



User Instruction & Installation Manual

Voyager 2



Product Reference Number:

A6095 VM500 350w 115/230v Em-Arc

Manufacturer's details:

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Manual Part Number: C26638

Issue: 1

19/11/14

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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.

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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;
- EmArc lamps operate under very high pressure conditions (up to 200 bar) and at high temperatures (inner bulb temp $\pm 1000^{\circ}\text{C}$) and may unexpectedly shatter;
- Lamps must not be used beyond their rated service life. Operation beyond the rated service life will increase the likelihood of bulb rupture; fast switching cycles will reduce lamp life.
- Never look directly into an illuminated searchlight as this may cause severe damage to eyesight from UV. 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 safety goggles or face mask and protective gloves 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 (minimum 10 minutes after switch off);
- If undue force appears necessary to remove the lamp, the equipment should be inspected by a competent person or contact the manufacturer;
- 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.
- In the event of a bulb rupture, a limited amount of mercury vapour could be emitted. To avoid inhaling this mercury vapour (which is toxic and can be harmful for lungs and nervous system) using a mask remove the front bezel from the searchlight and ventilate thoroughly for a period of at least 30 minutes.

- At the end of rated life, when lamp is removed from service, please dispose of in accordance with local universal waste law (Lamps are stamped with Hg mark). Some areas require all mercury containing lamps to be recycled, contact your environmental department for any regulation that may apply.

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 VM500 RC searchlight has the following features:

- All marine grade materials and fixings;
- Parabolic glass reflector;
- Instant lamp re-strike. No cooling down time required;
- Economical 2000 hour lamp life;
- 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;
- Searchlight to IP66;

The 240v searchlight also performs to the following optical data:

- Em Arc light source;
- Lamp Wattage – 350 Watts;
- Supply voltage – 115/240 volts;
- Peak Beam Candlepower – 23,100,000 lux;
- Range – 4808 metres;
- Divergence – 2.5°;
- 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.

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 11 metres 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	240v 350w	115v 350w
Cable Size (mm ²)	Distance Max	Distance Max
1.5	212 MTRS	49 MTRS
2.5	346 MTRS	79 MTRS
4	548 MTRS	126 MTRS
6	854 MTRS	196 MTRS
10	1429 MTRS	329 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 VM500 RC 240v supply searchlight is as follows:

Referring to wiring diagram C26645, 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 12core 0.5mm, 4core 1.5mm 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 above).

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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;

- The following safety equipment must be worn when handling lamps eye protection i.e. safety goggles or full face mask and safety gloves;
- Always isolate the equipment from the supply before inserting a lamp;
- Do not twist or bend the fused quartz bulb when fitting the lamp as mechanical stresses MUST be avoided;
- 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);

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 lampholder lead over the thread of the lamp and then screw into the rear PTFE lampholder;
- Connect the front lead using the pre fitted bullet connectors;

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 240v 350w Em Arc lamp:

Voltage reading = 240v; Amps reading = 1.45 amps
Therefore, Wattage = 240 x 1.45 = 350 watts

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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 lamp is present, the lamp will have failed. 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 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 lampholder 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	A6095 VM500 G.A
C26645	Wiring Diagram
C26540	Joystick Control Panel
C26637	Junction Box Assembly

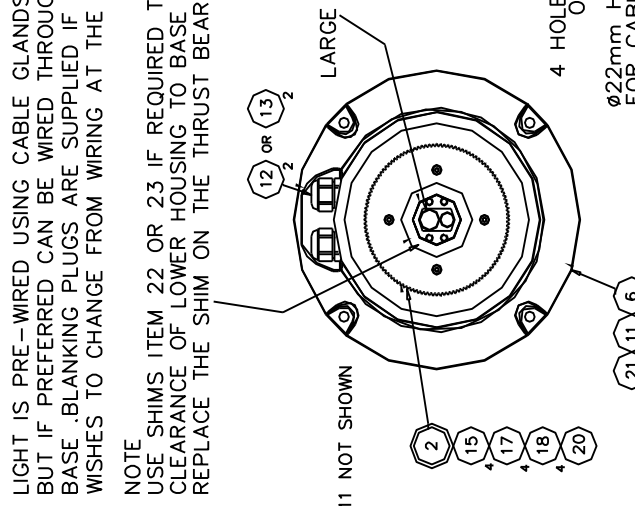
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16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

VIEW WITH UPPER HOUSING REMOVED

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

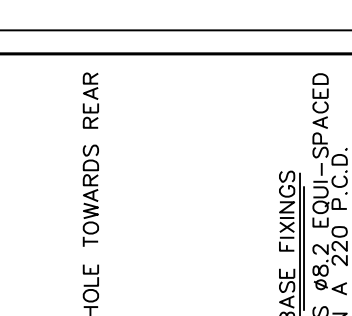


FIT SEALING STRIP AFTER FITTING THE GLASS TRIM TO SUIT

GLASS LOCATION INDICATOR WEBBS

VIEW WITH UPPER HOUSING REMOVED

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



LARGE HOLE TOWARDS REAR

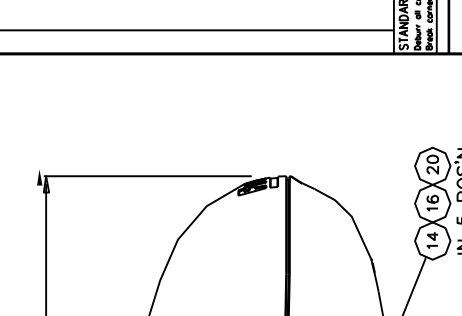
BASE FIXINGS
4 HOLES $\phi 8.2$ EQUI-SPACED ON A $\phi 220$ P.C.D.

$\phi 22$ mm HOLE IS RECOMMENDED FOR CABLE TO PASS THROUGH IF WIRING THROUGH CENTRE

IN 2 POSN

SEE ADDITIONAL FITTING INSTRUCTIONS

500



533

IN 5 POSN

14 16 20

21 11 6

2

2

2

2

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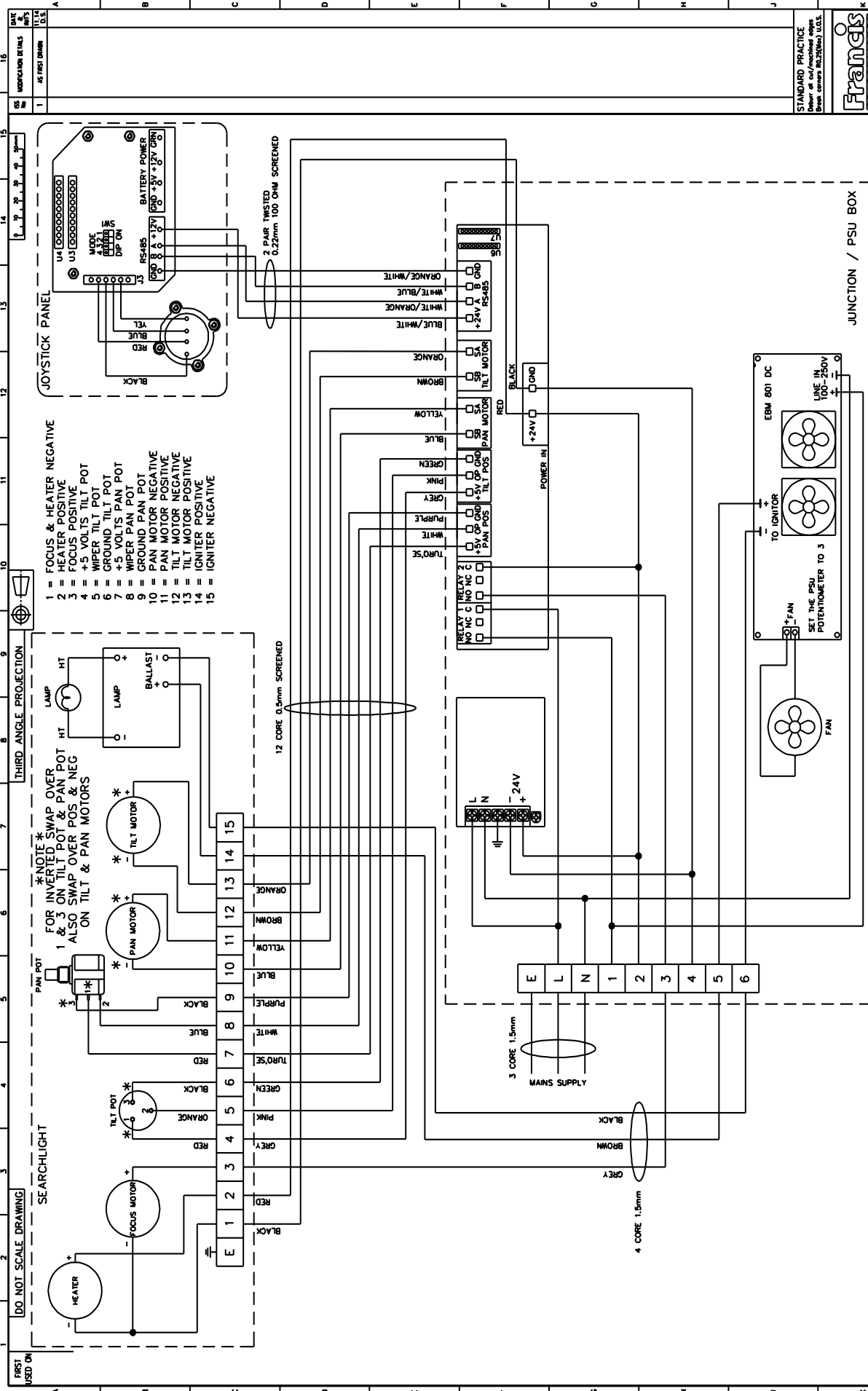
VOYAGER II GA (VH500 - VM500 - VX500)

STANDARD PRACTICE
Deviat on call/finished edges
Break corners to 25% R.O.S.

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SEARCHLIGHTS
LIMITED

© 2014
PART No./DRC No.
A1 CONT ON SHEET
A6093

DRAWN LW DATE 8.14 TOLERANCES
CHECKED SCALE 1:2 General &
ALL DIMENSIONS IN MILLIMETRES
SHEET 1 OF 1



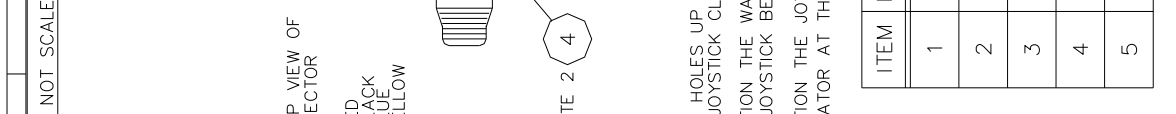
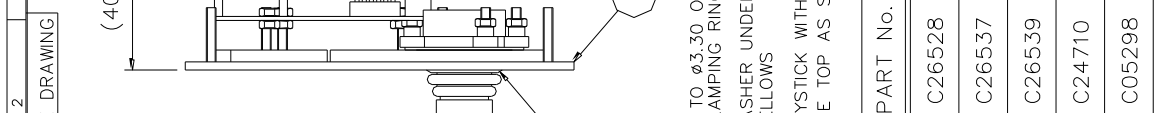
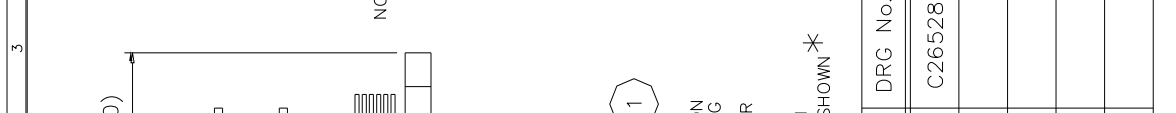
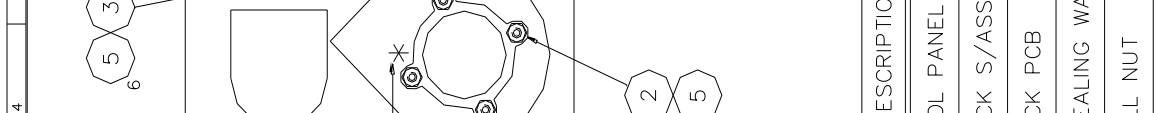
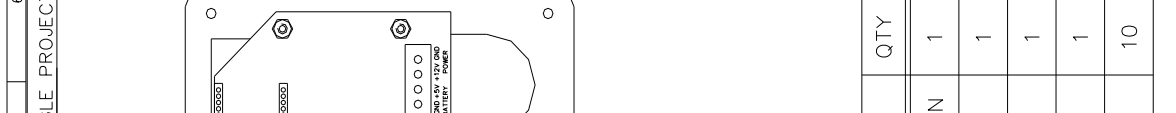
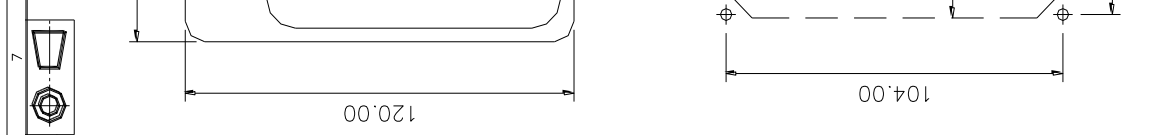
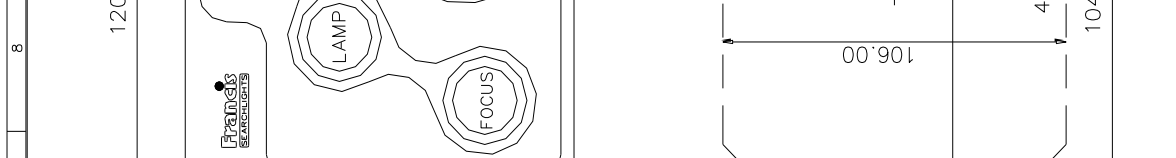
- 1 = FOCUS & HEATER NEGATIVE
- 2 = HEATER POSITIVE
- 3 = FOCUS POSITIVE
- 4 = +5 VOLTS TILT POT
- 5 = WIPER TILT POT
- 6 = GROUND TILT POT
- 7 = +5 VOLTS PAN POT
- 8 = WIPER PAN POT
- 9 = GROUND PAN POT
- 10 = PAN MOTOR POSITIVE
- 11 = PAN MOTOR NEGATIVE
- 12 = TILT MOTOR POSITIVE
- 13 = TILT MOTOR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

DATE & INIT'S	11.14 LW
MODIFICATION DETAILS	AS FIRST DRAWN
ISS No	1

STANDARD PRACTICE	Debur all cut/mechaned edges Break corners R0.25(Max) U.O.S.
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© 2013	A2	CONT ON SHEET
PART No./DRG No.	C26540 1	

FRANCIS SEARCHLIGHTS

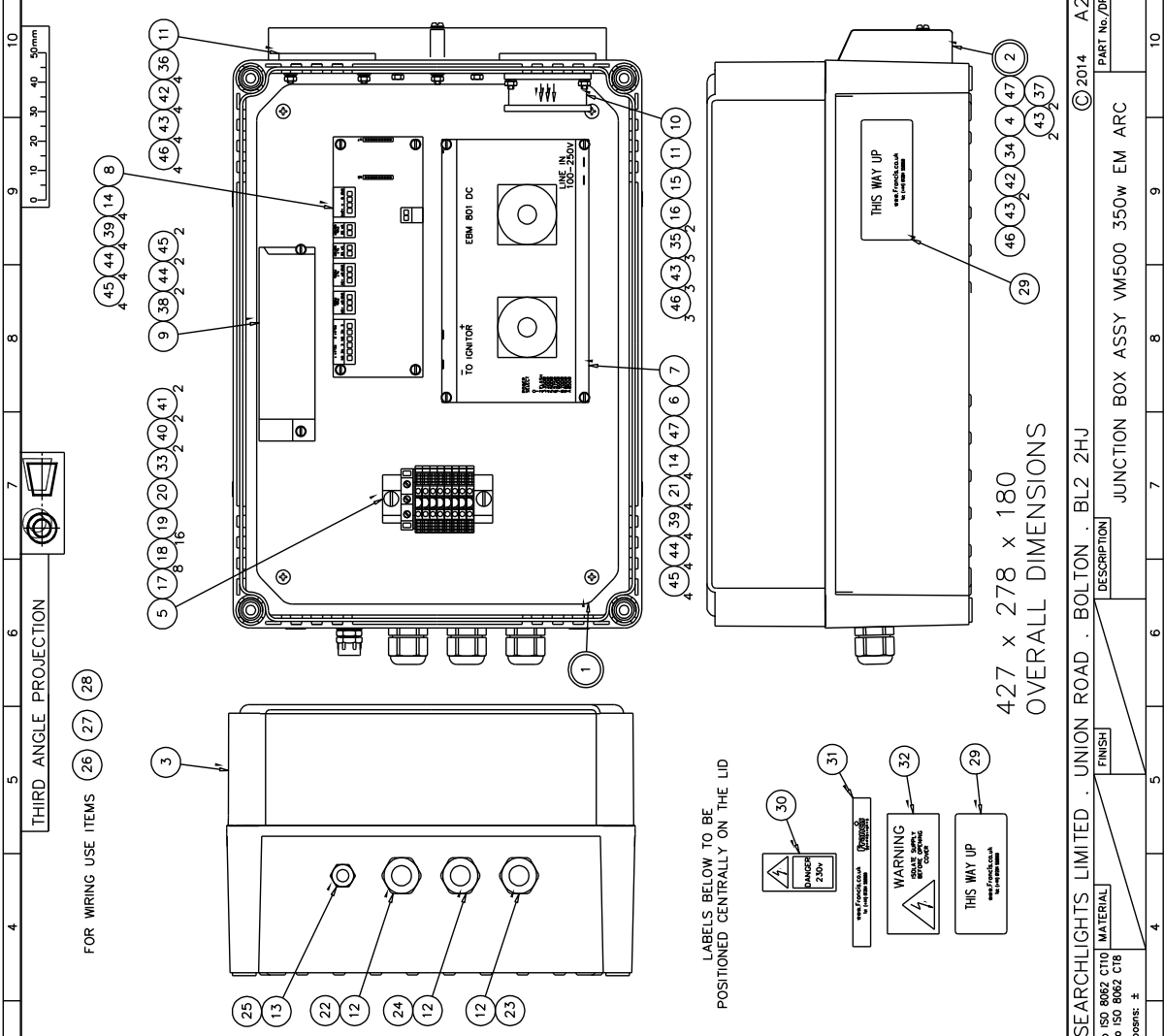


ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C26528	C26528	CONTROL PANEL 3 BUTTON	1
2	C26537		JOYSTICK S/ASSY	1
3	C26539		JOYSTICK PCB	1
4	C24710		M20 SEALING WASHER	1
5	C05298		M3 FULL NUT	10

FRANCIS SEARCHLIGHTS LIMITED . UNION ROAD . BOLTON . BL2 2HU	DESCRIPTION	JOYSTICK PANEL ASSY
FINISH		
MATERIAL		
Sand Casting: To ISO 8062 C10		
Die Casting: To ISO 8062 C18		
Hole centres & posns: ±		
General: ±		
Angular: ±		
ALL DIMENSIONS IN MILLIMETRES		

DRAWN LW	DATE 11.14	TOLERANCES	
CHECKED	SCALE 1:1	General: ±	
		Angular: ±	

DATE 11.14 D.S.	MODIFICATION DETAILS AS FIRST DRAWN	ISS No	1
STANDARD PRACTICE Recur all cut/finished edges Break corners R0.25(Min) U.O.S.		PART No./DRG No. C26637	
SHT 1		CONT ON SHEET A2	



ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C26634	C26634	CHASSIS PLATE ASSY	1
2	C24686	C24686	FAN SPLASH COVER ASSY	1
3	C26636	C26636	ENCLOSURE DRILLING	1
4	C24687	C24687	FAN COVER PILLAR	1
5	C23028	C23028	DIN RAIL	1
6	C24388	C24388	INSULATION PAD	1
7	C24185	C24185	350W EM ARC PSU	1
8	C26520	C26520	SPEED CONTROLLER	1
9	C26545	C26545	24V PSU	1
10	C22104	C22104	FAN	1
11	C24366	C24366	FAN COVER	2
12	C10158	C10158	M20 CABLE GLAND	3
13	C15293	C15293	M13 CABLE GLAND	1
14	C16591	C16591	SPACER	8
15	C22515	C22515	CONNECTOR	1
16	C22516	C22516	CONNECTOR CRIMP	2
17	C14400	C14400	TERMINAL	8
18	C19411	C19411	TERMINAL MARKERS	16
19	C14139	C14139	END COVER	1
20	C14379	C14379	EARTH TERMINAL	1
21	C14828	C14828	RED SHROUDED CRIMP	4
22	C08791	C08791	3 CORE 1.5mm BUTYL CABLE	4M
23	C16593	C16593	4 CORE 1.5mm BUTYL CABLE	4M
24	C20241	C20241	12 CORE 0.5mm SCREENED CABLE	4M
25	C24827	C24827	2 PAIR TWISTED SCREENED CABLE	4M
26	C13972	C13972	1.5mm S/C RED CABLE	A/R
27	C13973	C13973	1.5mm S/C BLACK CABLE	A/R
28	C15112	C15112	1.5mm S/C G/Y CABLE	A/R
29	C24369	C24369	THIS WAY UP LABEL	2
30	C21464	C21464	230V LABEL	1
31	C04900	C04900	FRANCIS EXTERNAL LABEL	1
32	C22036	C22036	ISOLATE SUPPLY LABEL	1
33	C09995	C09995	M5 x 10 PAN HD SCREW	2
34	C14468	C14468	M4 x 35 PAN HD SCREW	1
35	C10120	C10120	M4 x 20 CSK HD SCREW	3
36	C06981	C06981	M4 x 16 CSK HD SCREW	4
37	C14533	C14533	M4 x 10 HEX HD SCREW	2
38	C10207	C10207	M3 x 8 PAN HD SCREW	2
39	C14502	C14502	M3 x 6 PAN HD SCREW	8
40	C08392	C08392	M5 S/C SPRING WASHER	2
41	C09231	C09231	M5 S/C SPRING WASHER	2
42	C04376	C04376	M4 PLAIN WASHER	6
43	C08793	C08793	M4 S/C SPRING WASHER	10
44	C08028	C08028	M3 PLAIN WASHER	10
45	C10747	C10747	M3 S/C SPRING WASHER	10
46	C06266	C06266	M4 FULL NUT	8
47	C12039	C12039	CLEAR RTV	A/R

FRANCIS SEARCHLIGHTS LIMITED . UNION ROAD . BOLTON . BL2 2HU	DESCRIPTION JUNCTION BOX ASSY VM500 350w EM ARC	FINISH	MATERIAL	SCALE	1:2	DATE	11.14	TOLERANCES	±	ANGULAR	±
SHEET		PART No./DRG No.		SCALE		DATE		TOLERANCES		ANGULAR	
1		C26637		1:2		11.14		±		±	
CONT ON SHEET		A2		ALL DIMENSIONS IN MILLIMETRES		SHEET		ANGULAR		±	
A2		C26637		1:2		11.14		±		±	

10 - Spare Parts List

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

Searchlight Head

Part Number	Description
C24532-01	350w Em Arc Lamp Assembly
C24181-00	Ignitor
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	Heater
C23569-00	Pan potentiometer (10 Turn)
C25818-00	Tilt potentiometer (1 Turn)

Junction Box

C26545-00	24v PSU Converter
C26520-00	Speed Controller PCB
C24185-00	350w PSU
C22104-00	Fan

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.