



User Instruction & Installation Manual

Voyager 2



Product Reference Number:

A6097 VX500 300w 115/230v Xenon

A6096 VX500 150w 115/230v Xenon

Manufacturer's details:

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1 - Introduction

It is imperative that this manual is read carefully and understood before installing your equipment. For your future reference please keep this manual in a safe place.

Thank you for specifying a product from the Francis Searchlights range. All Francis products are designed to give complete customer satisfaction and are manufactured to the highest engineering standards in order to ensure optimum performance and service life.

The Francis range combines features proven over many years service in the most hazardous conditions in both marine and land installations.

In order to prolong the life and performance of your product, we recommend that you only specify Francis Searchlights spare parts. This will also ensure that any warranties on your equipment will not be invalidated. Information on spares ordering and parts is provided in this manual.

Should you ever need to contact Francis Searchlights Ltd. regarding your equipment, please quote the Product Serial Number at all times.

2 - Safety Precautions

The following instructions must be adhered to, in order to ensure a safe working environment and the safety of the user.

Note: When unpacking or manoeuvring the searchlight into its fixing position, suitable lifting points must be used in order to prevent damage to the equipment or personal injury.

- Prevent rain, snow, condensation and water droplets from contacting the lamp as this may cause bulb failure and possible shattering;
- Xenon lamps run with a high internal pressure in excess of atmospheric. Whilst the construction is inherently strong, there is a slight risk of the bulb shattering;
- Never look directly into an illuminated searchlight as this may cause severe damage to eyesight. If it is necessary to inspect a lamp whilst in operation, always wear suitable protective goggles;
- Should it be necessary to examine the lamp with the lid removed, always use a protective shield and wear goggles to ensure a safe working environment;
- Never attempt to clean a lamp whilst in use;
- Searchlights get hot. Never touch the unit when lit and always allow 15 to 20 minutes for cooling down after turning the searchlight off;
- Never place anything on or cover the searchlight when in use;
- Ensure the lamp has cooled sufficiently before removal;
- If undue force appears necessary to remove the lamp, the equipment should be inspected by a competent person or contact the manufacturer;
- When breaking a lamp for disposal, care must be taken to ensure the glass fragments are safely contained. This operation must be performed out of doors in free air. In all circumstances refer to the lamp manufacturers instructions packed with the lamp;
- Due to the vast range of lamps available it may appear possible that more powerful lamps can be used in the equipment than for which it was designed. Even when the unit will physically accept a higher wattage or voltage lamp, this substitution is not recommended and is dangerous. This action will also void any warranties on the equipment.

Always refer to the lamp manufacturer's technical data when dealing with lamps.

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3 - Technical Information

This product has been designed to operate in accordance with the product specification. The VX500RC searchlight has the following features:

- All marine grade materials and fixings;
- Parabolic glass reflector;
- Instant lamp re-strike. No cooling down time required;
- Economical 600 hour lamp life (300w) 1200 hour lamp life (150w);
- 350° horizontal rotation;
- Vertical movement +20° to -20°;
- Motor speed 1°- 20°/sec (Pan). 1°-10°/sec (Tilt);
- RS485 connectivity & auto home positioning;
- Remote focus facility;
- Self Regulating internal heater;
- Toughened front glass;
- Sealing to IP66;

The searchlight also performs to the following optical data:

- Xenon light source;
 - Lamp Wattage - 300 Watts;
 - Supply voltage – 110v/240v AC 1Ph 50/60 Hz;
 - Peak Beam Candlepower – 15.4 million Lux;
 - Range – 3920 metres;
 - Adjustable lamp focus, 1° spot to 10° flood;
 - Temperature range: -50°C
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- Xenon light source;
 - Lamp Wattage - 150 Watts;
 - Supply voltage – 110v/240v AC 1Ph 50/60 Hz;
 - Peak Beam Candlepower – 7.6 million Lux;
 - Range – 2760 metres;
 - Adjustable lamp focus, 1° spot to 10° flood;
 - Temperature range: -50°C

In order that the searchlight operates correctly it is imperative that competent personnel are responsible for the installation, operation and servicing of this equipment. Failure to adhere to this advice may cause premature failure or incorrect operation of the searchlight, which may damage the equipment or cause personal injury.

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4 - Unpacking and Installation Instructions

The following instructions should be read and fully understood prior to installing the equipment to ensure that the correct procedures are followed and all safety precautions are observed.

Note: If the equipment has been in storage for a considerable amount of time, it is advisable to conduct a routine maintenance check on all parts before installation.

Safety Precautions

This equipment should not be connected to an electrical supply before being installed. Installation procedures should be adhered to in order to ensure a safe working environment and reduce the risk of damage or personal injury.

Preparing the Mounting Position

Mark out and drill the fixing holes through the deck. When in the desired position fasten the searchlight firmly down. On an uneven surface it may be necessary to use a suitable sealant such as silicone, in order to ensure a weatherproofed joint. If no cabling is required to be seen on deck there is the option to wire from underneath the base directly into the deck. See drawing A6093 for details.

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5 - Electrical Installation

For safety purposes, only competent personnel should perform the electrical installation. All equipment should be installed to current Electrical Regulations and Standards.

In order to obtain the maximum light output from the searchlight, it is essential that the full operating voltage of the lamp fitted be applied to the lampholder contacts.

Method of Electrical Connection

- 1) Disconnect the supply before working on the electrical system;
- 2) The searchlight must be connected to a fused electrical supply, using suitably sized cable;
- 3) If the searchlight is located a considerable distance from the supply, provision must be made in the cable size in order to overcome the voltage drop. The following table should be used for indication purposes only:

The junction box should NOT be positioned more than 4 metres (300w) 6 metres (150w) away from the Searchlight.

The following table indicates the maximum length of cable to be used for AC supply cable, from the supply to the Searchlight

Searchlight	115v 300w	240v 300w
Cable Size (mm ²)	Distance Max	Distance Max
1.5	57 MTRS	247 MTRS
2.5	93 MTRS	404 MTRS
4.0	147 MTRS	640 MTRS
6.0	229 MTRS	997 MTRS
10.0	384 MTRS	1869 MTRS

Searchlight	115v 150w	240v 150w
Cable Size (mm ²)	Distance Max	Distance Max
1.5	71 MTRS	296 MTRS
2.5	120 MTRS	500 MTRS

- 4) Whenever possible cable terminations should be made below deck and with approved terminal devices;

- 5) If a spare auxiliary fuse or circuit breaker is not available, one of the correct type and rating should be fitted and connected to a positive supply. It is advisable to locate a bus bar or main connection and avoid any direct connection to the supply:
- 6) For 110/220v AC products, the following colour coding system should be used for the customer supply cable:

Brown	- Live
Blue	- Negative
Green/Yellow	- Earth

Note: This equipment must be earthed.

Installation Guidelines

A typical installation and connection routine for the VX500 RC 115/240v searchlight is as Follows:

Referring to wiring diagram C26649, a supply is fed to the junction box (control devices), which then provides a common feed to the searchlight and joystick panel.

The junction box to searchlight and joystick panel has been pre-wired with 3 metres of 12 core 0.5mm, 4 core 2.5mm and 2 pair twisted 0.22 screened cable. 3 metres of 3 core 1.5mm cable has been fitted for the supply (Customer may need to increase this length refer to table on previous page).

When the light is in operation the output from the PSU should be 20v at 15 amps. (300w)

When the light is in operation the output from the PSU should be 17.5v at 8.5 amps. (150w)

Basic Operation

When the searchlight is turned on an 115v/240v supply is fed to the PSU. This in turn generates a sufficient voltage to the ignitor in order that the ignition voltage is achieved and the Xenon lamp strikes.

After the lamp has lit, the PSU regulates the voltage through the ignitor so that the lamp operates within its design parameters.

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6 - Operating Instructions

This equipment is designed for use out of doors, in free air. Never place anything on, or cover the searchlight when in use as this may present a hazard.

The searchlight can be remotely positioned via the joystick control panel, with the facility for movement up, down, left and right.

The speed of movement depends on the more pressure applied to the joystick the faster the searchlight moves. When in the desired position the joystick should be simply released so that it returns to its home position dead centre.

The beam of the searchlight can be adjusted to give a variety of beam types. Using the focus button on the joystick panel, the desired beam can be achieved for any particular application. The beam will move continuously through 'spot' to 'flood'. In order to fix the beam type; simply release the button at the desired position.

To return the searchlight to its auto home position (forward and horizontal) simply switch off the joystick panel using the panel switch and then hold down the lamp switch for a few seconds.

The heaters specified on this equipment are self-regulating and will shut off when they reach the dew point temperature.

There is the option for added slave panels, the slave panel has all the features of the main panel i.e. joystick, focus and on/off.

NOTE both panels MUST NOT be operated simultaneously as this may damage the equipment

This product should not be used for any purpose other than for which it was designed. Any modifications to the product should not be undertaken without consulting the manufacturer.

Setting to Work

Safe service in use necessitates the strict observance of the following precautions.

- Any article fabricated from quartz or glass is inherently fragile and care should therefore be taken, at all times, when handling lamps;
- Eye protection must be worn when handling lamps that have been removed from their packaging materials. The protective sleeve should not be removed from the lamp for safety reasons, as there is a remote possibility of the lamp shattering violently, especially if it is subjected to mechanical shock or vibration;
- Ensure that the power rating of the lamp to be fitted is suitable for the lamp house and power supply equipment;
- Always isolate the equipment from the supply before inserting a lamp;
- Before inserting the lamp ensure that all contacts are clean. Contacts must be renewed at the slightest sign of corrosion. Sanding or filing down corroded areas is not recommended as this will only make the conducting surface between the pin and lamp holder smaller, thus causing the lamp to overheat;
- Do not twist or bend the fused quartz bulb when fitting the lamp as mechanical stresses MUST be avoided;
- When inserting or removing a lamp, always hold it securely by its' base in order to prevent breakage between base and bulb;
- The lamp holder must not exercise mechanical tensions on the lamp, neither during insertion or operation. Contacts must not discolour during use;
- For safety reasons, the lamp should be replaced once it has reached its' average life, and not later than 1.25 times the stated life. With continuing use the risk of the lamp exploding increases due to alterations within the quartz;
- Before the protective sleeve is removed, suitable protection must be worn i.e. face mask and gloves with wrist protection;
- Never touch the quartz bulb with bare hands, as fingerprints will make the glass cloudy and cause a severe loss of light. This may also cause recrystallisation and thus weaken the bulb material. Should the bulb be inadvertently touched, remove fingerprints with methylated spirit and a clean, soft paper towel. The bulb should then be wiped with distilled water. NOTE: ALWAYS WEAR MASK AND GLOVES DURING CLEANING);

- All packaging and the protective sleeve must be retained for re-use. Whenever removing a lamp, the protective sleeve must always be used for safety reasons;

In all circumstances the lamp manufacturer's data should be referred to when dealing with lamps.

Always isolate the equipment from the supply when fitting a lamp

Before fitting the lamp:

- Loosen and remove five M8 socket bolts with the dubo washer on the underneath of the searchlight, then remove the upper hood of the searchlight & store along with the bolts and washers in a safe area;

After fitting the lamp,

- Replace the upper hood, ensuring the groove aligns correctly with the glass gasket replace the bolts and washers and make sure they are securely fastened.

When fitting the lamp:

- Always isolate the equipment from the supply when inserting a lamp;
- Ensure the circuit is suitably fused;
- Ensure the lamp is of the correct power rating and type;
- Check the lampholder is in a good dry condition. Never allow water to collect in the lamp fitting or come into contact with the lamp.

To fit the lamp:

- Fit the rear lamp holder lead over the thread of the lamp and then screw into the rear PTFE lamp holder;
- Connect the front lead to the lamp and secure in place with the knurled nut;

Testing

Upon correct installation and connection to an electrical supply, the equipment can be tested in order to ensure its' correct performance. A competent person with some knowledge of electrical equipment must carry out this work.

Equipment required: Multi-meter with leads
 Ammeter

Using the equation $P=VI$, the approximate power output of the equipment can be calculated in the following way:

- Using the multi-meter, take a voltage reading from the terminal block inside the searchlight;
- Using the ammeter, take an amps reading from the live cable to the lamp;
- Multiply these figures together to give an approximate wattage (Power output).

For example:

Using a 300w xenon lamp:

Voltage reading = 20v; Amps reading = 15 amps

Therefore, Wattage = $20 \times 15 = 300$ watts

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7- Fault Finding

All fault finding must be conducted by a competent person or qualified Electrical Engineer.

Please refer to the following table for the trouble-shooting of Xenon lamps.

Fault	Cause	Remedy
<ul style="list-style-type: none"> ■ Wrong Polarity 	<ul style="list-style-type: none"> ■ Lamp incorrectly fitted ■ Faulty wiring 	<ul style="list-style-type: none"> ■ Anode (large electrode) must always be on top in vertical burning position ■ Check polarity, transpose connections if necessary
<ul style="list-style-type: none"> ■ Cap overheated ■ Cap temperature above 230°C 	<ul style="list-style-type: none"> ■ Faulty contacts ■ Cooling equipment defective 	<ul style="list-style-type: none"> ■ Check terminals, tighten or renew ■ Check cooling equipment and replace if necessary
<ul style="list-style-type: none"> ■ Arc unsteady 	<ul style="list-style-type: none"> ■ Lamp operated outside current control range ■ Magnetic stabilisation for horizontal operation defective 	<ul style="list-style-type: none"> ■ Correct current setting ■ Check magnetic stabilisation
<ul style="list-style-type: none"> ■ Bulb draws in air 	<ul style="list-style-type: none"> ■ Crack in graded seal caused by overheated cap ■ Maximum cap temperature 230°C 	<ul style="list-style-type: none"> ■ Check terminals - tighten or renew
<ul style="list-style-type: none"> ■ Glass erosion on fused quartz bulb 	<ul style="list-style-type: none"> ■ Lamp operated outside current control range ■ Lamp service life exceeded 	<ul style="list-style-type: none"> ■ Correct current setting ■ Check meter
<ul style="list-style-type: none"> ■ Electrodes damaged ■ Premature blackening 	<ul style="list-style-type: none"> ■ Current ripple too high ■ Auxiliary mirror incorrectly adjusted 	<ul style="list-style-type: none"> ■ Have power supply inspected ■ Adjust auxiliary mirror

■ Asymmetrical blackening of lamp (in horizontal burning position)	■ Lamp operated too long in same position	■ Turn lamp through 180° after half service life
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Failure of Lamp to ignite

In the event of the lamp failing to light the following steps should be taken:

- 1) Check that the supply is connected to the input of the PSU and check all connections as per the wiring diagram. On operation if the lamp does not light, switch off supply and check all fuses;
- 2) Check the PSU enclosure. On your command get an operator to switch on the light for approximately 2 seconds. During this time listen for any noise (cracking or hissing) coming from within. If this arcing is heard switch off the supply. Remove the searchlight body to expose the two supply leads from the PSU enclosure to the lamp. Using a dry cloth wipe these leads to remove any dust, moisture or condensation that may have formed around the inside of the barrel. Replace the body, ensuring the screws are securely fastened, and perform the check again, listening for the cracking. If the lamp still fails to ignite, switch off at the supply and replace the lamp in accordance with the safety procedures within the manual and the manufacturer information.

Any further tests to be carried out with regards to lamp failure must be conducted by a competent electrical engineer and should not be carried out in an explosive atmosphere.

- 3) Before a xenon lamp will ignite, the electrically insulated gas between the electrodes must be ionised. This is done by the ignitor which produces a high frequency voltage (up to 14,000 volts or higher). Switching the lamp on activates the ignitor. A cracking or hissing noise should be heard. The ignitor is housed within the searchlight head. If found to be faulty return to Francis Searchlights Ltd for evaluation and repair.

Failure of Remote Focus

Causes:

- 1) Power not supplied;
- 2) Faulty connections;
- 3) Failed motor;

Remedy:

- 1) Check voltage at supply and the output from the control board in the junction box. If no supply present fault is at customer supply. If power is present see remedy 2;
- 2) Check all wiring connections on motor and terminal block in accordance with the wiring diagram. If found to be correct, see remedy 3;
- 3) Remove the focus motor and apply 24v DC directly across terminals. If motor does not rotate the unit has failed. A new focus motor should be fitted to the assembly.

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8 - Maintenance and Servicing

In order to prolong the service life and performance of your searchlight, the following maintenance guidelines are recommended:

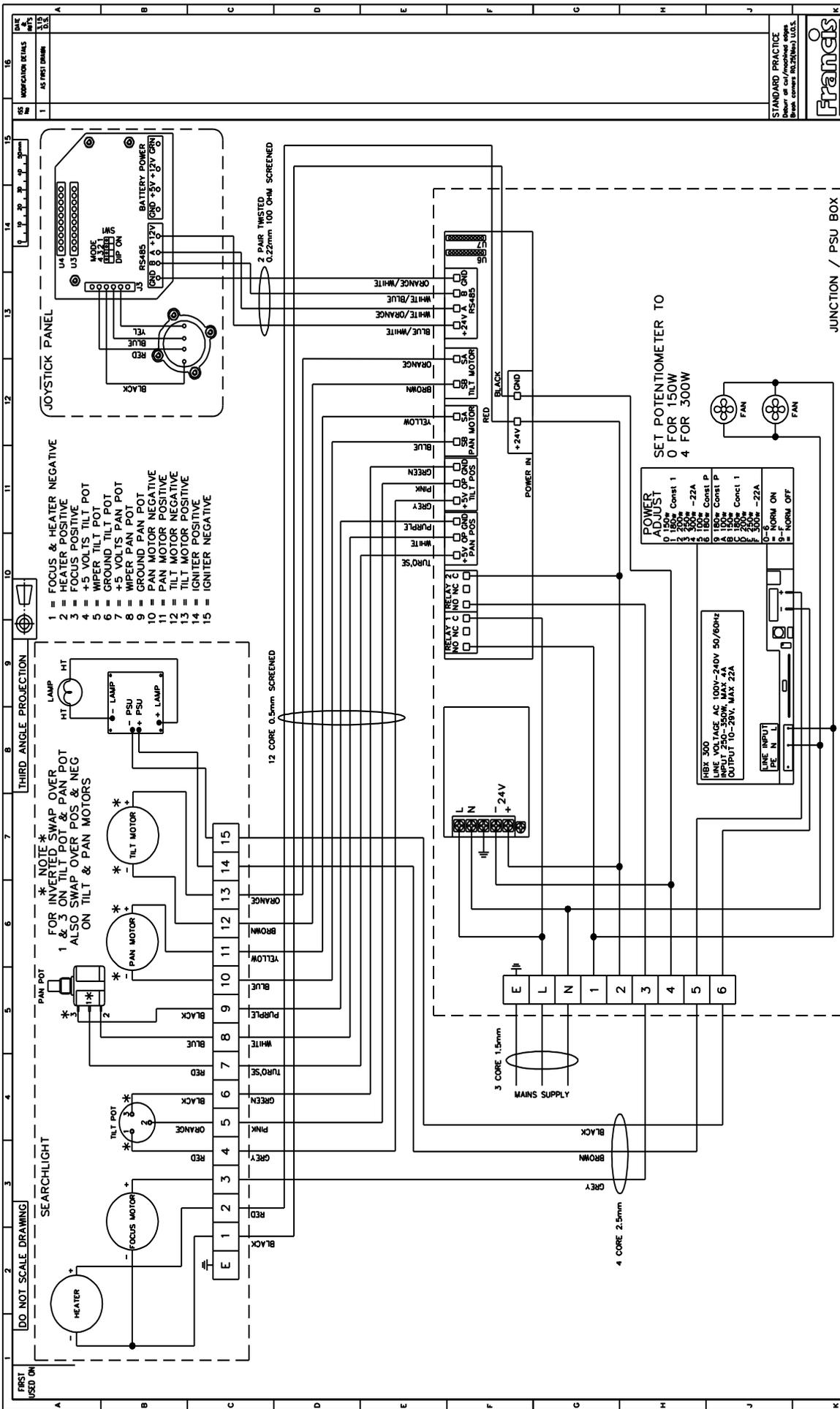
- Maintenance checks should be conducted before every voyage or at least every three months;
- Before checking, disconnect the equipment from the supply;
- Visually inspect the condition of the equipment;
- Any major or minor structural damage should be rectified immediately in order to reduce sympathetic wear;
- After inspection it may be necessary to clean the inside of the searchlight. The following procedure should be adhered to:
 - Remove the upper casting by removing the five M8 socket bolts with the dubo washer on the underneath of the searchlight,;
 - Clean the front glass inside and out using a proprietary glass cleaner or metal polish;
 - Clean the reflector if required;
 - Check earthing point for conductivity;
 - It is advisable to check all seals and gaskets for signs of degradation. Renew if necessary;
 - The searchlight is fitted with a breather unit. This ensures a steady airflow in order to prevent any vacuum forming within the barrel.
- Upon completing all maintenance requirements the searchlight should be tested for full working order (approximately 20 minutes).

If in any doubt as to the correct servicing procedures to adopt please contact your distributor/agent or the manufacturer who will be able to advise the best course of action for your product.

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9 - Wiring Diagrams and General Assembly

Drawing Number	Description
A6093	A6097 / A6096 VX500RC G A
C26649	Wiring Diagram
C26540	Joystick Panel Assembly
C26657	Junction Box Assembly



- 1 = FOCUS & HEATER NEGATIVE
- 2 = HEATER POSITIVE
- 3 = FOCUS POSITIVE
- 4 = +5 VOLTS TILT POT
- 5 = WIPER TILT POT
- 6 = GROUND TILT POT
- 7 = +5 VOLTS PAN POT
- 8 = WIPER PAN POT
- 9 = GROUND PAN POT
- 10 = PAN MOTOR POSITIVE
- 11 = PAN MOTOR NEGATIVE
- 12 = TILT MOTOR POSITIVE
- 13 = TILT MOTOR NEGATIVE
- 14 = IGNITER POSITIVE
- 15 = IGNITER NEGATIVE

DO NOT SCALE DRAWING

SEARCHLIGHT

THIRD ANGLE PROJECTION

* NOTE *
FOR INVERTED SWAP OVER
1 & 3 ON TILT POT & PAN POT
ALSO SWAP OVER POS & NEG
ON TILT & PAN MOTORS

JOYSTICK PANEL

MODE SWITCH

BATTERY POWER

RS485

2 PAIR TWISTED
0.22mm 100 OHM SCREENED

POWER ADJUST

0 180W Const 1

1 200W Const 2

2 220W Const 3

3 240W Const 4

4 260W Const 5

5 280W Const 6

6 300W Const 7

7 320W Const 8

8 340W Const 9

9 360W Const 10

10 380W Const 11

11 400W Const 12

12 420W Const 13

13 440W Const 14

14 460W Const 15

15 480W Const 16

16 500W Const 17

17 520W Const 18

18 540W Const 19

19 560W Const 20

20 580W Const 21

21 600W Const 22

22 620W Const 23

23 640W Const 24

24 660W Const 25

25 680W Const 26

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352 7220W Const 353

353 7240W Const 354

354 7260W Const 355

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356 7300W Const 357

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395 8080W Const 396

396 8100W Const 397

397 8120W Const 398

398 8140W Const 399

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400 8180W Const 401

401 8200W Const 402

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DATE 11/11											
MODIFICATION DETAILS											
ISS No											
1	1	1	1	1	1	1	1	1	1	1	1
AS FIRST DRAWN											

FIRST USED ON 16093

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

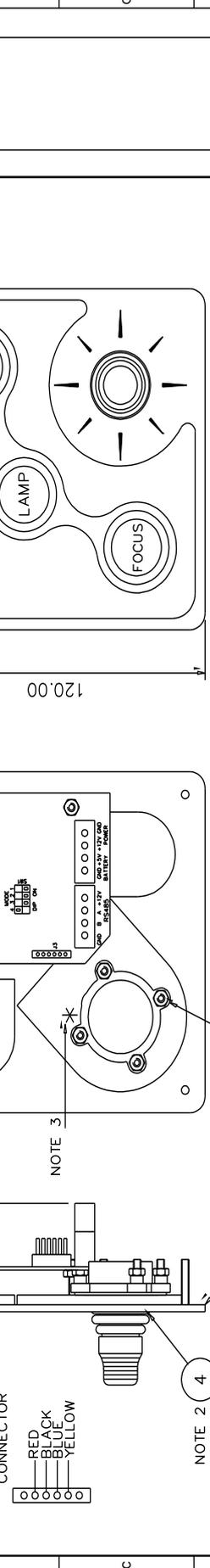


NOTE

1...OPEN HOLES UP TO $\phi 3.30$ ON THE JOYSTICK CLAMPING RING

2...POSITION THE WASHER UNDER THE JOYSTICK BELLOWS

3...POSITION THE JOYSTICK WITH INDICATOR AT THE TOP AS SHOWN *



ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C26528	C26528	CONTROL PANEL 3 BUTTON	1
2	C26537		JOYSTICK S/ASSY	1
3	C26539		JOYSTICK PCB	1
4	C24710		M20 SEALING WASHER	1
5	C05298		M3 FULL NUT	10

STANDARD PRACTICE
Debur all cut/mechanised edges
Break corners R0.25(Max) U.O.S.



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PART No./DRG No. C26540 1

FRANCIS SEARCHLIGHTS LIMITED . UNION ROAD . BOLTON . BL2 2HU

DESCRIPTION JOYSTICK PANEL ASSY

DRAWN	LW	DATE	11.14	TOLERANCES
CHECKED	SCALE	1:1	General: ±	Angular: ±
ALL DIMENSIONS IN MILLIMETRES				Scale Confg. To ISO 8052 CT10
				Die Casting To ISO 8052 CT8
				Note centres & posns. ±

FINISH	DESCRIPTION
	JOYSTICK PANEL ASSY

FINISH	DESCRIPTION
	JOYSTICK PANEL ASSY

FINISH	DESCRIPTION
	JOYSTICK PANEL ASSY

FINISH	DESCRIPTION
	JOYSTICK PANEL ASSY

10 - Spare Parts List

The following spare parts can be ordered directly from the manufacturer:

Searchlight Head

Part Number	Description
D21908	300w Xenon Lamp
D8151	150w Xenon Lamp
C26195-00	Igniter
C26139-00	Front Glass
C26184-00	Front Glass Gasket
C26183-00	Sealing Strip Gasket
C26475-00	Mounting Base Gasket
C16410-00	24v Motor – Focus and Tilt
C25884-00	Reflector
C22268-01	Breather Assembly
C24089-01	Pan Motor Sub Assembly
C21567-00	Searchlight Heater
C23569-00	Pan potentiometer (10 Turn)
C25818-00	Tilt potentiometer (1 Turn)

Junction Box

C26194-01	PSU (300w)
C26535-01	PSU (150w)
C22104-00	Fan
C26545-00	24v PSU Converter
C26520-00	Speed Controller PCB

Joystick Panel

C26537-01	Joystick
C26539-00	Joystick Controller PCB

In order to prolong the life and performance of your product, we recommend that you only specify Francis Searchlights spare parts. This will ensure that any warranties on your equipment will not be invalidated.

When ordering spare parts, please contact the Sales Department at Francis Searchlights Ltd. Please quote searchlight model and serial number at all times. This will enable a fast response to your spares' requirements.