Neuver Maritime

Maintenance Manual
Neuver Maritime

Flapped Rudders
FB, FM, and FS

Doc. no. DMN000326954				
Rev.	**Date**	**Reason for issue**	**Author, dept. and name**	**Authorizing dept. name, sign**
F	May 2025	Changed to new NM layout manual template Minor change in chapter 4. Changed contact email address.	Ø.B, P.G	

Table of Contents

Safety

Please take the time to read this chapter carefully, as it concerns your safety.

General statement

“UNDERTAKING ANY WORK ENVISAGED BY THIS DOCUMENT MAY EITHER DIRECTLY OR INDIRECTLY CREATE RISKS TO:

[1] THE SAFETY AND HEALTH OF THE PERSON UNDERTAKING THE WORK OR,

[2] THE PRODUCT AND/OR ITS COMPONENTS WHILST THE WORK IS BEING UNDERTAKEN.

IT IS THE RESPONSIBILITY OF THE USER TO ENSURE THAT APPROPRIATE CONTROLS AND PRECAUTIONS ARE IDENTIFIED AND APPLIED IN RELATION TO THE WORK ENVISAGED BY THIS DOCUMENT IN ACCORDANCE WITH RELEVANT STATUTORY, LEGAL AND INDUSTRY REQUIREMENTS TO PROTECT THE HEALTH AND SAFETY OF THE PERSONS UNDERTAKING THE WORK.

IT IS ALSO THE USER’S RESPONSIBILITY TO ENSURE THAT APPROPRIATE CONTROLS AND PRECAUTIONS ARE IDENTIFIED AND APPLIED IN RELATION TO WORK ENVISAGED BY THIS DOCUMENT TO PROTECT AGAINST RISKS TO THE NEUVER MARITIME EQUIPMENT AND/OR ITS COMPONENTS WHILST THE WORK IS BEING UNDERTAKEN.

NEITHER THIS DOCUMENT, NOR ITS USE, IN ANY WAY ABSOLVES THE USER FROM THEIR RESPONSIBILITY TO ENSURE THAT THE CONTROLS AND PRECAUTION REFERRED TO ABOVE ARE IMPLEMENTED.

IF, WHILST UNDERTAKING ANY WORK ENVISAGED BY THIS DOCUMENT, YOU BECOME AWARE OF ANY NEUVER MARITIME PRODUCT DESIGN RELATED FEATURE WHICH COULD CREATE RISK TO A PERSON UNDERTAKING WORK OR TO THE PRODUCT AND/OR ITS COMPONENTS PLEASE CONTACT THE RESPECTIVE TECHNICAL PRODUCT MANAGER AT NEUVER MARITIME IMMEDIATELY.”

Safety annotations

All safety directions must be respected in order to avoid damage to personnel, environment and equipment. In this document the following annotations are used with belonging significance:

WARNING!

Indicates possibilities for hazards or unsafe practices, which COULD result in fatal or severe personnel injuries or substantial product or property damage, if the required precautions are not taken.

NOTE!

Draws attention to specific information of technical significance which might not be obvious to specialist personnel, or points at important remarks in the procedures to follow.

1. Introduction

This manual provides the Neuver Maritime maintenance recommendations and instructions for Rudder type FB, FM, and FS. All recommendations are provided in relation to general Class requirements and guidelines.

2. Maintenance overview

Neuver Maritime Rudders are designed for safe operation with a minimum of maintenance. To prevent unexpected problems or downtime, it is recommended that the users maintain the Rudder system at regular intervals.

For scheduled class survey and general service or repair, it is recommended to use Neuver Maritime service engineers. This will decrease the time of repair to a minimum and ensure continuous safe operation.

This document describes all relevant maintenance procedures and activities to be carried out by the crew, in addition to the maintenance recommended to be performed by Neuver Maritime engineers. Any other information may be found in the Rudder INSTALLATION AND USER MANUAL or by contacting support@neuver.com.

After a certain number of years in operation it is, however, necessary to service the equipment and replace wear parts in order to achieve a predictable and safe life cycle for the rudder equipment. The service intervals are depending on factors such as:

- Class rules and regulations
- Rudder in-water survey and Clearance measurement
- Leakage, seawater ingress
- Cathodic protection / ICCP
- Steering gear / autopilot performance
- Other conditions such as DP operations, trawling, seismic

It is important to monitor the condition and performance of the equipment and take notice of any changes. This might be important to reveal any problem about to develop before a breakdown occur.

NOTE!

It is requested that any failures or maintenance work on the equipment, no matter how small should be reported to Neuver Maritime at; support@neuver.com

By reporting, any failures and maintenance work, an accurate equipment history can be maintained. This history will be continuously monitored and compared to other vessels with similar equipment. With this information, we can provide better service, faster delivery of spare parts, and guidance for preventive maintenance.

3. Docking related service and maintenance tasks

Please see below recommended intervals for service and maintenance, with relation to scheduled class surveys or docking.

Service and maintenance	5 YEAR	10 YEAR	15 YEAR	20 YEAR	25 YEAR
Visual inspection Rudder	**x**	**x**	**x**	**x**	**x**
Measure & record bearing clearance	**x**	**x**	**x**	**x**	**x**
Check tightening torque locking screws from shoulder bolts (only FB, FM)	**x**	**x**	**x**	**x**	**x**
Watertight air pressure test rudder	**(x)**	**x**	**(x)**	**x**	**(x)**
Replace Rudder stock seals inboard*		**x**		**x**	
Replace Rudder stock seals outboard*	**x**	**x**	**x**	**x**	**x**
Replace Seal washers*		**x**		**x**	
Replace Seal liners*		**x**		**x**	
Replace O-rings, lock washers, bolts*	**x**	**x**	**x**	**x**	**x**
Replace Inlet/drain plugs*	**x**	**x**	**x**	**x**	**x**
Replace Sacrificial anodes	**x**	**x**	**x**	**x**	**x**
Overhaul flap hinges*		**(x)**		**(x)**	
Overhaul Link mechanism*		**(x)**		**(x)**	
Replace neck bearing*			**(x)**	**(x)**	**(x)**
Check coating, Touching-up	**x**	**x**	**x**	**x**	**x**

*Recommended to be carried out by Neuver Maritime service engineers.

(x) - Service or maintenance recommendation dependent on equipment condition and service history.

x - Recommendation based on number of years in service.

Note: Changing outboard seals and liners is not applicable for water lubricated rudder systems.

3.1. Service and maintenance intervals

5 years	• Measure and record bearing clearances • Disconnect and lower rudder blade • Replace seals, O-rings and locking washers (seawater side) • Reinstall rudder blade • Fill up rudder trunk and lubricate neck bearing • Function- and maneuvering test
10 years	• Measure and record bearing clearances • Disconnect and lower rudder blade • Disassemble flap and link mechanism • Replace plain bearings, seal- and wear liners • Replace all seals, O-rings and locking washers • Assemble and reinstall rudder blade • Fill up rudder trunk and lubricate neck bearing • Function- and maneuvering test
15 years	• Recommended service and maintenance according to above service and maintenance table, previous service history and measuring reports • Same tasks as 5 years' service
20 years	• Recommended service and maintenance according to above service and maintenance table, previous service history and measuring reports • Same tasks as 10 years' service
25 years	• Recommended service and maintenance according to above service and maintenance table, previous service history and measuring reports • Same tasks as 15 years' service

4. Routine Maintenance tasks

The Maintenance instructions below details all preventative maintenance activities to be carried out by the Crew on a regular basis. Please add below tasks to applicable vessel maintenance system.

System (a)	Part (b)	Maintenance Task (c)	Freq (d)	Type (e)	Skill Level (f)	Facility (g)
Rudder Trunk	Rudder stock sealing Inboard	Check for leakages around rudder stock on top of the rudder trunk	1 wk	INS	A	A
Rudder Trunk	Neck bearing	Open trunk ventilation (swan´s neck) Pump few strokes of grease through the neck bearing inlet until grease returns from the ventilation	1 wk	LUB	A	A
Rudder Trunk	Grease overflow	Check a.m. grease return flow for any water content	1 wk	CHK	A	A
Rudder Trunk	Automatic lubrication system, if applicable	Check grease volume pump unit reservoir. Function test pump according to instructions. Check grease return flow	1 wk	CHK	A	A
Rudder unit	Rudder	Test rudder movement h.o.h.o. Check noice, irregular movement	1 wk	CHK	A	B
Rudder unit	Rudder in-water survey (RIWS)*	Measure and record bearing clearance acc to RIWS instructions	2,5 yr	MEA	B	Diver
Rudder unit	Tiller & stay	Check locking screws shoulder bolts	2,5 yr	CHK	B	Diver/ ROV
Rudder unit	Rudder	Check painting, damages, corrosion, cavitation, anodes etc	2,5 yr	CHK	B	Diver/ ROV

* if applicable, depending on class notation

Note: Lubrication of neck bearing is not applicable for water lubricated rudder systems.

Maintenance type:

Abbreviation	Description
BC	Bearing Change
CHK	Check
CL	Clean
FC	Filter Change
FLU	Flush
INSP	Inspect
LUB	Lubricate
MEA	Measure
MEG	Megger
OC	Oil Change
OVH	Overhaul
REP	Replace
NM OVH	Neuver Maritime Overhaul
SAM	Sample
TST	Test

Skill level and facility codes:

The skill levels indicate the skill level of the person responsible for the maintenance task:

- Maintenance Level A is general operational maintenance carried out by the ships crew on board, with no additional support or facilities.
- Maintenance Level B is maintenance carried out in port, using ships crew and local port supplied support and facilities.
- Maintenance Level C is maintenance carried out in port, requiring specialist Neuver Maritime support.
- Maintenance Level D is repair and overhaul activities undertaken in a Neuver Maritime specialist workshop.

The facility codes indicates the physical location of the vessel during the maintenance procedure:

- A – Onboard
- B – Harbour
- C – In dry dock
- D – In Workshop (Neuver Maritime or port workshop facilities)

5. Rudder in-water survey

The purpose of Rudder in-water survey (RIWS) is to measure clearance between the rudder stock and bearing, to determine bearing wear without dismantling of the rudder in dry-dock, and to fulfill classification society’s requirements where applicable.

Neuver Maritime – Rudders have developed special equipment for RIWS clearance measurement:

- Electronic sensor monitoring system
- Mechanical systems

A separate operating- and instruction manual is delivered with this equipment.

6. Corrosion protection

NEUVER MARITIME recommends carrying out underwater inspections of the rudders at suitable intervals between dry dockings, to ensure that corrosion protection is intact and active.

Insufficient corrosion protection can lead to following issues:

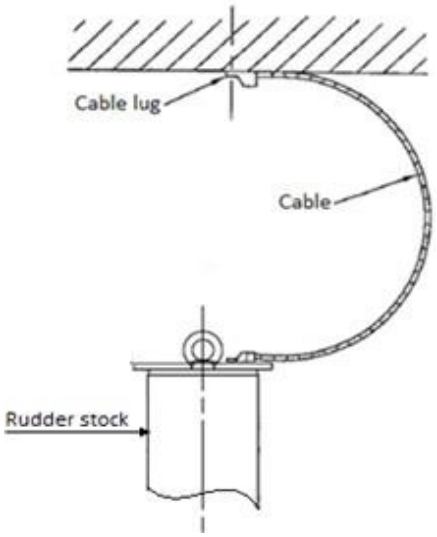
- Corrosion of welds, fittings, and structural parts
- Galvanic corrosion of fasteners
- Crevice corrosion of fasteners

This can result in major Rudder damage which will require costly repairs, or in extreme cases failure of the rudder flap mechanism in service.

If the vessel has installed an impressed cathodic current system (ICCP), make sure the system is functioning according to makers specifications.

NOTE!

There must be an earthing wire connected between the rudder stock and hull structure.



Additional cathodic protection of the rudder by sacrificial anodes should be considered.

NOTE!

At least one anode should be installed on every rudder for monitoring purpose.

7. Recommendations

WARNING!

Using oil/grease other than specified by NEUVER MARITIME may cause malfunctions when maneuvering the boat, and lead to personal injuries, and equipment damage.

7.1. Recommended grease

Manufacturer	Type	Bio-degradable type	NLGI-grade
Castrol	Spheerol SX2	BioTac MP2	2
Klüber		Klüberbio AG 39-602 N Klüberbio LG 39-700 N Klüberbio LG 39-701 N	1 – 2 1 1
ExxonMobil	Mobilgrease XHP222	SHC Aware EP 2	2
Panolin		Biogrease LL-EP 2	
Shell	Gadus S2 V220 2	Naturelle S5 V120P 2	2
Fuchs Lubricants Norway	RENOLIT Chassis Grease Winter		2
Texaco	Delo Starplex EP 2		2
Texaco	Multifak T EP 2		2
Total		Biomultis EP 2	2
Vickers		Biogrease EP 2	2

7.2. Recommended liquid seals

Manufacturer	Type
Permatex	Hylomar
Loctite	5922
E. Epple & Co. GMBH	33

7.3. Approved hydraulic oil for hydraulic nut and conical connection

Standard	Grade
ISO	VG 32-68

Viscosity at actual temperature should be between 20-75cSt.

8. Tightening torques

MATERAL QUALITY: **A4-80**

NOTE!

Given figures are with no lubrication. If lubrication is used, multiply with 0.84.

Size	Torque [Nm]
M10	47
M12	81
M16	197
M20	385
M24	681
M30	1310
M42	3640
M48	5450

NOTE!

Nord-Lock Washer and Loctite to be used to secure the bolts, ref. the installation drawings.

9. Spare parts

NEUVER MARITIME will assist you with recommended parts for all service- and maintenance jobs.

NOTE!

Information regarding the Rudder system and unit number is found in the instruction manual.

When ordering spare parts, please make sure to include the following information to spares department

Vessel name:		**Shipping address:**	
Owner name:		**Invoicing address:**	
IMO number:		**Drawing number:**	
Rudder system:		Position number	
Unit number:		Article number	
		Quantity	

Please note: Rudder parts are equipment specific and will vary between rudder types.

10. Contact:

Contact information:

NEUVER MARITIME AS
Aarsundvegen 24
6270 Brattvåg
N-6270 Brattvaag

All inquiries:
Phone: +47 48 28 85 00
E-mail: support@neuver.com

Home page:
www.neuver.com