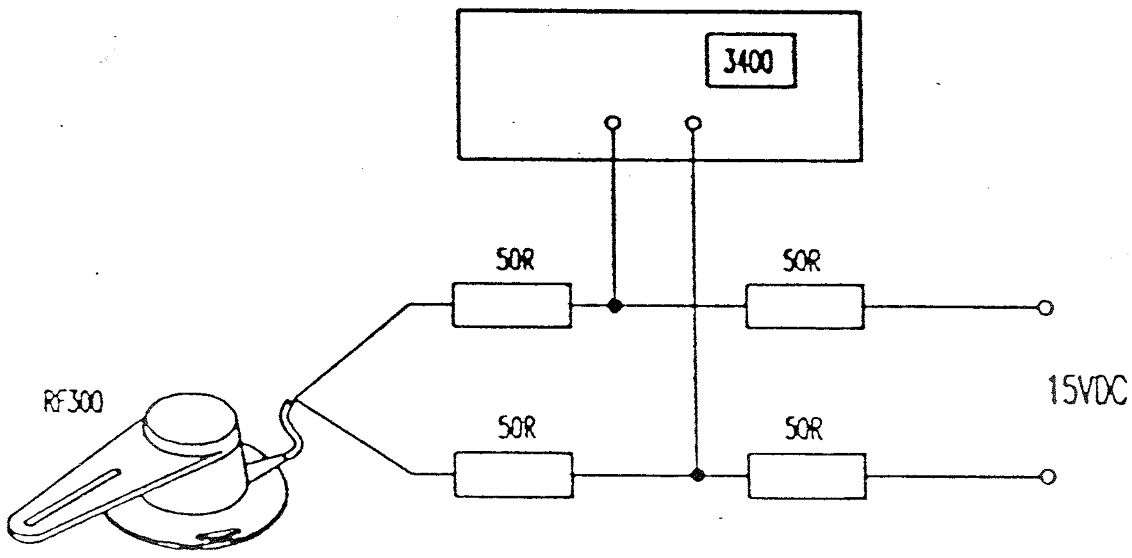
Sympthom

– Rudder Feedback failure

How to check a RF300 outside an autopilot system:

– Connect the suspected RF300 to a 15V power supply through a resistor network as shown below

– Hook up an oscilloscope or a frequency counter as shown. A working RF will give 3400Hz (square wave) in center position, changing ±20Hz per degree of movement.



Sympthom

- Compass failure

How to check a RFC35 outside an autopilot system:

- Hook up the RFC35 same way as for the RF300 check.
- The output is a pulse with modulated signal (square wave). It might be difficult to get a stable readout, but the frequency will be around 70Hz when duty cycle is 50%. Measuring with a "Fluke" will show 0,3 - 0,5 VAC.

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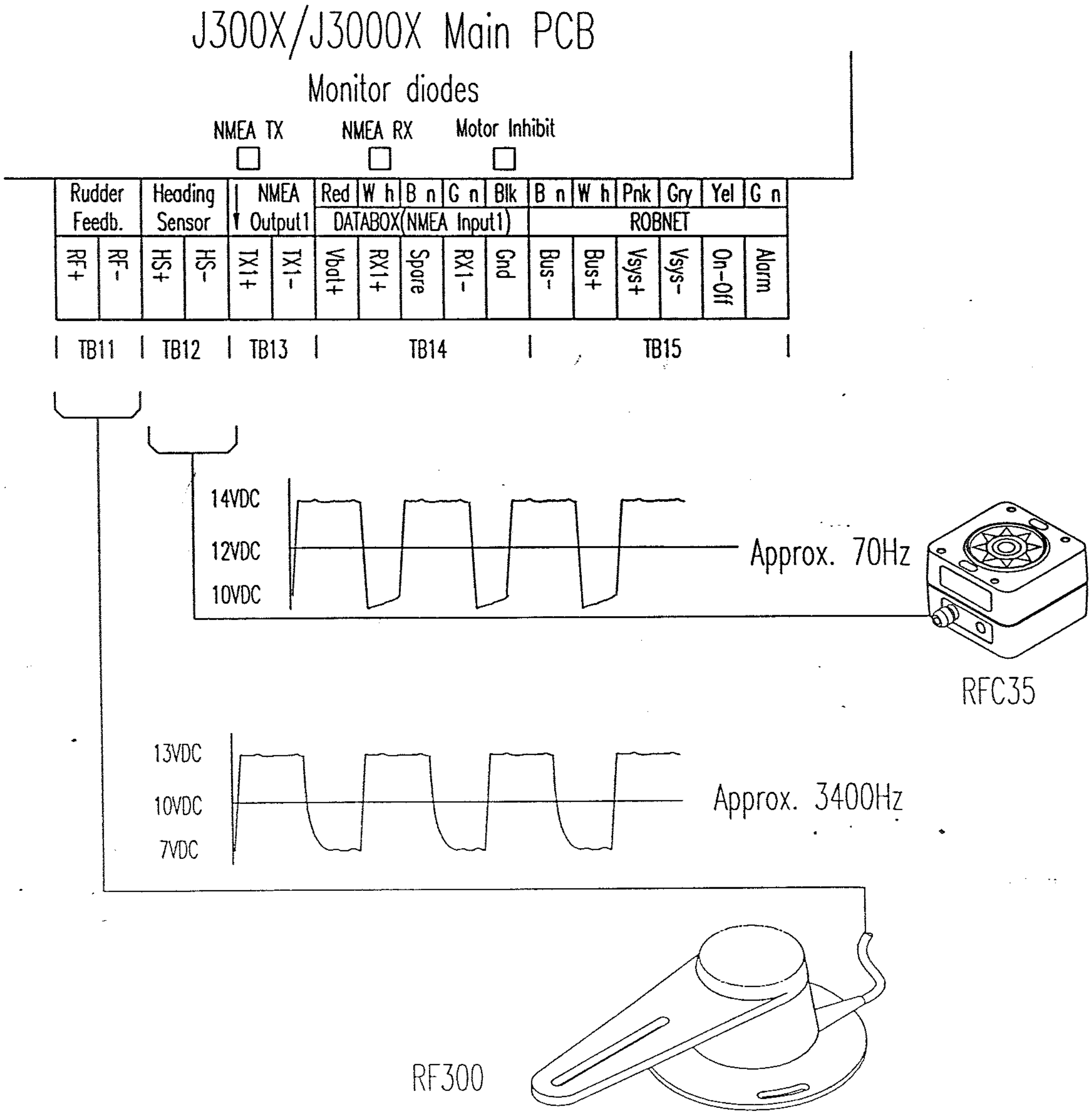
TROUBLE SHOOTING



RFC300:

This electronic compass is based on an oil damped gimbals. The signals from the coil are amplified and filtered before they are sampled by the AD converter and fed to the microprocessor. The microprocessor controls the various functions such as; the generation of the excitation signal, automatic gain control, calibration calculation, storage of the calibration parameters in EEPROM, computing of the magnetic heading and Robnet communication of heading information. The heading transmission from the RFC300 to the Bus can be accessed by other units. (I.E. a control unit can switch on or off the RFC300 heading message transmission according to the compass selection in the "User Setup" loop.)

RFC35:

The RFC35 is built around a core / coil which is smaller and has the coil fixed to a plastic housing containing a core-ring floating in oil to keep the sensing element horizontal as the vessel heels. The excitation signal is generated by a multistable vibrator and a counter circuit controls the demodulation of the return signals from the secondary windings. The output is a voltage signal which is converted to a pulse width where the high period represents the alongship magnetism and the low period the athwardship portion. In order to transmit this raw signal to the user, the pulse width signal is used to control the current flow in the supply for the compass. The supply line is rectified in a bridge rectifier to make the connection polarity independent. In the user end there is a current detector which translates the pulse signal into a digital signal which can be read by a microprocessor with the ability of measuring the pulse width.

The calibration function and the storage of the calibration is stored in the Junction box. The RFC35 is only a heading sensor that measures the magnetic field. It does not perform any calculation of heading or calibration. The advantages of using a pulse width signal is high resolution, simple connection to the user and higher noise immunity.

- The sensor in the RFC35, (and the RFC300) is composed of a ferrite based material with 2 windings 180 degrees apart. An AC voltage is fed into this module which results in a voltage being induced into these two coils. The output is a 5 volt pulsed square wave which varies in frequency based on the heading.

- The calibration of the RFC35 as well as any "compass offset value", if entered, is stored in the junction box.

On **all** installations the compass circle test should be performed before a compass is mounted. This procedure involves using a small hand held magnetic compass to explore the proposed mounting location. Before performing this test it is advisable to turn on all equipment that might be running while the pilot is operating. A motor may be hiding behind a bulkhead which may cause you difficulty later. Slowly move the compass in a horizontal circle of 1 foot radius around the desired mounting location. Be sure that the lubber line is parallel to the midship line, and observe any deviation from the original reading. Not more than a 3 degree deflection is acceptable. Repeat this procedure, but in an arc perpendicular to the original, checking the area above , and if possible below the mounting location. Little of no deflection should be observed.

Compass calibration accuracy problems can be caused by:

- Mounting the compass in an improper location. Keep it away from electrical, ferrous and electronic influences, remember that halfing the distance to an influencing object results in 4X's the effect.
- Remember DC voltages can cause large changes in a magnetic field. All pairs of electrical wires in the vicinity of the compass installation should be twisted together to minimize magnetic interference.
- Too fast a calibration - recommend about 6 degrees per second.
- Turn the vessel by using the rudder. Do not just spin the vessel upon itself by using the engines.
- Pick as calm a day as possible - excessive fluctuations caused by rough conditions will degrade the calibration.
- Confusion: Do not compare the calibrated autopilot compass to a reference which has not been compensated by a competent compass adjuster.

ROBNET:

- There have now been three versions of the Robnet Protocol.

V1.0 Original AP300 system
V2.0 Dataline system
V3.0 New AP3X systems

- This communication system is based on RS485. This is two way high speed communication, that is relatively insensitive to noise. Electrically it is the same as RS422 except it is two way communication. The Baud rate on this system is 38.4K. This system uses 9 bits. First a synchronizing pulse is sent out. This is followed by an identifying pulse.
- The voltage that the Robnet information travels upon is dependent upon the input voltage. With 32V In, the Robnet voltage is 40V.
  With 12 or 24 V In, the Robnet voltage is 26V.

Problems;

- Repeating the installation loop will solve most problems caused by incorrect setup and configuration.
- If a major fault develops, and repeating the Dockside settings does not solve it, try performing a ."Master Reset", and then re-initializing the pilot. (I.E. performing the installation loop again). **First** write down any parameters that you might wish to retain, such as NMEA setup and Parameter values, if they are other than stock and have previously steered the vessel well.
- A "Master Reset" should be performed whenever the J Box is replaced.
- Major system faults, once displayed on the control head can be silenced (the audible portion) by pushing any button. The visual portion though will continue to flash regularly until the system is turned off and then back on again.
- If "Clutch / Bypass Disengaged" or "Clutch Overload Alarm" is displayed, the pilot will stop giving rudder commands. Turning the unit off, and then on again will reset the alarm and eliminate the situation if it was caused by a spike of some type.

Notes:

- Only the **active control unit** in a system is sending status messages to the control head., therefore if you disconnect an active control head from a system you will get a "Communication Failure". Disconnecting an inactive head will not give this failure.