MANUAL

SIMRAD RI35 Mk2
Rudder Angle Indicator

20220919Db   English

Instruction Manual

This manual is intended as a reference guide for operating and correctly installing the RI35 Mk2 Rudder Angle Indicator.

Please take time to read the manual to get a thorough understanding of the indicator system and its relationship to a complete autopilot system.

Other documentation material that is provided with your system includes a warranty card. This must be filled out by the authorized dealer that performed the installation and mailed in to activate the warranty.

Document revisions

Rev	Date	Written by	Checked by	Approved by
A	101100	NG	IK	TR
B	210601	NG	IK	TR
C	040702	NG	IK	ThH
D	130603	NG	GK	VP
Db	230106	*NG*		*I.K.*

Document history

Rev. A   Original Issue

Rev. B   RI35 Mk2 Limiter not used with newer revisions of J3XX.

Rev. C   Connection to J50 Junction Unit included. Part no. for RI35 Mk2 included in the Spare Parts List.

Rev. D   Default setting of S1 plug-in strap on the RF45X PCB changed from AP45 to J3XX. Modified figure 3-3, 3-4 and 3-6.

Rev. Db   Modification on RF45 PCB. S1 plug-in strap removed on figure 3-7.

Contents

1. INTRODUCTION

The RI35 Mk2 is manufactured in non-corrosive aluminum with a non-reflective black finish.

It is designed to operate from frequency or current signals generated by a Simrad autopilot feedback unit.

It will also accept a NMEA 0183 rudder angle (RSA) signal.

The indicator is made in standard modular size (132x108 mm) to match the Simrad AP35 autopilot.

A separate PCB is mounted inside the instrument to convert the input signals and drive the indicator.

The instrument gives a continuous reading of the rudder position up to 45 degrees on either side of the midship's position. With no signal input the pointer moves out of scale to port.

A front panel key is used for illumination and setup adjustments.

The splash proof construction allows panel, bulkhead or bracket mounting in exposed locations, such as bridge wings as well as wheel house and engine room.

2. TECHNICAL SPECIFICATIONS

Dimensions: .... See Figure 2-1

Weight: .... 1.0 kg

Material: .... Epoxy coated aluminum

Supply voltage: .... 12/24V DC –10%/+30%, polarity independent

Power consumption: .... Max 3 W

Environmental protection: IP56

Safe distance to magnetic compass: .... 0.3 m (1 ft)

Wheelmarked according to:

Council Directive 96/98/EC of 20 December 1996 on Marine Equipment
as amended by directive 2001/53/EC

Temperature range:

Operating: .... –25 to +55°C (–13 to +130°F)
Storage: .... –30 to +70°C (–22 to +158°F)

Input signal: ....Frequency 3400 Hz (midship reference),
±20Hz/degree, polarity independent.
Current: 0.1 - 1.1mA (midship 0,6mA), polarity independent
NMEA 0183 RSA (min. 10 Hz): $--RSA,x.x,A,x.x,A*hh<cr><lf>

Output signal: .... NMEA 0183 RSA 20Hz: $--RSA,xx.x,A,,*hh<cr><lf>

Accuracy:..±0.5° (Indicator alone)

Cable:... 20 m, single twisted pair (not connected).

Rudder Feedback Units: .... RF300 (frequency signal),
RF45X (current or frequency signal),
RF100 (current signal).
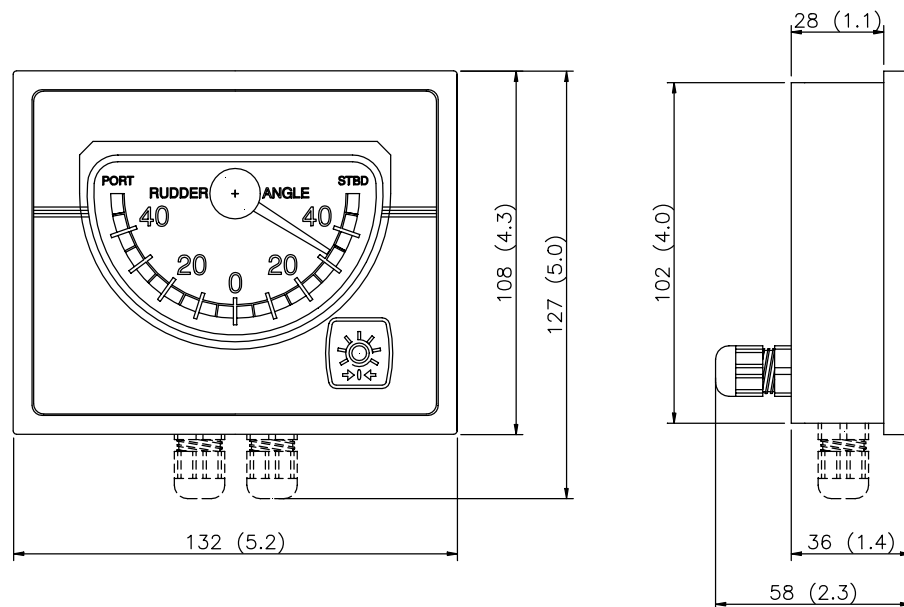
Figure 2-1 RI35 Mk2 Dimensions

3. INSTALLATION

The RI35 Mk2 is designed for flush, bulkhead or bracket mounting, and should be positioned in a location in clear view of the helmsman. When the mounting location is determined, the cables should be connected to RI35 Mk2 before the unit is mounted. Cables may be taken out underneath, or in the back of the RI35 Mk2.

20220919Db

3.1 Connections

Stand alone rudder angle indicator(s)

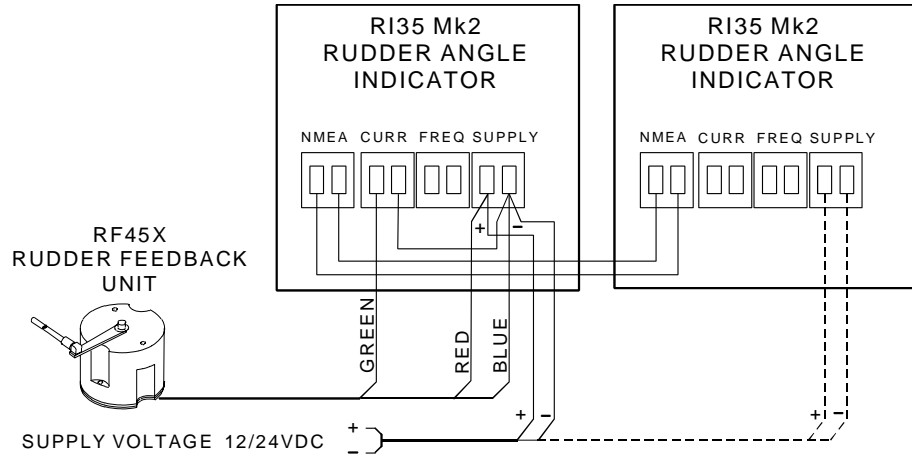### *RF45X Rudder Feedback Unit (Current signal)*

Figure 3-1 RI35 Mk2 - RF45X Stand alone wiring diagram

Note !   *If more than one indicator is needed, the other indicators must be connected via the NMEA ports. Max. 5 indicators (1+4).*
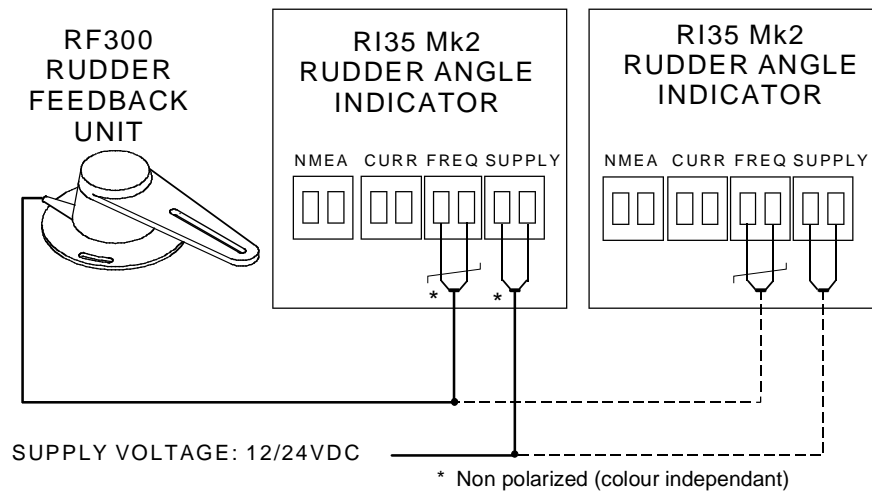
RF300 Rudder Feedback Unit

Figure 3-2 RI35 Mk2 – RF300 Stand alone wiring diagram

More indicators (max. 5) are connected in parallel.

Connection to J3XX and J50 Junction units

Figure 3-3 and Figure 3-4 is valid for J50 Junction Unit, ACXX Autopilot Computer and for J3XX Junction Units that have Main PCB rev. E onwards. For older J3XX versions see page 10.

The interconnection cables are screened, and the screen should be grounded in the autopilot junction unit. See Figure 3-3 through Figure 3-9 for connections to the different autopilot junction units.
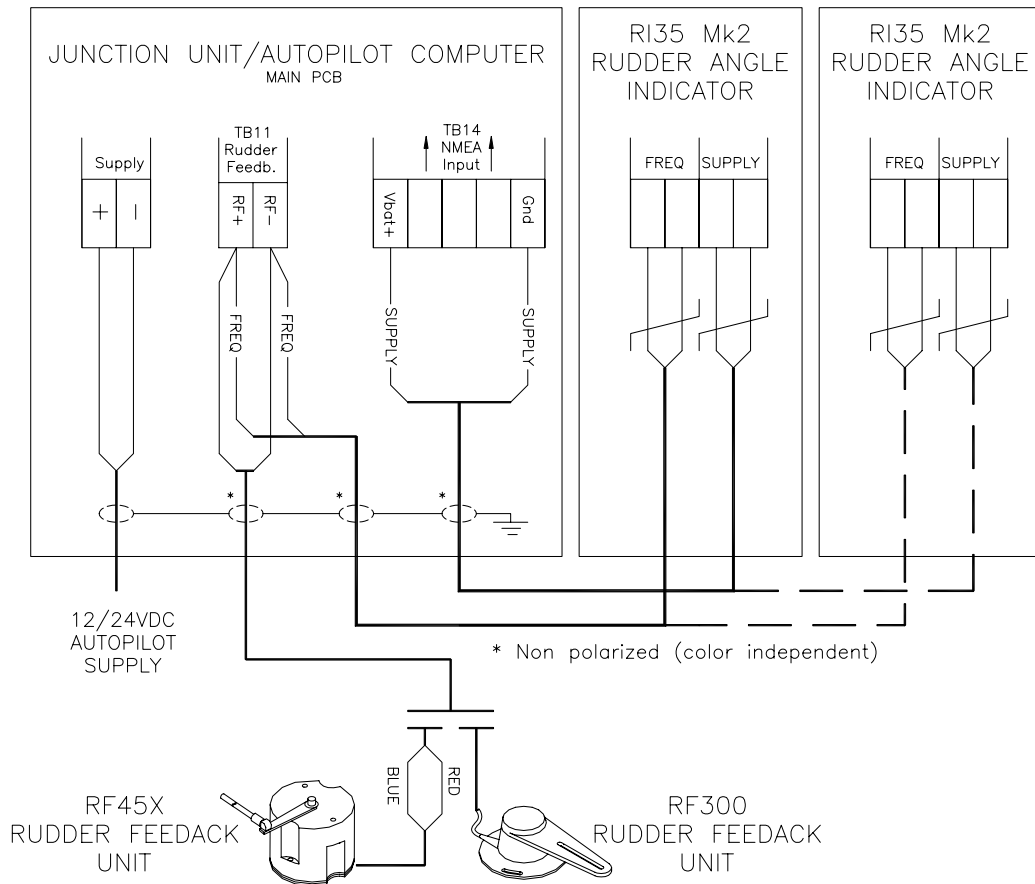

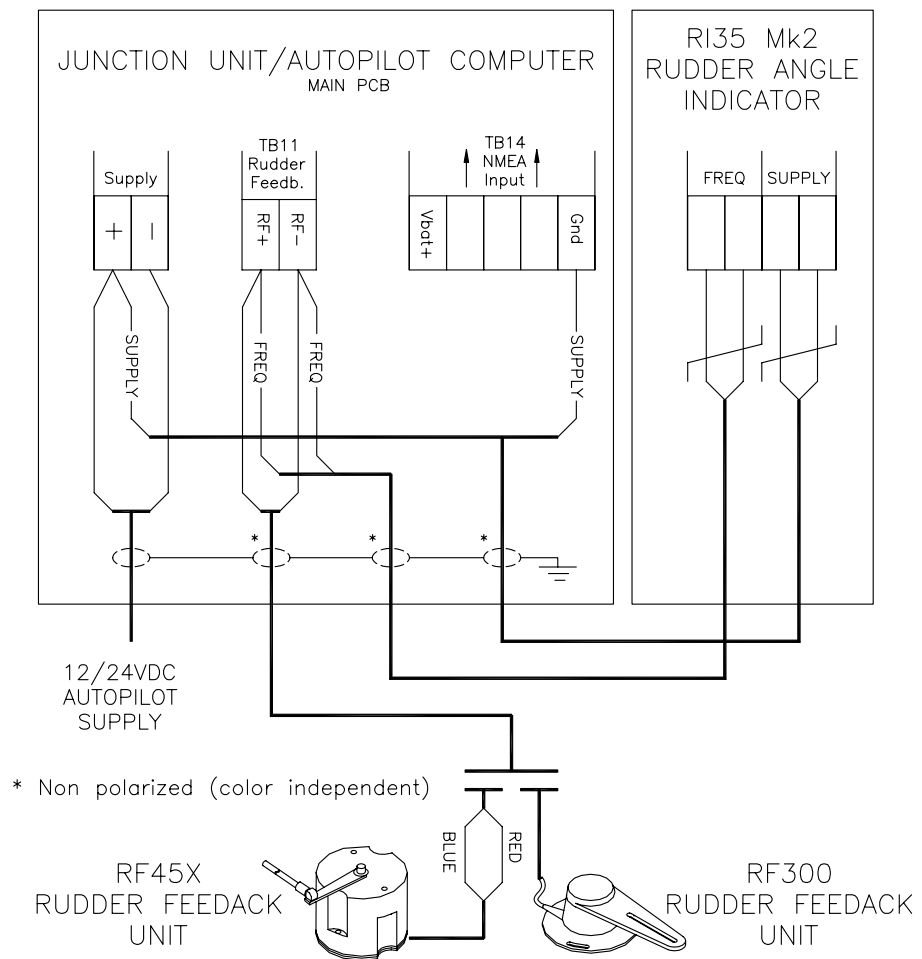**Figure 3-3 RI35 Mk2 – J50/J3XX, Wiring diagram dependent of autopilot function**

Figure 3-4 RI35 Mk2-J50/J3XX, independent function of autopilot

This connection gives you a full functioning indicator also with the autopilot switched off.

Connection to older revision J3XX Junction units

Figure 3-5 and Figure 3-6 is only valid for J3XX Junction units that contains Main PCB revision D or older (A, B, C).

The interconnection cables are screened, and the screen should be grounded in the autopilot junction unit.

Note !   *If the J3XX junction unit has 24V supply (Vbat), the RI35 Mk2 Limiter (part no. 22084990) must be connected to RF+ as shown in Figure 3-5.*
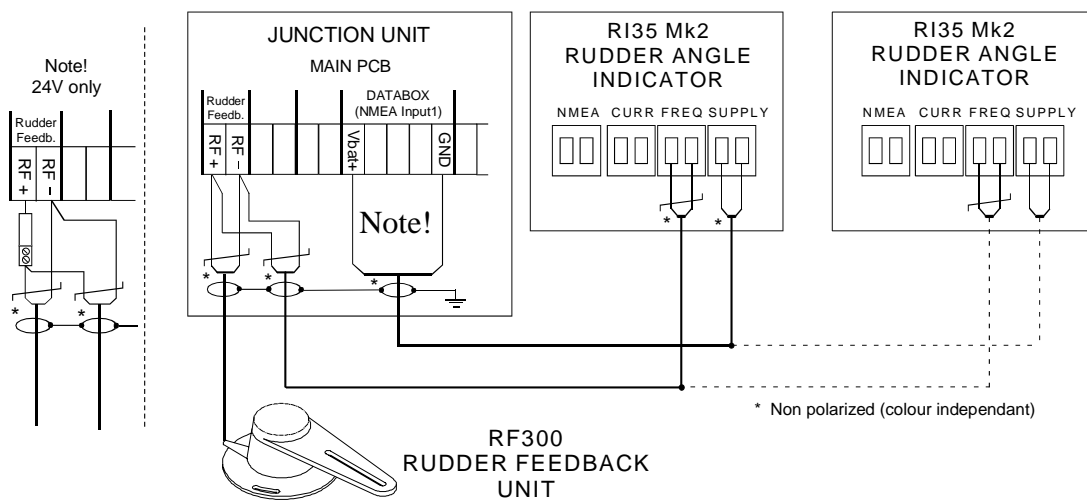
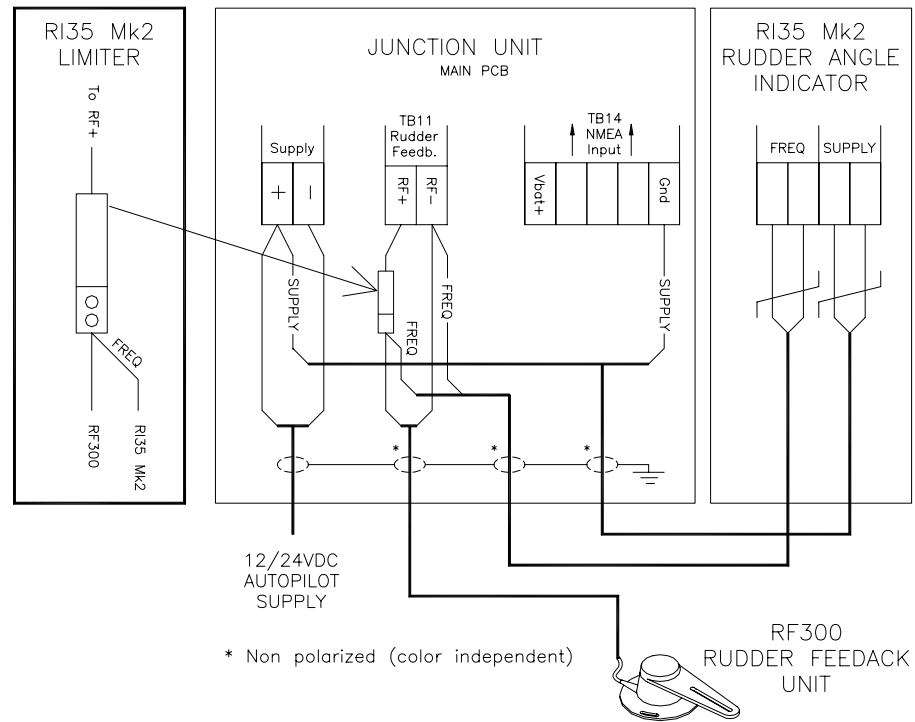**Figure 3-5 RI35 Mk2 - J3XX (old) Wiring diagram**

Figure 3-6 RI35 Mk2-J3XX (old), independent function of autopilot

Note !   *In order to use the indicator when the autopilot is switched off, the RI35 Mk2 Limiter must be connected as shown.*

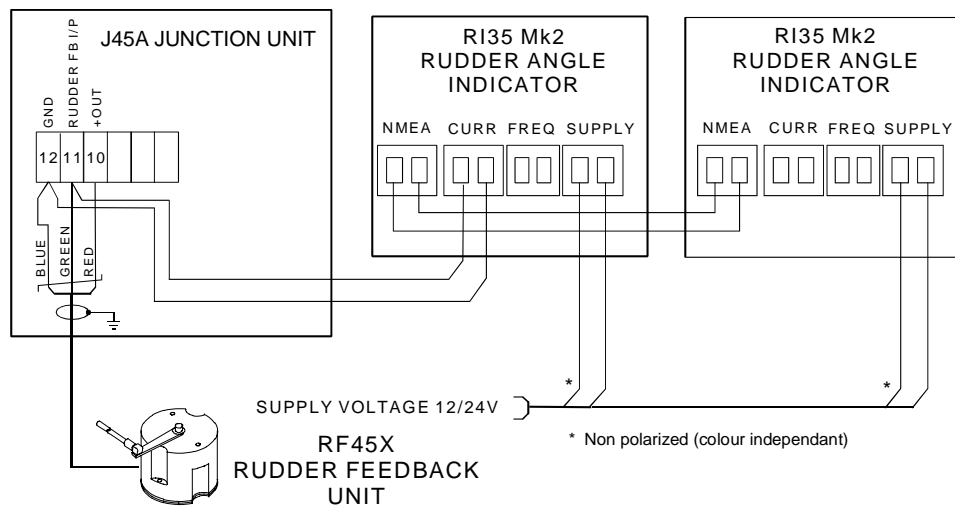## Connection to J45A/J45S Junction units

Figure 3-7 RI35 Mk2 - J45A Wiring diagram

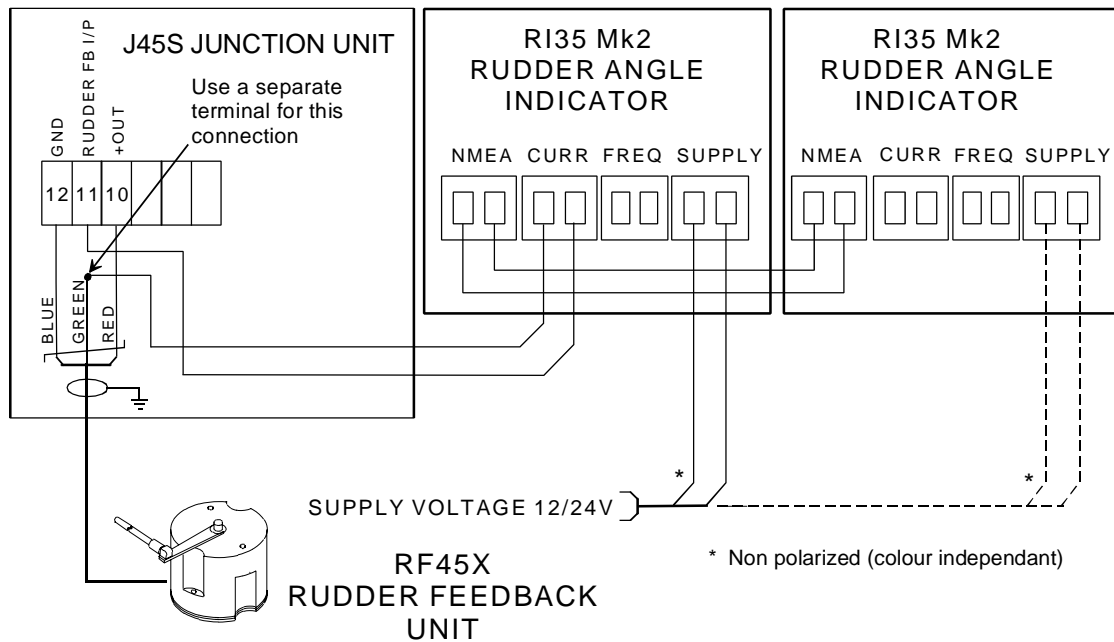Note !   *Autopilot supply and Indicator supply must have common GND.*

Figure 3-8 RI35 Mk2 - J45S Wiring diagram

Note !   *Autopilot supply and Indicator supply must have common GND.*

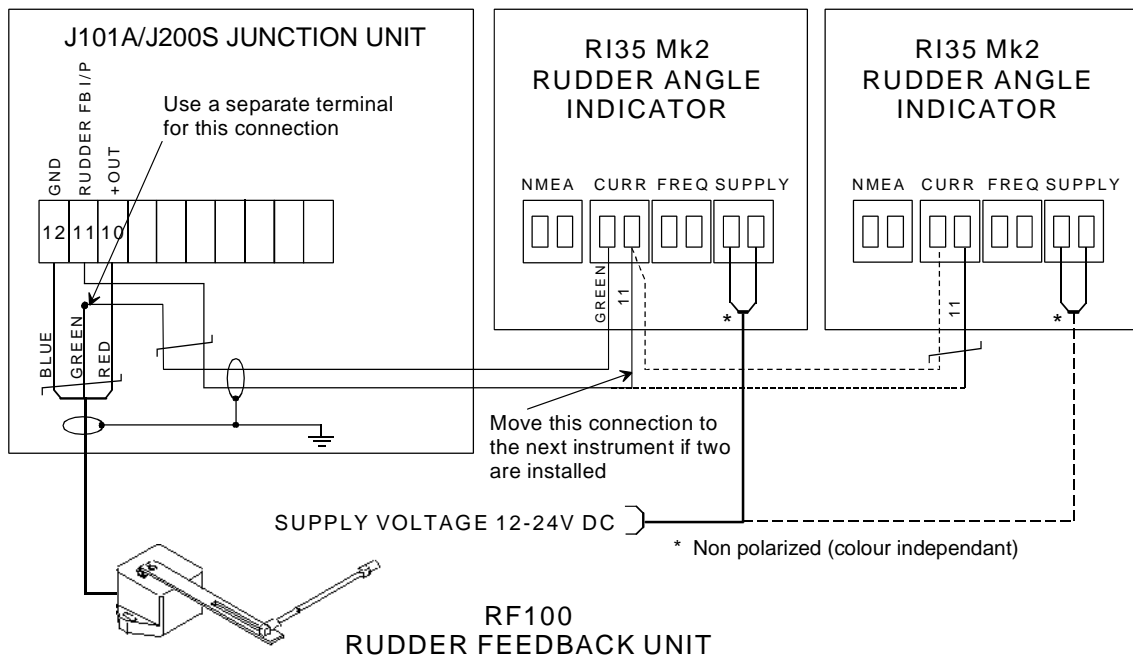## Connection to J101A/J200S Junction Units

Figure 3-9 RI35 Mk2 - J101A/J200S Wiring diagram

If more than two indicators are needed, use the NMEA port as per Figure 3-10.

Note !   *Autopilot supply and Indicator supply must have common GND.*

3.2 Use of NMEA

The NMEA port on the RI35 Mk2 is unidirectional, i.e. it is automatically configured for input (listening) or output (talking). The listener port is also non-polarized.

For best performance, if the RI35 Mk2 is to be used with a non-Simrad rudder feedback outputting NMEA data (RSA), 20Hz is recommended. Max. 5 indicators (1+4).
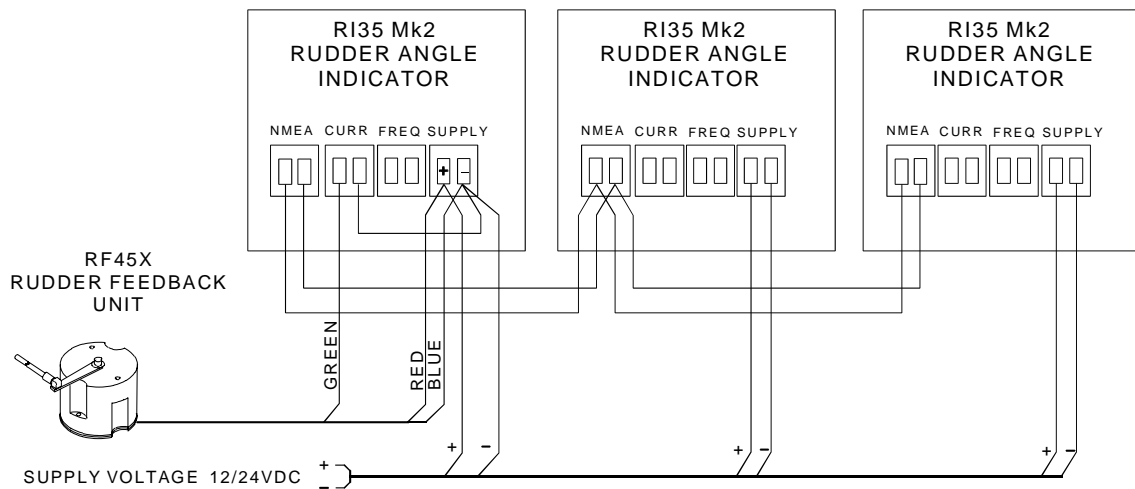

Figure 3-10 RI35 Mk2 – NMEA connection

3.3 Panel mounting

- Make a panel cut-out of 126 x 102 mm.

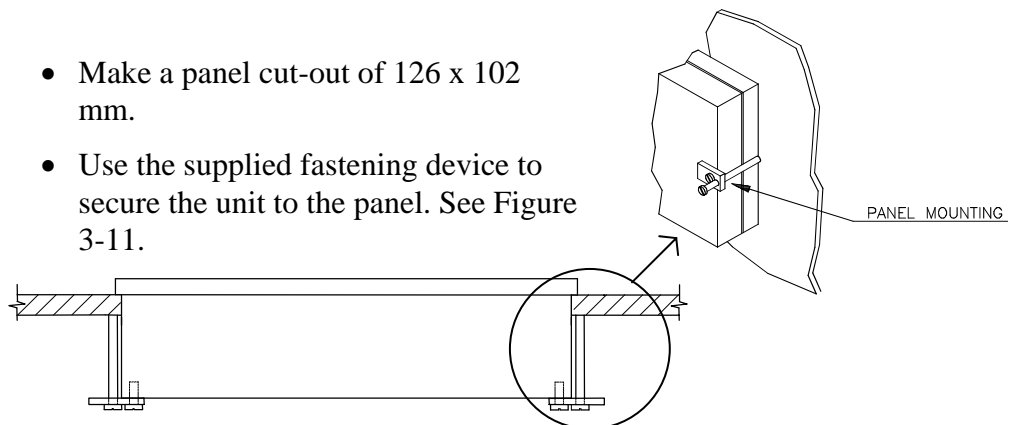- Use the supplied fastening device to secure the unit to the panel. See Figure 3-11.

Figure 3-11 RI35 Mk2 Panel mounting

3.4 Bracket mounting

- Mount two of the bracket halves to the RI35 Mk2.

- Temporarily bolt together the other two halves of the bracket to the first two halves.

- Hold the RI35 Mk2 in place by hand and mark the 4 holes for the fixing screws on the mounting surface.

- Remove the RI35 Mk2, drill the 4 mounting holes in the mounting surface.

- Unbolt the temporarily fitted bracket halves and secure them to the mounting surface using the self-tapping screws.

- Assemble the complete bracket again and adjust the RI35 Mk2 to best viewing angle and tighten up the mounting bracket bolts.
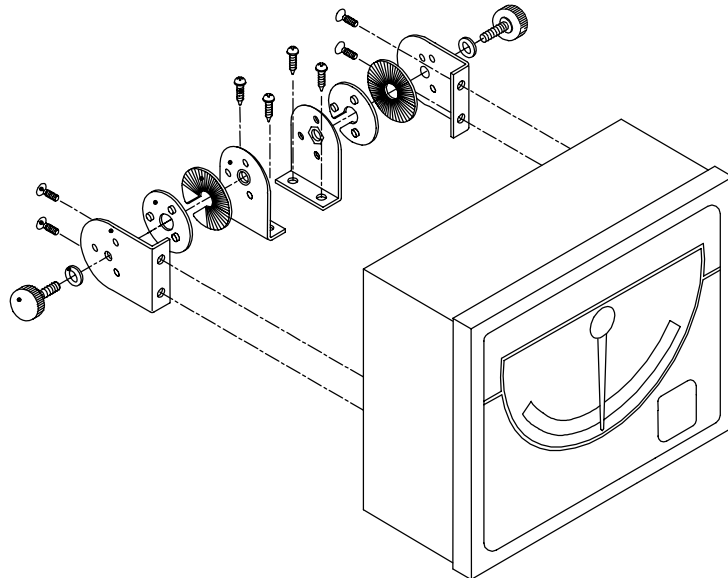
Figure 3-12 RI35 Mk2 Bracket mounting

3.5 Illumination

Internal LED's illuminates the scale. The illumination is turned on and adjusted in three steps by the front panel keypad.

3.6 Zero adjust

Note !   *Prior to making a zero adjustment on the indicator, make sure the feedback unit is installed and aligned according to it's mounting instruction.*

Autopilots with no rudder zero adjust

With the rudder amidships, the indicator should read zero. If not, adjust the pointer to zero reading by pressing and holding the illumination key for 5 (five) seconds. The pointer will now adjust itself to zero confirmed by a 1-second beep.

Autopilots with rudder zero adjust

Follow the instructions on the autopilot manual to zero adjust the rudder feedback.

Note !   *There may be a difference in the RI35 Mk2 and the autopilot reading. This is normal because the autopilot zero adjust compensates for drag caused by the hull, flaps etc. If you prefer the readings to be aligned, then put the rudder amidships using the RI35 Mk2 as reference, and then zero adjust the autopilot.*

Autopilots with "Rudder feedback calibration"

If the RI35 Mk2 has a different deflection compared to the readout on the autopilot (i.e. hard over stbd. shows 40° on the autopilot, but only 30° on RI35 Mk2) it is most probably caused by the "Feedback calibration" adjustment made in the autopilot.

To make them read the same; Make a new "Feedback calibration" and set the port and stbd h.o. angle to the same angle as RI35 Mk2 is showing.

Note !   *The RI35 Mk2 has been designed to be a "true" reading instrument, and therefore has no deflection adjustment.*

3.7 Reversed deflection

On installations where the rudder feedback unit is mounted upside down, the deflection of the pointer will be reversed. To make it correct, move the rudder to approximately 10° either way then press and hold the illumination key for 10 (ten) seconds. The pointer will then first travel to zero then continues to the opposite side of the scale confirmed by a 2-second beep.

Note !   *If you let go of key before conformation of reversed deflection has been given, the RI35 Mk2 will think you meant to do a zero adjust and leave the pointer at zero. Then simply repeat section 3.6.*

4. MAINTENANCE

Simrad rudder angle indicator equipment will need no special maintenance. It is, however, essential that the mechanical linkage Rudder stock - Rudder Feedback Unit is regularly checked and maintained in good condition to avoid misalignment.

5. TEST MODE

In the incident of an error, the RI35 Mk2 has a built in self-test mode for easier trouble finding. Holding down the illumination key during power-up accesses the automatic self-test. A short beep after the long start-up beep indicates that you have entered self-test mode successfully.

The self-test will now run the pointer to 45 deg port and 45 deg starboard, then 20 deg port, 20 deg starboard.
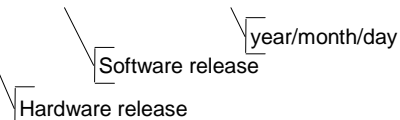
In 1-second intervals the self-test will set all 3-illumination levels.

When self-test is finished the RI35 Mk2 will run pointer to 0 deg and stay there until power is recycled.
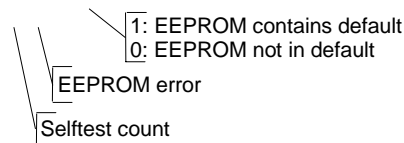
During self-test operation the NMEA port first transmits the message (PRTNV), and then after 200 ms the message (PRTNR) as per below. Each of the messages will be sent every 400 ms.

Note !   *With no signal input the pointer moves out of scale to port (after 5 seconds).*

$PRTNV,RI35MK2,HW:x,SW:x.xx,Date:xxxx/xx/xx*hh<cr><lf>

year/month/day

Software release

Hardware release

$PRTNR,xxx,xxx,x*hh<cr><lf>

1: EEPROM contains default
0: EEPROM not in default

EEPROM error

Selftest count

6. SPARE PARTS

Art. no.	Description
22084024	RI35 Mk2 Rudder Angle Indicator
22082929	Installation accessories
22083265	RI35 Cable
22083943	RI35 Mk2 Board assy (PCB)
22083968	RI35 Mk2 Front Panel
22084016	RI35 Mk2 Front Housing
22083992	RI35 Mk2 Back Cover
44164135	Blind plug
44140796	Cable gland
44141174	Seal (o-ring)
44140812	Screw, 3x7 mm
44148898	Screw, M4x12
22083307	Spacer
44163699	Plug-in terminal, 2 pole
44119154	Diode LED Green HLMP 1540
44138725	Dimmer Switch B3F
22084990	RI35 Mk2 Limiter (for 24VDC and separate supply with old J3XX junction unit)