

FX560RC 3Kw 240v 1Ph Xenon Remote Control Searchlight

User / Installation Manual

Product Part Number:

A7174 – FX560RC 3Kw 240v 1Ph Xenon Variable Speed Remote Control Searchlight

PLEASE NOTE!

Please read this manual before installation.

Francis
SEARCHLIGHTS

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General Information:

Francis Searchlights Ltd

Union Road, Bolton, BL2 2HJ

United Kingdom

T: 00 44 (0)1204 558 960

E: Sales@francis.co.uk

W: www.francis.co.uk

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 Xenon 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 name plate, inside the front of the barrel to the right.

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:	240VAC
Input current:	12.5 Amp Max
PSU output voltage:	29v DC
PSU current:	100 Amps
Wattage:	3Kw
Dimensions	
Height:	1489mm
Width:	784mm
Depth:	739mm
Weight: Searchlight – PSU Box	82Kgs – 24Kgs
Searchlight Performance	
Lamp power:	3000w
Range @ 1 Lux:	13,251m
Lamp life (approx.)	2200h
Divergence:	1.5 - 10°
PBCP (Peak Beam Candle Power):	175,000,000 cd
Colour temperature:	6000K
Luminous flux:	130,000 lumens
Searchlight movement	
Pan rotation:	385°
Tilt elevation:	Up 30° & Down 35°
Pan speed:	Variable Speed 1 to 23°/sec
Tilt Speed:	Variable Speed 1 to 8°/sec
Material, colour, IP rating	
Searchlight barrel head:	Aluminium BSEN485 5251
Gearbox housing:	Stainless Steel BS1449 304S31
Crutch:	Aluminium BS1474 6082 T6
Paint finish powder coated & stove enamel paint:	Ash Grey BS4800 00A01, Umbra Grey RAL 7022
IP rating:	IP66 Gearbox – IP56 Searchlight & PSU Box
Operating temperature:	-50°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.

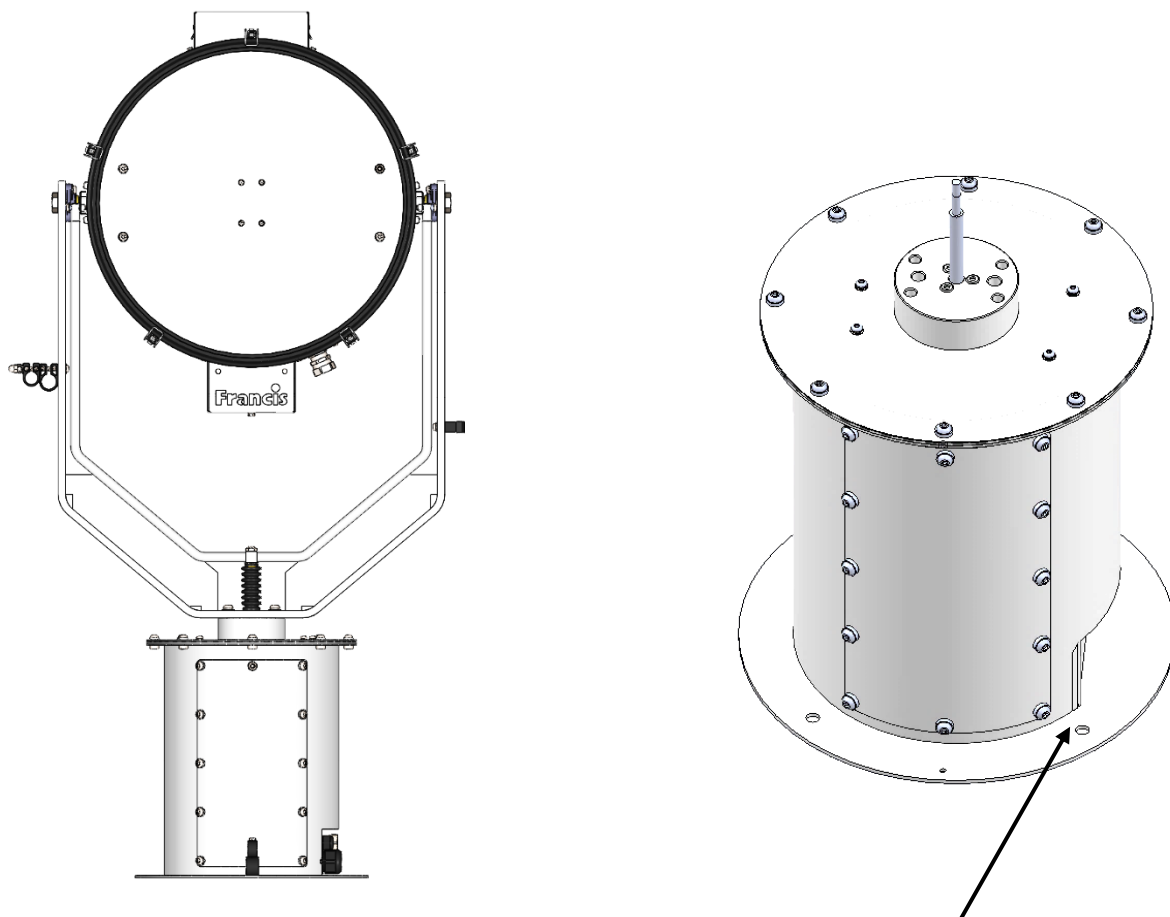
Safety Precautions

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, which you can find at the back of this manual.



5 – Electrical Installation

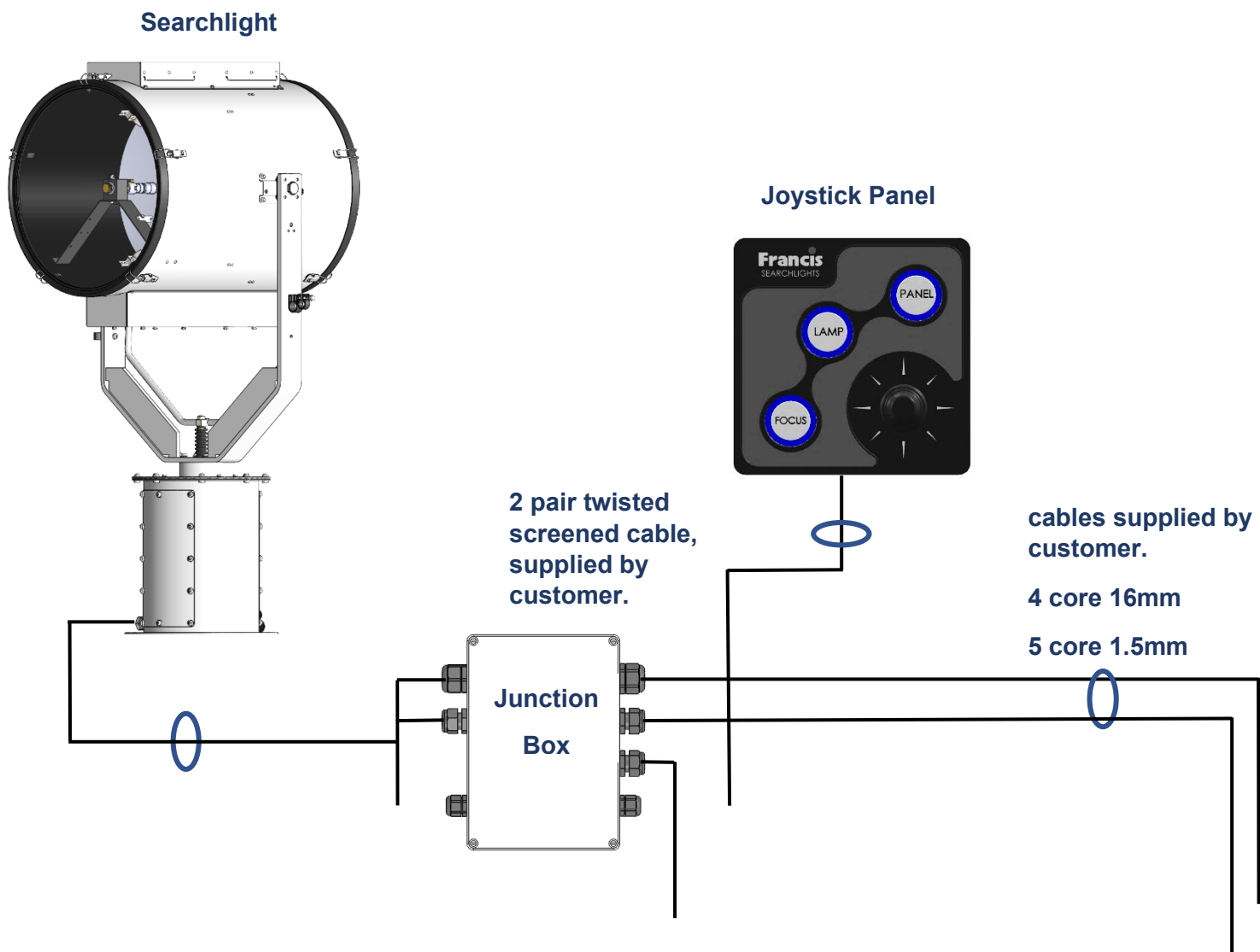
For safety purposes, only competent personnel should perform the electrical installation. All equipment should be installed to current Electrical Regulations and Standards.

Referring to wiring diagram C28256 (at the back of the manual), a supply is fed to the junction box, which then provides a common feed to the motor gearbox, searchlight, PSU, and joystick panel.

The searchlight has been pre-wired with 3 meters of cable from the motor gearbox to junction box provided. The searchlight head is pre-wired along with the connecting cable to the motor gearbox.

Cables required to be connected by the customer with the PSU mounted within 15m of the junction box, if the PSU cannot be installed within 15m of the junction box, then the correct cable should be fitted to compensate for the voltage drop. (See DC table on next page).

- 2 pair twisted 0.22mm 100ohm screened cable from the joystick panel to the junction box.
- 5 cores 1.5mm cable from the PSU to the junction box.
- 4 cores 16mm cable from the PSU to the junction box.
- Supply cable to the junction box.



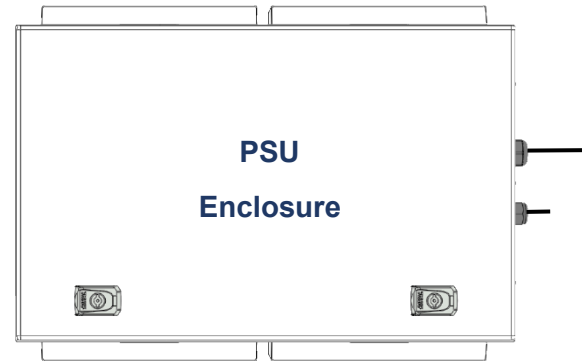
3m of cable supplied by Francis.

4 core 16mm

5 core 1.5mm

2 pair twisted screened.

main supply cable supplied by customer.



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	240v 3Kw
Cable Size (mm ²)	Distance Max
1.5	28m
2.5	48m
4	77m
6	115m
10	202m

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

Searchlight	3Kw
Cable Size (mm ²)	Distance Max
4 core 16mm	18M
4 core 25mm	28M

- 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 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.**
- Ensure that the spring contacts firmly surround the pins on the cap of the lamp. Do not apply unnecessary force when tightening the screws.
- After inserting the lamp, ensure that there is sufficient axial play in the lamp holder. 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.

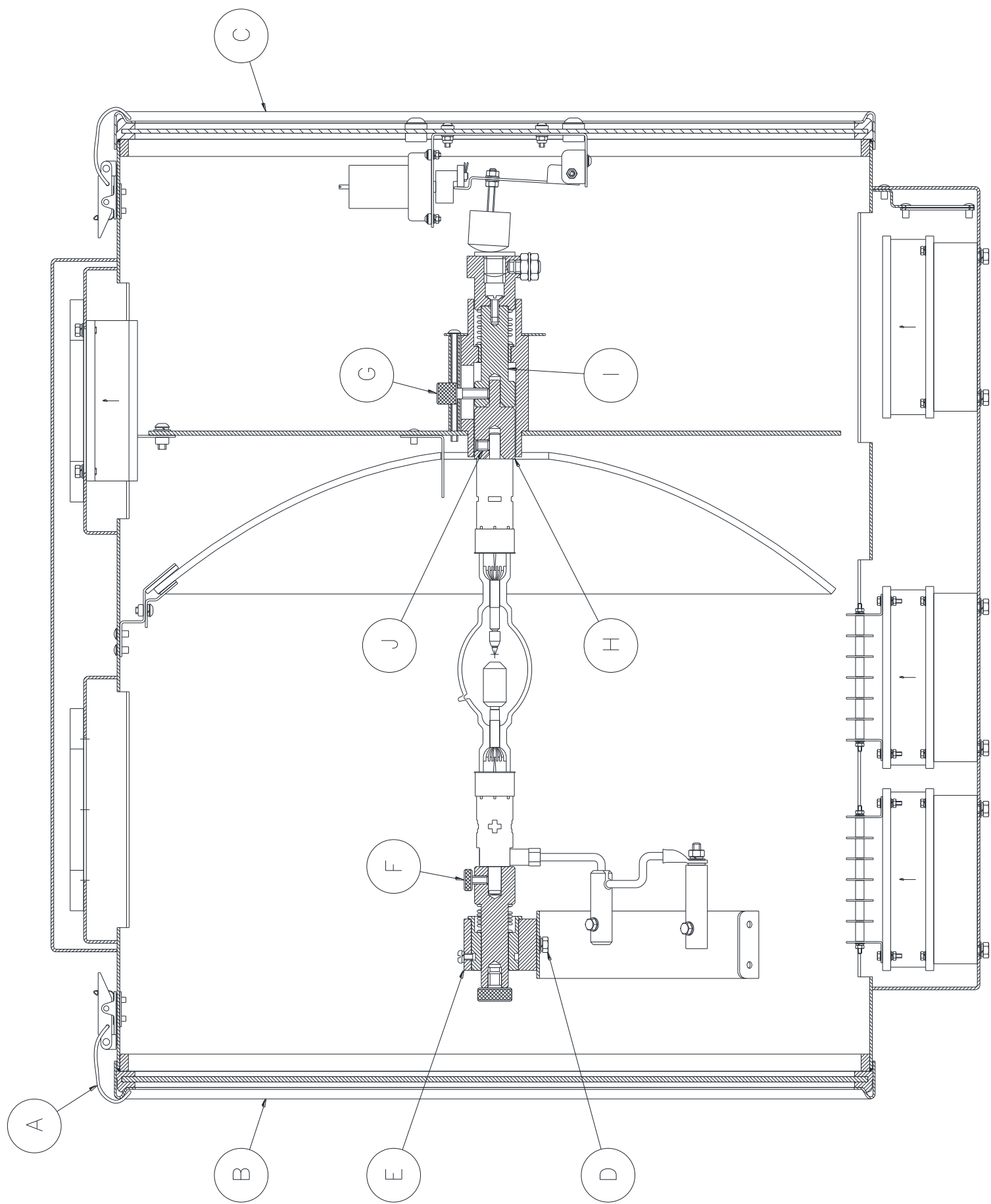
- The anode (positive cap marked '+') must be on top when the lamp is inserted in the vertical position. If the anode is incorrectly inserted the arc will be unstable, the bulb will blacken more quickly, and the lamp will prematurely fail.
- The HT lead from the high voltage terminal of the Ignitor, 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.

To fit the Xenon lamp

Always isolate the equipment from the supply when fitting a lamp

Referring to the diagram overleaf:

- 1) Unfasten ten latches (A) on the front and rear of the searchlight.
- 2) Remove the front bezel (B) and rear bezel (C) assemblies.
- 3) Unscrew the two M6 hexagon screws (D) from the front lamp holder mounting block (E) and remove the front lamp holder assembly from the mounting bracket.
- 4) Loosen the knurled screw on the front (F) and rear (G) lamp holder assemblies.
- 5) Attach the negative (cathode) end of the lamp to the lamp holder socket (H) which is supplied separately, using the M8 x 10 grub screw (J).
- 6) The lamp can now be inserted with the lamp holder socket into the lamp holder rear (I) the negative (cathode) end of the lamp is towards the rear of the searchlight.
- 7) On the rear lamp holder tighten the knurled screw (G) onto the lamp holder socket (H) to hold the lamp in position.
- 8) Fasten the front lamp holder mounting block back in position, it will be necessary to pull the front socket against its spring to fit over the lamp. When in place tighten the front knurled screw (F).
- 9) Fasten the front and rear lamp holder leads as wiring diagram, ensuring the connections are secure.
- 10) The front bezel and rear bezel can now be replaced.
- 11) Removal is the reverse of the above.



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 from the live cable to the lamp.
- Multiply these figures together to give an approximate wattage (Power output).

For example:

- With the multi meter, test the DC voltage in the searchlight head. This should be approximately 29 volts.
- With the DC ammeter, test the current of the red DC cable at front of searchlight. It should read approximately 100 amps.
- Multiply these readings together, as shown above, to obtain the desired wattage required, usually about 2900 watts.

Voltage reading = 29v; Amps reading = 100 amps.

Therefore, Wattage = 29 x 1000 = 2900 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 Tilt down to the limit, once this is complete, the searchlight will then move to the centre and horizontal, 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 joystick 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 searchlight 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 searchlight 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 searchlight 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 searchlight travel can be limited in either axis or either direction. To set a new limit switch the panel on and move the searchlight 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 searchlight 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 control panels. The system allows given panels to communicate with different searchlights and allows several panels to communicate with the same searchlight.

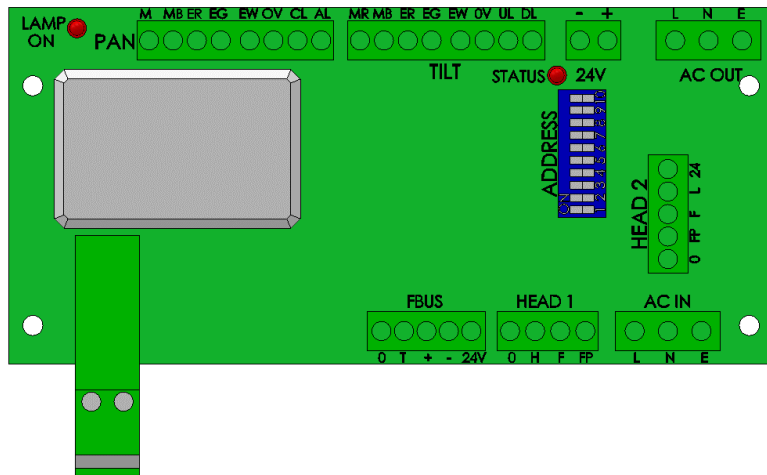
FBUS Address Switches

Setting Searchlight Address Value

The searchlight address is set using the Dip switches on the Speed Controller PCB located inside the Gearbox Assembly (see drawing C30401). 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.

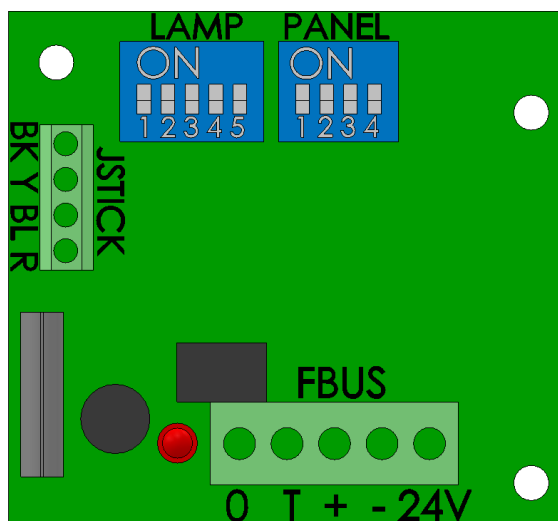
The address value is the sum of the numbers above which are active when the switch is on.

For example, if 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.

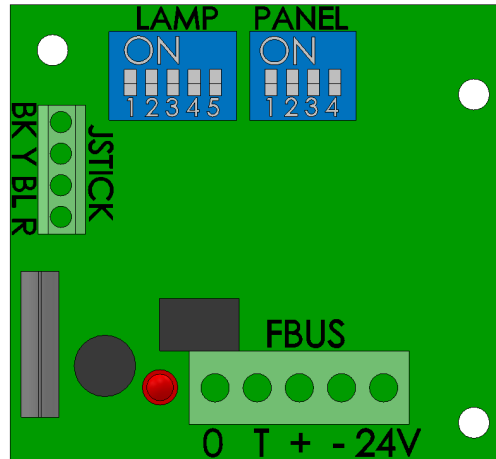
Standard Control Panel – Searchlight (Lamp) Address

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



Standard Control Panel – Control Panel Address

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



EXAMPLES

Standard control 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

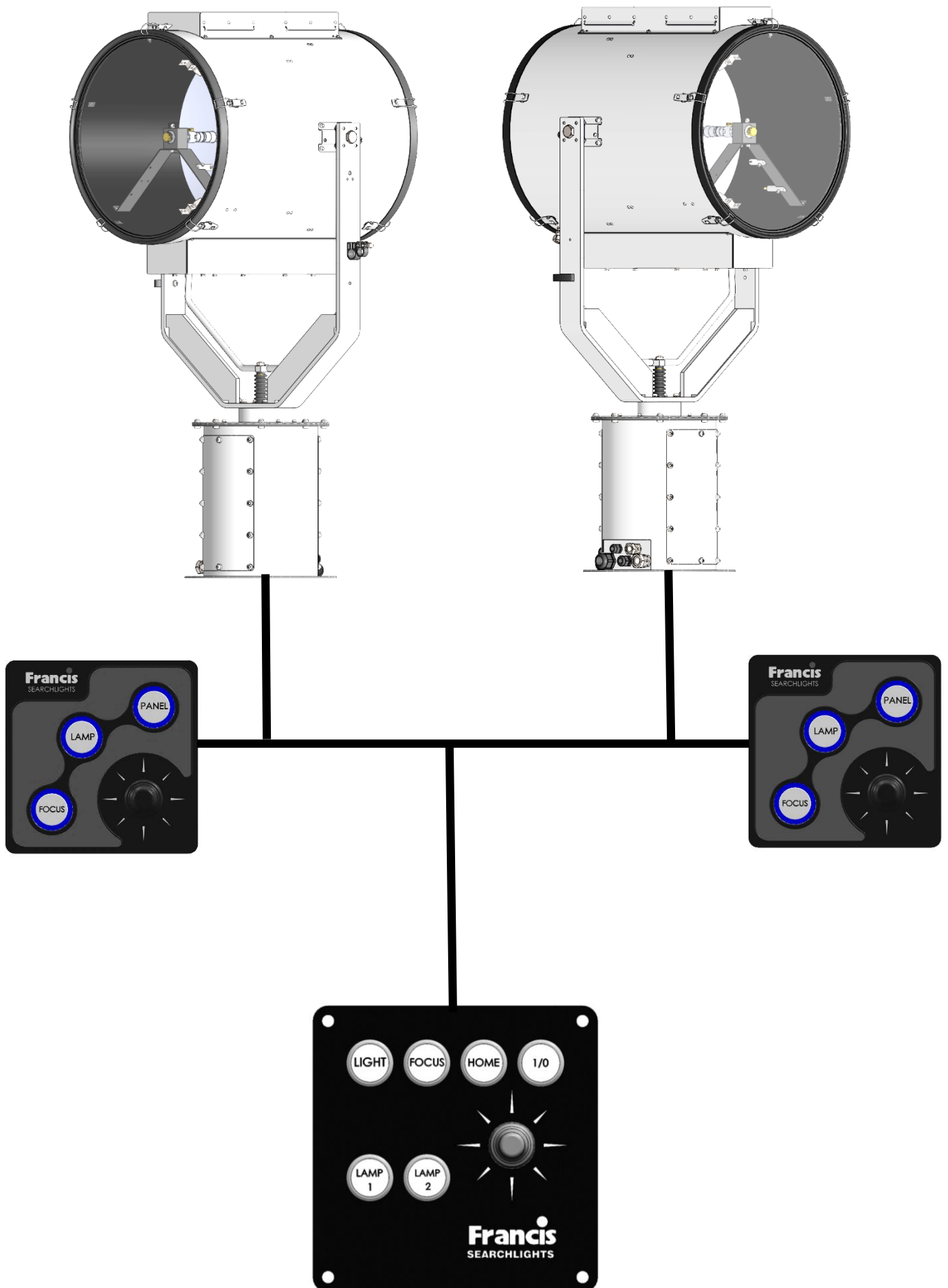
Every searchlight must have a unique address. The addresses should be sequential and should start from zero. If there were three searchlights in a system the addresses should be set to 0, 1 and 2.

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 searchlights and panels can be the same address. For example, on a system with two panels and two searchlights, 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 searchlight, they must still have individual panel addresses, but the lamp addresses can be set to the same address value as the searchlight which is to be controlled. Any number of panels can control the same lamp.

Multiple Searchlights, Control Panels and Master Control 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 control panel, then please check the data + & - connections on the FBUS connector located on the back of the control 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 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 and the lamp still does not ignite, check the searchlight head. 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 barrel. If this arcing is heard switch off the supply at the mains. Remove the rear bezel to expose the two supply leads to the xenon lamp. Using a dry cloth wipe these leads to remove any dust, moisture or condensation that may have formed around the inside of the barrel. Replace the rear bezel, ensuring the latches 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 xenon 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 32,000 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 barrel. This is a totally encapsulated unit and repair is not advised. If found to be faulty a new ignitor must be fitted.

Failure of Remote Focus Facility

The remote focus mechanism is controlled by a small electric motor situated at the rear of the searchlight barrel. If the focus of the light fails, the following procedure should be adopted:

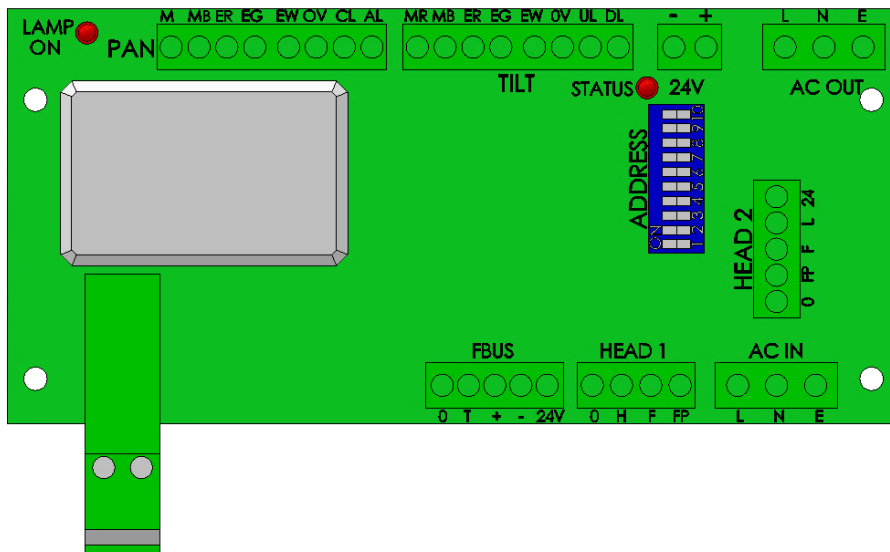
1. Remove the rear bezel from searchlight barrel and examine focus mechanism. If parts have become loose, tighten fasteners. The mechanism operates on a lever action, and this should be checked for correct positioning.
2. If the mechanism is okay, check the supply to the motor. This can be done by simply placing a multi-meter across the motor terminals.
3. If supply is present, this indicates that the motor has failed. Replace the focus motor ensuring that the assembly is correct.

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 control panel, please contact Francis Searchlights for ordering the required parts, sales@francis.co.uk

If the control panel is not communicating with the searchlight and none of the LED's on the control panel are lighting up, then you will need to access the speed controller PCB inside the gearbox (see drawing C30401), to access the speed controller PCB you will need to remove the 8 off M8 screws that hold the motor top to the gearbox housing and then lift the searchlight up out of the gearbox housing, taking care not to damage the assembly, the Status LED located near the top of the card (labelled "STATUS") on the speed controller PCB, 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 gearbox, as shown on drawing C30401 Item 5, 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 control 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

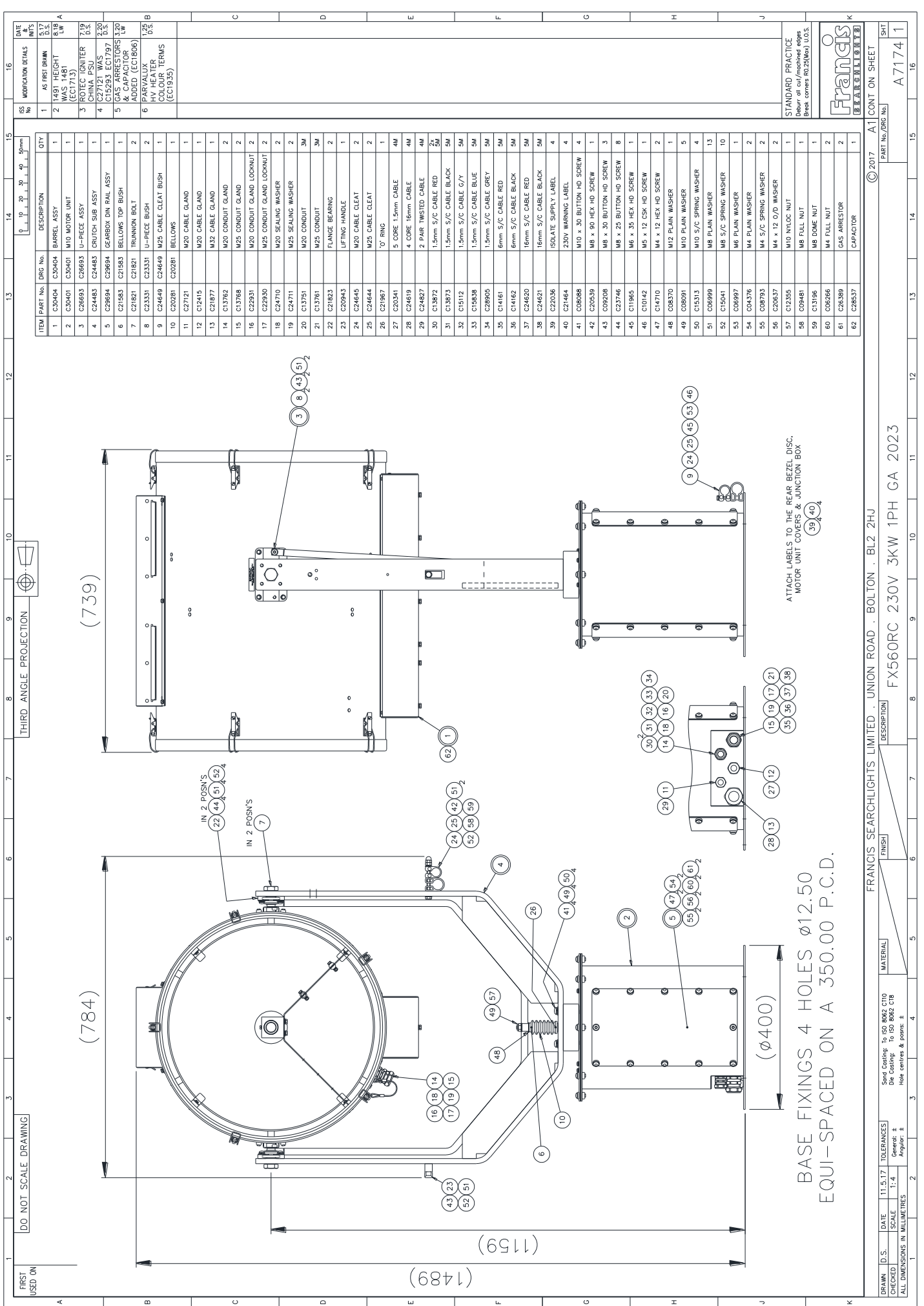
To prolong the service life and performance of your searchlight, the following maintenance guidelines are recommended:

- 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 inside of the searchlight. The following procedure should be adhered to:
 - Remove the front bezel.
 - Clean the front glass inside and out using a proprietary glass cleaner.
 - Clean the reflector if required.
 - Ensure that the lamp holder is free from corrosion or other damage.
- It is advisable to check all seals and gaskets for signs of degradation. Renew if necessary.
- 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
A7174	FX560RC 3Kw 240v 1Ph General Assembly
C28256	Wiring Diagram
C27312	Joystick Panel Assembly
C30449	Junction Box Assembly
C28802	Power Supply Enclosure Assembly
C30404	Barrel Assembly
C30401	Gearbox Assembly



ITEM PART No.	DRG No.	DESCRIPTION	QTY	DATE	BY
1	C30404	BARREL ASSY	1	AS FIRST DIMEN	5.7
2	C30401	M10 MOTOR UNIT	1	MAS 1481	8.19
3	C26693	U-PIECE ASSY	1	ISO 8052 C18	1.4
4	C24483	CRUICH SUB ASSY	1	ISO 8052 C18	1.4
5	C29694	GEARBOX DIN RAIL ASSY	1	CHINA PSU	7.19
6	C21583	BELLOWS TOP BUSH	1	C15293 EC1797	2.20
7	C21821	TRONNION BOLT	2	GAS ARRESTORS 3.20	1.40
8	C23331	U-PIECE BUSH	2	& CAPACITOR	1.40
9	C24649	M25 CABLE CLEAT BUSH	1	ROUSED (EC1806)	1.40
10	C20281	BELLOWS	1	PAINT COLOUR	0.75
11	C27121	M20 CABLE GLAND	1	COLOUR TERMS	(EC1935)
12	C12415	M20 CABLE GLAND	1		
13	C21877	M32 CABLE GLAND	1		
14	C13762	M20 CONDUIT GLAND	2		
15	C13768	M25 CONDUIT GLAND	2		
16	C22931	M20 CONDUIT GLAND LOCKNUT	2		
17	C22930	M25 CONDUIT GLAND LOCKNUT	2		
18	C24710	M20 SEALING WASHER	2		
19	C24711	M25 SEALING WASHER	2		
20	C13751	M20 CONDUIT	3M		
21	C13761	M25 CONDUIT	3M		
22	C21823	FLANGE BEARING	2		
23	C20943	LIFTING HANDLE	1		
24	C24645	M20 CABLE CLEAT	2		
25	C24644	M25 CABLE CLEAT	2		
26	C21967	O' RING	1		
27	C20341	5 CORE 1.5mm CABLE	4M		
28	C24619	4 CORE 16mm CABLE	4M		
29	C24627	2 PAIR TWISTED CABLE	4M		
30	C13872	1.5mm S/C CABLE RED	5M		
31	C13873	1.5mm S/C CABLE BLACK	5M		
32	C15112	1.5mm S/C CABLE G/Y	5M		
33	C15838	1.5mm S/C CABLE BLUE	5M		
34	C28905	1.5mm S/C CABLE GREY	5M		
35	C14161	6mm S/C CABLE RED	5M		
36	C14162	6mm S/C CABLE BLACK	5M		
37	C24620	16mm S/C CABLE RED	5M		
38	C24621	16mm S/C CABLE BLACK	5M		
39	C22036	ISOLATE SUPPLY LABEL	4		
40	C21464	230V WARNING LABEL	4		
41	C08088	M10 x 30 BUTTON HD SCREW	4		
42	C20539	M8 x 90 HEX HD SCREW	1		
43	C09208	M8 x 30 BUTTON HD SCREW	3		
44	C23746	M8 x 25 BUTTON HD SCREW	8		
45	C11965	M6 x 35 HEX HD SCREW	1		
46	C10142	M5 x 12 CSK HD SCREW	1		
47	C14710	M4 x 12 HEX HD SCREW	2		
48	C08370	M12 PLAIN WASHER	1		
49	C08091	M10 PLAIN WASHER	5		
50	C15313	M10 S/C SPRING WASHER	4		
51	C08899	M8 PLAIN WASHER	13		
52	C15041	M8 S/C SPRING WASHER	10		
53	C06897	M6 PLAIN WASHER	1		
54	C04376	M4 PLAIN WASHER	2		
55	C08793	M4 S/C SPRING WASHER	2		
56	C20637	M4 x 12 O/D WASHER	2		
57	C12355	M10 NYLOC NUT	1		
58	C09461	M8 FULL NUT	1		
59	C13196	M8 DOME NUT	1		
60	C06266	M4 FULL NUT	2		
61	C26389	GAS ARRESTOR	2		
62	C28537	CAPACITOR	1		

ITEM PART No.	DRG No.	DESCRIPTION	QTY	DATE	BY
1	C30404	BARREL ASSY	1	AS FIRST DIMEN	5.7
2	C30401	M10 MOTOR UNIT	1	MAS 1481	8.19
3	C26693	U-PIECE ASSY	1	ISO 8052 C18	1.4
4	C24483	CRUICH SUB ASSY	1	CHINA PSU	7.19
5	C29694	GEARBOX DIN RAIL ASSY	1	C15293 EC1797	2.20
6	C21583	BELLOWS TOP BUSH	1	GAS ARRESTORS 3.20	1.40
7	C21821	TRONNION BOLT	2	& CAPACITOR	1.40
8	C23331	U-PIECE BUSH	2	ROUSED (EC1806)	1.40
9	C24649	M25 CABLE CLEAT BUSH	1	PAINT COLOUR	0.75
10	C20281	BELLOWS	1	COLOUR TERMS	(EC1935)
11	C27121	M20 CABLE GLAND	1		
12	C12415	M20 CABLE GLAND	1		
13	C21877	M32 CABLE GLAND	1		
14	C13762	M20 CONDUIT GLAND	2		
15	C13768	M25 CONDUIT GLAND	2		
16	C22931	M20 CONDUIT GLAND LOCKNUT	2		
17	C22930	M25 CONDUIT GLAND LOCKNUT	2		
18	C24710	M20 SEALING WASHER	2		
19	C24711	M25 SEALING WASHER	2		
20	C13751	M20 CONDUIT	3M		
21	C13761	M25 CONDUIT	3M		
22	C21823	FLANGE BEARING	2		
23	C20943	LIFTING HANDLE	1		
24	C24645	M20 CABLE CLEAT	2		
25	C24644	M25 CABLE CLEAT	2		
26	C21967	O' RING	1		
27	C20341	5 CORE 1.5mm CABLE	4M		
28	C24619	4 CORE 16mm CABLE	4M		
29	C24627	2 PAIR TWISTED CABLE	4M		
30	C13872	1.5mm S/C CABLE RED	5M		
31	C13873	1.5mm S/C CABLE BLACK	5M		
32	C15112	1.5mm S/C CABLE G/Y	5M		
33	C15838	1.5mm S/C CABLE BLUE	5M		
34	C28905	1.5mm S/C CABLE GREY	5M		
35	C14161	6mm S/C CABLE RED	5M		
36	C14162	6mm S/C CABLE BLACK	5M		
37	C24620	16mm S/C CABLE RED	5M		
38	C24621	16mm S/C CABLE BLACK	5M		
39	C22036	ISOLATE SUPPLY LABEL	4		
40	C21464	230V WARNING LABEL	4		
41	C08088	M10 x 30 BUTTON HD SCREW	4		
42	C20539	M8 x 90 HEX HD SCREW	1		
43	C09208	M8 x 30 BUTTON HD SCREW	3		
44	C23746	M8 x 25 BUTTON HD SCREW	8		
45	C11965	M6 x 35 HEX HD SCREW	1		
46	C10142	M5 x 12 CSK HD SCREW	1		
47	C14710	M4 x 12 HEX HD SCREW	2		
48	C08370	M12 PLAIN WASHER	1		
49	C08091	M10 PLAIN WASHER	5		
50	C15313	M10 S/C SPRING WASHER	4		
51	C08899	M8 PLAIN WASHER	13		
52	C15041	M8 S/C SPRING WASHER	10		
53	C06897	M6 PLAIN WASHER	1		
54	C04376	M4 PLAIN WASHER	2		
55	C08793	M4 S/C SPRING WASHER	2		
56	C20637	M4 x 12 O/D WASHER	2		
57	C12355	M10 NYLOC NUT	1		
58	C09461	M8 FULL NUT	1		
59	C13196	M8 DOME NUT	1		
60	C06266	M4 FULL NUT	2		
61	C26389	GAS ARRESTOR	2		
62	C28537	CAPACITOR	1		

DRW No.	D.S.	DATE	11.5.17	TOLERANCES	MATERIAL	FINISH	DESCRIPTION	PART No./DRG No.	SHEET
				Form Casting: to ISO 8052 C18 Die Casting: to ISO 8052 C18 Hole centres & posns ±			FRANCIS SEARCHLIGHTS LIMITED · UNION ROAD · BOLTON · BL2 2HU	A1	16
				SCALE: 1:1			FX560RC 230V 3KW 1PH GA 2023		A7174 1

BASE FIXINGS 4 HOLES Ø12.50
EQUI-SPACED ON A 350.00 P.C.D.

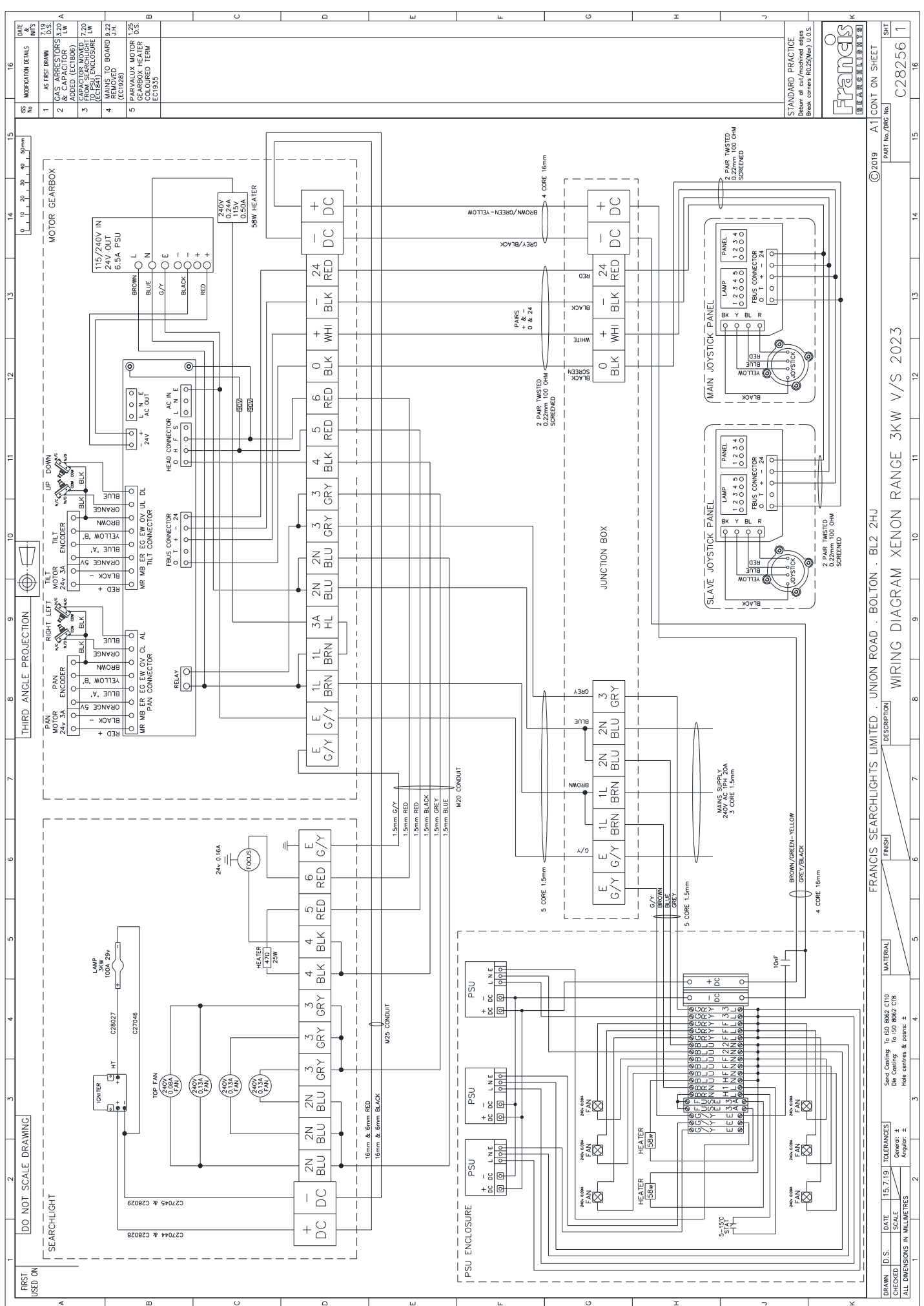
ATTACH LABELS TO THE REAR BEZEL DISC.
MOTOR UNIT COVERS & JUNCTION BOX.



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PART No./DRG No. A7174 1

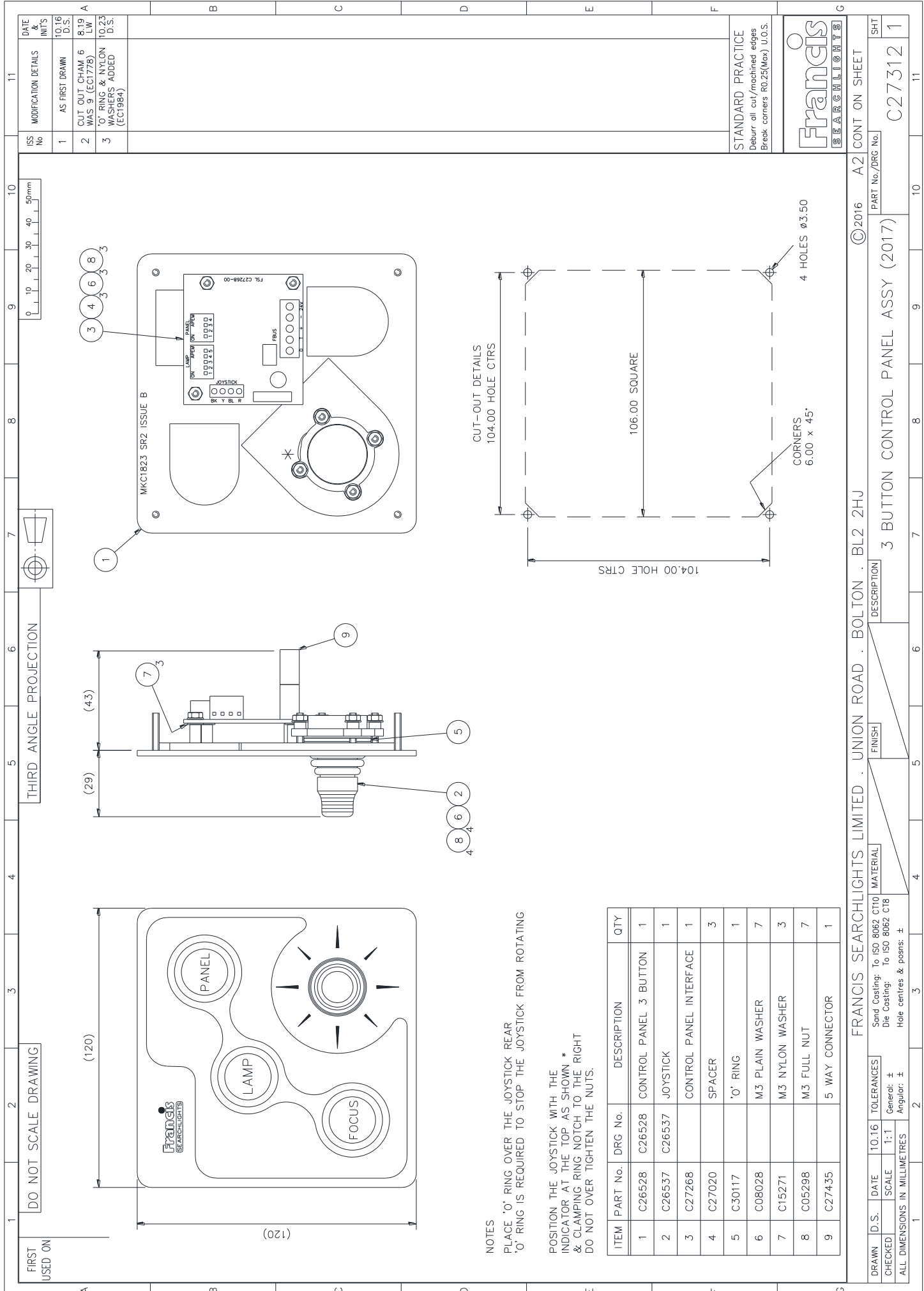
SHEET 16



DATE	NO	DESCRIPTION
15.7.19	1	AS FIRST DRAWN
15.7.19	2	GAS ARRESTORS 3.20 & CAPACITOR 10µF
15.7.19	3	CAPACITORS MOVED FROM SEARCHLIGHT TO PSU ENCLOSURE
15.7.19	4	MAINS TO BOARD 9.22 V/A
15.7.19	5	PARVALUX MOTOR 1.25 GEARBOX HEATER COLOURED TERM EC1925

DATE	NO	DESCRIPTION
15.7.19	1	AS FIRST DRAWN
15.7.19	2	GAS ARRESTORS 3.20 & CAPACITOR 10µF
15.7.19	3	CAPACITORS MOVED FROM SEARCHLIGHT TO PSU ENCLOSURE
15.7.19	4	MAINS TO BOARD 9.22 V/A
15.7.19	5	PARVALUX MOTOR 1.25 GEARBOX HEATER COLOURED TERM EC1925

FRST USED ON	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SEARCHLIGHT																
MOTOR GEARBOX																
JUNCTION BOX																
PSU ENCLOSURE																
MAIN JOYSTICK PANEL																
SLAVE JOYSTICK PANEL																
THIRD ANGLE PROJECTION																



DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	10.16 D.S.
2	CUT OUT CHAM 6 WAS 9 (ECT1778)	8.19 LW
3	'O' RING & NYLON WASHERS ADDED (ECT1984)	10.23 D.S.

FIRST USED ON

(120)

(4.3)

(29)

MK1823 SR2 ISSUE B

104.00 HOLE CTRS

106.00 SQUARE

104.00 HOLE CTRS

4 HOLES Ø3.50

CORNERS 6.00 x 45°

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.

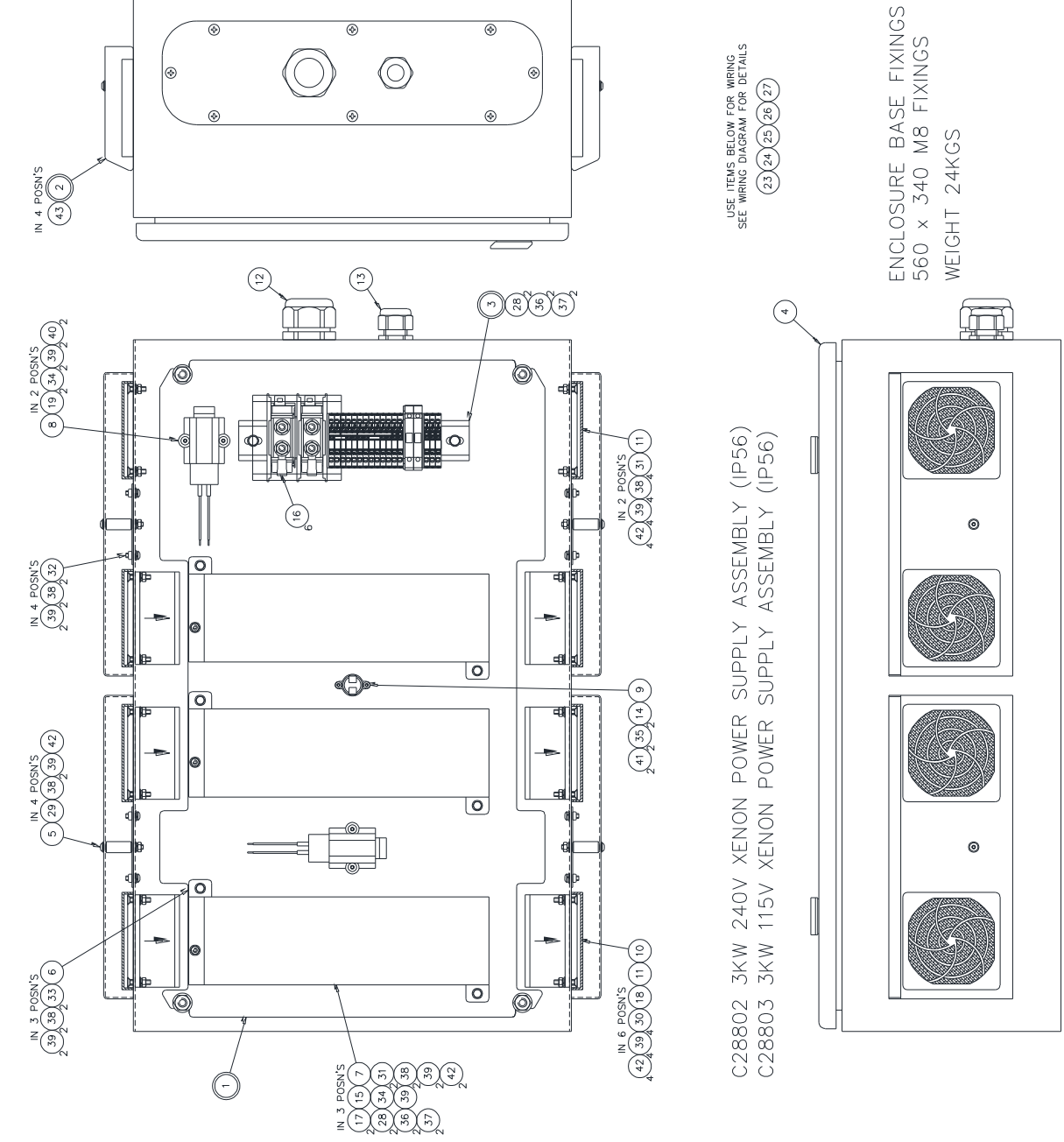
ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C26528	C26528	CONTROL PANEL 3 BUTTON	1
2	C26537	C26537	JOYSTICK	1
3	C27268	C27268	CONTROL PANEL INTERFACE	1
4	C27020	C27020	SPACER	3
5	C30117	C30117	'O' RING	1
6	C08028	C08028	M3 PLAIN WASHER	7
7	C15271	C15271	M3 NYLON WASHER	3
8	C05298	C05298	M3 FULL NUT	7
9	C27435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

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



DRAWN D.S.	DATE	10.16	TOLERANCES	General: ±	Angular: ±	Hole centres & poons: ±
CHECKED	SCALE	1:1	Material	Sand Casting: To ISO 8062 CT10 Die Casting: To ISO 8062 CT8		
ALL DIMENSIONS IN MILLIMETRES						
FRANCIS SEARCHLIGHTS LIMITED · UNION ROAD · BOLTON · BL2 2HU						
PART No./DRG No.			DESCRIPTION			
C27312			3 BUTTON CONTROL PANEL ASSY (2017)			
© 2016 A2 CONT ON SHEET						SHT
						1

ITEM	PART No.	DRG No.	DESCRIPTION	QTY	115V	240V
1	C28261	C28261	CHASSIS PLATE SUB ASSY	1	1	
2	C25012	C25012	FAN SPLASH COVER SUB ASSY	4	4	
3	C30408	C30408	PSU DIN RAIL ASSY	1	1	
4	C28804	C28804	ENCLOSURE DRILLING	1	1	
5	C24687	C24687	SPLASH COVER PILLAR	4	4	
6	C28263	C28263	PSU PLATE	3	3	
7	C30610	C30610	1KW XENON PSU 115V	3		3
7	C28264	C28264	1KW XENON PSU 240V	3		3
8	C23277	C23277	HEATER	2	2	
9	C24889	C24889	THERMAL SWITCH	1	1	
10	C16931	C16931	FAN 115V	6	6	
10	C16930	C16930	FAN 240V	8	8	
11	C25013	C25013	FAN COVER	8	8	
12	C21877	C21877	M32 CABLE GLAND	1	1	
13	C12415	C12415	M20 CABLE GLAND	1	1	
14	C15828	C15828	RED SHROUDED CRIMP	2	2	
15	C09299	C09299	M4 RED EYELET	3	3	
16	C22701	C22701	M8 YELLOW EYELET	6	6	
17	C02185	C02185	M5 YELLOW EYELET	6	6	
18	C29149	C29149	3 WAY LEVER CONNECTOR	6	6	
19	C27962	C27962	M4 x 10 PILLAR	4	4	
20	C22078	C22078	115V WARNING LABEL	1	1	
20	C21464	C21464	240V WARNING LABEL	1	1	
21	C22036	C22036	ISOLATE SUPPLY LABEL	1	1	
22	C04900	C04900	FRANCIS EXTERIOR LABEL	1	1	
23	C14161	C14161	6mm S/C SILICONE CABLE RED	A/R	A/R	
24	C14162	C14162	6mm S/C SILICONE CABLE BLACK	A/R	A/R	
25	C26799	C26799	1.5mm S/C SILICONE CABLE BROWN	A/R	A/R	
26	C19538	C19538	1.5mm S/C SILICONE CABLE BLUE	A/R	A/R	
27	C15112	C15112	1.5mm S/C SILICONE CABLE G/Y	A/R	A/R	
28	C13351	C13351	M5 x 10 HEX HD SCREW	8	8	
29	C14468	C14468	M4 x 35 BUTTON HD SCREW	4	4	
30	C10120	C10120	M4 x 20 SKT CSK HD SCREW	24	24	
31	C06981	C06981	M4 x 16 SKT CSK HD SCREW	14	14	
32	C14533	C14533	M4 x 10 BUTTON HD SCREW	8	8	
33	C26955	C26955	M4 x 10 HEX HD SCREW	6	6	
34	C23813	C23813	M4 x 8 BUTTON HD SCREW	7	7	
35	C14502	C14502	M3 x 6 BUTTON HD SCREW	2	2	
36	C06392	C06392	M5 PLAIN WASHER	8	8	
37	C09231	C09231	M5 S/C SPRING WASHER	8	8	
38	C04376	C04376	M4 PLAIN WASHER	60	60	
39	C08793	C08793	M4 S/C SPRING WASHER	63	63	
40	C20637	C20637	M4 x 12 O/D WASHER	4	4	
41	C10747	C10747	M3 S/C SPRING WASHER	2	2	
42	C06286	C06286	M4 FULL NUT	42	42	
43	C12039	C12039	CLEAR RTV	A/R	A/R	



C28802 3KW 240V XENON POWER SUPPLY ASSEMBLY (IP56)
C28803 3KW 115V XENON POWER SUPPLY ASSEMBLY (IP56)

ENCLOSURE BASE FIXINGS
560 x 340 M8 FIXINGS
WEIGHT 24KGS

ISS No	MODIFICATION DETAILS	DATE
1	AS FIRST DRAWN	9.20 12.3
2	CO. CLIPED TERMINALS	12.3 16.3
3	PSU ADDED C29149 QTY 6 ADDED (EC2094)	11.25 H.E.C

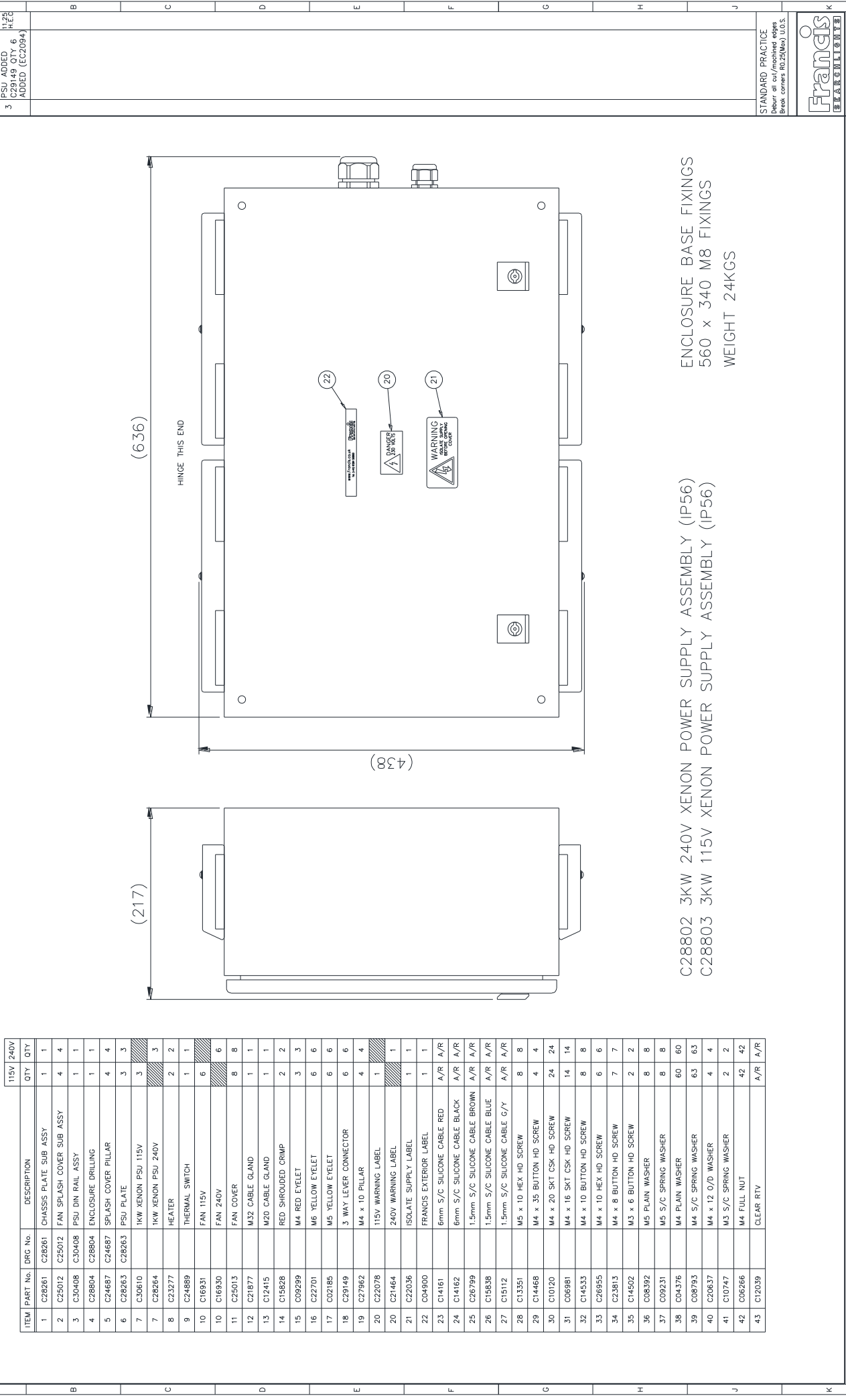
STANDARD PRACTICE
Hobart air cut/machined edges
Break corners (R2.5/3.0) U.O.S.



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PART No./DRG No.	C28802	1
SHT		

FRANCIS SEARCHLIGHTS LIMITED · UNION ROAD · BOLTON · BL2 2HU
3KW XENON POWER SUPPLY ASSEMBLY

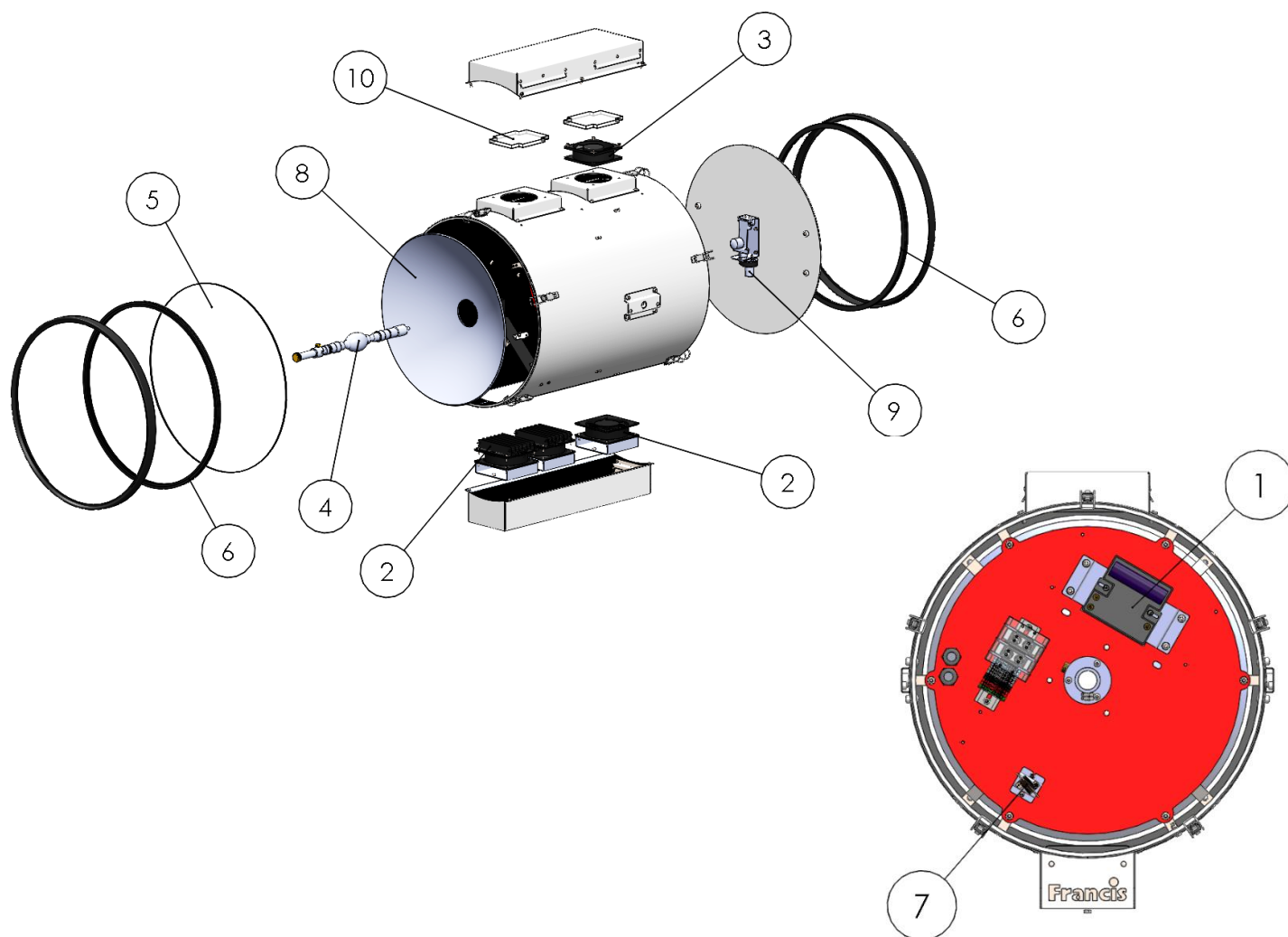
DRWN	D.S.	DATE	TOLERANCES	MATERIAL	FINISH	DESCRIPTION
CHECKED		16/03/20	Send Castings: To ISO 8062 C10 Die Castings: To ISO 8062 C18			
		SCALE	Generat: ±			
		ALL DIMENSIONS IN MILLIMETRES	Hole centres & posns: ±			
			Angular: ±			



ITEM	PART No.	DRG No.	DESCRIPTION	QTY	115V 240V
1	C28261	C28261	CHASSIS PLATE SUB ASSY	1	1
2	C25012	C25012	FAN SPLASH COVER SUB ASSY	4	4
3	C30408	C30408	PSU DIN RAIL ASSY	1	1
4	C28804	C28804	ENCLOSURE DRILLING	1	1
5	C24687	C24687	SPLASH COVER PILLAR	4	4
6	C28263	C28263	PSU PLATE	3	3
7	C30610	C30610	1KW XENON PSU 115V	3	3
8	C28264	C28264	1KW XENON PSU 240V	3	3
9	C24889	C24889	HEATER	2	2
10	C16931	C16931	THERMAL SWITCH	1	1
11	C16930	C16930	FAN 115V	6	6
12	C25013	C25013	FAN 240V	6	6
13	C21877	C21877	FAN COVER	8	8
14	C12415	C12415	M32 CABLE GLAND	1	1
15	C15828	C15828	M20 CABLE GLAND	1	1
16	C09299	C09299	RED SHROUDED CRIMP	2	2
17	C22701	C22701	M4 RED EYELET	3	3
18	C02185	C02185	M6 YELLOW EYELET	6	6
19	C29149	C29149	M5 YELLOW EYELET	6	6
20	C27962	C27962	3 WAY LEVER CONNECTOR	6	6
21	C22078	C22078	M4 x 10 PILLAR	4	4
22	C21464	C21464	115V WARNING LABEL	1	1
23	C20236	C20236	240V WARNING LABEL	1	1
24	C04900	C04900	ISOLATE SUPPLY LABEL	1	1
25	C14161	C14161	FRANCIS EXTERIOR LABEL	1	1
26	C14162	C14162	6mm S/C SILICONE CABLE RED	A/R	A/R
27	C26799	C26799	6mm S/C SILICONE CABLE BLACK	A/R	A/R
28	C15838	C15838	1.5mm S/C SILICONE CABLE BROWN	A/R	A/R
29	C15838	C15838	1.5mm S/C SILICONE CABLE BLUE	A/R	A/R
30	C19112	C19112	1.5mm S/C SILICONE CABLE G/Y	A/R	A/R
31	C13351	C13351	M5 x 10 HEX HD SCREW	8	8
32	C14468	C14468	M4 x 35 BUTTON HD SCREW	4	4
33	C10120	C10120	M4 x 20 SKT CSK HD SCREW	24	24
34	C06981	C06981	M4 x 16 SKT CSK HD SCREW	14	14
35	C14533	C14533	M4 x 10 BUTTON HD SCREW	8	8
36	C26955	C26955	M4 x 10 HEX HD SCREW	6	6
37	C23813	C23813	M4 x 8 BUTTON HD SCREW	7	7
38	C14502	C14502	M3 x 6 BUTTON HD SCREW	2	2
39	C06392	C06392	M5 S/C SPRING WASHER	8	8
40	C04376	C04376	M4 PLAIN WASHER	8	8
41	C08753	C08753	M4 S/C SPRING WASHER	60	60
42	C20637	C20637	M4 x 12 O/D WASHER	6.3	6.3
43	C10747	C10747	M3 S/C SPRING WASHER	4	4
44	C06266	C06266	M4 FULL NUT	2	2
45	C12039	C12039	CLEAR RTV	42	42
46				A/R	A/R

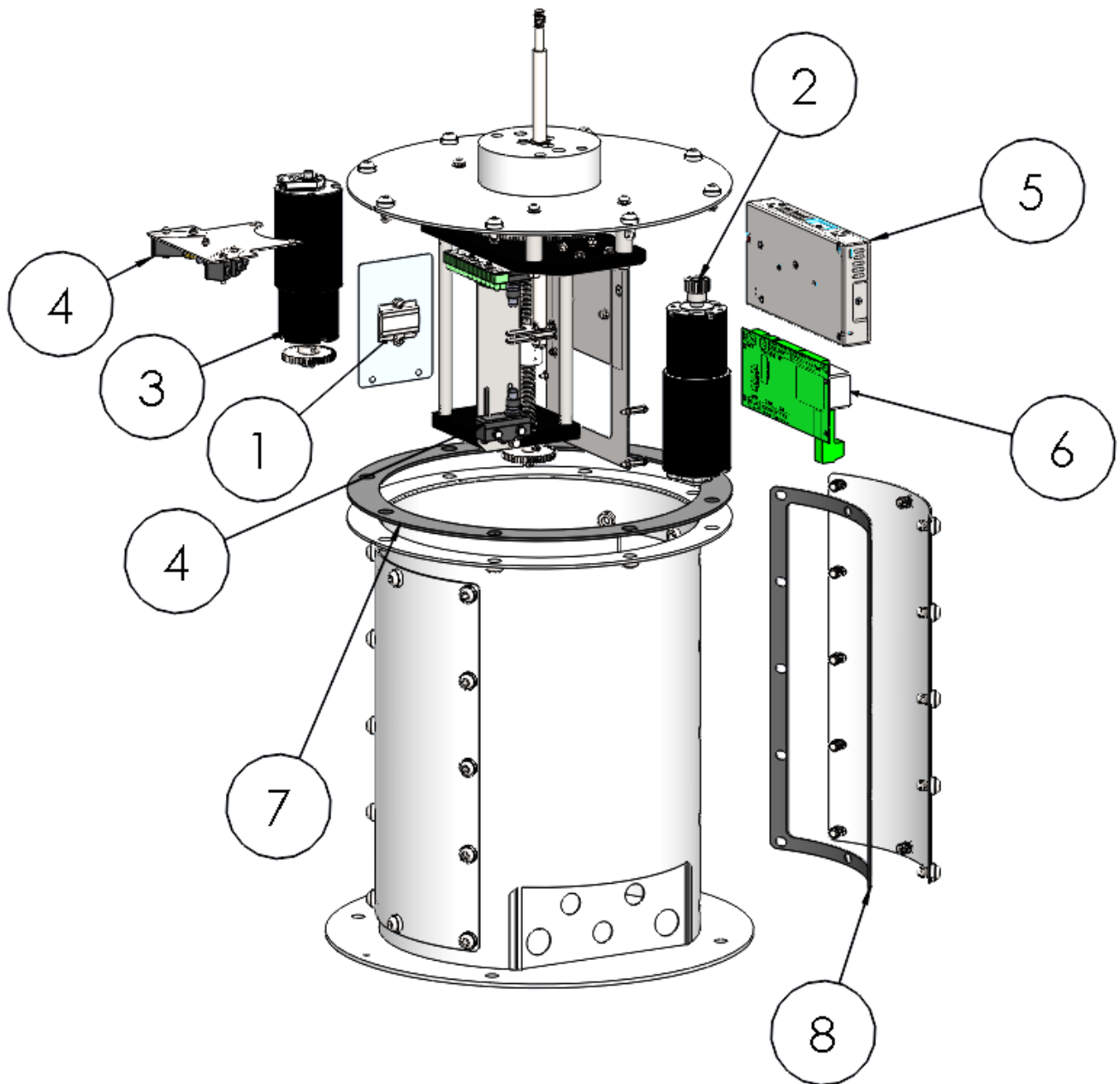
C28802 3KW 240V XENON POWER SUPPLY ASSEMBLY (IP56)
 C28803 3KW 115V XENON POWER SUPPLY ASSEMBLY (IP56)
 ENCLOSURE BASE FIXINGS
 560 x 340 M8 FIXINGS
 WEIGHT 24KGS

C30404 Barrel Assembly



Item Number	Part Number	Description	Quantity
1	C28009-00	Igniter	1
2	C24597-01	Bottom Fan 240v	3
3	C27203-01	Top Fan 240v	1
4	C28997-01	3Kw Xenon Lamp Assembly	1
5	C20881-00	Front Glass	1
6	C20569-00	Front & Rear Bezel Gasket	2
7	C27288-01	Heater	1
8	C06779-00	Reflector	1
9	C24706-01	Focus Motor	1
10	C27192-01	Top Canopy Box Filter	2

C30401 Gearbox Assembly



Item Number	Part Number	Description	Quantity
1	C23277-00	Heater	1
2	C29547-01	Pan Motor Assembly	1
3	C29468-01	Tilt Motor	1
4	C29275-00	Micro-switch	4
5	C29162-00	24v PSU	1
6	C29534-01	Speed Controller PCB	1
7	C22381-00	Ped Top Sealing Gasket	1
8	C26441-00	Ped Cover Gasket	2

10 - Spare Parts List

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

Part Number	Description
--------------------	--------------------

Searchlight Spares

C28009-00	Igniter
C24597-01	Bottom Fan 240v (Searchlight)
C27203-01	Top Fan 240v (Searchlight)
C28997-01	3Kw Xenon Lamp Assembly
C20881-00	Front Glass
C20569-00	Front & Rear Bezel Gasket
C27288-01	Heater (Searchlight)
C06779-00	Reflector
C24706-01	Focus Motor
C27192-01	Top Canopy Box Filter
C20281-00	Bellows
C28264-00	Power Supply Unit
C16930-01	Fan 240v (PSU)
C24889-00	Thermal Switch (PSU)
C23277-00	Heater (PSU)

Motor Gearbox Spares

C23277-00	Heater
C29547-01	Pan Motor Assembly
C29468-01	Tilt Motor
C29275-00	Micro switch
C29162-00	24v Power Supply Unit
C29534-01	Speed Controller PCB
C22381-00	Pedestal Top Sealing Gasket
C26441-00	Pedestal Cover Gasket

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 within the front of the barrel head to the right, on the name plate. This will enable a fast response to your spares' requirements.