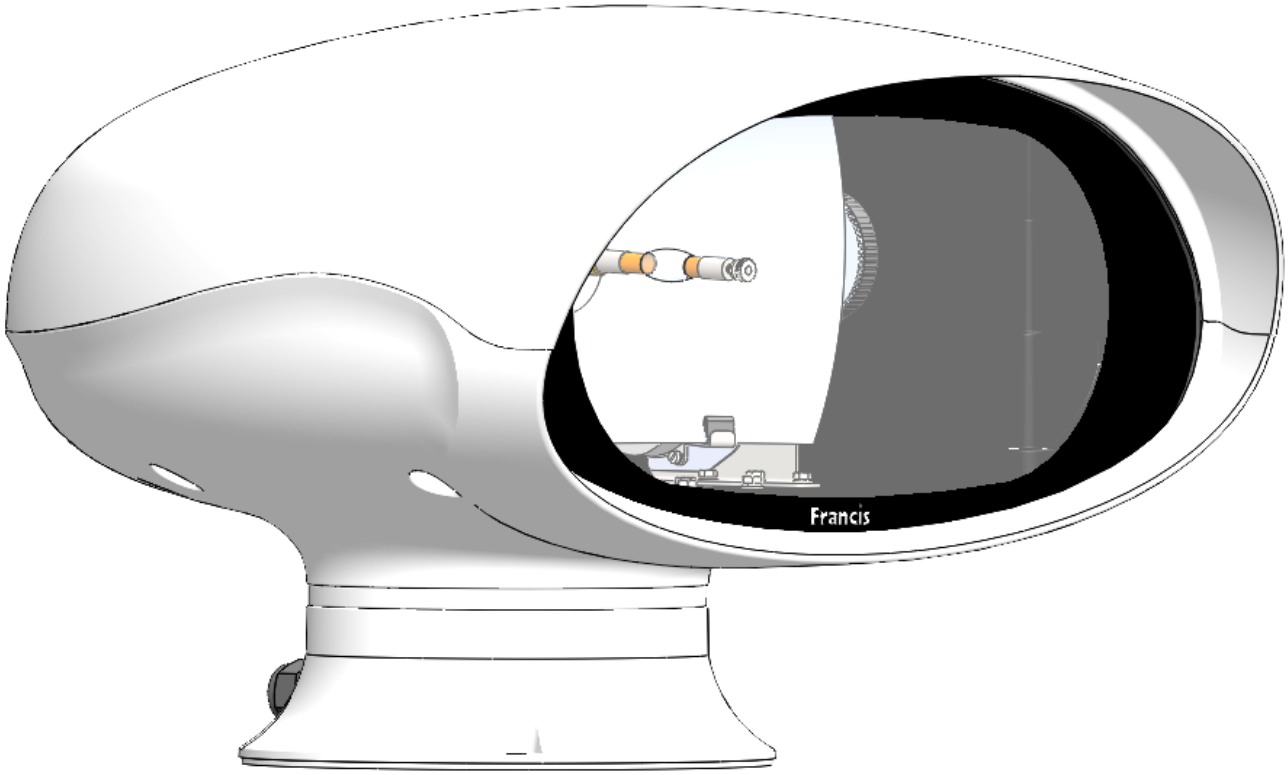

VX500RC 150W/300W Xenon Remote Control Searchlight

User / Installation Manual

Product Part Number:

A7183 – VX500RC 110/240V 150w Xenon Variable Speed Remote Control Searchlight

A7184 – VX500RC 110/240V 300w Xenon Variable Speed Remote Control Searchlight

PLEASE NOTE!

Please read this manual before installation.

Francis SEARCHLIGHTS

www.francis.co.uk

C27396 Issue 17 10.11.23 EC1983

CONTENTS

General Information:

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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 to ensure optimum performance and service life.

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

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 always quote the Product Number and Serial Number of the product you have, this is located on the junction box name plate.

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.

2 – Safety Precautions

The following instructions must be adhered to, 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 to prevent damage to the equipment or personal injury.

- Only suitably qualified personnel may install the products**.**
- Prevent rain, snow, condensation, and water droplets from contacting the lamp as this may cause bulb failure and possible shattering.
- Xenon bulbs run with a high internal pressure more than 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.
- 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 manufacturer’s 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.

3 – Technical Information

Electrical	150w		300w	
Input voltage:	110VAC	240 VAC	110VAC	240VAC
Input current:	1.2A Max	0.6A Max	2.4A Max	1.2A Max
PSU output voltage:	17v DC Max		20v DC Max	
PSU current:	8.8A Max		15A Max	
Wattage:	150w		300w	
Dimensions				
Searchlight Height:	340mm			
Width:	500mm			
Depth:	533mm			
Weight:	17Kgs			
PSU Height:	430mm			
Width:	278mm			
Depth:	130mm			
Weight:	5Kgs			
Searchlight Performance				
Lamp power:	150w		300w	
Range @ 1 Lux:	2760m		3920m	
Lamp life (approx.)	1200h		1000h	
Divergence:	1.5° - 10°		1.5° - 10°	
PBCP (Peak Beam Candle Power):	7,600,000 cd		15,400,000 cd	
Colour temperature:	6000 K		6000 K	
Luminous flux:	3,200 lumens		11,500 lumens	
Searchlight movement				
Pan rotation:	350°			
Tilt elevation:	Up 23° & Down 23°			
Pan speed:	Variable Speed 1 to 36°/sec			
Tilt Speed:	Variable Speed 1 to 3.5°/sec			
Material, colour, IP rating				
Searchlight barrel head:	Aluminium LM6 Die Casting			
Paint finish powder coated & stove enamel paint:	Signal White to RAL 9003			
IP rating, Searchlight, PSU:	IP66 Searchlight – IP54 PSU			
Operating temperature:	-20°C to +50°C			
Certification approval:				
Lloyds TA:	IEC 60945: 2002			
Russian Maritime Register of Shipping:	Parts XI & XVII, Part IV			
ISO9001 2015:	Quality Management System			

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, 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. If anti-vibration mounts are to be fitted, the fixing holes for the mounts should also be marked out and drilled. Prior to manoeuvring the searchlight into its' fixing position, the AV mounts should be fitted to the base. When in the desired position, bolt the searchlight firmly down. On an uneven surface it may be necessary to use a suitable sealant such as silicone, to ensure a weatherproofed joint.

Please refer to the drawing C27312 for the Joystick Panel cut out size.

Rear of Searchlight

Base Fixings, 4 Holes Ø8.2 Equally Spaced on a Ø220.00

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.

Referring to wiring diagram C27390 (at the back of the manual), a supply is fed to the junction box, which then provides a common feed to the searchlight and joystick control panel.

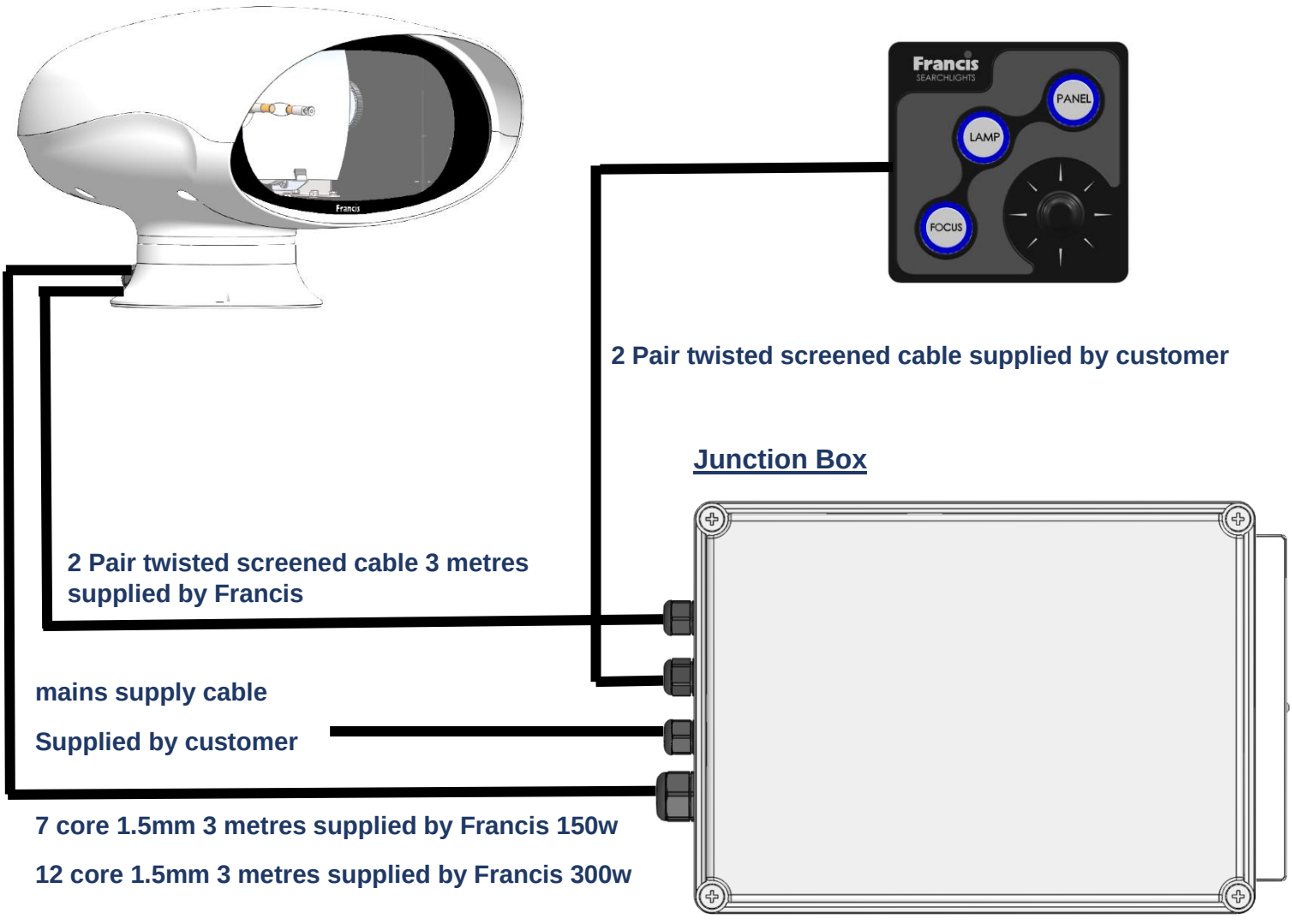
The searchlight has been pre-wired with 3 meters of cable from the Searchlight to junction box provided and the Xenon Lamp is already fitted in the searchlight.

If the installation requires the junction box to be mounted more than 3m away from the searchlight, then we would recommend additional junction box is installed to connect the additional cable. The correct cable should be fitted to compensate for the voltage drop over the distance between both junction boxes.

Cables to be supplied by the customer:

- 2 pair twisted 0.22mm 100ohm screened cable from the joystick panel to the junction box.
- Mains supply cable to the junction box.

Searchlight **Joystick Panel**



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 lamp holder contacts.

Method of Electrical Connection

- Disconnect the supply before working on the electrical system.
- The searchlight must be connected to a fused electrical supply, using suitably sized cable.
- If the searchlight is located a considerable distance from the supply, provision must be made in the cable size to overcome the voltage drop.

The following table below indicates the maximum length of cable to be used for the supply cable, from the mains supply to the junction box.

Searchlight	115v 150w	230v 150w	115v 300w	230v 300w
Cable Size (mm^2)	Distance Max	Distance Max	Distance Max	Distance Max
1.5	142M	593M	71M	297M
2.5	240M	1000M	120M	500M

The following table below indicates the maximum length of cable to be used for the DC cable, from the searchlight to the junction box.

Searchlight	150w	300w
Cable Size (mm^2)	Distance Max	Distance Max
7 cores 1.5	9M	
12 cores 1.5	21M	12M

- Whenever possible cable terminations should be made below deck and with approved terminal devices.
- If a spare auxiliary fuse or circuit breaker is not available, one of the correct type/ratings 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.
- For 115/240v 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.

6 – Start-up and Operating

When fitting the lamp

- Always isolate the equipment from the supply when inserting a lamp.
- 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.
- Ensure the circuit is suitably fused.
- Ensure the lamp is of the correct power rating and type.
- 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.
- The inert gas used in Xenon lamps are under a pressure of several bar even when the bulb is cold. FOR SAFETY REASONS THE LAMP MAY ONLY BE INSERTED INTO THE LAMPHOUSE WITH THE PROTECTIVE JACKET FITTED.
- Do not apply unnecessary force when tightening the screws.
- 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.
- Electrical leads must be arranged in such a way that there is a sufficient air gap (approximately 40mm) between them and the lamp house, to prevent flashovers from the ignition voltage. All flexible leads must have strain-relieving clamps.
- Before putting the lamp into service for the first time, check the polarity of the electrical connections. INCORRECT POLARITY WILL CAUSE IMMEDIATE DESTRUCTION OF THE LAMP.

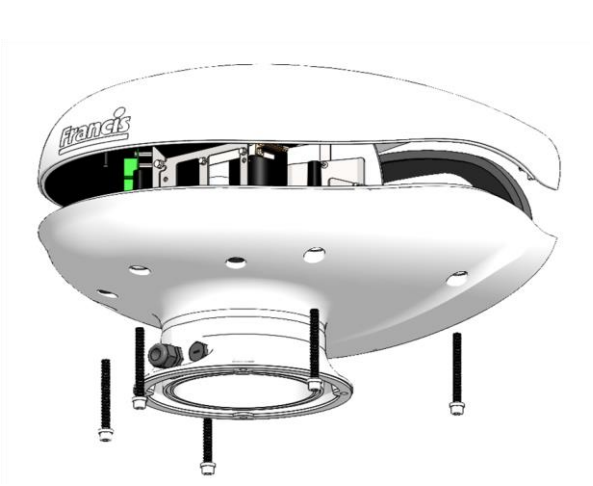
Notes:

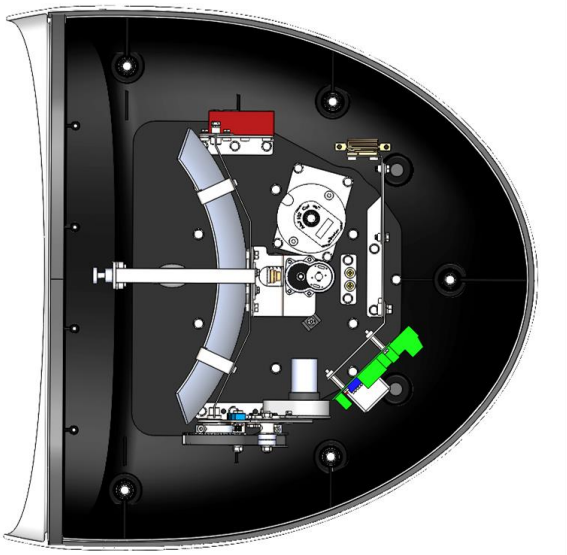
- Xenon lamps are designed for dc operation only. The dc current may only be varied within the limits of the current control range. Xenon lamps operate best at rated current; over the life of the lamp, the current may be increased to its maximum value to compensate for loss of light. The output of the lamp can be reduced by operating the lamp at minimum current, but this does not prolong the life of the lamp.
- For safety reasons, lamps should be replaced once they reach the end of their average lamp life, and not later than 1.25 times their average lamp life. After this time there is an increased risk of the lamp exploding.
- The anode (positive cap marked ‘+’) must be on top when the lamp is inserted in the vertical position. If the anode is incorrectly inserted the arc will be unstable, the bulb will blacken more quickly, and the lamp will prematurely fail.
- The HT lead from the high voltage terminal of the Ignitor, must be connected to the cathode (negative cap marked ‘- ‘). If the lamp is fitted with the wrong polarity, it will be irreparably damaged after a very short time.
- 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:

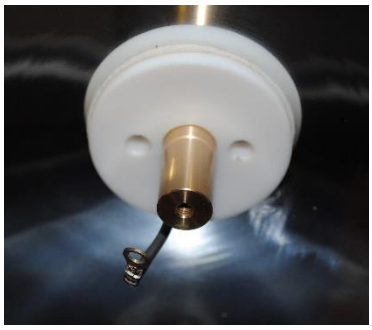
- Loosen and remove five M8 socket bolts with the sealing washers on the underneath of the searchlight, then remove the upper hood off the searchlight & store along with the bolts and washers in a safe area.





To fit the Xenon lamp

- Fit the lamp holder lead over the thread of the negative end of the lamp and then screw into the rear lamp holder (**DO NOT OVER TIGHEN**)



- Connect the front lead to the positive end of the lamp and secure in place with the knurled nut.

After fitting the lamp

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

Testing

Upon correct installation and connection to an electrical supply, the equipment can be tested 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.
- Using the ammeter, take an amp reading.
- Multiply these figures together to give an approximate wattage (Power output).

For example:

- With the multi meter, test the DC voltage in the junction box across terminals 4 & 5. This should be approximately 17 volts (150w) 20 volts (300w).
- With the DC ammeter, test the current of the wire/wires in terminal 4 in the junction box. It should read approximately 8.8 amps (150w) 15 amps (300w).
- Multiply these readings together, as shown above, to obtain the desired wattage required, usually about 150 or 300 watts.

e.g.

Voltage reading = 17v; Amps reading = 8.8 amps

Therefore, Wattage = 17 x 8.8 = 150 watts

Start-Up

When the main power is first applied to the searchlight, the searchlight will carry out a self-test, it will Pan to the left limit and the reflector will Tilt down to the limit, once this is complete, the searchlight will then move to the centre position, during this please do not try and operate the searchlight while this test is being carried out. Once the searchlight is back at centre the searchlight can then be operated normally, by pressing the Panel button on the control panel.

Operating

Switch On

The panel is activated using the PANEL button. This will illuminate brightly when the panel is active. Alternate operations of the PANEL button will switch the panel on and off.

Lamp Control

When the panel is active pressing the LAMP, button will switch the lamp on or off.
If the control panel is switched off with the PANEL button the lamp will switch off.

Focus Control

The lamp focus can be adjusted using the FOCUS button. Lamp focus will adjust continuously whilst FOCUS is pressed.

Beam Direction

The beam direction can be adjusted using the joystick when the panel is active. Moving the joystick left or right will pan the beam clockwise or anticlockwise.
Moving the joystick up or down will move the beam up or down. The speed of movement is proportional to the movement of the joystick. It is possible to move the beam in both directions at once by moving the joystick diagonally.

Home

The lamp can be returned to a pre-set home position. By default, this is dead ahead with the beam level although different positions can be programmed as described below.
To send the lamp to the home position switch the panel off then press the LAMP button.

Set New Home Position

To set a new home position move the lamp to the new desired home position. Switch the panel off then press the joystick down to its limit and press the lamp button. The current position will now be the new home position.

Set Motion Limit (only available when Remote Focus is fitted)

The lamp travel can be limited in all directions. To set a new limit switch the panel on and move the lamp to the desired limit position. Switch the panel off then press and hold the focus button whilst moving the joystick full travel in the direction of the desired limit. Hold in this position for 4 seconds. For example, to set a limit to the tilt up motion; -

1. Switch panel on and drive lamp to desired tilt up limit position.
2. Switch panel off.
3. Press and hold the FOCUS button and hold joystick in the full up position for 4 seconds.
4. Tilt up motion will now be inhibited above the current position.

Clear Motion Limits

Motion limits as set above can be cleared by switching the panel off then pressing and holding the focus button and lamp buttons together for 10 seconds.

Adjusting Panel Illumination

The panel illumination and indicators intensity can be adjusted to suit ambient light levels. To adjust the intensity, switch the panel on then switch it off with the PANEL button and keep the PANEL button pressed. To increase intensity, move the joystick to the right. To decrease move to the left. Note that the panel button must be kept depressed whilst the joystick is moved. All indicators will illuminate whilst adjustments are performed. Adjustment is complete when the panel button is released.

6.1 - FBUS Data & Panel Addresses

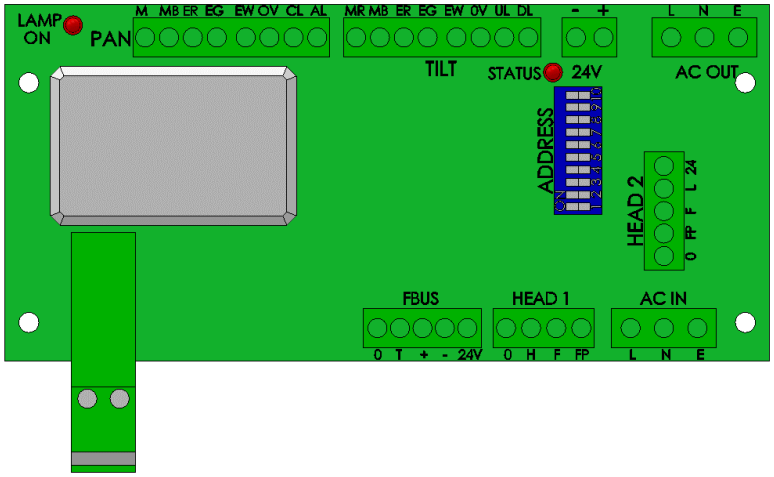
The Francis bus (FBUS) is a custom communication protocol based on RS485 two wire bi-directional communication hardware. The system provides a simple bi-directional link between searchlights and joystick panels. The system allows given panels to communicate with different searchlights and allows several panels to communicate with the same searchlight.

FBUS Address Switches

Setting Searchlight Address Value

The searchlight address is set using the Dip switches on the Speed Controller PCB located inside the Searchlight (see drawing A7183/4). With the address switches using simple binary input. Each switch has a binary value as details below; -

Dip Switch	Searchlight
10	1
9	2
8	4
7	8
6	16



If only 1 Searchlight is used, then all switches will be set to off.

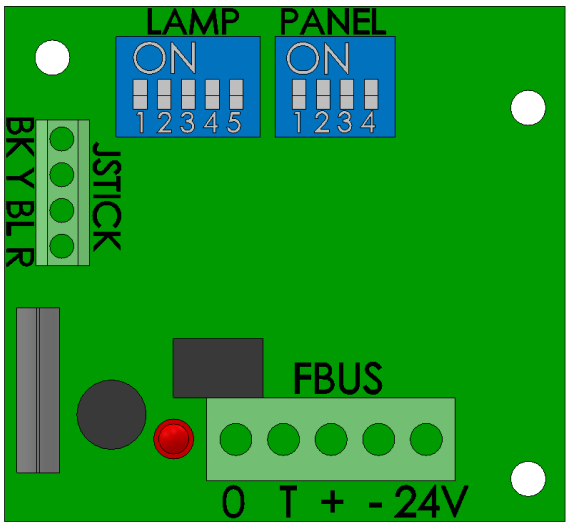
The address value is the sum of the numbers above which are active when the switch is on.

For example, if dip switches 8 and 10 are on, and all others are off, the address value would be 5.

Note that switches 1-3 are not used for address selection and should be switched off.

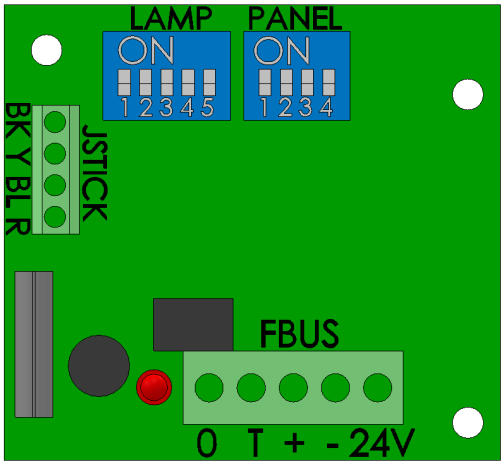
Standard Joystick Panel – Searchlight (Lamp) Address

Dip Switch	Searchlight
1	16
2	8
3	4
4	2
5	1



Standard Joystick Panel – Control (Panel) Address

Dip Switch	Control Panel
1	8
2	4
3	2
4	1



EXAMPLES

Standard joystick panel – panel address set to 5

Switch 1 = Off

Switch 2 = On (Value 4 added to address)

Switch 3 = Off

Switch 4 = On (Value 1 added to address)

4 + 1 = 5

Speed control card - lamp address set to 11

Switch 6 = Off

Switch 7 = On (Value 8 added to address)

Switch 8 = Off

Switch 9 = On (Value 2 added to address)

Switch 10 = On (Value 1 added to address)

8 + 2 + 1 = 11

ADDRESSING SYSTEM

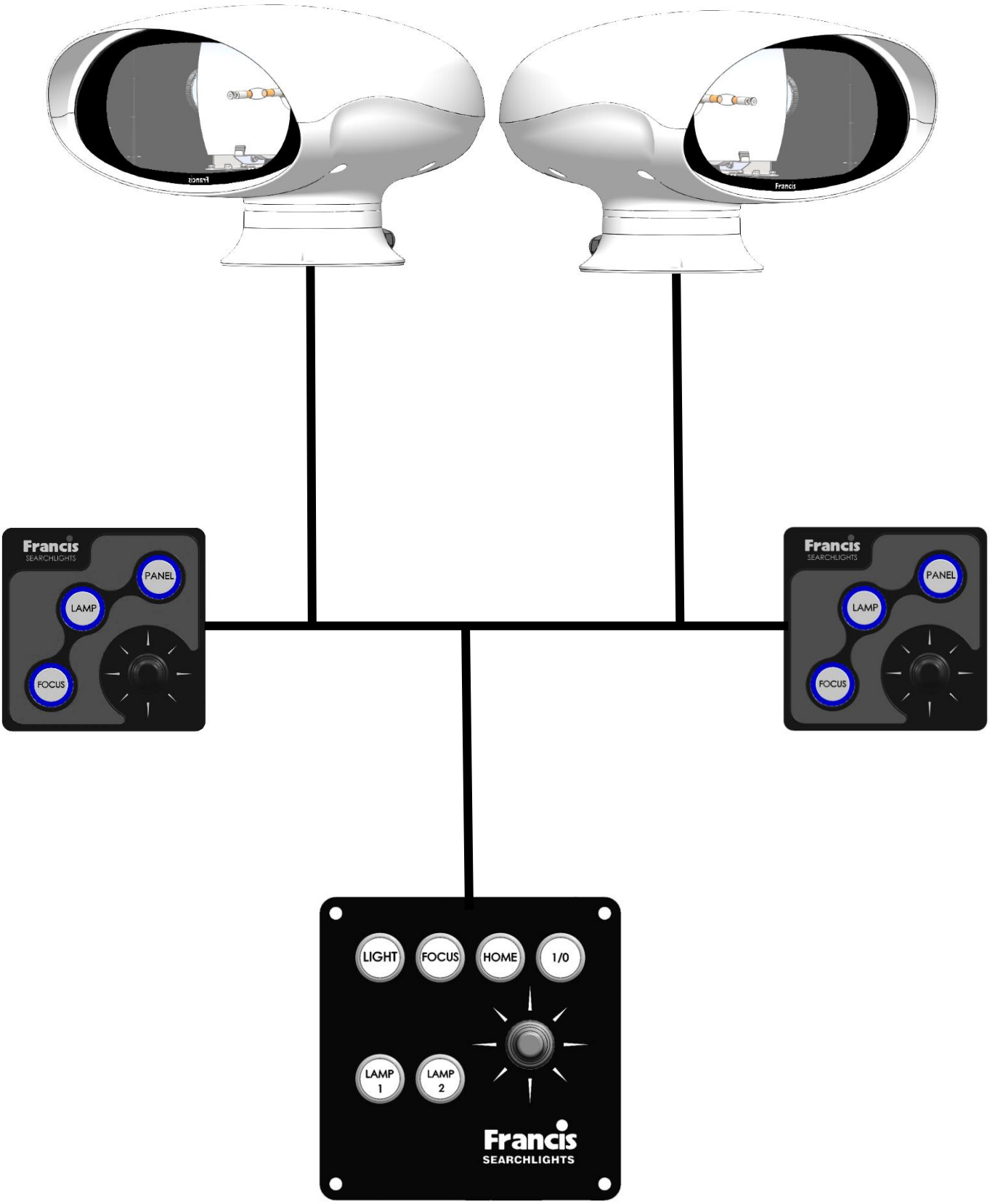
Every lamp must have a unique address. The addresses should be sequential and should start from zero. If there were three lamps in a system the addresses should be set to 0, 1 and 2.

Control panel – panel addresses use the same system being sequential and start from zero.

It is essential that all panels have a unique address with no duplication however note that lamps and panels can be the same address. For example, on a system with two panels and two lamps, the panel addresses will be 0 and 1 and the lamps addresses will be 0 and 1.

Control panel lamp addresses are defined by the system configuration. If two panels are used to control the same lamp, they must still have individual panel addresses, but the lamp addresses can be set to the same address value as the lamp which is to be controlled. Any number of panels can control the same lamp.

Multiple Searchlights, Joystick Panels and Master Joystick Panel.



7 – Fault Finding

7.1 Problems at Installation

- If the searchlight completes the Self-Test, e.g., Pan left, Tilts down then returns to centre and the LEDs on the joystick panel are not illuminate, then please check the 4 data cables connections on the FBUS connector located on the back of the control panel assembly, as these data cables could be swapped around, you can check the voltages on the 4 connections, you should get as shown below:

    - 0 & + = 2.2v DC
    - 0 & - = 2.2v DC
    - 24 & 0 = 18-24v DC

- If the searchlight completes the Self-Test, e.g., Pan left, Tilts down then returns to centre and the LEDs on the joystick panel are illuminated, but you are unable to control the searchlight via the joystick panel, then please check the data + & - connections on the FBUS connector located on the back of the joystick panel assembly, as these data cables could be swapped around.

- If you have more than 1 searchlight in the installation and 2 or more searchlights are moving at the same time in the same direction, then please check the dip switch settings on the speed controller PCB, see **Setting Searchlight Address Value.**

Failure of Emarc Lamp to light

Please refer to the following table for the troubleshooting of Xenon lamps.

Fault	Cause	Remedy
Wrong Polarity	Lamp incorrectly fitted	Anode (large electrode) must always be on top in vertical burning position
	Faulty wiring	Check polarity, transpose connections if necessary
Cap overheated Cap temperature above 230°C	Faulty contacts Cooling equipment defective	Check terminals, tighten or renew Check cooling equipment and replace if necessary
Arc unsteady	Lamp operated outside current control range.	Correct current setting
	Magnetic stabilisation for horizontal operation defective	Check magnetic stabilisation
Bulb draws in air	Crack in graded seal caused by overheated cap	Check terminals - tighten or renew.
	Maximum cap temperature 230°C	
Glass erosion on fused quartz bulb.	Lamp operated outside current control range.	Correct current setting
	Lamp service life exceeded.	Check meter
Electrodes damaged Premature blackening	Current ripple too high Auxiliary mirror incorrectly adjusted	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

Failure of Lamp to Ignite

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

1. Check that the mains supply is connected to the input of the PSU. On operating the lamp switch, if the lamp does not light, switch off mains supply and check all fuses.

2. On pressing the lamp switch the lamp still does not ignite, check the searchlight. On your command get an operator to activate the switch for approximately 10 seconds. During this time listen for any noise (cracking or hissing) coming from within the searchlight. If this arcing is heard switch off the supply at the mains. Remove the searchlight top to expose the two supply leads 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 searchlight. Replace the searchlight top, ensuring the gaskets are located, and perform the check again, listening for the cracking. If the lamp still fails to ignite, switch off at the mains and replace the lamp in accordance with the safety procedures within this manual and the manufacturer's 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.

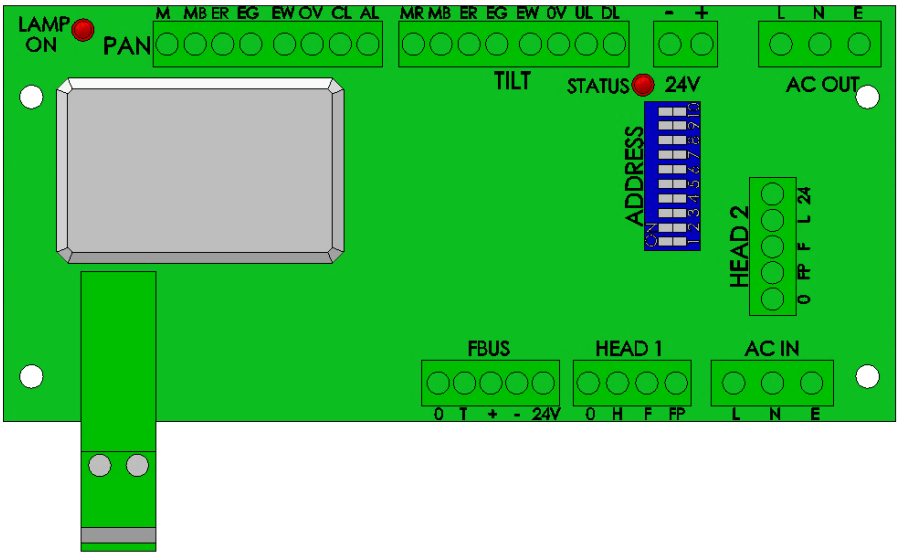
3. Before a Xenon lamp will ignite, the electrically insulated gas between the electrodes must be ionised. This is done by the ignitor which produces a high frequency voltage (up to 14,000 volts or higher). The ignitor is activated by switching the lamp on and a crackling or hissing noise should be heard. The ignitor is housed within the rear of the searchlight. This is a totally encapsulated unit and repair is not advised. If found to be faulty a new ignitor must be fitted.

7.2 - Problems After Installation

Please note, if the searchlight does not complete the self-test, you will not be able to operate the searchlight in any direction or switch the lamp on. Please refer to section **7.3 Obtaining Fault Status** below, to confirm the fault.

Once you have confirmed the fault via the joystick panel, please contact Francis Searchlights for ordering the required parts, sales@francis.co.uk

If the joystick panel is not communicating with the searchlight and none of the LED's on the joystick panel are lighting up, then you will need to access the speed controller PCB inside the searchlight (see drawing A7183/4), to access the speed controller PCB, you will need to remove the 5 off M8 bolts & washers, that are located beneath the searchlight head, then you can access the speed controller PCB, the Status LED located near the top of the card (labelled "STATUS") on the speed controller PCB, as shown below.



During faults normal status LED operation is overridden. The status LED will flash red several times with the number of flashes corresponding to the specific fault. If there are multiple faults the LED will flash accordingly with a gap between each fault flash sequence. Fault details are provided on the next page, with the number of flashes indicated on the left.

The Status LED has several functions as detailed below.

Software Version

When power is applied to the speed control card the status LED will flash green. The number of flashes corresponds to the software version.

FBUS Normal operation

When the system is operating from FBUS the status LED will illuminate static green. When a valid FBUS data signal is received the LED will switch off momentarily to indicate data reception. If data is continuous the LED will flash green slowly.

If the Status LED does not light up, then please check the 24v DC supply from the PSU within the junction box, as shown on drawing C27382 Item 7, if there is no output from the PSU then this will need to be replaced.

7.3 - Obtaining Fault Status

Fault codes can be accessed, with the joystick panel switched off, press the PANEL button and keeping the PANEL button pressed for 10 seconds. Fault codes are indicated by the PANEL button flashing several times related to the fault. Fault codes are detailed below. If more than one fault is present the PANEL button will indicate them in sequence.

1. Pan Limit. – Either of the pan limit switches operated. Note that this may not actually be a fault. The LED will flash when a limit switch is operated under normal circumstances i.e., the lamp is at the limit of travel. This will also indicate when a variable limit is reached.

2. Tilt Limit. – Either of the tilt limit switches operated. Note that this may not actually be a fault. The LED will flash when a limit switch is operated under normal circumstances i.e., the lamp is at the limit of travel. This will also indicate when a variable limit is reached.

3. Pan motor over current. – The pan motor is taking excessive current. The motor will be disabled for a period when this occurs. Fault indication will remain until power is removed or the fault is corrected.

4. Tilt motor over current. – The tilt motor is taking excessive current. The motor will be disabled for a period when this occurs. Fault indication will remain until power is removed or the fault is corrected.

5. Focus motor over current. – The focus motor is taking excessive current. The motor will be disabled for a period when this occurs. Fault indication will remain until power is removed or the fault is corrected.

6. FBUS interface over current. – The speed control card supplies 24VDC to the remote-control panels. This fault indicates the 24VDC output is taking excessive current. The FBUS supply output will switch off. To restore this output, remove the supply from the speed control card for a period.

7. Anti-condensation heater output over current. – The 24VDC anti condensation heater output is taking excessive current. The heater output will switch off. To restore this output, remove the supply from the speed control card for a period.

8. Limit Switch Error. Some lamp types do not use all or some limit switches. If an invalid limit switch input is detected it is probable the speed control card is set to the wrong product or there is a wiring error.

9. Datum Error. The start-up datum system has not completed correctly.

10. Product type not set or corrupt. The product type has not been set, has been set incorrectly or is corrupt.

11. Supply voltage out of tolerance. The 24V supply is outside the range 18-30V.

8 - Maintenance and Servicing

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 to reduce sympathetic wear.
- After inspection it may be necessary to clean the searchlight. The following procedure should be adhered to:
    - Clean the front glass using a proprietary glass cleaner.
    - Clean the reflector if required.
    - Ensure that the lamp holder is free from corrosion or other damage.
    - Check earth point for conductivity
- It is advisable to check all seals and gaskets for signs of degradation. Renew if necessary.
- The searchlight is fitted with two breather units. This ensures a steady airflow to prevent any vacuum forming within the head.
- 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 Francis who will be able to advise the best course of action for your product.

9 - Wiring Diagram & General Assembly

Drawing No:	Description
A7183	VX500RC 150W Xenon General Assembly
A7184	VX500RC 300W Xenon General Assembly
C27390	Wiring Diagram 150w/300w
C27312	Joystick Panel Assembly
C27417	Junction Box Assembly150w
C27382	Junction Box Assembly 300w

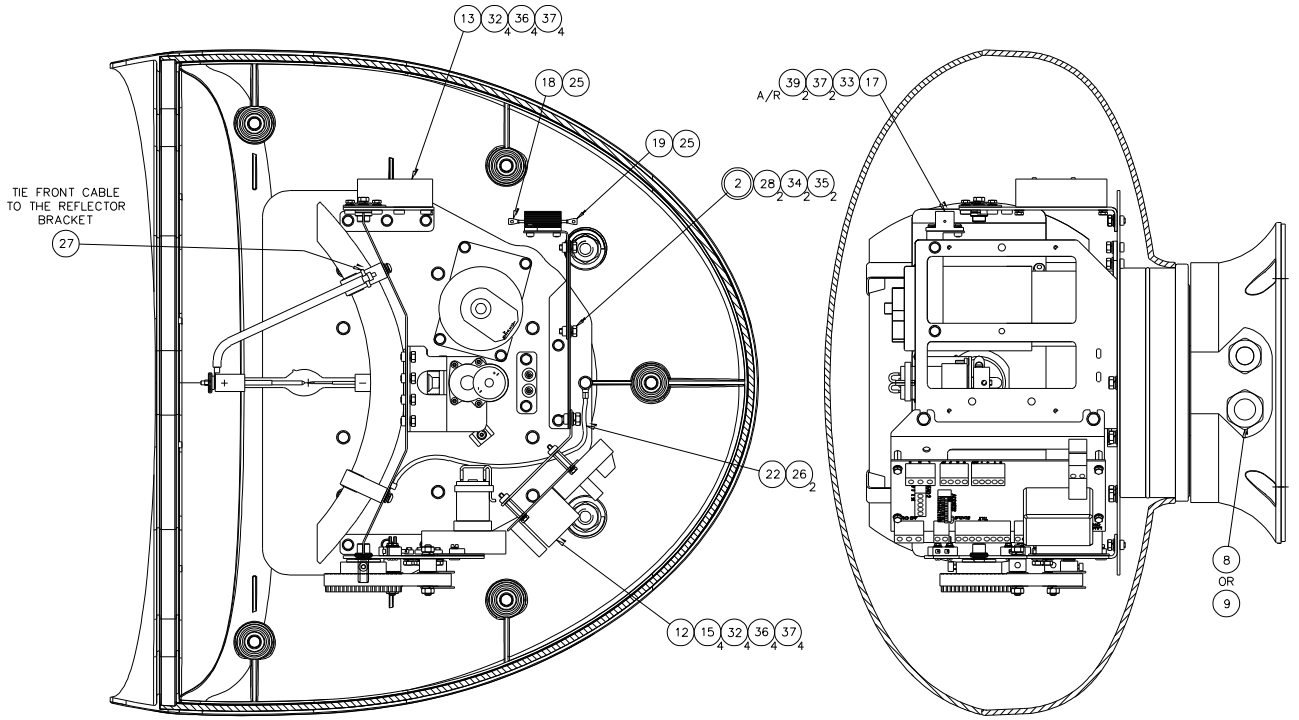
FIRST USED ON

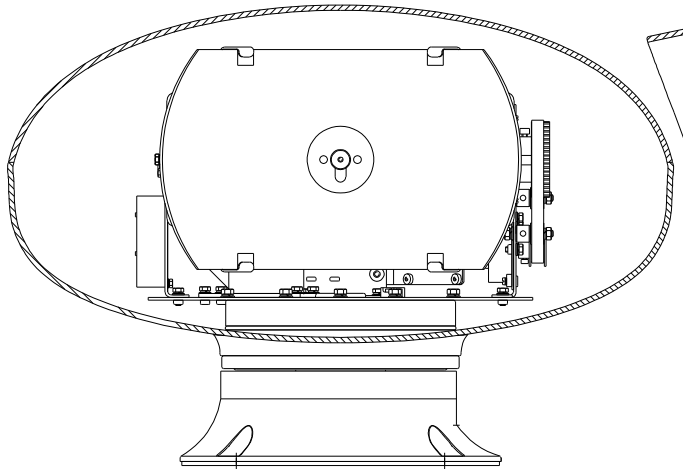
DO NOT SCALE DRAWING

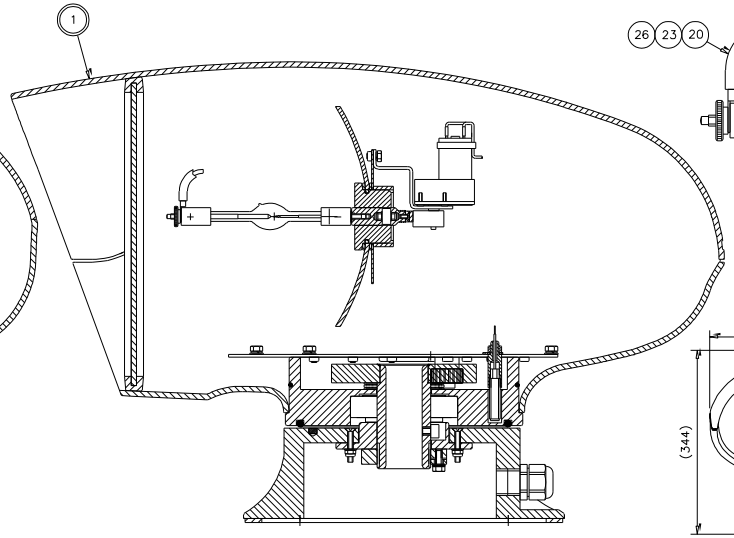
THIRD ANGLE PROJECTION

0 10 20 30 40 50mm

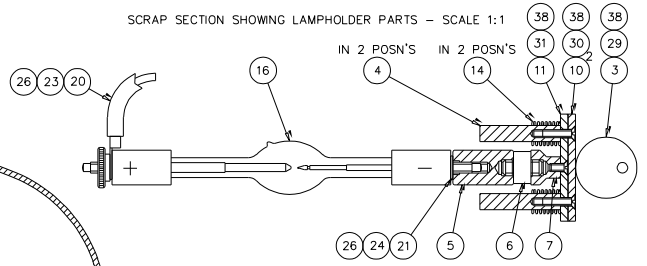
ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	A7305	A7305	VOYAGER 2 BLANK 2023	1
2	C30122	C30122	HEATER BRACKET SUB ASSY	1
3	C28220	C28220	FOCUS CAM	1
4	C23979	C23979	FOCUS PILLAR	2
5	C28573	C28573	FRONT LAMPHOLDER	1
6	C28574	C28574	MIDDLE LAMPHOLDER	1
7	C28572	C28572	REAR LAMPHOLDER	1
8	C12415	C12415	M20 CABLE GLAND	1
9	C20349		M20 BLANKING PLUG	1
10	C27745	C27745	FOCUS PLATE INNER	1
11	C27746	C27745	FOCUS PLATE OUTER	1
12	C29536		SPEED CONTROLLER PCB	1
13	C26195		IGNITER	1
14	C23810	C23810	SPRING	2
15	C27272		PILLAR	4
16	D8151		LAMP	1
17	C27288		HEATER	1
18	C17022		0.75mm S/C SILICONE CABLE RED	400 mm
19	C17023		0.75mm S/C SILICONE CABLE BLACK	400 mm
20	C26031		2.5mm S/C SILICONE CABLE RED	700 mm
21	C26030		2.5mm S/C SILICONE CABLE BLACK	500 mm
22	C15112		1.5mm S/C SILICONE CABLE G/Y	300 mm
23	C04481		RED SILICONE SLEEVING	500 mm
24	C28224		BLACK SILICONE SLEEVING	500 mm
25	C12841		SLEEVE	2
26	C16215		M5 CRIMP	4
27	C03636		CABLE TIE	1
28	C26955		M4 x 10 HEX HD SCREW	2
29	C08020		M4 x 4 GRUBSCREW	1
30	C27070		M3 x 12 CSK HD SCREW	2
31	C10208		M3 x 6 CSK HD SCREW	1
32	C26464		M3 x 8 HEX HD SCREW	8
33	C10207		M3 x 8 BTN HD SCREW	2
34	C04376		M4 PLAIN WASHER	2
35	C08793		M4 S/C SPRING WASHER	2
36	C08028		M3 PLAIN WASHER	8
37	C10747		M3 S/C SPRING WASHER	10
38	C13853		LOCTITE TL42	A/R
39	C14232		HEATSINK COMPOUND	A/R



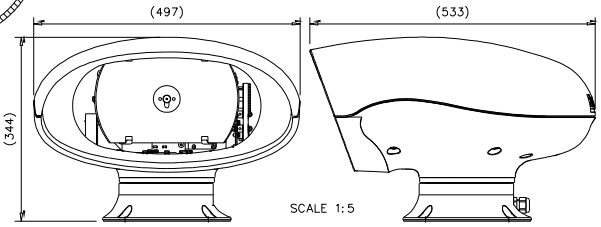




SCRAP SECTION SHOWING LAMPHOLDER PARTS – SCALE 1:1



BASE FISINGS
4 HOLES ø8.2
EQUI-SPACED ON A 220.00 P.C.D.



SCALE 1:5

ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	11.16 D.S.
2	BROUGHT INLINE WITH DETAIL (EC1780)	8.19 LW
3	PROXIMITY SWITCH ASSY ADDED (EC1860)	11.20 LW
4	NEW GA DRG (EC1894)	3.21 LW
5	REFLECTOR BKT REDUCED 4mm (EC1930)	11.22 J.H.
6	C15977 NOW C16215 (EC1939)	12.22 J.H.
7	PARVALUX (EC1935)	1.23 D.S.
8	IGNITER & HEATER POS'NS MOVED. EC1983	11.23 J.H.

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

Francis SEARCHLIGHTS

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

A1 CONT ON SHEET

DRAWN	D.S.	DATE	11.16	TOLERANCES	Sand Casting: To ISO 8062 CT10
CHECKED		SCALE	1:2	General: ± Angular: ±	Die Casting: To ISO 8062 CT8
ALL DIMENSIONS IN MILLIMETRES					Hole centres & posns: ±

MATERIAL | FINISH | DESCRIPTION: VOYAGER 2 150W HV XENON 2023

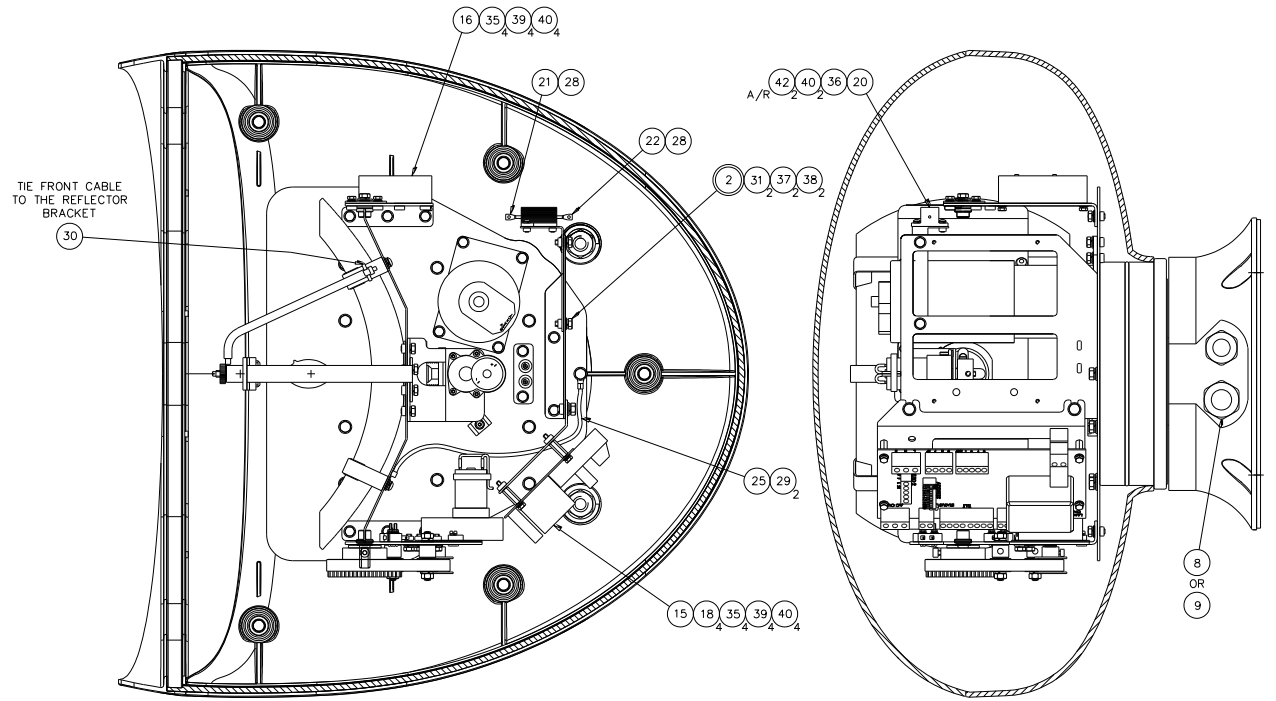
PART No./DRG No. A7183 | SHT 1

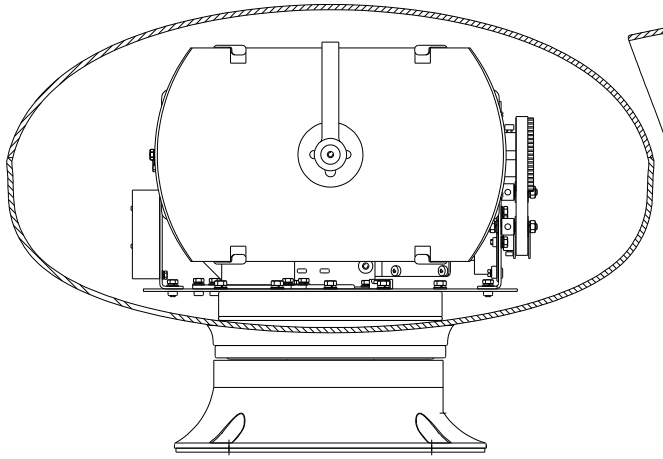
FIRST USED ON

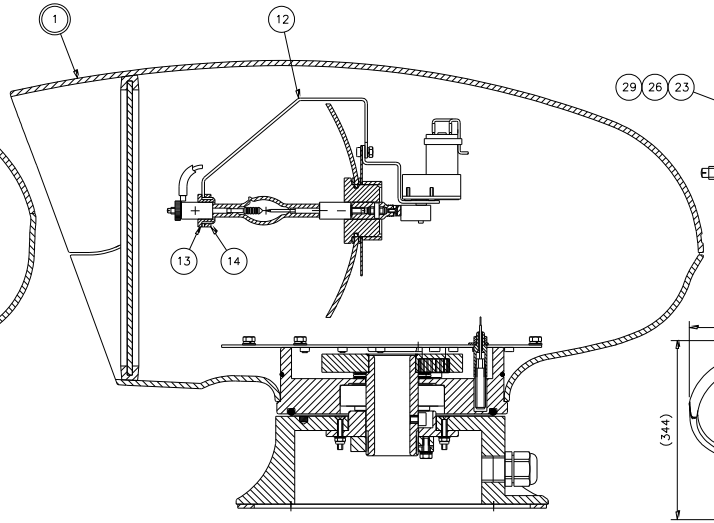
DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

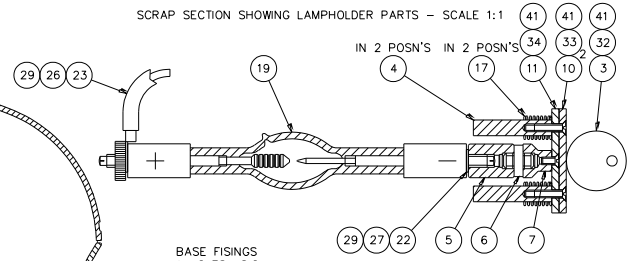
ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	A7305	A7305	VOYAGER 2 BLANK 2023	1
2	C30122	C30122	HEATER BRACKET SUB ASSY	1
3	C28220	C28220	FOCUS CAM	1
4	C23979	C23979	FOCUS PILLAR	2
5	C28946	C28946	FRONT LAMPHOLDER	1
6	C28571	C28571	MIDDLE LAMPHOLDER	1
7	C28572	C28572	REAR LAMPHOLDER	1
8	C12415	C12415	M20 CABLE GLAND	1
9	C20349		M20 BLANKING PLUG	1
10	C27745	C27745	FOCUS PLATE INNER	1
11	C27746	C27745	FOCUS PLATE OUTER	1
12	C28989	C28989	LAMP SUPPORT ARM	1
13	C28987	C28987	LAMP SUPPORT BUSH	1
14	C28988	C28987	LAMP SUPPORT NUT	1
15	C29536		SPEED CONTROLLER PCB	1
16	C26195		IGNITER	1
17	C23810	C23810	SPRING	2
18	C27272		PILLAR	4
19	D21908		LAMP	1
20	C27288		HEATER	1
21	C17022		0.75mm S/C SILICONE CABLE RED	400 mm
22	C17023		0.75mm S/C SILICONE CABLE BLACK	400 mm
23	C26031		2.5mm S/C SILICONE CABLE RED	700 mm
24	C26030		2.5mm S/C SILICONE CABLE BLACK	500 mm
25	C15112		1.5mm S/C SILICONE CABLE G/Y	300 mm
26	C04481		RED SILICONE SLEEVING	500 mm
27	C28224		BLACK SILICONE SLEEVING	500 mm
28	C12841		SLEEVE	2
29	C16215		M5 CRIMP	4
30	C03636		CABLE TIE	1
31	C26955		M4 x 10 HEX HD SCREW	2
32	C08020		M4 x 4 GRUBSCREW	1
33	C27070		M3 x 12 CSK HD SCREW	2
34	C10208		M3 x 6 CSK HD SCREW	1
35	C26464		M3 x 8 HEX HD SCREW	8
36	C10207		M3 x 8 BTN HD SCREW	2
37	C04376		M4 PLAIN WASHER	2
38	C08793		M4 S/C SPRING WASHER	2
39	C08028		M3 PLAIN WASHER	8
40	C10747		M3 S/C SPRING WASHER	10
41	C13853		LOCTITE TL42	A/R
42	C14232		HEATSINK COMPOUND	A/R



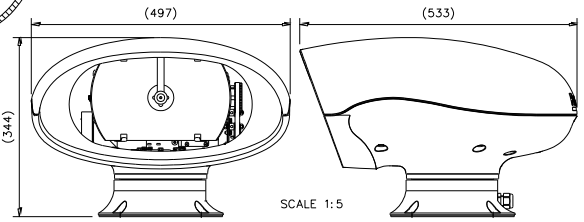




SCRAP SECTION SHOWING LAMPHOLDER PARTS – SCALE 1:1



BASE FISINGS
4 HOLES Ø8.2
EQUI-SPACED ON A 220.00 P.C.D.



SCALE 1:5

ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	11.16 D.S.
2	BROUGHT INLINE WITH DETAIL (EC1780)	8.19 LW
3	PROXIMITY SWITCH ASSY ADDED (EC1860)	11.20 LW
4	NEW GA DRG (EC1894)	3.21 LW
5	LAMP SUPPORT ADDED (EC1906)	10.21 LW
6	REFLECTOR BKT REDUCED 4mm (EC1930)	11.22 J.H.
7	C15977 NOW C16215 (EC1939)	12.22 J.H.
8	PARVALUX (EC1935)	1.23 D.S.
9	IGNITOR & HEATER POS'NS MOVED. EC1983	11.23 J.H.

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

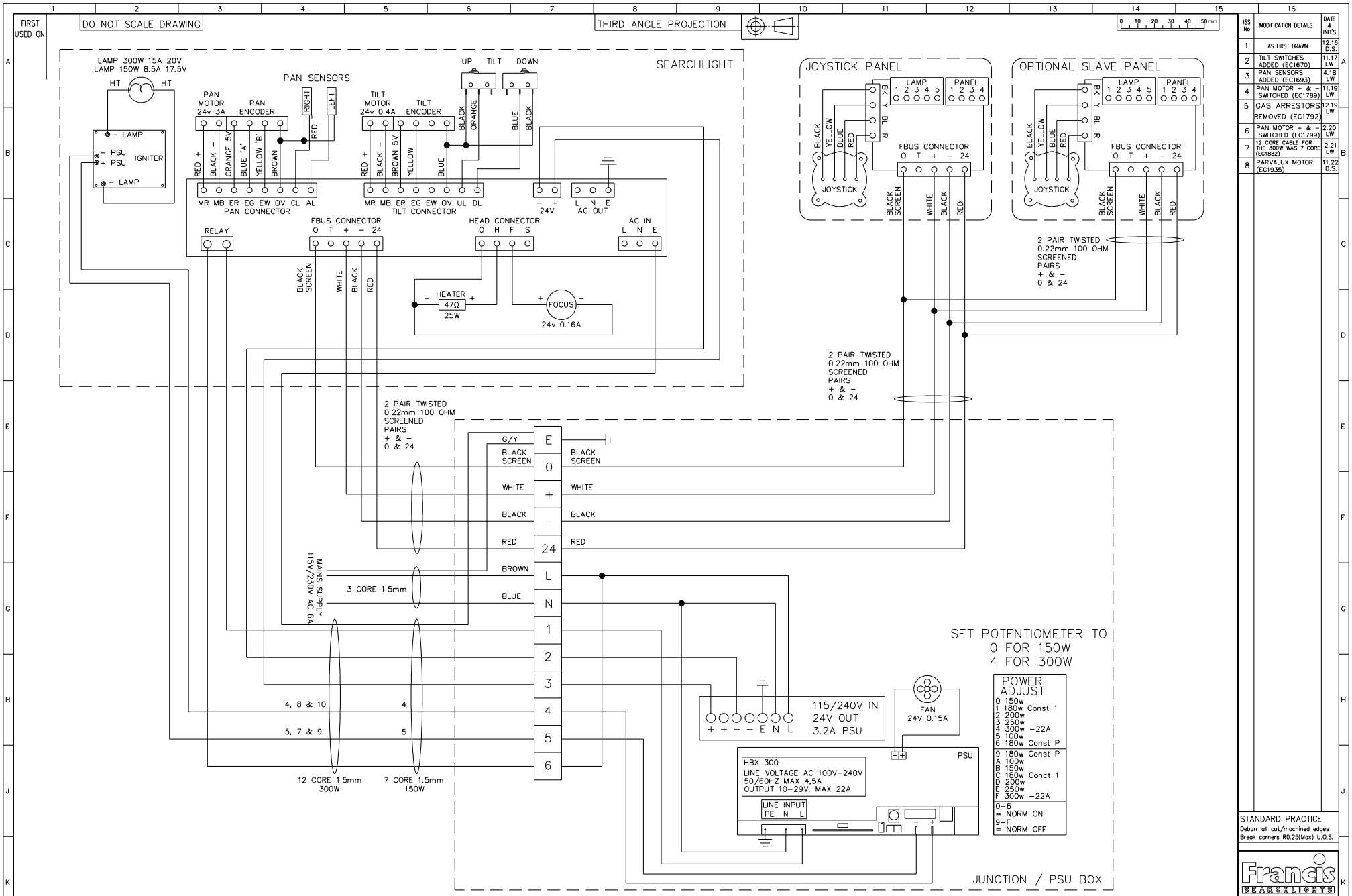
FRANCIS SEARCHLIGHTS LIMITED . UNION ROAD . BOLTON . BL2 2HJ

A1 CONT ON SHEET

DRAWN	D.S.	DATE	11.16	TOLERANCES	Sand Casting: To ISO 8062 CT10
CHECKED		SCALE	1: 2	General: ±	Die Casting: To ISO 8062 CT8
ALL DIMENSIONS IN MILLIMETRES				Angular: ±	Hole centres & posns: ±

MATERIAL | FINISH | DESCRIPTION: VOYAGER 2 300W XENON 2023

PART No./DRG No.: A7184 | SHT: 1



ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	12.16 D.S.
2	TILT SWITCHES ADDED (EC1670)	11.17 LW
3	PAN SENSORS ADDED (EC1693)	4.18 LW
4	PAN MOTOR + & – SWITCHED (EC1789)	11.19 LW
5	GAS ARRESTORS REMOVED (EC1792)	12.19 LW
6	PAN MOTOR + & – SWITCHED (EC1799)	2.20 LW
7	12 CORE CABLE FOR THE 300W WAS 7 CORE (EC1882)	2.21 LW
8	PARVALUX MOTOR (EC1935)	11.22 D.S.

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

Francis SEARCHLIGHTS

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

A1 CONT ON SHEET

DRAWN	D.S.	DATE	7.12.16
CHECKED		SCALE	
ALL DIMENSIONS IN MILLIMETRES			

TOLERANCES
General: ±
Angular: ±
Sand Casting: To ISO 8062 CT10
Die Casting: To ISO 8062 CT8
Hole centres & posns: ±

MATERIAL | FINISH | DESCRIPTION

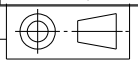
WIRING DIAGRAM VX500 HV 150W/300W XENON 2017

PART No./DRG No. C27390 SHT 1

FIRST USED ON

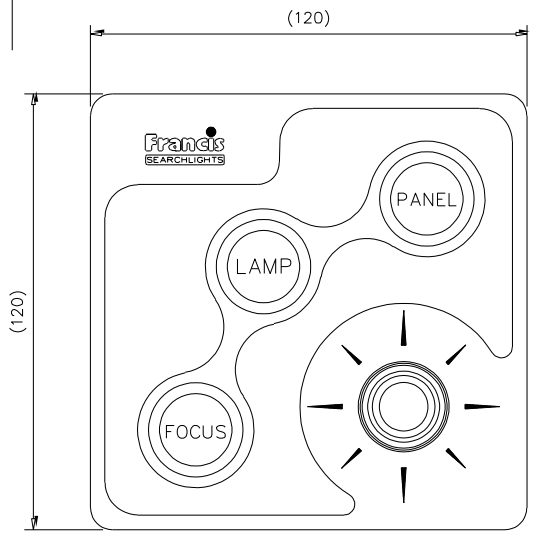
DO NOT SCALE DRAWING

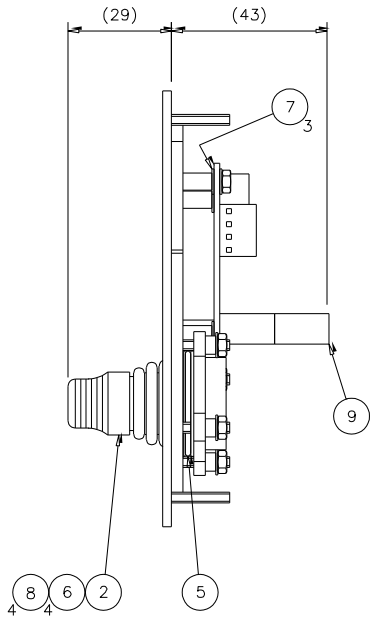
THIRD ANGLE PROJECTION

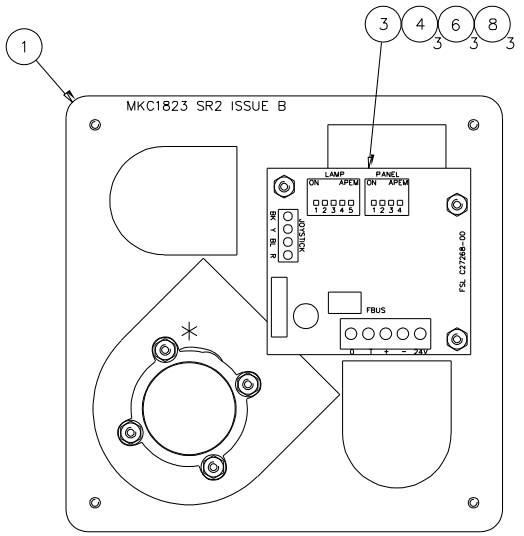


0 10 20 30 40 50mm

ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	10.16 D.S.
2	CUT OUT CHAM 6 WAS 9 (EC1778)	8.19 LW
3	'O' RING & NYLON WASHERS ADDED (EC1984)	10.23 D.S.





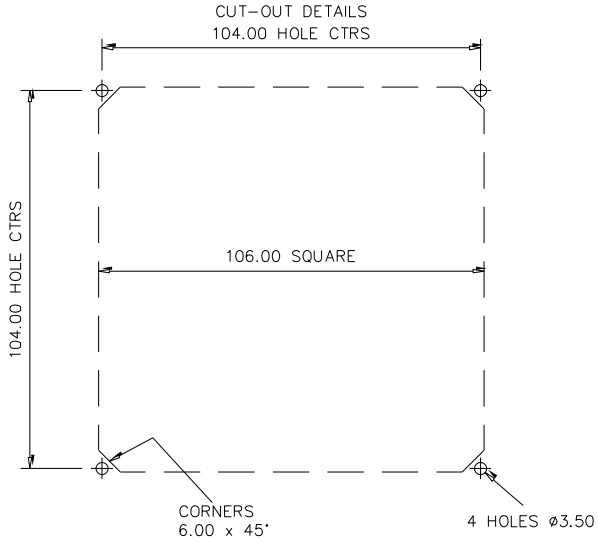


NOTES

PLACE 'O' RING OVER THE JOYSTICK REAR
'O' RING IS REQUIRED TO STOP THE JOYSTICK FROM ROTATING

POSITION THE JOYSTICK WITH THE
INDICATOR AT THE TOP AS SHOWN *
& CLAMPING RING NOTCH TO THE RIGHT
DO NOT OVER TIGHTEN THE NUTS.

ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C26528	C26528	CONTROL PANEL 3 BUTTON	1
2	C26537	C26537	JOYSTICK	1
3	C27268		CONTROL PANEL INTERFACE	1
4	C27020		SPACER	3
5	C30117		'O' RING	1
6	C08028		M3 PLAIN WASHER	7
7	C15271		M3 NYLON WASHER	3
8	C05298		M3 FULL NUT	7
9	C27435		5 WAY CONNECTOR	1



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

Francis SEARCHLIGHTS

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

A2

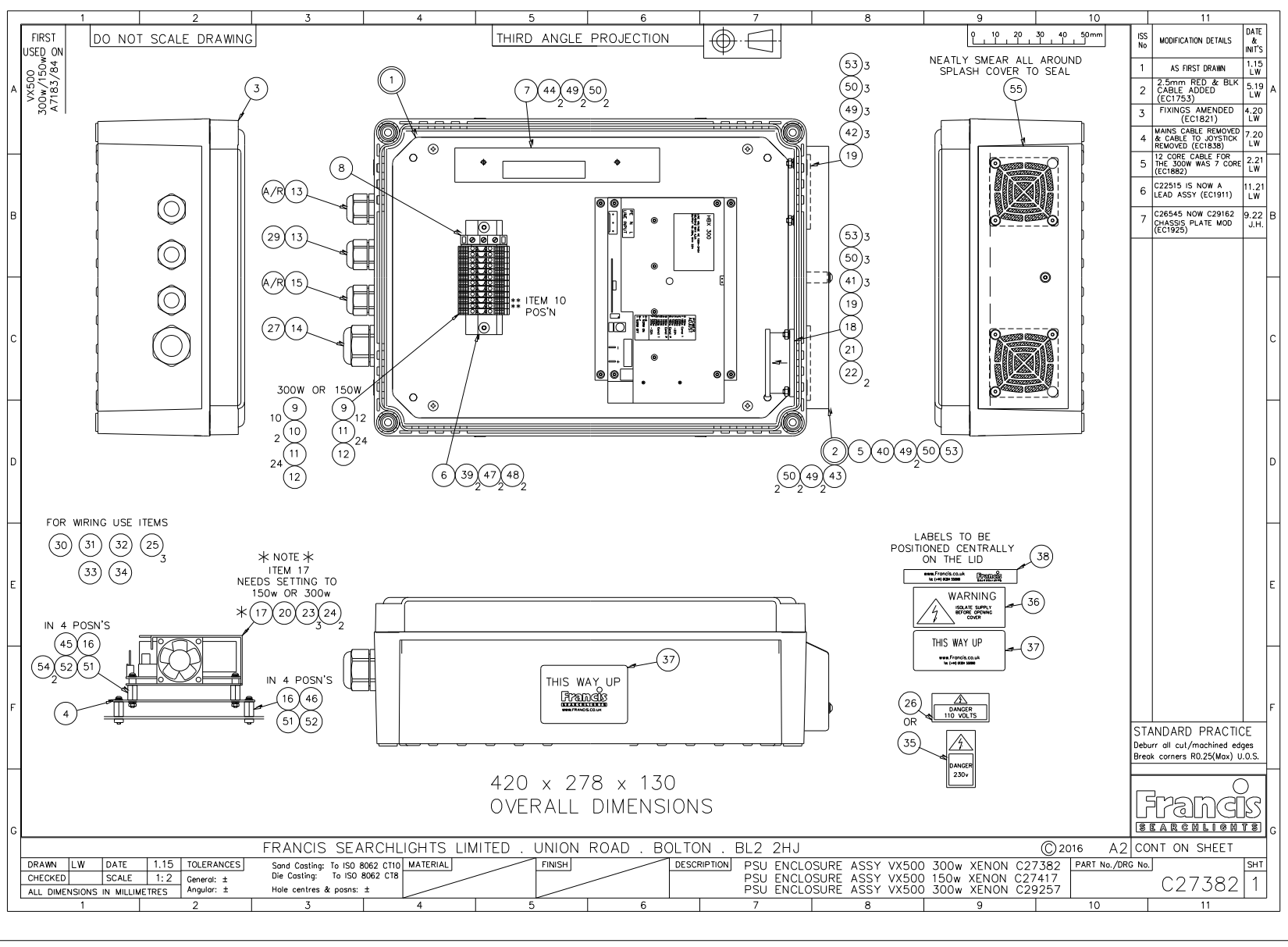
CONT ON SHEET

DRAWN	D.S.	DATE	10.16	TOLERANCES	Sand Casting: To ISO 8062 CT10
CHECKED		SCALE	1:1	General: ±	Die Casting: To ISO 8062 CT8
ALL DIMENSIONS IN MILLIMETRES				Angular: ±	Hole centres & posns: ±

MATERIAL | FINISH | DESCRIPTION: 3 BUTTON CONTROL PANEL ASSY (2017)

PART No./DRG No.: C27312

SHT 1



ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	1.15 LW
2	2.5mm RED & BLK CABLE ADDED (EC1753)	5.19 LW
3	FIXINGS AMENDED (EC1821)	4.20 LW
4	MAINS CABLE REMOVED & CABLE TO JOYSTICK REMOVED (EC1838)	7.20 LW
5	12 CORE CABLE FOR THE 300W WAS 7 CORE (EC1882)	2.21 LW
6	C22515 IS NOW A LEAD ASSY (EC1911)	11.21 LW
7	C26545 NOW C29162 CHASSIS PLATE MOD (EC1925)	9.22 J.H.

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

Francis SEARCHLIGHTS

FRANCIS SEARCHLIGHTS LIMITED . UNION ROAD . BOLTON . BL2 2HJ ©2016 A2 CONT ON SHEET

DRAWN	LW	DATE	1.15	TOLERANCES
CHECKED		SCALE	1:2	General: ±
ALL DIMENSIONS IN MILLIMETRES				Angular: ±

Sand Casting: To ISO 8062 CT10
Die Casting: To ISO 8062 CT8
Hole centres & posns: ±

MATERIAL | FINISH | DESCRIPTION

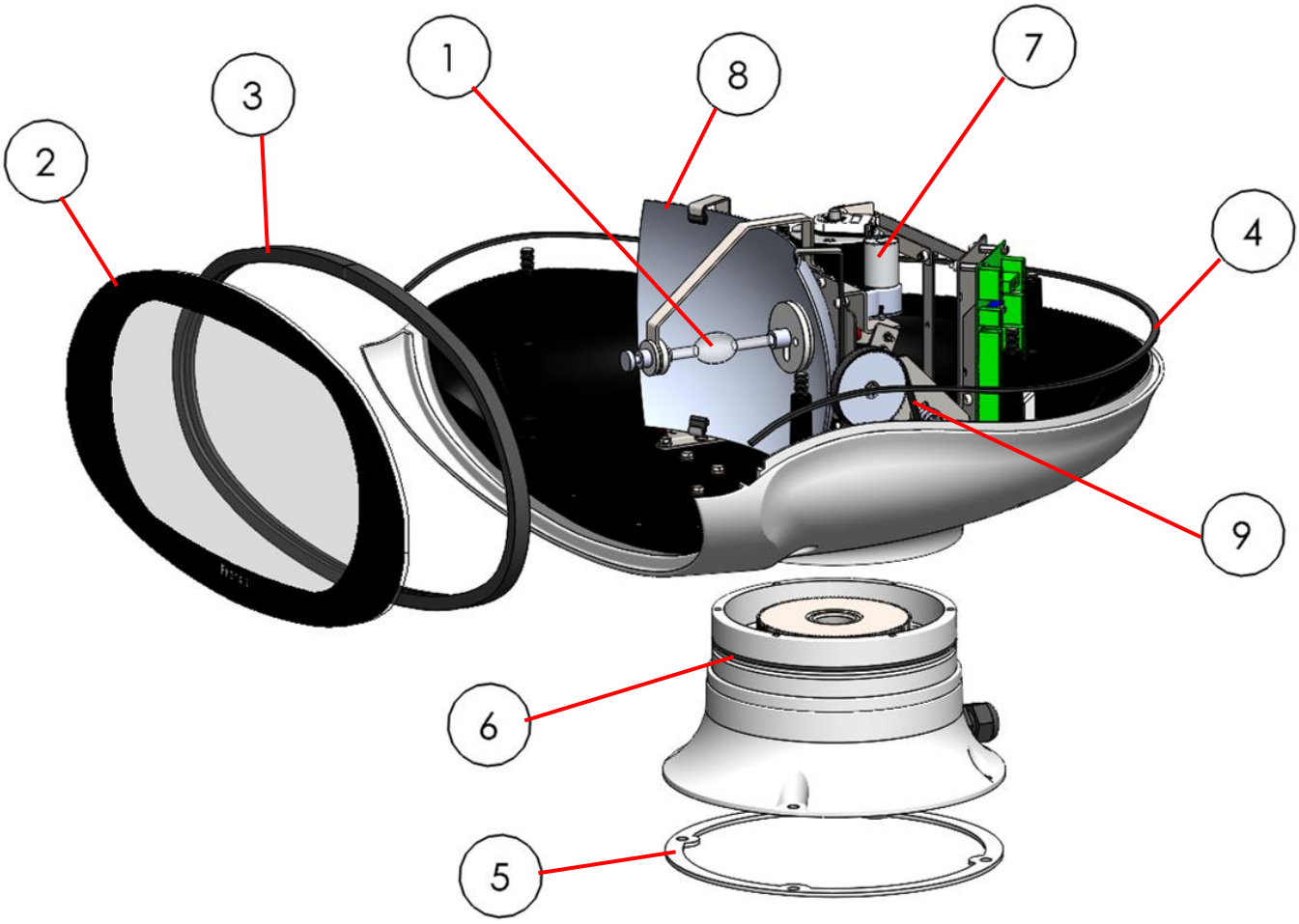
PSU ENCLOSURE ASSY VX500 300w XENON C27382
PSU ENCLOSURE ASSY VX500 150w XENON C27417
PSU ENCLOSURE ASSY VX500 300w XENON C29257

PART No./DRG No. C27382 SHT 1

C27382
C27417 C29257

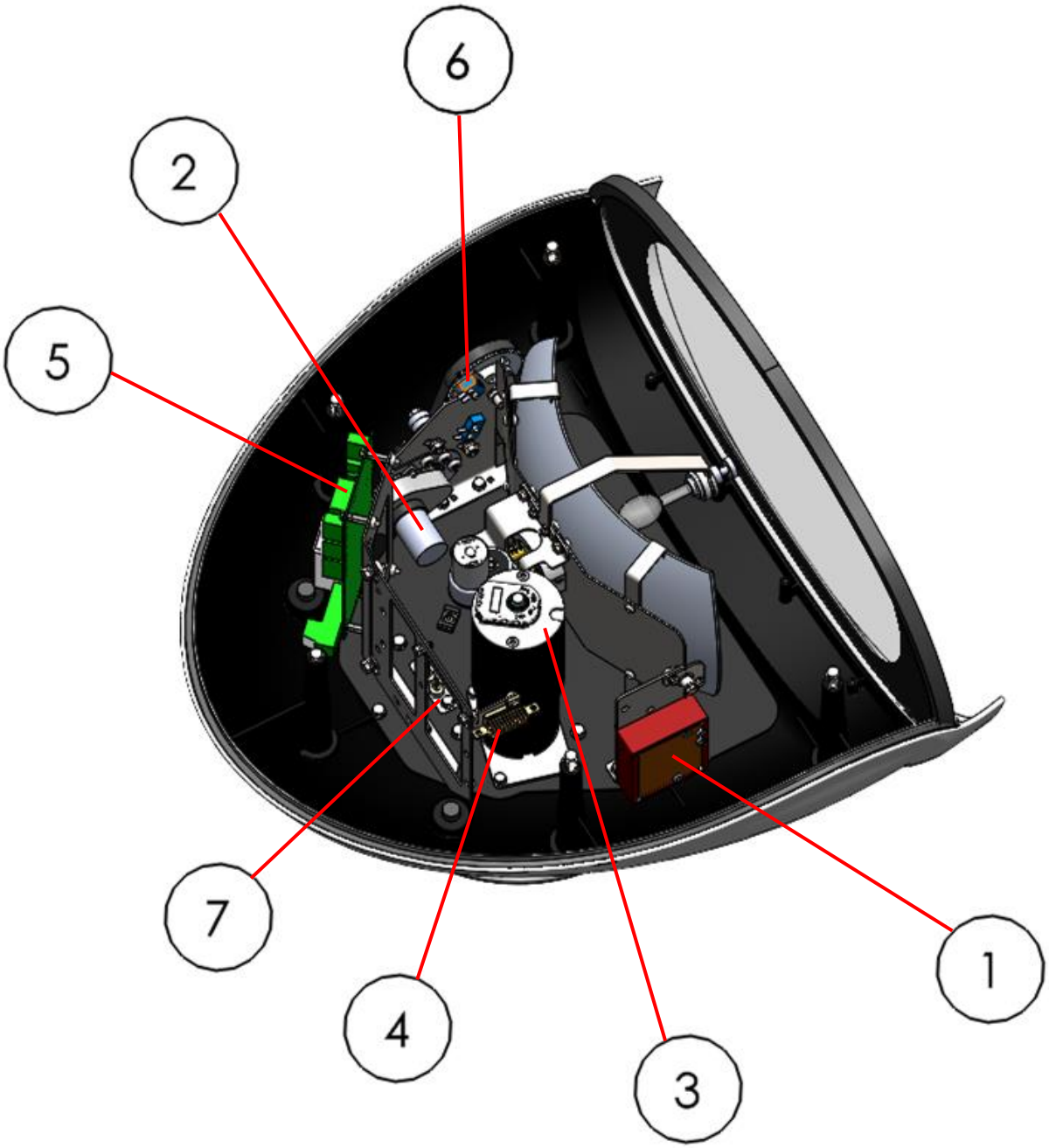
ITEM	PART No.	DRG No.	DESCRIPTION	150w QTY	300w QTY	300w QTY
1	C26655	C26655	CHASSIS PLATE S/ASSY	1	1	1
2	C24686	C24686	FAN SPLASH COVER ASSY	1	1	1
3	C27413	C27413	ENCLOSURE DRILLING	1	1	1
4	C26245	C26245	PSU MOUNTING PLATE	1	1	1
5	C24687	C24687	FAN COVER PILLAR	1	1	1
6	C20757	C20757	DIN RAIL	1	1	1
7	C29162		24V PSU	1	1	1
8	C14379		EARTH TERMINAL	1	1	1
9	C14400		TERMINAL	12	10	10
10	C15099		TERMINAL SAK4	X	2	2
11	C15411		TERMINAL MARKER	24	24	24
12	C14139		END COVER	1	1	1
13	C27121		CABLE GLAND	2	2	2
14	C15450		CABLE GLAND	1	1	1
15	C10158		CABLE GLAND	1	1	1
16	C16591		PILLAR	8	8	8
(17)	C26194		PSU 300w	X	1	X
(17)	C26535		PSU 150w	1	X	X
18	C22104		FAN	1	1	1
19	C24366		FAN COVER	2	2	2
20	C26246		CONNECTOR	1	1	1
21	C22515		CONNECTOR LEAD ASSY	1	1	1
22	C29148		2 WAY WAGO CONNECTOR	2	2	2
23	C26247		CRIMP	3	3	3
24	C16233		YELLOW SHROUDED CRIMP	2	2	2
25	C16215		M5 UN-INSULATED CRIMP	3	3	3
26	C22078		110v LABEL	1	1	1
(27)	C15974		7 CORE 1.5mm CABLE	4M	X	X
(27)	C24618		12 CORE 1.5mm CABLE	X	4M	10M
28	C08791		3 CORE 1.5mm CABLE	A/R	A/R	A/R
29	C24827		2 PAIR TWISTED SCREENED CABLE	4M	4M	10M
30	C13872		1.5mm S/C SILICONE RED	A/R	A/R	A/R
31	C13873		1.5mm S/C SILICONE BLACK	A/R	A/R	A/R
32	C15112		1.5mm S/C SILICONE G/Y	A/R	A/R	A/R
33	C26031		2.5mm S/C SILICONE RED	A/R	A/R	A/R
34	C26030		2.5mm S/C SILICONE BLACK	A/R	A/R	A/R
35	C21464		230v LABEL	1	1	1
36	C22036		ISOLATE SUPPLY LABEL	1	1	1
37	C24369		THIS WAY UP LABEL	2	2	2
38	C04900		FRANCIS EXTERNAL LABEL	1	1	1
39	C09895		M5 x 10 BTN HD SCREW	2	2	2
40	C14468		M4 x 35 BTN HD SCREW	1	1	1
41	C10120		M4 x 20 SKT CSK HD SCREW	3	3	3
42	C06981		M4 x 16 SKT CSK HD SCREW	3	3	3
43	C14533		M4 x 10 BTN HD SCREW	2	2	2
44	C23813		M4 x 8 BTN HD SCREW	2	2	2
45	C21488		M3 x 12 BTN HD SCREW	4	4	4
46	C10207		M3 x 8 BTN HD SCREW	4	4	4
47	C08392		M5 PLAIN WASHER	2	2	2
48	C09231		M5 S/C SPRING WASHER	2	2	2
49	C04376		M4 PLAIN WASHER	9	9	9
50	C08793		M4 S/C SPRING WASHER	11	11	11
51	C08028		M3 PLAIN WASHER	8	8	8
52	C10747		M3 S/C SPRING WASHER	12	12	12
53	C06266		M4 FULL NUT	7	7	7
54	C05298		M3 FULL NUT	4	4	4
55	C12039		RTV - CLEAR	A/R	A/R	A/R

Searchlight



Item Number	Part Number	Description	Quantity
1	D8151	150w Xenon Lamp	1
1	D21908	300w Xenon Lamp	1
2	C26139-00	Front Glass	1
3	C26184-00	Front Glass Gasket	1
4	C26183-00	Sealing Strip Gasket	1
5	C26475-00	Base Gasket	1
6	C23808-00	Base ‘O’ Ring	1
7	C28025-01	Focus Motor Assembly	1
8	C23802-00	Reflector	1
9	C26843-00	Pulley Belt	1

Searchlight



Item Number	Part Number	Description	Quantity
1	C26195-00	Igniter	1
2	C28654-01	Tilt Motor Assembly	1
3	C29521-01	Pan Motor Assembly	1
4	C27288-00	Heater	1
5	C29536-01	Speed Controller PCB	1
6	C27650-00	Tilt Microswitch	2
7	C25022-00	Proximity Switch	2

10 - Spare Parts List

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

Part Number	Description
Searchlight Spares	
D8151	150w Xenon Lamp
D21908	300w Xenon Lamp
C26195-00	Igniter
C26139-00	Front Glass
C26184-00	Front Glass Gasket
C26183-00	Sealing Strip Gasket
C26475-00	Mounting Base Gasket
C23808-00	Base ‘O’ Ring
C28025-01	Focus Motor Assembly
C23802-00	Reflector
C28654-01	Tilt Motor Assembly
C29521-01	Pan Motor Assembly
C27288-00	Heater
C26843-00	Pulley Belt
C29536-01	Speed Controller PCB
C27650-00	Tilt Micro Switch
C25022-00	Proximity Switch (Pan)
Junction Box Spares	
C26535-01	PSU (150w)
C26194-01	PSU (300w)
C22104-00	Fan
C29162-00	24v PSU Converter
Joystick Panel Spares	
C26537-01	Joystick
C27268-00	Joystick Controller PCB

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 Limited sales@francis.co.uk . Please always quote searchlight model and serial number, which you can find on the junction box name plate. This will enable a fast response to your spares’ requirements.