



## User Instruction & Installation Manual

# Voyager 2



### Product Reference Number:

**A6093 VH500 250w 24v Halogen**  
**A6094 VH500 250w 110v/230v Halogen**

#### *Manufacturer's details:*

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#### *Distributor details:*

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**Manual Part Number: C26639**

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**CONTENTS**

- 1 - Introduction
- 2 - Safety Precautions
- 3 - Technical Information
- 4 - Unpacking and Installation Instructions
- 5 - Electrical Installation
- 6 - Operating Instructions
- 7 - Fault Finding
- 8 - Maintenance and Servicing
- 9 - Wiring Diagrams & General Assembly
- 10 - Spare Parts List

## 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.

[Back To Top](#)

## 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;
- Quartz halogen bulbs 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.**

[Back To Top](#)

### 3 - Technical Information

This product has been designed to operate in accordance with the product specification. The VH500 searchlight has the following features:

- All marine grade materials and fixings;
- Parabolic glass reflector;
- 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:

■ Lamp Part Number	<u>250 Watt T/H</u> D9851
■ Peak Beam Candlepower	2,800,000 Lux
■ Range	1673 metres
■ Divergence	3°
■ Temperature range	-50°C
■ Lamp Life	300 hours

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.

[Back To Top](#)

## 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.

[Back To Top](#)

## 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 junction box to searchlight should not be positioned more than the following distances:**

24v 250w	=	6.5 metres
110v 250w	=	30 metres
24v 250w	=	65 metres

**The following table indicates the maximum length of cable to be used from the supply to the Junction Box:**

Searchlight	24v 250w
Cable Size (mm <sup>2</sup> )	Distance Max
2.5	5 MTRS
4	8 MTRS
6	12 MTRS
10	20 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:

**Note: This equipment must be earthed.**

## **Installation Guidelines**

**A typical installation and connection routine for the **VH500 RC 24v** supply searchlight is as follows:**

Referring to wiring diagram C26646, 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 meters of 12 core 0.5mm, 4 core 2.5mm and the two pair twisted screened cables. 3 metres of 3 core 2.5mm cable has been fitted for the supply (Customer may need to increase this length refer to table on previous page).

**A typical installation and connection routine for the **VH500 RC 240v** supply searchlight is as follows:**

Referring to wiring diagram C26648, a supply is fed to the junction box (control devices), which then provides a common feed to the searchlight and joystick panel.

The only difference between the 240 volt version and the 24 volt version is the step down transformer fitted in the junction box.

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

**A typical installation and connection routine for the **VH500 RC 115v** supply searchlight is as follows:**

Referring to wiring diagram C26647, a supply is fed to the junction box (control devices), which then provides a common feed to the searchlight and joystick panel.

The only difference between the 115 volt version and the 240 volt version is the wiring of the step down transformer fitted in the junction box.

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

[Back To Top](#)

## 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 jacket 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;
- 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 lampholder 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;
- The lamp must be capable of unimpeded expansion when it warms up to operating temperature. Mechanical forces must not be applied to the fused quartz bulb;
- Before the protective jacket 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);

**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 the lamp is fitted:**

- 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 Halogen lamp:**

- Ensure the circuit is suitably fused;
- Ensure the lamp is of the correct power rating and type;
- Check lamp holder is in good condition. If the contacts show any sign of corrosion, replace the lamp holder;
- Check the lamp holder 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 Halogen lamp:**

- Cut open one end of the protective sleeve surrounding the lamp;
- Using the sleeve to prevent the fingers coming into contact with the lamp, position the two pins inline with the holes in the lamp holder;
- Gently push the lamp into the lamp holder and remove the protective sleeve;

## 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 24v 250w Tungsten halogen lamp:  
Voltage reading = 24v; Amps reading = 10 amps

Therefore, Wattage =  $24 \times 10 = 240$  watts

Back To Top

## 7- Fault Finding

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

### **Failure of Lamp to light**

*Causes:*

- 1) Power not supplied;
- 2) Fuse blown;
- 3) Failed lamp;

*Remedy:*

- 1) Check voltage at supply. If supply is not present the fault is at the customer supply. If power is present, see remedy 2;
- 2) Check fuse for visual failure. If none noticeable check fuse for continuity using a multi-meter. If fuse found to be faulty, replace with new part and test equipment again for correct working order. If found to be working correctly see remedy 3;
- 3) Firstly, check supply at lampholder connecting block (within searchlight body). If supply is present, disconnect unit from power supply before removing the lamp. If noticeable damage to filament is present, the lamp will have failed. The lamp can also be checked for continuity using a multi-meter. Replace lamp ensuring all precautions and instructions previously outlined in this manual are adhered to.

### **Failure of Remote Focus**

*Causes:*

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

*Remedy:*

- 1) Check voltage at supply, output of the step down transformer 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.

[Back To Top](#)

## 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.**

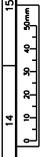
[Back To Top](#)

## 9 - Wiring Diagrams and General Assembly

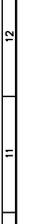
<b>Drawing Number</b>	<b>Description</b>
A6093	A6093/A6094 VH500 GA
C26646	Wiring Diagram 24v Supply
C26648	Wiring Diagram 240v Supply
C26647	Wiring Diagram 115v Supply
C26540	Joystick Control Panel
C26675	Junction Box L.V
C26662	Junction Box H.V



DATE	16
INDICATION ITEMS	1 AS FIRST DRAWING 2 NEW MOTOR PIVOT 7.1.15 BRACKET EC1549 LV A
IS No	
1	
2	



THIRD ANGLE PROJECTION

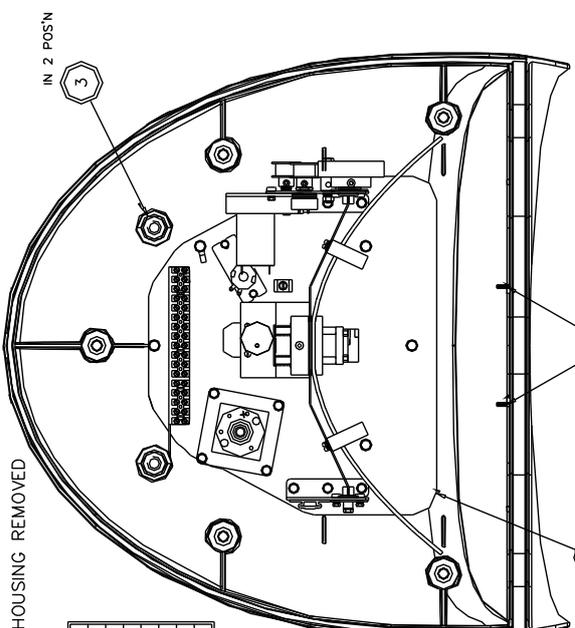


DO NOT SCALE DRAWING

FIRST USED ON

VIEW WITH UPPER HOUSING REMOVED

VH500	A6093	LV 250w TUNG HAL
VH500	A6094	HV 250w TUNG HAL
VM500	A6095	HV 350w EM-ARC
VM500	A6096	HV 150w XENON
VM500	A6097	HV 300w XENON
VM500	A6123	LV 150w XENON
VM500	A6124	LV 100w XENON
VM500	A6125	HV 100w XENON



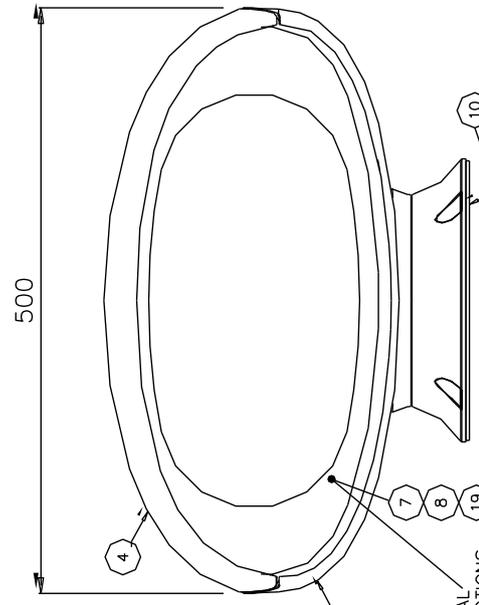
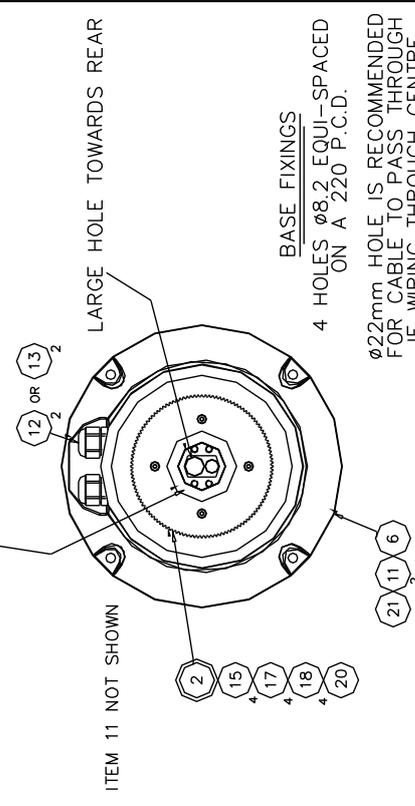
FIT SEALING STRIP AFTER FITTING THE GLASS TRIM TO SUIT

GLASS LOCATION INDICATOR WEBBS

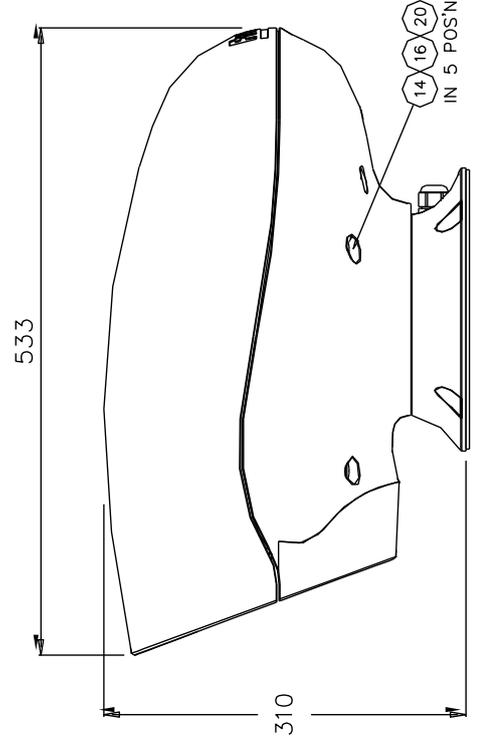
LIGHT IS PRE-WIRED USING CABLE GLANDS TO THE REAR BUT IF PREFERRED CAN BE WIRED THROUGH HOLE IN THE BASE. BLANKING PLUGS ARE SUPPLIED IF CUSTOMER WISHES TO CHANGE FROM WIRING AT THE REAR.

NOTE

USE SHIMS ITEM 22 OR 23 IF REQUIRED TO OBTAIN DESIRED CLEARANCE OF LOWER HOUSING TO BASE. REPLACE THE SHIM ON THE THRUST BEARING



SEE ADDITIONAL WORK INSTRUCTIONS



FRANCIS SEARCHLIGHTS LIMITED	UNION ROAD · BOLTON · BL2 2JU			
CHECKED	DATE	SCALE	TOLERANCES	Serial Casting: To ISO 8002 C10 Die Casting: To ISO 8002 C10 Hole centres & points: ±
LV	6.14	1:2	General: ±	
ALL DIMENSIONS IN MILLIMETRES	Angular: ±			
MATERIAL	FINISH	DESCRIPTION	PART No (Proj No)	
		VOYAGER II GA (VH500-VM500-VX500)	A1 CONT ON SHEET	
			A6093	
			SHEET	

STANDARD PRACTICE  
Dibour et al / Machine edge  
Bent corners R0.25/Mod 0.035



© 2014

FRST USED ON 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

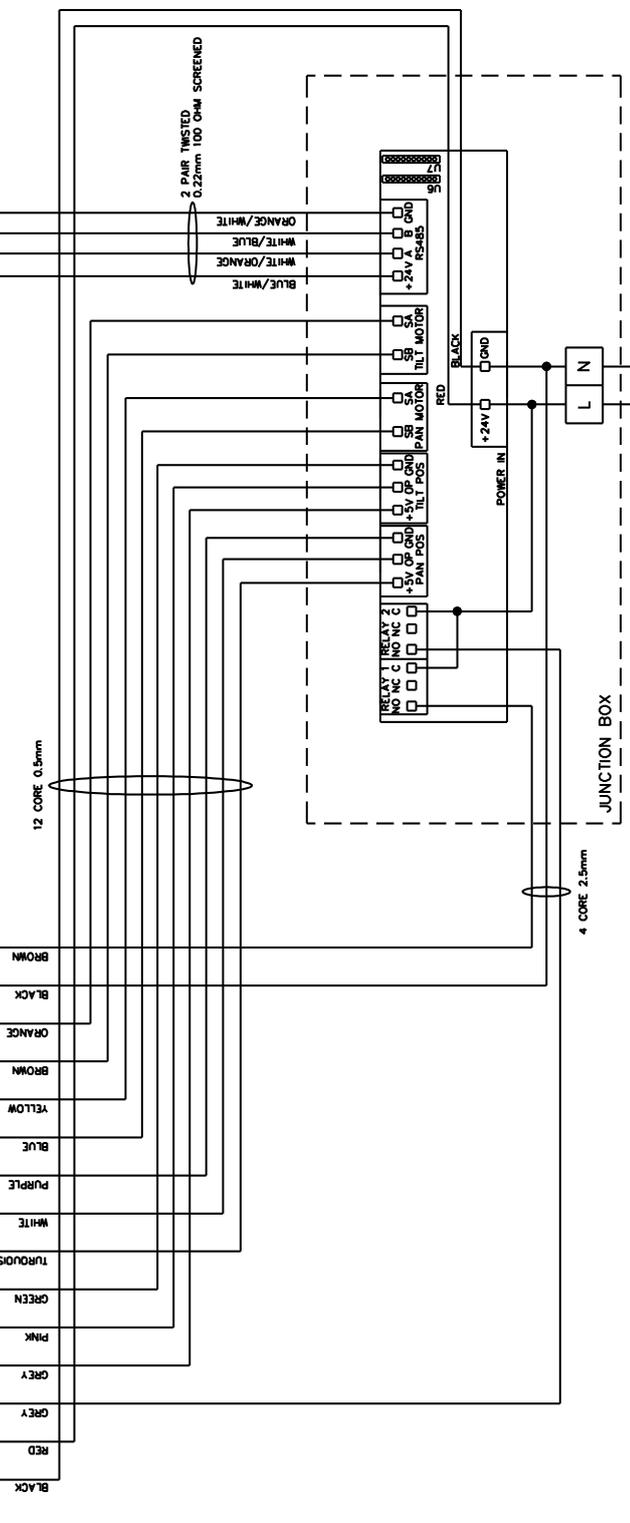
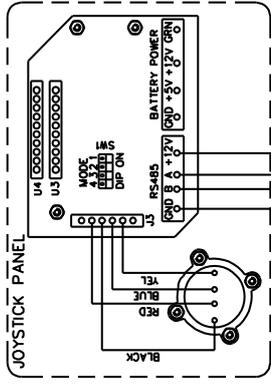
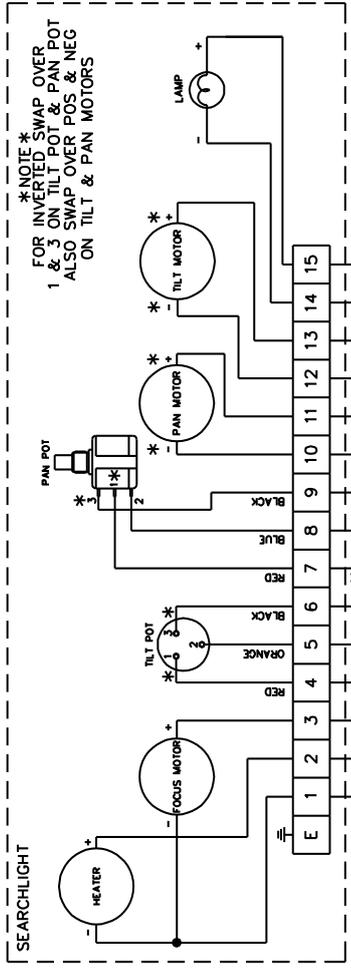
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

AS FIRST DRAWN

INDICATION DETAILS

1



MAINS SUPPLY  
24V DC 20A

STANDARD PRACTICE  
Drawn to AS/NZS 1500:2007  
Bend corners R0.25(N/A) U.O.C.S.

Francis  
SEARCHLIGHTS

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PART No./REV. No.  
C26646 1

FRANCIS SEARCHLIGHTS LIMITED · UNION ROAD · BOLTON · BL2 2HJ  
WIRING DIAGRAM VH500 LV HALOGEN

DRAWN	D.S.	DATE	6.2.15	TOLERANCES
CHECKED	SCALE	UNLESS OTHERWISE SPECIFIED	AS SHOWN	UNLESS OTHERWISE SPECIFIED
CALC	ENGINEERING	UNLESS OTHERWISE SPECIFIED	AS SHOWN	UNLESS OTHERWISE SPECIFIED

Weld Coatings to ISO 8082 C110  
Part Coatings to ISO 8082 C10  
Note corners & joints 1





11 10 9 8 7 6 5 4 3 2 1

DATE INT'S 11.14 L.W. AS FIRST DRAWN

ISS No 1

MODIFICATION DETAILS

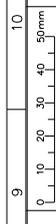
STANDARD PRACTICE  
Debur all cut/finished edges.  
Break corners R0.25(Min) U.O.S.

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PART No./DRG No. C26540

SHT 1

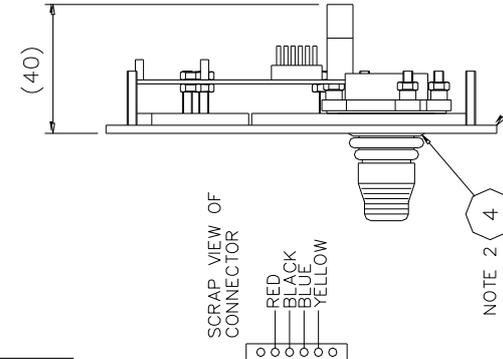
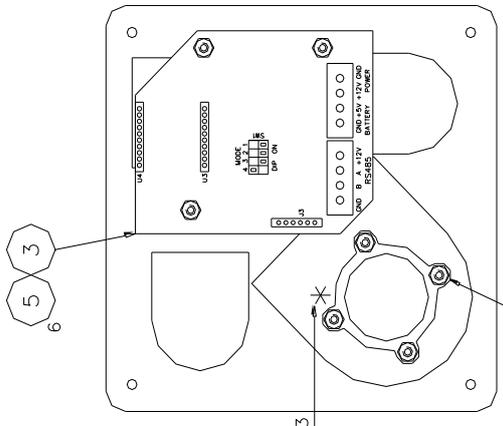
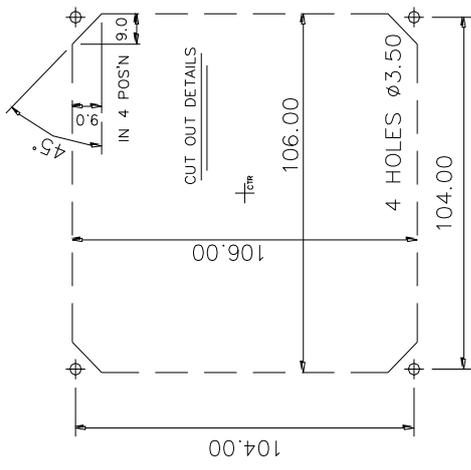
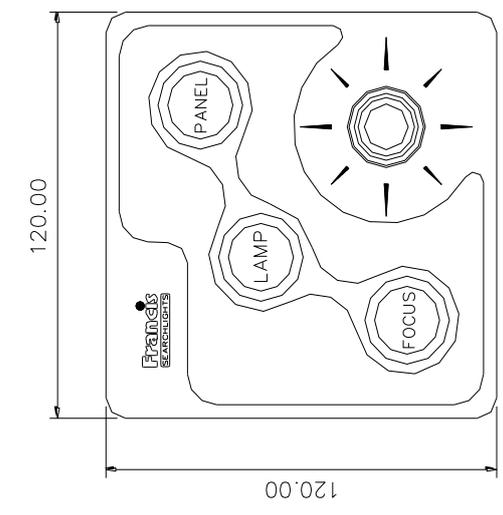
FRANCIS SEARCHLIGHTS



THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

FIRST USED ON A6093



- 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

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PART No./DRG No. C26540

SHT 1

DESCRIPTION: JOYSTICK PANEL ASSY

FINISH: To ISO 8062 CT10

MATERIAL: Sand Casting: To ISO 8062 CT8

Die Casting: To ISO 8062 CT8

Hole centres & posns:  $\pm$

ALL DIMENSIONS IN MILLIMETRES

Angular:  $\pm$

General:  $\pm$

Scale: 1:1

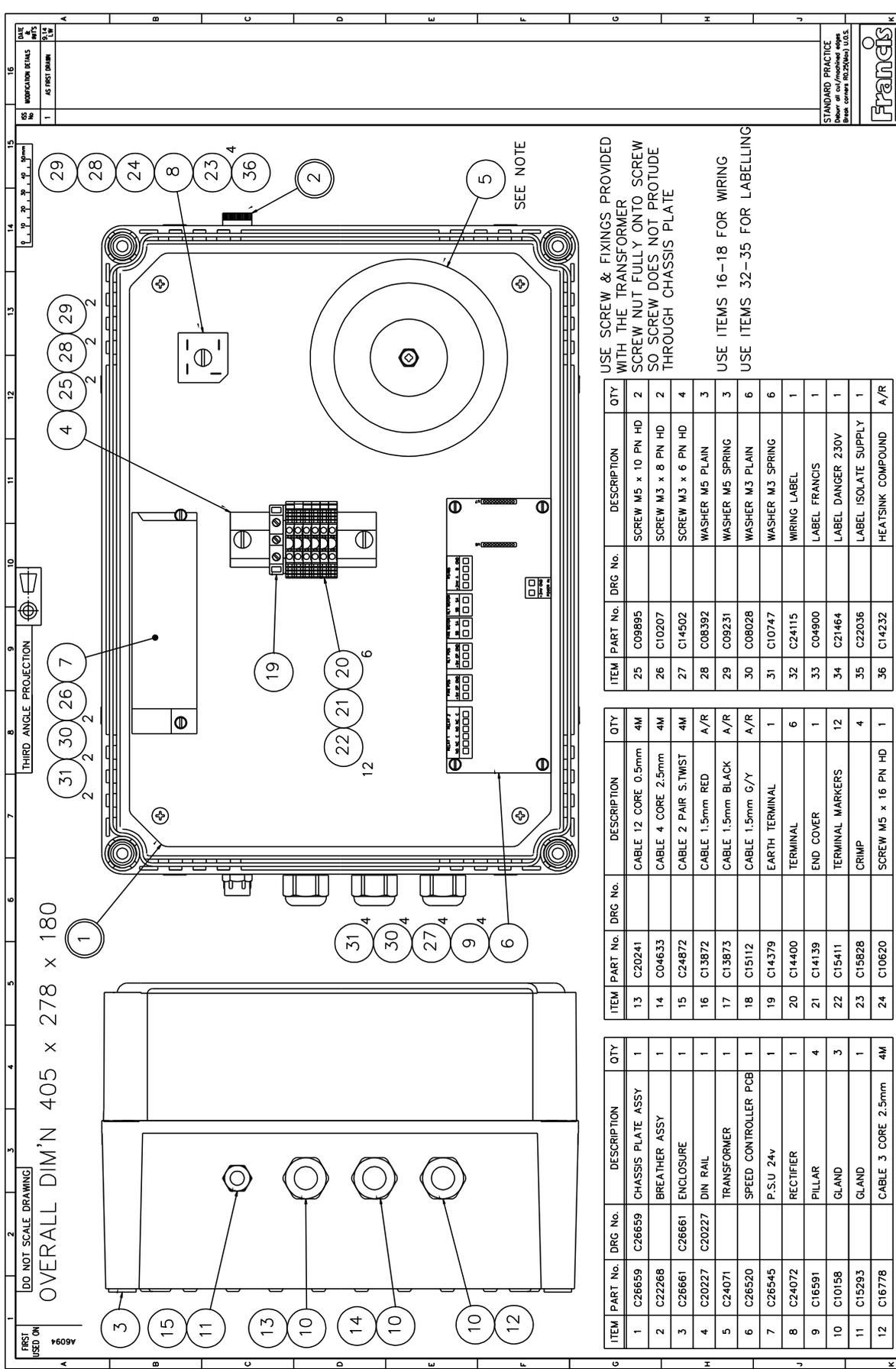
TOLERANCES: 11.14

DATE: 11.14

DRAWN: L.W.

CHECKED: L.W.





ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C26659	C26659	CHASSIS PLATE ASSY	1
2	C22268		BREATHER ASSY	1
3	C26661	C26661	ENCLOSURE	1
4	C20227	C20227	DIN RAIL	1
5	C24071		TRANSFORMER	1
6	C26520		SPEED CONTROLLER PCB	1
7	C26545		P.S.U 24v	1
8	C24072		RECTIFIER	1
9	C16591		PILLAR	4
10	C10158		GLAND	3
11	C15293		GLAND	1
12	C16778		CABLE 3 CORE 2.5mm	4M
13	C20241		CABLE 12 CORE 0.5mm	4M
14	C04633		CABLE 4 CORE 2.5mm	4M
15	C24872		CABLE 2 PAIR S.TWIST	4M
16	C13872		CABLE 1.5mm RED	A/R
17	C13873		CABLE 1.5mm BLACK	A/R
18	C15112		CABLE 1.5mm G/Y	A/R
19	C14379		EARTH TERMINAL	1
20	C14400		TERMINAL	6
21	C14139		END COVER	1
22	C15411		TERMINAL MARKERS	12
23	C15828		CRIMP	4
24	C10620		SCREW M5 x 16 PN HD	1
25	C09895		SCREW M5 x 10 PN HD	2
26	C10207		SCREW M3 x 8 PN HD	2
27	C14502		SCREW M3 x 6 PN HD	4
28	C08392		WASHER M5 PLAIN	3
29	C09231		WASHER M5 SPRING	3
30	C08028		WASHER M3 PLAIN	6
31	C10747		WASHER M3 SPRING	6
32	C24115		WIRING LABEL	1
33	C04900		LABEL FRANGIB	1
34	C21464		LABEL DANGER 230V	1
35	C22036		LABEL ISOLATE SUPPLY	1
36	C14232		HEATSINK COMPOUND	A/R

USE SCREW & FIXINGS PROVIDED WITH THE TRANSFORMER SCREW NUT FULLY ONTO SCREW SO SCREW DOES NOT PROTRUDE THROUGH CHASSIS PLATE

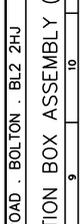
USE ITEMS 16-18 FOR WIRING  
USE ITEMS 32-35 FOR LABELLING

SEE NOTE

DATE	BY	DESCRIPTION
9.14.14		AS FIRST DRAWING

ITEM	NO	DESCRIPTION
1		AS FIRST DRAWING

STANDARD PRACTICE  
Observe all cut/machined edges  
Break corners R0.25(0.010) U.C.S.



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PART NO. / REV. NO. C26662

FRANCIS SEARCHLIGHTS LIMITED UNION ROAD BOLTON BL2 2HU

JUNCTION BOX ASSEMBLY (VH500 250W HV)

DRWING	LW	DATE	SCALE	TOLERANCES	MATERIAL	DESCRIPTION
CHECKED		9.14.14	1:1	General to ISO 2802 C/B Hole centres to ISO 2802 C/B Hole centres & points ±		

## 10 - Spare Parts List

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

### Searchlight Head

<b>Part Number</b>	<b>Description</b>
D9851	24v 250w 300HRS GX6.35 Tungsten Halogen Lamp
D4695	24v 250w 2000HRS GX6.35 Tungsten Halogen Lamp
C16878-00	Lampholder GX6.35
C26139-00	Front Glass
C26184-00	Front Glass Gasket
C26183-00	Sealing Strip Gasket
C26475-00	Mounting Base Gasket
C23808-00	Base 'O' Ring
C16410-00	24v Motor – Focus
C24706-00	24v Motor – Tilt
C25884-00	Reflector
C22268-01	Breather Assembly
C24089-01	Pan Motor Assembly
C21567-00	Heater
C23569-00	Pan potentiometer (10 Turn)
C25818-00	Tilt potentiometer (1 Turn)

### Junction Box

C26545-00	24v PSU Converter (240 & 115 volt versions)
C26520-00	Speed Controller PCB
C24071-00	Transformer (240 & 115 volt versions)
C24072-00	Rectifier (240 & 115 volt versions)

### 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.