



## User Instruction & Installation Manual

### L480 Remote Control Tungsten Halogen Searchlight



#### Product Reference Number:

**A2497 – Variable Speed Motor Unit 1Kw 115/240v**

**A2500 – Variable Speed Motor Unit 2Kw 115/240v**

#### *Manufacturers details:*

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Manual Part Number: C21400

23.11.11 Issue : 15

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# 1 - Introduction

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

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

The Francis Lite 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.**

- Prevent rain, snow, condensation and water droplets from contacting the lamp as this may cause bulb failure and possible shattering;
- Quartz halogen bulbs run with a high internal pressure in excess of 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;
- 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;
- 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 manufacturers 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 manufacturers technical data when dealing with lamps.**

### 3 - Technical Information

This product has been designed to operate in accordance with the product specification. The L480RC searchlight has the following features:

- All marine grade materials and fixings;
- Parabolic formed aluminium reflector;
- Powder coated / Stove enamel paint finish;
- 385° horizontal rotation;
- Vertical movement  $\pm 20^\circ$ ;
- Motor speed 20°/sec fast, 10°/sec slow (Pan)  
0-10°/sec fast, 0-5°/sec slow (Tilt);
- Effective weather sealing to IP66;
- Toughened front glass;

The searchlight also performs to the following optical data:

	<u>1000 Watt T/H</u>	<u>2000 Watt T/H</u>
■ Supply voltage	220/240v or 110/115v	220/240v or 110/115v
■ Peak Beam Candlepower	1,235,000 lux	2,471,000 lux
■ Range	1111 metres	1572 metres
■ Divergence	4.5°	6.5°
■ Temperature range	-20°C to +50°C	-20°C to +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.

## 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. 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, in order to ensure a weatherproofed joint.

## 5 - Electrical Installation

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

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

### Method of Electrical Connection

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

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

Searchlight	120v 1Kw	120v 2Kw	230v 1Kw	230v 2Kw
Cable Size (mm <sup>2</sup> )	Distance Max	Distance Max	Distance Max	Distance Max
1.5	18 MTRS	9 MTRS	68 MTRS	34 MTRS
2.5	30 MTRS	15 MTRS	111 MTRS	55 MTRS
4	48 MTRS	24 MTRS	176 MTRS	88 MTRS
6	74 MTRS	37 MTRS	275 MTRS	137 MTRS
10	125 MTRS	62 MTRS	460 MTRS	230 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 L480RC 1Kw searchlight is as follows:**

Referring to wiring diagram C22694, a supply is fed to the control panel, which then provides a common feed to the motor gearbox and the searchlight.

The searchlight has been pre-wired with 3 meters of cable from the gearbox to a junction box provided.

Cables required to be connected by the customer: -  
4 core 1.5mm<sup>2</sup> cable from the Junction Box to the Control Panel.  
12 core 0.5mm<sup>2</sup> cable from the Junction Box to the Control Panel.

#### **Optional Slave Panel Wiring**

6 core 0.5mm<sup>2</sup> cable from the Slave Panel to the Junction Box.

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

### **A typical installation and connection routine for the L480RC 2Kw searchlight is as follows:**

Referring to wiring diagram C22978, a supply is fed to the control panel, which then provides a common feed to the motor gearbox and the searchlight.

The searchlight has been pre-wired with 3 meters of cable from the gearbox to a junction box provided.

Cables required to be connected by the customer: -  
4 core 1.5mm<sup>2</sup> cable from the Junction Box to the Control Panel.  
12 core 0.5mm<sup>2</sup> cable from the Junction Box to the Control Panel.

#### **Optional Slave Panel Wiring**

6 core 0.5mm<sup>2</sup> cable from the Slave Panel to the Junction Box.

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



## 6 - Operating Instructions

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

The searchlight can be remotely positioned via the joystick control panel, with the facility for movement up, down, left and right. The speed of movement depends on the more pressure applied to the joystick the faster the searchlight moves. When in the desired position the joystick should be 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 externally adjusted to give a variety of 'spreads'. Using the focussing handle situated underneath the barrel head. The lampholder can be moved into the desired position, towards the front for spot or the rear for flood.

The searchlight is fitted with a Breather Assembly. This ensures a steady airflow in order to prevent any vacuum forming within the barrel.

The heaters specified on this equipment are self-regulating and will increase/decrease the heat as required.

**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 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;
- 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;
- 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;
- Before the protective jacket 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);

In all circumstances the lamp manufacturers data should be referred to when dealing with lamps.

#### *When fitting the lamp:*

- Always isolate the equipment from the supply when inserting a lamp;
- Ensure the circuit is suitably fused;
- Ensure the lamp is of the correct power rating and type;
- Check lampholder is in good condition. If the contacts show any sign of corrosion, replace the lampholder;
- Check the lampholder is in a good dry condition. Never allow water to collect in the lamp fitting or come into contact with the lamp.

#### *To fit the lamp:*

- Remove the front bezel assembly by operating the safety catch and lifting the latch body;
- For easier access the light shield/spill ring may be removed by undoing the fasteners;
- Cut open one end of the protective sleeve surrounding the lamp;
- Using the sleeve to prevent the fingers coming into contact with the lamp, position the two pins above the holes in the lampholder;
- Gently push the lamp into the lampholder and remove the protective sleeve;
- Replace the light shield/spill ring and front bezel assembly, ensuring the safety catch is engaged.

### Testing

Upon correct installation and connection to an electrical supply, the equipment can be tested in order to ensure its' correct performance. A competent person with some knowledge of electrical equipment must carry out this work.

Equipment required:      Multi-meter with leads  
   Ammeter

Using the equation  $P=VI$ , the approximate power output of the equipment can be calculated in the following way:

- Using the multi-meter, take a voltage reading;
- Using the ammeter, take an amps reading from the live cable to the lamp;
- Multiply these figures together to give an approximate wattage (Power output).

For example:

Using a 240v 1000w Tungsten halogen lamp:  
Voltage reading = 240v ;Amps reading = 4 amps

Therefore, Wattage =  $240 \times 4 = 960$  watts

## 7- Fault Finding

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

### Failure of Lamp to light

#### *Causes:*

- 1) Power not supplied;
- 2) Fuse blown;
- 3) Failed lamp

#### *Remedy:*

- 1) Check voltage at supply. If supply is not present the fault is at the customer supply. If power is present, see remedy 2;
- 2) Check fuse for visual failure. If none noticeable check fuse for continuity using a multi-meter. If fuse found to be faulty, replace with new part and test equipment again for correct working order. If found to be working correctly see remedy 3;
- 3) Firstly, check supply at lampholder connecting block (within searchlight barrel). If supply is present, disconnect unit from power supply before removing the lamp. If noticeable damage to filament is present, the lamp will have failed. The lamp can also be checked for continuity using a multi-meter. Replace lamp ensuring all precautions and instructions previously outlined in this manual are adhered to.

**NOTE:** If a fault occurs on the pan and tilt 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;
  - 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 and General Assembly

<b>Part / Drawing Number</b>	<b>Description</b>
C22694	Wiring Diagram Lite Range Variable Speed 10 Amp
C22978	Wiring Diagram Lite Range Variable Speed 20 Amp
A2497/A2500	L480RC 1/2Kw 115/240v Variable Speed General Assembly drawing
C23603	Junction Box Assembly Control Panel Assembly

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

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

WIRING DIAGRAM LITE RANGE VARIABLE SPEED H.V 10 AMP

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STANDARD PRACTICE  
Drawn all cut/machined edges  
Break corners R0.25(Min) U.S.S.

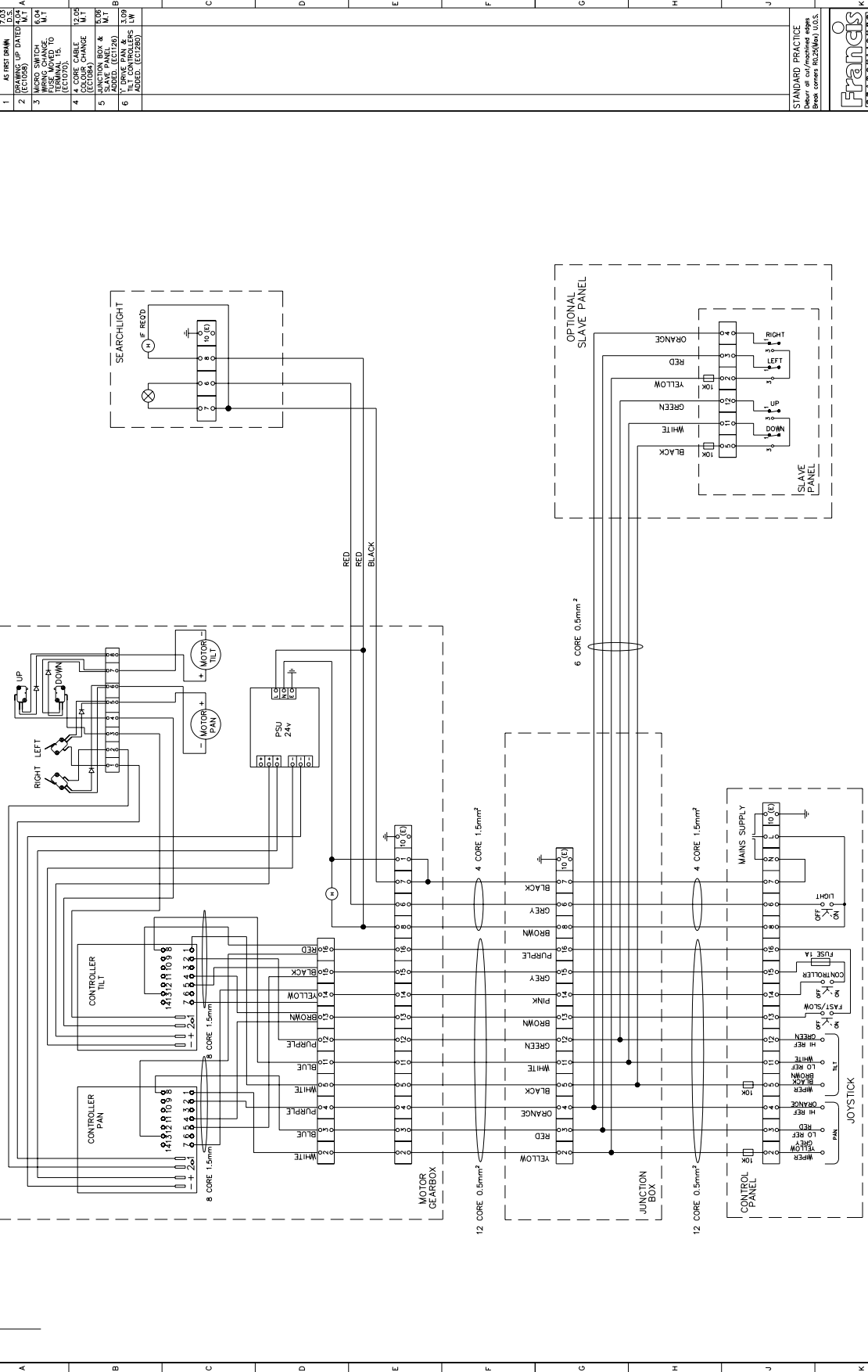
Francis  
SEARCHLIGHTS

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

WIRING DIAGRAM LITE RANGE VARIABLE SPEED H.V 10 AMP

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STANDARD PRACTICE  
Drawn all cut/machined edges  
Break corners R0.25(Min) U.S.S.



NO	REVISION	DATE	BY	CHKD
1	AS FIRST DRAWN	7.03.03		
2	DRAWING UP DATED FOR M.T.			
3	REVISIONS MADE TO M.T.			
4	4 CORE CABLE CHANGE M.T. (EC1084)			
5	SLAVE PANEL & M.T. ADDED. (EC1125)			
6	SLAVE CONTROLS M.T. ADDED. (EC1280)			

DATE	BY	CHKD
7.03.03		

NO	REVISION	DATE	BY	CHKD
1	AS FIRST DRAWN	7.03.03		
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7.03.03		

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DATE	BY	CHKD
7.03.03		

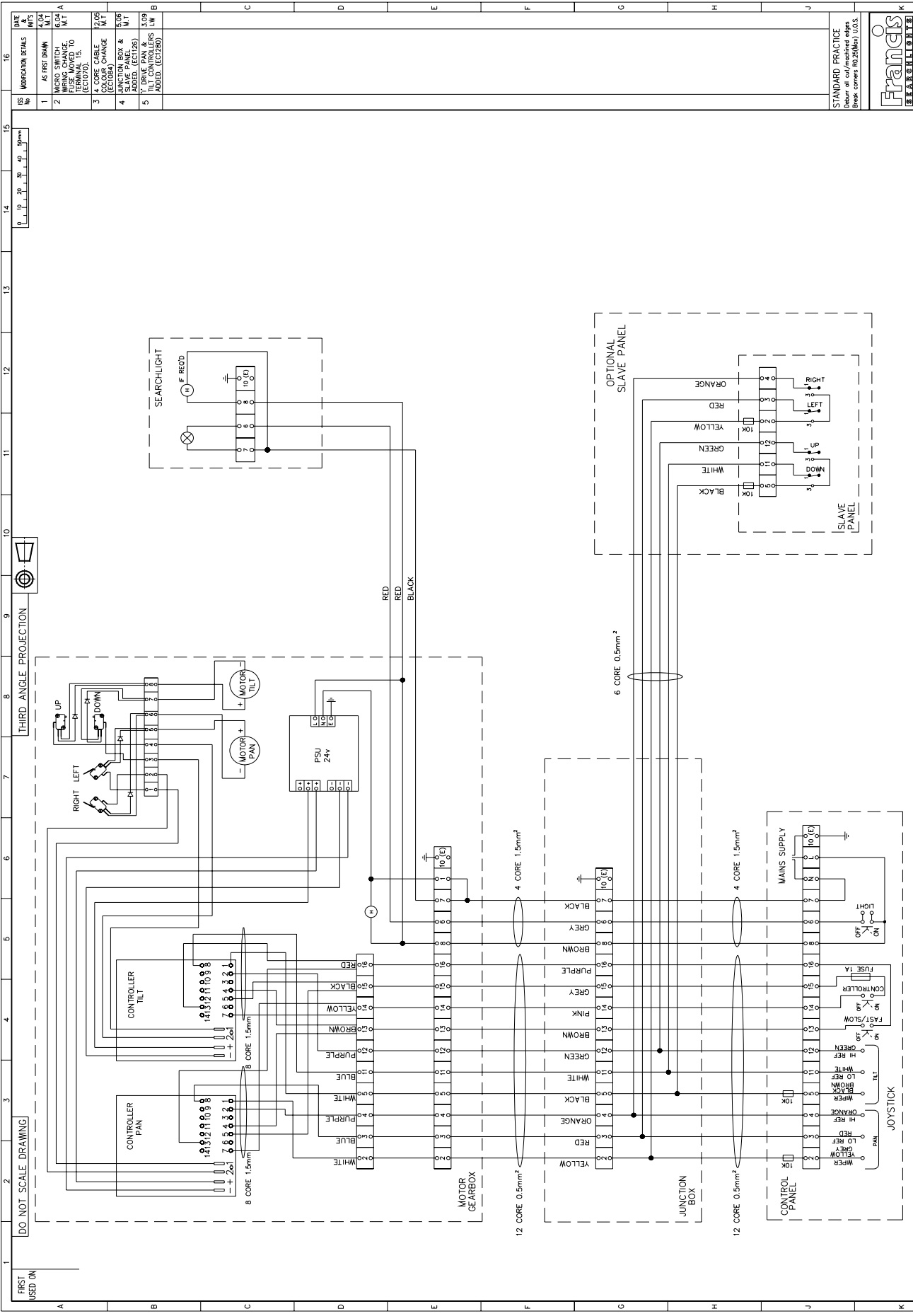
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DATE	BY	CHKD
7.03.03		

DRAWN: D.S. DATE: 14.7.03 TOLERANCES: See Config. To ISO 8002 C18  
 CHECKED: S.H. SCALE: As per drawing  
 ALL DIMENSIONS IN MILLIMETRES

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



REV	NO	DESCRIPTION	DATE
1	1	AS FIRST DRAWING	6.04.10
2	2	MICRO SWITCH WIRING CHANGE. TERMINAL 1 TO TERMINAL 15. (EC1074D)	15.11.10
3	3	CABLE CHANGE. (EC1084)	22.05.11
4	4	FUNCTION BOX & WIRING CHANGES ADDED. (EC1126)	10.08.11
5	5	1. DRIVE PAN & 2. SEARCHLIGHT ADDED. (EC1280)	10.08.11

REV	NO	DESCRIPTION	DATE
1	1	AS FIRST DRAWING	6.04.10
2	2	MICRO SWITCH WIRING CHANGE. TERMINAL 1 TO TERMINAL 15. (EC1074D)	15.11.10
3	3	CABLE CHANGE. (EC1084)	22.05.11
4	4	FUNCTION BOX & WIRING CHANGES ADDED. (EC1126)	10.08.11
5	5	1. DRIVE PAN & 2. SEARCHLIGHT ADDED. (EC1280)	10.08.11

STANDARD PRACTICE  
Debur all cut/finished edges  
Break corners R0.25(Min) U.O.S.

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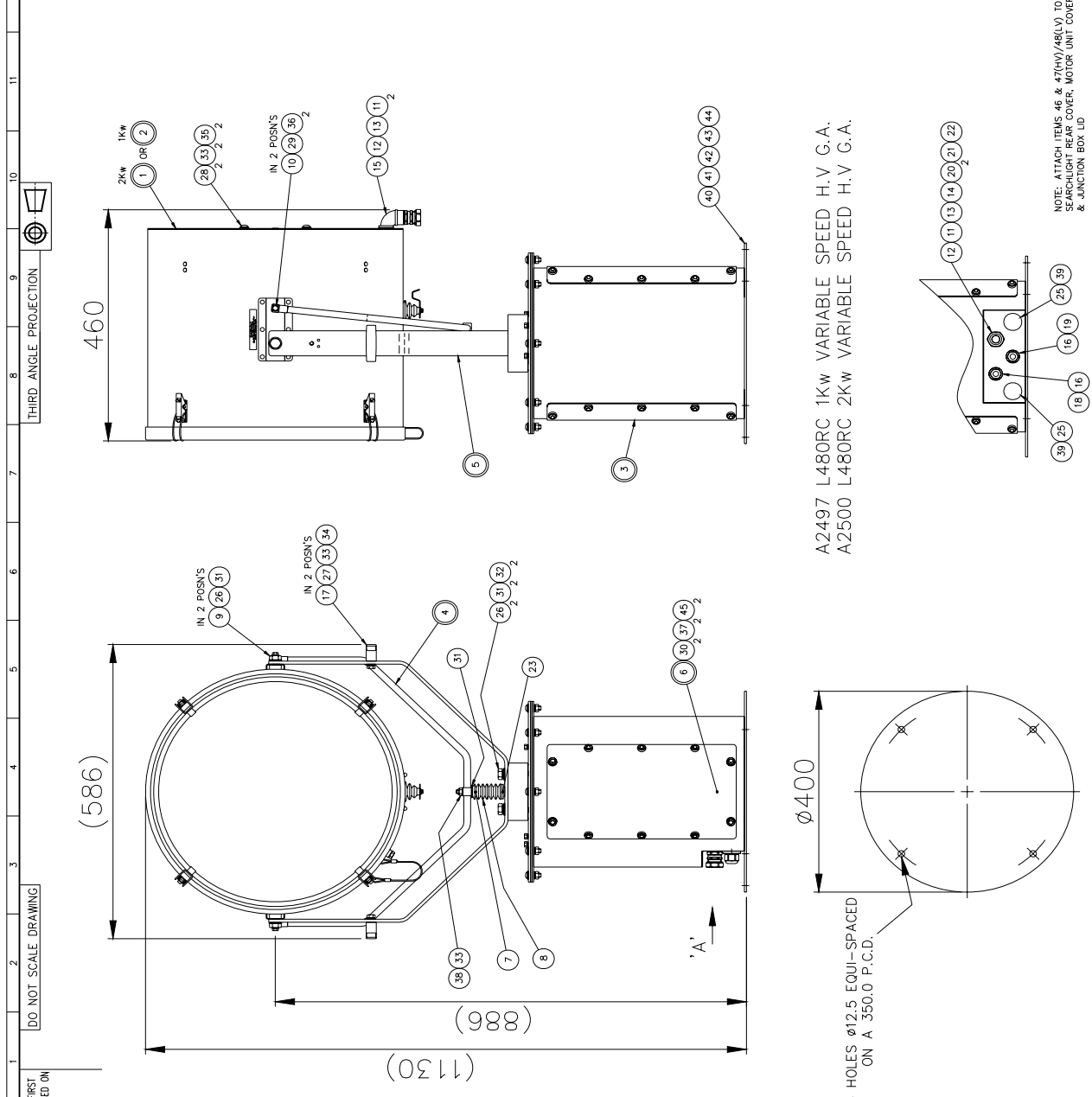
FRANCIS SEARCHLIGHTS LIMITED · UNION ROAD · BOLTON · BL2 2HU

WIRING DIAGRAM LITE RANGE VARIABLE SPEED H.V 20 AMP

DRAWN	D.S.	DATE	16.4.04	TOLERANCES
CHECKED	SCALE	General: 1	Angular: 1	Spot Castings: To ISO 8002 CT10 Die Castings: To ISO 8002 CT8 Hot centres & points: 1
ALL DIMENSIONS IN MILLIMETRES	MATERIAL	FINISH		

ITEM	PART No.	DRG No.	DESCRIPTION	QTY	UNIT
1	C20765	C20765	BARREL ASSY 2kw	1	U-P
2	C20724	C20724	BARREL ASSY 1kw	1	U-P
3	C22363	C22363	VARIABLE SPEED MOTOR UNIT	1	U-P
4	C21240	C21240	U-PIECE ASSY	1	U-P
5	C20725	C20725	CRUTCH SUB ASSY	1	U-P
6	C22768	C22768	TERMINAL RAIL ASSY	1	U-P
7	C20270	C20270	BELLOWS TOP BUSH	1	U-P
8	C20281	C20281	BELLOWS	1	U-P
9	C22264	C22264	TRUNNION SPACER	2	U-P
10	C23329	C23329	U-PIECE BUSH	2	U-P
11	C24710		M20 SEALING WASHER	3	U-P
12	C15762		CONDUIT GLAND M20	2	U-P
13	C22931		M20 GLAND LOCKNUT	2	U-P
14	C15751		CONDUIT M20 4.7MTRS	1	U-P
15	C22401		90° BEND ADAPTOR M20	1	U-P
16	C10158		GLAND M20	1	U-P
17	C20943		LIFTING HANDLE	2	U-P
18	C20241		CABLE 12 CORE 0.5mm	1	U-P
19	C16593		CABLE 4 CORE 1.5mm	1	U-P
20	C13873		CABLE 1.5mm BLACK	1	U-P
21	C13872		CABLE 1.5mm RED	2	U-P
22	C15112		CABLE 1.5mm G/YELLOW	1	U-P
23	C21867		'O' RING	1	U-P
24					
25	C23526		M25 BODY PLUG	2	U-P
26	C08369		SCREW M12 x 20 HEX HD	4	U-P
27	C09208		SCREW M8 x 30 HEX HD	2	U-P
28	C21398		SCREW M8 x 16 SKT BUTT. HD	2	U-P
29	C11872		SCREW M6 x 30 HEX HD	2	U-P
30	C14644		SCREW M4 x 8 HEX HD	2	U-P
31	C08370		WASHER M12 PLAIN	5	U-P
32	C12133		WASHER M12 S/C SPRING	2	U-P
33	C06999		WASHER M8 PLAIN	5	U-P
34	C15041		WASHER M8 S/C SPRING	2	U-P
35	C15275		WASHER M8 NYLON 6/6	2	U-P
36	C06997		WASHER M6 PLAIN	4	U-P
37	C08793		WASHER M4 S/C SPRING	2	U-P
38	C12354		NUT M8 NYLOCK	1	U-P
39	C12039		RTV	A/R	U-P
40	C24648		CABLE CLEAT BUSH	1	U-P
41	C24645		CABLE CLEAT	1	U-P
42	C10142		SCREW M5 x 12 CSK HD	1	U-P
43	C16335		SCREW M5 x 12 HEX HD	1	U-P
44	C08392		WASHER M5 PLAIN	1	U-P
45	C04376		WASHER M4 PLAIN	2	U-P
46	C22036		LABEL ISOLATE SUPPLY	3	U-P
47	C21464		LABEL DANGER 230V (HV)	3	U-P
48	C22078		LABEL DANGER 110V (LV)	3	U-P

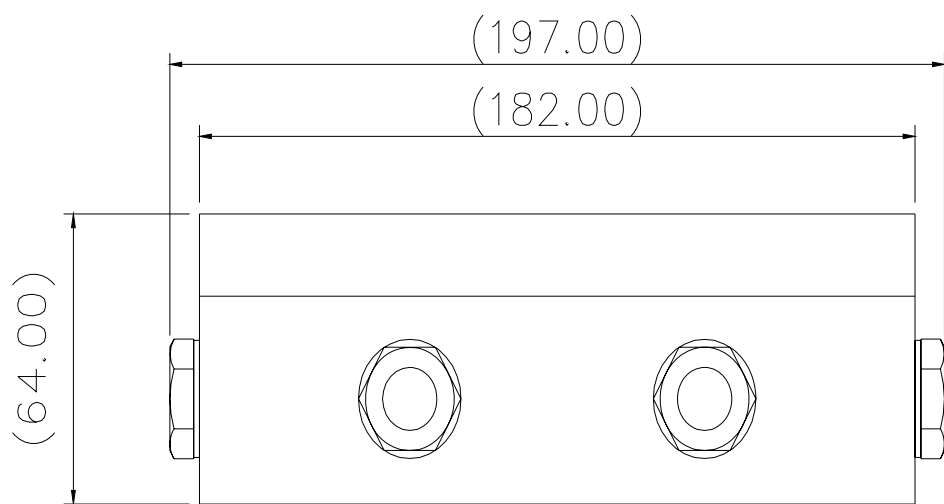
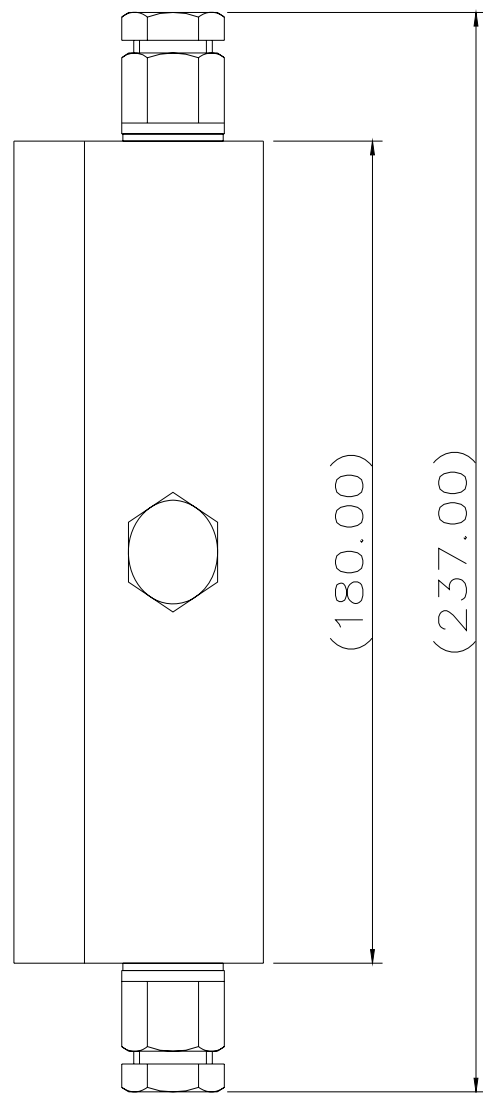
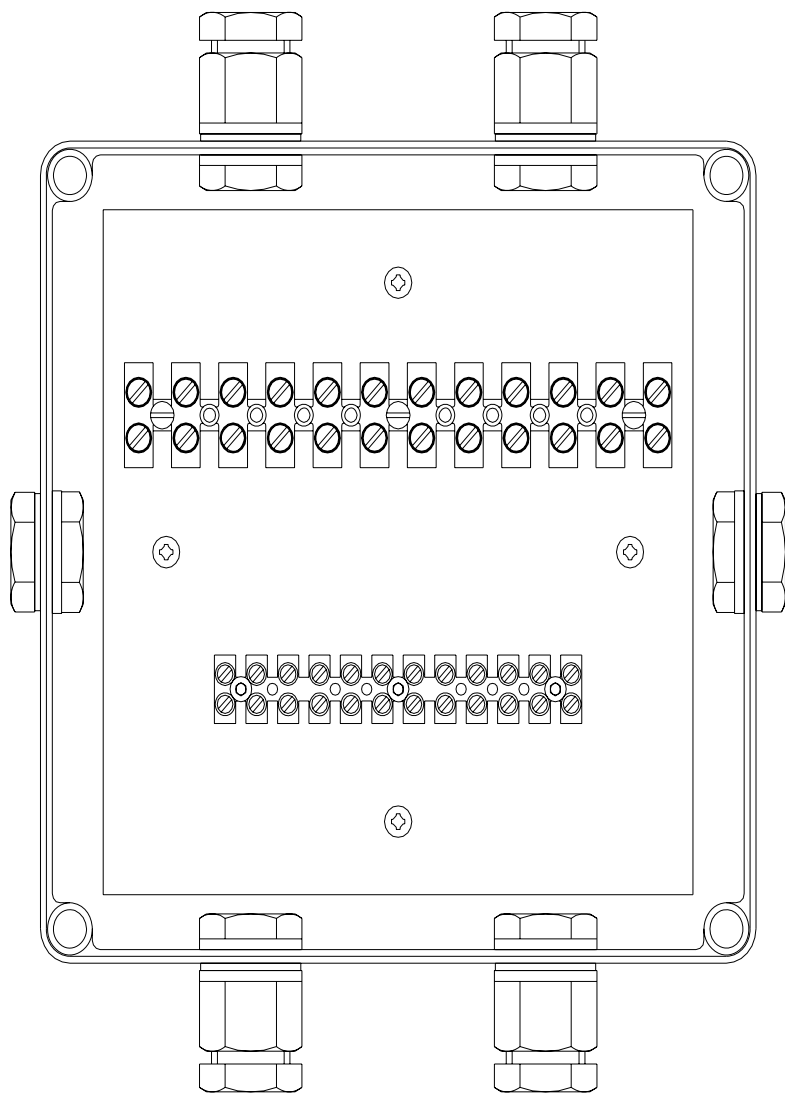
REV	NO	MODIFICATION DETAILS	DATE
1	AS FIRST DRAWN		
2	U-PIECE BUSH NOM 5.00 B/L		
3	C23329 (EC1084)		
4	WASHER & 'O' RING 0.5		
5	ADDED (EC126)		
6	C2098 WAS REPLACED BY U-P		
7	SCREW CLASS (C22)		
8	BROUGHT IN LINE WITH DETAIL (EC133)		
9	REWORKED MOTOR UNIT (EC136)		
10	REWORKED MOTOR UNIT (EC149)		

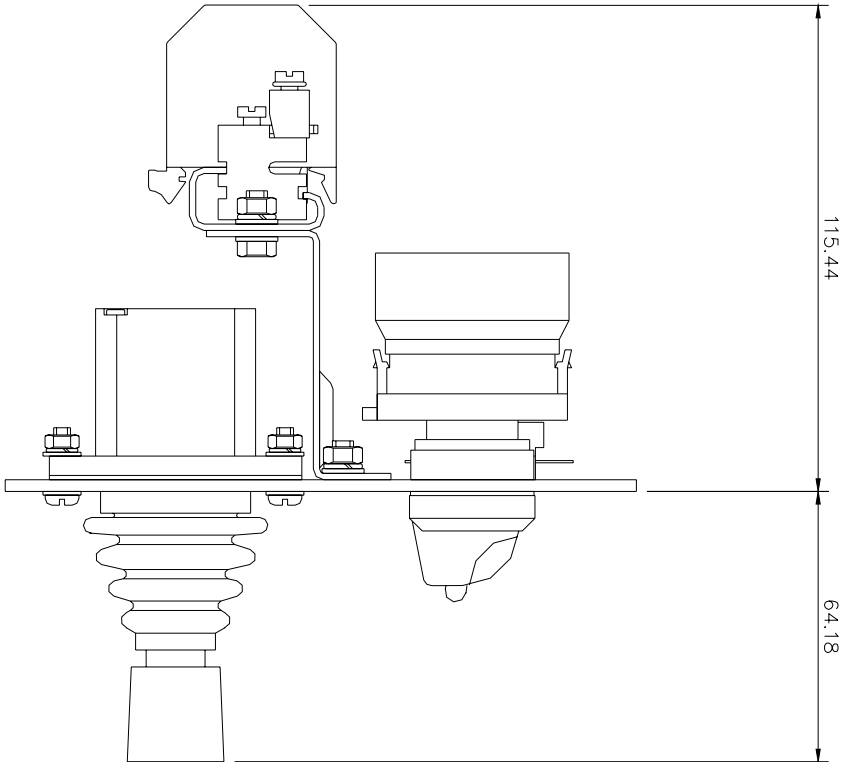
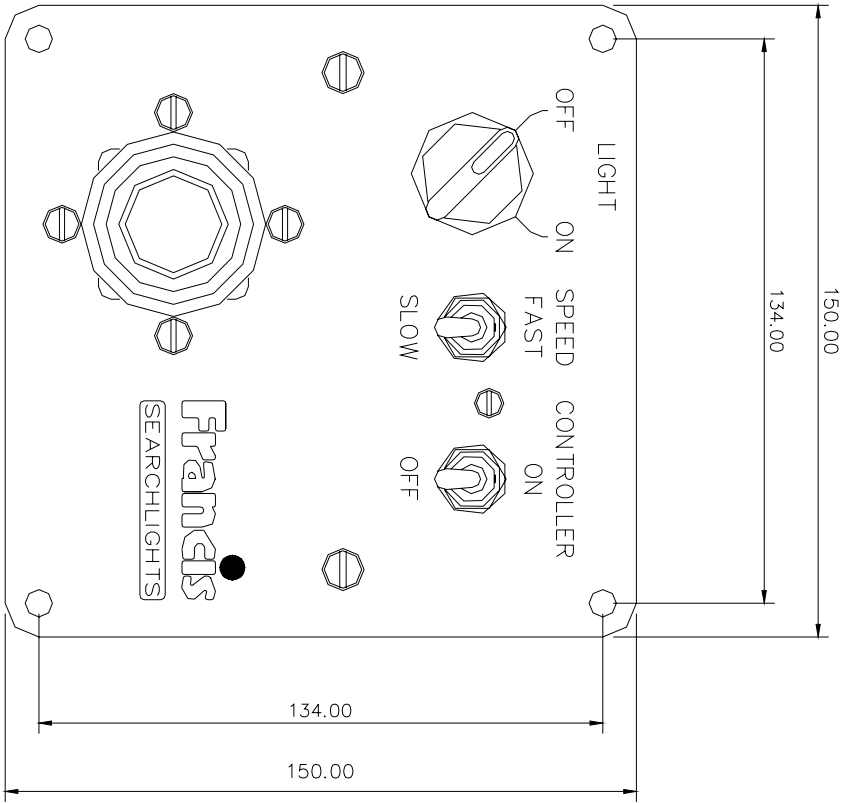


ITEM	DESCRIPTION	QTY	UNIT
1	AS FIRST DRAWN		
2	U-PIECE BUSH NOM 5.00 B/L		
3	C23329 (EC1084)		
4	WASHER & 'O' RING 0.5		
5	ADDED (EC126)		
6	C2098 WAS REPLACED BY U-P		
7	SCREW CLASS (C22)		
8	BROUGHT IN LINE WITH DETAIL (EC133)		
9	REWORKED MOTOR UNIT (EC136)		
10	REWORKED MOTOR UNIT (EC149)		

STANDARD PRACTICE  
Debur at cut/finished edges  
Break corners R0.2(0.8) U.S.







## 10 - Spare Parts List

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

Part Number	Description
Searchlight Spares	
D1809	115v 1Kw GX9.5 Tungsten Halogen Lamp
D6715	220v 1Kw GX9.5 Tungsten Halogen Lamp
D1814	240v 1Kw GX9.5 Tungsten Halogen Lamp
D20390	115v 2Kw GY16 Tungsten Halogen Lamp
D20236	230v 2Kw GY16 Tungsten Halogen Lamp
C03022-00	Lampholder 1Kw GX9.5
C20185-00	Lampholder 2Kw GY16
C14143-00	Selector Switch 10Amp – On/Off
C23002-00	Selector Switch 20Amp – On/Off
C22347-00	Joystick
C22941-00	Switch (Controller / Speed)
C20707-00	Front Glass
C20568-00	Font Glass Gasket
C20550-00	Latch
C20620-00	Reflector
C22268-01	Breather Assy
C16761-00	A.V. Mount
C20281-00	Bellows
C20860-01	Lampholder Conversion Kit 1Kw GX9.5
C20861-01	Lampholder Conversion Kit 2Kw GY16

### Motor Gearbox Spares

C20261-00	Heater
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.

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