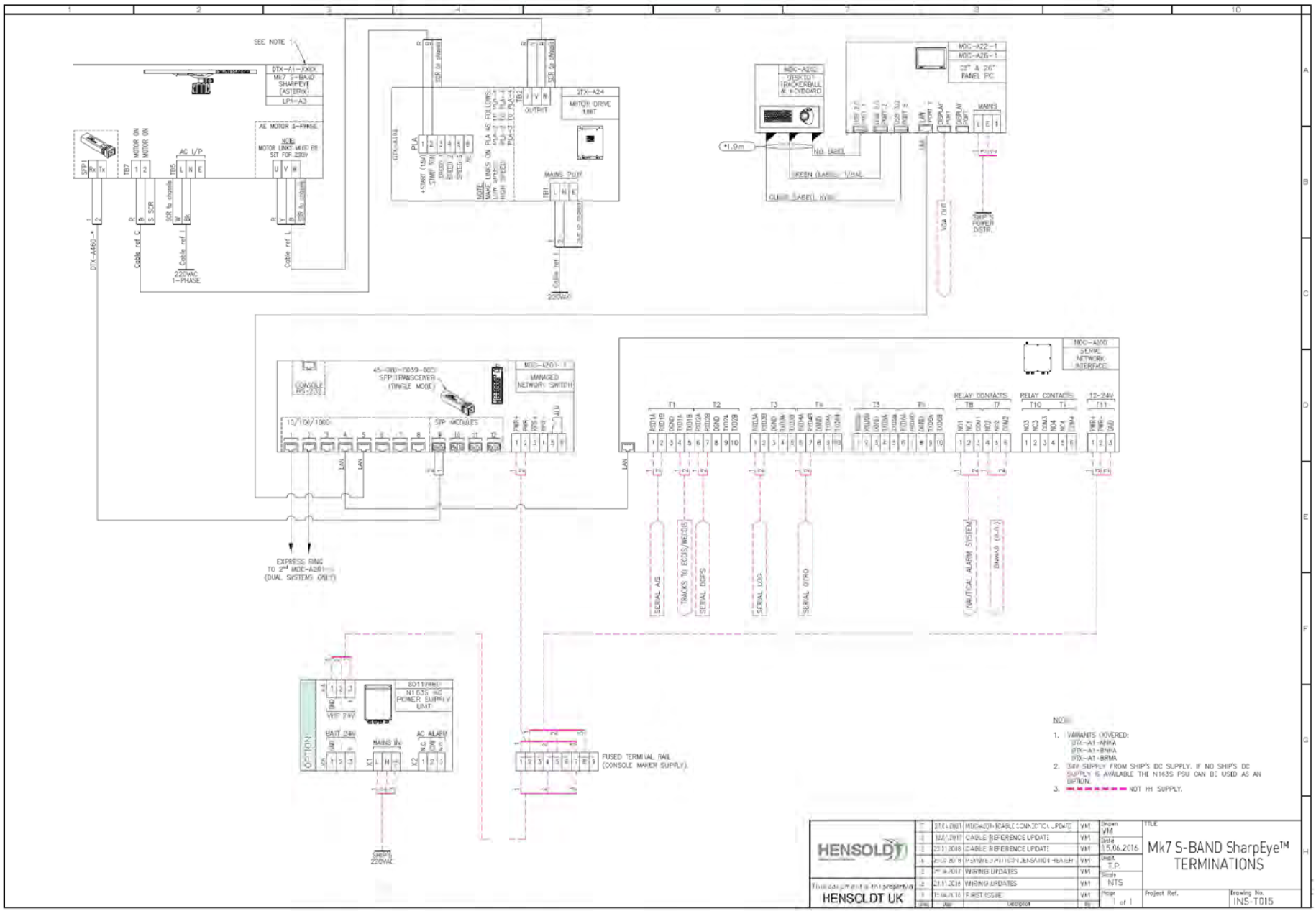
5.4 CONNECTION DIAGRAM




HENSOLDT

6 Commissioning

6.1 Transceiver

The health and Safety notices shown at the beginning of this handbook must be observed at all times when installing, terminating, commissioning, operating and maintaining the equipment and its sub-assemblies.

The Transceiver system is commissioned via the display sub-system using a web page that is pre-programmed into the SharpEye™.

The commissioning details are not contained in this handbook.

Please refer to the Kelvin Hughes Navigation Display installation & commissioning handbook for details.
HANDBOOK REFERENCE HBK-2300-2

COMMISSIONING AUTHORISATION
Commissioning must only be carried out by an authorised/ trained engineer.

CAUTION
Incorrect use of the commissioning web page can render the system inoperable.

6.2 GTX-A24 Drive Control Unit

INVERTER CONFIGURATION
Unless specifically advised by HENSOLDT UK, the inverter should be left at the factory configured default settings.

Incorrect configuration of the inverter settings can cause damage to equipment and possibly override the MOTOR ON/OFF safety switch located on the top of the unit.

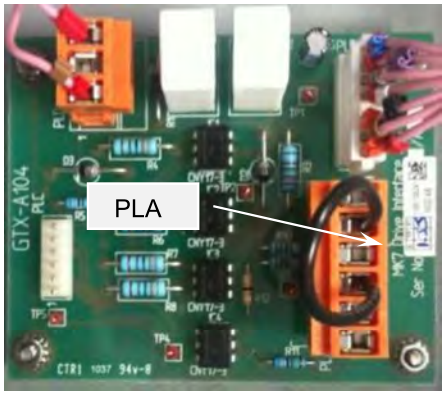
DEFAULT INVERTER SETTINGS
Refer to **Annex A: Inverter Defaults** for inverter details and the factory default settings.

6.3 Antenna speed

The antenna speed of 24 RPM (**DEFAULT SETTING**) or 40 RPM is set by making links on PLA of the GTX-A104 PCB located within the GTX-A24.

CAUTION: 40RPM/ HIGH SPEED SETTING

Do not set the GTX-A24 to 40RPM unless specifically advised to do so by Kelvin Hughes.



Example of GTX-A104 set for 24rpm

LOW SPEED: 24 RPM
DEFAULT SETTING

- PLA pins 2 to 4

HIGH SPEED: 40 RPM
DO NOT USE; SEE CAUTION above

- PLA pins 2 to 4
- PLA pins 3 to 4

6.4 Inverter status

In normal operation, the inverter will have the following on the display.

25.0Hz Indicating that the inverter output is set to provide approximately 24RPM (**DEFAULT SETTING**)
or
50.0Hz Indicating that the inverter output is set to provide approximately 40RPM.

WARNING: SAFETY SWITCH OVERRIDE/ ANTEENA ROTATION

In certain modes, If 'RUN' is selected on the inverter, the safety keyswitch is overridden and the antenna can rotate.

7 Completion of installation

On completion of an installation and/ or commissioning of a system, the following tasks must be carried out.

CLEAR THE WORKING AREA
On completion of an installation, engineers should ensure that all unused materials such as unused cables, wire cuttings etc. are tidied away and are safely disposed of as detailed below. All working areas used should be left clean and tidy.

DISPOSAL OF PACKAGING
Unless specifically required for repacking, storage, transport or return, all equipment packaging and any waste material generated during equipment installation should be disposed of in accordance with ships requirements and/ or current local waste disposal regulations.

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. Hensoldt UK request that waste material 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 the local regulatory body for current waste disposal instructions.

FUNCTIONAL TESTS
On completion of an installation or service, all system functionality should be tested.

KEYS
The keys for the GTX-A24 should be handed to the equipment owner. Spare keys must not be retained by the installation engineer.

WARRANTY CARDS
The warranty card(s) for every piece of Hensoldt UK equipment installed must be individually completed.

ALL items shown on the check list must be inspected and confirmed as having been inspected. In addition to the inspections shown on the warranty card, the following additional checks must be made:

- Service covers, access plates, panels or doors are securely, correctly closed and sealed.
- Bulkheads that have been removed are securely and correctly replaced.
- Cables are marked noting the signal type and/ or source.
- Antennas can rotate freely without obstruction.

If an inspection on the warranty card checklist is NOT ticked, it is assumed that the installation engineer has NOT carried out the inspection. Costs incurred due to re-attendance to repair incorrect or uninspected installations will be forwarded to the company responsible for the failure to correctly perform the work.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Detect and Protect.

8 Operation

8.1 DTX-A1-xxxx

The health and Safety notices shown at the beginning of this handbook must be observed at all times when installing, terminating, commissioning, operating and maintaining the equipment and its sub-assemblies.

UNIT OPERATION

There are no operator controls or indicators on the DTX-A1-xxxx.
All control of the transceiver is carried out via the GTX-A24 and the display sub-system.

EQUIPMENT ACCESS

Access to the transceiver is not required during normal operation

PERFORMANCE MONITORING

There are no user accessible performance monitor functions on or in the transceiver. The SharpEye™ within the DTX-A1-xxxx constantly monitors the transceiver and receiver performance and will automatically alert the operator via warnings/ alerts at the display sub-system to any performance related issues.

8.2 GTX-A24 Drive Control Unit

TURNING MOTOR AC
The GTX-A24 Drive Control Unit generates and controls the antenna motor AC supply.

SINGLE PHASE AC
The unit DOES NOT control the single phase AC power for the transceiver.

OPERATOR CONTROL
Control is limited to the operation of the Drive Control Unit **ON/ OFF** keyswitch and observation of the power indicators located on the top of the unit.

- There are no operator functions or controls within the Drive Control Unit.
- The GTX-A24 should never be opened during normal operation.
- The Drive Control Unit does not control or switch the single phase AC supplies to the transceiver.

Top view of the Drive Control Unit

Controls and indicators located on top of the GTX-A24

STATUS			DESCRIPTION
	OFF / ON SWITCH	**SWITCH POSITION OFF**	**THE DRIVE CONTROL UNIT IS SWITCHED OFF** • The antenna motor AC supply is OFF but the unit is not isolated. • In the OFF position, the key can be removed from the switch by the maintainer as part of the safety procedures for the installation.
		SWITCH POSITION ON	**NO RUN command**: The drive control unit is ON but the 3-phase output is NOT switched ON. **RUN Command active**: The drive control unit is switched ON and 3-phase power is sent to the antenna sub-system.
	MAINS ON INDICATOR	**LAMP ON**	AC mains input to the Drive Control Unit is ON.
		LAMP OFF	The AC input to the Drive Control Unit is OFF.
	MOTOR ON INDICATOR	**LAMP ON**	The Drive Control Unit is switched ON and an AC output is being sent to the antenna motor.
		LAMP OFF	AC outputs from the Drive Control Unit are OFF.

8.3 Switch ON/ OFF

SWITCH ON PROCEDURE

- Ensure that the single phase AC mains supply to the GTX-A24 Drive Control Unit is switched ON and that the **MAINS ON** indicator on the top of the unit is illuminated.
- Ensure that the single phase AC supply to the DTX-A1-xxxx is switched ON. This powers the SharpEye™ transceiver within the unit. There are no operator accessible indicators on the transceiver that show when AC mains is available.
- Place the Drive Control Unit **ON/ OFF** keyswitch on top of the Drive Control Unit into the ON position.
- The system is now switched ON and is ready to be controlled by the display sub-system.
- When a RUN command is received from the display sub-system via the SharpEye™, the Drive Control Unit switches ON, the **MOTOR ON** lamp illuminates and AC output to the antenna motor is switched ON. **Note**

SWITCH OFF PROCEDURE

- From the display sub-system, place the transceiver into Standby.
- Place the Drive Control Unit **ON/ OFF** keyswitch into the OFF position. The key can be removed from the switch as an additional safety precaution.
- The **Motor ON** indicator is OFF.
- The AC output to the antenna is inhibited but AC voltages are still present within the Drive Control Unit and the transceiver housing both of which are not isolated. The **MAINS ON** indicator on the top of the unit remains illuminated.
- Switched OFF the single phase AC supply to the DTX-A1-xxxx.

WARNING: AC OFF BUT NOT ISOLATED

When the Drive Control Unit ON/ OFF keyswitch is in the **OFF** position or in the **ON** position with **no RUN command**, AC outputs are inhibited but AC voltages are still present within the system *which is not isolated*.

WARNING: SYSTEM ISOLATION

The system must be fully electrically and mechanically isolated from all sources of power and locked into the OFF position prior to commencing any service or maintenance work or opening the drive control unit. See section 8.5 for details on isolating the system.

8.4 EMERGENCY ANTENNA STOP

The ON/ OFF keyswitch on the GTX-A24 Drive Control Unit can be used by the operator if a situation is detected that requires immediate shutdown of the antenna rotation.

Place the keyswitch located on the top of the GTX-A24-2 Drive Control Unit into the OFF position.

The system IS NOT ISOLATED, see AC warnings above.

The Drive Control Unit ON/ OFF keyswitch forms part of a safety current loop. This safety loop is purely hardware (no software). When the current loop is opened, the AC supply to the antenna motor is switched OFF by use of contactors within the unit thus stopping antenna rotation.

Kelvin Hughes recommends that users carry out a safety assessment and risk mitigation procedure in terms of interlocks prior to approving any work on the equipment.

Note: The Motor ON lamp is powered by the AC output of the Drive Control Unit.

8.5 SYSTEM ISOLATION

In addition to site health and safety requirements and local electrical lock-out procedures, all systems must be made safe prior to carrying out any maintenance task by fully isolating all AC power supplies and locking breakers into the OFF position. This must include the isolation of any optional UPS supported supplies.

When the system is isolated, ensure that suitable warning signs are in place.

DISPLAY SUB-SYSTEM

- From the display sub-system, place all transceivers into Standby.
- To prevent accidental activation of transceivers attached to the network, isolate and lock OFF all AC supplies to ALL displays and the associated sub-systems including any UPS supported supplies.

THREE-PHASE AC ISOLATION

- Place the Drive Control Unit **ON/ OFF** keyswitch on the top of the GTX-A24 Drive Control Unit into the **OFF** position.
- The key should be removed and retained until the task being undertaken has been completed.
- Note that AC voltages are still present within the GTX-A24. The single phase AC supply to the unit must now be isolated as detailed below.

SINGLE PHASE ISOLATION

Switch OFF, mechanically isolate and lock OFF the external breakers that supply the AC supplies to the following equipment:

- DTX-A1-xxxx transceiver.
- GTX-A24 Drive Control Unit.
- Display Sub-System as detailed earlier.

Both the **MAINS ON** and **MOTOR ON** indicators on the Drive Control Unit should be OFF.

WHEN CONFIGURED AS DETAILED ABOVE, THE SYSTEM IS ISOLATED.

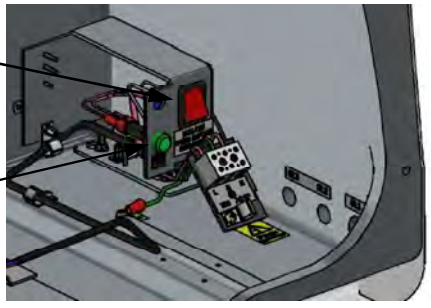
MAINTAINER'S SWITCH

A maintainer's safety switch and AC indicator is located within the DTX-A1-xxxx. The switch must be used in conjunction with the working aloft and system isolation procedures.

The AC maintainer switch within the DTX-A1-xxxx only switches the single phase AC to the gearbox housing. The switch does not isolate the system or control the antenna motor supply.

SINGLE PHASE AC SWITCH
WARNING: This does not isolate the system.

AC INPUT INDICATOR (GREEN NEON)
Illuminates when the main AC supply is ON



9 Planned maintenance

9.1 Overview

The health and Safety notices shown at the beginning of this handbook must be observed at all times when installing, terminating, commissioning, operating and maintaining the equipment and its sub-assemblies.

EQUIPMENT

The following pages detail the **annual** and **planned maintenance** schedules for the following equipment:

- LPA-A3: S-band Low Profile Antenna
- DTX-A1-xxxx: S-band SharpEye™ Radar (ASTERIX).
- GTX-A24: Drive Control Unit

MAINTENANCE RECORD

The following pages have been designed to be printed, completed and stored as a maintenance record.

TEST FAILURE / EQUIPMENT DAMAGE

If any of the tests described as part of the planned maintenance tasks fail, please contact Hensoldt UK for further advice. If equipment damage is identified as part of an inspection, this should be immediately reported to Hensoldt UK and appropriate action taken to prevent further damage occurring.

PROCEDURE & SYSTEM ISOLATION

a) Prior to carrying out any maintenance, the system must be fully isolated from all sources of AC including any UPS supported supplies as detailed in section 8.5.

b) The required maintenance task(s) should be undertaken.

c) On completion of the planned maintenance task(s), the power should be restored and the system fully tested to ensure satisfactory operation.

SPARES

Where required, only Hensoldt UK approved spares must be used. The use of unapproved spares invalidates the warranty status of the unit and could lead to a malfunction of the system.

ADVERSE WEATHER

It is strongly recommended that the gearbox inspections noted in section 9.3 onwards are carried out at the earliest safe opportunity after the system has been exposed to severe or adverse weather conditions.

9.2 Desiccant replacement

REPLACEMENT/ SPARE

55-100-397-001-S Desiccant replacement	Desiccant sachet 500g silica gel (210mm x 135mm)	QTY 1
55-100-0311-003 Service Access Panel seal	'O' RING 506.86 x 5.33 (EPDM E70Q)	QTY 1

RECOMMENDED REPLACEMENT SCHEDULE

A desiccant sachet is located within the transceiver/ turning mechanism enclosure.

It is strongly recommended that the desiccant sachet is changed every time the Service Access Panel is opened.

The replacement desiccant is supplied in a sealed package that has a storage shelf life of 2-years.

Example of a desiccant bag holder

SERVICE ACCESS PANEL REMOVAL

Please refer to section 4.2.6 for details on removing and replacing the Service Access Panel. If the panel seal is damaged it should be replaced using the spare part noted above.

DESICCANT REPLACEMENT NOTES

- Do not open the sealed package until the desiccant bag is ready to be installed.
- Do not open or pierce the desiccant bag; damaged bags should not be used.
- Take care when lifting the desiccant bag from the container. If the bag splits during removal, all traces of desiccant material should be removed using protective gloves.
- To avoid exposure to moisture, install the desiccant bag as the last operation before closing/ replacing the Service Access Panel.
- Used/ old desiccant bags should be disposed of in accordance with local waste disposal instructions.

9.3 Annual maintenance

EQUIPMENT DETAILS			
Gearbox		**Low Profile Antenna**	
Part number: Add the last 4 digits of the part number.	DTX-A1-xxxx	**Part number:**	LPA-A3-xxxx
Serial number:		**Serial number:**	
MOD strike:		**MOD strike:**	
Drive Control Unit			
Part number:	GTX-A24		
Serial number:			
MOD strike:			
Inspection date:	(DD/ MM/ YYYY)		
Inspected by:	*Print:*	*Sign:*	
Tools required:	• Blower or soft brush. • Medium cross head screwdriver (*for opening Drive Control Unit*). • M8/ 13mm AF spanner (removal of the service access panel). • Mild detergent. *Note: Do not use abrasive cleaners or products containing alcohol.* • Soft abrasive free cloth. • Safety ohmmeter, bridge Megger or Multimeter. • Spanners (*6mm, 10mm and as required for custom earth attachments*). • Wire brush or emery cloth.		
Recommended spares:	**55-100-397-001-S** Desiccant sachet replacement (500g silica gel, 210mm x 135mm).		
Skill level:	Basic electrical training, working at heights awareness.		
Time:	Approximately 2-hours depending on equipment location and accessibility.		

LPA-A3 ANTENNA INSPECTION			
TASK	**DESCRIPTION**	**PASS**	**FAIL**
CLEANING	Clean the antenna facia with a soft cloth moistened in a mild non-abrasive soap solution. **NOTES** • Cleaning the antenna is important as the system performance can be degraded if dirt accumulates on the antenna transmission face. • The antenna facia must never be painted.	☐	☐
PHYSICAL INSPECTION	Ensure that all nuts and bolts are tight, secure and show no signs of severe corrosion or damage.	☐	☐
	Check that waveguide couplings are securely fastened and appear to be waterproof.	☐	☐
	The antenna should be checked to ensure that there is no obvious external damage, cracking or potential fault that could lead to a general failure of any part of the system.	☐	☐

CAUTION

The following tests should only be undertaken when it is safe to manually rotate the antenna i.e. the system is fully isolated from *all* sources of power and the antenna can be *safely* accessed and reached.
Do not use excessive force and do not take unnecessary risk when turning the antenna such as reaching too far or leaning outside safety guardrails.
THIS TASK SHOULD BE DISREGARDED IF THERE ARE ANY SAFETY CONCERNS.

TASK	DESCRIPTION	PASS	FAIL
Manual antenna rotation	Noting the above safety precautions and where safe to do so, manually rotate the antenna and ensure that it is free from obstruction and turns smoothly	☐	☐
		Antenna not accessible ☐	

DTX-A1-XXXX GEARBOX INSPECTION			
TASK	**DESCRIPTION**	**PASS**	**FAIL**
GENERAL CLEANING	Clean all exterior surfaces with a soft cloth moistened in a mild non-abrasive soap solution.	☐	☐
DESICCANT REPLACEMENT	As required, replace the static desiccant bag.	☐	☐
		Not applicable	☐
PHYSICAL INSPECTION	Ensure that all securing bolts for the gearbox and antenna are secure and show no signs of severe corrosion or damage. Pay particular attention to the four bolts that hold the gearbox assembly to the mounting plate.	☐	☐
	Inspect the gearbox including all mounting points for *any* signs of stress damage. **SEVERE WEATHER CHECKS** This inspection should be carried out at the earliest safe opportunity after the system has been exposed to severe or adverse weather conditions.	☐	☐
	Check that cable glands, cable entries and waveguide couplings are securely fastened and appear to be waterproof.	☐	☐
	Within reason and where safe to do so, check all accessible or exposed cables for any signs of damage and ensure they are safely secured into/ onto cable trays or trunking.	☐	☐
	The system should be checked to ensure that there is no obvious external damage or potential fault conditions that could lead to a general failure of any part of the system.	☐	☐
	Check that there are no signs of any oil leaks from the gearbox assembly.	☐	☐
EARTH BONDING AND CONTINUITY	Ensure that the earth bonding nuts and bolts are tight and free from corrosion. If corrosion is present, clean and re-terminate as described in section 9.5	☐	☐
	Test the earth bonding conductivity by attaching one lead of the test equipment such as a safety ohmmeter, bridge Megger or Multimeter to earth/ chassis and the other to an unpainted part of the equipment under test. Check earth bonding for continuity, the resistance should not exceed 0.1 ohms. If a test fails, investigate the bonding, rectify (see section 9.5) and repeat the test.	☐	☐

GTX-A24 DRIVE CONTROL UNIT				
TASK	**DESCRIPTION**		**PASS**	**FAIL**
CLEANING	**EXTERNAL SURFACES**	Clean with a soft, non-abrasive cloth moistened in a mild soap solution.	☐	☐
	INTERNAL SURFACES	Remove the cover of the Drive Control Unit using a screwdriver. Clean out the unit using blower and/ or soft brush.	☐	☐
PHYSICAL INSPECTION	**EXTERNAL**	Ensure that all mounting bolts are secure.	☐	☐
		Ensure all connectors are securely in place; inspect external cabling for condition and wear.	☐	☐
		Check that all air vents are clear of obstructions and dust.	☐	☐
	INTERNAL	Ensure all PCB's and connectors are securely in place; inspect internal cabling for condition and wear.	☐	☐
		Check that all air vents are clear of obstructions and clear of dust accumulation.	☐	☐
	GENERAL	The system should be checked to ensure that there is no obvious internal, external damage or potential fault condition that could lead to a general failure of any part of the system.	☐	☐
EARTH BONDING AND CONTINUITY	Visually inspect the earth terminal for damage and corrosion. If corrosion is present, clean and re-terminate as described in section 9.5.		☐	☐
	Test the earth bonding conductivity by attaching one lead of the test equipment [note] to earth/ chassis and the other to an unpainted part of the equipment under test. Check the earth bonding for continuity, the resistance should not exceed 0.1 ohms. If a test fails, investigate the bonding, rectify and repeat the test. **Note:** Safety ohmmeter, bridge Megger or Multimeter.		☐	☐

RESTORE POWER TO THE SYSTEM		
On completion of the above maintenance tasks and noting that the following tests WILL CAUSE ANTENNA ROTATION AND SYSTEM TRANSMISSION, restore power to the system.		
TASK	**DESCRIPTION**	**COMPLETED**
AC SUPPLY	Restore the single phase AC supply to the Drive Control Unit and DTX-A1-xxxx transceiver.	☐
SECURITY SWITCHES	Place the Drive Control Unit ON/ OFF keyswitch into the ON position.	☐
TEST	Observing all Health & Safety requirements, test the system and ensure full functionality.	☐

SAFETY SWITCH TESTS

The following tests should be carried out with power restored to the system and check that the keyswitch will STOP antenna rotation.

WARNING: HEALTH & SAFETY

When carrying out the following test, do not contravene any Health and Safety precautions including those associated with working aloft, antenna or electrical safety.

GTX-A24 KEYSWITCH OPERATION			
TASK	**DESCRIPTION**	**PASS**	**FAIL**
MOTOR ON/ OFF KEYSWITCH OPERATION	Observing all Health & Safety considerations, place the DTX-A1-xxxx into RUN from the display sub-system. **The antenna should be rotating.**	☐	☐
	Place the Drive Control Unit ON/ OFF keyswitch located on the top of the Drive Control Unit into the OFF position. The MOTOR ON indicator should be OFF (not illuminated). **Antenna Rotation should have stopped**	☐	☐
	Place the Drive Control Unit ON/ OFF Keyswitch on the Drive Control Unit into the FREE position. **Antenna rotation should have resumed.**	☐	☐

TEST FAILURE?

If any of the above safety switch tests fail please contact Kelvin Hughes for assistance.

9.4 10-year maintenance

CHANGING THE STATIC INVERTER

In addition to the annual maintenance requirements indicated earlier in this section, after 10-years of use, the static inverter located within the GTX-A24 Drive Control Unit must be changed as over time, the electrolytic capacitors within the inverter can dry out.

Please contact Hensoldt UK for details or to arrange for an engineer to change the inverter.

When contacting Hensoldt UK please ensure that you have the full part and serial number of the GTX-A24 Drive Control Unit as this assists in identifying the inverter fitted within the equipment.

The following can be used to record when the system was installed and when inverter replacement is necessary.

10 YEAR INVERTER REPLACEMENT RECORD	
GTX-A24 DRIVE CONTROL UNIT	
GTX-A24 serial Number	
System Installation Date: (dd/ mm/ yyyy)	
Replacement inverter serial number:	
Inverter changed by Name: **Company:** **Replacement date:** (dd/ mm/ yyyy)	

WARNING: AC VOLTAGES

Lethal single phase and antenna motor AC supplies are present within the inverter.

CAUTION: INVERTER REPLACEMENT

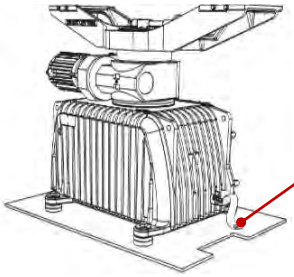
The inverter must be replaced by a suitable qualified technician.
Only Hensoldt UK approved inverters must be used.
The installation of an unapproved inverter can cause irreparable damage the system.

NOTICE: DO NOT DISMANTLE THE INVERTER

The inverter is a factory sealed unit that contains no serviceable or replaceable parts

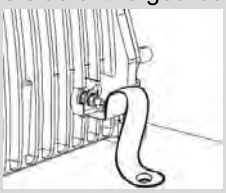
9.5 Earth bonding maintenance

Where an earth chassis bonding point has been found to be corroded or fails a conductivity test, the bonding joint should be dismantled, cleaned and reassembled as follows:



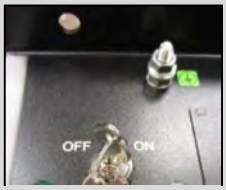
DTX-A1-xxx gearbox

The gearbox grounding strap is located to the side of the gearbox.



GTX-A24 Drive Control Unit

The Drive Control Unit M6 grounding/ earth stud is located on the top of the unit



EARTH BONDING CLEANING PROCEDURE

a) Fully isolate the equipment from all AC power including any UPS supported supplies.

b) Release the nuts/bolts securing the equipment earthing/ ground straps.

c) Clean the affected parts with a wire brush or emery cloth to provide bright metal surfaces.

d) Refit the equipment/straps and tighten all nuts/bolts.

e) Carry out a continuity check in accordance with the appropriate maintenance procedure.

f) If the test is satisfactory, restore the equipment power supplies and test the system.

g) Protect the earth bonding point from corrosion.