IMPORTANT!!!!

PLEASE TAKE THE TIME TO FILL OUT THE FORM COMPLETELY. FILE 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 #  CIP400TWR Controller

SERIAL #

PURCHASE DATE

PURCHASED FROM
MEDIUM INTENSITY LED
MODEL CIP400TWR

VOCABULARY

Base = the foot of the light fixture used for mounting and in which the internal is fitted and the lens/dome is placed on
CIP400 = Communication & Interface Processor for L450 OR L550 medium and low Intensity lights
CIPSF = Communication & Interface Processor Synchronized Flasher
Commissioning = check-up after installation, if correct, powering up to look for correct operation
Enclosure = box, cabinet
FAA = Federal Aviation Authority
Gasket = rubber seal
GPS020 = GPS synchronizer
ICAO = International Civil Aviation Organization
Junction box = box/enclosure to connect lights and other devices together
Latch = stainless steel clamp(s) that secure the lens/dome to the base
Light = complete light (= base + LED array + lens)
Sidelight = low intensity light, sometimes also called ‘marker light’
MLM26 = Marker Light Monitoring panel
PCB = Printed Circuit Board
RMA number = Return Material Authorization number
SLC = Strobeline cable
Station = low or medium intensity light or MLM26 etc
Strobocable-9 = connection cable with mains power and data wires
MEDIUM INTENSITY LED
MODEL CIP400TWR

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MEDIUM INTENSITY LED
MODEL CIP400TWR

NOTICE
This instruction manual provides information about installation, operation, and maintenance of the TWR Lighting, Inc. Aviation Obstacle Lights controller and their variations.

The manual has been written for installation, user and first line maintenance personnel.

For information about required adjustments or repair not instructed in this manual, please contact TWR Lighting, Inc.

TWR Lighting Inc. (for North, Central and South America)
c/o /TWR Lighting, Inc. Telephone: 713 973-6905
10810 W Little York Rd. #130 Fax: 713 973-9352
Houston, Texas Toll Free: 800 661-8606
77041-4051 USA E-mail: techsupport@twrlighting.com

The use of Non-original manufacturer parts which are not approved by TWR Lighting, Inc. may invalidate the warranty as well as compliance with requirements as published in the ICAO Annex 14 Volume 1 standards, FAA Advisory Circulars AC70/7460-1L, AC150/5345-43G and AC150/5345-53.

DISCLAIMER
While every effort has been made to provide a complete, up-to-date, accurate manual, no liability claims for damages resulting from any errors or omissions in this manual will be accepted by TWR Lighting, Inc.

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All rights reserved. Reproduction or use of any part of this installation & operation manual is prohibited without express written permission from TWR Lighting, Inc.
TRADEMARK ACKNOWLEDGEMENTS

TWR Lighting, Inc. ® is registered trademark name and property of TWR Lighting, Inc. and is recognized and acknowledged as such by TWR Lighting, Inc.

THE SUPPLIER

This equipment has been manufactured and sold to you by TWR Lighting, Inc.

**WARNING!**

The **WARNING!** sign denotes a hazard. It calls attention to a procedure or practices which if not correctly performed or adhered to could result in injury or loss of life. Do not proceed beyond a **WARNING!** sign until the indicated conditions are fully understood.

**CAUTION!**

A **CAUTION!** sign denotes a hazard. It calls attention to a procedure or practices, which if not correctly performed or adhered to, could result in damage or destruction of part or of all the equipment. Do not proceed beyond a **CAUTION!** sign until the indicated conditions are fully understood and met.

**NOTE!**

A **NOTE!** sign denotes an important piece of information to keep in mind.
Warranty & Return Policy

TWR Lighting®, Inc. ("TWR") warrants its products (other than “LED Product”) against defects in design, material (excluding incandescent bulbs) and workmanship for a period ending on the earlier of two (2) years from the date of shipment or one (1) year from the date of installation.

TWR Lighting®, Inc. ("TWR") warrants its “LED Product” against defects in design, material and workmanship for a period of five (5) years from the date of shipment. TWR®, at its sole option, will, itself, or through others, repair, replace or refund the purchase price paid for “LED Product” that TWR® verifies as being inoperable due to original design, material or workmanship. All warranty replacement “LED Product” is warranted only for the remainder of the original warranty of the “LED Product” replaced. Replacement “LED Product” will be equivalent in function, but not necessarily identical, to the replaced “LED Product.”

TWR Lighting®, Inc. ("TWR") warrants its “LED Product” against light degradation for a period of five (5) years from the date of installation. TWR®, at its sole option, will, itself, or through others, repair, replace or refund the purchase price paid for “LED Product” that TWR® verifies as failing to meet 75% of the minimum intensity requirements as defined in the FAA Advisory Circular 150/5345-43G dated 09/26/12. All warranty replacement “LED Product” is warranted only for the remainder of the original warranty of the “LED Product” replaced. Replacement “LED Product” will be equivalent in function, but not necessarily identical, to the replaced “LED Product.”

Replacement parts (other than “LED Product”) are warranted for 90 days from the date of shipment.

Conditions not covered by this Warranty, or which might void this Warranty are as follows:
- Improper Installation or Operation
- Misuse
- Abuse
- Unauthorized or Improper Repair or Alteration
- Accident or Negligence in Use, Storage, Transportation, or Handling
- Any Acts of God or Nature
- Non-OEM Parts

The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

Field Service – Repairs are warranted for 90 days from the date of service, except where TWR® has made recommendations that were not adhered to that may cause premature failure on previous repairs. Labor, Travel, and Tower Climb are not covered under warranty. Customer shall be obligated to pay for all incurred charges not related to warranty. All warranty repairs are performed by trained TWR® personnel, or dispatched through an extensive network of certified and insured Service Representatives.
Return Terms – You must first contact our Customer Service Department at 713-973-6905 to acquire a Return Merchandise Authorization (RMA) number in order to return the product(s). Please have the following information available when requesting an RMA number:
  x The contact name and phone number of the tower owner
  x The contact name and phone number of the contractor
  x The site name and number
  x The part number(s)
  x The serial number(s) (if any)
  x A description of the problem
  x The billing information
  x The Ship To address
This RMA number must be clearly visible on the outside of the box. If the RMA number is not clearly labeled on the outside of the box, your shipment will be refused. Please ensure the material you are returning is packaged carefully. The warranty is null and void if the product(s) are damaged in the return shipment.
All RMAs must be received by TWR LIGHTING®, INC., 10810 W LITTLE YORK RD. #130, HOUSTON TX 77041-4, within 30 days of issuance.
Upon full compliance with the Return Terms, TWR® will replace, repair and return, or credit product(s) returned by the customer. It is TWR®’s sole discretion to determine the disposition of the returned item(s).
Replacements – Replacement part(s) will be shipped and billed to the customer for product(s) considered as Warranty, pending return of defective product(s). When available, a certified reconditioned part is shipped as warranty replacement with a Return Merchandise Authorization (RMA) number attached. Upon receipt of returned product(s), inspection, testing, and evaluation will be performed to determine the cause of defect. The customer is then notified of the determination of the testing.
  x Product(s) that is deemed defective and/or unrepairable and covered under warranty - a credit will be issued to the customer’s account.
  x Product(s) found to have no defect will be subject to a $75.00 per hour testing charge (1 hour minimum), which will be invoiced to the customer. At this time the customer may decide to have the tested part(s) returned and is responsible for the return charges.
  x Product(s) under warranty, which the customer does not wish returned, the customer will be issued a credit against the replacement invoice.
Warranty & Return Policy

(continued)

**Repair & Return** – A Return Merchandise Authorization (RMA) will be issued for all part(s) returned to TWR® for repair. Upon receipt of returned product(s), inspection, testing and evaluation will be performed to determine the cause of defect. The customer is then notified of the determination of the testing. If the returned part(s) is deemed unrepairable, or the returned part(s) is found to have no defect, the customer will be subject to a **$75.00 per hour testing charge (1 hour minimum), which will be invoiced to the customer.** Should the returned parts be determined to be repairable, a written estimated cost of repair will be sent to the customer for their written approval prior to any work being performed. In order to have the tested part(s) repaired and/or returned, the customer must issue a purchase order and is responsible for the return shipping charges.

**Return to Stock** – Any order that is returned to TWR® for part(s) ordered incorrectly by the customer, or unneeded upon receipt, the customer is required to pay a **20% restocking fee.** A credit will be issued once it is determined that the Return Terms are met.

**Credits** – Credits are issued once it is determined that all of the Warranty and Return Terms are met. All credits are processed on Fridays. In the event a Friday falls on a Holiday, the credit will be issued on the following Friday.

**Freight** – All warranty replacement part(s) will be shipped via ground delivery and paid for by TWR®. Delivery other than ground is the responsibility of the customer.

**REMEDIES UNDER THIS WARRANTY ARE LIMITED TO PROVISIONS OF REPLACEMENT PARTS AND REPAIRS AS SPECIFICALLY PROVIDED. IN NO EVENT SHALL TWR® BE LIABLE FOR ANY OTHER LOSSES, DAMAGES, COSTS OR EXPENSES INCURRED BY THE CUSTOMER, INCLUDING, BUT NOT LIMITED TO, LOSS FROM FAILURE OF THE PRODUCT(S) TO OPERATE FOR ANY TIME, AND ALL OTHER DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING ALL PERSONAL INJURY OR PROPERTY DAMAGE DUE TO ALLEGED NEGLIGENCE, OR ANY OTHER LEGAL THEORY WHATSOEVER. THIS WARRANTY IS MADE BY TWR® EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, WITHOUT LIMITING THE GENERALITY OF THE FORGOING, TWR® MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS OF THE PRODUCT(S) FOR ANY PARTICULAR PURPOSE. TWR® EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES.**
RMA-Form

<table>
<thead>
<tr>
<th>TWR Lighting, Inc. reference RMA #</th>
<th>:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date (mm-dd-yyyy)</td>
<td>:</td>
</tr>
<tr>
<td>Number of pages</td>
<td>1 of</td>
</tr>
<tr>
<td>Customer name</td>
<td>:</td>
</tr>
<tr>
<td>Contact person</td>
<td>:</td>
</tr>
<tr>
<td>Delivery address</td>
<td>TWR Lighting, Inc., 10810 W Little York Rd. #130 Houston, Tx 77041</td>
</tr>
<tr>
<td>Department</td>
<td>Service</td>
</tr>
<tr>
<td>Telephone</td>
<td>(713) 973-6905</td>
</tr>
<tr>
<td>Fax</td>
<td>(713) 973-9352</td>
</tr>
</tbody>
</table>

Dear customer,

Please fill in this form completely and return it to the above mentioned fax number without indicating a RMA number. The RMA number will be immediately generated by us. Please complete the following questions. Use one sheet for each item that is returned.

Customer reference RMA nr. : 

Site location : 

Product type : 

Serial number : 

Reason for return delivery : 

Initial TWR Lighting, Inc. PO (order) number : 

Warranty claimed : Yes / No 

Replacement product needed in advance? : Yes / No

Inspection costs in the amount of $75.00 will be charged for each product. When a replacement product is ordered, the inspection cost will be calculated in the price.
1 INTRODUCTION

The CIP400 is a control and monitoring unit for use in TWR Lighting, Inc. Aviation obstacle light systems.

The CIP400 may be used in an obstacle light system that includes L550 and L810 medium and low intensity lights.

The CIP400 uses digital data communication technology that allows all the lights on the system to be connected via a single TWR Lighting, Inc. Strobcable-9 or Strobeline cable. These cables are a combined cable with power and control wires to simplify system installation.

The CIP400 includes a simple user interface to allow at site interaction with the controller without the need for any additional equipment or tools. These functions and more are also available through customer web interface.

Full access and diagnostics to the facilities and functions of the CIP400 can be accessed by a TWR Lighting, Inc. service engineer with customer optional wireless or Ethernet setup.

The CIP400 has separate power and control modules, the power module includes Class III over voltage protection devices.

Each light has a unique system address which allows the CIP400 to control the operation and monitor the total system condition, and to indicate that real time status of the system including all FAIL conditions as prescribed and specified by FAA and ICAO that need to be advised to third party monitoring services. In addition to these critical FAIL condition alarms other ALARM conditions that indicate the system is operating with some non-critical status indicators outside of the normal mode are identified.

All CIP400 system control connections are galvanically isolated.
### CIP400 (module) Function Description

<table>
<thead>
<tr>
<th>Contacts</th>
<th>Connector number</th>
<th>Pinout</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>M1-J1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>M1-J10</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>M1&amp;2-J2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>M1-J7</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>M1-J3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>M1-J11</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>M1-J12</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>M2-J6&amp;8</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>M2-J11</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>M2-J10</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>M2-J4</td>
</tr>
</tbody>
</table>

### Max 99 stations (L450 or/and L550)

### Modular design to allow easy in site maintenance

### User Interface by means of display and web (RJ45)

### SD card holder for easy storage of data (optional facility)

### Internal RTC for time stamping events

### Operates from 120/230Vac nominal 50-60Hz external power supply.

### DC Input not used

### Ground / Earth

### TWR Lighting, Inc. communication protocol [OrTalk] compatible.

### 4KV galvanic separation

### Service OrTalk Bridge connector.

### Ethernet - Customer web interface and remote service

### Failure and Sync signal

### [see Note 1]

### OrTalk

### IO Outputs (TWR use only)

### [see Note 2]

### IO Inputs (5-7 = Photocell override input)

### (contact TWR for support)

### I/O (RS485 - Modbus)
Note 1: Fail and Sync signal/indications (M1- J12 C, S & F)

The CIP400 has the failure (f) output provided to customer through controller K3 relay contact and SYNC E (s) output provided to CIPSF for Sidelight synchronization.

These relay outputs are software controlled.

During power up (bootmode) all relays are in de-energized state.

After the CIP400 has booted properly the relays are set according to the state that the status of the CIP400 dictates.

In “power off” and during “boot” all relays are de-energized.

Note 2: Intensity step status indication (M2-J11)

This relay is used to indicate mode changes (day and night) to the CIPSF only – DO NOT use to power any other devices. (Photocell event/status potential (day/night/common) is available on CIPSF.) Please note on A series lighting (red only lights) place jumper across pins 6 & 7. If jumper is not installed the sidelights will not come on during twilight time as the A series (red beacon) only does.

Customer Alarm and failure dry contacts

Power fail (K2)

One relay indicating power status. This relay will be connected to the 24VDC power supply and will therefore indicate if the AC or DC power has failed. It is recommended and noted on drawings to use the normally closed to common for status.

Beacon fail (K3)

One relay indicating beacon status. This relay will be connected to the M1 module J12 (f) supply and will therefore indicate if the AC or DC power has failed. It is recommended and noted on drawings to use the normally closed to common for status.

Sidelight fail (M3)

Current sensor indicating beacon status. This module will be connected to the sidelight fuse and will therefore indicate if failure occurs. It is recommended and noted on drawings to use the normally closed to common for status.
User Interface functions

- Controls the day, twilight or night light intensity mode setting and the color of the lights in the system according to the ambient light conditions.
- Station status and information/alarms
- Real time clock.
- Etc...

Overvoltage protection

TWR Lighting, Inc. uses components to provide overvoltage protection on the power supply connections of its obstacle lighting systems. Each system component incorporates a dual protection overvoltage safety device with a combination of gas discharge tubes, metal oxide varistors with inductors in between. The device provides a Class III protection level.

CAUTION!

It is assumed that the incoming power supply is suitably protected at the site distribution board.

Customer interface connections

The customer’s interfaces to the system are all protected by the use of opto coupler devices.

NOTE!

For installations where the light will be exposed to high radio frequency (RF) radiation please consult TWR Lighting, Inc. prior to installation.
2 SAFETY PRECAUTIONS

Although TWR Lighting, Inc. has incorporated practical safety precautions always exercise extreme caution when dealing with electrical equipment. The following general safety precautions must be observed during all phases of operation service and repair of this equipment.

Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of this equipment. TWR Lighting, Inc. assumes no liability for the customers’ failure to comply with these requirements.

- Do not look directly at the light at close range when it may flash or burn as the intensity of the light could result in permanent eye damage.
- Do not touch the components of the electrical circuit while the system is in operation. Never adjust or change the settings while the system is "on".
- Do not replace components with the power connected.
- Always wait for at least 2 minutes after disconnecting the power source before opening or working on any part of the system because dangerous voltages can be stored in capacitors, even if the power is switched off. Observe the flashing power indication LED in the light.
- To prevent fire or shock hazard, do not expose the device to rain or moisture while opened.
- Should any solid objects or liquid fall into the device while opened, disconnect the system immediately and have it checked by qualified personnel before any further use.
- Do not service or maintain the system when distracted or short of sleep.
- Maintenance and repair of the opened device under voltage should be avoided if at all possible and when required should be carried out only by a skilled person who is aware of the hazards involved.
- Do not install substitute parts or perform any unauthorized modification to the equipment.

WARNING: HIGH VOLTAGE!
The device operates at voltage levels that constitute a personnel safety hazard. Personnel must observe safety regulations at all times.
3 UNPACKING

Receiving the equipment
Before unpacking, check if the packing shows any signs of damage.

After opening, check the contents against the delivery slip. All items should be inspected separately for visible damage. Report any damage or loss claims immediately to the freight handler and take any necessary steps to protect your rights.

Handling
- The device must always be handled with care.
- Labels on the outside of the package show the top and bottom.
- Do not change or remove any labels from the equipment.

Pre-installation test
If possible, it is recommended that the device is tested on site before it is installed on the site to confirm the correct operation.

The device should only be tested under safe and dry conditions.

The device can be tested by simply connecting a 120/230 VAC (±10 %), 50-60 Hz power supply to the connection terminals inside the device. The device should start to operate as soon as the power is supplied.

CAUTION!
It is assumed that the incoming power supply is suitably protected at the site distribution board.
4 INSTALLATION

- Read this manual in full before starting.
- Check if all connections are tight.
- Clean equipment externally and internally if necessary.
- Start with the mechanical installation of the devices that are appropriate for your system. Detailed information concerning the mechanical installation of a certain piece of equipment is given in the sub-chapter "Mechanical installation" of that particular piece of equipment.

**NOTE!**
This warranty is to be declared null and void if TWR Lighting’s inspection indicates that items have not been installed according the instructions and diagrams in this manual.

When deciding on the mounting location take care to ensure sufficient space for the cable entries and to allow the hinged front cover to be opened.

**Mechanical installation**
- The control panel can be mounted inside or outside (shaded from direct sunlight) on a suitable secure vertical surface. Consideration must be given to accessibility regarding the door opening requirements.
- Check after the mechanical installation that all bolts and nuts are fixed tight.
- Once the mechanical installation has been completed, the external cabling to the different devices can be made.
- Make sure that the enclosure is correctly grounded.

**Electrical installation**
The TWR Lighting, Inc. medium intensity obstacle light system requires a supply voltage use of 120/230 VAC (±10 %), 50-60 Hz with a single cable run to interconnect the lights and the CIP400 controller.

**Strobcable-9 & Strobeline cable**
The TWR Lighting, Inc. stations are typically supplied with factory fitted Strobeline cable and Strobcable-9 or Strobeline cable is used to interconnect all stations. These cables have power and control wires combined. The wires are color coded (see Figure 1 - Colors of the Strobcable-9 & Strobeline cable wires).

<table>
<thead>
<tr>
<th>Color wires Strobcable-9 cable</th>
<th>(* Red wire omitted on Strobeline cable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td></td>
</tr>
<tr>
<td>Phase/Live</td>
<td>Black</td>
</tr>
<tr>
<td>* Phase/Live</td>
<td>* Red</td>
</tr>
<tr>
<td>Neutral</td>
<td>White</td>
</tr>
<tr>
<td>Earth/ground</td>
<td>Green</td>
</tr>
<tr>
<td>Fieldbus</td>
<td>Orange</td>
</tr>
<tr>
<td>A</td>
<td>Yellow</td>
</tr>
<tr>
<td>Screen</td>
<td>Black -sleeved</td>
</tr>
</tbody>
</table>

*Figure 1 - Colors of the Strobcable-9 & Strobeline cable wires*
Client supplied cable

In cases where a locally supplied system cable is to be used between the junction boxes and the CIP400 controller then it is probable that separate power and data cables will be used. It is important to use the correct data cable specifications (as Belden 9207 or 89207). The power supply cable core size should be calculated to ensure that the voltage drop does not exceed a difference of 5 % between the CIP400 controller and the farthest light in the system. For the nominal power consumption of each light, see the applicable light manual.

Data cable recommended make: Belden 9207 or 89207
1 x twisted pair shielded twinax 100 Ω, 1 mm² (AWG20), wrapped in aluminum polyester tape, which is covered by a tinned copper braid with an outer PVC (UL 2919) jacket.

Operating Voltage: 300 V max
Operating temperature: -55 to +85 ºC
Impedance: 100 Ω (±5 Ω)
Capacitance between cores: <60 pF/m
Capacitance between screen and core: <80 pF/m
Attenuation at 100 MHz: <20 dB/100 m
Velocity: 66 %
Coverage of the twinax: >85 %

**CAUTION!**
It is assumed that the incoming power supply is suitably protected at the site distribution board.

- As soon as the mechanical installation has been completed, the external cabling into the controller panel and the other items can be carried out.
- Connect the cable to the glands as shown in 0 below.
- The cable wires shall be terminated to the terminal strip inside the junction box or CIP400 enclosure as appropriate
- Check that all system wiring connections are correctly made and that the wires are securely connected on the terminals.
- The cables should be tested and checked for earth fault prior to proceeding.
- Make sure that the system does not contain two parts with the same station number.
- Make a note of the position on the structure of each station number and leave this in the CIP400 enclosure to help with future service work.
- The cables should be subjected to a high voltage test and checked for earth faults before applying any power to the system.
Connecting the Strobcable-9 and Strobeline cable with EMC gland

The screen of the cable, when used with the correct EMC cable glands, provides an effective equipotential bonding system between the system components. This ensures that the secondary lightning current (which there will always be in the event of a lightning discharge because of the impedance of a structure to earth will never be zero) will flow through a controlled path.

In cases where the cable needs to be cut and terminated, it should be completed as follows:

- Strip the wires of the cable as mentioned in Figure 2 - Wires of the Strobcable-9 & Strobeline cable.

- The Fieldbus data screen must be isolated and connected to the screen terminals in the junction box. Make the screen suitable for the terminals by putting a heat shrink sleeve or electrical tape around it as shown above.

**CAUTION!**

Do not connect the fieldbus screen to the earth rail (terminals). The fieldbus data screen **MUST BE** isolated from the potential earth and connected to the "screen" terminals.
MEDIUM INTENSITY LED
MODEL CIP400TWR

- Properly strip and prepare end of the wires. See Figure 3 - Wire Ends.

The control wires of the Strobcable-9 and Strobeline cable have a separate screen to prevent signal corruption.

**Figure 3 - Wire ends**

Use electrical tape to secure down 63.5mm (2.5”) end of outer screen. Put the EMC cable gland around the cable as shown in Figure 4 - EMC cable gland – outer screen. Put the metal ring around braided screen as shown.

**Figure 4 - EMC cable gland – outer screen**
Make sure that the outer screen is in contact with the metal ring, this to ensure that the device is protected against the effects of lightning discharge electric emissions. See Figure 5 - Cable gland connected to the Strobcable-9 cable.

The outer screen/armor is easily unraveled with a small screw driver (DO NOT CUT UNTIL DESIRED LENGTH HAS BEEN UNRAVELED). Leave approximately 2.5 inches of braided screen for cable gland connection and use electrical tape to secure.
**Fieldbus communication**

The TWR Lighting, Inc. Strobocable-9 & Strobeline cable is provided with power and data wires. The orange, yellow and fieldbus screen wires of the cable are used for the fieldbus data communication.

The maximum length of a copper fieldbus for reliable operation is 1200 meter (3937 feet) without the use of repeaters. Both ends of the fieldbus must be terminated with a terminator (resistor of 150 Ω):

![Diagram](image)

Max. 1200 meter (3937 feet)

The maximum length from a T-junction to a station (light) is 5 meters (16 feet):

![Diagram](image)

Max. 5 meters (16 feet)

When a light is installed further away from the fieldbus line on a T-junction of more than 5 meters (16 feet); a loop via the light must be adopted so that the fieldbus to the light is now a part of the fieldbus line.

![Diagram](image)

More than 5 meters (16 feet)

**Figure 6 - Maximum length of the copper fieldbus**

The fieldbus terminator (150 Ω resistor) is a factory fitted item attached to terminal block (see Figure 7 - Fieldbus terminator mounted on the Terminal block) and wired to the back of the (A) orange and (B) yellow terminals in the CIP400 controller and must be mounted in the furthest junction box typically near the top light.

![Image](image)

A fieldbus terminator fitted to the A & B terminals

**Figure 7 - Fieldbus terminator mounted on the Terminal block**
Earthing of the system

The correct operation and protection of this TWR Lighting, Inc. obstacle light system depends on the system being correctly protected from overvoltage and electrostatic discharges by ensuring that the light system is correctly connected to the earth.

The Strobcable-9 & Strobeline cable must be attached to the light fixture and other system enclosures using the provided cable glands according to above.

All light fixtures, junction boxes and the CIP400 enclosure must be directly connected to an earth point with a minimum 6AWG wire. The mounting lug of the light fixture and enclosures may be used as the earth connection point.

All mounting brackets in the system must be directly connected to an earth point with a minimum 6AWG wire.

If the system is not correctly connected to the earth it may behave erratically, the system components may be damaged, the service life of the system components significantly reduced, and the warranty of the system invalidated.

Commissioning procedure

Follow the steps on the Commissioning Sheet

CAUTION!

It is assumed that the incoming power supply is suitably protected at the site distribution board.

No special spare parts are needed for the commissioning procedure.

The warranty statement as written in this manual is applicable during the installation and commissioning procedure and daily operation.

After installation, the system is ready for commissioning.
Obstacle light system commissioning sheet
Use this sheet together with the system diagrams and manuals

<table>
<thead>
<tr>
<th>Installation Date</th>
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<tbody>
<tr>
<td>Site Address</td>
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<table>
<thead>
<tr>
<th>Commissioning Date</th>
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<tr>
<td>Installed by</td>
<td></td>
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<tr>
<td>Commissioned by</td>
<td></td>
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<tr>
<td>TWR LIGHTING, INC. Order reference number</td>
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</table>

<table>
<thead>
<tr>
<th>System Information</th>
<th>Location on structure</th>
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</thead>
<tbody>
<tr>
<td>Serial Number CIP Controller</td>
<td></td>
</tr>
<tr>
<td>Serial Number Light 1</td>
<td></td>
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<td>Serial Number Light 2</td>
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<td>Serial Number Light 10</td>
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<td>Serial Number Light 11</td>
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<tr>
<td>Serial Number Light 12</td>
<td></td>
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</tbody>
</table>
### Visual Inspection

- [ ] Check the lights to make sure that they have not been damaged during installation
- [ ] Check that all installation terminal connection screws are tight and that the wires are connected according to the applicable interconnection diagrams ([Take photos of wiring](#))
- [ ] Check that the lights are installed horizontally - use the level indicator on the lights
- [ ] Check the mechanical installation (nuts and bolts tight, cables properly secured etc)
- [ ] Check electrical connections are properly made (no stray wires, properly connected cable glands etc)
- [ ] Check that all of the system parts are properly grounded
- [ ] Check that the System Terminators (Resistors) are installed in the right places in accordance with the diagrams. ([Take photo](#))

### Measurements (with a multimeter) “Take photographs”

- [ ] Check the resistance of the fieldbus is correct before power up the system! ([Refer to 6.2 missing station, impedance measurements](#))

**Impedance must be within stated parameters.** *(A to B=80 Ohms, A & B to Screen/Shield must be in K Ohms and Screen/Shield to Line, Neutral and Ground must be in M Ohms)*

If you have question about this important measurement call **TWR Installation Support 713-973-6905 Ext 6**.

- [ ] Check the incoming power supply is the correct voltage and has the correct protection level

### Start up

- [ ] Connect the power supply to the system

1. **Check that incoming power supply has the correct voltage and proper protection level?**
   - 3-phase 208VAC? (   ) Measure each line to Ground L1-(   ) L2-(   ) L3-(   )
   - Single phase 120VAC? (   ) ([Take photos](#))
2. **Check Voltage at very top junction box L to L or N (   ) and L to Ground (   )**

- [ ] Turn on the power supply and allow the system to initialize (approx. 1 minute)

---

Refer to the system manual to resolve any system faults

Contact TWR Lighting, Inc. for support:
Tel 713-973-6905

---

**Figure 8 - Obstacle light system commissioning sheet**
5 START UP THE SYSTEM

Make sure that TWR Lighting, Inc. system components are correctly connected to the CIP400 and that the products are properly closed, before you first turn on the power supply. This will prevent the occurrence of system FAIL and ALARM messages created during the startup of a system that is not ready for operation.

⇒ Check the incoming power supply with the correct input power supply for all products connected to the system.
⇒ Turn on the power supply. The system will automatically start up.
⇒ It may take up to 5 minutes for the system to initialize and start to operate correctly. Initially the lights will start up individually (not synchronized). The lights in the system will then synchronize with each other and operate at the photocell determined ambient light level.
⇒ The system automatically checks itself.
⇒ Check for any alarm messages on the CIP400 display.
⇒ Check that the system operates correctly.

6 TROUBLESHOOTING

Missing Station due to no power at the light fixture

1. Check the connections of the Strobcable-9 & Strobeline cable at the light, the local junction box near the light and the CIP.

2. Check if the Strobcable-9 & Strobeline cable connections are correct.

3. Turn on the power supply.

4. If this does not resolve the problem it indicates that the internal power supply of the light is damaged, contact TWR Tel 713-973-6905 Installation Support
Missing Station due to no communication with the light

If power is available at the light, check the fieldbus connections of the Strobcable-9 cable at the CIP400 (orange, yellow and screen wires). This can be done by checking the correct installation of the fieldbus by measuring the impedance between the fieldbus wires with the power turned off.

The system is fitted with two (2) fieldbus terminators (150 Ω resistors). Take the measurements with the system fully connected to the CIP400 and power TURNED OFF.

The values given below are indicative and should be considered as guidelines only. The MΩ fieldbus screen against potential earth measurements especially are subject to humidity levels.

<table>
<thead>
<tr>
<th>Impedance measurement on the fieldbus connection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On an individual station (without a fieldbus connection)</strong></td>
</tr>
<tr>
<td>A (orange) against B (yellow) wire</td>
</tr>
<tr>
<td>A (orange) or B (yellow) against the fieldbus screen</td>
</tr>
<tr>
<td>Fieldbus screen against PE (potential earth)</td>
</tr>
<tr>
<td><strong>On a fieldbus with connected stations</strong></td>
</tr>
<tr>
<td>A against B wire</td>
</tr>
<tr>
<td>75 Ω</td>
</tr>
<tr>
<td>OK</td>
</tr>
<tr>
<td>A or B against screen of the fieldbus (with 1 or 2 terminators installed)</td>
</tr>
<tr>
<td>1 station</td>
</tr>
<tr>
<td>Screen of fieldbus against PE (potential earth)</td>
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<tr>
<td>1 station</td>
</tr>
<tr>
<td>Screen of fieldbus against Live or Neutral</td>
</tr>
<tr>
<td>Independant of number of stations</td>
</tr>
</tbody>
</table>

All values are indicative. They should be analyzed by using common sense. Especially the MΩ values are subject to external conditions like humidity and moisture.

**WARNING!**
The fieldbus shield must be isolated from the earth/ground

When the fieldbus measurements are found to be correct, a “missing station” message indicates that the communication module of the light is damaged – contact TWR Tel 713-973-6905 Installation Support.
Incorrect day/night mode operation
The obstacle light system is not operating according to the ambient light conditions.

The system cannot determine the correct day or night operating mode due to incorrect photocell information.

Each light in the system contains a photocell and the CIP400 uses the information from these photocells to determine the correct operating mode. If a photocell is damaged then the CIP400 will disregard the information from this photocell and will base the system operation on the information from the remaining photocells.

A system wide "photocell fail" is only initiated when there are no remaining operating photocells in the system.

The photocells are inherently very reliable so a problem with the photocell part of the light is very unlikely.

Check if the photocell has a clear view to be able to measure the ambient light conditions.

Do not position the light where the photocell is closely located to an obstacle which can block ambient light conditions.

Do not position the light where the photocell is affected by any other light source.

Make sure that the photocell is not covered by dirt. Clean the photocell.
7 CIP400 DISPLAY INFORMATION

Main screen (Logo)

During startup, the logo is displayed while the internal database is verified. If the database is missing or is damaged, the screen displays:

Header

Each screen with a title header also displays the status indication for the system. This status is displayed by only one character. The following statuses are used:

F: The system has fails
A: The system has alarms
O: The system is in manual override
R: The system is in remote override
I: The system isn’t “Instant On”, so the system intensity is off
N: The system functions in the night intensity
T: The system functions in the twilight intensity
D: The system functions in the day intensity

The statuses are listed in the order of appearance. So, a fail is more important than an alarm which is more important than an override and so on.
Main Menu

From the main menu all the functions of the CIP400 can be accessed.

Use UP and DOWN to navigate through the menu and use OK to enter the function.

If ESC is pressed in any screen, the display returns to the previous screen.

The main screen looks like this:

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

F M i n Menu

F a i l Screen

A l a r m Screen

C o n f i g Menu

M a i n t e n a n c e
```

FAIL Alarm screen

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

F a i l S c r e e n

S t 0 1 L E D F a i l

S t 0 2 H i g h T e m p

S t 0 4 M i s s i n g

C i 0 1 T e m p
```

To find out details for an individual FAIL / ALARM, use the up/down arrows to select the alarm with the selection bar and press OK.

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

F a i l Info

* L 5 5 0 -
6 3 A / 6 3 B - 4 0 - G
C h x x H i g h T e m p
1 0 - 0 5 - 1 1 2 1 : 1 2
```

The asterisk in front of the fail description has the following states:

```
* L 5 5 0 - -> Fail/Alarm is not resolved and not accepted

* L 5 5 0 - -> Fail/Alarm is not resolved and accepted

L 5 5 0 - -> Fail/Alarm is resolved but not accepted
```
There are several different messages associated with a missing station:

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tag | s | channel

In case of incorrect substation (Module type) in relation to the CIP400 configuration – i.e. type of light is present that the CIP400 is not programmed to expect to be in the system:

<table>
<thead>
<tr>
<th>1</th>
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In case of incorrect substation (Sub type) in relation to the CIP400 configuration – i.e. correct type of light (L550) but incorrect version or configuration of light:

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<thead>
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In case of unknown substation (Module type) in relation to the CIP400 configuration – i.e a type of light that the CIP400 does not recognize:

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tag | s | channel
Configuration menu
The key functions are the same as in the main menu.
The configuration menu is shown below:

Override
The intensity of the system can be overridden to the desired state. The override has an AUTO RESET function so that the override can be set indefinitely [AUTO RESET = NO] or be reset automatically after 24 hours [AUTO RESET = YES]. The following screens demonstrate how to do this:
Clock Setting

![Clock Setting Display](image)

- **DATE** (DD-MM-YY)
  - 21-02-08
- **TIME** (HH:MM:SS)
  - 09:01:30

Note: To change the value press OK, if OK is pressed longer than 4 sec than the value increases in tenths. The update rate is 0.5s.

Maintenance Screen

The key functions are the same as in the main menu (0). The maintenance menu is depicted below:

![Maintenance Screen Display](image)
Show Stations

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
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| S | e | r | v | i | c | e | T | o | o | l | s | 0 | 1 |     |     |
| U | n | d | e | f | i | n | e | d | S | u | b | s | 0 | 2 |     |

Notes:
- "Present" substations which are configured and where the AB wires are correctly connected are indicated in steady normal mode.
- "Present" substations which are configured and where the AB wires are reversed connected are indicated in steady inverse mode (i.e. 04 above)

If the station number 99 is detected it will be presented in the first screen in the upper right-hand corner. The indication of this substation is handled in accordance with the above remarks. Station 99 indicates a substation with factory default is detected. This must be corrected because no substation should be used with this factory default address.

Station Status

The status of a substation or of the CIP400 can be displayed. The status screen is an option and this must be enabled to enter this screen. The screen looks like this:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>S</td>
<td>t</td>
<td>a</td>
<td>t</td>
<td>i</td>
<td>o</td>
<td>n</td>
<td>N</td>
<td>o</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>c</td>
<td>r</td>
<td>e</td>
<td>e</td>
<td>n</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| E | n | t | e | r | i | n | g | 0 | 0 | W | i | l | l | S | h | o | w | T | h | e | C | I | P | 4 | 0 | 0 | P | r | o | p | e | r | t | i | e | s |
By pressing UP or DOWN the station number can be changed. ESC returns to the Main Menu and OK is used to view the status of the requested station.

For the CIP400 status the Master No “01” must be entered, and all the other numbers are for the status of the substations starting at “01”.
If a station isn’t present the next screen is displayed:

Substation Status

The status of the substations is displayed by using three screens. By pressing UP or DOWN the pages are changed.
To return to the selection screen the ESC key must be used.
The initial screen contains the station number, the module type and subtype:

If you press down, the next screen displays the software versions of the application and the bootROM, the hardware version and the hardware variation.

Note: The hardware version consists of the cardcode followed by a dot and the board revision.
If the station is still in the bootROM status the application version can’t be displayed, so this text is replaced by the text “BootROM Mode”.

If you press page down again you enter the next screen with even more information. If the station has rotary switches the screen looks like this:

If the station doesn’t have rotary switches:

Note: If the station only has a short serial number, the second line isn’t used and the first line contains the short serial number.

If the system is in bootROM mode the serial number and the rotary switches can’t be read. The following is displayed:
Reset stations

By using this function, a substation or the entire system can be reset. The screen looks like this:

By pressing UP or DOWN the station number selected can be changed for the individual reset of substations.

ESC returns to the Maintenance Menu and OK is used to reset selected station.

To rest the entire system Station No “00” has to be entered

If a station isn’t present the following screen is displayed:
MEDIUM INTENSITY LED
MODEL CIP400TWR

System info

The current system information of the CIP400 is displayed in this screen. To exit this screen the ESC key must be used.

The screen looks like this:

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
F S y s t e m  I n f o
E t h S t : N o L i n k
E t h M A C : x x : x x
   x x : x x
↓ x x : x x
```

The second screen shows the following variables: The auto acceptance state, the instant on state, the reduced intensity percentage and the type of sync message.

```
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
F S h o w S y s I n f o
↑ A u t o A c c . O f f
I n s t a n t O n N o
R e d u c e d % 1 0 0
S y n c M s g 0 l d
```

Connect to the web interface

*Tools and parts*

- Computer with JAVA version 1.7.55 or higher and a compatible internet browser (Microsoft Internet Explorer is preferred).
- RJ45 ethernet cable

1. Connect the computer to the ethernet socket (A). Use the ethernet cable.
2. Change the TCP/IPv4 settings of the computer. Use these settings:
   - IP-address: **192.168.75.100**
   - Subnet mask: **255.255.255.0**
   - DHCP settings: ‘Static’
   
   Refer to the help-function of the computer or your system administrator.
3. Enter the IP-address (**192.168.75.2 by default**) of the CIP400 in the address bar of the internet browser.
4. If applicable, run the application. The internet browser shows the start menu of the web interface.
5. If the internet browser does not show the start menu, refer next troubleshooting.
Troubleshooting on the web interface connection
1. Make sure that you properly did the procedure in above section
2. Compare the blink sequence of the ethernet status LED with the codes in section
3. If the ethernet status LED is off, stop the firewall of the computer or ask your system administrator.
4. Reset the ethernet connection:
   a. Push and hold the reset button until the ethernet status LED comes on steady.
   b. Do the procedure in above section - Use the default IP-address **192.168.75.2**.
5. If you still cannot connect to the web interface, call TWR.

<table>
<thead>
<tr>
<th>Code</th>
<th>Problem</th>
<th>Possible cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| 0.1 sec on, 0.1 sec off   | Ethernet fail            | The CIP400 is defective             | 1. Push and hold the reset button until the ethernet status LED comes on steady.  
                            |                           |                                                    | 2. Do the procedure in above section  
                            |                           |                                                    | 3. Call TWR                                                                 |
| 0.1 sec on, 0.1 sec off, 0.1 sec on, 1.2 sec off | Ethernet Link Partner No Auto-Negotiate | The IP-address of the computer is not set to Auto-Negotiate.  | Change the TCP/IPv4 settings of the computer: ‘Obtain an IP address automatically’ and ‘Obtain DNS server address automatically’. |
| 0.1 sec on, 1.4 sec off   | Ethernet No Link Partner | The ethernet cable is broken or not properly installed. | Do a check on the connection of the ethernet cable. Install a new ethernet cable. |
| Blinks three times        | No problem, Ethernet OK  | The CIP400 starts the connection.    | Wait for the CIP400 to start the connection. |

Set the date and time
1. In the start menu of the web interface, click ‘Configuration’.
2. Click ‘Real-time Clock’.
3. Use buttons (A) to set the date and time.
4. Enable or disable the daylight savings function (B).
5. Choose the time format (C) and the date format (D).
6. Click ‘Systems’ (E). The settings are stored and the start menu is shown

*Many other Web Interface options are available. Call TWR for instructions*
MAINTENANCE

The CIP400 is designed as a maintenance free device once the connections are properly and securely made and tested.

The power supply should be isolated prior to the execution of any maintenance work.

During service visits, it only needs to be checked that:

- the unit is securely mounted to the structure;
- there are no signs of mechanical damage to the enclosure;
- the enclosure is securely closed;
- the enclosure is connected to earth;
- the device is being kept clean;
- the inside shows no signs of water ingress (condensation, dry water marks etc). Clean it if necessary;
- the ingress protection (cable and gland connections + door sealing: condition of the gasket and mounting hole and screws) is still present;
- the breather (at the bottom of the enclosure) is open and free of dirt;
- the printed circuit boards and electrical connections are checked for tightness, absence of corrosion and high-voltage damage. Clean or replace any device that shows dirt or marks of high-voltage damage;
- the Strobcable-9 & Strobeline cable connection to the EMC gland is correct. The connection has to be tight and protective against dirt and moisture ingress. Ensure that the Strobcable-9 cable is securely fastened at & Strobeline short intervals to the structure or supporting parts;
- the wire connections to the terminals are secure;
- the locking screws are not severely corroded and move freely; Close the enclosure.
8 COMPONENT AND SPARE PARTS LIST

No spare parts are expected to be needed during the warranty period neither during the commissioning procedure. In case a site requires maintaining some spare parts at hand, the ‘SP’ marked parts can be bought in advance.

The warranty statement as written in this manual is applicable during the installation and commissioning procedure and daily operation.

<table>
<thead>
<tr>
<th>Qty.</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
<th>SP</th>
<th>PICTURE</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>1 AMP Fuse</td>
<td>KTK-1</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3 AMP Fuse</td>
<td>KTK-3</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5 AMP Fuse</td>
<td>KTK-5</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10 AMP Fuse</td>
<td>FNQ-10</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LED SIDELIGHT ALARM CURRENT SENSOR</td>
<td>RM22JA31MR</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SURGE PROTECTOR</td>
<td>DTK-120HW</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>POWER SUPPLY</td>
<td>MDR-20-24</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CIP2408 MODULE</td>
<td>200515</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>CIP Synchronized Flasher</td>
<td>CIPSF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>END STOP</td>
<td>8WA1808</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SINGLE POLE TERMINAL</td>
<td>8WA1204</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FUSE HOLDER</td>
<td>USM-1</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>RESISTOR</td>
<td>150 OHM .125W</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2 POSITION PLUG</td>
<td>STT60043</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5 POSITION PLUG</td>
<td>STT60044</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2 POSITION PLUG</td>
<td>STT60045</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3 POSITION PLUG</td>
<td>STT60046</td>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>
# MEDIUM INTENSITY LED
## MODEL CIP400TWR

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Part Number</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9 POSITION PLUG</td>
<td>STT60047</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>24VDC Relay Module</td>
<td>2966171</td>
<td>N</td>
</tr>
</tbody>
</table>

## 9 DRAWINGS / WIRING DIAGRAMS

* * * * *

**END OF MANUAL**
Typical D(White) Beacon Wiring Example
Strobcable-9 (from controller)  Strobeline (pigtail from beacon)

Typical E(Dual White/Red) Beacon Wiring Example
• Top junction box, with mounting kit, secured with one beacon mounting bolt.

• STROBELINE connections from beacon to junction box with 150Ω resistor.

• Red conductor only used for sidelights.

• STROBECABLE-9 connections from controller to junction box.

Typical E(Dual White/Red) Beacon Wiring Example
**20W Single Output Industrial DIN Rail Power Supply**  
**MDR-20 series**

- **Features:**
  - Universal AC input/Full range
  - Protections: Short circuit / Overload / Over voltage
  - Cooling by free air convection
  - Can be installed on DIN rail TS-35/7.5 or 15
  - Built in DC OK active signal
  - LED indicator for power on
  - No load power consumption<0.75W
  - 100% full load burn-in test
  - 3 years warranty

### SPECIFICATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MDR-20-5</th>
<th>MDR-20-12</th>
<th>MDR-20-15</th>
<th>MDR-20-24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUTPUT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC VOLTAGE</td>
<td>5V</td>
<td>12V</td>
<td>15V</td>
<td>24V</td>
</tr>
<tr>
<td>RATED CURRENT</td>
<td>3A</td>
<td>1.67A</td>
<td>1.34A</td>
<td>1A</td>
</tr>
<tr>
<td>CURRENT RANGE</td>
<td>0 ~ 3A</td>
<td>0 ~ 1.67A</td>
<td>0 ~ 1.34A</td>
<td>0 ~ 1A</td>
</tr>
<tr>
<td>RATED POWER</td>
<td>15W</td>
<td>20W</td>
<td>20W</td>
<td>24W</td>
</tr>
<tr>
<td>RIPPLE &amp; NOISE (max.) Note 2</td>
<td>88mVp-p</td>
<td>120mVp-p</td>
<td>120mVp-p</td>
<td>150mVp-p</td>
</tr>
<tr>
<td>VOLTAGE ADJ. RANGE</td>
<td>4.75 ~ 5.5V</td>
<td>10.8 ~ 13.2V</td>
<td>13.5 ~ 16.5V</td>
<td>21.6 ~ 26.4V</td>
</tr>
<tr>
<td>VOLTAGE TOLERANCE Note 2</td>
<td>±2.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
</tr>
<tr>
<td>LINE REGULATION</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
</tr>
<tr>
<td>LOAD REGULATION</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
<td>±1.0%</td>
</tr>
<tr>
<td>SETUP, RISE TIME Note 5</td>
<td>500ms, 30ms/230VAC</td>
<td>1000ms, 30ms/115VAC at full load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOLD UP TIME (Typ.)</td>
<td>50ms/230VAC</td>
<td>20ms/115VAC at full load</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>INPUT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLTAGE RANGE</td>
<td>85 ~ 264VAC</td>
<td>120 ~ 370VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREQUENCY (Typ.)</td>
<td>47 ~ 63Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFFICIENCY (Typ.)</td>
<td>76%</td>
<td>80%</td>
<td>81%</td>
<td>84%</td>
</tr>
<tr>
<td>AC CURRENT (Typ.)</td>
<td>0.55A/115VAC</td>
<td>0.35A/230VAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INRUSH CURRENT (Typ.)</td>
<td>COLD START 20A/115VAC</td>
<td>40A/230VAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEAKAGE CURRENT</td>
<td>&lt;1mA / 240VAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROTECTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVERLOAD</td>
<td>105 ~ 160% rated output power</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROTECTION type</td>
<td>Constant current limiting, recovers automatically after fault condition is removed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVER VOLTAGE</td>
<td>5.75 ~ 6.75V</td>
<td>13.8 ~ 16.2V</td>
<td>17.25 ~ 20.25V</td>
<td>27.6 ~ 32.4V</td>
</tr>
<tr>
<td>PROTECTION type</td>
<td>Shut down if over voltage, re-power on to recover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FUNCTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC OK ACTIVE SIGNAL (max.)</td>
<td>3.75 ~ 6V / 50mA</td>
<td>9 ~ 13.5V / 40mA</td>
<td>11.5 ~ 16.5V / 40mA</td>
<td>18 ~ 27V / 20mA</td>
</tr>
<tr>
<td><strong>ENVIRONMENT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WORKING TEMP.</td>
<td>-20 ~ +70°C (Refer to “Derating Curve”)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WORKING HUMIDITY</td>
<td>20 ~ 90% RH non-condensing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STORAGE TEMP., HUMIDITY</td>
<td>-40 ~ +85°C, 10 ~ 95% RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEMP. COEFFICIENT</td>
<td>±0.03%/°C (0 ~ 50°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIBRATION</td>
<td>Component:10 ~ 500Hz, 2G 10min./cycle, 60min. each along X, Y, Z axes; Mounting: Compliance to IEC60068-2-6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SAFETY &amp; EMC (Note 4)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAFETY STANDARDS</td>
<td>UL508, TUV EN60950-1 approved</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WITHSTAND VOLTAGE</td>
<td>IP-O/IP-3KVAC</td>
<td>IP-FG-2KVAC</td>
<td>IP-FG-0.5KVAC</td>
<td></td>
</tr>
<tr>
<td>ISOLATION RESISTANCE</td>
<td>IP-O/IP, IP-FG, OIP-FG-100M Ohms / 500VDC / 25°C / 70% RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMC EMISSION</td>
<td>Compliance to EN55011, EN55022 (CISPR22), EN61240-3 Class B, EN61000-3-2-3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>EMC IMMUNITY</td>
<td>Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55024,EN61000-6-1,EN61204-3, light industry level, criteria A</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>OTHERS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTBF</td>
<td>236.9k hrs min.</td>
<td>MIL-HDBK-217F (25°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIMENSION</td>
<td>22.590<em>100mm (W</em>H*D)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACKING</td>
<td>0.19Kg; 72pcs/14.7Kg/0.91CUFT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on http://www.meanwell.com)
5. Length of setup time is measured at cold start first. Turning ON/OFF the power supply may lead to increase of the set up time.
Securing Electrical Conduit

TWR Provides hose clamps (Part#HC6-10) for securing the lighting system conduit to a structure using the following method. Hose claps require 5/16” tightening tool such as nut driver, wrench, or ratchet bit.

1. To secure conduit (part#CONDUIT34) at side marker level place conduit horizontally to structure leg. Place hose clamp (part#HC6-10) diagonally across structure leg and conduit.

2. Tighten hose clamp firmly. Once hose clamp is secured trim any excess material. Be sure to bend edge of band to prevent any sharp edges being exposed.

3. Place second hose clamp diagonally in the opposite direction of first hose clamp. Repeat to tighten hose clamp firmly, trim any excess material and bend remaining band to prevent any sharp edges being exposed.

4. Perform steps 1 through 3 at remaining structure legs. Be sure not to overtighten hose clamp to prevent damage to threads.

* When installing conduit, other than in horizontal position, use hose clamps accordingly to ensure a secure installation.

*Local electrical code may supersede this recommended method.
120VAC PRODUCT SPECIFIC SETTINGS

<table>
<thead>
<tr>
<th>QTY</th>
<th>PART NO.</th>
<th>INPUT</th>
<th>#1</th>
<th>#2</th>
<th>#3</th>
<th>#4</th>
<th>#5</th>
<th>PRD.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>OL1_LED2</td>
<td>E2</td>
<td>*&lt;1</td>
<td>30</td>
<td>20</td>
<td>30</td>
<td>OFF</td>
<td>TWR</td>
</tr>
<tr>
<td>2</td>
<td>OL1_LED2</td>
<td>E2</td>
<td>*&lt;1</td>
<td>50</td>
<td>20</td>
<td>30</td>
<td>OFF</td>
<td>TWR</td>
</tr>
<tr>
<td>3</td>
<td>OL1_LED2</td>
<td>E3</td>
<td>*&lt;1</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>OFF</td>
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<td>30</td>
<td>OFF</td>
<td>ORGA</td>
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*NO MEMORY

FUNCTIONS
1) Configuration: Selection of operation mode
   (<1 / >1 / >1< ) with or without memory.
2) Adjustment of current threshold as % of setting range.
3) Hysteresis adjustment from 5% to 50%.
4) Time Delay adjustment from 0.1 to 30sec.
5) Diagnostic button.
6) Yellow indicator light (See conditions below)
7) Dial Pointer (Green) LED
   - Steady green LED indicates that supply to the RM22 is present
   - Flashing green LED indicates a setting has been changed that requires a power cycle.

YELLOW LED CONDITIONS
NOTE: (*) ASTERISK INDICATES LED CONDITIONS OPERATE OPPOSITE FROM RM22JA31MR MODULE

Steady Burn Fixtures
- Yellow light *off : Normal condition (no alarm)
- Yellow light flashing : Undervoltage condition detected and time delay initiated
- Yellow light *on : Alarm condition

Flashing Fixtures
- Yellow light flashing inconsistent : Normal condition (no alarm)
- Yellow light flashing consistent : Under current condition detected and time delay initiated

NOTE: To help troubleshoot or to set the sense current, turn the time delay to 0sec. Adjusting the current setting should only be done if it is known that all the lights are functioning. For Steady Burn adjust the current until the yellow LED comes *off, and the relay is not dropping in and out. For Flashing Fixtures adjust the current setting until the yellow light starts to flash. This is the normal condition setting. Return the time delay back to 30sec.
- Yellow light *on : Alarm condition

Due to current draw tolerances slight adjustments to setting #2 may be needed for proper alarming.
BILL OF MATERIALS

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<td>BOLTS/WASHERS/NUTS FOR BEACON MOUNTING</td>
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<td>SINGLE EYE LAG WASH 0.84 - 0.74</td>
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<td>19</td>
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<td>3/4&quot; CAP</td>
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- ITEMS QUANTITY CALCULATED ACCORDING TO STRUCTURE HEIGHT. 
- ITEMS NOT SHOWN IN DRAWING

NOTES:
1. THIS DRAWING IS PROVIDED AS A GENERAL REFERENCE. THEW LIGHTING, INC. 
   DOCUMENTATION SUPERSEDES THIS DRAWING & SHOULD BE REVIEWED 
   PRIOR TO INSTALLATION OF THIS SYSTEM.
2. PART C5014/3 TO BE CUT TO LENGTH FOR PROPER EXTENSION OF OLS 
3. PART CABLERG-03 IS USED TO SUPPORT CABLE BEFORE CORD CONNECTOR. 
   SINGLE EYE LOOP SHOULD BE ATTACHED TO STRUCTURE.
4. USE PART HCD-10 TO SECURE JUNCTION BOX ASSEMBLY TO A HORIZONTAL 
   PORTION OF STRUCTURE AS WELL AS OLS MOUNTING BRACKET. SEE 
   01787011 FOR DETAIL REFERENCE.
5. USE PART TOILET TO SECURE STROBCABLE-9 AND C5014/3 TO THE 
   STRUCTURE EVERY 5' (MAXIMUM SEPARATION).
6. OUTER SHIELD/SCREEN (MESH WIRE COVERING ALL WIRES) IS TO BE 
   TERMINATED TO EARTH GROUND THROUGH PROPER INSTALLATION IN ENZ-34 
   CORD CONNECTOR. REFER TO MANUAL.
7. IT IS EXTREMELY IMPORTANT TO ISOLATE AND CONNECT ALL DATA 
   SHIELD/SCREEN WIRES (MESH WIRE COVERING ONLY THE ORANGE AND 
   YELLOW DATA WIRES) IN JUNCTION BOX TERMINAL BLOCK. RE-USE DATA 
   WIRES CABLE COVERING, ELECTRICAL TAPE OR HEAT SHRINK TO COVER 
   MESH WIRE AND ISOLATE.
8. IT IS RECOMMENDED TO INSTALL CABLE WITH ONE SERVICE LOOP AT EACH 
   LIGHTING. IF LENGTH OF CABLE REQUIRES MORE THAN ONE LOOP THEN 
   EITHER PATTERN IN AN S OR WAVE SHAPE.
9. USE 3/4" CAP PLUG FROM SIZE HUB OF THE JUNCTION BOX TO SEAL TOP 
   HUB OF THE JUNCTION BOX.
10. IF MOUNT IS NEEDED FOR BEACON USE PART B40-1-1.

POWER CONSUMPTION
- 12hrs day: 10,800/10800, - for CP40005/10/884
  (15 x 12 = 0.120kW)
- 12hrs night: 10,004/2290, - for CP40005/10/884
  (54 x 12 = 0.846kW)
- 24hrs x 7.5kW/hour

10/16/13 - UPDATED OL LEVEL

L5T1A11550 RED LED LIGHTING KIT 
(TOWERS 150/46M TO 350/107M)

DRAWN BY: I. AMBERLAND
APPROVED BY: I. AMBERLAND
CHECKED BY: I. AMBERLAND
DATE: 04/28/2015
PAGE: 1

TLG 1282 E:
001-607

L5T1A11550 RED LED LIGHTING KIT (TOWERS 150/46M TO 350/107M)

10/16/13 - UPDATED OL LEVEL
### PARTS LIST

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<td>3/4&quot; MOUNTING BRACKET</td>
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<td>STAINLESS STEEL MOUNTING STRAP 6&quot; DIA.</td>
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<td>JBS/7</td>
<td>3/4&quot; JUNCTION BOX</td>
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<td>3/4&quot; CONDUIT LOCKNUT</td>
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<td>1/4&quot;W / 3CON. S.O. CORD</td>
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### NOTES

1. PART HC6-10 NEEDS TO BE DOUBLED FOR TOWER LEGS WITH A DIAMETER LARGER THAN 6".
2. USE PART HC6-10 TO SECURE JUNCTION BOX ASSEMBLY TO A HORIZONTAL PORTION OF STRUCTURE.
3. USE PART STCABLETIE OR TAPE METHOD AT LEAST EVERY 5' TO SECURE CABLE TO THE STRUCTURE.
The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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**Parts List**

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<td>8-32 X 1/4 PH SS SLOT SCREW</td>
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**DIMENSIONS**

- **4.813" (122.25)**
- **8.404" (213.46)**
- **3.430" (87.12)**
- **3/4" NATIONAL PIPE THREAD**

*GROUND WIRE MUST BE CONNECTED TO PROPERLY PROTECT POWER SUPPLY. FAILURE TO GROUND WILL VOID ALL WARRANTIES.*

**WEIGHT:** 2.2 lbs (0.998kg)
The use of non-OEM parts or modifications to original equipment design will void the manufacturer warranty and could invalidate the assurance of complying with FAA requirements as published in Advisory Circular 150/5345-43.

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**Dimensions**

- **4.813"**
- **7.342"**
- **2.368"**

---

*GROUND WIRE MUST BE CONNECTED TO PROPERLY PROTECT POWER SUPPLY. FAILURE TO GROUND WILL VOID ALL WARRANTIES.*

---

**OL1CLED2 120/240VAC FAA-OL16LED (L810 OBSTRUCTION LIGHT)**

**TWR Lighting, Inc.**

**AUTHOR**

J.ZAMORANO

**REV**

A

**DATE**

1/20/2015

**DESCRIPTION**

UPDATED B.O.M

---

**Keeping the Energy of Life**

**TWR Lighting, Inc.**

**Edmond**

**REV**

A

**DATE**

1/20/2015

**DESCRIPTION**

UPDATED B.O.M

---

**SHEET SIZE**

B 1

**SHEET QTY.**

OF 1

---

**WEIGHT:** 2.2 lbs (0.998kg)