



## User Instruction & Installation Manual

### FH560 Remote Control 2.5 Kilowatt Metal Halide Searchlight



#### Product Reference Number:

**A2475 – Variable Speed Motor Unit 240v**

**A2477 – Variable Speed Motor Unit 115v**

#### *Manufacturer's details:*

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Manual Part Number: **C20257**

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# CONTENTS

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

# 1 - Introduction

**It is imperative that this manual is read carefully and understood before installing your equipment. For your future reference please keep this manual in a safe place.**

Thank you for specifying a product from the Francis Searchlights range. All Francis products are designed to give complete customer satisfaction and are manufactured to the highest engineering standards in order to ensure optimum performance and service life.

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

In order to prolong the life and performance of your product, we recommend that you only specify Francis Searchlights spare parts. This will also ensure that any warranties on your equipment will not be invalidated. Information on spares ordering and parts is provided in this manual.

Should you ever need to contact Francis Searchlights Ltd. regarding your equipment, please quote the Product Serial Number at all times.

## 2 - Safety Precautions

The following instructions must be adhered to, in order to ensure a safe working environment and the safety of the user.

**Note: When unpacking or manoeuvring the searchlight into its fixing position, suitable lifting points must be used in order to prevent damage to the equipment or personal injury.**

- Because of the high internal pressure within the lamp, there is a risk of explosion in either a hot or cold state;
- During operation this lamp emits intense UV radiation which is harmful to the eyes and skin. Suitable protection should be worn;
- The high luminance of the arc can cause severe damage to the eye if viewed directly. ALWAYS wear suitable protective goggles when viewing the lamp;
- Always use protective sleeves supplied with the lamp;
- Should it be necessary to examine the lamp with the front bezel removed, always use a protective shield and wear goggles to ensure a safe working environment;
- 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 disposing of lamps, return the lamp, via the supplier, to the lamp manufacturer in its complete packaging;
- 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

This product has been designed to operate in accordance with the product specification. The FH560RC 2500 watt searchlight has the following features:

- All marine grade materials and fixings;
- Parabolic glass reflector;
- Stove enamel painted;
- Full 385° horizontal rotation;
- Vertical movement 25° to -25°;
- Motor speed 0-20°/sec fast, 0-10°/sec slow (Pan)  
0-10°/sec fast, 0-5°/sec slow (Tilt);
- Remote focus facility;
- Internal self regulating heater;

The searchlight also performs to the following optical data:

- Metal Halide light source;
- Lamp Wattage - 2500 Watts;
- Supply voltage - 220/240V or 110/120v;
- Peak Beam Candlepower – 141 million lux;
- Range – 11,870 metres;
- Divergence - 1.5°;
- Temperature range: -50°C;

In order that the searchlight operates correctly it is imperative that competent personnel are responsible for the installation, operation and servicing of this equipment. Failure to adhere to this advice may cause premature failure or incorrect operation of the searchlight, which may damage the equipment or cause personal injury.

Technical information on the Irem Ignitor & PSU is included overleaf. For more detailed information please contact the manufacturer.

Ignitor ref: AD3050B-US (Irem)  
PSU ref: BC2500E 240v(Irem)  
BC2500A 115v (Irem)

## 4 - Unpacking and Installation Instructions

The following instructions should be read and fully understood prior to installing the equipment to ensure that the correct procedures are followed and all safety precautions are observed.

**Note: If the equipment has been in storage for a considerable amount of time, it is advisable to conduct a routine maintenance check on all parts before installation.**

### Safety Precautions

This equipment should not be connected to an electrical supply before being installed. Installation procedures should be adhered to in order to ensure a safe working environment and reduce the risk of damage or personal injury.

### Preparing the Mounting Position

Mark out and drill the fixing holes through the deck and bolt the searchlight base securely. On an uneven surface it is necessary to use a sealant, such as silicone, in order to ensure a weatherproof joint. 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.

## 5 - Electrical Installation

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

In order to obtain the maximum light output from the searchlight, it is essential that the full operating voltage of the lamp fitted be applied to the lampholder contacts.

### Method of Electrical Connection

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

**The Control Gear should NOT be positioned know more then 5 meters away from the Searchlight.**

The following table below indicates the maximum length of cable to be used for the AC supply cable, from the control panel to the searchlight:

Searchlight	115v 2.5Kw	240v 2.5Kw
Cable Size (mm <sup>2</sup> )	Distance Max	Distance Max
1.5	7 MTRS	30 MTRS
2.5	11 MTRS	48 MTRS
4	17 MTRS	77 MTRS
6	27 MTRS	120 MTRS
10	46 MTRS	200 MTRS

- 4) Whenever possible cable terminations should be made below deck and with approved terminal devices;
- 5) If a spare auxiliary fuse or circuit breaker is not available, one of the correct type and rating should be fitted and connected to a positive supply. It is advisable to locate a bus bar or main connection and avoid any direct connection to the supply;
- 6) For 110/220v 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.**

## Installation Guidelines

**A typical installation and connection routine for the FH560RC 2.5Kw searchlight Variable Speed Gearbox is as follows:**

Referring to wiring diagram C22541, a supply is fed to the Control Panel, which then provides a common feed to the Motor Gearbox, Power Supply Unit and the Searchlight Control Panel. The searchlight has been pre-wired with 3 meters of cable from the gearbox to junction box provided.

Cables required to be connected by the customer: -  
2 off 6mm cables from the Junction Box into the PSU Plug,  
4 core 1.5mm cable from the Junction Box to the PSU Plug,  
3 core 2.5mm cable from the PSU Mains into the Control Panel.  
12 core 0.5mm cable from the Junction Box to the Control Panel,  
10 core 1.5mm from the Junction Box to the Control Panel

The Mains cable to the Control Panel is to be supplied by the customer.  
The searchlight head is pre-wired along with the connecting cable to the motor gearbox.

When the light is in operation, the output from the PSU should be approximately 110v ac at 25.6amps.

## Basic Operation

When the searchlight is switched on a supply is fed to the PSU and linked to the ignitor. Also from the PSU, a dc output is fed to the lamp. The ignitor ionises the gas within the lamp and this strikes the light. All other facilities are fed via the control panels and motor gearbox.

### NOTE:

It is essential that the searchlight 'ON/OFF' is switched 'ON' prior to 'STRIKE' on/off is operated.

After lamp strike ensure that both switches remain in the 'ON' position.

Either switch can be used to turn the lamp off but it should be noted that they **MUST** be returned to the 'OFF' position prior to re-striking the lamp.

## 6 - Operating Instructions

This equipment is designed for use out of doors, in free air. Never place anything on, or cover, the searchlight when in use as this may present a hazard.

All PSU should be housed below deck/in doors. Never leave the PSU exposed to weather conditions.

The searchlight can be remotely positioned via the joystick control panel, with the facility for movement up, down, left and right. The speed of movement depends on the more pressure applied to the joystick the faster the searchlight moves. When in the desired position the joystick should be released so that it returns to its' home position, dead centre.

The variable speed gearbox has a fast and slow setting. You activate this by switching the controller switch on the control panel then selecting fast or slow.

The beam of the searchlight can be adjusted to give a variety of beam types. Using the yellow remote focus button on the joystick panel, the desired beam can be achieved for any particular application. The beam will move continuously through 'spot' to 'flood'. In order to fix the beam type, simply release the button at the desired position.

The heaters specified on this equipment are self-regulating and will shut off when they reach the dew point temperature.

**This product should not be used for any purpose other than for which it was designed. Any modifications to the product should not be undertaken without consulting the manufacturer.**

## Setting to Work

Safe service in use necessitates the strict observance of the following precautions.

- Any article fabricated from quartz or glass is inherently fragile and care should therefore be taken, at all times, when handling lamps;
- Eye protection must be worn when handling lamps that have been removed from their packaging materials. The protective sleeve 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 that the power rating of the lamp to be fitted is suitable for the lamphouse and power supply equipment;
- Always isolate the equipment from the supply before inserting a lamp;
- Before inserting the lamp ensure that all contacts are clean. Contacts must be renewed at the slightest sign of corrosion. Sanding or filing down corroded areas is not recommended as this will only make the conducting surface between the pin and lampholder smaller, thus causing the lamp to overheat;
- Do not twist or bend the fused quartz bulb when fitting the lamp as mechanical stresses MUST be avoided;
- When inserting or removing a lamp, always hold it securely by its' base in order to prevent breakage between base and bulb;
- The lampholder must not exercise mechanical tensions on the lamp, neither during insertion or operation. Contacts must not discolour during use;
- For safety reasons, the lamp should be replaced once it has reached its' average life, and not later than 1.25 times the stated life. With continuing use the risk of the lamp exploding increases due to alterations within the quartz;
- Before the protective sleeve is removed, suitable protection must be worn i.e face mask and gloves with wrist protection;
- Never touch the quartz bulb with bare hands, as fingerprints will make the glass cloudy and cause a severe loss of light. This may also cause recrystallisation and thus weaken the bulb material. Should the bulb be inadvertently touched, remove fingerprints with methylated spirit and a clean, soft paper towel. The bulb should then be wiped with distilled water. NOTE: ALWAYS WEAR MASK AND GLOVES DURING CLEANING;
- All packaging and the protective jacket must be retained for re-use. Whenever removing a lamp, the protective jacket must always be used for safety reasons;
- In all circumstances the lamp manufacturer's data should be referred to when dealing with lamps.

## 7- Fault Finding

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

### Failure of Lamp to Ignite

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

- 1) Check that the mains supply is connected to the input of the PSU and check all connections as per the wiring diagram. On operating the exciter switch (strike), if the lamp does not light, switch off mains supply and check all fuses;
- 2) Check the searchlight head. On your command get an operator to activate the exciter switch (strike) for approximately 2 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 from the ignitor 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 barrel. Replace the rear bezel, ensuring the latches are securely tightened, 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 manufacturers 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 metal halide 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 30,000 volts or higher). Switching the lamp on and depressing the exciter switch (strike) activates the ignitor. 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 on the lampholder assembly within the searchlight barrel. If the focus of the light fails the following procedure should be adopted:

- 1) Remove the front bezel from searchlight barrel and examine focus mechanism. If parts have become loose, tighten fasteners.
- 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;

- 4) If no supply is present, check the transformer at the rear of the searchlight. Remove the rear bezel and using a multi-meter check the supply into and from the transformer. If found to be faulty, replace the transformer and check operation of focus mechanism.
- 5) If no supply is present there is a fault in the motor gearbox. This should be examined and rectified accordingly.

**Note: If a fault occurs on the motor gearbox, the unit should be returned to Francis Searchlights Limited for fault evaluation and repair.**

## 8 - Maintenance and Servicing

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

- Maintenance checks should be conducted before every voyage or at least every three months;
- Before checking, disconnect the equipment from the supply;
- Visually inspect the condition of the equipment;
- Any major or minor structural damage should be rectified immediately in order to reduce sympathetic wear;
- After inspection it may be necessary to clean the inside of the searchlight. The following procedure should be adhered to:
  - Remove the front bezel;
  - Clean the front glass inside and out using a proprietary glass cleaner or metal polish;
  - Clean the reflector if required;
  - Check the reflector mounting gaskets. If signs of corrosion or damage are evident, replace as necessary;
  - Ensure that the lampholder is free from corrosion or other damage;
  - Check earthing point for conductivity;
- 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).

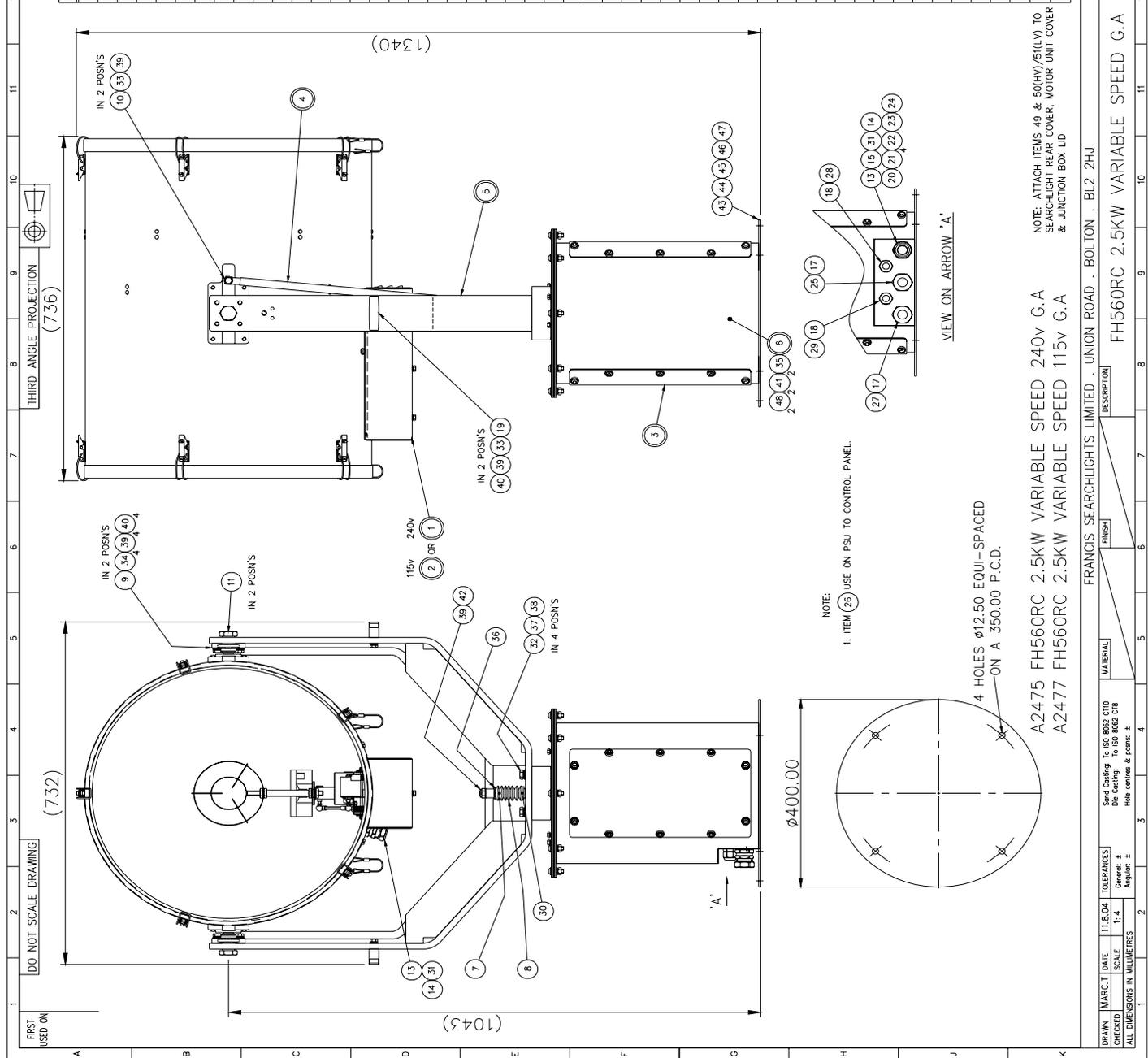
**If in any doubt as to the correct servicing procedures to adopt please contact your distributor/agent or the manufacturer who will be able to advise the best course of action for your product.**

## 9 - Wiring Diagram

Drawing Number	Description
A2475/A2477	FH560RC 2.5Kw Variable Speed G.A
C22541	Metal Halide RC Wiring Diagram variable speed Control Panel Outline Drawing variable speed
C26319	Junction Box Assembly

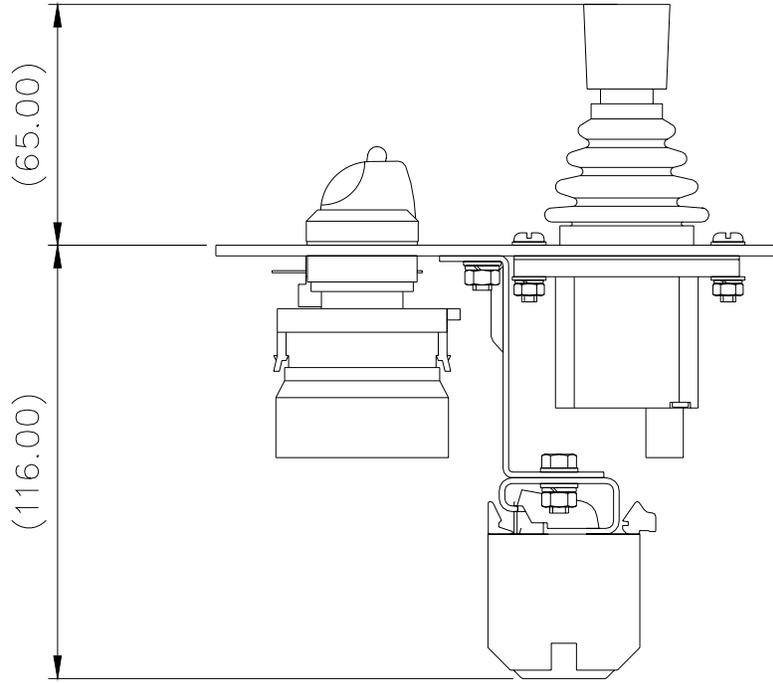
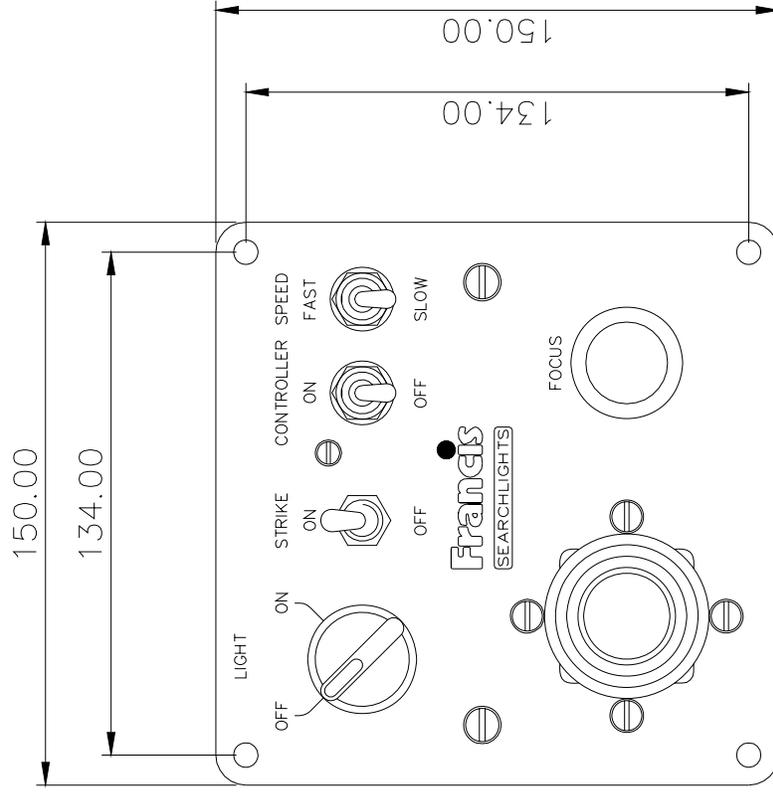
ISS No	MODIFICATION DETAILS	DATE
1	AS FIRST DRAWN	9/04/03
2	115V OPTION ADDED (EC1076)	9/04/03
3	U-PIECE BUSH NON M25 (EC1094)	5/05/03
4	WASHER & NUT RING D.S. ADDED (EC1249)	11/11/03
5	COVER HAS REPLACED 4.08 (C2419) (EC1179)	9/09/03
6	BROUGHT IN LINE WITH DETAIL (EC1537)	11/11/03
7	REWORKED MOTOR UNIT (EC1308)	11/11/03
8	REWORKED MOTOR UNIT (EC1449)	11/11/03

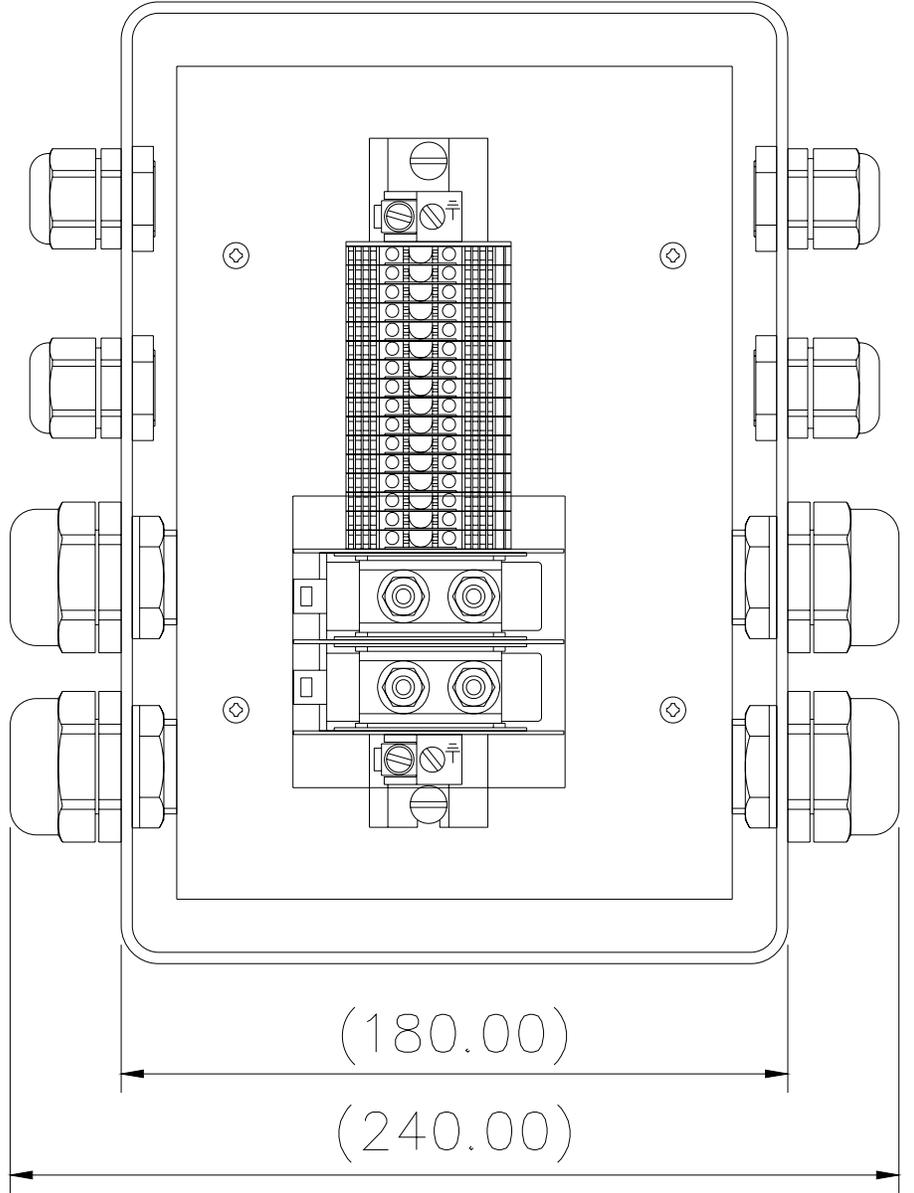
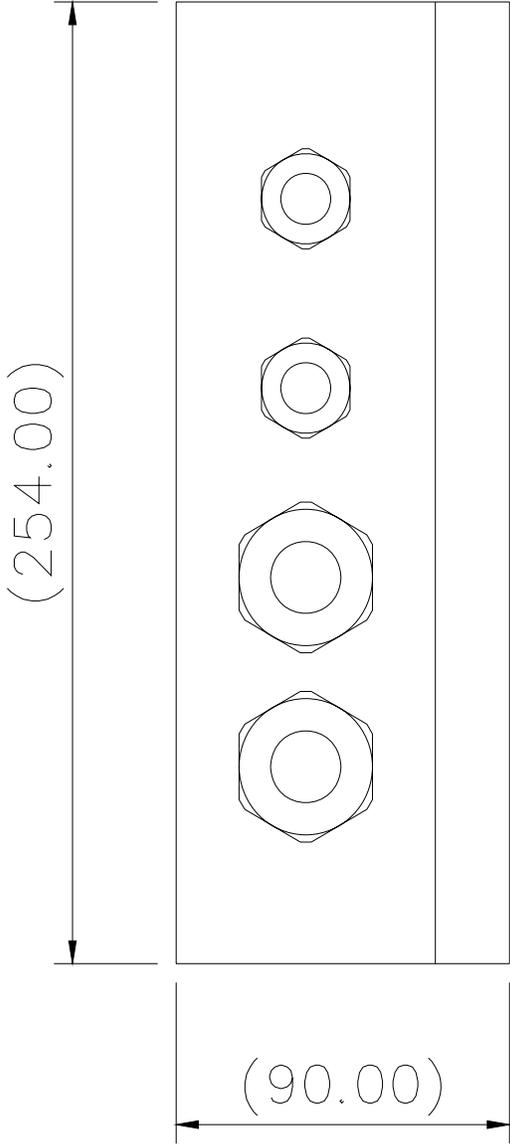
ITEM	PART No.	DRG No.	DESCRIPTION	QTY	UNIT
1	C22603	C22603	BARREL ASSY 240v	1	
2	C23170	C22603	BARREL ASSY 115v	1	
3	C22420	C22420	VARIABLE/S MOTOR UNIT	1	
4	C21577	C21577	U-PIECE ASSY	1	
5	C21579	C21579	CRUTCH SUB ASSY	1	
6	C23138	C23138	TERMINAL RAIL ASSY	1	
7	C21583	C21583	BELLOWS TOP BUSH	1	
8	C20281	C20281	BELLOWS	1	
9	C21823		FLANGE BEARING	2	
10	C23331	C23331	U-PIECE BUSH	2	
11	C21821	C21821	TRUNNION BOLT	2	
12					
13	C13768		CONDUIT GLAND M25	2	
14	C22930		M25 GLAND LOCKNUT	2	
15	C13761		CONDUIT M25	1	
16					
17	C15450		GLAND M25	2	
18	C10158		GLAND M20	2	
19	C20943		LIFTING HANDLE	2	
20	C13873		CABLE 1.5mm BLACK	1	
21	C13872		CABLE 1.5mm RED	4	
22	C15112		CABLE 1.5mm G/YELLOW	1	
23	C14161		CABLE 6mm RED	1	
24	C14162		CABLE 6mm BLK	1	
25	C05267		CABLE 3 CORE 6mm	1	
26	C16778		CABLE 2.5mm	1	
27	C15448		CABLE 10 CORE 1.5mm	1	
28	C16583		CABLE 4 CORE 1.5mm	1	
29	C20241		CABLE 12 CORE 0.5mm	1	
30	C21967		'O' RING	1	
31	C24711		M25 SEALING WASHER	2	
32	C08088		SCREW M10 x 30 HEX HD	4	
33	C09208		SCREW M8 x 30 HEX HD	4	
34	C06088		SCREW M8 x 25 HEX HD	8	
35	C14644		SCREW M4 x 8 HEX HD	2	
36	C08370		WASHER M12 PLAIN	1	
37	C08091		WASHER M10 PLAIN	4	
38	C15313		WASHER M10 S/C SPRING	4	
39	C08999		WASHER M8 PLAIN	13	
40	C15041		WASHER M8 S/C SPRING	10	
41	C08793		WASHER M4 S/C SPRING	2	
42	C12354		NUT M8 NYLOCK	1	
43	C24649		CABLE CLEAN BUSH	1	
44	C24644		CABLE CLEAN	1	
45	C10142		SCREW M5 x 12 CSK HD	1	
46	C10733		SCREW M6 x 12 HEX HD	1	
47	C08697		WASHER M6 PLAIN	1	
48	C04376		WASHER M4 PLAIN	2	
49	C22036		LABEL ISOLATE SUPPLY	3	
50	C21464		LABEL DANGER 230V (HV)	3	
51	C22078		LABEL DANGER 110V (LV)	3	



DRW	MARCT	DATE	11.8.04	TOLERANCES	General: ±	Angular: ±
CHECKED	SCALE	1:4		Sand Coating: to ISO 8062 C10	Die Coating: to ISO 8062 C18	Hole centres & points: ±
ALL DIMENSIONS IN MILLIMETRES						







## 10 - Spare Parts List

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

Part Number	Description
Searchlight spares	
C09868-00	G38 Lampholder
C20223-00	Ignitor (Irem ref: AD3050/B-US) 110v/240v
C20224-00	Fan 240v
C21573-00	Fan 115v
D20194	2.5Kw Metal Halide Lamp
C23012-00	Switch - On/Off, Searchlight
C14142-00	Switch – Focus
C22347-00	Joystick
C22941-00	Switch (Controller/speed)
C15792-00	Strike Switch
C20881-00	Front Glass
C20569-00	Front Glass Gasket
C16410-00	Motor - Remote Focus
C16488-00	Transformer – 240v to 24v
C16854-00	Diode
C23277-01	Heater & Fuse Assembly
C05396-00	Reflector
C21172-00	PSU (Irem ref: BC2500E) 240v
C23150-00	PSU (Irem ref: BC2500A) 115v
C21173-00	Male Plug for C21172-00
Motor gearbox spares	
C22403-01	Pan Motor S/Assy
C22287-00	Tilt Motor
C22380-00	Microswitch no lever
C22382-00	Microswitch with lever
C24030-01	'I' Drive Pan Speed Controller
C24060-01	'I' Drive Tilt Speed Controller
C23530-01	P.S.U.
C22381-00	Pedestal Top Sealing Gasket
C26185-00	Pedestal Cover Gasket

In order to prolong the life and performance of your product, we recommend that you only specify Francis Searchlights spare parts. This will ensure that any warranties on your equipment will not be invalidated.

When ordering spare parts please contact the Sales Department at Francis Searchlights Limited. Please quote searchlight model and serial number at all times. This will enable a fast response to your spares' requirements.

[Back To Top](#)