



User Instruction & Installation Manual

FX230 Deck & Cabin 150 Watt Xenon Searchlight



Product Reference Number:

A2432 – FX230 Deck
A2433 – FX230 Cabin

Manufacturer's details:

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Distributor details:

Manual Part Number: **C15817**
Issue: 7

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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 Xenon 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 FX230 150watt searchlight has the following features:

- All marine grade materials and fixings;
- Parabolic electro-formed nickel, bright rhodium coated reflector;
- Stove enamel painted;
- Full 360° horizontal rotation;
- Vertical movement $\pm 45^\circ$ (Deck); -20° to 40° (Cabin);
- Remote focus facility;
- Internal self-regulating heater;
- Instant lamp re-strike. No cooling down time required;
- Economical 1200 hour lamp life;
- Toughened front glass;
- Supplied with control panel incorporating focus control and on/off switch;
- Luminous flux 2900;
- Colour temperature 6000K;
- Sealing to IP56.

The searchlight also performs to the following optical data:

- Xenon light source
- Lamp Wattage - 150 Watts;
- Supply voltage – 10.8v to 30v DC;
- Peak Beam Candlepower – 5,479,861 lux;
- Range – 2,341 metres;
- Adjustable lamp focus, 1.5° spot to 10° flood;
- 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.

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, using the template provided. 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.

In the case of cabin control models, a centre hole is also required to allow the mechanism to pass through.

Fit the 'O' ring in position and bolt the searchlight down securely. On an uneven surface it is necessary to use a suitable sealant, such as silicone, to ensure a weatherproofed joint.

For cabin control models it is necessary to remove the underdeck control assembly prior to installation.

Using the Allen key provided, the five grub screws on the underdeck mechanism should be loosened to allow the underdeck control assembly to be removed. The outer tube can now be positioned through the centre hole. The searchlight base can now be securely fixed as stated above.

Upon installation, re-assemble the underdeck control mechanism ensuring the grub screws are secure and the mechanism operates correctly.

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 should be used for indication purposes only:

Searchlight	12v 150w	24v 150w
Cable Size (mm ²)	Distance Max	Distance Max
6.0	5 MTRS	20 MTRS
10.0	8 MTRS	34 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 - 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 positioned using the elevation and base plate lockwheels. When in the desired position the lockwheels should be securely fastened to prevent damage.

The beam of the searchlight can be adjusted to give a variety of beam types. Using the remote focus switch on the control 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 switch at the desired position.

Please note that a heater is fitted in the searchlight and is hardwired so that it is permanently on. The heater specified on this equipment is self-regulating and will shut off when the dew point temperature is reached. It should be noted that the power to the searchlight must be left on to allow the heating element to function correctly.

The searchlight is also fitted with an IP66 drainage plug to allow for efficient water drainage should any ingress occur. The breather at the rear of the searchlight ensures a steady airflow to prevent any vacuum forming within the barrel.

After use the searchlight should be returned to the horizontal position in order that a level plane is provided to allow for any water drainage.

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 sleeve must be retained for re-use. Whenever removing a lamp, the protective sleeve 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.

Please refer to the following table for the trouble-shooting of Xenon lamps.

Fault	Cause	Remedy
<ul style="list-style-type: none"> ■ Wrong Polarity 	<ul style="list-style-type: none"> ■ Lamp incorrectly fitted ■ Faulty wiring 	<ul style="list-style-type: none"> ■ Anode (large electrode) must always be on top in vertical burning position ■ Check polarity, transpose connections if necessary
<ul style="list-style-type: none"> ■ Cap overheated ■ Cap temperature above 230°C 	<ul style="list-style-type: none"> ■ Faulty contacts ■ Cooling equipment defective 	<ul style="list-style-type: none"> ■ Check terminals, tighten or renew ■ Check cooling equipment and replace if necessary
<ul style="list-style-type: none"> ■ Arc unsteady 	<ul style="list-style-type: none"> ■ Lamp operated outside current control range ■ Magnetic stabilisation for horizontal operation defective 	<ul style="list-style-type: none"> ■ Correct current setting ■ Check magnetic stabilisation
<ul style="list-style-type: none"> ■ Bulb draws in air 	<ul style="list-style-type: none"> ■ Crack in graded seal caused by overheated cap ■ Maximum cap temperature 230°C 	<ul style="list-style-type: none"> ■ Check terminals - tighten or renew
<ul style="list-style-type: none"> ■ Glass erosion on fused quartz bulb 	<ul style="list-style-type: none"> ■ Lamp operated outside current control range ■ Lamp service life exceeded 	<ul style="list-style-type: none"> ■ Correct current setting ■ Check meter
<ul style="list-style-type: none"> ■ Electrodes damaged ■ Premature blackening 	<ul style="list-style-type: none"> ■ Current ripple too high ■ Auxiliary mirror incorrectly adjusted 	<ul style="list-style-type: none"> ■ Have power supply inspected ■ Adjust auxiliary mirror
<ul style="list-style-type: none"> ■ Asymmetrical blackening of lamp (in horizontal burning position) 	<ul style="list-style-type: none"> ■ Lamp operated too long in same position 	<ul style="list-style-type: none"> ■ Turn lamp through 180° after half service life

Failure of Lamp to ignite

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

- 1) Check that the supply is connected to the input of the PSU and check all connections as per the wiring diagram. On operation if the lamp does not light, switch off supply and check all fuses;
- 2) Check the searchlight head. On your command get an operator to switch on the light 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. Remove the front and rear bezels 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 front and rear bezels, ensuring the swing bolts are securely fastened, and perform the check again, listening for the cracking. If the lamp still fails to ignite, switch off at the supply and replace the lamp in accordance with the safety procedures within the 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 25,000 volts or higher). Switching the lamp on activates the ignitor. A cracking or hissing noise should be heard. The ignitor is housed within the rear of the searchlight barrel. 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 rear bulkhead assembly within the searchlight barrel. If the focus of the light fails, the following procedure should be adopted:

- 1) Remove the rear bezel from the searchlight barrel and examine focus mechanism. If parts have become loose, tighten fasteners. The mechanism operates on a cam 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 multimeter 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, there is a fault on the control panel (check all terminations are secure) or with the supply. This should be examined and rectified accordingly.

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;
 - Clean the reflector if required;
 - Ensure that the lampholder 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 the manufacturer who will be able to advise the best course of action for your product.

Notes for Lamp Fitting/Removal for FX230 150w Xenon

To fit lamp:

- Remove lamp from packaging, ensuring protective jacket is still in place;
- Remove front and rear bezels from searchlight by unfastening the swing bolts. Care should be taken when removing the rear bezel assembly so that no damage to the PSU is incurred;
- Now remove the spill rings from the front of the searchlight by removing the clips;
- Place the lamp extender onto the negative (-) end of the lamp, place the lamp through the lampholder HT/reflector boss and secure with T-bar at rear;
- Place the HT lead (red) over the front of the lamp (positive) and secure in position using the lamp heatsink;
- Now screw the Tufnol insulator into the lamp heatsink and ensure that the HT lead is tightly secured to prevent any arcing;
- Place the PTFE bush over the insulator and fix mechanism in position by pushing the retaining clip through the insulator;
- Replace the spill rings in front of barrel and fix in position with clips;
- Replace front and rear bezel assemblies and fasten down swing bolts securely, ensuring bezels are central to barrel and a good seal is achieved;
- Reverse this procedure for lamp removal.

Note: The protective lamp jacket must be removed prior to lamp strike. Retain jacket for future use.

9 – General Assembly and Wiring Diagrams

Drawing Number	Description
X4182	FX230 Deck General Assembly
X4152	FX230 Cabin General Assembly
X4200	Wiring Diagram
X4194	Cabin Control Panel Cut-out
X4193	Control Panel Wiring
	Control Panel

DATE 10.24.86	16
AS FIRST DRAWN (EC0524)	15
LENGTH 140 U.S.	14
ITEM 7 ADDED (EC0875)	13
BROUGHT IN-LINE WITH DETAIL (CP-123)	12
	11
	10
	9
	8
	7
	6
	5
	4
	3
	2
	1

IS INSTRUCTIONS DETAILS

1 AS FIRST DRAWN (EC0524)

2 LENGTH 140 U.S.

3 ITEM 7 ADDED (EC0875)

4 BROUGHT IN-LINE WITH DETAIL (CP-123)

STANDARD PRACTICE
Detail as cut / finished unless
Break corner R0.25(Min) U.O.S.

© 1994 A1 CONT. ON SHEET
PART No. (REV. No.)
A2433/X4152 1

FRANCIS SEARCHLIGHTS LIMITED UNION ROAD . BOLTON . BL2 2HU
DESCRIPTION FX230C 24v 150W

FINISH MATERIAL

Send Centre to ISO 8000 C70
DIN Scaling to ISO 8000 C78
Hide centres & points ±

DATE 14.10.94 TOLERANCES
SCALE 1:2
General ±
Angular ±

ALL DIMENSIONS IN MILLIMETRES

FIRST USED ON

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

0 10 20 30 40 50mm

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

A B C D E F G H J K

(283)

(516)

(841)

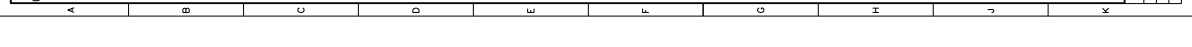
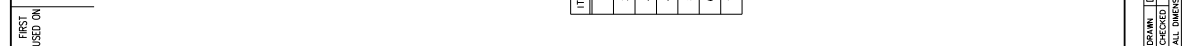
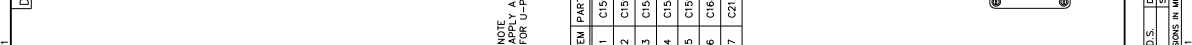
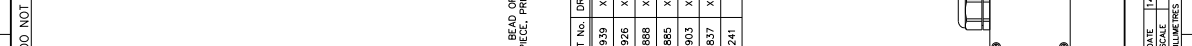
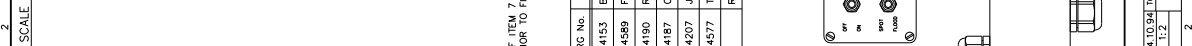
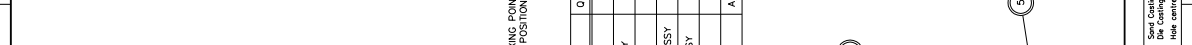
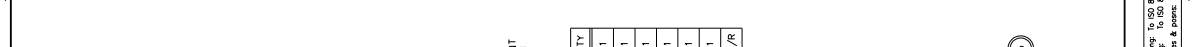
1 2 3 4 5 6 7

8 9 10 11 12 13 14 15 16

A B C D E F G H J K

NOTE: APPLY A BEAD OF ITEM 7 TO SIDEPLATE FIXING POINT FOR U-PIECE, PRIOR TO FIXING U-PIECE IN POSITION

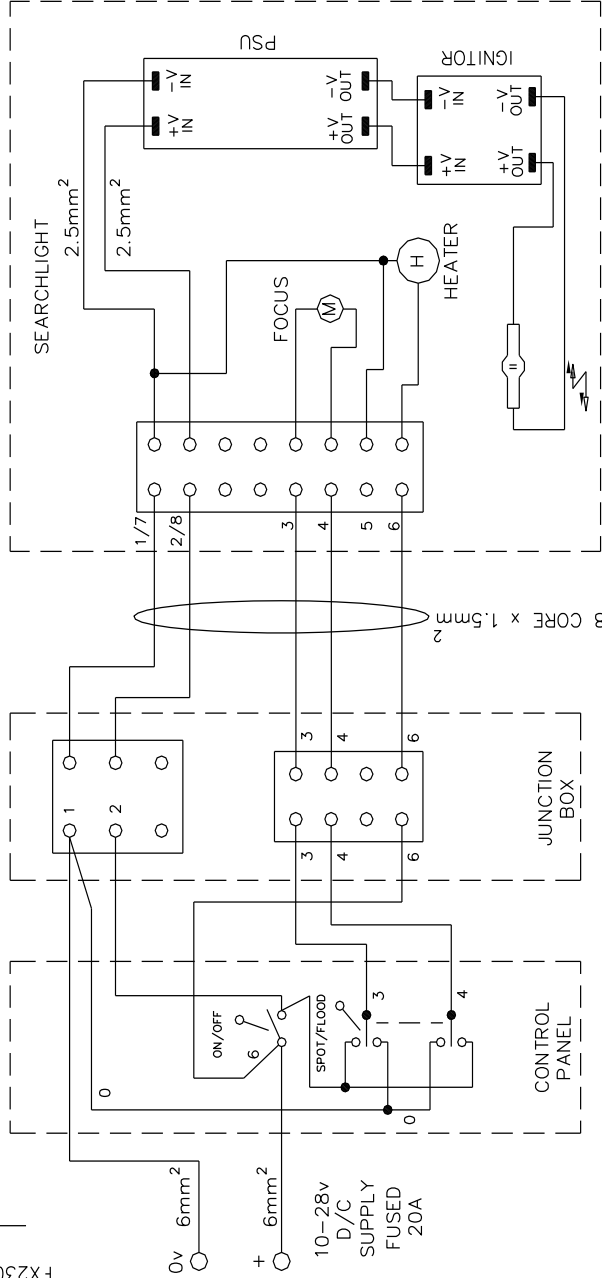
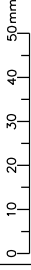
ITEM	PART No.	DRG No.	DESCRIPTION	QTY
1	C15939	X4153	BARREL ASSY	1
2	C15926	X4589	FRONT BEZEL ASSY	1
3	C15888	X4190	REAR BEZEL ASSY	1
4	C15885	X4187	CONTROL PANEL ASSY	1
5	C15903	X4207	JUNCTION BOX ASSY	1
6	C16837	X4577	TRAINER MOUNT	1
7	C21241		RETAINER	A/R



FIRST USED ON
FX230 CABIN

DO NOT SCALE DRAWING

THIRD ANGLE PROJ



* A MINIMUM OF 11v MUST BE PRESENT AT THE SUPPLY CONDUCTORS IN THE JUNCTION BOX WHEN THE SEARCHLIGHT IS RUNNING. SUPPLY CABLES MUST BE SIZED ACCORDING.
6mm² SHOULD BE REGARDED AS A MINIMUM.
REVERSED POLARITY CAN SERIOUSLY DAMAGE THIS EQUIPMENT, DOUBLE CHECK ALL CONNECTIONS.

ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	12.94 D.S.
2	24 VDC SUPPLY MODULE ADDED	12.95 SJJ
3	24 VDC SUPPLY MODULE REMOVED HALF/STROBE REMOVED (EC0524)	10.96 D.S.
4	HEATER REMOVED (EC0563)	6.97 D.S.
5	HEATER ADDED. (EC0892)	02.01 SJJ
6	12 WAY WAS 10 TO MAKE EACH SUPPLY CABLE 6mm CABLE No. CHANGED (EC1119)	3.06 D.S.
7	8 CORE CABLE WAS 12 CORE. CABLE No CHANGED (EC1325)	9.06 LW

STANDARD PRACTICE
Deburr all cut/machined edges
Break corners R0.25(Max) U.O.S.
TOLERANCES U.O.S: -
General: ±
Angular: ±
Hole centres & posns: ±
Sand Casting: To ISO 8062 CT10
Die Casting: To ISO 8062 CT18

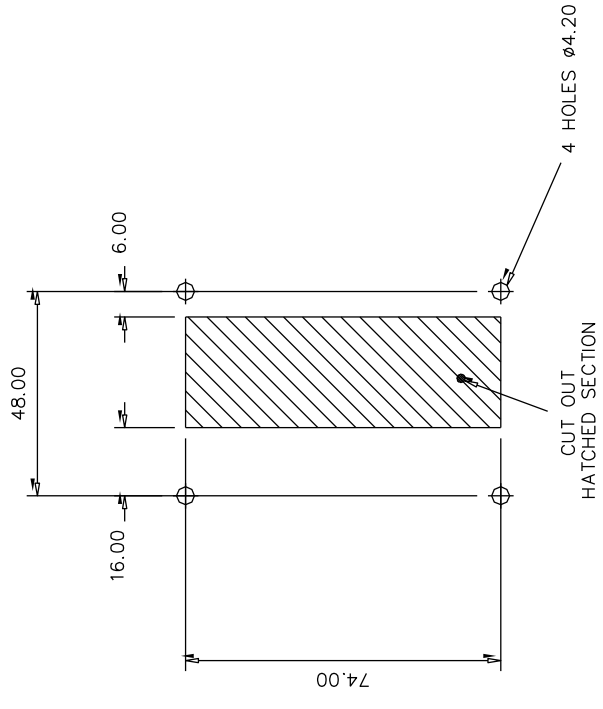
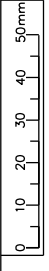


FRANCIS SEARCHLIGHTS LIMITED, UNION ROAD, BOLTON, BL2 2HJ		© 1994	A3	CONT ON SHEET
DRAWN	D.S.	DATE	13.12.94	MATERIAL
CHECKED	SCALE	FINISH		
ALL DIMENSIONS IN MILLIMETRES				DESCRIPTION
PART No./DRG No.				WIRING DIAGRAM
SHT				X4200 1

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FX230 CABIN

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THIRD ANGLE



ISSUE No	MODIFICATION DETAILS	DATE & INITIALS
1	AS FIRST DRAWN	30.11.94 D.S.
2	NEW PANEL (EC0524)	7.10.96 D.S.

STANDARD PRACTICE
 Deburr Completely all Cut or Machined Edges
 Break all Corners R0.25(MAX) unless stated.

UNLESS OTHERWISE STATED: -
 Threads are to be ISO Metric COARSE Pitch
 TOLERANCE on drilled holes $\pm 1\%$ or ± 0.05 whichever is greater
 TOLERANCE on Machined Dimensions ± 0.25
 TOLERANCE on Hole Centres ± 0.25
 TOLERANCE on Formed Dimensions ± 0.50
 TOLERANCE on Cast Dimensions ± 0.50
 IMPERIAL Dimensions in (brackets) are to be used as Secondary Alternatives.

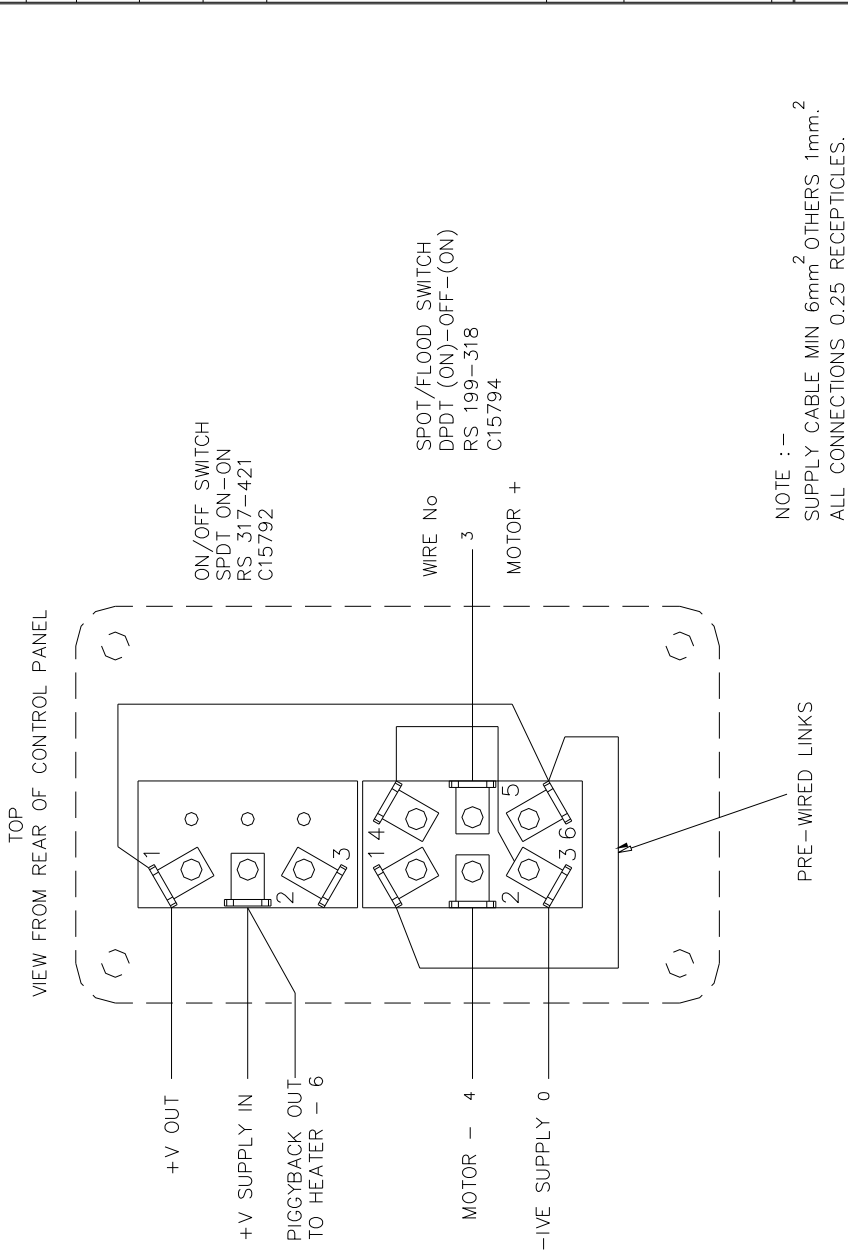
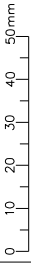
Francis
 SEARCHLIGHTS

FRANCIS SEARCHLIGHTS (1990) LIMITED, UNION ROAD, BOLTON, BL2 2HJ © 1994		A3	
DRAWN	D.S.	DATE	30.11.94
CHECKED		SCALE	1:1
ALL DIMENSIONS IN MILLIMETRES			
PART No./DRG. No.		X4194	
DESCRIPTION		CONTROL PANEL CUTOUT	
FINISH			
MATERIAL			
SHT		1	

FIRST USED ON
FX230

DO NOT SCALE DRAWING

THIRD ANGLE PROJ

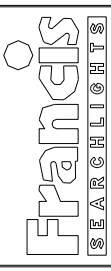


ISS No	MODIFICATION DETAILS	DATE & INIT'S
1	AS FIRST DRAWN	11.94 D.S.
2	DRAWING REVISED	12.95 SUJ
3	HALF/STROBE REMOVED (EC0524)	10.96 D.S.
4	CONNECTION TO HEATER ADDED. (EC0892)	02.01 SUJ
5	CABLE No.s CHANGED (EC1119)	3.06 D.S.
6	CABLE No.s CHANGED (EC1325)	6.09 LW

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

TOLERANCES U.O.S. :-
General: ±
Angular: ±
Hole centres & posits: ±

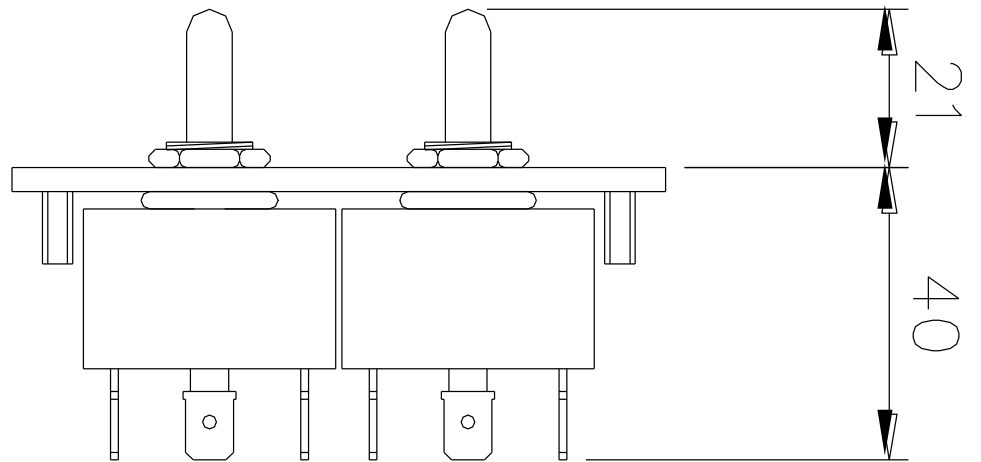
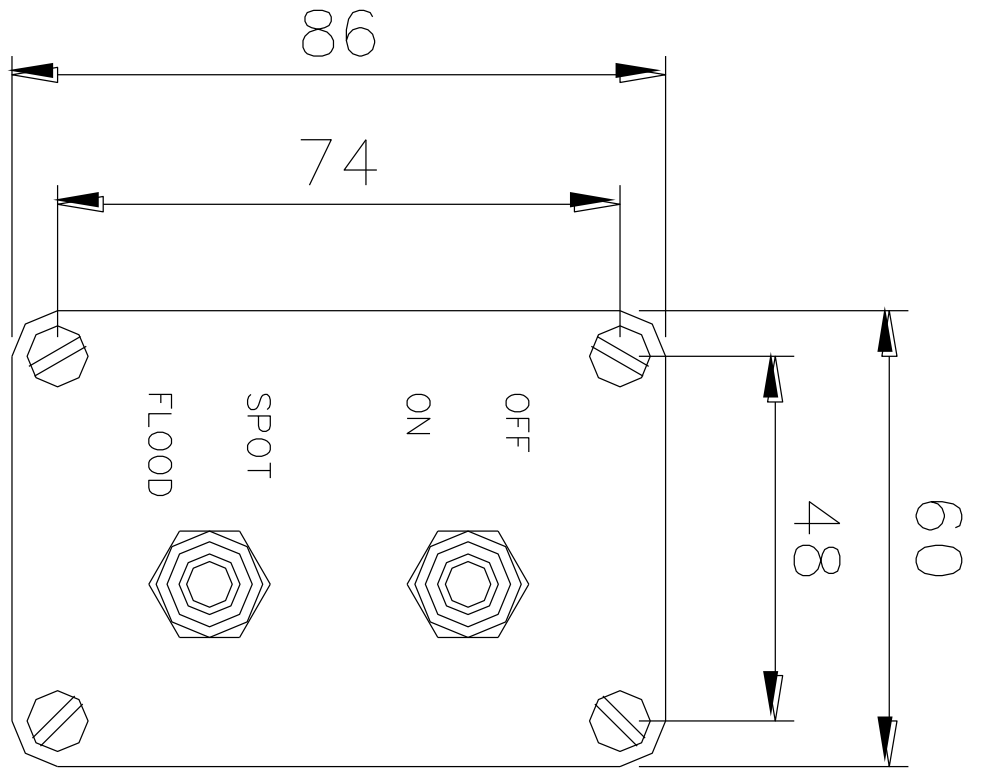
Sand Casting: To ISO 8062 CT10
Die Casting: To ISO 8062 CT8



1994	A3	CONT ON SHEET
PART No./DRG No.		X4193
DESCRIPTION		CONTROL PANEL WIRING
FINISH		
MATERIAL		
DRAWN	D.S.	DATE 30.11.94
CHECKED		SCALE
ALL DIMENSIONS IN MILLIMETRES		
SHT		1

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

M4 FIXINGS



10 – Spare Parts List

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

Part Number	Description
D8151	150w Xenon Lamp
C15885-01	Control Panel Assembly
C08865-00	Front glass
C08835-00	Front glass gasket
C16410-00	Motor - Remote Focus
C16592-00	Ignitor
C16596-00	150w Xenon PSU
C22268-01	Breather Assembly
C15929-00	Reflector
F4906	Quick Release Filter unit
C15903-01	Junction Box Assembly
C15866-01	Lampholder H.T.
C15299-18	Lamp Connector
C14230-00	Retaining Pin

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.