HENSOLDT
Detect and Protect.

S-BAND SHARPEYE™ MK7 RADAR (ASTERIX) SYSTEM HANBDOOK

DTX-A1-xxxx (ASTERIX) transceiver
LPA-A3 Low Profile Antenna

HBK-2300-4 issue 3

DOCUMENT HISTORY

ISSUE	RELEASE DATE	CHANGE DETAILS
1	July 2016	1st issue
2	July 2019	• Typical system drawing updated. • Antenna installation instructions improved. • Fibre Optic cable details, cable laying, cable pulling and cable gland instructions updated. • Power & signal details updated. • Anti-Condensation heaters removed. • Connection diagram updated (ACH removed). • Static desiccant bag added. • Annual maintenance procedure updated (ACH removed/ Desiccant added). • Handbook listings added. • As necessary, drawings rebranded and updated to the latest release. • Minor corrections and updates. • Reference to HBK-1000 (Radar installation guidelines & interpretation of display) added.
3	**April 2021**	• **French Health & Safety section added.** • **FCC notices added.** • **Branding updated.** • **As appropriate, all drawings rebranded and updated to the latest release.** • **Minor corrections and updates.**

When planning any aspect of the installation, commissioning, operation, maintenance or risk analysis (RADHAZ) of the system(s) described in this handbook, it is the responsibility of the individual carrying out the required task to ensure they are working from the latest issue/ revision of the relevant system(s) handbooks.

Where translated, the original English version of this document will remain the definitive document and should be referred to in any situation of doubt, confusion or conflict.

Specifications are subject to change without notice.

Printed copies of this document are unmaintained.

This publication supersedes all previous versions.

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2 Health & Safety notices

2.1 ENGLISH: Health & Safety notices

KEY TO SAFETY NOTICES

NOTICE	CAUTION	WARNING
A notice on a condition or setting that may affect the operation of the equipment but has no safety implications.	A condition or setting that if incorrectly used or applied could present a potentially hazardous situation, condition or setting.	A condition or setting that if incorrectly used or applied would lead to a hazardous situation or condition.

FCC NOTICES

IC RSS-GEN, Sec 8.4 Warning Statement- (Required for license-exempt devices)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

IC RSS-GEN, Sec 8.3 Warning Statement-

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device. When working on HENSOLDT UK equipment, operators, engineers and agents are expected to work within the health and safety guidelines noted in the handbook, as issued by their respective employer or as stated by site regulations, shipyard or vessel owner. Risk assessments of a working area must be undertaken prior to commencement of any work and must be regularly reviewed.

HEALTH & SAFETY

When working on HENSOLDT UK equipment, users, engineers and agents are expected to work within the health and safety guidelines as issued by their respective employers, shipyards or vessel owners. Copies of the HENSOLDT UK Health and Safety requirements are available upon request.

RISK ASSESSMENT

In line with an employer's, shipyards or vessel owners requirements, risk assessments of a working area must be undertaken prior to commencement of any work and must be regularly reviewed.

AID TO NAVIGATION

Navigation systems and equipment supplied by HENSOLDT UK comply with the relevant SOLAS regulations. The equipment is provided as an aid to navigation and should be used in accordance with the SOLAS regulations.

RADIATION HAZARDS

WARNING: RADIATION HAZARDS (RADHAZ) NON-IONISING

Avoid exposure to the main beam of a stationary radar antenna. Avoid standing closer to the central front face of the antenna than the distances specified in the RADHAZ ranges detailed below. Users of cardiac pacemakers should be aware of the possibility that radio frequency transmissions can damage some devices or cause irregularities in their operation. Anyone using such devices should understand the risks present before exposure.

WARNING: RF LEAKAGE

Radiation risks are greater from an unterminated, leaky or damaged waveguide. Ensure the system is not transmitting and is fully isolated from all sources of AC power prior to gaining access to the transceiver platform or before working on any part of the system.

MICROWAVE RADIATION LEVELS (RADHAZ)

The range at which specified RF exposure limits can be exceeded is far greater for a non-rotating antenna. For that reason, RF transmission without antenna rotation is not a permitted operational mode for this equipment: The system includes interlocks to prevent this occurring.

The basic restriction level for the operating frequency of this product, as set out in 1999/519/EC (Annex III table 2) and calculated in accordance with EN50385:2002, is 10W/m2 averaged over a six minute period. For normal operation, the EU basic restriction level for public exposure is only exceeded within the distance of the antenna centre detailed below.

In all SharpEye™ systems, the fault condition following the loss of Heading Line and Azimuth data (e.g. the antenna has stopped rotating) will be recognised and trigger the transceiver OFF condition within a few seconds.

ANTENNA		RANGE WITHIN WHICH THE POWER DENSITY EXCEEDS THE FOLLOWING:		
		$10W/m^2$	$50W/m^2$	$100W/m^2$
S-band LPA-A3	Rotating	1.40m	Less than 0.01m	Less than 0.01m
	Non-rotating	3.5m	0.95m	Less than 0.01m

NOTE: The range for a non-rotating antenna is far greater due to the lack of averaging but this is not a permitted operational mode and the system includes interlocks to prevent this mode of operation for a prolonged period.

NOTICE: RADHAZ FIGURES

It is the responsibility of the end user to ensure that they are working from the latest officially released version of the handbook when planning an installation or carrying out any form of risk or hazard assessment.

STOPPING ANTENNA ROTATION

- Antenna rotation can be inhibited using the 'Antenna OFF/ Free' keyswitch located on the top of the GTX-A24 Drive Control Unit. This mechanism can be used by a person who sees a potential hazard such as a loose halyard and decides to protect the antenna.
- The key for the keyswitch is captive when set to Free (enable rotation) but can be removed when the keyswitch is to OFF. The key should be removed and retained by the person who intends to enter the potentially hazardous volume of the rotating antenna.
- With the switch in the OFF position, the 3-phase AC power to the antenna and transceiver is switched OFF, stopping powered rotation of the antenna. This mechanism does not remove AC power from the SharpEye™ transceiver or isolate the system.
- The Drive Control Unit ON/ OFF Antenna Rotation keyswitch forms part of a safety current loop. This safety loop is purely hardware (no software); when the current loop is opened, AC mains supplies to the inverter within the GTX-A24 are switched OFF by use of contactors.
- HENSOLDT UK recommends that radar users carry out a safety assessment and risk mitigation procedure in terms of interlocks prior to approving any work on the equipment.

HAZARDS & PRECAUTIONS

All HENSOLDT UK designed equipment is constructed so that access to high voltages may only be gained after having used a tool, such as a spanner or screwdriver. Warning labels are prominently displayed both within the equipment and on protective covers.

WARNING: ELECTRICAL HAZARDS

Some equipment does not have safety interlocks fitted.
Lethal single and three phase AC and DC voltages may be present when units are open and exposed.
Before accessing any internal parts, ALL power sources to the equipment must be fully electrically and mechanically isolated; this must include the isolation of all UPS supported supplies to the system.

WARNING: AC VOLTAGES

All HENSOLDT UK equipment is supplied with mains input voltage set for 220VAC, 50/60 Hz ac unless otherwise stated on labels attached to the equipment.

RESIDUAL VOLTAGES

Residual voltages may be present on large capacitors within units.

WARNING: FIRE RISK

Some equipment contains materials which may produce toxic fumes if burnt.

WARNING: SharpEye™ PROCESSOR

The factory sealed SharpEye™ processor must not be dismantled. Components within some early models may contain traces of Beryllium and Trivalent Chromium which can represent a risk if the processor is dismantled.
SharpEye™ transceivers are factory sealed units that contains no field serviceable parts or lifed components.

CAUTION: HOUSING TEMPERATURE

This unit will become hot during normal operation. When the system has been operating in strong sunlight or elevated temperatures, the surfaces of the transceiver, unit housing and antenna surfaces may exceed +70°C.

DESICCANT BAG

WARNING: SILICA GEL DESICCANT BAG

A Silica Gel desiccant bag is located within the housing.
Inhalation of desiccant material may cause dryness and irritation to mucous membranes, nose, and throat; symptoms may include coughing, sore throat, and wheezing.
No adverse effects expected if the material is ingested.

FIBRE OPTIC CABLE

WARNING: CLASS 1 LASER PRODUCT

There is a class 1 laser within the sealed SharpEye™ transceiver processor which can represent a risk if the processor is dismantled. The LAN fibre optic cable connecting the SharpEye™ SFP module to the MDC-A201-1 Managed Network Switch is considered as a class 1 laser. Do not look into the end of the fibre optic cable when the system is switched ON.

WARNING: BROKEN OR DAMAGED FIBRE OPTIC CABLES

Broken ends of fibre cables and scraps of fibre can be extremely dangerous.
The ends are extremely sharp and can easily penetrate skin, invariably break off and are very hard to find and remove.
Use protective gloves when handling damaged fibres.
Dispose of all broken fibre cables in line with local disposal requirements.

CAUTION

The fibre optic cable must not be shortened or re-terminated as specialist equipment is required to construct and test the cable.

EQUIPMENT ACCESS

CAUTION: ACCESS TO EQUIPMENT

To meet with electrical safety recommendations, all equipment should be situated in a restricted area where access is only available to authorised personnel. Persons entering the restricted area should be aware of the dangers that are present when the system is operational, which include rotating equipment, radiation hazards and where applicable, working at heights

GROUNDING/ EARTH POINTS

All parts of the system must be fully and correctly connected to a proven earth point prior to connecting any source of AC power.

CONNECTION POINT:	All HENSOLDT UK equipment is fitted with a single protective earth connection point which is indicated on the mechanical installation drawings.
CONDUCTIVITY TESTS:	During installation and maintenance, the earth connections must be tested for conductivity using a high current impedance meter such as a Megger or similar.
WRIST STRAPS:	Fully isolate all sources of AC before attaching ESD protective wrist straps to the various points in the system.

WARNING

The system must NOT be operated or have AC power switched ON with Earth/ Grounding points disconnected

SAFETY ALOFT

- When working aloft or near any radar scanners, moving or RF radiating equipment, ALL sources of power to the platform and equipment including Anti-Condensation Heaters (ACH) supplies must be electrically and mechanically isolated and be locked into the OFF position.
- Ensure someone in authority at ground level knows of your intentions and ensure that suitable clear warnings are in place.
- Ensure all means of access aloft are secure and beware of wet or slippery ladder rungs and working areas.
- All working at height health and safety requirements and procedures, including the inspection and use of personal protective equipment (PPE) such as approved safety harnesses and gloves, must be adhered to at all times as required by your employer, site regulations, shipyard and / or vessel.

SAFETY CORDON

When working aloft, a safety cordon must be established and managed below the working area(s).

DROP HAZARDS

When working aloft, all tools, Line Replacement Units and any loose items must be safely stowed or secured so that they cannot present a drop hazard.

WARNING: WEATHER CONDITIONS

When weather conditions are poor, a full risk assessment must be carried out prior to working aloft as defined by an individual's employer or shipborne safety procedures. Poor weather conditions can include but are not restricted to high winds, heavy rain, snow, ice or if access is required at sea, risk of vessel pitch and roll.

LIFTING EQUIPMENT

WARNING

Gearbox, antennas and the transceiver enclosures are heavy items and must be hoisted to the fixing position using suitable lifting equipment, a secured block and tackle or by rope strops. During installation, the equipment being lifted must be secured and supported at all times to prevent any risk of falling or slipping. Antennas must never be left un-retained on the swing casting.

LIFTING SPARES

Where spare parts are required for equipment located on a platform or access is via a ladder, heavy items must be lifted to the platform using a suitably rated lifting bag or lifting strop. Heavy items must not be manually carried up ladders.

GENERAL LIFTING PRECAUTIONS

- All health and safety requirements must be checked and observed at all times when lifting *any* equipment. All appropriate personal protective equipment (PPE) must be worn.
- Where special equipment such as cranes hoists and jigs is required, consideration must be given to the authority to use such equipment.
- During lifting, a safety zone shall be established beneath the lifting area around any cranes or platforms. Safety personnel must ensure that persons do not encroach on the area of work.
- Consult with the lifting operator to obtain the best and safest method of securing lifting strops or ropes to the equipment and advise lifting operators of the areas of a system that are susceptible to damage such as antenna fascia's, swing castings etc.
- Check that the centre of gravity of the equipment cannot cause the lifting strops or ropes to slip or move.
- All straps, lifting cables or ropes must be thoroughly checked to ensure that there is no risk of the unit slipping or falling from the lifting strap or lifting equipment.
- Gearboxes must never be lifted by the antenna or swing casting.
- If lifting a gearbox with the antenna pre-assembled, the lifting equipment, ropes or straps must not place any pressure on any part of the antenna or the swing casting.
- HENSOLDT UK cannot be held responsible for any damage that occurs to supplied or 3rd party equipment as a result of incorrect lifting procedures or handling or equipment.

ANTENNA LIFTING

- Care should be taken when unpacking or lifting antennas to ensure that the coaxial waveguide is not bent, crushed or damaged during handling.
- Support the antenna near the ends when lifting it out of the packing and when fitting into position on the turning mechanism.
- Do not lift, handle or support the antenna by the waveguide.
- When rotating an installed antenna by hand, do not apply excessive force.
- The antenna and antenna facia must never be painted or be fitted with non-approved labels.
- When lifting gearboxes with an antenna fitted, the lifting ropes or strops must not touch or place pressure on the antenna.

CORRECT & INCORRECT LIFTING PROCEDURES

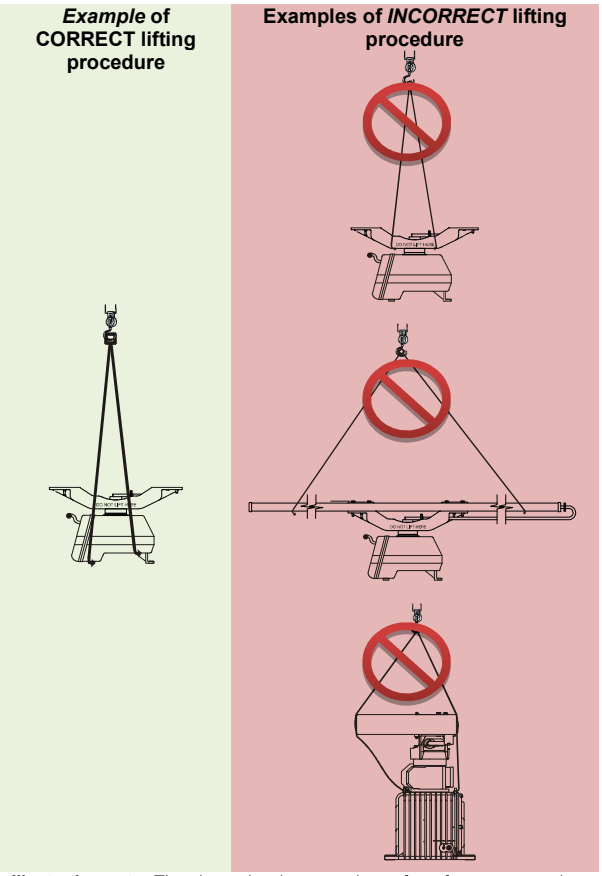

Illustration note: The above drawings are shown for reference use only and may not represent the actual equipment supplied.

ANTI-STATIC HANDLING

CAUTION: HANDLING OF ELECTROSTATIC-SENSITIVE SEMICONDUCTOR DEVICES

Persons removing sub-units from equipment containing these devices must be earthed by a wrist strap and a resistor at the labelled point provided on/ within the equipment. Certain semiconductor devices used in the equipment are liable to damage due to static voltage. Observe the following precautions when handling these devices in their un-terminated state, or sub-units containing these devices:

- Soldering irons used during authorised repair operations must be low voltage types with earthed tips and isolated from the mains voltage by a double insulated transformer.
- Outer clothing worn must be unable to generate static charges.
- Printed circuit boards fitted with these devices must be stored and transported in anti-static containers.

SERVICING AND REPAIR

Service and equipment repair must only be undertaken by HENSOLDT UK or an authorised service agent/ engineer. Un-authorised repair or servicing of equipment during the warranty period may invalidate the warranty status of the equipment.

RoHS STATEMENT

For details on RoHS (Restriction of Hazardous Substances) statements please contact HENSOLDT UK; contact details can be found in at the end of this handbook.

END OF LIFE DISPOSAL

HENSOLDT UK are committed to recycling and reducing landfill waste. It is has been globally recognised that the incorrect disposal of some materials including plastics can have a harmful and negative impact on the environment.

When any HENSOLDT UK supplied equipment has reached the end of its serviceable life, the various parts that make up the system should be disposed of in accordance with all current local industrial waste disposal and recycling regulations. It is requested that the equipment is not discarded as general waste or by a method that could lead to the equipment being disposed of in a landfill site.

Please contact your local regulatory body for current waste disposal instructions or contact HENSOLDT UK for a list of any potentially hazardous material contained within the system.

SHARPEYE™ SPECIFIC DISPOSAL NOTICE

SharpEye™ transceivers are factory sealed units that contains no field serviceable parts or lifed components. Components within some early models of the processor may contain traces of Beryllium and Trivalent Chromium. For details on the end of life disposal of a SharpEye™ processor please contact HENSOLDT UK quoting the SharpEye™ processor part number and MOD state. Contact details can be found at the end of this handbook.

2.2 FRANÇAIS: Recommandations Sanitaires et de Sécurité

AVIS DE TRADUCTION

Lorsqu'il est traduit, la version originale anglaise de ce document demeurera le document définitif et devrait être mentionnée dans toute situation de doute, de confusion ou de conflit.

CLÉ DES AVIS DE SÉCURITÉ

REMARQUER	ATTENTION	AVERTISSEMENT
Un avis à une condition ou à un réglage qui peut affecter le fonctionnement de l'équipement, mais qui n'a aucune incidence sur la sécurité.	Une condition ou un réglage qui, s'il est mal utilisé ou appliqué, pourrait présenter une situation, une condition ou un réglage potentiellement dangereux.	Une condition ou un réglage qui, s'il était mal utilisé ou appliqué, entraînerait une situation ou une condition dangereuse.

FCC STATEMENT

IC RSS-GEN, Sec 8.4 Warning Statement- (Required for license-exempt devices).
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC RSS-GEN, Sec 8.3 Warning Statement-
Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur. Les opérateurs et les ingénieurs travaillant sur l'équipement HENSOLDT doivent se conformer aux consignes relatives à la santé et la sécurité énoncées dans le présent manuel, conformément aux exigences de leurs employeurs respectifs ou comme énoncé dans la réglementation du site, ou par les propriétaires du chantier naval ou du navire. Des évaluations des risques d'une zone de travail doivent être réalisées avant le démarrage de tout travail et doivent être régulièrement revues. AVERTISSEMENT

SANITAIRES ET DE SÉCURITÉ

Lorsqu'ils travaillent sur l'équipement HENSOLDT UK, les utilisateurs, les ingénieurs et les agents sont censés travailler selon les lignes directrices en matière de santé et de sécurité émises par leurs employeurs respectifs, les chantiers navals ou les propriétaires de navires. Des copies des exigences de HENSOLDT UK Health and Safety sont disponibles sur demande.

ÉVALUATION DU RISQUE

Conformément aux exigences de l'employeur, des chantiers navals ou des propriétaires de navires, les évaluations des risques d'une zone de travail doivent être effectuées avant le début des travaux et doivent faire l'objet d'un examen régulier.

AIDE À LA NAVIGATION

Les systèmes de navigation et l'équipement fournis par HENSOLDT UK sont conformes aux règlements SOLAS pertinents. L'équipement est fourni comme une aide à la navigation et doit être utilisé conformément à la réglementation SOLAS.

RISQUES DE RADIATION

AVERTISSEMENT : RISQUES DE RADIATION (RADHAZ) NON IONISANTS
Évitez l'exposition au faisceau principal d'une antenne radar stationnaire. Évitez de vous tenir plus près de la face avant centrale de l'antenne que les distances spécifiées dans les plages RADHAZ détaillées ci-dessous. Les utilisateurs de stimulateurs cardiaques devraient être conscients de la possibilité que les transmissions par radiofréquence puissent endommager certains appareils ou causer des irrégularités dans leur fonctionnement. Toute personne utilisant de tels appareils doit comprendre les risques présents avant l'exposition.

AVERTISSEMENT: FUITE RF
Les risques de rayonnement sont plus élevés en raison d'un guide d'ondes non terminé, qui fuit ou qui est endommagé. Assurez-vous que le système ne transmet pas et qu'il est complètement isolé de toutes les sources d'énergie AC avant d'avoir accès à la plate-forme de transmetteur ou avant de travailler sur n'importe quelle partie du système.

NIVEAUX DE RAYONNEMENT MICRO-ONDES (RADHAZ)

La plage à laquelle les limites d'exposition RF spécifiées peuvent être dépassées est beaucoup plus grande pour une antenne non rotative. Pour cette raison, la transmission RF sans rotation d'antenne n'est pas un mode opérationnel autorisé pour cet équipement : le système comprend des verrouillages pour éviter que cela ne se produise.

Le niveau de restriction de base pour la fréquence d'exploitation de ce produit, tel qu'il a été établi en 1999/519/CE (tableau 2 de l'annexe III) et calculé conformément à EN50385:2002, est de 10W/m2 en moyenne sur une période de six minutes. Pour un fonctionnement normal, le niveau de restriction de base de l'UE pour l'exposition du public n'est dépassé qu'à l'intérieur de la distance du centre d'antennes décrit ci-dessous.

Dans tous les systèmes SharpEye™, l'état de défaut à la suite de la perte des données heading line et Azimuth (par exemple, l'antenne a cessé de tourner) sera reconnu et déclenchera l'état de transmetteur OFF en quelques secondes.

ANTENNA		PLAGE DANS LAQUELLE LA DENSITÉ DE PUISSANCE DÉPASSE LES ÉLÉMENTS SUIVANTS:		
		$10W/m^2$	$50W/m^2$	$100W/m^2$
S-band LPA-A3	Rotatif	1.40m	Less than 0.01m	Less than 0.01m
	Non-rotatif	3.5m	0.95m	Less than 0.01m