

Guidelines on the Installation of the Inland Automatic Identification System (Inland AIS)

This document is meant as a guide for authorised firms¹, installing Inland AIS stations on board of inland vessels. Its purpose is to guide the installation, configuration and testing of the equipment to ensure a correct setup.

This document is meant to be used in addition to the installation manuals of the manufacturer providing the Inland AIS station.

The following actions have to be taken during installation:

- Install the Inland AIS station on board, according to the installation manual provided by the manufacturer,
- Configure the Inland AIS station as per the installation manual,
- Carry out testing of the Inland AIS station for correct operation and settings,
- Document all settings in the “Report about installation and operation of the Inland AIS station”,
- Train the skipper in editing the static and voyage related data as appropriate and how to handle alarm messages of the Inland AIS station,
- Hand over the “Report about installation and operation of the Inland AIS station” to the skipper / ship owner to keep it on board and to the installation firm for its records.

The relevant local regulations must be followed regarding documents to be kept on board and to be submitted to the national competent authority (e.g. CCNR-report about installation and operation of the Inland AIS station).

¹ The specialised firms, which are approved by the CCNR, are listed in Attachment N, Part 4, of the Rhine Vessel Inspection Regulation (RVIR) and published on the homepage of the CCNR (www.ccr-zkr.org).

Part I: Recommendation for the installation of an Inland AIS station on board of inland vessels

1. General

This recommendation is meant to be used in addition to the installation manuals of the manufacturer providing the Inland AIS station.

Possibly, additional requirements from local regulations have to be taken into consideration.

2. Installation of the Inland AIS station

The Inland AIS station has to be installed in such a way that it does not disturb the performance of other navigation devices like radar and VHF, and other navigation devices do not disturb the correct operation of the AIS.

The coaxial cable between the Inland AIS transponder and the AIS VHF antenna should be as short as possible to prevent coupling with other cables and to get optimal reception.

3. Installation of the MKD (Minimum Keyboard and Display)

The functionality of an internal or external MKD should be accessible to the skipper. Alarm and status information of the Inland AIS station shall be in direct view of the skipper, but other devices used for navigational purposes may have a higher preference for direct view.

Any indicating lights must stay visible after installation of the equipment.

4. Antenna installation

The use of certified antennas, type approved with the Inland AIS station, are mandatory.

Antennas not included in the type approval need a declaration of conformity to the type approval certificate, delivered by the manufacturer of the type approved Inland AIS station.

4.1 AIS VHF Antenna

The AIS VHF antenna should be installed in such a way that the potential interference with other high-power energy sources, such as radar and other VHF antennas, is as low as technically and physically possible. The VHF antenna should be placed in a vertical position, but it must be possible to lower the antenna temporarily for passing bridges and other objects with a reduced height.

Interferences to the ship's VHF radiotelephone shall be avoided; attention should be paid to the location and installation of the various antennas, in order to support the antenna characteristics in the best possible way.

The AIS VHF antenna must have an omni-directional characteristic and a vertical polarisation. Special attention should be paid to the installation on a movable antenna mast.

The AIS VHF antenna should be placed in an elevated position, as free standing as possible, with maximum horizontal distance from objects made of conductive materials. The antenna should not be installed close to any large vertical obstruction. The AIS VHF antenna should have a visible horizon of 360°.

The AIS VHF antenna should be installed with maximum horizontal distance from interfering high-power energy sources, such as radar, and if possible out of the way of their transmitting beam.

The distance between the Inland AIS VHF antenna and other VHF antennas, e.g. for VHF voice communication, shall be as large as possible to avoid interference between the antennas.

4.2 GNSS Antennas

An Inland AIS station shall be connected to a GNSS antenna, even if the Inland AIS station is connected with an external GNSS position device.

The GNSS antennas must be installed where they have a clear view to the sky, so that they access the horizon freely over 360°, with a vertical observation of 5° to 90° above the horizon.

The antennas should be installed with maximum horizontal distance from high-power transmitters (e.g. Radar), and out of their transmitting beam.

If a DGNSS system is included or connected to the AIS system, it should be in accordance with IEC 61108-4.

4.3 Antenna cabling

The recommendation of the manufacturer should be considered and appropriate cable types shall be used for the VHF antenna and the GNSS antenna working under the environmental conditions of inland navigation.

The coaxial cables between the antennas and the Inland AIS station should be routed directly in order to minimize attenuation of the signal and to reduce electromagnetic interference. Coaxial cables should be installed in separate signal cable channels/tubes preferably, and if possible not less than 10 cm away from any power supply cables. Crossing of cables should take place at right angles (90°). The cable should not be installed close to high-power lines, such as radar or radio-transmitter lines. Coaxial down-leads should be used for VHF antennas, and the coaxial screen should be connected to the ground at one end.

All outdoor connectors on the coaxial cables should be fitted with preventive isolation, such as shrink-tubing/stocking with silicone to protect the antenna cable against water penetration.

4.4 Combined VHF antenna

A combined use of the VHF antenna and cabling for both VHF radio and Inland AIS is not allowed.

4.5 Combined VHF/GNSS antenna

A combined VHF/GNSS antenna for Inland AIS is allowed. The combined use of the cabling for AIS VHF and GNSS is allowed.

5. Additional requirements for the installation of Inland AIS stations on ADN tank vessels

For ADN tank vessels additional requirements apply.

According to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) no part of an aerial for electronic apparatus, no lightning conductor and no wire cable must be situated above the cargo area and no part of a VHF antenna for Inland AIS stations must be situated within 2 m from the cargo area.

6. Connection of blue sign

Blue sign information has to correspond to the real state of the blue sign on the ship. The status of the blue sign may only be sent if the connection to such a device ensures that the real state can be determined at all times. It is recommended to use the feedback signal from blue sign.

The status "not available" must be sent if the blue sign is not connected to the Inland AIS station.

7. Connection to Inland ECDIS

It is recommended to connect the Inland AIS station to an Inland ECDIS to use the Inland AIS derived information for on board navigation support.

8. Connection of external sensors (Position, Heading, Rate of Turn)

The Inland AIS station has interfaces (configurable as IEC 61162-1 or 61162-2) for position, speed over ground (SOG), heading and rate of turn (ROT) sensors.

Only type approved sensors should be connected to the Inland AIS station. In the absence of suitable inland navigation standards the external sensors connected to the Inland AIS station have to be type approved in accordance to the following appropriate maritime standards:

Sensor	Minimum performance standard (IMO)	ISO/IEC standard
GPS	MSC 112(73)	IEC 61108-1
DGPS/DGLONASS	MSC 114(73)	IEC 61108-4
Galileo	MSC 233(82)	IEC 61108-3
Heading/GPS Compass	MSC 116(73)	ISO 22090-3 Part 3 "GNSS-Principles"

9. Power supply

Inland AIS stations must be permanently supplied with electric power via a fail-safe electric circuit with a separate fuse, and connect directly to this power supply.

It should be connected to the vessel's battery buffered main power source. A new battery capacity calculation may be required.

The stability of the power supply has to be considered. Appropriate measures have to be taken if needed for the correct operation of the Inland AIS station.

The Inland AIS station should stay connected to the power supply even in case of a central switch-off (red button). So the operation of the station can be ensured for example in case of loading and discharging of cargo, when some electronic devices have to be switched off.

10. Configuration of the Inland AIS station

The minimum mandatory data set transmitted by the Inland AIS station is subject to national regulations or international agreements.

Data transferred by Inland AIS must be valid and correct. Some data have to be maintained manually and should be kept up to date, e.g. the navigational status information of the ship.

During installation of the Inland AIS station the data of the vessel have to be entered properly. This includes the password protected static data like MMSI, unique European vessel identification number (ENI), name of the vessel. These data must not be changed by the user.

User changeable semi static data like length and beam, which may change at a convoy, and voyage related data like navigational status, ship's draught, must be kept up to date.

10.1 Missing unique European vessel identification number

In case the ship has not yet been assigned a unique European Vessel identification Number (ENI) the official ship number with a leading "0" to supplement the official ship number, so it consists of 8 characters, should be used.

10.2 Special aspects

Special attention should be taken while configuring following data due to the fact that those data appear on both places, in the inland specific data set as well as in the common maritime/inland data set. The correct conversion between both data sets has to be checked or has to be undertaken manually.

10.2.1 Length and beam of a convoy or a ship

The data overall length and beam of the convoy or of a single vessel have to match with the length and beam derived from the reference point of the GNSS antenna (A, B, C, D values). When converting from decimeter (dm) to meter (m), the values should always be rounded upwards.

Both settings – length / beam and reference point of GNSS antenna – have to be amended by the skipper at any change of the convoy. Some Inland AIS stations provide a mismatch warning in case both settings don't match.

10.2.2 Type of convoy / type of ship

The type of convoy / type of ship value shall be set according Annex E: "ERI Ship Types" of the Vessel Tracking and Tracing Standard. (This annex is for information purposes attached to this guideline.) The conversion from the ERI ship type - in the annex also referred to as UN ship type - to the IMO ship type is also provided in this annex.

Some Inland AIS stations convert automatically from ERI ship type to IMO ship type when ERI ship type is entered.

Both settings – ERI ship type and IMO ship type – have to be amended by the skipper at any change of the convoy.

10.2.3 Ship's draught

The maximum present static draught of the convoy or the ship is provided as decimeter value (dm) for the common maritime / inland setting and as centimeter value (cm) for the specific inland setting.

Converting from centimeter (cm) to decimeter (dm) the value should always be rounded upwards.

Some Inland AIS stations convert the draught automatically from centimeter value to decimeter value when centimeter value is entered.

Both settings – draught in dm and draught in cm - have to be amended by the skipper at any change of the present static draught of the convoy or the ship.

11. Quality of sensor input

The parameter quality of sensor input shall be set to "low" as default value.

The parameter "Quality of speed information", "Quality of course information" or "Quality of heading information" shall be set to "high" only if the externally connected speed log, course sensor or heading sensor are type approved.

12. Testing of the Inland AIS station

After completion of the installation and configuration of the Inland AIS station a functional test has to be performed to ensure correct operation and settings.

12.1 Test of received data

Data received from another Inland AIS station should be checked either using the MKD or, if available, by visualisation in the Inland ECDIS equipment on board.

12.2 Test of transmitted data

For this purpose the transmission of the installed Inland AIS station has to be observed and controlled with another Inland AIS transponder, either on board of another vessel or by a portable device. Port authorities may offer a verification service of the transmitted data.

The following items must be verified:

- Principal reception of the AIS information,
- Transmission of correct geo-referenced position,
- Transmission of correct vessel identity (MMSI, call sign, name of ship, ENI),
- Transmission of correct ship dimensions, reference point of GNSS antenna and ERI ship type,
- Transmission of correct static data,
- Transmission of correct dynamic data.

Part II: Report about installation and operation of the Inland AIS station

Report about Installation and Operation of the Inland AIS station	
NAME OF THE SHIP:	
Unique European Ship Number (ENI)	
or Official Ship Number (OFS)	
Maritime Mobile Service Identity (MMSI)	
Type of ship	
Ship Owner	
Contact person	
Address	
Phone	
Fax	
Email	

Inland AIS Station	
Type	
Manufacturer	
Certificate Number	

Certified Installation Company	
Name	
Address	
Phone	
Fax	
Email	

Inland AIS station configuration			
Static data			
Manufacturer		Serial number	
Software Version		MMSI	
Ship Name		Call Sign / ATIS name	
ENI		IMO No (if applicable)	
Quality of sensor input	Speed: high low	Course: high low	Heading: high low
Semi static data (static for single vessel, semi static for convoy)			
Internal GNSS antenna position [m] considering overall dimension	A: B: C: D:		
External GNSS antenna position [m] considering overall dimension	A: B: C: D:		
Length Convoy [dm]		Beam Convoy [dm]	
ERI Ship Type		IMO Ship type (converted)	
Voyage related data			
Navigational Status			
Loaded / Unloaded		No. of Blue Cones	
Inland AIS Draught cm		IMO Draught in dm	
Destination		ETA at destination	
Persons on Board	Crew:	Support:	Passengers:
<i>The user has been informed on how to enter and maintain the above configured semi static and voyage related data as well as other optional information supported by the Inland AIS station.</i>			

Sensor Configuration			
Sensor connected	Type of connected Equipment	Used NMEA Talker/Sentences	Update rate of the information
Sensor e.g. heading CH1			
Sensor CH2			
Sensor CH3			
ECDIS CH4			
Pilot Port CH5			
Long Range CH8			
DGNSS CH9			
Alarm relay CH10			
Blue Sign connection			

Inland AIS station installation	
Please list which peripheral equipment is connected – state equipment manufacturer and type specification:	
Power Supply of the Inland AIS station	
Estimated Cable length to GNSS antenna in m	
Estimated Cable length to VHF antenna in m	
Please describe antenna position for VHF and GNSS (internal, external) below or add an antenna layout to this document. (preferred drawing)	

The final installation verification has been carried out by:			
Visual verification by Keyboard and Display of the own ship data		Visual verification by Keyboard and Display of any other ships data	
Verification of the own ship data via a connected ECDIS (YES/NO)		Verification of the own ship data via any other receiving AIS station	

Indication of the active alarms IF present					
Alarm type:	Yes	No	Alarm type	Yes	No
ID 01 Tx-Malfunction			ID 25 External EPFS lost		
ID 02 VSWR limit			ID 26 No Sensor		
ID 03 Rx ch1 Malfunction			ID 29 No valid SOG info		
ID 04 Rx ch2 Malfunction			ID 30 No valid COG info		
ID 05 Rx ch70 Malfunction			ID 32 Heading lost/invalid		
ID 06 General failure			ID 35 No valid ROT info		

Confirmation of the proper installation and training	
Realized by	
Place	
Date	

ANNEX E: ERI SHIP TYPES OF THE VESSEL TRACKING AND TRACING STANDARD

This table should be used to convert the UN ship types, which are used in Inland message 10 to the IMO types which are used in IMO message 5.

ERI Code			SOLAS AIS Code	
code	U	ship name	1st digit	2nd digit
8000	No	Vessel, type unknown	9	9
8010	V	Motor freighter	7	9
8020	V	Motor tanker	8	9
8021	V	Motor tanker, liquid cargo, type N	8	0
8022	V	Motor tanker, liquid cargo, type C	8	0
8023	V	Motor tanker, dry cargo as if liquid (e.g. cement)	8	9
8030	V	Container vessel	7	9
8040	V	Gas tanker	8	0
8050	C	Motor freighter, tug	7	9
8060	C	Motor tanker, tug	8	9
8070	C	Motor freighter with one or more ships alongside	7	9
8080	C	Motor freighter with tanker	8	9
8090	C	Motor freighter pushing one or more freighters	7	9
8100	C	Motor freighter pushing at least one tank-ship	8	9
8110	No	Tug, freighter	7	9
8120	No	Tug, tanker	8	9
8130	C	Tug freighter, coupled	3	1
8140	C	Tug, freighter/tanker, coupled	3	1
8150	V	Freightbarge	9	9
8160	V	Tankbarge	9	9
8161	V	Tankbarge, liquid cargo, type N	9	0
8162	V	Tankbarge, liquid cargo, type C	9	0
8163	V	Tankbarge, dry cargo as if liquid (e.g. cement)	9	9
8170	V	Freightbarge with containers	8	9
8180	V	Tankbarge, gas	9	0
8210	C	Pushtow, one cargo barge	7	9
8220	C	Pushtow, two cargo barges	7	9
8230	C	Pushtow, three cargo barges	7	9
8240	C	Pushtow, four cargo barges	7	9
8250	C	Pushtow, five cargo barges	7	9
8260	C	Pushtow, six cargo barges	7	9
8270	C	Pushtow, seven cargo barges	7	9
8280	C	Pushtow, eighth cargo barges	7	9
8290	C	Pushtow, nine or more barges	7	9
8310	C	Pushtow, one tank/gas barge	8	0
8320	C	Pushtow, two barges at least one tanker or gas barge	8	0
8330	C	Pushtow, three barges at least one tanker or gas barge	8	0
8340	C	Pushtow, four barges at least one tanker or gas barge	8	0
8350	C	Pushtow, five barges at least one tanker or gas barge	8	0
8360	C	Pushtow, six barges at least one tanker or gas barge	8	0
8370	C	Pushtow, seven barges at least one tanker or gas barge	8	0
8380	C	Pushtow, eight barges at least one tanker or gas barge	8	0
8390	C	Pushtow, nine or more barges at least one tanker or gas barge	8	0
8400	V	Tug, single	5	2
8410	No	Tug, one or more tows	3	1
8420	C	Tug, assisting a vessel or linked combination	3	1
8430	V	Pushboat, single	9	9
8440	V	Passenger ship, ferry, cruise ship, red cross ship	6	9
8441	V	Ferry	6	9
8442	V	Red cross ship	5	8
8443	V	Cruise ship	6	9
8444	V	Passenger ship without accomodation	6	9
8450	V	Service vessel, police patrol, port service	9	9
8460	V	Vessel, work maintainance craft, floating derrick, cable-ship, buoy-ship, dredge	3	3
8470	C	Object, towed, not otherwise specified	9	9
8480	V	Fishing boat	3	0
8490	V	Bunkership	9	9
8500	V	Barge, tanker, chemical	8	0
8510	C	Object, not otherwise specified	9	9
1500	V	General cargo Vessel maritime	7	9
1510	V	Unit carrier maritime	7	9
1520	V	bulk carrier maritime	7	9
1530	V	Tanker	8	0
1540	V	liquified gas tanker	8	0
1850	V	pleasure craft, longer than 20 metres	3	7
1900	V	fast ship	4	9
1910	V	Hydrofoil	4	9
1920	V	catamaran fast	4	9