



Displays

① act. heading display:

actual heading from gyrocompass (mode gyro)/
magnetic compass (mode mag)

② set heading/course display:

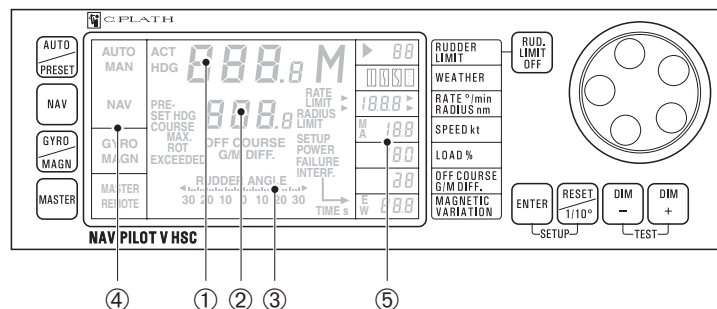
autopilot set heading (mode auto)
commanded course to steer (mode nav)
act. heading (manual steering mode)

③ rudder angle display:

rudder angle (bargraph)
rudder engine valve action (stb./pt. arrows)

④ mode display:

MAN manual steering mode
AUTO autopilot steering mode
NAV waypoint navigation
GYRO heading reference gyrocompass
MAG heading reference magnetic compass
MASTER unit operating mode master
REMOTE unit operating mode remote



⑤ steering parameter display:

RUDDER LIMIT rudder limit set by operator
WEATHER steering strategy (confined waters /
open sea / rough sea); CR-lock
RATE / RADIUS rate of turn / turn radius
SPEED act. speed
LOAD load percentage
OFF COURSE / G/M DIFF. off-course / gyro/magnetic diff.
alarm threshold
MAGNETIC VARIATION magnetic variation

Operation

Power-Up

Select manual steering mode. Energize autopilot system. Operating unit performs self test and enters normal operational mode. Both heading displays show actual heading.

Autopilot steering mode (AUTO)

Switch rudder engine to single pump action / slow speed. Select autopilot steering mode. Actual heading is automatically taken over as autopilot set heading.

Set autopilot heading



Turn control disc cw to increase set heading (step width 1°).



Turn control disc ccw to decrease set heading (step width 1°).



Press while turning control disc to increase/decrease set heading (step width 1/10°).

Preset autopilot heading



Press to enter preset heading (steering mode manual or auto).



Select required heading value.

Switch to autopilot steering mode, if necessary.



Press to take over preset heading as autopilot set heading.

Waypoint navigation (NAV)



In steering mode auto, press to receive commanded course to next waypoint from nav. receiver / INS.



On course change alarm, press to receive course to next waypoint.



Press to return to autopilot steering mode.



Operation (contd.)

Select heading reference

 Press to toggle between gyro/magnetic heading reference (in manual steering mode only).

Take over master control

 Press to change unit's working mode from remote to master.

Clear rudder limit

 Press to clear rudder limit, if set.

Display illumination

 Press key. Display becomes brighter.

 Press key. Display becomes darker.

Display test

  Press and hold keys simultaneously. While keys are pressed, all display elements and the alarm buzzer are activated.

Alarm system

When the autopilot detects an alarm state, an audible alarm is given and a corresponding message is displayed.

MAX. ROT EXCEEDED	rate of turn exceeds permitted max. value
OFF COURSE	difference between actual heading and set heading/course exceeds limit
G/M DIFF.	difference between gyrocompass heading and magnetic compass heading exceeds limit
POWER FAILURE	failure in power supply
FAILURE INTERF. HdB	no valid data at gyro- or magnetic compass interface
" SPd	" speed interface
" nRu	" NAV-interface; Nav. receiver
" InS	" NAV-interface; INS

Mute audible alarm

 On alarm, press to mute alarm buzzer. Alarm status at ext. output will be cleared.

View error codes

  On alarm, press and hold keys simultaneously to view error code. Note displayed code number and press keys again to check for additional errors. Repeat until **888** is displayed (end of error code list).

Set autopilot parameters

Set steering parameters (enter mode)

 Press to select enter mode. For enter mode operation, see page 3.

Set operating parameters (user setup)

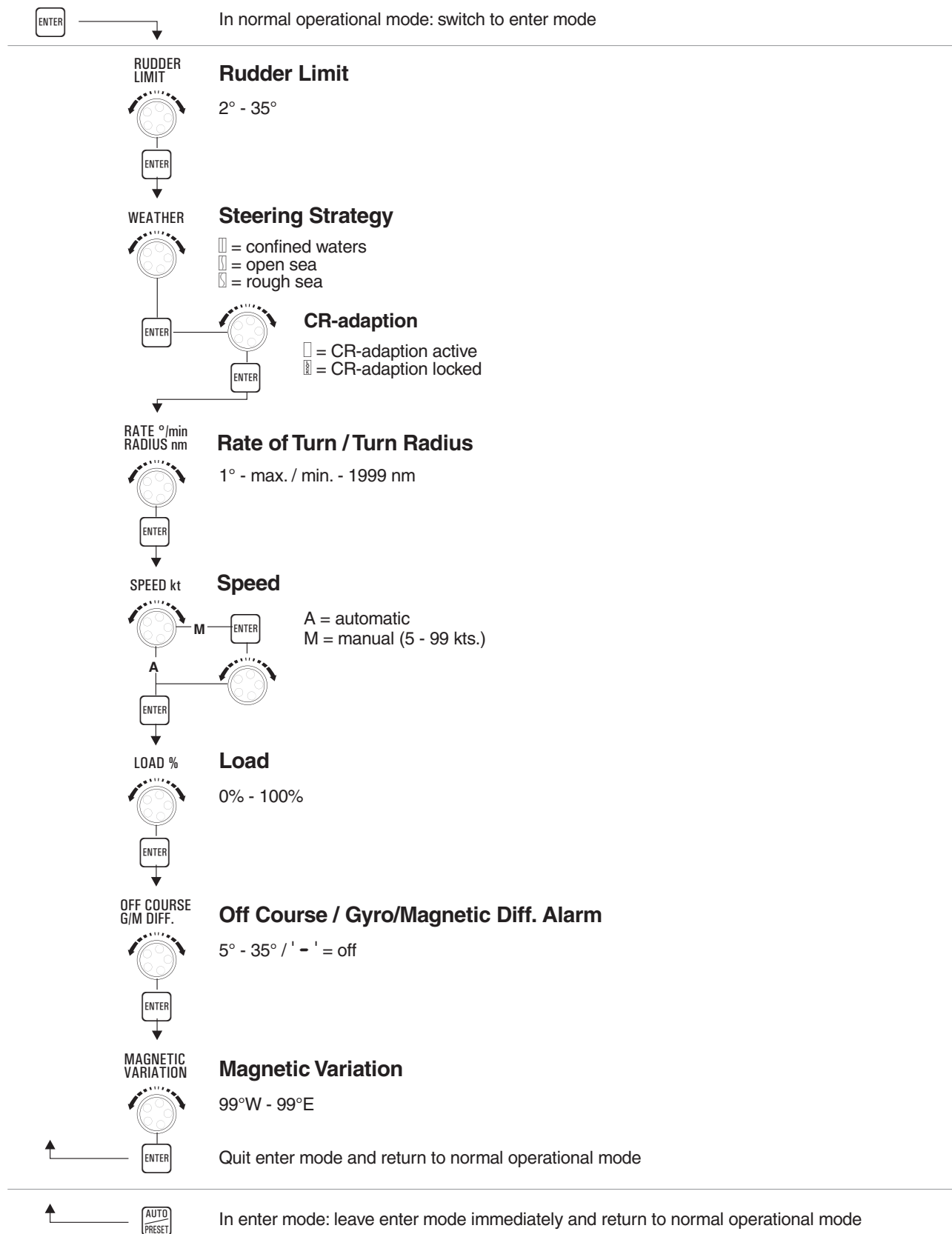
  Press keys simultaneously to enter user setup. For user setup operation, see page 4.

Set basic configuration parameters (service setup 1 and 2)

  In manual steering mode, press keys simultaneously to access service setups. For service setup operation, see pages 7 and 9.



Enter mode

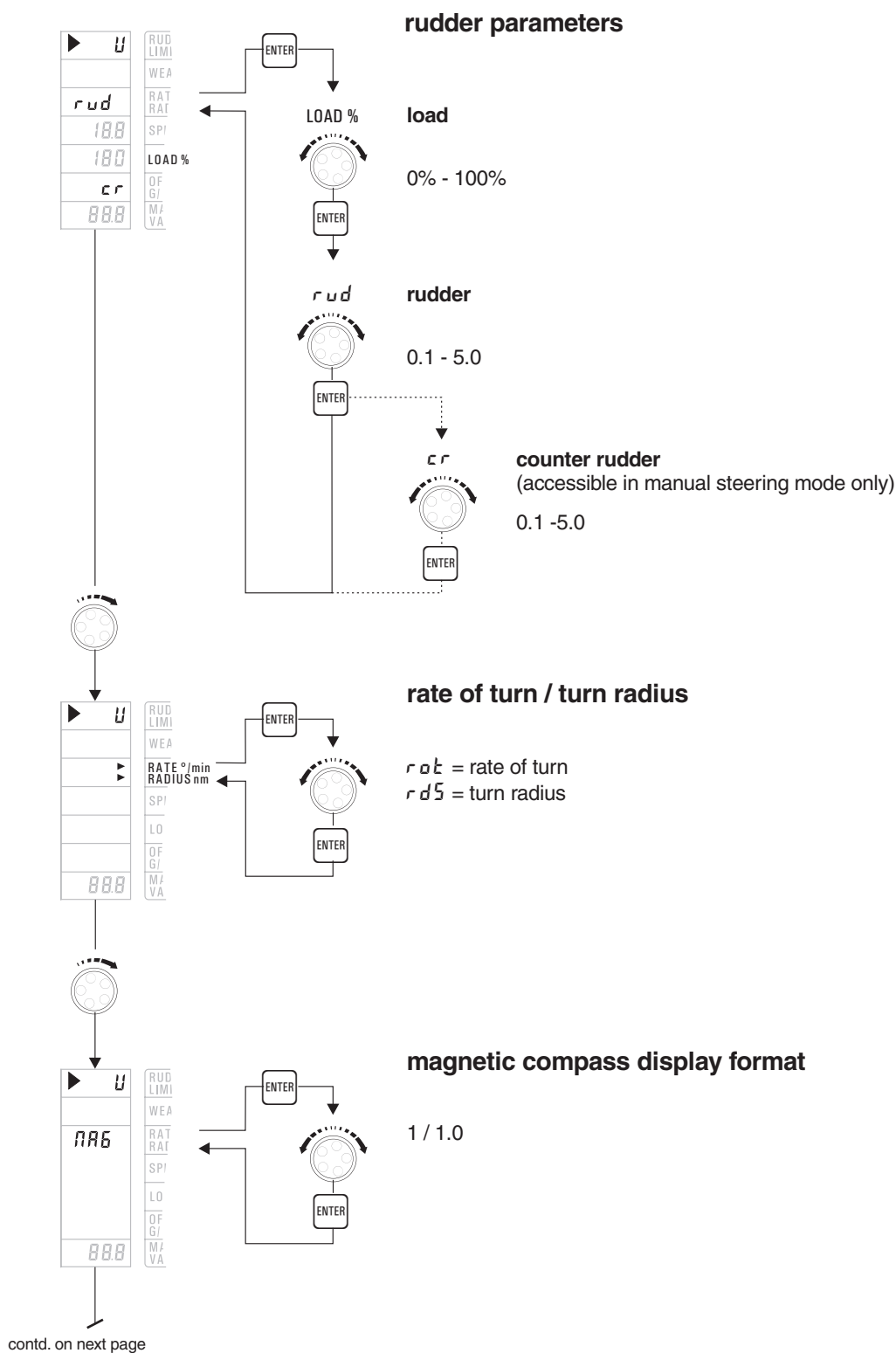




User setup



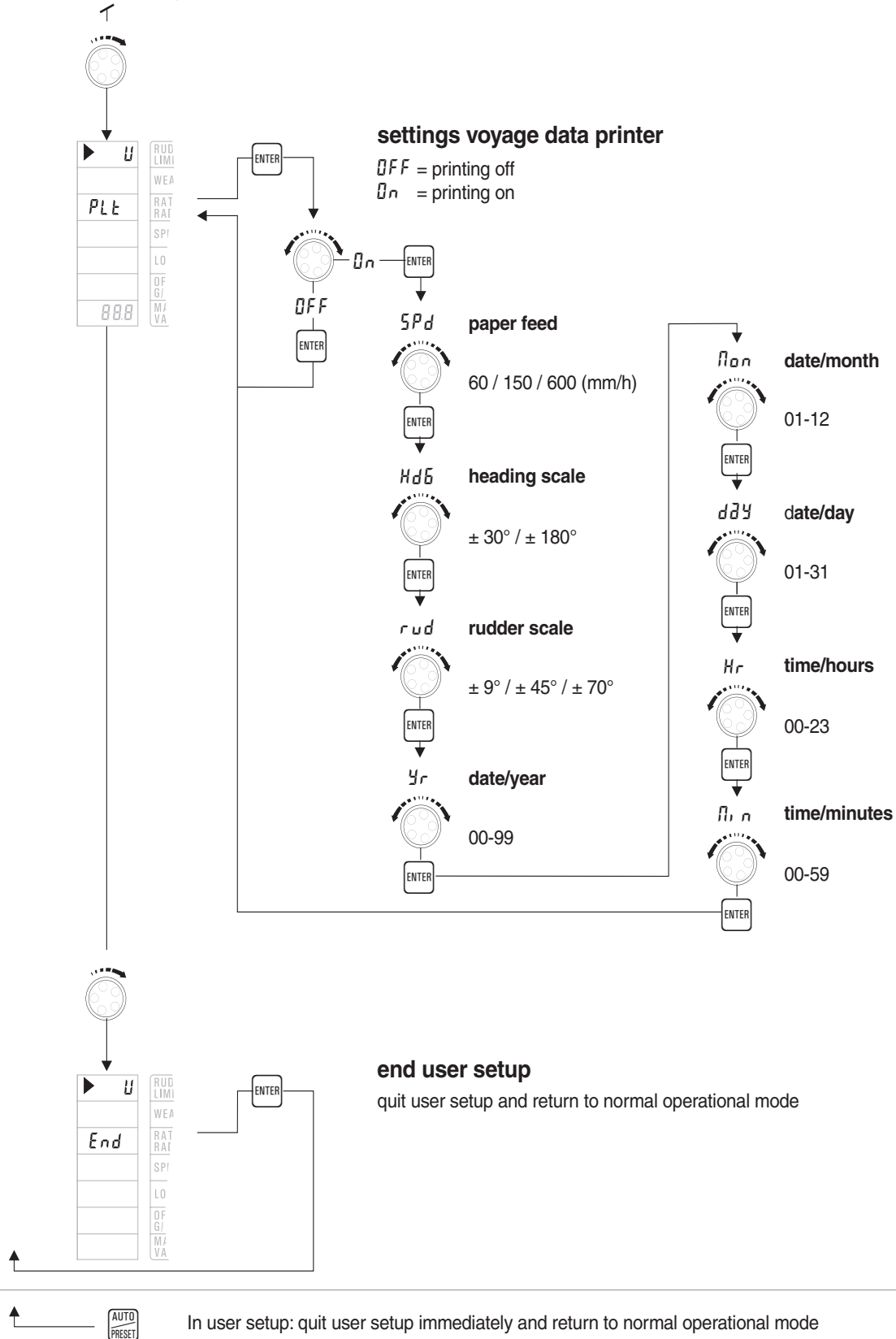
In normal operational mode: press simultaneously to access user setup.





User setup (contd.)

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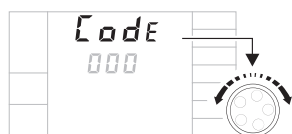




Service setup 1



In normal operational mode: press simultaneously to access setup modes



access code

service setup 1: code "6"



cross track error sensitivity

(with relevant NAV interface protocols only)

0 - 20



magnetic compass calibration

OFF = calibration off
ON = calibration on

OFF

ENTER

DIM - / DIM +

magnetic heading value
0° - 359°



correction value
-20° - +20°

store hdg./corr. value
in calibration table

RUD. LIMIT OFF

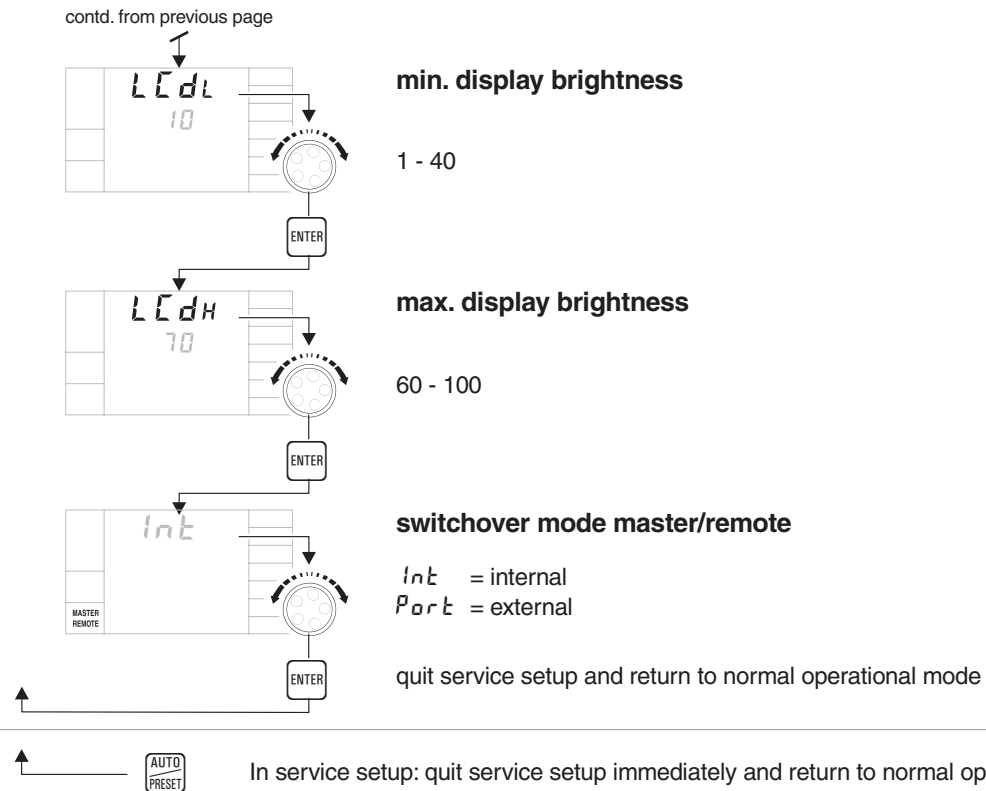
ENTER

RESET 1/10° clear entry from
calibration table

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Service setup 1 (contd.)

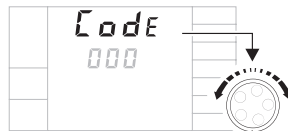




Service setup 2



In normal operational mode: press simultaneously to access service setup modes



access code

service setup 2: code "7"



time constant τ (tau)

2 sec. - 80 sec.



cruising speed (U_0)

5 kts. - 99 kts.



ext. off course alarm delay

0 sec. - 300 sec.

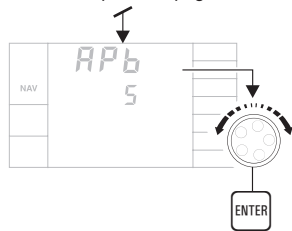


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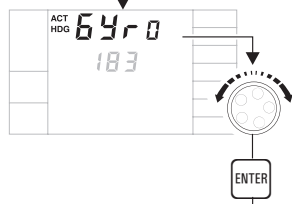
Service setup 2 (contd.)

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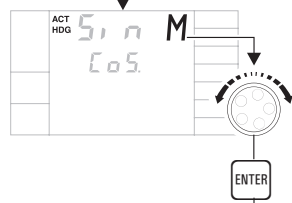
NAV interface protocol

OFF = interface disabled
HSC = NMEA sentence HSC
bod = NMEA sentence BOD (+ XTE)
APA = NMEA sentence APA
APb = NMEA sentence APB
CTS = NMEA sentence CTS
PCT = NMEA sentence PCT
bPI = NMEA sentence BPI (+ XTE)
BWR = NMEA sentence BWR (+ XTE)
BWC = NMEA sentence BWC (+ XTE)
INS1 = INS data 1 (general)
INS2 = INS data 2 (chart plotter NAVIPILOT)
INS3 = INS data 3 (NACOS)
INS4 = INS data 4 (VECTOR)
INS5 = INS data 5 (DB 2000)
INS6 = INS data 6 (INS 970)
INS7 = INS data 7 (VMS)
Serv = for service only



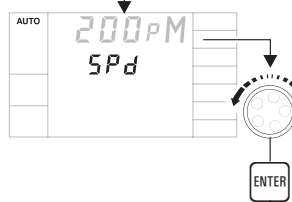
gyrocompass interface format

OFF = interface disabled
6 = 6 step/°
12 = 12 step/° / synchro 1:360
P96 = Plath-format 9600 baud
L96 = Lehmkuhl 9600 baud
L12 = Lehmkuhl 1200 baud
183 = NMEA 0183
nt = compass monitor NAVITWIN



magnetic compass interface format

OFF = interface disabled
Sin Cos = fluxgate sensor, sin/cos type
183 = NMEA 0183
test = for service only



speed interface format

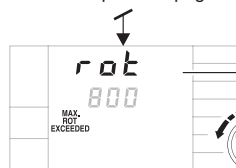
OFF = interface disabled
200PM = 200 p./nm
183 = NMEA 0183

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Service setup 2 (contd.)

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max. permitted rate of turn

30 °/min. - 1999 °/min.

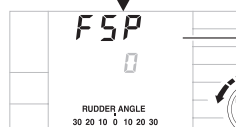
ENTER



rel. integration time constant (I_t)

0% - 300%

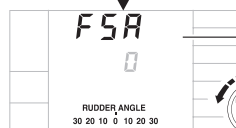
ENTER



following sea pulse duration (FSP)

0% - 90% (percent of τ)

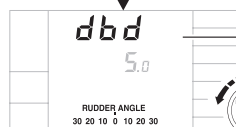
ENTER



following sea rudder angle (FSA)

0° - 5°

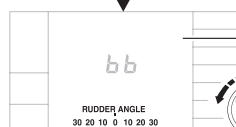
ENTER



rudder engine dead band

0° - 10°

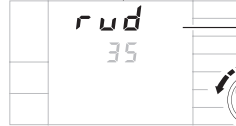
ENTER



rudder engine type

Rn = analogue rudder control
 bb = bang-bang-control (solenoid valves)

ENTER



max. rudder angle

20° - 35°

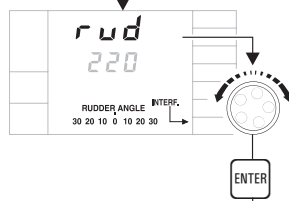
ENTER

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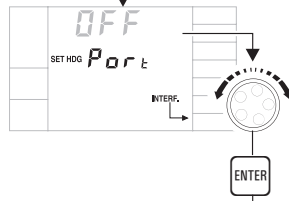
Service setup 2 (contd.)

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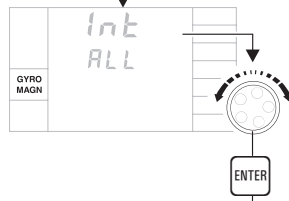
scale factor of rudder angle feedback unit

50 mV/° - 300 mV/°



function ext. status input

OFF = input disabled
turn = turn 180° port/stbd.
180° = turn hdg. display 180°
SEp = alter set hdg. port/stbd. (tiller or pushbuttons)
LOAD = select load state



switchover mode gyro/magnetic

Int M = internal, from control master only
Int ALL = internal, from all operating units
Port = external



In service setup: quit service setup immediately and return to normal operational mode



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