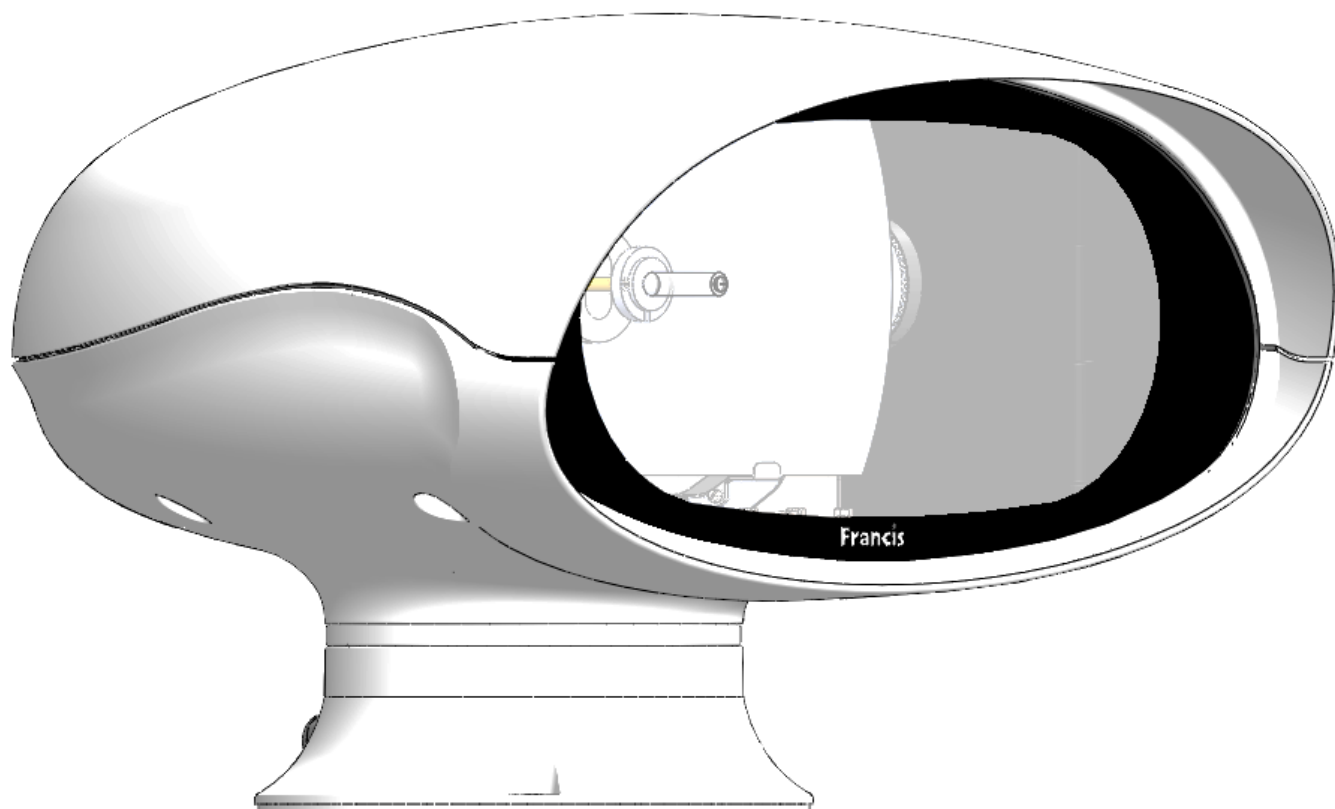




VX500RC 110/240v 100w Xenon Remote Control Searchlight

User / Installation Manual

Product Part Number:

A7187 – VX500RC 110/240V 100w Xenon Variable Speed Remote Control Searchlight

PLEASE NOTE!

Please read this manual before installation.

Francis
SEARCHLIGHTS

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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		
Input voltage:	110V	240V
Input current:	2A Max	1A Max
Ballast output voltage:	24v DC Max	
Ballast current:	4A Max	
Wattage:	100w	
Dimensions		
Searchlight Height:	340mm	
Width:	500mm	
Depth:	533mm	
Weight:	17Kgs	
Junction Box Size:	378mm x 278mm x 110mm	
Junction Box Weight:	3Kg	
Searchlight Performance		
Lamp power:	100w	
Range @ 1 Lux:	2081m	
Lamp life (approx.)	3000h	
Divergence:	5° - 29°	
PBCP (Peak Beam Candle Power):	4,300,000 cd	
Colour temperature:	6000 K	
Luminous flux:	100 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 – IP66 Junction Box	
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.

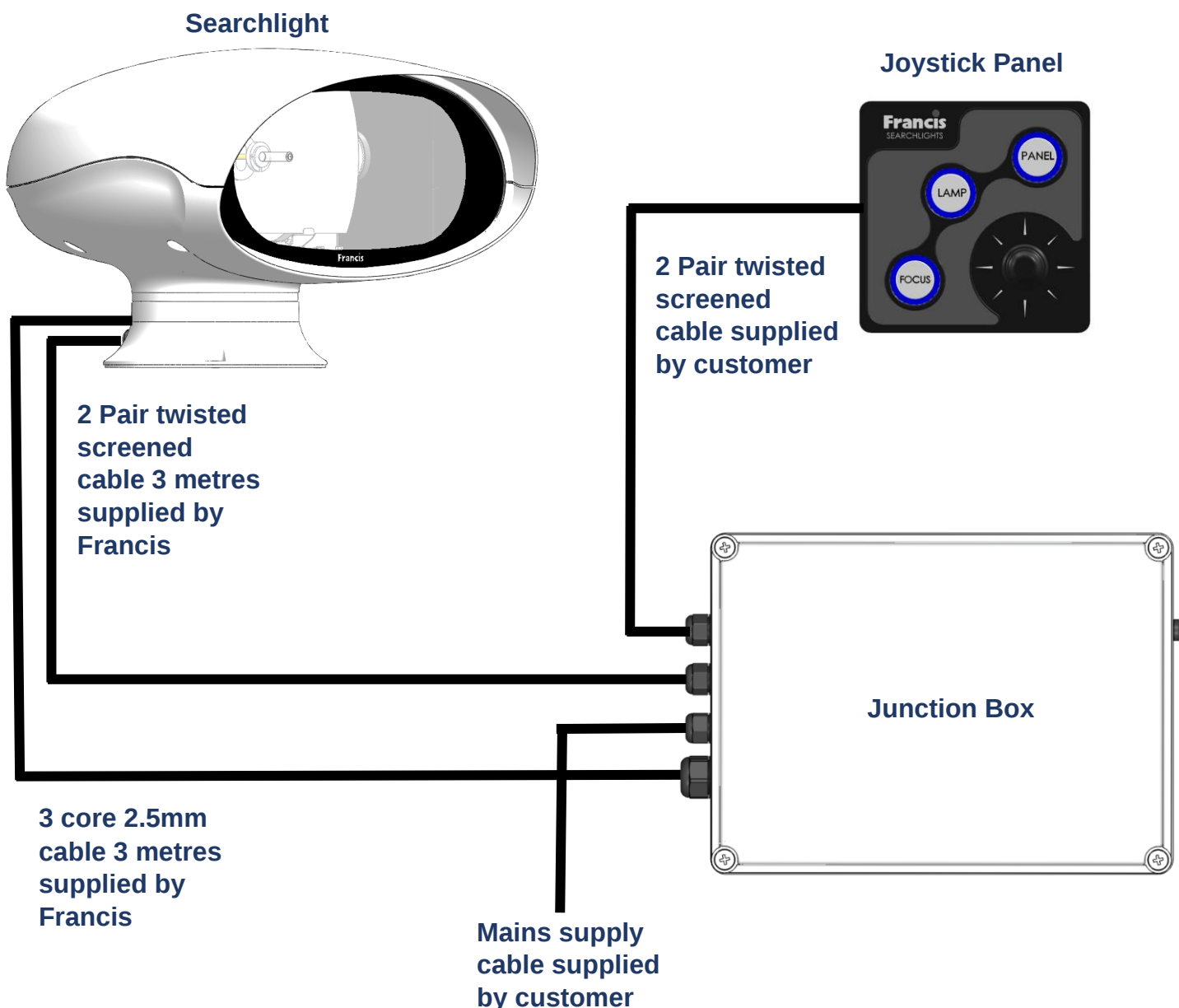
Referring to wiring diagram C27392 (at the back of the manual), a supply is fed to the junction box, which then provides a common feed to the searchlight and joystick control panel.

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.



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 searchlight.

Searchlight	110v 100w	240v 100w
Cable Size (mm ²)		Distance Max
1.5	85M	355M

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	100w
Cable Size (mm ²)	Distance Max
2.5	15M
4.0	24M

- 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.

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.
- Ensure the circuit is suitably fused.
- Ensure the lamp is of the correct power rating and type.
- Do not apply unnecessary force when tightening the screws.
- Mechanical forces must not be applied to the fused quartz bulb.

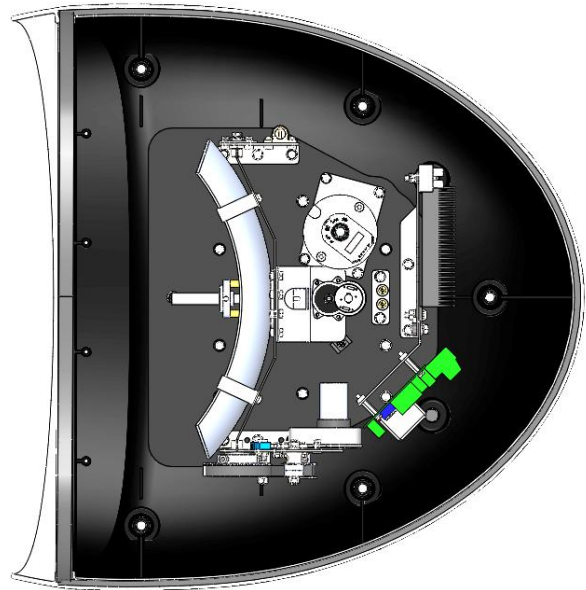
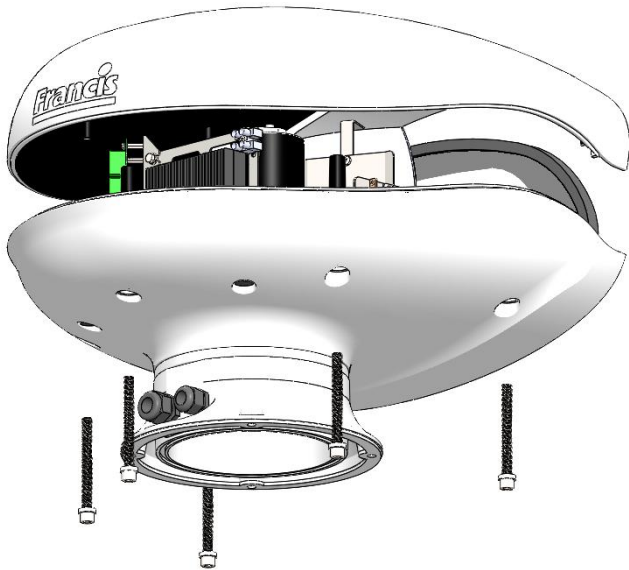
Notes:

- 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.
- 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

- Feed the lamp leads through the centre PTFE reflector boss slot.
- Nip the lamp holder M4 grub screw onto the lamp to fix in place.
- Connect the lamp leads to the leads from the ballast unit.

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 across terminals 0v & 24vDC in the junction box.
- Using the ammeter, take an amp reading from the cable in terminal 24v DC in the junction box.
- Multiply these figures together to give an approximate wattage (Power output).

For example:

Voltage reading = 24v; Amps reading = 4 amps

Therefore, Wattage = $24 \times 4 = 96$ 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

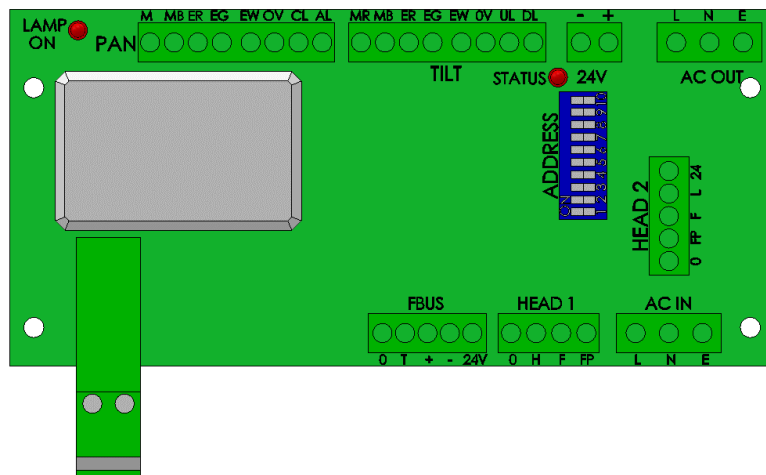
The Francis bus (FBUS) is a custom communication protocol based on RS485 two wire bi-directional communication hardware. The system provides a simple bi-directional link between searchlights and joystick panels. The system allows given panels to communicate with different searchlights and allows several 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 A7186). 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.

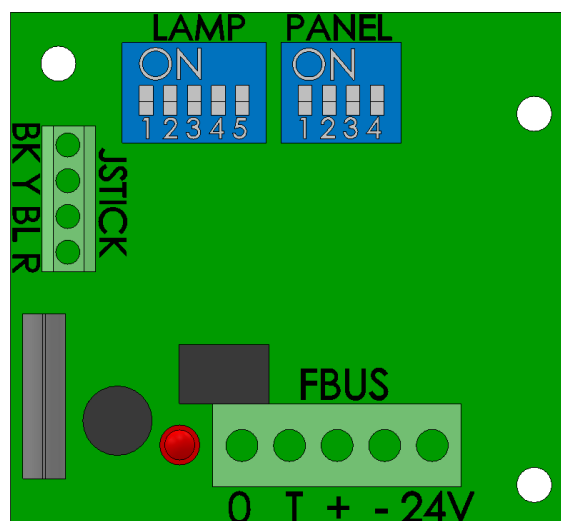
The address value is the sum of the numbers above which are active when the switch is on.

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.

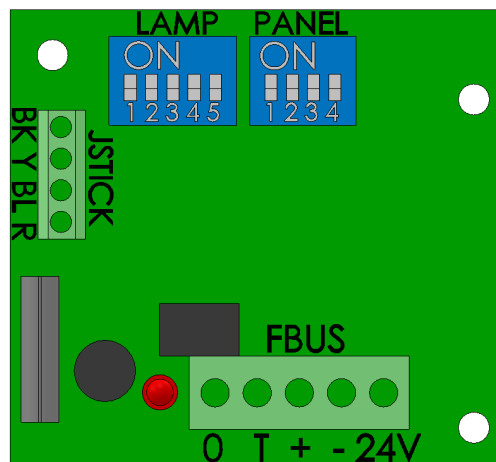
Standard Joystick Panel – Searchlight (Lamp) Address

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

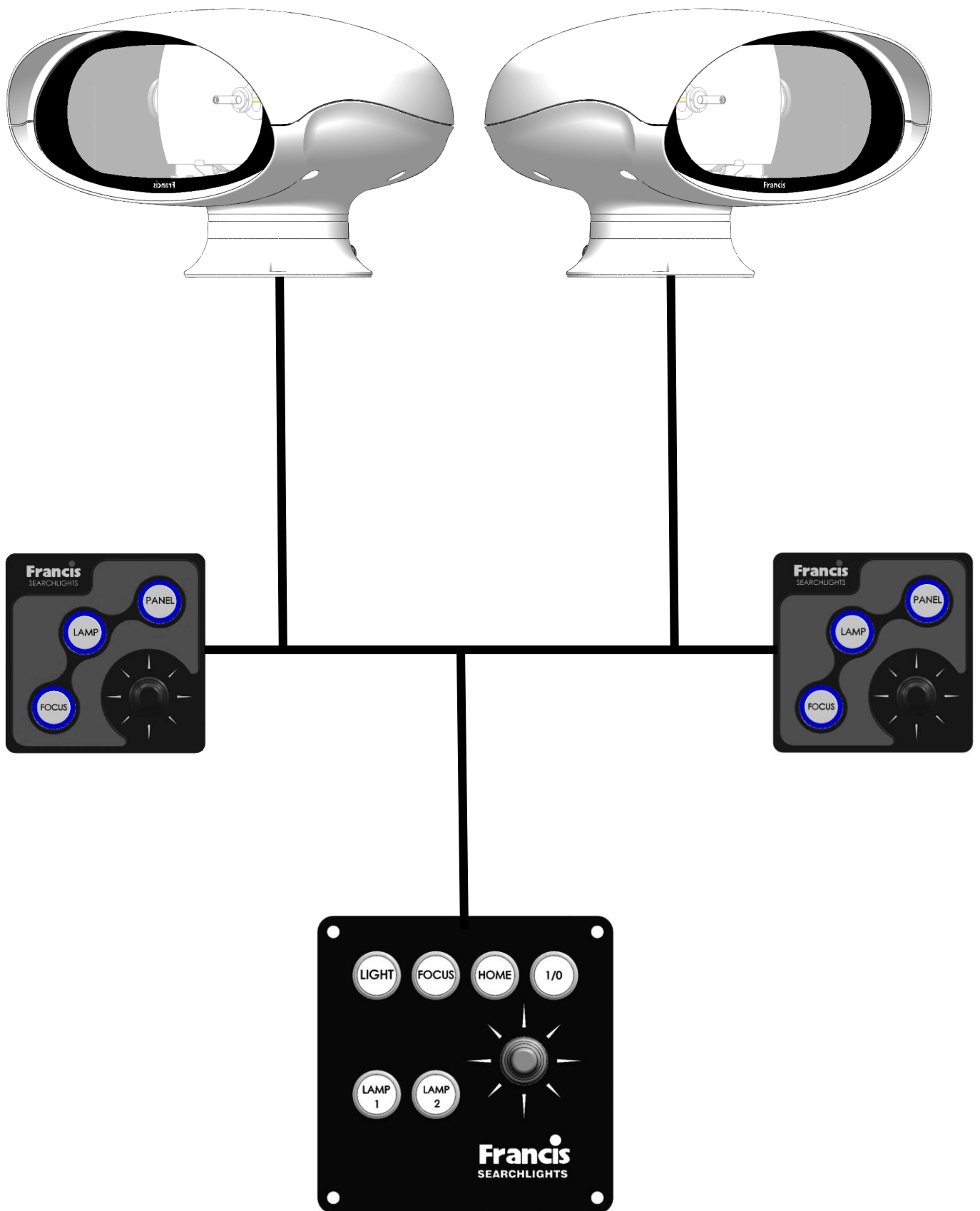
Every lamp must have a unique address. The addresses should be sequential and should start from zero. If there were three lamps in a system the addresses should be set to 0, 1 and 2.

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 Lamp to light

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

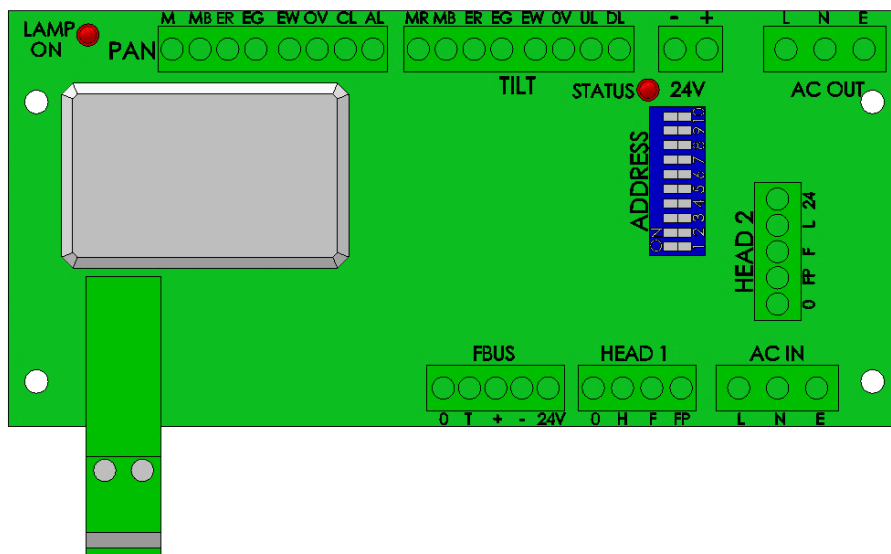
1. Check that the mains supply is connected to the input of the ballast. On operating the lamp switch, if the lamp does not light, switch off mains supply and check all fuses.
2. If the lamp still fails to ignite, switch off at the mains and replace the lamp in accordance with the safety procedures within this manual and the manufacturer's information.
3. If the lamp still fails to ignite, replace the ballast / igniter unit.

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 A7186), 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.

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:

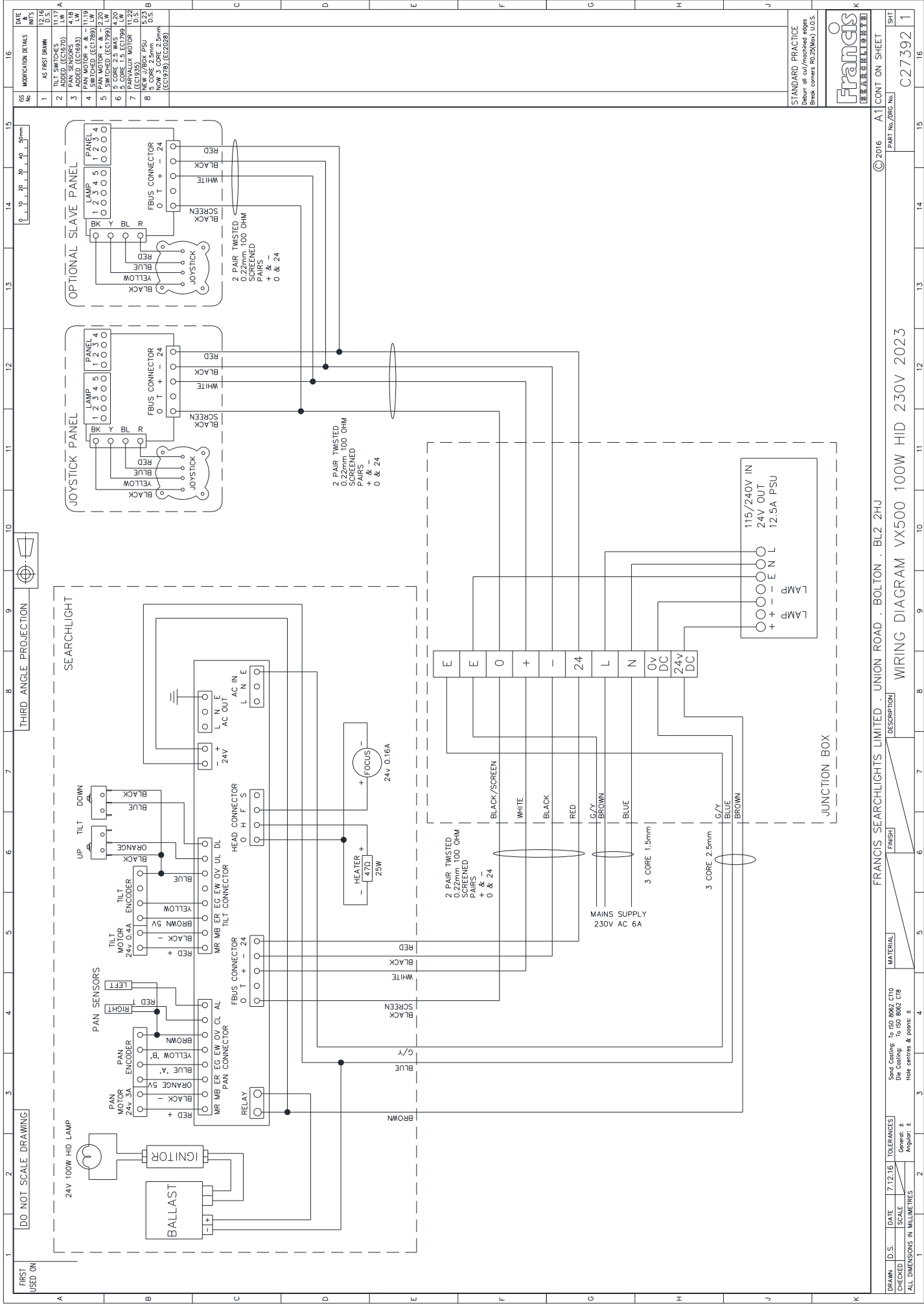
- Maintenance checks should be conducted before every voyage or at least every three months.
- Before checking, disconnect the equipment from the supply.
- Visually inspect the condition of the equipment.
- Any major or minor structural damage should be rectified immediately to reduce sympathetic wear.
- 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).

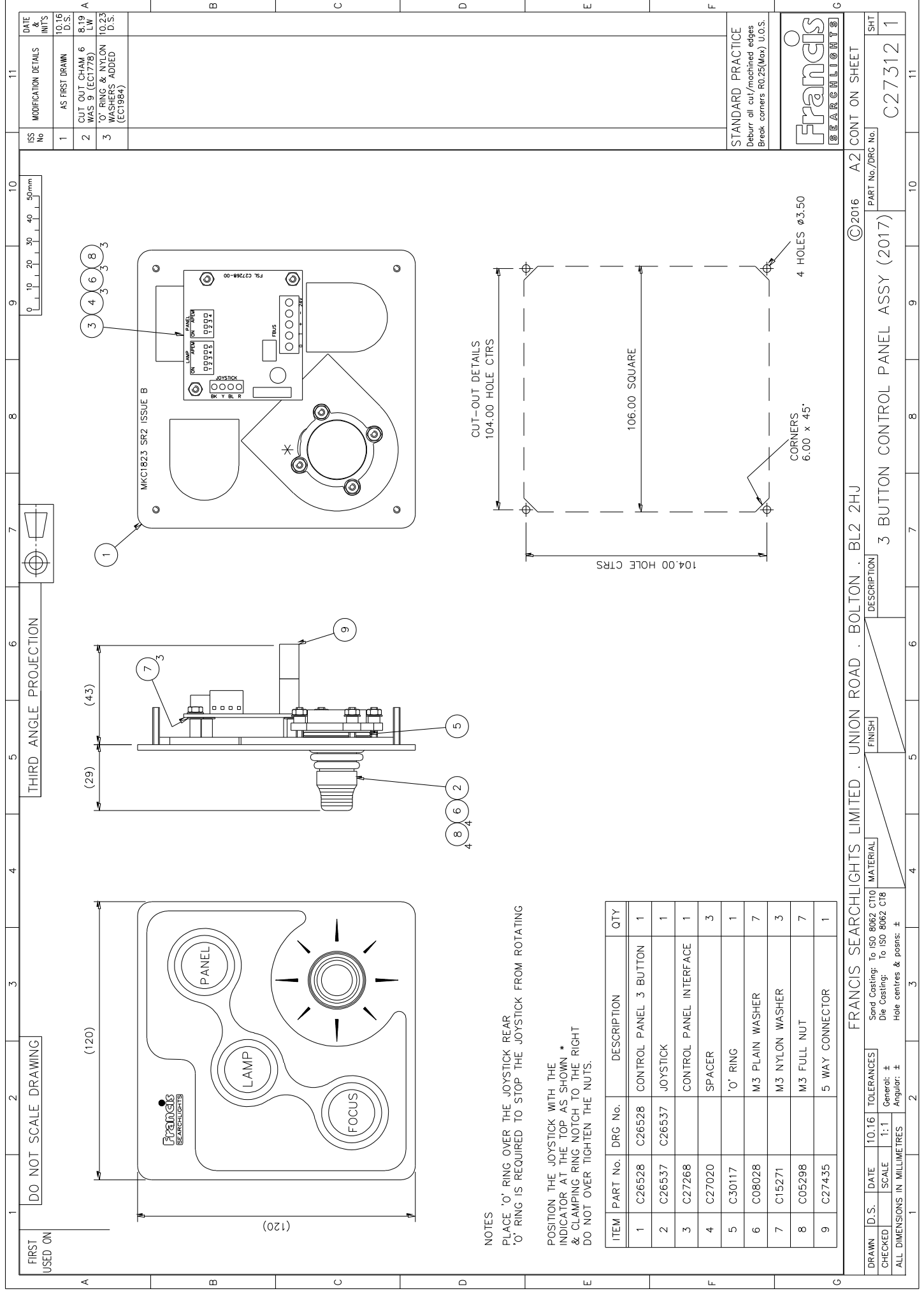
If in any doubt as to the correct servicing procedures to adopt, please contact your distributor/agent or Francis who will be able to advise the best course of action for your product.

9 - Wiring Diagram & General Assembly

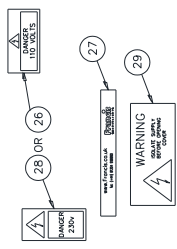
Drawing No:	Description
A7186	Voyager 2 24v 100w Xenon General Assembly
C27392	Wiring Diagram
C27312	Joystick Panel Assembly
C27380	Junction Box Assembly

[illegible]





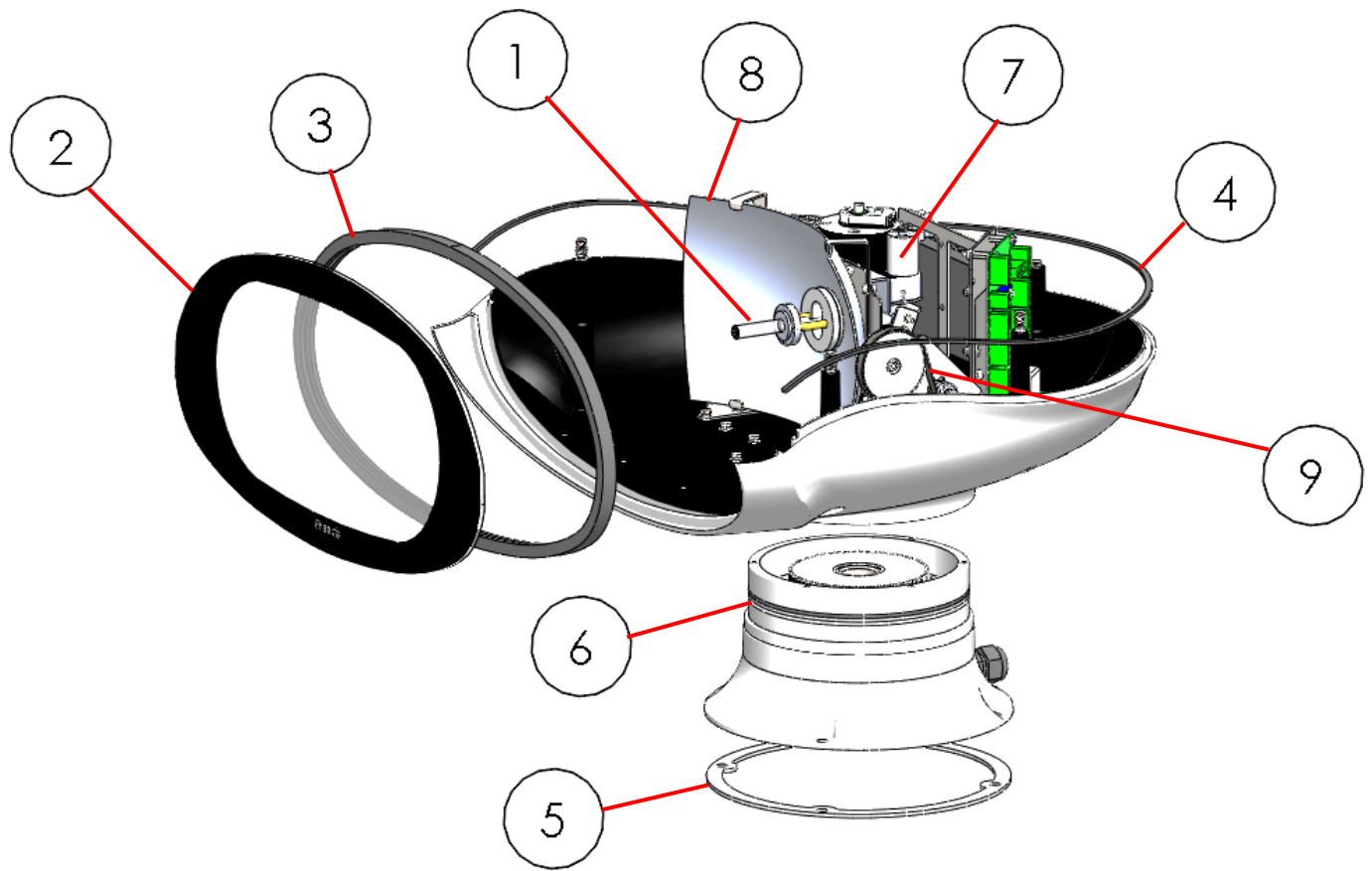
STANDARD PRACTICE
Deburr all cut/machined edges
Break corners R0.25(Max) U.O.S.



ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C27419	C27418	CHASSIS PLATE ASSY	1
2	C22268		BREATHER ASSY	1
3	C28583	C28583	ENCLOSURE	1
4	C20757	C20757	DIN RAIL	1
5	C29359	C29359	PSU MOUNTING PLATE	1
6	C29241		PSU	1
7	C10158		M20 CABLE GLAND	1
8	C12415		M20 CABLE GLAND	1
9	C27121		M20 CABLE GLAND	2
10	C16778		3 CORE 2.5mm CABLE	4M

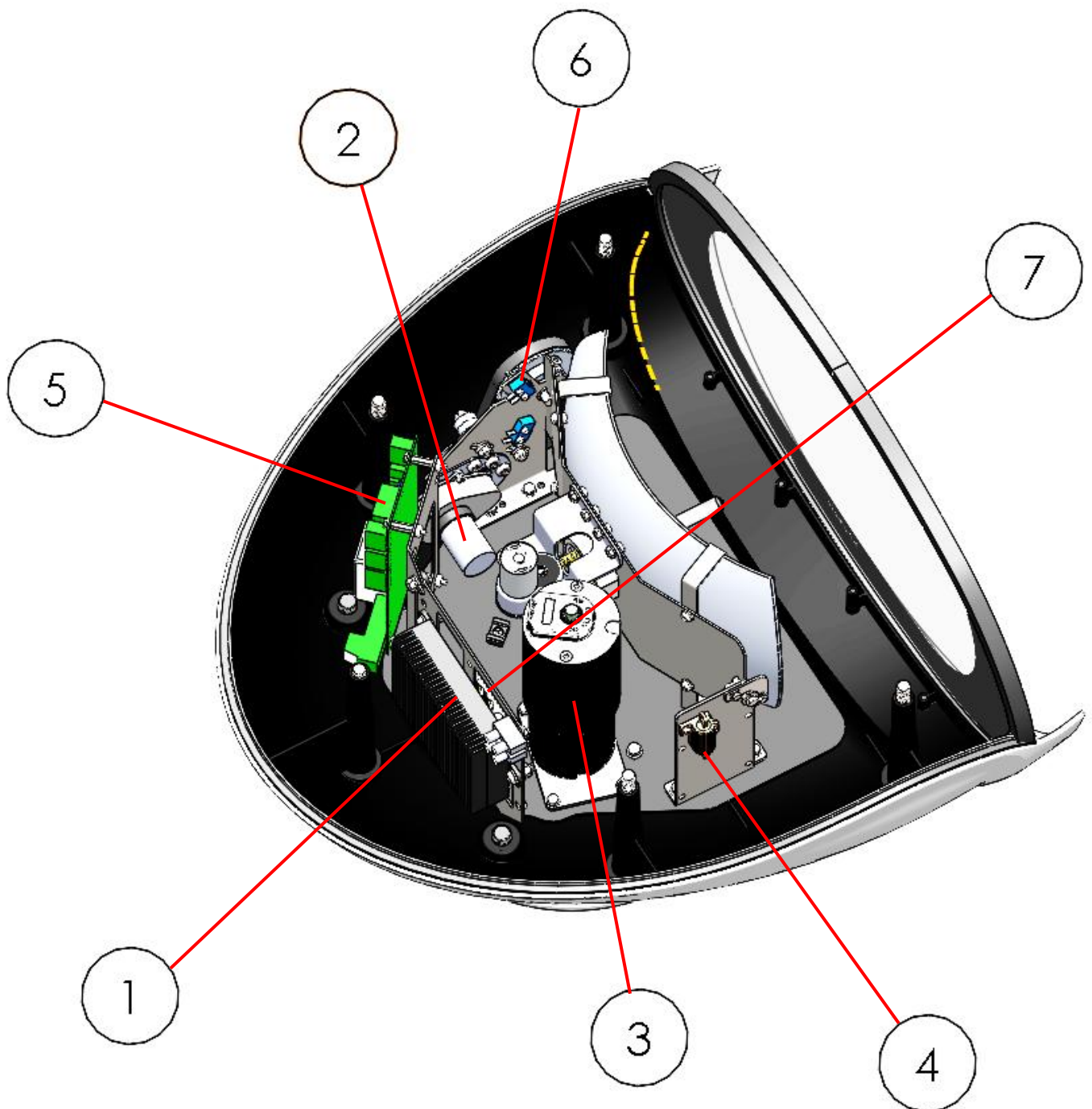
NO.	C27380	1
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Searchlight



Item Number	Part Number	Description	Quantity
1	D25858	100w 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	C25827-01	Ballast & 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

D25858	100w Xenon Lamp
C25857-01	Ballast & 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)
C29241-00	24v PSU (Junction Box)

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.