

**FU91 Follow up
Steering Lever**

Operation

The FU91 is activated by operating the push to take command (PTTC) button. When in “COMMAND”, the button light is switched on and the autopilot INFO display will show:

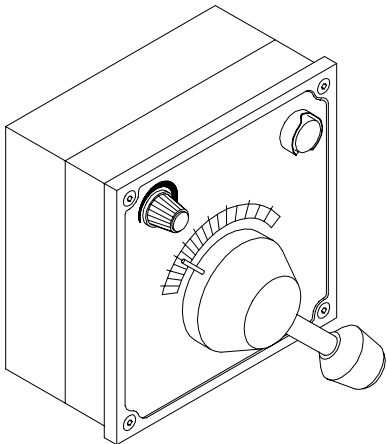
FOLLOW UP
HELMSMAN

Rudder commands are made by setting the lever to the required rudder angle, wherafter the rudder will move to the commanded angle and stop.

FU91 may be connected to AP45 in two different ways. See Fig. 5-32 and Fig. 5-33

FU91 without mode switching

The lever can only be activated when the autopilot is in Helmsman mode. Pressing the PTTC button repeatedly will toggle between NFU and FU mode on AP45. See table below.



FU91 Switch	AP45 Mode	Function	AP45 Displays	
OFF	MANUAL	NFU steering by NFU lever or push button control	NON FOLLOW UP MANUAL	H 085
ON	MANUAL	Follow Up steering by moving FU91 lever to desired rudder angle as read on FU91	FOLLOW UP MANUAL	H 085
ON-OFF	AUTO	Automatic steering	* * * * * AUTO	A 080

Note!

If the Helmsman button is pressed when the FU91 is active, or if a NFU lever is operated, the autopilot will go to NFU mode even though the PTTC button light is on. However, as soon as the FU91 is operated again (lever is moved), the autopilot will resume FU mode.

For safety reason, the FU91 should always be switched to OFF when not in use.

FU91 with mode switching

The lever can be activated also with autopilot in Auto mode. Pressing the PTTC button brings the AP45 into Helmsman mode. What mode/sequence you get when pressing the PTTC button again is depending on which value of the resistor R is installed (Ref. page 5-29)

R = 1K: Auto - Dodge - Auto (previous course)

R = 3K: Auto Manual - Manual

R = 5,1K: Auto - Manual - Auto (new course)

The mode change sequence is in principle similar to S9 operation alt. 2, 3 and 4 explained at page 2-12 and 2-13.

Multiple FU91 installation

The operation of each lever is identical to above description of a single lever. Activating one FU91 will deactivate the one that was previously active.

FU91 and S9 connected to the same autopilot

It is recommended not to have both S9 and FU91 in operational condition at the same time. This may create confusion and inadvertent operation. The main rules are:

- Always put the S9 lever to locked position after use .
- Always switch the FU91 to OFF after use.

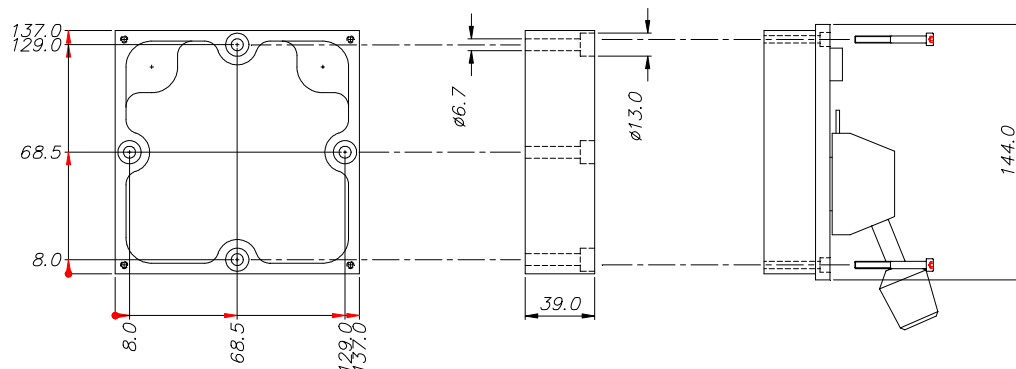
FU91 Steering Lever Mounting

Fig. 5-31
FU91 Mounting

For bulkhead mounting, use the 8 bushings enclosed with the unit. These are placed two and two against each other and the screws are put through them. Direct contact between FU91 and a steel bulkhead is then avoided and corrosion is prevented. The cover plate can be turned 360 degrees for the most convenient position of cable outlet. For panel mounting use the two mounting brackets enclosed with the unit.

Electrical connection

There is two alternatives of connecting FU91 to AP45; without mode switching or with mode switching (similar to S9)

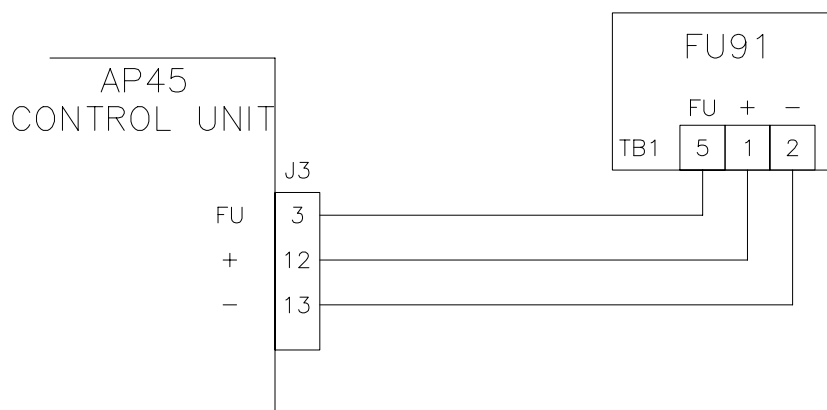
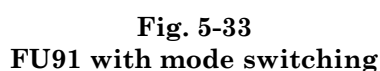


Fig. 5-32
FU91 without mode switching

See page 2-14 for operation.



R = 1.0K: Auto $\rightarrow$ Dodge $\rightarrow$ Auto
R = 3.0K: Auto $\rightarrow$ Manual $\rightarrow$ Manual
R = 5.1K: Auto $\rightarrow$ Manual $\rightarrow$ Auto

Multiple FU91 installation is not recommended with AP45 unless the optional FU-Junction box is used. Connections are shown in Fig. 5-34

The diagram illustrates the wiring of the AP45 Control Unit. On the left, the AP45 Control Unit has terminals J3, FU, 3, 5, 1, 2, 12, 13, +, and -. These are connected to the FU Junction Box. The junction box has terminals TB1, TB2, TB3, and FU. TB1 is connected to the FU terminal of the junction box. TB2 and TB3 are connected to the FU, EN, TC, -, and + terminals of two FU91 units. The FU91 units have terminals 5, 4, 3, 2, 1, FU, EN, TC, -, and +.

Fig. 5-34
FU91 Multiple installation

Alternative operation.

The S9 can be configured in four alternatives. At delivery from Robertson the S9 is connected for alternative 1. If alternative 2, 3 or 4 is to be used, S9 has to be modified according to the chapter “S9 Steering Lever”, page 5-26.

Note!

If a F200-40 also is connected, only alternative 1 can be used.

Alternative 1 (No resistor)

S9 Lever	AP45 Mode	Function	AP45 Displays	
IN	MANUAL	S9 locked	NON FOLLOW UP MANUAL	H 080
OUT	MANUAL	NFU steering by moving lever to left or right	NON FOLLOW UP MANUAL	H 080
IN	AUTO, WORK	S9 locked	→← AUTOMATIC	A 146
OUT	AUTO, WORK	Course change by moving lever	→← AUTOMATIC	A 146

Alternative 2 (R = 1K)

S9 Lever	AP45 Mode	Function	AP45 Displays	
IN	MANUAL	S9 locked	NON FOLLOW UP MANUAL	H 080
OUT	MANUAL	NFU steering by moving lever to left or right	NON FOLLOW UP MANUAL	H 080
IN	AUTO, WORK	S9 locked	→← AUTOMATIC	A 146
OUT	AUTO, WORK	Dodging made by lever	DODGING	H 080
IN	AUTO, WORK	S9 locked. Return to previous course	→← AUTOMATIC	A 146

Alternative 3 (R = 3K)

S9 Lever	AP45 Mode	Function	AP45 Displays	
IN	MANUAL	S9 locked	NON FOLLOW UP MANUAL	H 080
OUT	MANUAL	NFU steering by moving lever to left or right	NON FOLLOW UP MANUAL	H 080
IN	AUTO, WORK	S9 locked	→← AUTOMATIC	A 146
OUT	MANUAL	NFU-steering by moving lever	NON FOLLOW UP MANUAL	H 080
IN	MANUAL Remains in manual mode until new mode has been selected on control unit.	S9 locked. Return to previous course	NON FOLLOW UP MANUAL	H 080

Alternative 4 (R = 5,1K)

S9 Lever	AP45 Mode	Function	AP45 Displays	
IN	MANUAL	S9 locked	NON FOLLOW UP MANUAL	H 080
OUT	MANUAL	NFU steering by moving lever to left or right	NON FOLLOW UP MANUAL	H 080
IN	AUTO, WORK	S9 locked	→← AUTOMATIC	A 146
OUT	MANUAL	NFU-steering by moving lever	NON FOLLOW UP MANUAL	H 080
IN	AUTO, WORK	S9 locked. Continues on new set course, same as vessel's heading	→← AUTOMATIC	A 080

S9 Steering Lever

Dimensions:.....See Fig. 4-9.

Protection:IP56

Ambient temperature:-25 - +70°C

Safe distance to magnetic compass:0.3 m

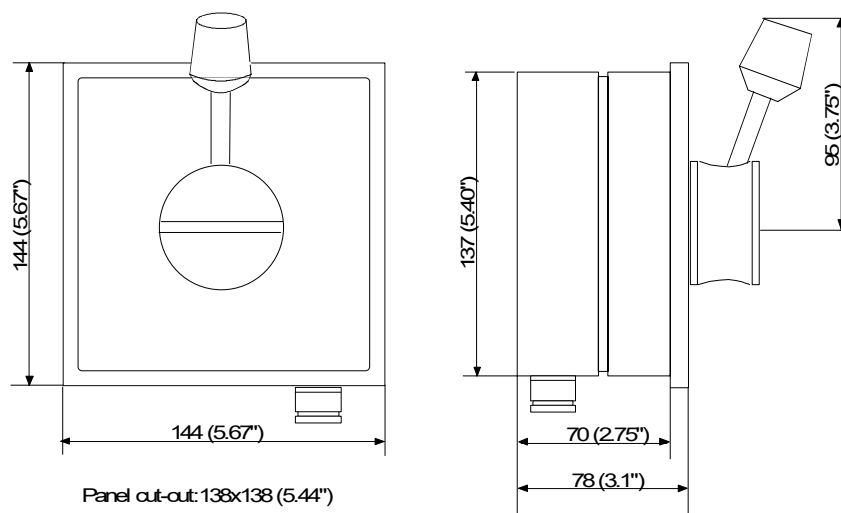
Max. inductive load:4A/24V DC, 60mA/110W AC,
25mA/220V AC

Fig. 4-9
S9 Steering Lever - Dimensions

FU91 Steering Lever

Dimensions:See Fig. 4-10.

Protection:IP56

Ambient temperature, storage:-25 - +70°C
operation:-10 - +55°C

Safe distance to magnetic compass:0.3 m

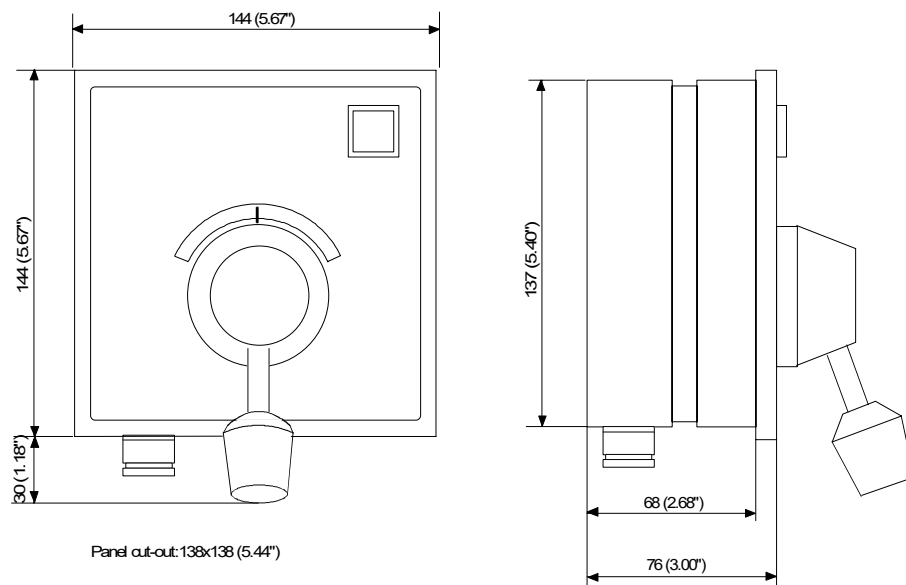


Fig. 4-10
FU91 Steering Lever - Dimensions