POWER ASSISTED HYDRAULIC STEERING SYSTEMS

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CONTENTS

Pages

•	Torque Calculation	2
•	Power Assisted Steering System LS 185 kpm	3
•	Power Assisted Steering System LS 265 kpm	4
•	Power Assisted Steering System LS 344 kpm	5
•	Power Assisted Steering System LS 450 kpm	6
•	Power Assisted Steering System LS 600 kpm	7
•	Power Assisted Steering System LS 840 kpm	8
•	Power Assisted Steering System LS 1000 kpm	9
•	Power Assisted Steering System LS 1200 kpm	10
•	Power Assisted Steering System LS 1600 kpm	11
•	Power Assisted Steering System LS 2000 kpm	12
•	Determination of the Lengths of Flexible Tubes	13
•	Flexible tubes with pre-crimped connections	14
•	Steering oil	14
•	Tiller arms	15
•	Range of Steering Wheels	16

• Guarantee

LS POWER ASSISTED STEERING SYSTEMS

Specifically designed for luxury vessels getting regular and intensive use, LS range of Power Assisted Steering Systems is designed in total compliance with the strictest norms applying to marine equipment.

The recommended solutions for 185 kpm to 2,000 kpm rudder torque are suitable to equip 15 to 40 metre vessels.

Absolute security comes first: steering is still possible even in case of electrical failure.

► eatures such as smoothness, accuracy and reduced number of wheel turns give LS power assisted steering systems unequalled comfort.

The ease of use of the catalogue enables the shipyards engineering and design departments to define straightaway the correct system in function of the rudder torque, the power supply available on board and the number of steering stations.

Rated torque, hydraulic connection diagram and assembly dimensions are all featured on a same page which can be added to the vessel technical file. A lettered diagram on page 12 facilitates the definition of the required flexible tubes with pre-crimp connections.

TORQUE CALCULATION

• For boats fitted with a rudder, the torque of the rudder or rudders is calculated as per the following formula and corrections.

It must be known that the torque necessary to manoeuvre a boat depends on :

- the speed of the water flowing on the surface of the rudder at a certain angle,
- the rudder size,
- the total sweep of the rudder (and part of the boat), if the rudder shaft is not perpendicular,
- the compensating surface of the rudder (balance).

$C = S \times [(0,4 Lg) - Lc] \times V^2 \times K$

- C = Torque in kpm
- S = Total surface of rudder (H x Lg) in sq. m
- H = Height of rudder in m
- Lg = Width of rudder in m
- Lc = Compensation width in m
- V = Maximum speed of the boat in knots
- K = Coefficient in function of total rudder angle
 - Port to starboard 70° K = 15,89
 - Port to starboard 80° **K = 17,80**
 - Port to starboard 90° K = 19,52

• Corrections in function of the type of boat :

- For a boat with a steering nozzle
- C x 2,0 C x 0.5
- For twin engine power boats with 1 rudder C x 0,5
 For boats fitted with several rudders (catamarans, monohulls), multiply the calculated torque result by the number of rudders fitted on the boat.



LS 185 kpm POWER ASSISTANCE



LS 265 kpm POWER ASSISTANCE



LS 344 kpm POWER ASSISTANCE



LS 450 kpm POWER ASSISTANCE



LS 600 kpm POWER ASSISTANCE



LS 840 kpm POWER ASSISTANCE



LS 1,000 kpm POWER ASSISTANCE



LS 1,200 kpm POWER ASSISTANCE



LS 1,600 kpm POWER ASSISTANCE



LS 2,000 kpm POWER ASSISTANCE



DETERMINATION OF THE LENGTHS OF FLEXIBLE TUBES



Record in the chart below the dimensions as per the selected configuration above and send this page back to us by mail, fax or e-mail.

A = mm	I = mm
B = mm	J = mm
C = mm	K = mm
D = mm	L = mm
E = mm	M = mm
F = mm	N = mm
G = mm	O = mm
H = mm	P = mm
	Q = mm

FLEXIBLE TUBES WITH PRE-CRIMPED CONNECTIONS

High pressure flexible tubes of various lengths with pre-crimped connections of various kinds (several diameters, straight fittings, 90° elbow fittings). Stainless steel fittings available.

A few references in 10 L :



STEERING OIL



TILLER ARMS



RANGE OF STEERING WHEELS



GUARANTEE

1) The manufacturer guarantees the equipment sold and supplied against any faulty manufacturing or defects whether they are the result of the design, the TaW material, the manufacturing or construction under the terms and restrictions indicated below :

2) The guarantee is applicable only if the client has satisfied the general obligations of this contract, in particular, the terms of payment.

3) The guarantee only includes equipment sold by the manufacturer. It does not extend to equipment in which the manufacturers supply has been installed and, in particular, to the performances of this equipment.

4) When the manufacturers supplies are installed by the client or a third party into any other equipment, they remain solely responsible for this installation, the selection and suitability of the manufacturers supplies as the manufacturers diagrams, designs and proposais are given as an indication only, unless otherwise specified in the order. In particular, the manufacturer does not guarantee components or equipment not sold by him, nor the assembly, adaptation, design or operation of the assembly or parts of the assembly thus created. The manufacturers supply, as well as the assembly created by the client or a third party, are assumed to be operated under the exclusive control of the client or the third party.

5) The period of the guarantee is eighteen months starting from the date of first use by the original consumer or twenty four months from the date of delivery of the products to the transporter, distributor or wholesaler. The manufacturer has the right to require from the client proof of the commissioning date specified on the guarantee request. 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.

6) The obligation of the guarantee only applies if the client establishes that the defect appeared under normal operating conditions stipulated for this type of supply, or indicated by the manufacturer in writing and during normal operation. It does not apply in case of negligence, faulty maintenance or supervision, operators responsibility, imprudence, non observance of recommended or operating instructions, 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. The guarantee also does not apply for any incidents resulting from a case of force majeure or Acts of God, as well as any damage, replacement or repairs exceeding the normal material wear.

7) The guarantee is limited to the repair in the manufacturer's shop at his own cost within the shortest possible time, of the equipment and parts supplied by him, identified as defective by the technical department. These parts must be sent pre-paid. No claim may be made for compensation for any damage such as personal injury, damage to goods other than those concerned in this contract, privation of possession, operating losses, commercial damage or loss of earnings. During the guarantee period, the cast of labor, dismantling and reassembly of the equipment outside the manufacturer's plant, the shipping costs for repaired, replaced or faulty equipment, travelling and accommodation expanses for technicians are the responsibility of the client.

When the guarantees are given according to the industrial results for a given equipment, these results and the consequences of this undertaking will result in a special agreement between the parties.

8) In order to take advantage of this guarantee, the client must notify the manufacturer in writing as soon as possible of the defects attributed to the equipment and provide any proof concerning these defects. He must do his best for the manufacturer to be able to ascertain these defects and to perform corrective actions. 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. After receiving proper notification of the equipment defect, the manufacturer 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.

9) The client agrees that the manufacturer will not be responsible for damage due to the fact that the client has not satisfied anyone of the obligations defined above.

