IMPORTANT!!!

PLEASE TAKE THE TIME TO FILL OUT THIS FORM COMPLETELY. FILE IT IN A SAFE PLACE. IN THE EVENT YOU EXPERIENCE PROBLEMS WITH OR HAVE QUESTIONS CONCERNING YOUR CONTROLLER, THE FOLLOWING INFORMATION IS NECESSARY TO OBTAIN PROPER SERVICE AND PARTS.

MODEL # AAOXFRM230V1SL

SERIAL #

PURCHASE DATE

PURCHASED FROM
TABLE OF CONTENTS

GENERAL INFORMATION ........................................................................................................ 1

INSTALLATION INSTRUCTIONS .......................................................................................... 2

MAINTENANCE GUIDE ........................................................................................................ 5

THEORY OF OPERATIONS .................................................................................................. 6

MAJOR COMPONENTS PARTS LIST ................................................................................... 7

SUGGESTED SPARE PARTS LIST ....................................................................................... 8

WARRANTY & RETURN POLICY

RETURN MERCHANDISE AUTHORIZATION (RMA) FORM
APPENDIX

1.0 CHASSIS LAYOUT ........................................................................................................1232-R
2.0 CHASSIS SCHEMATIC .................................................................................................1232-S
3.0 TOWER LIGHTING KIT 147’ TO 295’ ........................................................................T1237
4.0 PHOTOCCELL HOUSING DETAIL ..............................................................................100239
5.0 L-810 OL-1 SINGLE OBSTRUCTION LIGHT DETAIL ......................................... FM10018
6.0 L-810 OL-1 SINGLE OBSTRUCTION LIGHT ASSEMBLY DETAIL ................. 279-OL
7.0 L-810 OL-2 DOUBLE OBSTRUCTION LIGHT DETAIL ......................................... FM10020
8.0 L-810 OL-2 DOUBLE OBSTRUCTION LIGHT ASSEMBLY DETAIL ...................... 310
9.0 L-810 OL-1 WIRING DETAIL ............................................................................... 274-S
10.0 JUNCTION AND STRAIN RELIEF BOXES .............................................................. 100089
GENERAL INFORMATION

TWR Lighting, Inc.’s Model AAOXFRM230V1SL Controller is for application of AA0 lighting of towers 147’ to 295’ above ground level (AGL) in accordance with the Federal Advisory Circular 70/7460-1K with safety and reliability in mind. TWR welcomes you to our family of fine products and we look forward to servicing your needs now and in the future.

Two (2) L-810 double obstruction light fixtures will be at the top of the structure and one (1) level of sidelights at the mid-level with respect to the overall tower height.

The first double obstruction light will burn steady. When a lamp failure occurs, it will transfer power to the secondary double obstruction light, and the first double obstruction light will shut down. Each fixture requires two (2) 116 Watt 230V AC bulbs (116A21TS230V).

A by-pass switch (SW1) allows the controller to turn on during daylight hours without covering the photocell.

The photocell is the 3 blade, twist to lock type.

Power supplied to the controller should be 230V AC 50 Hz.

Controller functions that are monitored by remote alarms in the form of dry contact closures are as follows:

FIRST DOUBLE OBSTRUCTION LIGHTS
Will give an alarm when one (1) of the two (2) lamps fails, and the secondary double obstruction light will activate.

NOTE – The second double obstruction light will **not** be monitored.

SIDELIGHT LEVEL
Will give an alarm when one (1) of the three (3) lamps fails.
1.0 MONTING THE CONTROL CABINET
(Refer to Drawing 1232-R)

1.1 The power supply control cabinet can be located at the base of the structure, or in an equipment building. Mounting footprints are shown on Drawing 1232-R. Power wiring to the control cabinet should be in accordance with local methods and the National Electric Code (NEC).

1.1.1 If the control cabinet is mounted inside an equipment building, the photocell should be mounted vertically on ½" conduit outside the building above the eves facing north. Wiring the photocell socket to the control cabinet should consist of one (1) each: red, black and white wires. The white wire is connected to the socket terminal marked “N.” The black wire is connected to the terminal marked “L,” and the red wire is connected to the socket terminal marked “LO.” As above, the photocell shall be positioned so that it does not “see” ambient light, which would prevent it from switching to the nightmode.

1.1.2 If the control cabinet is mounted outside an equipment building, the photocell should be mounted vertically on ½” conduit so the photocell is above the control cabinet. Care must be taken to assure that the photocell does not “see” any ambient light that would prevent it from switching into nightmode. The photocell wiring is the same as in 1.1.1.

1.2 The wiring from the photocell, the service breaker, and the sidelights should enter the control cabinet through the water tight connectors in the bottom of the cabinet. Inside the cabinet, the connections will be made on the terminal strip and breakers located at the bottom of the chassis. These connections are made as follows:
INSTALLATION INSTRUCTIONS

2.0 EXTERNAL PHOTOCELL WIRING
(Refer to Drawing 1232-R)

2.1 Connect the BLACK wire from the photocell to terminal block (TB2) marked “L.”

2.2 Connect the RED wire from the photocell to terminal block (TB2) marked “SSR.”

2.3 Connect the WHITE wire from the photocell to terminal block (TB2) marked “N.”

3.0 POWER WIRING
(Refer to Drawing 1232-R)

3.1 Power wiring to the control cabinet should be in accordance with local methods and the NEC.

3.2 Circuit breaker needs to be rated at 5 amps.

3.3 Connect incoming 230V AC “HOT” to terminal block (TB1) marked “L.”

3.4 Connect neutral to one (1) of the terminal blocks (TB1) marked “N.”

3.5 Connect the AC ground to the grounding lug on plate.

4.0 1st and 2nd DOUBLE OBSTRUCTION LIGHT WIRING
(Refer to Drawing 1232-R)

4.1 Connect the BLACK wire from the first OL-2 fixture to the circuit breaker marked “S1.”

4.2 Connect the BLACK wire from the second OL-2 fixture to the circuit breaker marked "S2."

4.3 Connect the BLACK wire from the three (3) mid-level OL-1 fixtures to the circuit breaker marked “SL.”

4.4 Connect the NEUTRAL wires to one (1) of the terminal blocks on (TB1) marked “N.”
5.0 1st DOUBLE OBSTRUCTION AND MID-LEVEL SIDELIGHTS ALARM WIRING
(Refer to Drawings 1232-R and 1232-S)

5.1 Dry contacts are provided for alarm monitoring of the 1st OL-2 fixture and mid-level sidelights. Alarm will occur in the event of one (1) lamp failure. The contact points for these fixtures can be found on Modules M1, and M2.

5.2 Alarm Wiring: To utilize the dry contacts, the customer will need two (2) pair of wires to interface with the alarm device. One (1) wire (common) for each of the two (2) pair will terminate on Module M1, terminal T4, of each of the modules. The remaining wire for each pair will terminate as follows:

5.2.1 1st OL-2 Alarm – Connect to Module M1, terminal T5, for normally open operations or terminal T6, for normally closed operations.

5.2.2 Mid-Level Sidelight Alarm – Connect to Module M2, terminal T5, for normally open operations, or terminal T6, for normally closed operations.

5.3 Alarm Testing: To test alarm, follow the procedures using an “OHM” meter between alarm common and alarm points.

5.3.1 1st OL-2 fixture – Turn on switch SW1, or cover the photocell. Trip breakers S1, and S2, on the controller panel. A delay of a couple of seconds will be noticed from the time of failure until the alarm pulls in as well as transfer occurs. At this time the standby condition red indicator on Modules M1, and M2 will be illuminated, along with a change in status on the alarm contacts.
6.0 RED OBSTRUCTION LIGHTING

The only required maintenance needed to be performed is replacements of the lamps in the L-810 fixture. Lamps should be replaced after being operated for not more than 75% of the rated life, or immediately upon failure as per Federal Aviation Advisory Circular 70/7460-1K. By following these instructions, maximum safety and performance can be achieved.

TOOLS REQUIRED: NONE

6.1 L-810 LAMP REPLACEMENT

6.1.1 Unclasp the two (2) latches and allow the bail to recline backward.

6.1.2 Lift the lens up and over the lamp letting the lens hang from the safety cable.

6.1.3 Unscrew the lamp counter – clockwise and remove.

6.1.4 Install the new lamp by screwing the lamp clockwise.

6.1.5 Reinstall the lens making sure it is seated properly on the base.

6.1.6 Reclasp the two (2) latches.

6.2 CONTROLLER

No scheduled maintenance is required. Perform on an as needed basis only.

6.3 PHOTOCELL

The photocell is a sealed unit. No maintenance is needed or required, other than replacement as needed.
THEORY OF OPERATION

7.0 POWER SUPPLY

230V AC enters the controller from the service breaker panel. Line sits at the 102FAA photocell waiting to be switched. When the 102FAA photocell is activated, line (SSR) energizes the rest of the controller. This can also be accomplished by using the photocell by-pass switch (SW1).

7.1 1st OBSTRUCTION LIGHTS – OL2

Line (SSR) is sent to Modules M1, and M2, and to relay K1, then to the breakers S1, S2, and S3, and then on to the lamps. If the one (1) lamp from the OL2 extinguishes, then the transfer to the second OL2 will occur on that particular circuit as will a change in state on the alarm contacts.
## MAJOR COMPONENTS PARTS LIST

<table>
<thead>
<tr>
<th>QTY</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>102FAA</td>
<td>120 – 230V PHOTOCELL</td>
</tr>
<tr>
<td>1</td>
<td>SCR630T</td>
<td>SIDELIGHT BURNOUT DETECTOR</td>
</tr>
<tr>
<td>1</td>
<td>VJ1008HWPL1X004</td>
<td>ENCLOSURE</td>
</tr>
<tr>
<td>7</td>
<td>8WA1204</td>
<td>TERMINAL BLOCK (TB1), (TB2)</td>
</tr>
<tr>
<td>2</td>
<td>S261D2</td>
<td>2 amp BREAKER</td>
</tr>
<tr>
<td>2</td>
<td>8W1808</td>
<td>END SECTION</td>
</tr>
<tr>
<td>1</td>
<td>SSPIGTAIL</td>
<td>20' PHOTOCELL SOCKET PIGTAIL</td>
</tr>
<tr>
<td>2</td>
<td>MOV1V250</td>
<td>METAL OXIDE VARITOR</td>
</tr>
<tr>
<td>1</td>
<td>S261D3</td>
<td>3 amp BREAKER</td>
</tr>
<tr>
<td>QTY</td>
<td>PART NUMBER</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>-----</td>
<td>-------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>1</td>
<td>102 FAA</td>
<td>120 – 230V PHOTOCCELL</td>
</tr>
<tr>
<td>1</td>
<td>SCR 630T</td>
<td>SIDELIGHT BURNOUT DETECTOR</td>
</tr>
<tr>
<td>1</td>
<td>S261D2</td>
<td>2 amp BREAKER</td>
</tr>
<tr>
<td>1</td>
<td>S261D3</td>
<td>3 amp BREAKER</td>
</tr>
</tbody>
</table>
RETURN MATERIAL AUTHORIZATION (RMA) FORM

RGA#: ___________________________ DATE: ___________________________

CUSTOMER: _______________________________________________________
____________________________________________________________________

CONTACT: ____________________ PHONE NO.: _________________________

ITEM DESCRIPTION (PART NO.): ______________________________________
____________________________________________________________________

MODEL NO.: ____________________ SERIAL NO.: _______________________

ORIGINAL TWR INVOICE NO.: __________ DATED: ___________________

DESCRIPTION OF PROBLEM: _________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

SIGNED __________________________ DATE NEEDED ___________________

RETURN ADDRESS: ____________________________________________________
____________________________________________________________________

PLEASE RETURN PRODUCT TO: 4300 WINDFERN RD #100 HOUSTON TX 77041-8943
RETURN MATERIAL AUTHORIZATION (RMA) FORM

RGA#: __________________________ DATE: __________________________

CUSTOMER: ______________________________________________________

____________________________________________________________________

CONTACT: ______________________ PHONE NO.: ______________________

ITEM DESCRIPTION (PART NO.): ______________________________________

____________________________________________________________________

MODEL NO.: ______________ SERIAL NO.: _____________________________

ORIGINAL TWR INVOICE NO.: ______________________ DATED: __________

DESCRIPTION OF PROBLEM: _________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

SIGNED ______________________ DATE NEEDED ______________________

RETURN ADDRESS: _________________________________________________

PLEASE RETURN PRODUCT TO: 4300 WINDFERN RD #100 HOUSTON TX 77041-8943
NOTES:

1. PLUG 102 FAA PHOTOCELL INTO 43109 TWIST LOCK RECEPTACLE AND TWIST TO LOCK.
2. WIRES ARE CONNECTED LETTER TO LETTER. (EXAMPLE) S1 TO S1...
NOTES:

1. Item #7 can be used to reduce 3/4" conduit to 1/2" conduit at the housing or at the controller itself.

2. If additional wire is required over the factory 20', use the following chart:
   - 21' to 300' - 16 AWG TFFN
   - 301' to 500' - 14 AWG TFFN
For use as an obstruction light on towers, building, bridges, cooling towers. Meets or exceeds all FAA specs as found in AC 150/5345-43 Type L-810.

Our most popular light. The side hub allows for a straight run of conduit from the junction box for hook up.

High temperature, ultra pure FAA approved Aviation red, blue, yellow, or clear glass fresnel lens.

Copper free aluminum casting and all stainless steel latches and hardware for corrosion protection.

Can be used steady burning or flashing.

Neoprene gasket for weatherproofing.

Specify conduit size
3/4", 1", 1-1/4" NPT
(19.055mm), (25.407mm), (31.756mm)

No special tools required for maintenance.

General Specifications
Height 7.5 inches (19.055 cm)
Weight 3 lbs (13605.442g)
Power 120, 230, or 240 volts AC
Uses 116W, 120V or 240V bulbs
Bulbs sold separately
NOTE:
1. FAA APPROVED LIGHT USES THE 116A2TS LAMP. OTHER LAMPS ARE AVAILABLE TO MEET YOUR APPLICATION.
For use as an obstruction light on towers, buildings, etc. ETL approved to meet or exceed all FAA specifications as found in AC 150/5345-43 Type L-810.

When used with our AOXFR controller, when one bulb burns out, the unit automatically switches to backup bulb.

High temperature ultra pure FAA approved aviation red, blue yellow and clear lenses.

High quality porcelain receptacle.

Neoprene gaskets for weatherproofing.

Stainless steel safety cable.

Stainless steel latches and hardware for corrosion protection.

Standard 3/4” NPT

General Specifications

Height 7 inches (38.1 cm)
Weight 10 lbs. (4.5 kg)
Power 120 to 240V AC, 50 or 60Hz
Uses 116W, 120 or 240V bulbs
Bulbs sold separately

TWR Lighting, Inc.
4300 Windfern Rd. #100
Houston, TX., 77041-8943
Phone: (713)973-6905
Fax: (713)973-9352
WEB SITE: http://www.twrlighting.com
©2003 TWR Lighting, Inc.
### Assembly Detail (Part # OL2)

**3/4" OL-2 SIDELIGHT**

<table>
<thead>
<tr>
<th>ITEM NO</th>
<th>QTY</th>
<th>TWR PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>AP35222</td>
<td>RED SIDELIGHT GLASS</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>OL2C</td>
<td>DOUBLE SIDELIGHT BODY</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>106C</td>
<td>LENS HOLDER RING</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>12V245</td>
<td>OIL LENS CUP</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>832X14PH</td>
<td>8-32 X 1/4&quot; PH S.S. SLOT</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>HC255SS</td>
<td>SIDELIGHT LATCHES</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>7X75S</td>
<td>1/16&quot; 7 X 7 S.S. WIRE</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>A1A</td>
<td>STAKON CRIMP</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>OL2G</td>
<td>OIL GASKET</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>19062</td>
<td>SIDELIGHT RECEPTACLE</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>100324</td>
<td>OL2 SERIAL NUMBER LABEL</td>
</tr>
<tr>
<td>12</td>
<td>8</td>
<td>&quot;5RPRSS</td>
<td>1/8&quot; POP RIVETS</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>A314</td>
<td>3/4&quot; CONDUIT LOCKNUT</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td>104C</td>
<td>WHITE Teflon WASHER</td>
</tr>
<tr>
<td>15</td>
<td>4</td>
<td>832X34PH</td>
<td>8-32 X 3/4&quot; S.S. PH SLOT</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>&quot;116A21TS</td>
<td>116W-120V LAMP (Typ.)</td>
</tr>
</tbody>
</table>

**NOTE:**
- FAA APPROVED LIGHT USES THE 116A21TS LAMP. OTHER LAMPS ARE AVAILABLE TO MEET YOUR APPLICATION.

---

**TWR Lighting, Inc.**

Enlightened Technology

11/08/96 (A) REVISED ITEM #15, #16

DATE: LTR: REVISION
**NOTES:**

1) DRAWING ILLUSTRATES METHOD OF STRAIN RELIEVING WIRE. USE THIS METHOD ON ALL JUNCTION BOXES.

2) THE NATIONAL ELECTRICAL CODE—ARTICLE 300–19–83 REQUIRES CONDUCTORS IN A VERTICAL CONDUIT BE SUPPORTED TO RELIEVE STRAIN ON TERMINAL BLOCK CONNECTIONS.

3) SKETCH ILLUSTRATES METHOD OF STRAIN RELIEVING A SINGLE CONDUCTOR. SEVERAL CONDUCTORS MAY BE GROUPED TOGETHER.

4) CONDUCTORS MAY BE MIXED BUT SHOULD NOT TAKE UP MORE THAN 40% OF CONDUIT’S INSIDE AREA.

<table>
<thead>
<tr>
<th>AWG</th>
<th>MAX. NUMBER WIRE SIZE</th>
<th>MAX. NUMBER WIRE SIZE IN 3/4&quot; CONDUIT</th>
<th>MAX. NUMBER WIRE SIZE IN 1&quot; CONDUIT</th>
<th>WIRE AREA SQ. INCHES</th>
<th>WEIGHT PER 100 FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 THHN</td>
<td>16</td>
<td>26</td>
<td>0.0117</td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td>10 THHN</td>
<td>10</td>
<td>17</td>
<td>0.0184</td>
<td>4.10</td>
<td></td>
</tr>
<tr>
<td>8 THHN</td>
<td>6</td>
<td>9</td>
<td>0.0373</td>
<td>6.70</td>
<td></td>
</tr>
<tr>
<td>6 THHN</td>
<td>4</td>
<td>7</td>
<td>0.0519</td>
<td>10.30</td>
<td></td>
</tr>
<tr>
<td>4 THHN</td>
<td>2</td>
<td>4</td>
<td>0.0845</td>
<td>16.20</td>
<td></td>
</tr>
</tbody>
</table>