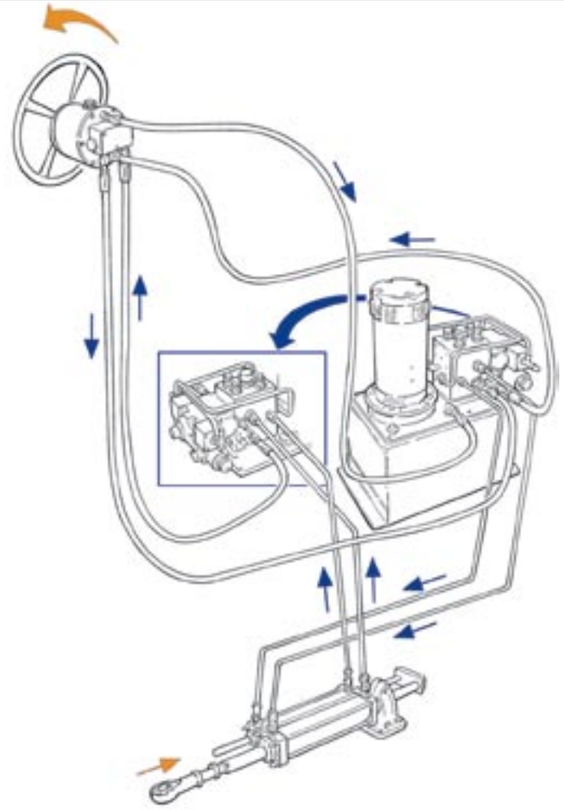
5. To rotate the rudder in the opposite direction, simply turn the helm pump the other way.

In case of electrical failure (the power unit cannot be turned on or is out of order), turning the helm pump causes oil to flow automatically into the main cylinder (which makes the rudder rotate).
The power-assisted steering **automatically** becomes a **manual hydraulic back-up system** with no need to switch anything or open/close any by-pass.

Main Features of the Power-Assisted Cylinders

- Compact design with reduced dimensions
- Servo cylinder integrally fixed to the main one
- Available in a wide variety of volumes and strokes for application flexibility
- Provided with bleeders
- Available with anodized aluminium or bronze body
- Piston rod in stainless steel
- Cylinder base twisting either horizontally or vertically
- High resistance to corrosion
- Fittings and ball joint available in stainless steel
- Meet ABYC standards
- CE marked

The BCS power-assisted steering cylinders are available with anodized aluminum body (for applications up to 45'), or with a bronze body (for applications over 45').
The small servo cylinder is mounted directly to the main cylinder. This results in an extremely simple design with reduced dimensions for an easy installation in very narrow spaces.
The piston rod is made of stainless steel in both the servo and main cylinders for longer life and a higher resistance to rust and corrosion.
Ball joints are available in the most popular sizes for the market and can be supplied in stainless steel upon request.
The cylinder base can adjust either horizontally, to follow the complete arc of the cylinder, or vertically, in order to adapt to any tiller extension.
Every cylinder is supplied with Tee fittings with bleeders as well as the necessary fittings for hose connection.
All cylinders are built with materials suitable for application in marine environment, even high salt conditions.
In case of particularly difficult environment conditions, it is suggested to request the stainless steel versions of ball joint and fittings.



Power-assisted steering system applications according to the boat length

Boat lenght LOA	System to order		
	Planing Hull	Semi Displacement Hull	
		Pleasure	Working
12 - 13,7 mt / 40 - 45 ft	15	17	18
13,7 - 15,3 mt / 45 - 50 ft	16	18	19
15,3 - 16,8 mt / 50 - 55 ft	17	19	20
16,8 - 18 mt / 55 - 60 ft	18	20	21
18 - 19,8 mt / 60 - 65 ft	19	21	22
19,8 - 21 mt / 65 - 70 ft	20	22	/
21 - 22,9 mt / 70 - 75 ft	21	22	/
22,9 - 24,4 mt / 75 - 80 ft	22	/	/
24,3 - 26 mt / 80 - 85 ft	22	/	/

WARNING! The above suggestions shall be intended as merely INDICATIVE. To check the proper application the required max torque must be calculated. If the required information is not available please contact our authorized dealer or service center and submit boat length, maximum speed and rudder dimensions.

WARNING! For planing boats, the above steering systems are suggested for boat speeds between 30 and 45 knots and for semi displacement boat with hull speed between 15 and 20 knots.

POWER-ASSISTED STEERING SYSTEM							
System to order	Cylinder	Pump	Wheel turns lock-to-lock (Manual)	Wheel turns lock-to-lock (Servo-Assisted)	Power-Unit	Hydraulic scheme	
						Main station	Second station
System 15	CTA80AU (12681)	20 cc/rev	10.7	4	CO500/3/0,5U - 12Vdc (16132) CO500/3/0,5U - 24Vdc (12572)	SI-600/B	SI-610/B
System 16	CTB110AU (12686)	30 cc/rev	9.4	3.8		SI-601/B	SI-611/B
System 17	CTB130AU (12690)	30 cc/rev	10.7	4.4		SI-602/B	SI-612/B
		42 cc/rev	7.7	3.1		SI-602/C	SI-612/C
System 18	CTB145AU (15883)	30 cc/rev	12	4.9	CO500/4/0,75U - 24Vdc (16133)	SI-603/B	SI-613/B
		42 cc/rev	8.6	3.5		SI-603/C	SI-613/C
System 19	CTC200AU (15885)	30 cc/rev	16.6	4.3	CO500/6/0,75U - 24Vdc (16134)	SI-604/B	SI-614/B
		42 cc/rev	11.9	3		SI-604/C	SI-614/C
System 20	CTC230AU (15887)	30 cc/rev	19	4.9		SI-605/B	SI-615/B
		42 cc/rev	13.6	3.5		SI-605/C	SI-615/C
System 21	CTC300AU (15889)	42 cc/rev	17.8	4.6		SI-606/A	SI-616/A
System 22	CTC400AU (16136)	42 cc/rev	24	6.1		SI-606/C	SI-616/C

Responsiveness

SLOW **MEDIUM** **FAST**

SYSTEM 15

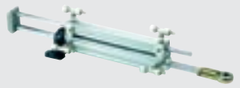
Components	Model	Code	Q.ty
Cylinder	**CTA80AU**	**12681**	1
Helm pump	**P20BAP**	**21173**	1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/3/0,5U 12 Vdc** **CO500/3/0,5U 24 Vdc**	**16132** **12572**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P20BAP**	**21173**	1
Fittings kit for additional station		**23376**	1
Hydraulic oil	**VG22**	**21334**	1

SYSTEM 16

Components	Model	Code	Q.ty
Cylinder	**CTB110AU**	**12686**	1
Helm pump	**P30BAP**	**21174**	1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/3/0,5U 12 Vdc** **CO500/3/0,5U 24 Vdc**	**16132** **12572**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P30BAP**	**21174**	1
Fittings kit for additional station		**23376**	1
Hydraulic oil	**VG22**	**21334**	1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
- less wheel turns, MORE effort
- more wheel turns, LESS effort

	HELM PUMP		
	 **P20BAP Cod. 21173 (*)**	 **P30BAP Cod. 21174 (*)**	 **P42BAP Cod. 21175 (*)**
CYLINDER  **CTA80AU Cod. / Part # 12681**	N. of wheel turns: Manual: **10,7** Servo-control system: **4,0** Suggested min hose (**) Tiller: 200 mm / 7.8 in. Angle: 35° + 35° Torque: 107,36 Kgm / 92,97 in/lb Min. wheel diam: 350 mm - 13,77 in.		
 **CTB110AU Cod. / Part # 12686**		N. of wheel turns: Manual: **9,4** Servo-control system: **3,8** Suggested min hose (**) Tiller: 153 mm / 6.0 in. Angle: 35° + 35° Torque: 140. 85 Kgm / 121,97 in/lb Min. wheel diam: 350 mm - 13,77 in.	

(*) See the specific section "HELM PUMP" on page 12 and following for more detailed information about mounting configuration
(**) For the choice of the hydraulic hose, please see the relative scheme.

SYSTEM 17

Components	Model	Code	Q.ty
Cylinder	**CTB130AU**	**12690**	1
Helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/3/0,5U 12 Vdc** **CO500/3/0,5U 24 Vdc**	**16132** **12572**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings kit for additional station		**23376**	1
Hydraulic oil	**VG22**	**21334**	1

SYSTEM 18

Components	Model	Code	Q.ty
Cylinder	**CTB145AU**	**15883**	1
Helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/4/0,75U 24 Vdc**	**16133**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings kit for additional station		**23376**	1
Hydraulic oil	**VG22**	**21334**	1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
- less wheel turns, MORE effort
- more wheel turns, LESS effort

CYLINDER	HELM PUMP **P20BAP** **Cod. 21173(*)**	 **P30BAP** **Cod. 21174(*)**	 **P42BAP** **Cod. 21175(*)**
 **CTB130AU** **Cod. / Part # 12690**		N. of wheel turns: Manual: **10,7** Servo-control system: **4,4** Suggested min hose (**) Tiller: 180 mm / 7.0 in. Angle: 35° + 35° Torque: 161,42 Kgm / 13978 in/lb Min. wheel diam: 350 mm - 13,77 in.	N. of wheel turns: Manual: **7,7** Servo-control system: **3,2** Suggested min hose (**) Tiller: 180 mm / 7.0 in. Angle: 35° + 35° Torque: 161,42 Kgm / 13978 in/lb Min. wheel diam: 450 mm - 17,71 in.
 **CTB145AU** **Cod. / Part # 15883**		N. of wheel turns: Manual: **12** Servo-control system: **4,9** Suggested min hose (**) Tiller: 200 mm / 7.8 in. Angle: 35° + 35° Torque: 180,41 Kgm / 15623 in/lb Min. wheel diam: 350 mm - 13,77 in.	N. of wheel turns: Manual: **8,6** Servo-control system: **3,5** Suggested min hose (**) Tiller: 200 mm / 7.8 in. Angle: 35° + 35° Torque: 180,41 Kgm / 15623 in/lb Min. wheel diam: 450 mm - 17,71 in.

(*) See the specific section "HELM PUMP" on page 12 and following for more detailed information about mounting configuration
(**) For the choice of the hydraulic hose, please see the relative scheme.

SYSTEM 19

Components	Model	Code	Q.ty
Cylinder	**CTC200AU**	**15885**	1
Helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/6/0,75U 24 Vdc**	**16134**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings kit for additional station		**23376**	1
Hydraulic oil	**VG22**	**21334**	1

SYSTEM 20

Components	Model	Code	Q.ty
Cylinder	**CTC230AU**	**15887**	1
Helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/6/0,75U 24 Vdc**	**16134**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P30BAP** **P42BAP**	**21174** **21175**	1 1
Fittings kit for additional station		**23376**	1
Hydraulic oil	**VG22**	**21334**	1

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
- less wheel turns, MORE effort
- more wheel turns, LESS effort

CYLINDER	HELM PUMP **P20BAP** **Cod. 21173 (*)**	 **P30BAP** **Cod. 21174 (*)**	 **P42BAP** **Cod. 21175 (*)**
 **CTC200AU** **Cod. / Part # 15885**		N. of wheel turns: Manual: **16,6** Servo-control system: **4,3** Suggested min hose (**) Tiller: 175 mm / 6.9 in. Angle: 35° + 35° Torque: 249,93 Kgm / 21643 in/lb Min. wheel diam: 350 mm - 13,77 in.	N. of wheel turns: Manual: **11,9** Servo-control system: **3,1** Suggested min hose (**) Tiller: 175 mm / 6.9 in Angle: 35° + 35° Torque: 249,93 Kgm / 21643 in/lb Min. wheel diam: 450 mm - 17,71 in.
 **CTC230AU** **Cod. / Part # 15887**		N. of wheel turns: Manual: **7,6** Servo-control system: **4,9** Suggested min hose (**) Tiller: 200 mm / 7.8 in. Angle: 35° + 35° Torque: 284,92 Kgm / 24674 in/lb Min. wheel diam: 350 mm - 13,77 in.	N. of wheel turns: Manual: **13,6** Servo-control system: **3,5** Suggested min hose (**) Tiller: 200 mm / 7.8 in. Angle: 35° + 35° Torque: 284,92 Kgm / 24674 in/lb Min. wheel diam: 450 mm - 17,71 in.

(*) See the specific section "HELM PUMP" on page 12 and following for more detailed information about mounting configuration
(**) For the choice of the hydraulic hose, please see the relative scheme.

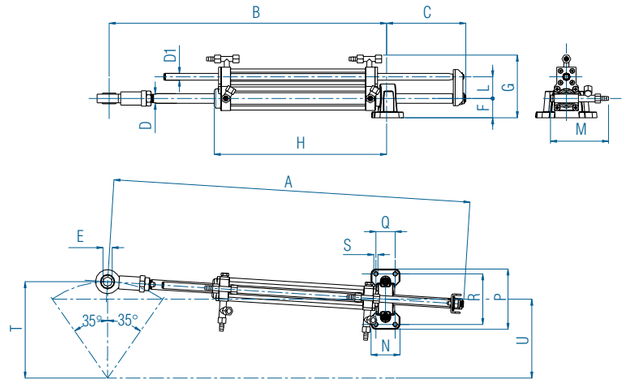
SYSTEM 21

Components	Model	Code	Q.ty
Cylinder	**CTC300AU**	**15889**	1
Helm pump	**P42BAP**	**21175**	1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/6/0,75U 24 Vdc**	**16134**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P42BAP**	**21175**	1
Fittings kit for additional station		**23944**	1
Hydraulic oil	**VG22**	**21334**	1

SYSTEM 22

Components	Model	Code	Q.ty
Cylinder	**CTC400AU**	**16136**	1
Helm pump	**P42BAP**	**21175**	1
Fittings for single station		**12784**	2
Electro-hydraulic power unit	**CO500/6/0,75U 24 Vdc**	**16134**	1
Hydraulic oil	**VG22**	**21334**	3
In case of a second station please add:			
2° station helm pump	**P42BAP**	**21175**	1
Fittings kit for additional station		**23944**	1
Hydraulic oil	**VG22**	**21334**	1

POWER-ASSISTED INBOARD STEERING CYLINDERS
• SERIES **CTA_AU**



The BCS power-assisted steering cylinders are available either with an anodized aluminum body (for applications up to 45'), or with a brass body, for applications over 45'.
The small servo-cylinder is mounted directly to the main cylinder. This results in an extremely simple design with reduced dimensions for an easy installation in very narrow spaces.
The piston rod is made of stainless steel in both servo and main cylinders for longer life and a higher resistance to rust and corrosion.
Ball joints are available in the most popular sizes for the market and can be supplied in stainless steel upon request.
The cylinder base can adjust either horizontally, to follow the complete arc of the cylinder, or vertically, in order to adapt to any tiller extension.
Every cylinder is supplied with Tee fittings with bleeders as well as the necessary fittings for hose connection.
All cylinders are built with materials suitable for application in marine environment, even high salt conditions.
In case of particularly difficult environment conditions, it is suggested to request the stainless steel versions of ball joint and fittings.

Main Features of Cylinder Series CTA_AU

- Cylinder body in anodized aluminium
- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Supplied with bleeders
- Meets ABYC Standards

PUMP-CYLINDER COMBINATION

It is possible to choose the combination between pump and cylinder in order to determine the number of wheel turns lock-to-lock
NOTE: the required effort on the steering wheel is proportional to the number of wheel turns lock-to-lock:
• less wheel turns, MORE effort
• more wheel turns, LESS effort

	HELM PUMP		
	 **P20BAP Cod. 21173 (*)**	 **P30BAP Cod. 21174 (*)**	 **P42BAP Cod. 21175 (*)**
CYLINDER  **CTC300AU Cod. / Part # 15889**			N. of wheel turns: Manual: **17,8** Servo-control system: **4,6** Suggested min hose (**) Tiller: 260 mm / 10,2 in. Angle: 35° + 35° Torque: 374,89 Kgm / 32465 in/lb Min. wheel diam: 450 mm - 17,71 in.
CYLINDER  **CTC400AU Cod. / Part # 16136**			N. of wheel turns: Manual: **24,0** Servo-control system: **6,1** Suggested min hose (**) Tiller: 350mm / 13,7 in. Angle: 35° + 35° Torque: 499,85 Kgm / 43287 in/lb Min. wheel diam: 450 mm - 17,71 in.

(*) See the specific section "HELM PUMP" on page 12 and following for more detailed information about mounting configuration
(**) For the choice of the hydraulic hose, please see the relative scheme.

Technical specifications

DIMENSIONS																			
Model	**Stroke**	**A**	**B**	**C**	**D**	**D1**	**E**	**F**	**G**	**H**	**L**	**M**	**N**	**P**	**Q**	**R**	**S**	**T**	**U**
CTA80AU	228 mm	741 mm	578 mm	162 mm	20 mm	14 mm	19,05 mm	40 mm	130 mm	360 mm	45 mm	120 mm	60 mm	125 mm	40 mm	105 mm	8,5 mm	200 mm	165 mm
	9,0 in.	29,17 in.	22,77 in.	6,38 in.	0,79 in.	0,55 in.	3/4 in.	1,57 in.	5,11 in.	13,17 in.	1,77 in.	4,72 in.	2,36 in.	4,92 in.	1,57 in.	4,13 in.	0.33 in.	7,87 in.	6,5 in.

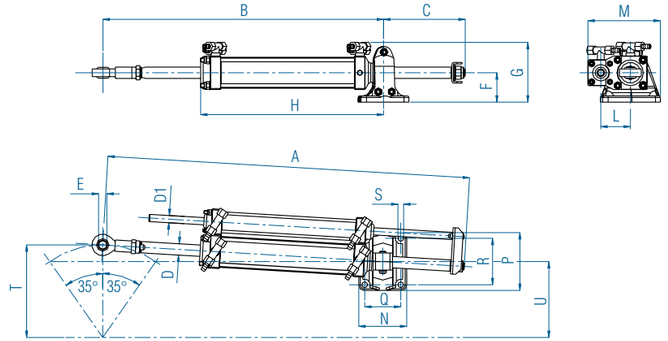
TECHNICAL DETAILS									
Model	**Code**	**Stroke**	**Rudder Torque**	**Thrust at 70 bar - 1000 psi**	**Volume**	**Tiller**	**Angle**	**Fittings**	**Weight**
CTA80AU	**12681**	228 mm	107.33 Kgm	659,4 Kgf	214.78 cc	200 mm	35° + 35°	1/4"NPT - 3/8" O.D.	5,5 Kg
		9.0 in	9297 in/lb	1453 lbf	13.11 cu.in	7,8 in.			12,13 lb

NOTE: The cylinders type CTA_AU are not suggested for application on racing boats. The cylinders type CTA_AU are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.

POWER-ASSISTED INBOARD STEERING CYLINDERS
• SERIES **CTB_AU**

Main Features of the Cylinder Series CTB_AU

- Cylinder body in brass
- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 280cc and 360cc
- Supplied with bleeders
- Meets ABYC standards



Technical specifications

DIMENSIONS

Model	Stroke	A	B	C	D	D1	E	F	G	H	L	M	N	P	Q	R	S	T	U
CTB110AU	178 mm	666 mm	521 mm	146 mm	22 mm	14 mm	19,05 mm	57 mm	116 mm	329 mm	58 mm	140 mm	93 mm	112 mm	70 mm	90 mm	11 mm	153 mm	127 mm
	7.0 in.	26,22 in.	20,51 in.	5.75 in.	0.87 in.	0.55 in.	3/4 in.	2.24 in.	4.56 in.	12.95 in.	2.28 in.	5.51 in.	3.66 in.	4.4 in.	2.75 in.	3.54 in.	0.43 in.	6.0 in.	5,0 in.
CTB130AU	204 mm	703 mm	545 mm	159 mm	22 mm	14 mm	16 mm	57 mm	116 mm	355 mm	58 mm	140 mm	93 mm	112 mm	70 mm	90 mm	11 mm	180 mm	147 mm
	8.0 in.	27,68 in.	21.46 in.	6,26 in.	0.87 in.	0.55 in.	0,63 in.	2.24 in.	4.56 in.	13.98 in.	2.28 in.	5.51 in.	3.66 in.	4.4 in.	2.75 in.	3.54 in.	0.43 in.	7.08 in.	5,78 in.
CTB145AU	228 mm	766 mm	596 mm	171 mm	22 mm	14 mm	19,05 mm	57 mm	116 mm	379 mm	58 mm	140 mm	93 mm	112 mm	70 mm	90 mm	11 mm	200 mm	164 mm
	9.0 in.	30,16 in.	23.46 in.	6.73 in.	0.87 in.	0.55 in.	3/4 in.	2.24 in.	4.56 in.	14.92 in.	2.28 in.	5.51 in.	3.66 in.	4.4 in.	2.75 in.	3.54 in.	0.43 in.	7.87 in.	6,5 in.

TECHNICAL DETAILS

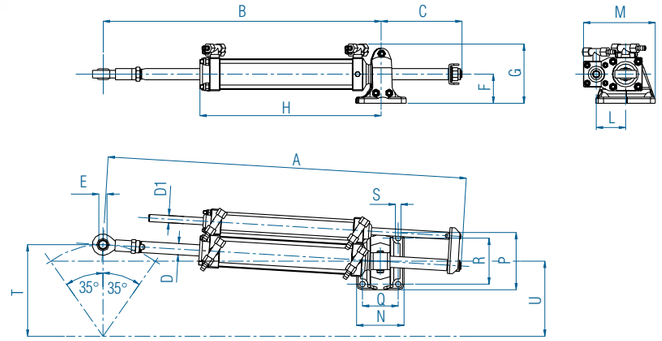
Model	Code	Stroke	Rudder Torque	Thrust at 70 bar - 1000 psi	Volume	Tiller	Angle	Fittings	Weight
CTB110AU	12686	178 mm	140.85 Kgm	1108 Kgf	281,77 cc	153 mm	35°+35°	1/4"NPT - 3/8" O.D.	11,9 Kg
		7.0 in.	12197 in/lb	2442 lbf	17.19 cu.in	6.0 in.			26,2 lb
CTB130AU	12690	204 mm	161,42 Kgm	1108 Kgf	322,93 cc	180 mm	35°+35°	1/4"NPT - 3/8" O.D.	12,3 Kg
		8 in.	13978 in/lb	2442 lbf	19,71 cu.in	7.0 in.			27,2 lb
CTB145AU	15883	228 mm	180.41 Kgm	1108 Kgf	360,92 cc	200 mm	35°+35°	1/4"NPT - 3/8" O.D.	13,1 Kg
		9.0 in.	15623 in/lb	2442 lbf	22,0 cu.in	7.87 in.			28,85 lb

NOTE: The cylinders type CTB_AU are not suggested for application on racing boats. The cylinders type CTB_AU are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.

POWER-ASSISTED INBOARD STEERING CYLINDERS
• SERIES **CTC_AU**

Main Features of the Cylinder Series CTC_AU

- Piston rod in stainless steel for a high corrosion resistance
- Adjustable base either horizontally or vertically
- Available in a range of volumes between 500cc and 1000cc
- Supplied with bleeders
- Meets ABYC standards



Technical specifications

DIMENSIONS

Model	Stroke	A	B	C	D	D1	E	F	G	H	L	M	N	P	Q	R	S	T	U
CTC200AU	200 mm	767 mm	607 mm	161 mm	28 mm	14 mm	25 mm	55 mm	132,5 mm	385 mm	65 mm	162 mm	100 mm	140 mm	72 mm	112 mm	11 mm	175 mm	143 mm
	7.87 in.	30.2 in.	23.9 in.	6.34 in.	1,10 in.	0,55 in.	0,98 in.	2,17 in.	5,22 in.	15,16 in.	2,56 in.	6,38 in.	3,94 in.	5,51 in.	2,83 in.	4,41 in.	0,43 in.	6,89 in.	5,6 in.
CTC230AU	228 mm	823 mm	649 mm	175 mm	28 mm	14 mm	25 mm	55 mm	132,5 mm	413 mm	65 mm	162 mm	100 mm	140 mm	72 mm	112 mm	11 mm	200 mm	164 mm
	9.0 in.	32.4 in.	25.55 in.	6.89 in.	1,10 in.	0,55 in.	0,98 in.	2,17 in.	5,22 in.	16,26 in.	2,56 in.	6,38 in.	3,94 in.	5,51 in.	2,83 in.	4,41 in.	0,43 in.	7,87 in.	6,5 in.
CTC300AU	300 mm	967 mm	757 mm	211 mm	28 mm	14 mm	25 mm	55 mm	132,5 mm	485 mm	65 mm	162 mm	100 mm	140 mm	72 mm	112 mm	11 mm	260 mm	215 mm
	11,81 in.	38 in.	29.8 in.	8.3 in.	1,10 in.	0,55 in.	0,98 in.	2,17 in.	5,22 in.	19,09 in.	2,56 in.	6,38 in.	3,94 in.	5,51 in.	2,83 in.	4,41 in.	0,43 in.	10,24 in.	8,5 in.
CTC400AU	400 mm	1167 mm	907 mm	261 mm	28 mm	14 mm	25 mm	55 mm	132,5 mm	585 mm	65 mm	162 mm	100 mm	140 mm	72 mm	112 mm	11 mm	350 mm	286 mm
	15.75 in.	46 in.	35.7 in.	10.27 in.	1,10 in.	0,55 in.	0,98 in.	2,17 in.	5,22 in.	23,0 in.	2,56 in.	6,38 in.	3,94 in.	5,51 in.	2,83 in.	4,41 in.	0,43 in.	13,78 in.	11,3 in.

TECHNICAL DETAILS

Model	Code	Stroke	Rudder Torque	Thrust at 70 bar - 1000 psi	Volume	Tiller	Angle	Fittings	Weight
CTC200AU	15885	200 mm	249,93 Kgm	1750 Kgf	500,0 cc	175 mm	35°+35°	1/4"NPT - 3/8" O.D. for Servo-control cylinder	16,8 Kg
		7,87 in.	21643 in/lb	3857 lbf	30.5 cu.in	6.9 in.		1/4"NPT - 1/2" O.D. for main cylinder	37,1 lb
CTC230AU	15887	228 mm	284,92 Kgm	1750 Kgf	570,0 cc	200 mm	35°+35°	1/4"NPT - 3/8" O.D. for Servo-control system	19,2 Kg
		9.0 in.	24674 in/lb	3857 lbf	34,78 cu.in	7.87 in.		1/4"NPT - 1/2" O.D. for main cylinder	42,3 lb
CTC300AU	15889	300 mm	374.89 Kgm	1750 Kgf	750,0 cc	260 mm	35°+35°	1/4"NPT - 3/8" O.D. for Servo-control system	21,8 Kg
		11.81 in.	32465 in/lb	3857 lbf	45.77 cu.in	10.2 in.		1/4"NPT - 1/2" O.D. for main cylinder	48,1 lb.
CTC400AU	16136	400 mm	499.85 Kgm	1750 Kgf	1000,0 cc	350 mm	35°+35°	1/4"NPT - 3/8" O.D. for Servo-control system	26,8 Kg
		15.75 in.	43287 in/lb	3857 lbf	61,02 cu.in	13.7 in.		1/4"NPT - 1/2" O.D. for main cylinder	59 lb

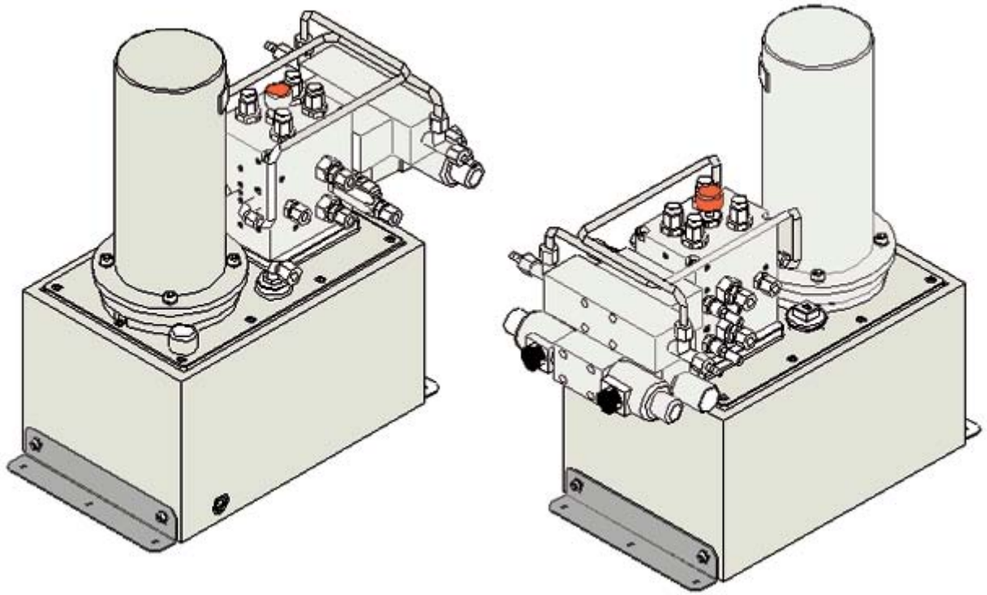
NOTE: The cylinders type CTC_AU are not suggested for application on racing boats. The cylinders type CTC_AU are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.

The electro-hydraulic power unit for servo-control system is what makes the BCS power-assisted steering different from our competitors' solutions.
Thanks to this self–powered unit the steering is **completely independent from the boat's main engines.**
Extremely compact, it is composed of:

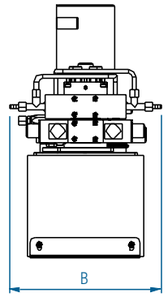
- a hard plastic tank, allowing the oil level to be easily checked;
- an electric motor;
- an hydraulic pump;
- a filter group;
- all necessary valves for both the steering operation and safety (non return valves, relief valves, servo-control groups, pressure adjusters, etc..), are mounted directly on the unit plate covering the oil tank.

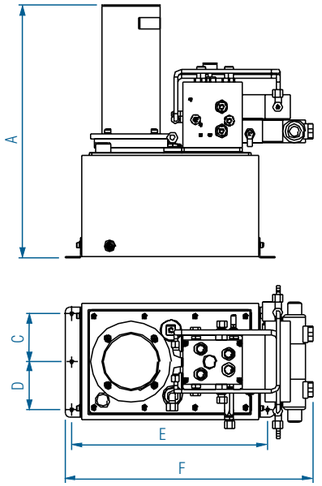
This power unit is **provided with an interface for the auto-pilot,** as well as a special device for automatic filling of the system, which makes the bleeding procedure both easier and faster (see description of the working principle for this device at the section "Auto-pilot power units with automatic filling").
A speed adjuster is mounted to the top of the unit to adapt it to the auto-pilot manufacturer's requirements.
The servo-control power unit can be excluded from the steering system at any time by merely depressing the red button. This immediately converts the system into a manual steering system.
(Please, also see the steering working principle on page 67)

POWER-ASSISTED ELECTRO-HYDRAULIC POWER UNITS



POWER-ASSISTED ELECTRO-HYDRAULIC POWER UNITS
• MOD. **CO500**





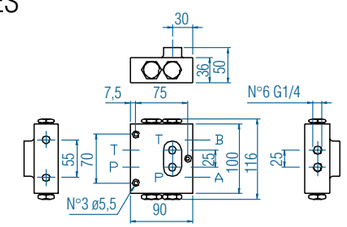
Technical specifications

DIMENSIONS						
Model	**A**	**B**	**C**	**D**	**E**	**F**
CO500/3/0,5U	510 mm	300 mm	95 mm	95 mm	387 mm	480 mm
	20 in.	11,81 in.	3,74 in.	3,74 in.	15,24 in.	18,90 in.
CO500/4/0,75U	510 mm	300 mm	95 mm	95 mm	387 mm	480 mm
	20 in.	11,81 in.	3,74 in.	3,74 in.	15,24 in.	18,90 in.
CO500/6/0,75U	540 mm	300 mm	95 mm	95 mm	387 mm	480 mm
	21,2 in.	11,81 in.	3,74 in.	3,74 in.	15,24 in.	18,90 in.

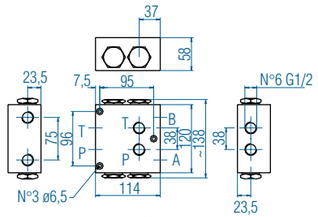
APPLICATION AND TECHNICAL DETAILS										
Model	**Code**	**BCS cylinder application**	**Delivery in Servo-control system**	**Delivery with auto-pilot**	**Setting pressure**	**Max power consumption**	**Termal protection**	**Motor nominal power**	**Tank capacity**	**Weight***
CO500/3/0,5U 12V	**16132**	**CTA80AU - CTB110AU CTB130AU**	3300 cc/min	675 cc/min	56 bar	43 A	50 A	600 W	12 lt	35 Kg
CO500/3/0,5U 24V	**12572**		201,5 cu.in/min	41,2 cu.in/min	812 psi	23 A	25 A	500 W	732 cu.in	77,16 lb
CO500/4/0,75U 24V	**16133**	**CTB145AU**	3900 cc/min	855 cc/min	56 bar	27 A	32 A	500 W	12 lt	35 Kg
			238,0 cu.in/min	52,2 cu.in/min	812 psi				732 cu.in	77,16 lb
CO500/6/0,75U 24V	**16134**	**CTC200AU - CTC230AU CTC300AU - CTC400AU**	6450 cc/min	1260 cc/min	56 bar	41 A	40 A	800 W	12 lt	35 Kg
			394,0 cu.in/min	77,0 cu.in/min	812 psi				732 cu.in	77,16 lb

NOTE: The power units mod. CO500 are provided with inch fittings. Versions with metric fittings are also available. Please specify when placing the order.
(*) Weight is intended without oil

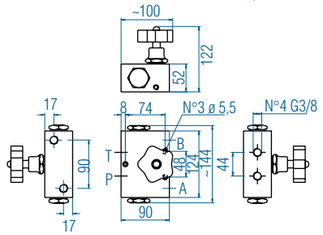
NON RETURN VALVES



DOUBLE NON RETURN VALVE MOD. MT50 WITH FITTINGS d. 10	**15706**
DOUBLE NON RETURN VALVE MOD. MT50 WITH FITTINGS d. 12	**17119**
DOUBLE NON RETURN VALVE MOD.MT50 G1/4" THREADS WITHOUT FITTINGS	**15378**



DOUBLE NON RETURN VALVE MOD. MT100 WITH FITTINGS d. 12	**15708**
DOUBLE NON RETURN VALVE MOD.MT100 WITH FITTINGS d.1/2"	**23504**
DOUBLE NON RETURN VALVE MOD.MT100 WITH "PALPELLA" FITTINGS d.14	**15771**
DOUBLE NON RETURN VALVE MOD. MT100 WITH "PALPELLA" FITTINGS d. 14 AND FITTINGS d.12	**23513**
DOUBLE NON RETURN VALVE MOD.MT100 G3/8" THREADS WITHOUT FITTINGS	**15380**

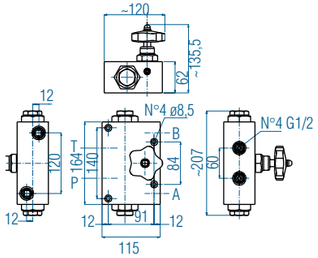


BY-PASS NON RETURN VALVE MOD. MT100 WITH FITTINGS d.12	**15707**
BY-PASS NON RETURN VALVE MOD. MT100 WITH FITTINGS d. 14	**17672**
BY-PASS NON RETURN VALVE MOD.MT100 G3/8" THREADS WITHOUT FITTINGS	**15370**

STEERING ACCESSORIES

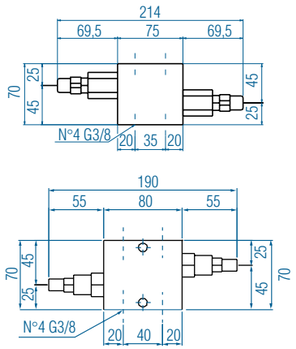
BCS helm pumps and steering cylinders can be combined with several accessories to complete the system and maintain safety and control.
It is possible to choose among several types of relief valves, non return and by-pass valves, rudder angle indicator kits and fittings or hose kits for different configurations.

In consideration of the many models for any article, each of the following sections contains a selection of the most popular and requested items.
For any additional information or suggestion for a specific application, please contact the BCS Technical Department.



BY-PASS NON RETURN VALVE MOD. MT320 WITH FITTINGS d.18	**15709**
BY-PASS NON RETURN VALVE MOD.MT320 G1/2" THREADS WITHOUT FITTINGS	**15372**

CROSS RELIEF VALVE WITH G 3/8" THREADS - FITTINGS d.12	**17042**
CROSS RELIEF VALVE WITH G 1/2" THREADS - FITTINGS d.14	**23021**
CROSS RELIEF VALVE WITH G 1/2" THREADS - FITTINGS d.18	**15659**
CROSS RELIEF VALVE WITH d.12 THREADS - MALE FITTINGS G1/2"	**23500**
CROSS RELIEF VALVE WITH d.14 THREADS - MALE FITTINGS G1/2"	**23501**
CROSS RELIEF VALVE WITH d.18 THREADS - MALE FITTINGS G1/2"	**23503**
RELIEF VALVE G1/2" THREADS WITHOUT FITTINGS	**15364**
RELIEF VALVE G3/8" THREADS WITHOUT FITTINGS	**15365**



RUDDER ANGLE INDICATOR SET

Knowing the exact position of the rudder is very important to drive the boat safely. For this reason it is correct that the BCS steering range contains a kit of rudder angle indicators and transmitters.
The set includes rudder angle indicators type San Giorgio SEIN having a range from 0° to +40°, as well as a kit of angle transmitters which is supplied with the lever mechanism and a ball joint together with a rod for connection to the tiller.
It is a very simple and precise system for control of position!

Single-station rudder angle indicator kit **code 13608**

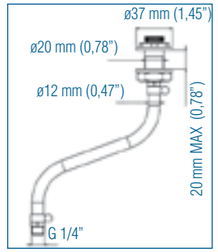
Double-station rudder angle indicator kit **code 13609**

STEERING HYDRAULIC OIL

Steering hydraulic oil type ISO VG 22 – 1 lt bottle **code 21334**

FILLING KIT HELM PUMP

In all those cases where the helm pump mounting configuration does not allow easy access to the filling cap placed on the helm top (i.e. REAR mounting or TILT mounting) it is suggested to purchase a FILLING KIT. This kit is directly screwed on the helm cap and moves the filling point to another one more easily accessed by means of a hose prolongation.



MK100
code 18599

ELECTRIC BY-PASS FOR AUTO-PILOT POWER UNITS

NOTE: The choice of the electric by-pass depends on the Cylinder volume and the power units displacement as shown on table on page 64

ELECTRIC BY-PASS AT 12Vdc FOR AUTO-PILOT POWER UNITS MOD. CO2-CO2/3-CO3	**12140**
ELECTRIC BY-PASS AT 24Vdc FOR AUTO-PILOT POWER UNITS MOD. CO2-CO2/3-CO3	**12141**
ELECTRIC BY-PASS AT 12Vdc FOR AUTO-PILOT POWER UNIT MOD. CO4	**15713**
ELECTRIC BY-PASS AT 24Vdc FOR AUTO-PILOT POWER UNIT MOD. CO4	**15714**
ELECTRIC BY-PASS AT 12Vdc FOR AUTO-PILOT POWER UNITS MOD. CO2-CO2/3-CO3 - FITTINGS FOR d.3/8" HOSE	**21330**
ELECTRIC BY-PASS AT 24Vdc FOR AUTO-PILOT POWER UNITS MOD. CO2-CO2/3-CO3 - FITTINGS FOR d.3/8" HOSE	**21331**
ELECTRIC BY-PASS AT 12Vdc FOR AUTO-PILOT POWER UNIT MOD. CO4 - FITTINGS FOR d.1/2" HOSE	**21332**
ELECTRIC BY-PASS AT 24Vdc FOR AUTO-PILOT POWER UNIT MOD. CO4 - FITTINGS FOR d.1/2" HOSE	**21333**

STEERING FLEXIBLE HOSE

	FLEXIBLE HOSE TYPE SAE100 R7 3/8" I.D. FOR d. 1/2" REUSABLE FITTINGS - PER METER	cod. 14349
	FLEXIBLE HOSE TYPE SAE100 R7 5/16" I.D. FOR d. 3/8" REUSABLE FITTINGS - PER METER	cod. 14351
	d. 3/8" PARFLEX FLEXIBLE HOSE (O.D. 0,075") TYPE PARKER NBR-06-075 - PER METER	cod. 11543

NOTE: This type of flexible hose is suggested for combination with 20cc and 30cc helm pumps if the total length between pump and cylinder does not exceed 5mt - 15'

KIT OF d. 5/16" HOSES WITH INCH CRIMPED FITTINGS

Description	Model	Code
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 0,5 mt	SH - 0105	20260
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 1 mt	SH - 0110	20261
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 1,5 mt	SH - 0115	20262
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 2 mt	SH - 0120	20263
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 2,5 mt	SH - 0125	20264
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 3 mt	SH - 0130	20265
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 3,5 mt	SH - 0135	20266
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 4 mt	SH - 0140	20267
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 4,5 mt	SH - 0145	20268
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 5 mt	SH - 0150	20269
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 5,5 mt	SH - 0155	20270
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 6 mt	SH - 0160	20271
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 6,5 mt	SH - 0165	20272
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 7 mt	SH - 0170	20273
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 7,5 mt	SH - 0175	20274
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 8 mt	SH - 0180	20275
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 8,5 mt	SH - 0185	20276
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 9 mt	SH - 0190	20277
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 10 mt	SH - 01100	20278
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 11 mt	SH - 01110	20279
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 12 mt	SH - 01120	20280
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 13 mt	SH - 01130	20281
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 14 mt	SH - 01140	20282
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 15 mt	SH - 01150	20283
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 16 mt	SH - 01160	20284
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 17mt	SH - 01170	20285
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 18 mt	SH - 01180	20286
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 19 mt	SH - 01190	20287
KIT OF d.5/16" HOSES WITH FEMALE COMPRESSION FITTINGS - PARKER CRIMPED HOSE L = 20 mt	SH - 01200	20288

KIT OF d. 5/16" HOSES WITH INCH REUSABLE FITTINGS

Description		Model	Code
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L =0,5 mt	SH-0505	23098
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 1 mt	SH-0510	23099
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 1,5 mt	SH-0515	23100
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 2 mt	SH-0520	23101
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 2,5 mt	SH-0525	23102
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 3 mt	SH-0530	23103
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 3,5 mt	SH-0535	23104
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 4 mt	SH-0540	23105
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 4,5 mt	SH-0545	23106
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 5 mt	SH-0550	23107
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 5,5 mt	SH-0555	23108
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 6 mt	SH-0560	23109
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 6,5 mt	SH-0565	23110
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 7 mt	SH-0570	23111
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 7,5 mt	SH-0575	23112
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 8 mt	SH-0580	23113
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 8,5 mt	SH-0585	23114
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 9 mt	SH-0590	23115
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 10 mt	SH-05100	23381
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 11 mt	SH-05110	23382
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 12 mt	SH-05120	23383
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 13 mt	SH-05130	23384
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 14 mt	SH-05140	23385
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 15 mt	SH-05150	23386
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 16 mt	SH-05160	23387
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 17 mt	SH-05170	23388
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 18 mt	SH-05180	23389
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 19 mt	SH-05190	23390
KIT OF d. 5/16" HOSES WITH 3/8" STRAIGHT REUSABLE FITTINGS	L = 20 mt	SH-05200	23391

FLEXIBLE HOSES FOR “HEAVY DUTY” STEERING CYLINDERS

FLEXIBLE HOSE TYPE SAE100 R1 1/2” WITH d.12 FITTING - G 1/2” FEMALE COMPRESSION FITTING	L = 600	SINGLE HOSE	11374
FLEXIBLE HOSE TYPE SAE100 R1 1/2” WITH d.12 FITTING - G 1/2” FEMALE COMPRESSION FITTING	L = 1 m	SINGLE HOSE	20954
FLEXIBLE HOSE TYPE SAE100 R1 1/2” WITH d.12 FITTING - G 1/2” FEMALE COMPRESSION FITTING	L = 1,5 m	SINGLE HOSE	22157
FLEXIBLE HOSE TYPE SAE100 R1 1/2” WITH d.14 FITTING - G 1/2” FEMALE COMPRESSION FITTING	L = 600	SINGLE HOSE	11371
FLEXIBLE HOSE TYPE SAE100 R1 1/2” - 1/2” MALE FITTING - G 1/2” FEMALE COMPRESSION FITTING	L = 1 m	SINGLE HOSE	23404
FLEXIBLE HOSE TYPE SAE100 R1 1/2” - 1/2” MALE FITTING - G 1/2” FEMALE COMPRESSION FITTING	L = 1,5 m	SINGLE HOSE	23405
FLEXIBLE HOSE TYPE SAE100 R1 3/8” - 3/8” MALE FITTING - G 3/8” FEMALE COMPRESSION FITTING	L = 600	SINGLE HOSE	23406
FLEXIBLE HOSE TYPE SAE100 R1 3/8” - 3/8” MALE FITTING - G 3/8” FEMALE COMPRESSION FITTING	L = 1 m	SINGLE HOSE	23407
FLEXIBLE HOSE TYPE SAE100 R1 3/8” - 3/8” MALE FITTING - G 3/8” FEMALE COMPRESSION FITTING	L = 1,5 m	SINGLE HOSE	23408

KIT OF FITTINGS FOR OUTBOARD AND INBOARD STEERINGS

KIT OF FITTINGS FOR DOUBLE STATION PUMP INSTALLATIONS - d. 3/8” FITTINGS	23376
KIT OF FITTINGS FOR DOUBLE STATION PUMP INSTALLATIONS - 1/2” FITTINGS	23418
KIT OF FITTINGS FOR SINGLE STATION PUMP INSTALLATIONS - d. 3/8” FITTINGS	23377
KIT OF FITTINGS FOR SINGLE STATION PUMP INSTALLATIONS - d. 1/2” FITTINGS	23373

BALL-COCK WITH LEVER

BALL-COCK WITH LEVER - 1/2” FEMALE - 1/2” FEMALE FITTINGS	14524
BALL-COCK WITH LEVER - 1/4” FEMALE - 1/4” FEMALE FITTINGS	14526
BALL-COCK WITH LEVER - 3/8” FEMALE - 3/8” FEMALE FITTINGS	14529

KIT OF FITTINGS FOR “HEAVY DUTY” STEERINGS

KIT OF FITTINGS FOR DOUBLE STATION “P63” HEAVY DUTY PUMP INSTALLATIONS - d.12 FITTINGS	23492
KIT OF FITTINGS FOR DOUBLE STATION “P63” AND “P89” HEAVY DUTY PUMP INSTALLATIONS - d.14 FITTINGS	23493
KIT OF FITTINGS FOR DOUBLE STATION “P63” AND “P89” HEAVY DUTY PUMP INSTALLATIONS - d.18 FITTINGS	23452
KIT OF FITTINGS FOR DOUBLE STATION “P105”, “151” AND “P191” HEAVY DUTY PUMP INSTALLATIONS - d.18 FITTINGS	23518

BY-PASS

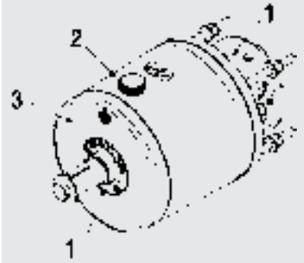
	MANUAL BY-PASS WITH 1/4” COCKS AND FITTINGS FOR d. 3/8” HOSE	23186
	MANUAL BY-PASS WITH 1/4” COCKS AND FITTINGS FOR d. 10 HOSE	12216
	MANUAL BY-PASS WITH 3/8” COCKS AND FITTINGS FOR d. 12 HOSE	16968
	MANUAL BY-PASS WITH 3/8” COCKS AND FITTINGS FOR d. 1/2” HOSE	23480
	MANUAL BY-PASS WITH 1/2” COCKS AND FITTINGS FOR d. 14 HOSE	23036
	MANUAL BY-PASS WITH 1/2” COCKS AND FITTINGS FOR d. 18 HOSE	23037

FITTINGS

	Description	Code for Zinc Plated	Code for Brass	Code for Chromium Plated
	KIT OF SEAL AND FITTING FOR CTA CYLINDER BLEEDER			23048
	KIT OF SEAL AND FITTING FOR CTB CYLINDER BLEEDER			23049
	KIT OF SEAL AND FITTING FOR CTC CYLINDER BLEEDER			23050
	KIT OF SEAL AND FITTING FOR POWER-ASSISTED CTA_A CYLINDER BLEEDER			23051
	KIT OF SEAL AND FITTING FOR POWER-ASSISTED CTB_A CYLINDER BLEEDER			23052
	KIT OF SEAL AND FITTING FOR POWER-ASSISTED CTC_A CYLINDER BLEEDER			23053
	KIT OF SEAL AND FITTING FOR CTAU AND OB108-133 CYLINDER BLEEDER			23054
	KIT OF SEAL AND FITTING FOR CTBU CYLINDER BLEEDER			23055
	KIT OF SEAL AND FITTING FOR CTCU CYLINDER BLEEDER			23056
	KIT OF SEAL AND FITTING FOR POWER-ASSISTED CTA_AU CYLINDER BLEEDER			23057
	KIT OF SEAL AND FITTING FOR POWER-ASSISTED CTB_AU CYLINDER BLEEDER			23058
	KIT OF SEAL AND FITTING FOR POWER-ASSISTED CTC_AU CYLINDER BLEEDER			23059
	STRAIGHT CONNECTION FITTING G1/2” - G1/2”		21199	
	STRAIGHT CONNECTION FITTING G3/8” - G3/8”		21198	
	STRAIGHT CONNECTION FITTING d. 10 HOSE - d.10 HOSE			17038
	STRAIGHT CONNECTION FITTING d. 12 HOSE - d.12 HOSE			12877
	STRAIGHT CONNECTION FITTING d. 14 HOSE - d.14 HOSE	12879		
	STRAIGHT CONNECTION FITTING d. 16 HOSE - d.16 HOSE	12880		
	STRAIGHT CONNECTION FITTING d. 18 HOSE - d.18 HOSE	12881		
	STRAIGHT FITTING G3/8” - d. 10 HOSE	12800	14358	
	STRAIGHT FITTING G3/8” - d. 12 HOSE	12801	14359	12791
	STRAIGHT FITTING G3/8” - d. 14 HOSE	12802	14360	
	STRAIGHT FITTING G3/8” - d. 18 HOSE		14361	
	STRAIGHT FITTING G1/2” - d. 14 HOSE	12793	12808	
	STRAIGHT FITTING G1/2” - d. 16 HOSE	12794		
	STRAIGHT FITTING G1/2” - d. 18 HOSE	12795	14355	
	STRAIGHT FITTING G1/4” - d. 10 HOSE		14356	
	STRAIGHT FITTING G1/4” - d. 12 HOSE	16043		
	STRAIGHT FITTING 1/4” NPTF - d. 1/2” HOSE		21077	
	STRAIGHT FITTING 1/4” NPTF - d. 3/8” HOSE		12784	

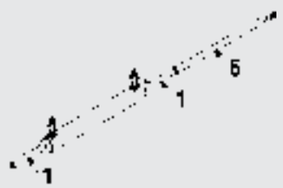
	Description	Code for Zinc Plated	Code for Brass	Code for Chromium Plated
	REDUCTION - G3/8" MALE - G1/2" FEMALE	12836		
	REDUCTION - G3/8" MALE - G1/4" FEMALE		12851	
	REDUCTION - G1/2" MALE - G3/8" FEMALE	12844	12839	
	REDUCTION - G1/4" MALE - G3/8" FEMALE	12848		12826
	REDUCTION - G1/2" MALE - 1/4" NPTF FEMALE		11211	
	REDUCTION - G1/4" MALE - 1/4" NPTF FEMALE		14352	
	REDUCTION - 1/4" NPTF MALE - 3/8" NPTF FEMALE		23546	
	STRAIGHT REUSABLE FITTING FOR R7 5/16" HOSE - d. 10		15610	
	STRAIGHT REUSABLE FITTING FOR R7 5/16" HOSE - d. 3/8"		15613	
	STRAIGHT REUSABLE FITTING FOR R7 3/8" HOSE - d. 12		15720	
	STRAIGHT REUSABLE FITTING FOR R7 3/8" HOSE - d. 1/2"		23477	
	ELBOW REUSABLE FITTING FOR R7 5/16" HOSE - d. 3/8"		23476	
	ELBOW REUSABLE FITTING FOR R7 5/16" HOSE - d. 10		15718	
	ELBOW REUSABLE FITTING FOR R7 3/8" HOSE - d. 12	15721		
	TEE FITTING d.3/8" HOSE - 1/4"NPTF - d.3/8" HOSE		14734	
	TEE FITTING d.3/8" HOSE - 3/8"NPTF - d.3/8" HOSE		20837	
	TEE FITTING d.1/2" HOSE - 3/8"NPTF - d.1/2" HOSE		14733	
	TEE FITTING d.12 HOSE - G3/8" - d.12 HOSE			14750
	TEE FITTING d.18 HOSE - G1/2" - d.18 HOSE	22482		
	TEE FITTING d.10 HOSE - G1/4" - d.10 HOSE			14996+11795
	ELBOW FITTING 1/4"NPTF - d.1/2" HOSE		20574	
	ELBOW FITTING 1/4"NPTF - d.3/8" HOSE		11676	
	ELBOW FITTING G1/4" - d.10 HOS	11687		11678
	ELBOW FITTING G1/4" - d.12 HOSE	11688		
	EQUAL TEE FITTING d.3/8" HOSE		21092	
	EQUAL TEE FITTING d.1/2" HOSE		21093	
	EQUAL TEE FITTING d.10 HOSE		14873	14874
	EQUAL TEE FITTING d.12 HOSE			14882
	EQUAL TEE FITTING d.14 HOSE	14877		
	EQUAL TEE FITTING d.18 HOSE	14878		

SPARE PARTS FOR HELM PUMPS



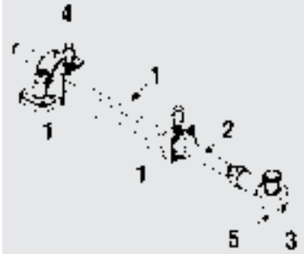
Position	Description	Code
1	KIT OF SEALS FOR **P20BAP - P30BAP - P42BAP AND TSP** HELM PUMPS	23041
	KIT OF SEALS FOR **P25FLY - P35FLY - P42FLY** HELM PUMPS	16465
	KIT OF SEALS FOR **P63T - P63S - P89T - P89S** HELM PUMPS	23042
	KIT OF SEALS FOR **P105 - P151 - P191** HELM PUMPS	21987
2	KIT FOR NO-BLEEDER CAP (CAP+SEAL+WASHER) FOR **20cc - 25cc - 30cc - 35cc - 42cc - BAP - TSP AND FLY** SERIES HELM PUMPS	23009
	KIT FOR BLEEDER CAP (CAP+SEAL+WASHER) FOR **20cc - 25cc - 30cc - 35cc - 42cc - BAP - TSP AND FLY** SERIES HELM PUMPS	23006
3	COVER FLANGE FOR **20cc - 30cc - 42cc - BAP** SERIES HELM PUMPS	16390

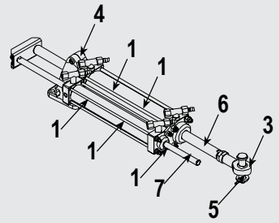
SPARE PARTS FOR OUTBOARD CYLINDERS



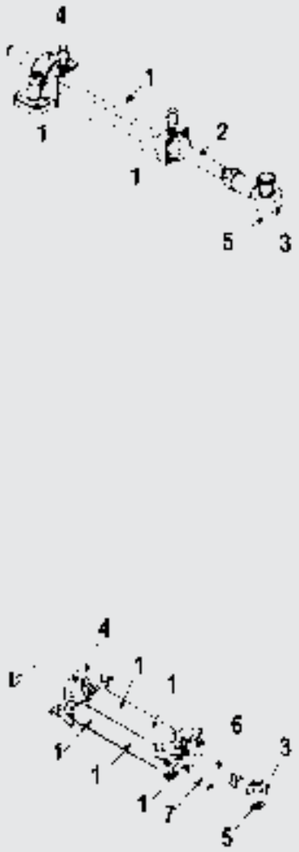
Position	Description	Code
1	KIT OF SEALS FOR **OB133 AND OB108** CYLINDERS	20797
	KIT OF SEALS FOR **OB163SY** CYLINDER	11514
2	BLACK SIDE BRACKET FOR **OB133** CYLINDER	12056
	BLACK SIDE BRACKET FOR **OB108** CYLINDER	19297
3	THROUGH-TUBE STAINLESS STEEL ROD FOR **OB133** CYLINDER	11855
	THROUGH-TUBE STAINLESS STEEL ROD FOR **OB108** CYLINDER	19301
4	LINK ARM KIT FOR **OB133** CYLINDER	23038
5	KIT OF SPACERS FOR **OB 133 AND OB108** CYLINDERS	19495
6	EXTENTION ROD KIT FOR **OB163SY** CYLINDERS (EXTENTION ROD + PIN)	23018

SPARE PARTS FOR INBOARD STEERING CYLINDERS



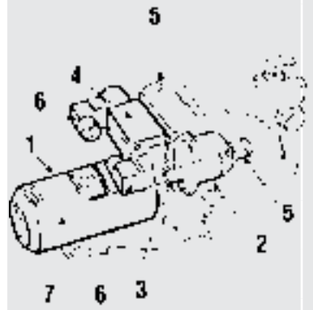


Position	Description	Code
1	KIT OF SEALS FOR **CTA40 - CTA40U** CYLINDERS	21407
	KIT OF SEALS FOR **CTA65 - CTA65U - CTA75 - CTA75U - CTA80 - CTA80U** CYLINDERS	11601
	KIT OF SEALS FOR **CTY90 - CTY100** CYLINDERS	11513
	KIT OF SEALS FOR **CTB110 - CTB110U - CTB130 - CTB130U - CTB145 - CTB145U** CYLINDERS	11603
	KIT OF SEALS FOR **CTC200 - CTC200U - CTC230 - CTC230U -CTC300 - CTC300U - CTC400 - CTC400U** CYLINDERS	11602
	KIT OF SEALS FOR **CTD 310 - CTD450** CYLINDERS	11556
	KIT OF SEALS FOR **CTE 600 - CTE 900 - CTE 1200** CYLINDERS	11586
	KIT OF SEALS FOR **CTF 1600** CYLINDERS	20709
	KIT OF SEALS FOR POWER-ASSISTED **CTA80A - CTA80AU** CYLINDERS	22698
	KIT OF SEALS FOR POWER-ASSISTED **CTB110A - CTB110AU - CTB130A - CTB130AU - CTB145A - CTB145AU** CYLINDERS	22699
	KIT OF SEALS FOR POWER-ASSISTED **CTC200A - CTC200AU - CTC230A - CTC230AU - CTC300A - CTC300AU - CTC400A - CTC400AU** CYLINDERS	22700
2	KIT OF ROD + PISTON FOR **CTA40 - CTA40U** CYLINDERS	10753
	KIT OF ROD + PISTON FOR **CTA65 - CTA65U** CYLINDERS	10677
	KIT OF ROD + PISTON FOR **CTA75 - CTA75U** CYLINDERS	10682
	KIT OF ROD + PISTON FOR **CTA80 - CTA80U** CYLINDERS	10684
	KIT OF ROD + PISTON FOR **CTB110 - CTB110U** CYLINDERS	10740
	KIT OF ROD + PISTON FOR **CTB130 - CTB130U** CYLINDERS	10692
	KIT OF ROD + PISTON FOR **CTB145 - CTB145U** CYLINDERS	10746
	KIT OF ROD + PISTON FOR **CTC200 - CTC200U** CYLINDERS	25648
	KIT OF ROD + PISTON FOR **CTC230 - CTC230U** CYLINDERS	25647
	KIT OF ROD + PISTON FOR **CTC300 - CTC300U** CYLINDERS	25649
	KIT OF ROD + PISTON FOR **CTC400 - CTC400U** CYLINDERS	25650
	KIT OF ROD + PISTON FOR **CTD310** CYLINDERS	25560
	KIT OF ROD + PISTON FOR **CTD450** CYLINDERS	25559
	KIT OF ROD + PISTON FOR **CTE600** CYLINDERS	25564
	KIT OF ROD + PISTON FOR **CTE900** CYLINDERS	25565
	KIT OF ROD + PISTON FOR **CTE1200** CYLINDERS	25566
	KIT OF ROD + PISTON FOR **CTF1600** CYLINDERS	23027
6	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTA80A - CTA80AU**	10757
	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTB110A - CTB110AU**	15880
	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTB130A - CTB130AU**	10697
	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTB145A - CTB145AU**	10749
	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTC200A - CTC200AU**	25698
	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTC230A - CTC230AU**	25696
	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTC300A - CTC300AU**	25697
	KIT OF ROD + PISTON FOR MAIN CYLINDER OF **CTC400A - CTC400AU**	25699
7	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTA80A - CTA80AU**	10760
	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTB110A - CTB110AU**	10743
	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTB130A - CTB130AU**	10698
	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTB145A - CTB145AU**	10750
	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTC200A - CTC200AU**	10738
	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTC230A - CTC230AU**	10719
	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTC300A - CTC300AU**	10731
	KIT OF ROD + PISTON FOR SERVO-CONTROL CYLINDER OF **CTC400A - CTC400AU**	10784

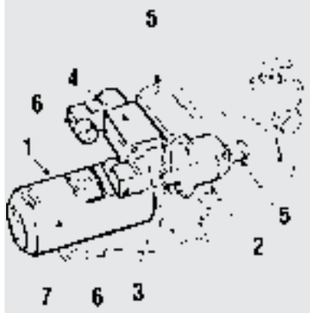


Position	Description	Code
3	BALL JOINT FOR **CTA 40 - CTA40U** CYLINDERS	14712
	BALL JOINT FOR **CTY100** CYLINDERS	14714
	BALL JOINT FOR **CTA 65 - CTA65U - CTA75 - CTA75U - CTA80 - CTA80U - CTA80A - CTA80AU - CTB110 - CTB110U - CTB110A - CTB110AU - CTB145 - CTB145U - CTB145A - CTB145AU** CYLINDERS	14713
	BALL JOINT FOR **CTB130 - CTB130U - CTB130A - CTB130AU** CYLINDERS	14706
	BALL JOINT FOR **CTC200 - CTC200U - CTC200A - CTC200AU - CTC 230 - CTC230U - CTC230A - CTC230AU - CTC 300 - CTC300U - CTC300A - CTC300AU - CTC 400 - CTC400U - CTC400A - CTC400AU** CYLINDERS	14711
	BALL JOINT FOR **CTD 310 - CTD450** CYLINDERS	14703
	BALL JOINT FOR **CTE 600 - CTE 900 - CTE 1200** CYLINDERS	14702
4	COMPLETE BASE FOR **CTA40 - CTA40U** CYLINDERS (SCREWS + BASE + BALL BEARINGS)	22994
	COMPLETE BASE FOR **CTA65 - CTA65U - CTA75 - CTA75U - CTA80 - CTA80U - CTA80A - CTA80AU** CYLINDERS (SCREWS + BASE + 2 BALL BEARINGS)	22995
	COMPLETE BASE FOR **CTY100** CYLINDERS (SCREWS + BASE + BALL BEARINGS)	22997
	COMPLETE BASE FOR **CTB110 - CTB110U - CTB110A - CTB110AU - CTB130 - CTB130U - CTB130A - CTB130AU - CTB145 - CTB145U - CTB145A - CTB145AU** CYLINDERS (SCREWS + BASE + BALL BEARINGS)	22999
	COMPLETE BASE FOR **CTC200 - CTC200U - CTC200A - CTC200AU - CTC230 - CTC230U - CTC230A - CTC230AU -CTC300 - CTC300U - CTC300A - CTC300AU -CTC400 - CTC400U - CTC400A - CTC400AU** CYLINDERS (SCREWS + BASE + BALL BEARINGS)	23001
	COMPLETE BASE FOR **CTD 310 - CTD450** CYLINDERS (SCREWS + BASE + BALL BEARINGS)	23002
	COMPLETE BASE FOR **CTE 600 - CTE 900 - CTE 1200** CYLINDERS (SCREWS + BASE + BALL BEARINGS)	23003
5	PIN OF d.12,7-60 FOR **CTA40** AND CTA40U CYLINDERS	15643
	PIN OF d.19,05-84,5 FOR **CTA65 - CTA65U - CTA75 - CTA75U - CTA80 - CTA80U - CTA80A - CTA80AU - CTB110 - CTB110U - CTB110A - CTB110AU - CTB145 - CTB145U - CTB145A - CTB145AU** CYLINDERS	11159
	PIN OF d.16-73,5 FOR **CTB130 - CTB130U - CTB130A - CTB130AU** CYLINDERS	11121
	PIN OF d.25-103 FOR **CTC200 - CTC200U - CTC200A - CTC200AU - CTC230 - CTC230U - CTC230A - CTC230AU - CTC300 - CTC300U - CTC300A - CTC300AU - CTC400 - CTC400U - CTC400A - CTC400AU** CYLINDERS	11133
	PIN OF d.30-108 FOR **CTD310 - CTD450** CYLINDERS	14125
	PIN OF d.35-128 FOR **CTE600 - CTE900 - CTE1200** CYLINDERS	11128
	PIN OF d.36-143 FOR **CTF1600** CYLINDERS	15863

SPARE PARTS FOR SOLENOID VALVES POWER UNITS

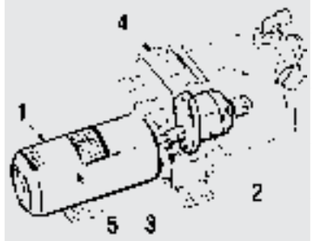


Position	Description	Code
1	ELECTRIC MOTOR 80W 12Vdc - S1 9A FOR POWER UNIT MOD. **CO1NU-CO1N AND CO2NU-CO2N AT 12V**	11587
	ELECTRIC MOTOR 80W 24Vdc - S1 5A FOR POWER UNIT MOD. **CO1NU-CO1N AND CO2NU-CO2N AT 24V**	11589
	ELECTRIC MOTOR 125W 12Vdc - S1 13A FOR POWER UNIT MOD. **CO2/3NU-CO2/3N AND CO3NU-CO3N AT 12V**	11292
	ELECTRIC MOTOR 125W 24Vdc - S1 7A FOR POWER UNIT MOD. **CO2/3NU-CO2/3N AND CO3NU-CO3N AT 24V**	11293
	ELECTRIC MOTOR 200W 12Vdc - S1 22A FOR POWER UNIT MOD. **CO4 AND CO4/5 AT 12V**	11294
	ELECTRIC MOTOR 200W 24Vdc - S2 10A FOR POWER UNIT MOD. **CO4 AND CO4/5 AT 24V**	11295
	ELECTRIC MOTOR 300W 24Vdc - S2 19A FOR POWER UNIT MOD. **CO7 - CO8 - CO9 - CO10 AT 24V**	11297
	ELECTRIC MOTOR 550W 24Vdc - S2 32A FOR POWER UNIT MOD. **CO11 - CO12 - CO13 AT 24V**	11299
	ELECTRIC MOTOR 1000W 24Vdc - S2 52A FOR POWER UNIT MOD. **CO14 - CO15 - CO16 AT 24V**	11446
2	GEAR PUMP FOR POWER UNITS MOD. **CO1NU-CO1N AND CO1NU-CO1N AT 12-24 V**	11308
	GEAR PUMP FOR POWER UNITS MOD. **CO2NU-CO2N AND CO2NU-CO2N AT 12-24 V**	11309
	GEAR PUMP FOR POWER UNITS MOD. **CO2/3NU-CO2/3N AT 12-24 V**	11311
	GEAR PUMP FOR POWER UNITS MOD. **CO3NU-CO3N AT 12-24 V**	11325
	GEAR PUMP FOR POWER UNITS MOD. **CO4-12V AND CO4-24V**	11328
	GEAR PUMP FOR POWER UNITS MOD. **CO4/5-12V AND CO4/5-24V**	11329
	GEAR PUMP FOR POWER UNIT MOD. **CO7-24V**	11365
	GEAR PUMP FOR POWER UNIT MOD. **CO8-24V**	11368
	GEAR PUMP FOR POWER UNIT MOD. **CO9-24V**	11375
	GEAR PUMP FOR POWER UNITS MOD. **CO10-24 AND CO11- 24V**	11391
	GEAR PUMP FOR POWER UNIT MOD. **CO12-24V**	11392
	GEAR PUMP FOR POWER UNIT MOD. **CO13-24V**	11397
	GEAR PUMP FOR POWER UNIT MOD. **CO14-24V**	11396
	GEAR PUMP FOR POWER UNIT MOD. **CO15-24V**	11409
	GEAR PUMP FOR POWER UNIT MOD. **CO16-24V**	11428
3	PUMP COUPLING FOR POWER UNITS MOD. **CO1NU-CO1N - CO1NU-CO1N - CO2NU-CO2N - CO2NU-CO2N AT 12-24 V**	13204
	PUMP COUPLING FOR POWER UNITS MOD. **CO3NU-CO3N - CO3NU-CO3N - CO2/3NU-CO2/3N - CO2/3NU-CO2/3N AT 12-24 V**	13205
	PUMP COUPLING FOR POWER UNITS MOD. **CO4-12 - CO4-24 - CO4/5-12 - CO4/5-24V**	10468
	PUMP COUPLING FOR POWER UNITS MOD. **CO7 - CO8 - CO9 - CO10 AT 24V**	10486
	PUMP COUPLING FOR POWER UNITS MOD. **CO11 - CO12 - CO13 AT 24V**	10488
	PUMP COUPLING FOR POWER UNITS MOD. **CO14 - CO15 - CO16 AT 24V**	10487



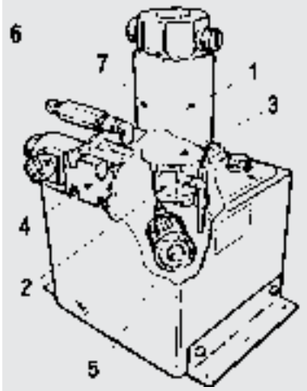
Position	Description	Code
4	TWO-SOLENOIDS ELECTRO VALVE AT 12Vdc - "C" VERSION WITH MANUAL CONTROL FOR ALL POWER UNITS FROM MOD. **CO1NU-CO1N TO MOD. CO4/5 AT 12V**	20610
	TWO-SOLENOIDS ELECTRO VALVE AT 24Vdc - "C" VERSION WITH MANUAL CONTROL FOR ALL POWER UNITS FROM MOD. **CO1NU-CO1N TO MOD. CO16 AT 24V**	20611
5	FILTER G1/4" FOR POWER UNITS MOD. **CO1NU-CO1N - CO2NU-CO2N - CO2/3NU-CO2/3N - CO3NU-CO3N AT 12-24 V**	13176
	FILTER G3/8" FOR POWER UNITS MOD. **CO4-12 AND CO4-24**	13177
	FILTER FOR POWER-UNITS MOD. **CO4/5-12 - CO4/5-24 - CO4-12 - CO4-24**	13179
	FILTER FOR POWER UNITS MOD. **CO7- CO8 - CO9 - CO10 - CO11 - CO13 - CO14 - CO15 AT 24V**	13182
	FILTER FOR POWER UNITS MOD. **CO12 - CO16 AT 24V**	13183
6	ELECTROVALVE CONNECTOR FOR ALL **SOLENOID VALVE POWER UNITS**	12632
7	BRUSHES FOR **ELECTRIC MOTOR OF 80W - 125W 12-24 V**	14718
	BRUSHES FOR **ELECTRIC MOTOR OF 200W - 12-24 V**	14719
	BRUSHES FOR **ELECTRIC MOTOR OF 300W - 550W 24 V**	14720
	BRUSHES FOR **ELECTRIC MOTOR OF 1000W**	14721

SPARE PARTS FOR REVERSIBLE AUTO-PILOT POWER UNITS



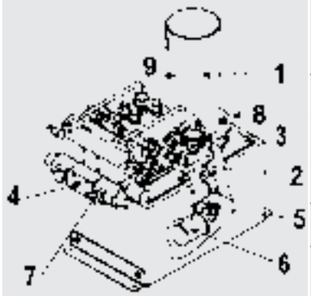
Position	Description	Code
1	ELECTRIC MOTOR 80W - 12 Vdc - S1 9A FOR POWER UNITS MOD. **CO1RU-CO1R - CO2RU-CO2R AT 12 V**	11587
	ELECTRIC MOTOR 80W - 24 Vdc - S1 5A FOR POWER UNITS MOD. **CO1RU-CO1R - CO2RU-CO2R AT 24 V**	11589
	ELECTRIC MOTOR 125W - 12 Vdc - S1 13A FOR POWER UNIT MOD. **CO3RU-CO3R AT 12 V**	11292
	ELECTRIC MOTOR 125W - 24 Vdc - S1 7A FOR POWER UNIT MOD. **CO3RU-CO3R AT 24 V**	11293
	ELECTRIC MOTOR 150W - 12 Vdc - S1 16A FOR POWER UNIT MOD. **CO4NRU-CO4NR AT 12 V**	11291
	ELECTRIC MOTOR 200W - 24 Vdc - S2 10A FOR POWER UNIT MOD. **CO4NRU-CO4NR AT 24 V**	16446
2	REVERSIBLE GEAR PUMP FOR POWER UNITS MOD. **CO1RU-CO1R AT 12-24 V**	11307
	REVERSIBLE GEAR PUMP FOR POWER UNITS MOD. **CO2RU-CO2R AT 12-24 V**	11314
	REVERSIBLE GEAR PUMP FOR POWER UNITS MOD. **CO3RU-CO3R - CO4NRU-CO4NR AT 12-24 V**	16083
3	PUMP COUPLING FOR POWER UNITS MOD. **CO1RU-CO1R - CO2RU-CO2R AT 12-24 V**	13204
	PUMP COUPLING FOR POWER UNITS MOD. **CO4NRU-CO4NR AT 12-24 V**	13205
4	FILTER G1/4" FOR POWER UNITS MOD. **CO1RU-CO1R - CO2RU-CO2R - CO2/3RU-CO2/3R - CO3RU-CO3R AT 12-24 V**	13176
5	BRUSHES FOR **ELECTRIC MOTOR OF 80W - 125W - 150W - 200 W - 12-24 V**	14718

SPARE PARTS FOR SOLENOID VALVE AUTO-PILOT POWER UNITS WITH AUTOMATIC FILLING



Position	Description	Code
1	ELECTRIC MOTOR 125W 12Vdc - S1 13A FOR POWER UNIT MOD. **CO3RAU-CO3RA AT 12 V**	11292
	ELECTRIC MOTOR 125W 24Vdc - S1 7A FOR POWER UNIT MOD. **CO3RAU-CO3RA AT 24 V**	11293
	ELECTRIC MOTOR 200W 12Vdc - S1 22A FOR POWER UNIT MOD. **CO4RAU-CO4RA AT 12 V**	11294
	ELECTRIC MOTOR 200W 24Vdc - S1 10A FOR POWER UNIT MOD. **CO4RAU-CO4RA AT 24 V**	11295
2	GEAR PUMP FOR POWER UNITS MOD. **CO3RAU-CO3RA AND CO3RAU-CO3RA AT 12-24 V**	11321
	GEAR PUMP FOR POWER UNITS MOD. **CO4RAU-CO4RA AND CO4RAU-CO4RA AT 12-24 V**	11328
3	PUMP COUPLING FOR POWER UNITS MOD. **CO3RAU-CO3RA AND CO3RAU-CO3RA AT 12-24 V**	13201
	PUMP COUPLING FOR POWER UNITS MOD. **CO4RAU-CO4RA AND CO4RAU-CO4RA AT 12-24 V**	10468
4	TWO-SOLENOIDS ELECTROVALVE AT 12Vdc - "C" VERSION WITH MANUAL CONTROL FOR POWER UNITS MOD. **CO3RAU-CO3RA AND CO4RAU-CO4RA AT 12 V**	20610
	TWO-SOLENOIDS ELECTROVALVE AT 24Vdc - C" VERSION WITH MANUAL CONTROL FOR POWER UNITS MOD. **CO3RAU-CO3RA AND CO4RAU-CO4RA AT 24 V**	20611
5	FILTER FOR POWER UNITS MOD. **CO3RAU-CO3RA - CO4RAU-CO4RA AT 12-24 V**	13182
6	ELECTROVALVE CONNECTOR FOR ALL **SOLENOID VALVE POWER UNITS**	12632
7	BRUSHES FOR **ELECTRIC MOTOR OF 125W - 12-24 V**	14718
	BRUSHES FOR **ELECTRIC MOTOR OF 200W - 12-24 V**	14719

SPARE PARTS FOR POWER-ASSISTED ELECTRO-HYDRAULIC POWER UNITS



Position	Description	Code
1	ELECTRIC MOTOR 600W - S2 65A FOR POWER UNIT MOD. **CO500/3/0,5U-CO500/3/0,5 AT 12V**	11301
	ELECTRIC MOTOR 500W - S2 30A FOR POWER UNIT MOD. **CO500/3/0,5U-CO500/3/0,5 AND CO500/4/0,75U-CO500/4/0,75 AT 24V**	11302
	ELECTRIC MOTOR 800W - S2 42A FOR POWER UNIT MOD. **CO500/6/0,75U-CO500/6/0,75 AT 24V**	11613
2	GEAR PUMP FOR POWER UNITS MOD. **CO500/3/0,5U 12V AND CO500/3/0,5U 24V**	11664
	GEAR PUMP FOR POWER UNIT MOD. **CO500/4/0,75U-CO500/4/0,75 AT 24V**	11665
	GEAR PUMP FOR POWER UNIT MOD. **CO500/6/0,75U-CO500/6/0,75 AT 24V**	11666
3	PUMP COUPLING FOR **ALL CO500** POWER UNITS	10486
4	TWO-SOLENOIDS ELECTROVALVE 12Vdc - "C" VERSION WITH MANUAL CONTROL FOR POWER UNIT MOD. **CO500/3/0,5U-CO500/3/0,5 AT 12V**	20610
	TWO-SOLENOIDS ELECTROVALVE 24Vdc - "C" VERSION WITH MANUAL CONTROL FOR POWER UNIT MOD. **CO500/3/0,5U-CO500/3/0,5 - CO500/4/0,75U-CO500/4/0,75 - CO500/6/0,75U-CO500/6/0,75 AT 24V**	20611
5	SUCTION FILTER FOR **ALL CO500** POWER UNITS	13180
6	FILTER FOR **ALL CO500** POWER UNITS	13182
7	ELECTROVALVE CONNECTOR FOR **ALL SOLENOID VALVE POWER UNITS**	12632
8	SPACER FOR **ELECTRIC MOTOR FOR ALL CO500**	12912
9	BRUSHES FOR **ELECTRIC MOTOR OF 500W - 600W - 12-24V**	14720

BCS WARRANTY CONDITIONS

BCS, guarantees his equipment are sold and supplied against any faulty manufacturing or defects whether they are the result of the design, the raw material or construction under the terms and restrictions indicated below:

1) Warranty validity period:

1.a. The period of warranty is twenty four (24) months starting from the date of the first use by the original consumer or thirty (30) months from the date of delivery of the products to the forwarder, distributor or wholesaler. In case our systems are mounted or used on work or commercial boats the guarantee period is of twelve (12) months from the date of production. The manufacturer has the right to require from the client proof of the commissioning date specified on the guarantee request.

1.b. This period is neither extended nor interrupted through legal or amicable claims on the part of the client. At the end of this period, the guarantee is terminated without further consideration.

1.c. The warranty will not be renewed following repairs or replacement or if the item is resold

2) Conditions that make the warranty null and void

2.a. The obligation of guarantee not apply in case of negligence, faulty maintenance or supervision, operators responsibility, imprudence, non observance of recommended or operating instructions, incidents resulting from a cause of force majeure, or the use of oil of insufficient quality for the equipment. The manufacturer is released from responsibility for any damage caused by loss of oil or leaks.

2.b. The guarantee also does not apply for any incidents resulting from a cause of force major or Acts of God, as well as any damage, replacement or repairs exceeding the normal wear.

2.c. The guarantee is no more valid in case some of our components are installed on a control system together with other manufacturers' products.

2.d. The guarantee does not apply if the equipment is not returned to the manufacturer in the state in which it broke down or if it has previously been disassembled, repaired, modified either by a third party, the user or the client.

2.e. The warranty does not cover failure due to construction or the choice of unsuitable materials whenever the customer has order the product with such characteristics in spite of prior advice given by BCS.

3) Conditions of call-out

3.a. In case of equipment failure within its warranty period the manufacturer or service center, dealer and distributor, must be contacted to authorized any work. The client must do his best for the assistant to be able to ascertain these defects and to perform corrective actions. After receiving proper notification of the equipment defect, the assistance shall correct this fault as soon as possible, reserving the right, if applicable, to modify all or part of equipment in order to fulfil the obligations.

3.b. The repair or replacement of the defective components under warranty condition is left to the technical staff judgement, and the warranty is limited both to repair in the manufacturer's shop or the nearest authorized service center at its own cost within the shortest possible time of the equipment and parts supplied, or to the article replacement in case it is not reparable.

3.c. The defective products must be sent pre-paid together with a copy of invoice as well as the return form.

3.d. BCS or its assistance, agrees to repair the vessel in a good workmanlike manner. In case the repairing is not under warranty as specified in the condition paragraph 2 , the owner agrees to pay BCS for said work , labour and materials at BCS usual and customary time and material charge unless specifics prices for specific items or job are agreed upon. Oral price quotes by personnel are rough estimates and are not binding upon, but must be in writing signed by the owner and or representative,

3.e. During the guarantee period, the cost of labour, dismantling and reassembly of the faulty items, repairing, travelling and accommodation expenses for technicians are the responsibility of BCS. The shipping costs for repaired or replaced products , as well as for hauling or furniture dismantling shall be paid by the client.

3.f. Emergencies: BCS prefers to do work on vessels only with Owner's specific instruction. However BCS does reserve the right to repair Owner's vessel if in the opinion of BCS an emergency arises making such action necessary in the protection of the vessel. Owner agree to pay for emergency hauling and/or necessary repairs at regular prevailing rates in case the job is not under warranty.

3.g. BCS reserves all rights against the vessel and personally against the owner for payment of all charges in full.

3.h. BCS shall not be responsible for any damage to said vessel while accessed by BCS nor shall BCS be responsible for damage to or loss of any articles or personal property, gear, or any other appurtenances left aboard the vessel, whether vessel's owner, representative and agents have at all time access to the vessel and accordingly BCS does not have exclusive custody, care and control of the boat.

3.i. BCS does not provide insurance for vessels and BCS insurance liability coverage for BCS only. Owner agree that he will provide his own insurance for his vessel , will keep coverage in effect for the time period the vessel being accessed by or in custody of BCS and release BCS from any damage.

4) General warranty terms

4.a. The obligation of the guarantee only applies if the defect appeared under normal operating conditions stipulated for this type of supply, or indicated by the manufacturer in writing .

4.b. The components replaced under warranty must return immediately to BCS as they are no longer customer's property.

4.c. BCS reserves the right to change its models or parts of them without any obligation to make the same alterations to any products previously manufactured.

4.d. The client agrees that the manufacturer will not be responsible for damage resulting form the client non compliance with any of the obligations defined above

4.e. No claim may be made for compensation such as personal injury, damage to goods other than those concerned in this document, privation of possession, operating losses, commercial damage or loss of earnings

International Distributors

NORTH AMERICA

U.S.A.

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