



*Thank you for choosing the R4 AIS Transponder System! This quick installation guide serves as a complement to the standard manuals found on the documentation CD. It is designed to give immediate access to essential information when executing an installation and a functionality test.*

***Installation of the R4 AIS System should always be carefully planned and executed by skilled personnel.***

*Please visit our website for the latest news regarding this and our other shipborne products. Our website contains contact information to our dealers and service stations worldwide and much more.*

*For the complete manual set please see the included documentation CD.*

Saab TransponderTech AB  
[www.saabgroup.com/transpondertech](http://www.saabgroup.com/transpondertech)

## RECOMMENDED PHYSICAL LOCATION

The Display unit should be available to the navigator at the position from which the ship is normally operated.

The Transponder unit should be installed as close as possible to its GPS and VHF antenna to minimize cable loss, preferably with the LEDs visible.

Temperature and humidity should be moderate and stable. Avoid areas with high flow of humid salt air, high levels of vibrations and shocks or high temperatures.

The display and transponder is interconnected through 4 double twisted pairs. (Transponder <> Display + Transponder <> Display integrated Pilot Plug). Signal cables may be extended should the standard 2 meter not be enough. Consult TransponderTech before altering any standard configurations (i.e. signal cable lengths).

## VHF ANTENNA INSTALLATION

VHF radio frequencies propagation characteristics are close to line of sight. Installation will affect the transmitting and receiving capabilities. General recommendations for antenna placement to minimize the risk for interference and decreased range:

- Coaxial down-leads should be used with shielding screen connected to ground at one end.
- The VHF cable should not be installed close to high-power lines, such as radar or radio-transmitter lines, and at least 10 cm away from any power supply cables.
- The antenna should be mounted above or below other transmitter antennas with no horizontal separation and with a minimum of two meters vertical separation. If it is located on the same level as other antennas, the distance apart should be at least 10 meters.
- The antenna should be installed at least 3 meters away from interfering high-power energy sources, out of the way of the transmitting beam.
- The antenna should be placed in an elevated position, as free standing as possible, with a visible sky of 360° and minimum of 2



meters in horizontal direction from objects made of conductive materials.

## GPS ANTENNA INSTALLATION

The GPS antenna and its receiving capabilities is a crucial part of the system. The internal GPS is used for backup positioning but more important providing time to synchronize on the AIS VHF-link. Follow these recommendations:

- ▶ Coaxial down-leads should be used with shielding screen connected to ground at one end.
- ▶ For optimum performance antenna LNA gain minus cable attenuation shall result in 10dB gain (0 to +26dB).
- ▶ The GPS antenna should have free horizontal observation 360° and vertical observation of 5° to 90°.
- ▶ Install GPS antenna at least 3 meters away from any transmitter antenna or its beam.

## ALARM RELAY

It is required that the AIS alarm output (relay) is connected to an audible alarm device or the ship's alarm system, if available. Alternatively, the ship's BIIT alarm system may use the alarm messages output on the AIS Presentation Interface (PI) provided the alarm system is AIS compatible. Alarm relay is standard in the J4 Junction box (optional).

## PILOT PLUG

The pilot plug, for connecting the Personal Pilot Unit (PPU), is located on the front of the R4 Display and is connected to the transponder by a dedicated serial line. The installer may choose to also install a separate pilot plug. This pilot plug should be connected in parallel with the R4 Display pilot plug.

## SYSTEM POWER UP

The R4 Transponder will start to operate when power is applied, it does not have a power switch. The R4 Display is turned on by pressing the *POWER* key, after applying power.

## SYSTEM CONFIGURATION

The installer is required to set the following parameters during installation of an AIS Class A system:

- MMSI number (Maritime Mobile Service Identity)
- IMO vessel number
- Call Sign (Radio Call Sign)
- Ship Name
- Height Over Keel
- Type of ship
- GPS antenna position(s) / Ship dimensions

*Note: System default passwords are "user" and "admin"*

## SET SHIP DIMENSIONS

Note that the ship dimensions are derived from the GNSS antenna parameters. Dimensions are referenced to the position of the GPS antenna.

25° 56.0415' N			AIS
116° 44.1938' E			11:14 UTC
<b>GNSS Antenna, Internal GNSS</b>			
A	<input type="text" value="12"/>	m	
B	<input type="text" value="2"/>	m	
C	<input type="text" value="4"/>	m	
D	<input type="text" value="3"/>	m	
Apply and Exit	Internal GNSS	External GNSS	



## SYSTEM FUNCTIONAL TEST

Before performing transmitting and receiving tests using other AIS transponders it is recommended to check the following.

### TRANSPONDER STATUS LED's

The LED's are located on the front of the R4 Transponder. The green LED indicates that power is applied to the R4 transponder. A flashing yellow LED indicates that the R4 Transponder is receiving data. A flashing red LED indicates that the R4 Transponder is transmitting on the radio link (transmission starts approximately 1 minute after power on).

### ALARM LIST

The Alarm List in the display shows the currently active alarms. Active alarms are gathered in the top of the list and are marked with exclamation mark (!). If external sensors are excluded in this installation some alarms will be active. In a typical Class A installation there should be no active alarms. It is configurable what ways alarms should be displayed/output.

### OWN SHIP DATA

When the R4 transponder transmits data on the AIS-link it simultaneously outputs this data on the serial ports. This information is displayed on the Own Ship Data page in the display.

### TIME AND DATE

The Date and Time (UTC) in the upper right corner of the R4 Display is initialized by the R4 transponder internal GPS. If this information is incorrect after rebooting the display, the transponder internal GPS does not have a position fix. This will also be indicated by message "UTC clock lost" in the Status List page. The transponder internal GPS is primary source for synchronization on the AIS VHF data link and should have a position fix at all times. Verify GPS performance using the R4 Display Transponder GPS Status dialog found under:

*Config* → *System Info* → *Transpon. GPS*.

#### Physical

Transponder  
Size W x H x D: 144x85x226 (mm)  
Display  
Size W x H x D: 270x207x102 (mm)

#### Power

Input 24 V DC (21-32 V DC)  
Power Consumption  
Transponder 16 W (55 W peak)  
Display 8.4 W

#### GPS Receiver (AIS internal)

Receiver: 16 CH (Ready for DGPS)  
Frequency: L1 (1575.42 MHz)  
Update Rate: 1 Hz  
Position accuracy (SA off)  
Position <2.0 m DGPS (CEP)  
Position <2.5 m GPS (CEP)  
Antenna feeding: 5 VDC

#### Electrical Interfaces

8 data ports RS422

Port	Default speed (bps)
Pilot In/Out	38400
ECDIS In/Out	38400
LR In/Out	9600
Sensor 1 In	4800
Sensor 2 In	4800
Sensor 3 In	4800
Aux In	9600
Display In/Out	57600

Transponder data port: 50 pin D-sub (M)  
Transponder power: 9 pin D-sub (M)  
GPS 50 ohm antenna connector TNC female  
VHF 50 ohm antenna connector BNC female  
Display data port: 18 pole Conxall Maxi-Con-X  
Display power: 3-pole Mini-Con-X  
Power and data interfaces to be connected on rail terminals or in junction box

#### Cables (recommended)

VHF and GPS	RG214/U
Sensors e.g. Gyro	RFE-HF1 2x2x0.75 mm <sup>2</sup>
Transponder to MKD	RFE-HF1 4x2x0.75 mm <sup>2</sup>
Power cable MKD and Transponder	LKM-HF 3x2.5 mm <sup>2</sup>

#### VHF Transceiver

Frequency 156-163 MHz  
Output power 1/12.5 W  
Channel bandwidth 25/12.5 kHz  
Channel step 12,5 kHz  
Bit Rate 9600 bps  
Intervals between position reports 1-180 s  
Modulation FM-GMSK/GFSK  
Transmitter 1  
Receivers 3  
DSP Based Transceiver Sensitivity <-107 dBm

#### Environmental data

Protected environment (IEC 60945)  
Operating temperature -15 °C to 55 °C

#### Compass safe distance

*Transponder*  
15 cm to standard magnetic compass  
9 cm to steering magnetic compass  
*Display*  
53 cm to standard magnetic compass  
28 cm to steering magnetic compass

#### The R4 AIS Class A System is compliant with the following Standards

IMO Performance Standard for AIS (MSC 74(69) Annex 3)  
ITU-R M. 1371-3  
ITU-R M. 825-3  
ITU-R M. 1084-3  
IEC 61993-2 Edition 1  
IEC 61162-1/2 Edition 2 (NMEA 0183, Version 3.0)  
IEC 61108-1 Edition 2  
IEC 60945 Edition 4  
IEC 62288 Edition 1  
IALA Guidelines on AIS

Specifications subject to change without notice



**SAAB**

# R4 AIS Installation Quick Reference Guide

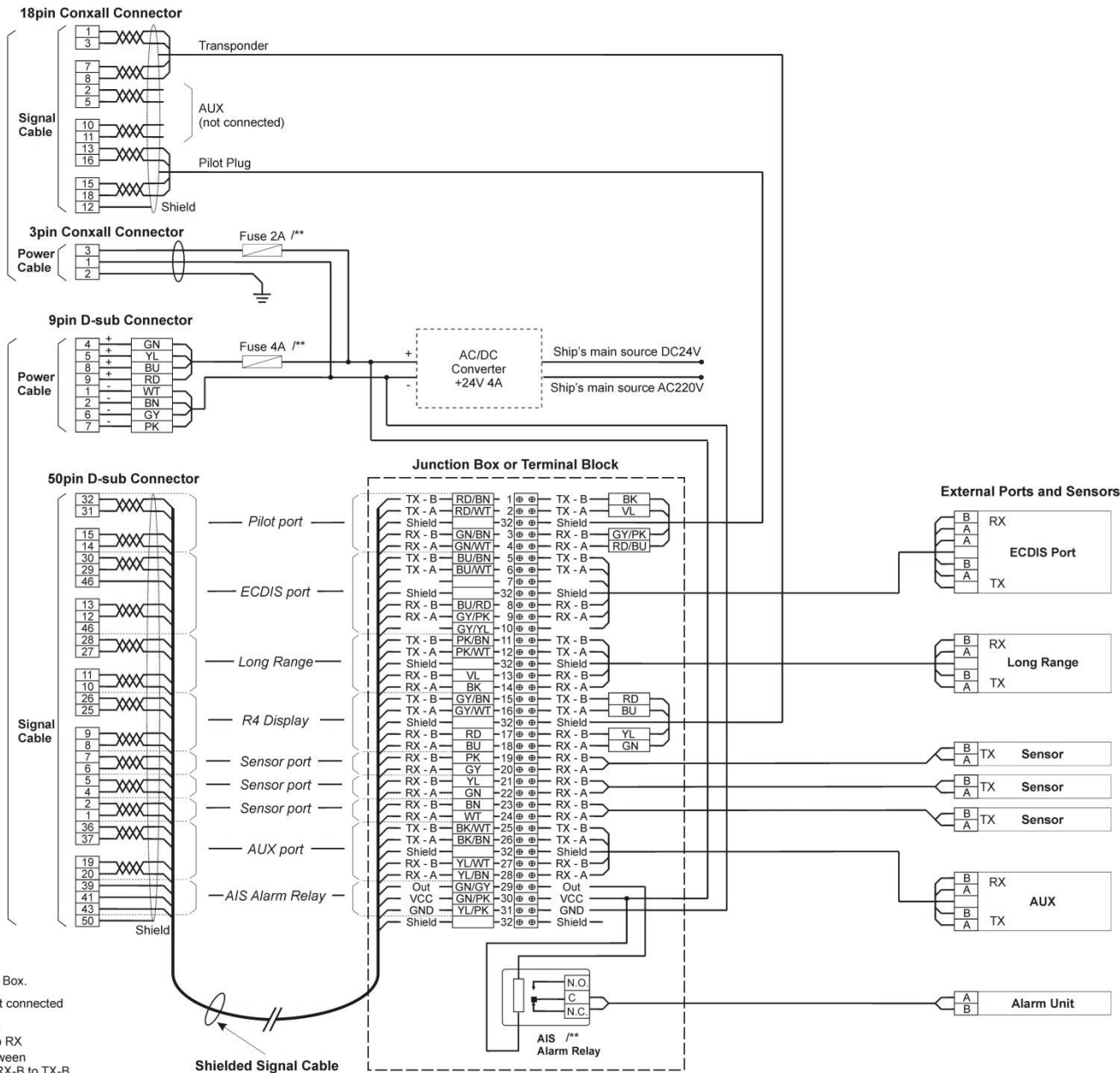
**7000 100-400 A3**



R4 Display



R4 Transponder



Note: /\* Terminal Block  
 Note: /\*\* item is optional Junction Box  
 Note: /\*\*\* K2 Terminal block no. in Junction Box.  
 Note: Pos 25 and 26 in Junction Box are not connected  
 Note: Pilot Port Straight connection between Transponder and Display TX to TX and RX to RX  
 Note: for R4-Display crossed connection between Transponder and Display RX-A to TX-A and RX-B to TX-B

Colour codes as per DIN 47100

White	WT
Brown	BN
Green	GN
Yellow	YL
Grey	GY
Pink	PK
Blue	BU
Red	RD
Black	BK
Violet	VL