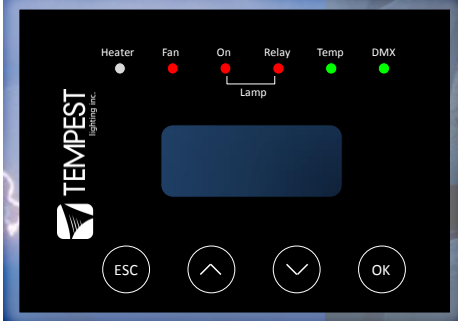
User Manual

Tornado Moving Light Enclosures



Tempest Lighting, Inc.
13110 Saticoy Street, Unit C
N. Hollywood, CA 91605, USA
Tel +1 818 787 8984
Fax +1 818 982 5510
info@tempestlighting.com

www.tempest.org

For the following products, manufactured after August 2013

Tornado 1900, 1950

Tornado 2000, 2100

Tornado 2200, 2300

Tornado 2400

With DEC3.3 Goldilocks™ rev 0.01.006 or higher

In the interest of continuous product improvement, the information in this document is subject to change without notice. Neither Tempest Lighting, Inc. nor its representatives or agents may be held liable for expense or injury arising from it.

September, 2013

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CE

CERTIFICATE AND DECLARATION OF CONFORMITY FOR CE MARKING

Tempest Lighting, Inc.

13110 Saticoy Street, Unit C, North Hollywood, CA 91605, USA

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www.tempest.org

Tempest Lighting, Inc. declares that their:

Tornado Lighting Enclosure Series 19xx.xxx, 2xxx.xxx

complies with the Essential Requirements of the following EU Directives:

Low Voltage Directive 2006/95/EC	Test Report 60065-2000-13
Electromagnetic Compatibility Directive 2004/108/EC	Test Report 61000-2000-15

and further conforms with the following EU Harmonized Standards:

EN 60065 : 2002	Test Report 60065-2000-13
EN 60529:2001-2002	Test Report 60529-2000-14
EN 61000-6-3:2007+A1:2011	Test Report 61000-2000-15
EN61000-6-1:2007	Test Report 61000-2000-15
EN55015:2006+A2:2009	Test Report 61000-2000-15

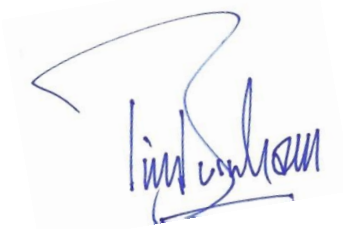
Dated: 1st March 2013

Position of signatory: President

Name of Signatory: Tim Burnham

Signed below:

on behalf of Tempest Lighting, Inc.



. . . . . .

This is to certify that the following products

Tornado 2000.US(H,V) Lighting Enclosure
Tornado 2050.US Lighting Enclosure
Tornado 2000.US(H,V) Lighting Enclosure
Tornado 2200.US(H,V) Lighting Enclosure
Tornado 2300.US(H,V) Lighting Enclosure
Tornado 2400.US Lighting Enclosure

Have been tested and approved to standards UL 508 (electrical) and UL 50 (environmental), as NEMA 3R enclosures, for use in the United States and Canada.

This declaration is made by the manufacturer

Tempest Lighting, Inc.
13110 Saticoy Street, Unit C
North Hollywood, CA 91605, USA

This declaration is based on tests that were conducted on the submitted samples of the above mentioned products.

Listing Report No. 3198609LAX-001a refers.

Dated: December 17th, 2010
Signature . . . . . .
Tempest Lighting Inc

Tempest Lighting, Inc.,
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1 Introduction

Using This Manual

Please read this manual in its entirety before starting work. All the information contained is important, and should be read carefully before proceeding. Heed all warnings and advisories.
Terminology:
Enclosure - Tornado Lighting Enclosure
Luminaire - intelligent lighting fixture that will be placed into the enclosure
DMX - ANSI E1.11-2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories.
RDM - ANSI E1.20-2006, Entertainment Technology - RDM, Remote Device Management over DMX512 Networks

Icon Key:

ⓘ Valuable information

Electrical Warning

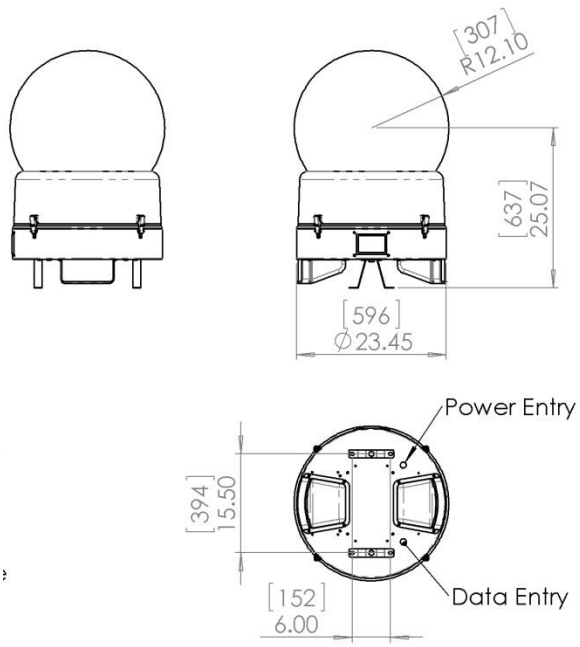
Safety Information

IMPORTANT SAFETY NOTICE: All safety instructions provided by the luminaire manufacturer must be followed carefully. Failure to do this may void both the luminaire and the enclosure warranties.
When working at heights or in awkward locations, it is imperative to develop a safety plan, based on the information in this manual, and on local conditions and safety regulations. The safety plan must be approved by the site engineer/safety officer, as appropriate to local conditions. NEVER attempt to install Tornado enclosures in high winds or when precipitation is present or imminent.

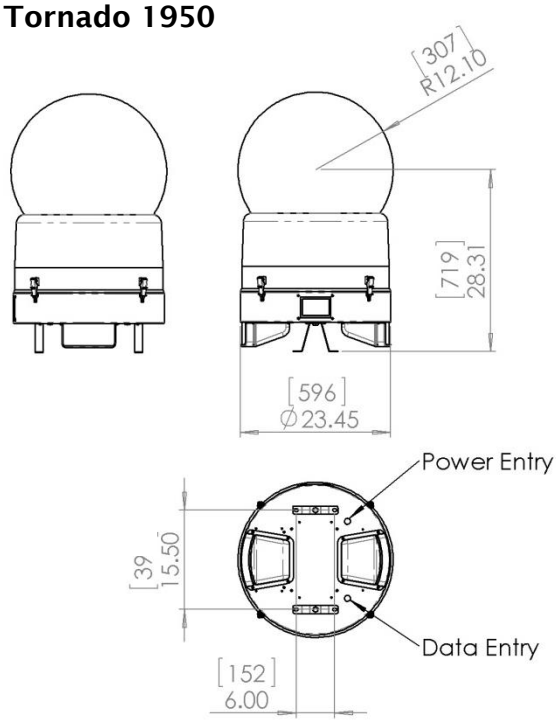
Dimensions

CAD drawings in DWG and PDF format are available for download at www.tempest.org

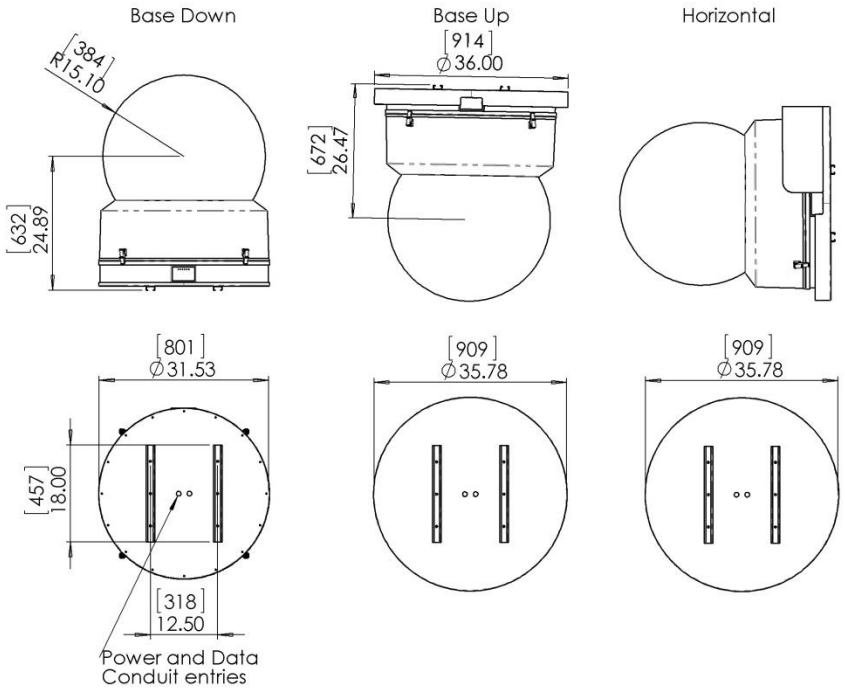
Tornado 1900



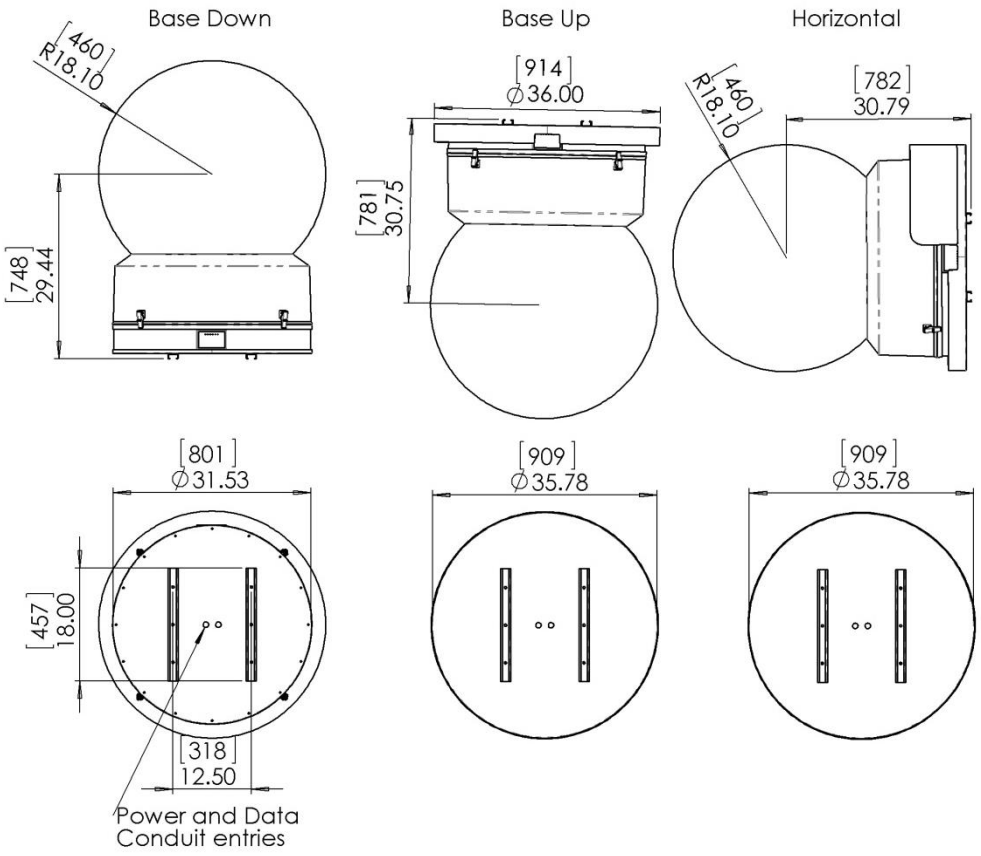
Tornado 1950



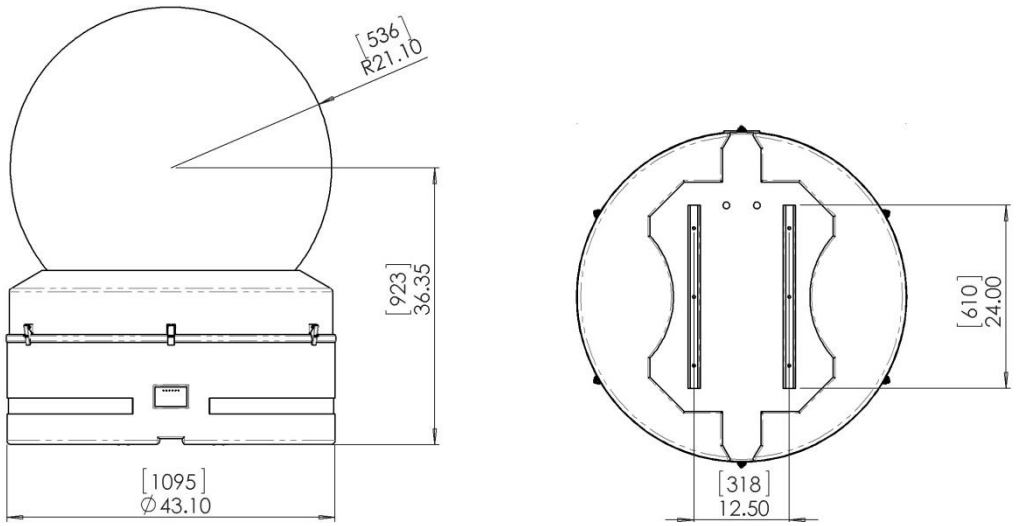
Tornado 2000-2100



Tornado 2200-2300

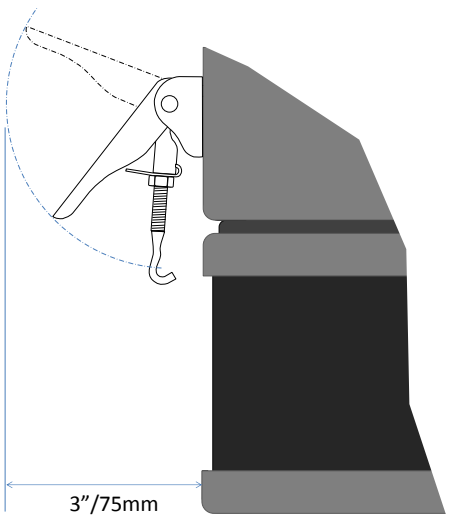


Tornado 2400



Note – Draw Latch Clearance

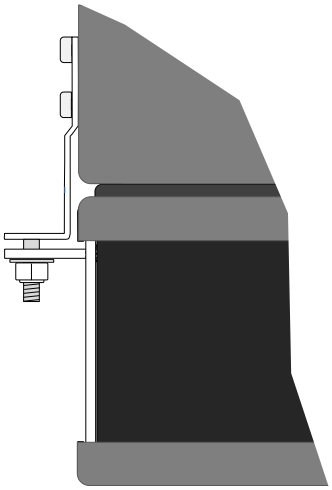
Allow adequate clearance for all latches.



Note: Tornado 2400 may be installed base up or base down only

Note - Marine Latches

Marine Latches require a tool to open the enclosure.



Marine Latch.
Designs vary slightly by model.

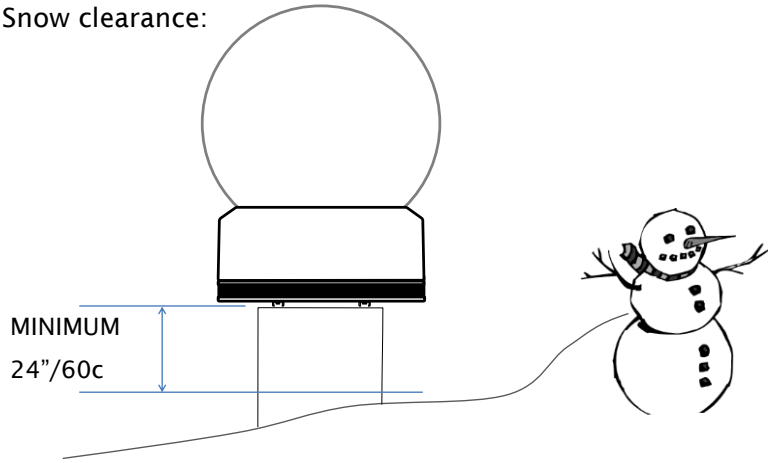
2 Installation

Safety and Warnings

- Read the Manual before installing the enclosure
- Read the manual before opening or servicing the enclosure
- Never leave the enclosure unattended when open.
- Ensure all bolts and terminals are tight and clean
- Do not touch the heater unless you can be sure that it is cool.
- Observe all warning labels in the enclosure itself.
- Do not open any electrical boxes until power is off
- Do not open the enclosure in wet weather.
- Never move the enclosure with the luminaire inside.
- Never handle the enclosure by the globe.
- Always lift the enclosure from under the base.

Planning

ⓘ Snow clearance:



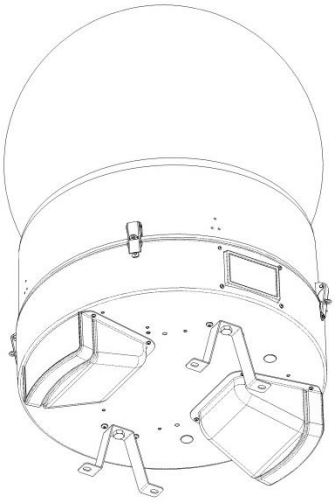
ⓘ Enclosure must be powered 24/7/365.

Warning: This installation cannot be safely completed by 1 person.

Mounting – Tornado 1900-1950

ⓘ Each Enclosure must be wall, floor or ceiling mounted with the two stainless steel brackets provided.

ⓘ Tempest Lighting recommends only stainless steel mounting hardware for permanent installation outdoors.

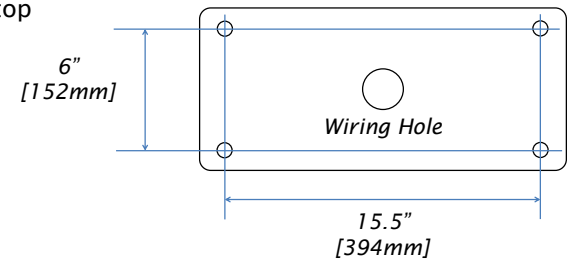


Floor, Wall or Ceiling Mounting

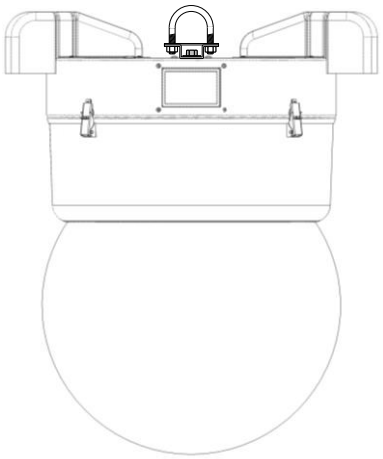
Use the two stainless steel mounting brackets provided with the Tornado 1900/1950.
Fix the holes in the bracket feet to a secure structure using 3/8” [M10] stainless steel hardware (not supplied).

Pole Mounting

To mount to the top of a pole, fabricate a plate with four 0.434”/11mm holes and weld to the top of your pole. Use these dimensions:



Pipe Mounting



Pipe Clamps

4900.MCT Pipe clamp, for pipes 1.5" (38mm) to 2" (50mm) OD. Order TWO per enclosure.
4925.MCT Pipe clamp, for pipes 2" (50mm) to 2.5"/64mm OD. Order TWO per enclosure.

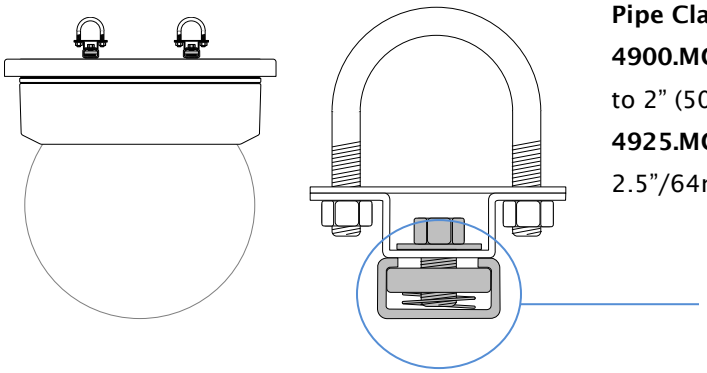
Pipe Clamps mount to the enclosure base in the same locations as the mounting brackets provided.

NOTE: Chesboro' style half-couplers may be used for temporary installations, but are not recommended for permanent installs.

Mounting – Tornado 2000 and up

- ⓘ Each Enclosure must be mounted with FOUR points.
- ⓘ Tempest Lighting recommends only stainless steel mounting hardware.
- ⓘ The bolts attaching the enclosure to its shipping pallet are mounting bolts. **Do not Discard.**
- ⓘ All mountings must be made using the two Unistrut channels on the base of the enclosure.

Pipe Mounting



Pipe Clamps

4900.MCT Pipe clamp, for pipes 1.5" (38mm) to 2" (50mm) OD. Order FOUR per enclosure.
4925.MCT Pipe clamp, for pipes 2" (50mm) to 2.5"/64mm OD. Order FOUR per enclosure.

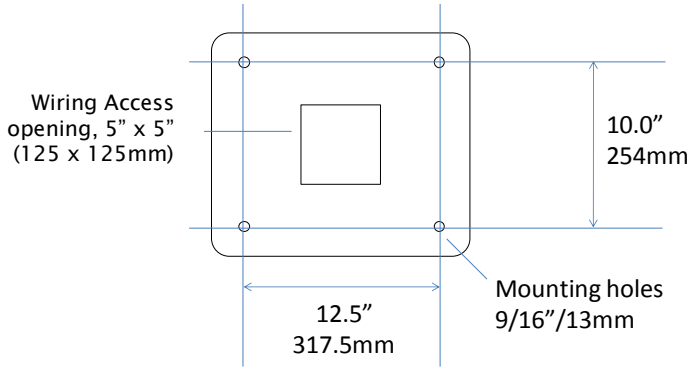
Note: These parts are supplied with the Tornado enclosure.

Mounting plate Guidelines

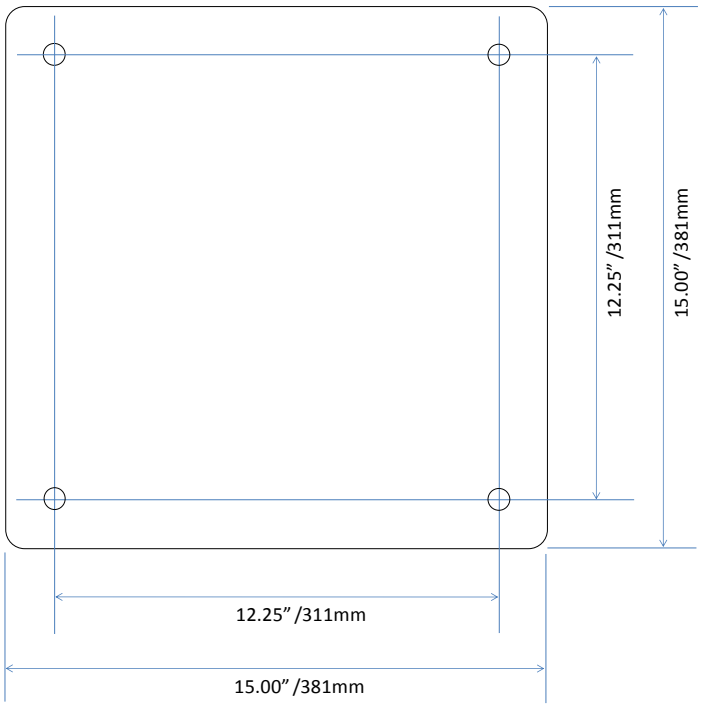
Use ¼" (6mm) or greater galvanized steel or stainless steel plate.

Do not obstruct wiring access.

Tornado 2000, 2200, 2300 Mounting Hole Pattern

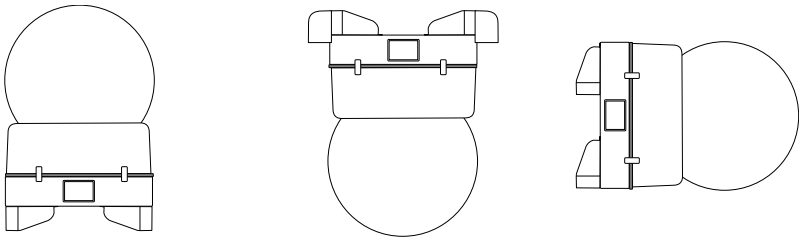


Tornado 2400 Mounting Hole Pattern

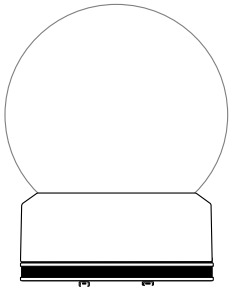


Orientation Guidelines

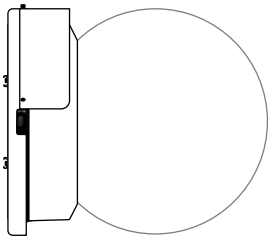
Tornado 1900.xx
Tornado 1950.xx



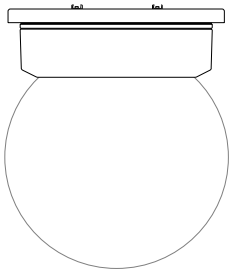
Tornado 2000.xx
Tornado 2100.xx
Tornado 2200.xx
Tornado 2300.xx



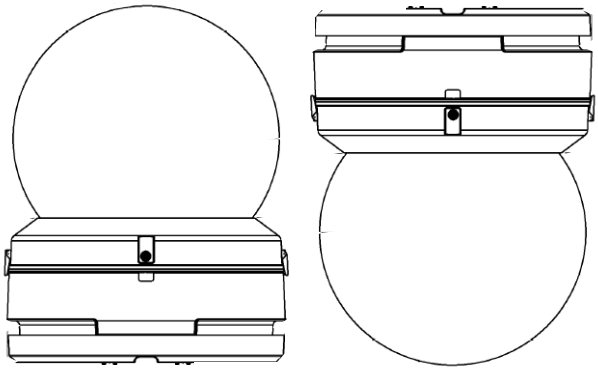
Tornado 2000.xxH
Tornado 2100.xxH
Tornado 2200.xxH
Tornado 2300.xxH



Tornado 2000.xxV
Tornado 2100.xxV
Tornado 2200.xxV
Tornado 2300.xxV

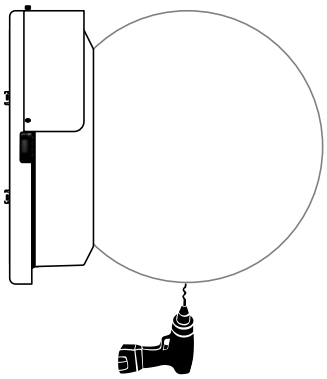


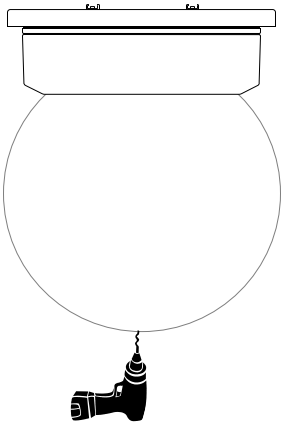
Tornado 2400.xx



Drainage

For base up/globe down or horizontal operation, a small drainage hole will be drilled in the globe, to permit any water draining through the enclosure to exit harmlessly.
This will normally be done at the factory, but if done on site, **YOU MUST USE THE APPROPRIATE TAPERED DRILL BIT, OBTAINABLE FREE OF CHARGE FROM TEMPEST LIGHTING.** A standard drill bit may crack the plexiglass globe. Tempest Lighting will not be responsible for such damage.





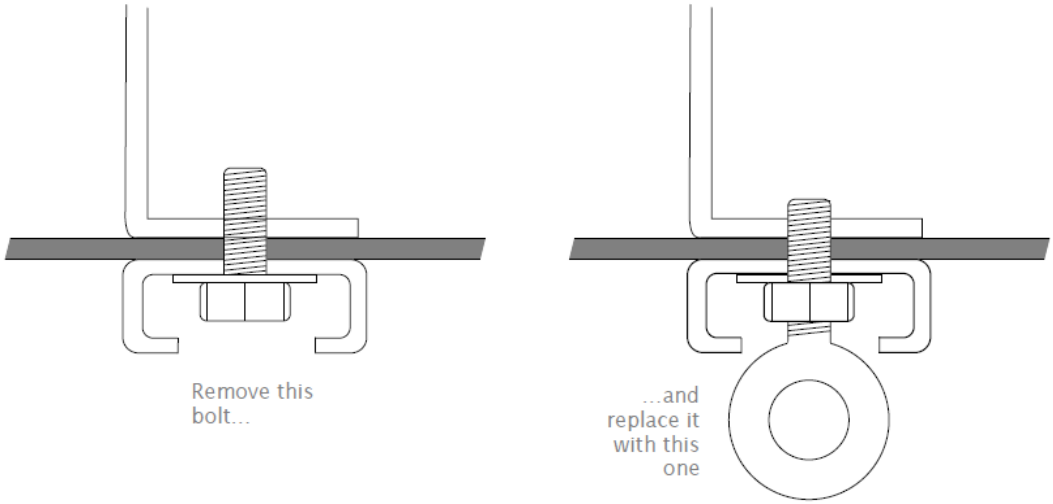
Horizontal Enclosures – be sure to replace the globe with the drainage hole at the lowest point after relamping.

Note: A tapered drill bit is included with all **Tornado 1900-1950** shipments. Weep holes must be drilled on site as part of the installation process.

Installation above public Spaces

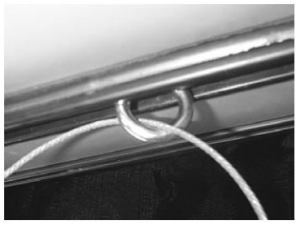
If the Tornado enclosure is to be installed above an area accessible to the public (eg a street or an auditorium), some jurisdictions require a safety bond to be installed.
A stainless steel eyebolt is included with base-up and horizontal versions, and should be installed as follows:

1. Remove one of the four bolts holding the Unistrut onto the enclosure base
2. Replace it with the eye bolt, washer and nut supplied, and screw down tight



Safety Bond

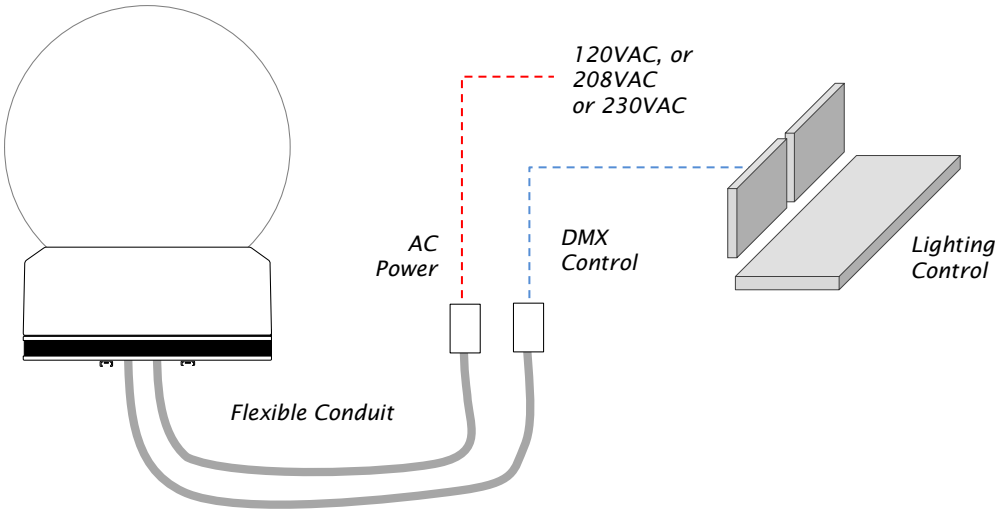
Use a suitably-rated steel wire rope, threaded through the eyebolt, and attach securely to a structural member, in accordance with local safety regulations.



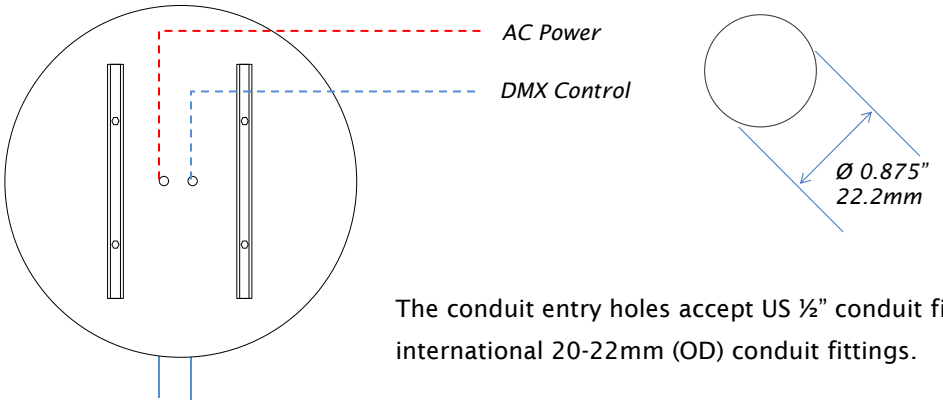
3 Wiring and Control

All electrical work must be carried out by a properly licensed electrician, in compliance with local electrical standards. Failure to observe this point will void the factory warranty for the Tempest Enclosure.

1. Switch off power to the branch circuit, carefully following lockout and tag-out procedures. Failure to do so could cause serious injury or death.
2. You will need two electrical junction boxes, located within a short distance from the enclosure, one for power, one for DMX control. Use outdoor-rated flexible conduit between the box and the enclosure.
3. AC and control circuits must be wired in separate conduits.



Conduit entry holes

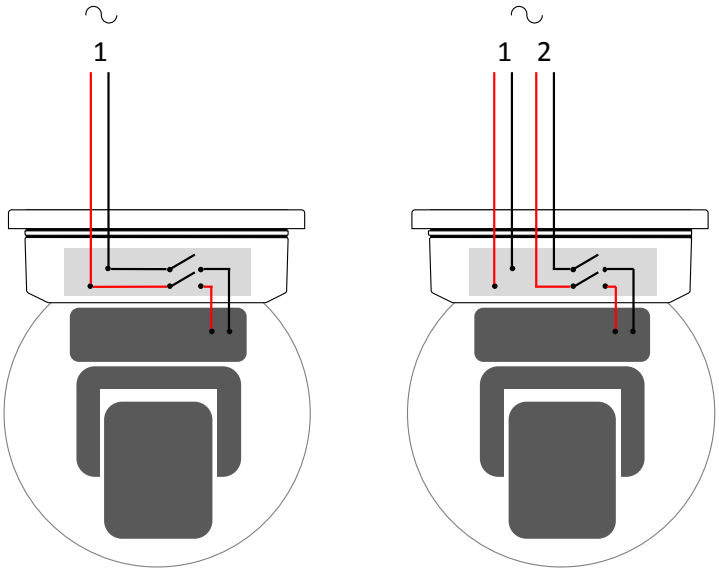


Power and DMX conduit entries

The conduit entry holes accept US ½" conduit fittings, and international 20-22mm (OD) conduit fittings.

For temporary installations, use a suitable cable and clamp in the same openings.

One or Two Power Circuits?



Single Feed Split Feed

Tempest enclosures may be wired on single or double line supplies. On a single feed, both enclosure and luminaire are permanently on. With a double-line supply, you can switch off the luminaire when not in use, while the enclosure continues to protect it 24/7.

Single Feed

- Enclosure and luminaire are permanently on.
- Enclosure and Luminaire must be rated for the same voltage.
- Supply must be rated for luminaire current plus 150 watts.
- Supply must be permanently ON.

Split feed

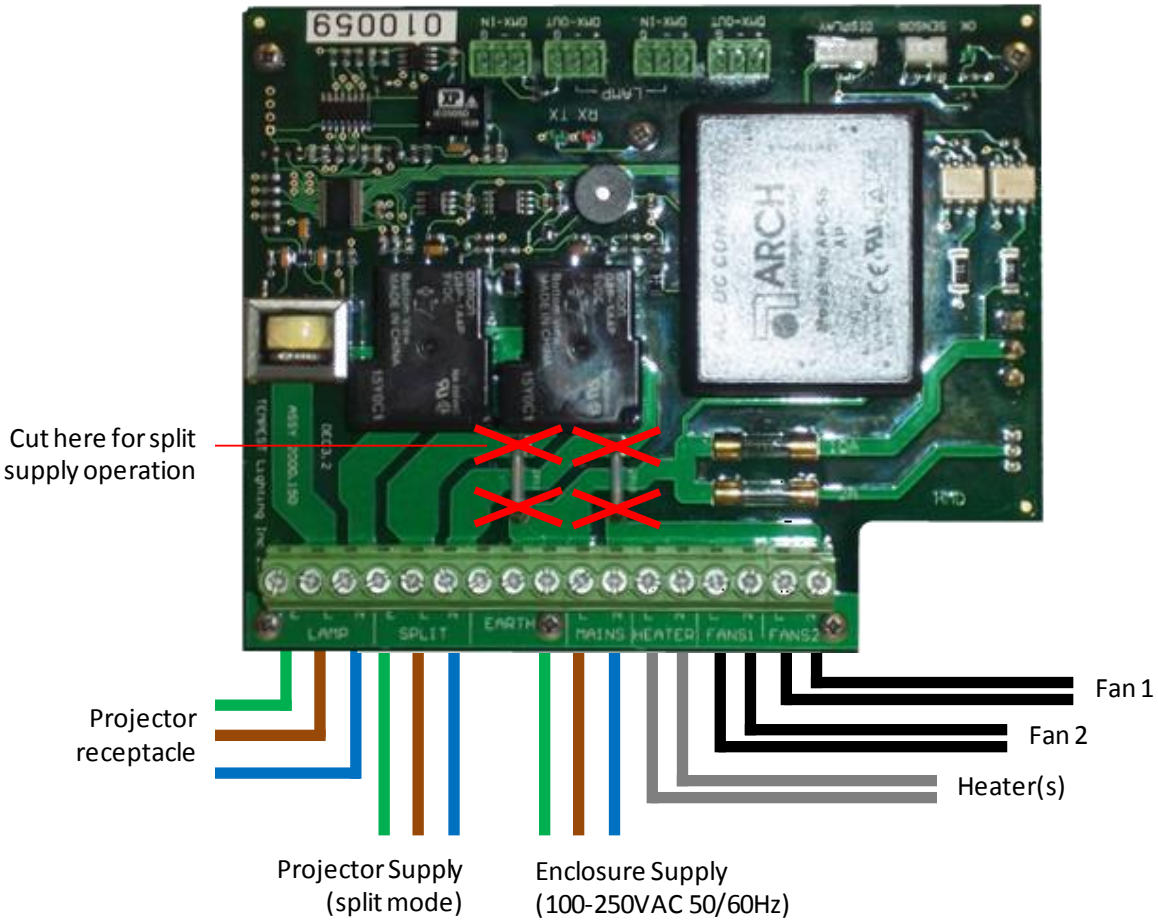
- Enclosure power must be permanently ON.
- Luminaire power may be switched off.
- Enclosure power must be rated for 1150 watts.
- Luminaire power must be rated for the luminaire (see luminaire manual).
- Luminaire and enclosure power must be same voltage.

Either way, the enclosure must be powered 24/7, in order to protect the luminaire inside against condensation and extremes of temperature.
Since the enclosure heater(s) never operate when the projector/fixture lamp is on, it is NOT necessary to rate the power service for the SUM of the enclosure and the projector/light fixture.

IMPORTANT **Tempest enclosures are supplied for either 120VAC 50/60Hz, or 208-240VAC, 50/60Hz operation. Tempest Lighting is not liable for damage or failure to operate correctly due to connection to an inappropriate electrical supply.**

ALL ELECTRICAL CONNECTIONS MUST BE UNDERTAKEN BY A QUALIFIED ELECTRICIAN, IN COMPLIANCE WITH LOCAL NORMS AND STANDARDS.

Split Feed Connections



Note: wire colors may differ depending on applicable electrical standards. European wire colors are shown here.

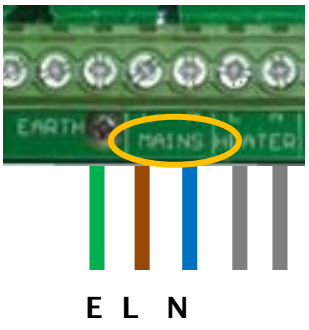
IMPORTANT: MAKE SURE THAT TERMINAL SCREWS ARE FULLY BACKED OUT BEFORE INSERTING WIRES.

Common Feed Connection (factory default)

Enclosure and projector share the same electrical circuit.

Circuit must be powered ON 24/7.

Connect incoming power to the terminals labeled **MAINS**:

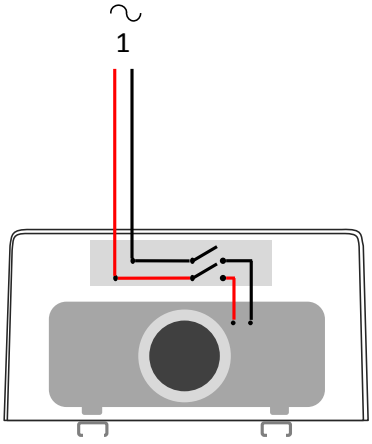


E L N

(E) Earth/Ground

(L) Live

(N) Neutral



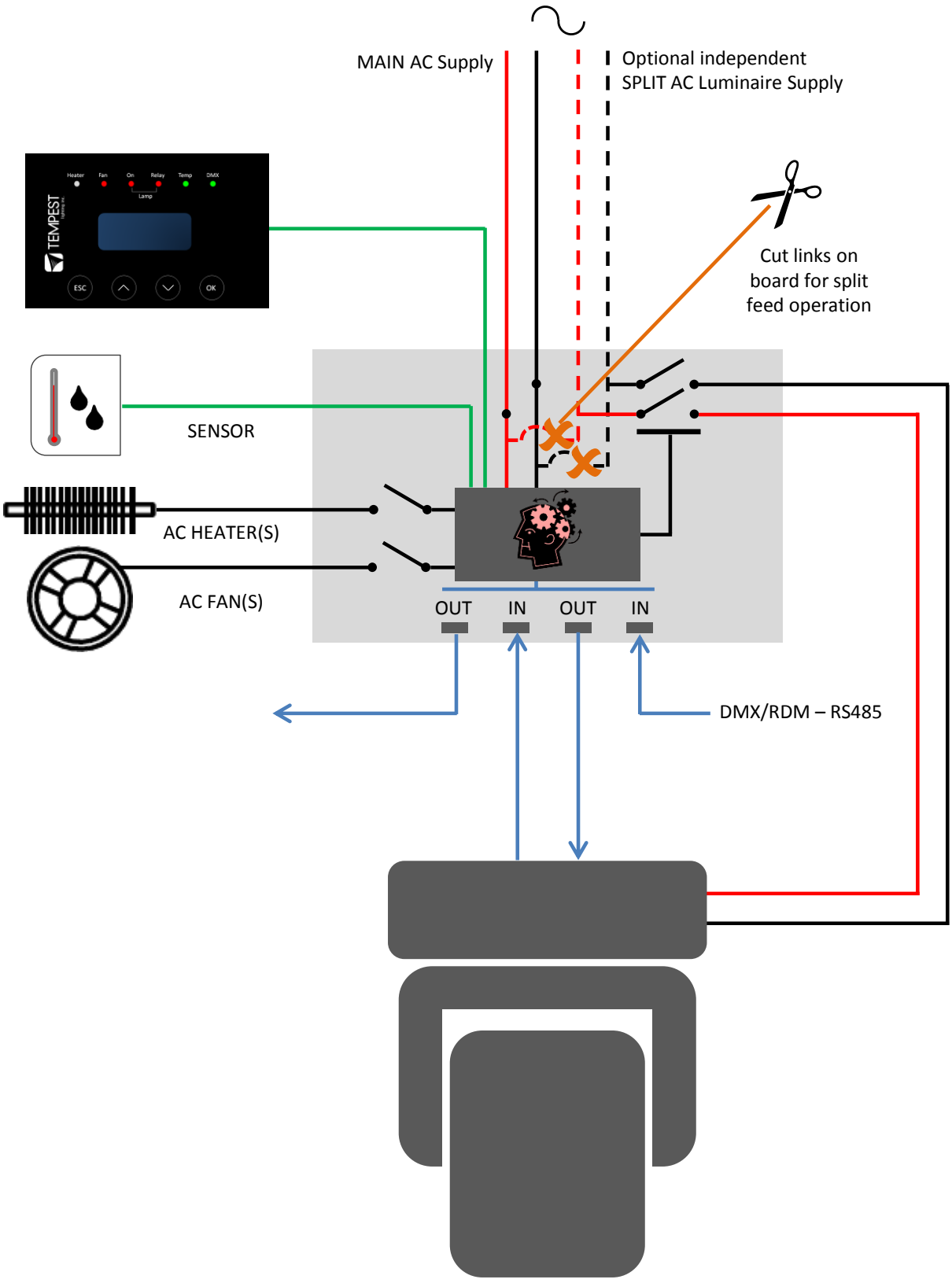
4 Digital Enclosure Control

DEC3.3™ with Goldilocks™

DEC3.3™ – that's *Digital Enclosure Control, third Generation, revision 3* – is the brain of your Tempest enclosure. It will maintain the internal environment in a comfortable temperature and humidity range, and prevent condensation – the real killer of outdoor equipment. DEC3.3 monitors internal temperature, humidity and lamp current at all times, and uses this information to control the enclosure's lamp relay, fan(s) and heater(s). It can report back over the DMX cable, using the RDM protocol (Remote Device Management) if desired.

From summer 2013 DEC is running Tempest's new ***Goldilocks™*** operating system (patents pending). A completely new OS, ***Goldilocks*** analyzes temperature and humidity trends, targeting and maintaining safe ranges, and acting to prevent condensation before it happens. ***Goldilocks*** is also much more energy-efficient than previous generations, so your equipment is always in the Goldilocks zone, and you save money too.

DEC3.3 Schematic



DEC3.3 Main Functions

1 Sense current to luminaire (lamp on/off)
2 Record lamp hours
3 Monitor temperature and humidity inside Enclosure
4 Maintain temperature at safe operating level
5 Maintain relative humidity within safe limits
6 Prevent condensation
7 Isolate luminaire in case of unsafe temperature
8 Report status over RDM
9 (Optional) remote luminaire relay control over DMX

DEC3.3 constantly monitors the following parameters:

- Luminaire/Luminaire power
- Line Voltage
- Temperature
- Humidity

DEC 3.3's patented Goldilocks™ algorithm uses a combination of heaters and fans to maintain a safe operating temperature and a safe relative humidity level that will not allow condensation to take place.

As air is heated it is able to support more moisture without condensing, so Goldilocks uses heat to raise the air temperature inside the enclosure in the event that relative humidity approaches dewpoint.

Factory Settings – Basic Mode

In most applications, DEC3.3 will operate correctly with its factory default settings, in Basic operating mode.

You do not need to do anything. Please skip to the ***Power Connections*** section below.

If your needs are more complex, read on.

Operating Modes

DEC3.3 may operate in one of four modes, set using either the Front Panel or by RDM control. In all configurations, the luminaire inside the enclosure may also be an RDM enabled device.

Basic Mode (factory setting)

- Standard temperature settings
- DMX and RDM disabled
- Best for standalone operation

Monitor Mode

- As Basic mode, plus:
- RDM status reporting
- RDM configuration – settings may be changed remotely or at the enclosure control panel
- DEC3.3 does not require a DMX signal to operate

Control Mode

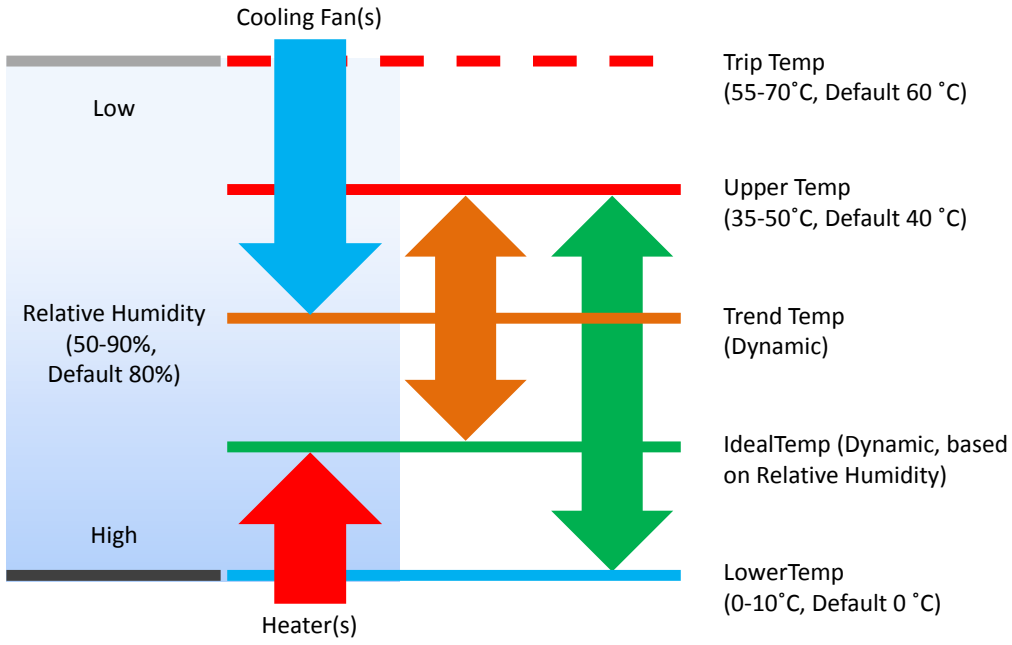
- As Basic mode, plus:
- Enclosure functions as a 1-channel DMX device, with remote control of the lamp relay
    - DMX level > 75% enables normal relay operation (normally ON)
    - DMX level < 25% disables normal relay operation (relay turns OFF)
    - This allows you to force a hard reset of the lamp relay in the event of a luminaire malfunction
- Control mode is recommended for show control applications, but can be risky in live show operation, since the DMX slot used for the enclosure MUST be kept high to prevent the lamp relay from opening.

Service Mode

- For trained service personnel only
- Normal operation is suspended and the enclosure functions as a 3-channel DMX device:
    - Lamp Relay (Slot 1)
    - Fans (Slot 2)
    - Heater (Slot 3)
- Service mode is ONLY for troubleshooting – DO NOT use Service mode for normal operation.

DEC3.3 Control Parameters

Temperature and Humidity Ranges:



Notes:

1. *In moving light enclosures the temperature sensor is located in the exhaust airflow. Temperatures shown may be higher than those around the luminaire.*
2. *We recommend using the factory default settings for several weeks or months before making any changes. In most cases they will not be necessary.*

Max Humidity Range 50-90%, *Default 80%*
The threshold at which air inside the enclosure is heated to raise dewpoint and prevent condensation. Setting a higher Max Humidity is not a bad thing in high-humidity climates. Setting the Max Humidity too low will result in unnecessary heating and excessive energy use. So set the Max Humidity at the top end of the relative humidity likely to be experienced on site.

DMX Address *Range 001-510, Default 001*
Sets the DMX address for the lamp relay control. *(See also DMX Response)*

Set Temp Units Display Degrees Celsius or Fahrenheit. Default Celsius
Note that temperature settings must always be Celsius.

Lamp Hours *Default 0000*
Counts lamp hours – you must reset to zero when changing lamps.

Lamp On Point The lamp current at which DEC detects the luminaire/luminaire lamp is running. Default is 1 Amp, which allows for equipment fans and power supplies to run

without changing the air in the enclosure. Lamp on point may be set in 0.2 Amp increments between 0.2 Amps and 2.0 Amps.

Start-up Validation

When you switch power ON to the DEC3.3 controller (firmware 01.00.006 and up), the following indications will confirm that the major system elements are working correctly:

- BEEP! – a loud beep indicates that the processor has initialized and is functioning correctly.
- FANS – fans run for three seconds
- HEATER – the heater turns on for 15 seconds. This is enough to get warm to the touch.

DMX Connections

DMX refers to USITT DMX512, a commonly used control protocol in the entertainment industry, running over RS485. Consult USITT DMX installation guidelines when laying out a system, or employ a qualified DMX system integrator.

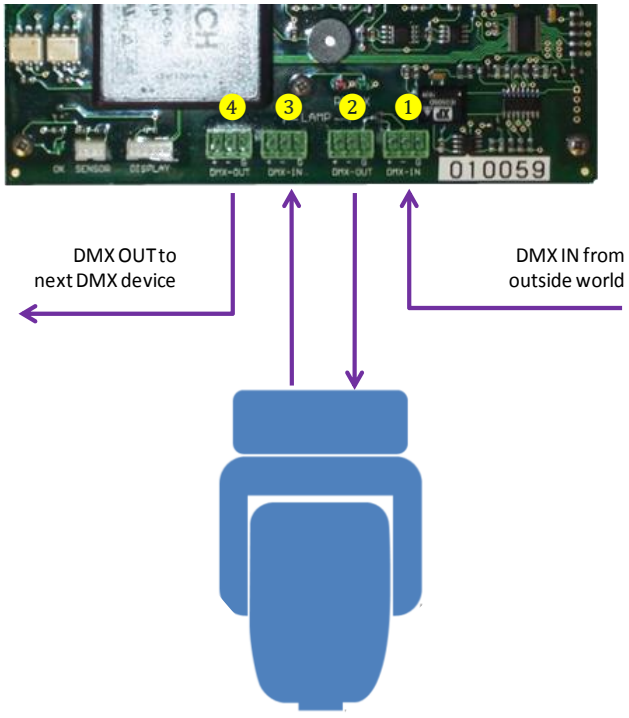
A DMX network will be required if:

a) The luminaire inside the enclosure requires a DMX control signal

b) You wish to monitor the enclosure using RDM

c) You wish to control the enclosure lamp relay over DMX

DMX Terminations



Note: DMX will not normally be used in luminaire installations.

Pinout: (1) Ground, (2) Data -, (3) Data +.

DMX Connectors:

1 DMX IN from network

2 DMX OUT to luminaire (or to network if not controlling luminaire)

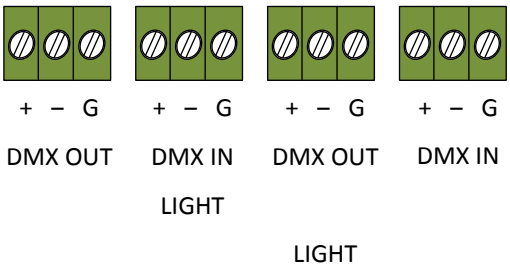
3 DMX IN from luminaire

4 DMX OUT to network

Note: If the enclosed equipment does not use DMX, then connector (2) on the controller is DMX OUT for the enclosure.

DMX Line Terminations

DMX cable runs must be terminated at the far end of the cable run with a termination resistor as detailed in the DMX512 standard.



The individual equipment installed inside the Tempest enclosures must NOT be terminated. It is recommended that any line termination is done using the 3-pin terminal connector fitted to the DEC3.3 control circuit board.

Remote Device Management (RDM)

RDM refers to ANSI E1.20, a control protocol in the entertainment industry used for device configuration and monitoring, and essentially an "extension" of DMX512. The use of RDM is optional, and uses *the same RS485 cable connection* as DMX512, so ***no additional wiring*** is required if DMX is already present. The user must ensure that any DMX splitters or other routing devices used are RDM operable as well as DMX use. Tempest strongly recommends working with a qualified RDM system integrator when designing an RDM network. Go to www.tempest.org for contact information.

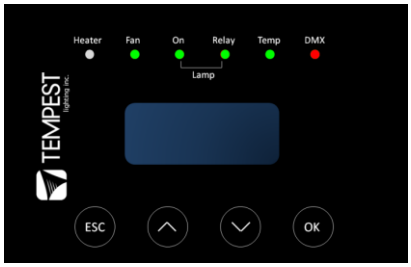
RDM and RDM Integration

DEC3.3's RDM implementation allows system integrators to remotely configure, control or monitor DEC3.3 attributes, including:

- Relative Humidity
- Air Temperature
- PCB Temperature
- Lamp Current
- Elapsed Lamp Hours
- Lamp Relay Status
- Fan Relay Status
- Heater Relay Status
- DMX Status
- DMX Start Address
- DMX Personality (RDM Mode)
- Device Type
- Device Label
- Software Version

RDM is an effective and powerful tool for commissioning and monitoring an installation, particularly in large systems. For further guidance, please consult a qualified RDM system integrator. Tempest Lighting warrants DEC3.3 to be compliant with the RDM standard, but is not an RDM systems integrator, and can offer only basic guidance on RDM utilization.

Control Interface



LED Indicators

Heater	ON (Green)	Heater is ON, to maintain lower temperature level or to prevent condensation
Fan	ON (Green)	Lamp is ON, **or** Temperature is HIGH and Fan is cooling enclosure. Short burst when lamp off indicates fan moving air to stabilize temp/humidity
Lamp On	ON (Green)	Current sensing shows lamp is ON Lamp hour counter is running
	OFF	Current sensing shows lamp is OFF Lamp hour counter is not running
Lamp Relay	ON (Green)	Lamp relay is closed (normal) Luminaire power receptacle is energized
	ON (Red)	Lamp relay is open due to over-temperature event. Luminaire power receptacle is isolated.
Temp	FLASHING (Green)	Temperature is below lower temp setting
	ON (Green)	Temperature is in normal range
	ON (Amber)	Humidity is above target limit
	ON (Red)	Temperature is above top setting
	FLASHING (Red)	Temperature is above Trip level Luminaire power is isolated
DMX	OFF	DEC3.3 is in BASIC Mode – DMX not used. **OR** DEC3.3 is in Monitor or Control Mode and no valid DMX or RDM packet has been detected.
	ON (GREEN)	Good DMX or RDM data packet received.
	ON (RED)	Control Mode: DMX Fail. A previously good DMX signal has failed. Monitor Mode: No RDM information being received (this is normal)

Control Display

The display on the Control display provides additional status information, depending on the operating mode:

Basic Mode &
Monitor Mode

28˚C 47%
209V OFF

internal temperature, relative humidity
line voltage, lamp status

DMX Mode &
Service Mode

28˚C 47%
209V OFF

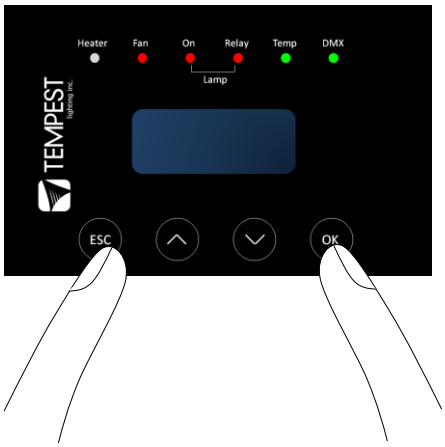
internal temperature, relative humidity
line voltage, lamp status

Alternating with:

DMX: 001
No DMX

DMX Start Address
DMX Status

Control Interface Operation



The Control Interface is normally LOCKED.

To UNLOCK, hold **ESC** and **OK** together for 5 seconds.

You are now in the **CONTROL MENU**

Use ↑ ↓ to scroll up and down the menu.

Press **OK** to enter a menu item

Use ↑ ↓ to set the item parameter, or to scroll to the next menu level.

Use **ESC** to go BACK, and **OK** to confirm settings (↵).

To LOCK, hold **ESC** for 5 seconds.

Menu will time out after ten minutes.

Control Menu

SET DMX OPTIONS

SET DMX MODE

From the Front Panel, this menu item allows the user to check (and if necessary change) the RDM mode.

BASIC	Standalone operation, no DMX/RDM (factory default)
MONITOR	Standalone, plus support for RDM remote configuration and monitoring
CONTROL	Monitor, plus use of a single DMX slot to control Lamp relay
SERVICE	Monitor, plus use of three DMX slots to control Lamp, Heater and Fan

Important: Please ensure that the DEC3.3 is NOT left in Service Mode.

SET DMX ADDRESS (in Monitor, Control or Service modes)

Select a DMX starting address in the range 001 to 510

1 – Lamp Relay

In Service Mode an addition two slots are available

2 – Fan Duty Control

3 – Heater Duty Control

Note that the DMX control is designed using a SAFETY pile-on Logic. So the DMX input can only override automatic settings within safe limits.

SET DMX CURVE

DMX Curves affect the way the fixture relay is controlled in Control Mode.

DMX levels are shown as %.

Response Curve 1 (default)

DMX level 0-25 Relay disabled (open)

DMX level 26-75 *No change to relay status*

DMX level 76-100 Relay enabled (normally closed)

Response Curve 2

DMX level 0-19 *No change to relay status*

DMX level 20-40 Relay disabled (open)

DMX level 41-59 *No change to relay status*

DMX level 60-80 Relay enabled (normally closed)

DMX level 81-100 *No change to relay status*

SET DMX RESPONSE

DMX Response sets a delay time before DMX Control Mode settings are acted on. Setting a response delay of a few seconds would prevent unintended fixture relay state changes in the event of a short accidental change in DMX level.

NOTE: from firmware revision 0.00.100, DEC holds last valid DMX level if DMX is interrupted.

Response Delay Values are:

No Delay (default), 1, 2, 5, 10, 15, 20, 30, 60 seconds.

SET TEMP UNITS

Choose to display temperature values in Celsius or Fahrenheit (default Celsius)

Note that temperature settings must be entered in Celsius.

SET TEMP RANGES

Set three temperature trigger points for Bottom, Top and Trip temperatures, in ˚C.

SET TEMP LOWER *(minimum temperature to be maintained)*

(default 0˚C, permissible range 0-10˚C).

SET TEMP UPPER *(maximum desired temperature)*

(default 40˚C, permissible range 35-50˚C).

SET TEMP TRIP *(temperature at which load will be isolated – see note)*

(default 60˚C, permissible range 55-70˚C).

Note: A thermal emergency is when enclosure ventilation fails with the lamp on, in which case the temperature will rise very quickly. To avoid nuisance tripping we recommend setting a higher Trip temperature, 60˚C or above.

SET MAX HUMIDITY

(default 80%, permissible range 50-90%).

Set target maximum relative humidity level. This should be set at or a few % higher than the normal high humidity levels expected on site.

SET LAMP ON POINT

The lamp current at which DEC detects the luminaire/luminaire lamp is running. Default is 1 Amp, which allows for equipment fans and power supplies to run without changing the air in the enclosure. Lamp on point may be set in 0.2 Amp increments between 0.2 Amps and 2.0 Amps.

RESET LAMP HOURS

Reset each time you change the lamp in the luminaire/luminaire.

Make this a part of your maintenance instructions.

STATUS DISPLAY

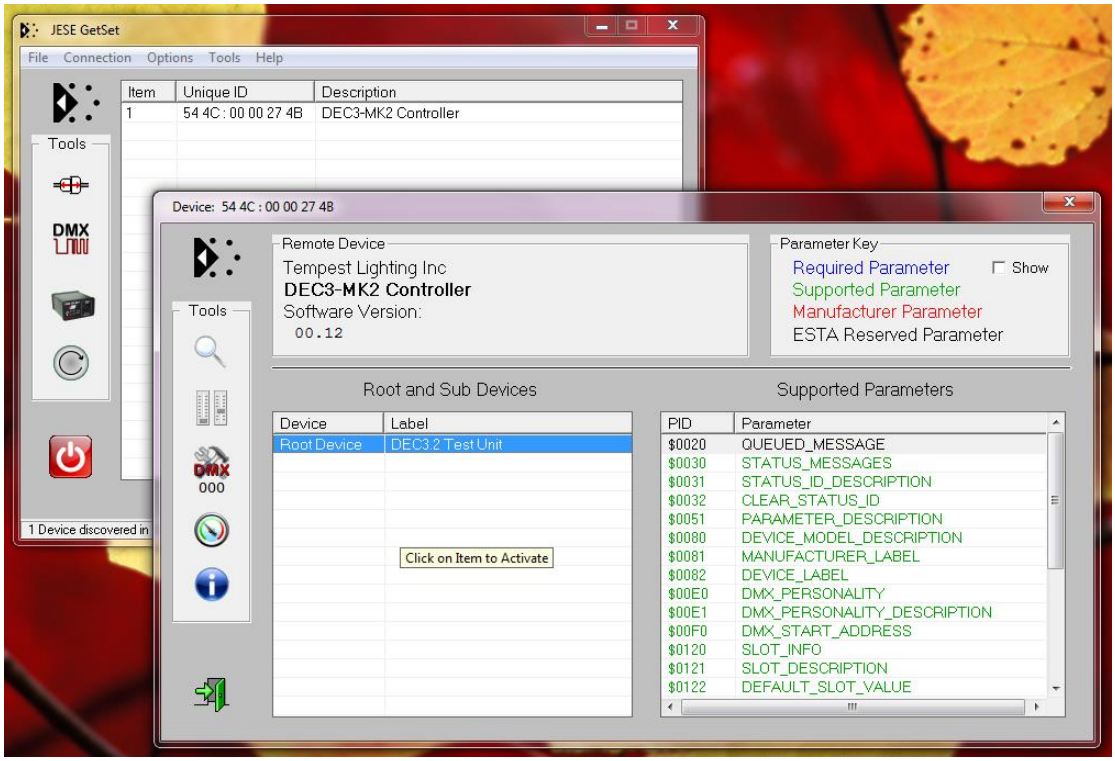
View current status information, using the arrow keys to scroll through:

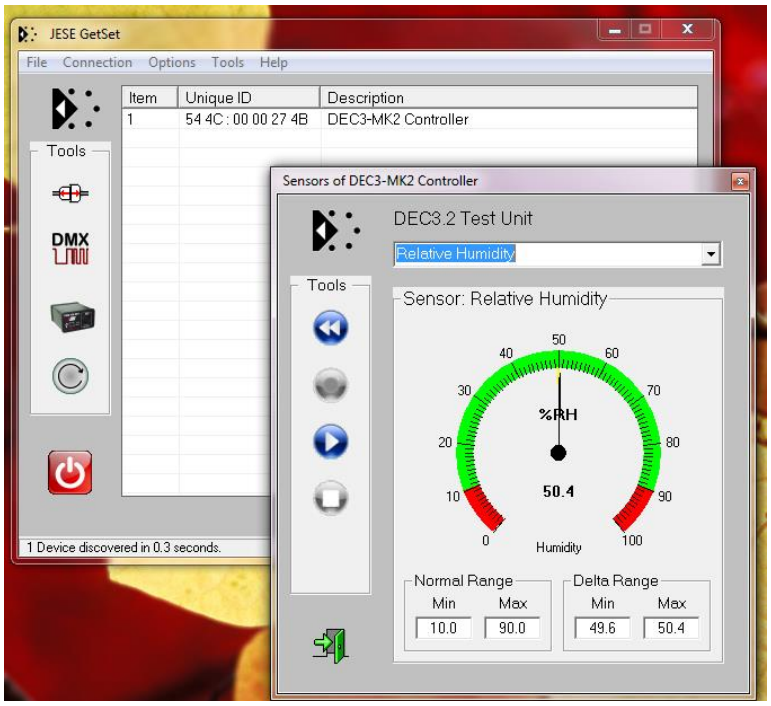
a) Humidity – relative humidity in %
b) Air temperature, in degrees C or F
c) PCB temperature (this will usually be significantly higher than air temperature)
d) Voltage – line Voltage reaching the DEC
e) Current being drawn by luminaire/light, in Amps
f) Lamp Hours elapsed since last reset
g) Firmware version

RDM Monitoring and Configuration

All the features accessible over the DEC3.3 control panel are also available over RDM. Just how this information is displayed will depend on the RDM interface used. These screen shots were taken running the GetSet program in Windows 7, and connecting to a DEC3.3 controller using a RDM TRI MK1 interface, **Tempest part # 2000.190**

GetSet gives you a powerful RDM front end suite, with Tempest-specific functions and displays.





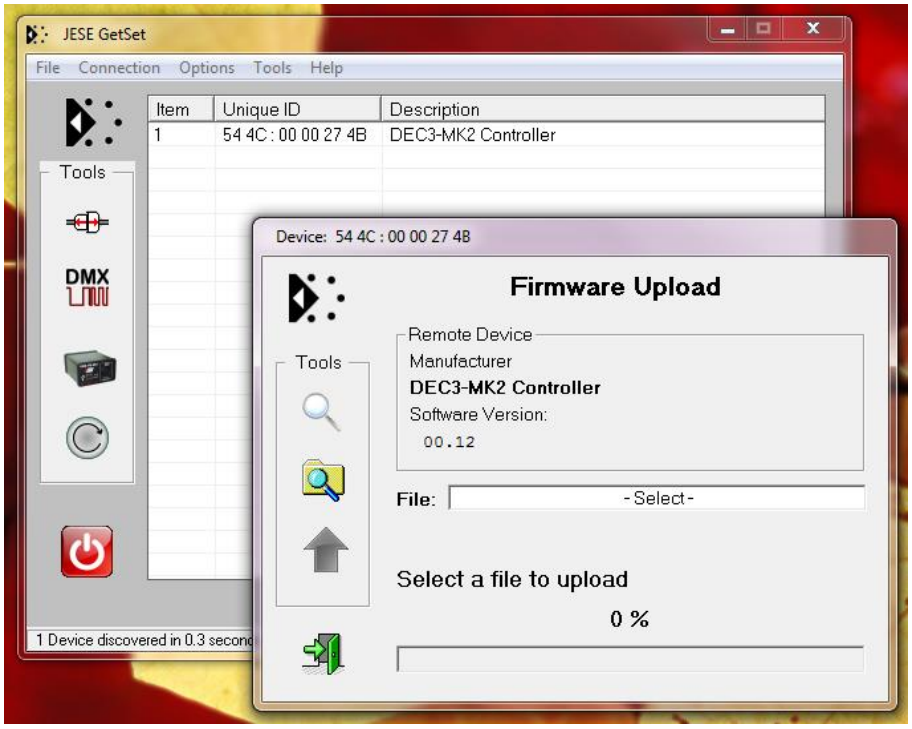
This view shows a single DEC3.2 test unit that has been correctly discovered and labeled by the GetSet software suite, and a log of RDM messages.

This RDM interface provides a graphic view of the various sensor functions supported by DEC3.2 and up

Important:

Check that your RDM interface vendor has tested his interface with Tempest enclosures and all other RDM devices you plan to use on the same network.

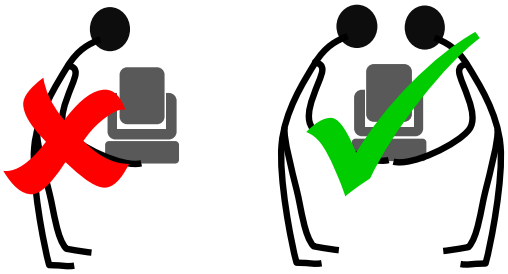
Firmware Upgrade over RDM



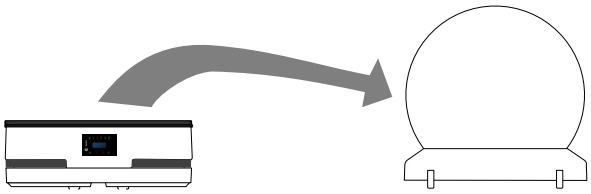
DEC3.3 firmware is field-upgradeable, using RDM. A field upgrade requires a JESE RDM TRI MK1 interface to be connected to the DMX network on which the DEC3.3 is located, and the use of JESE GetSet software. The kit is available from Tempest under part # 2000.190.

5 Mounting the Luminaire

- Do not attempt to mount the luminaire with only a single person.

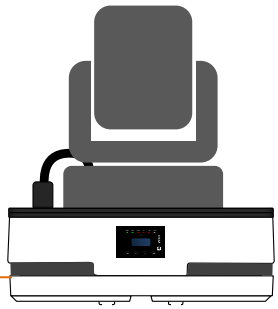


1 Remove the globe and place it in a safe location.

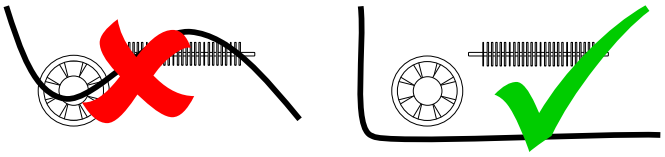


2 Follow the instructions below for different luminaire types

3 Plug the luminaire into the power receptacle in the enclosure, and then connect the DMX cables to the luminaire



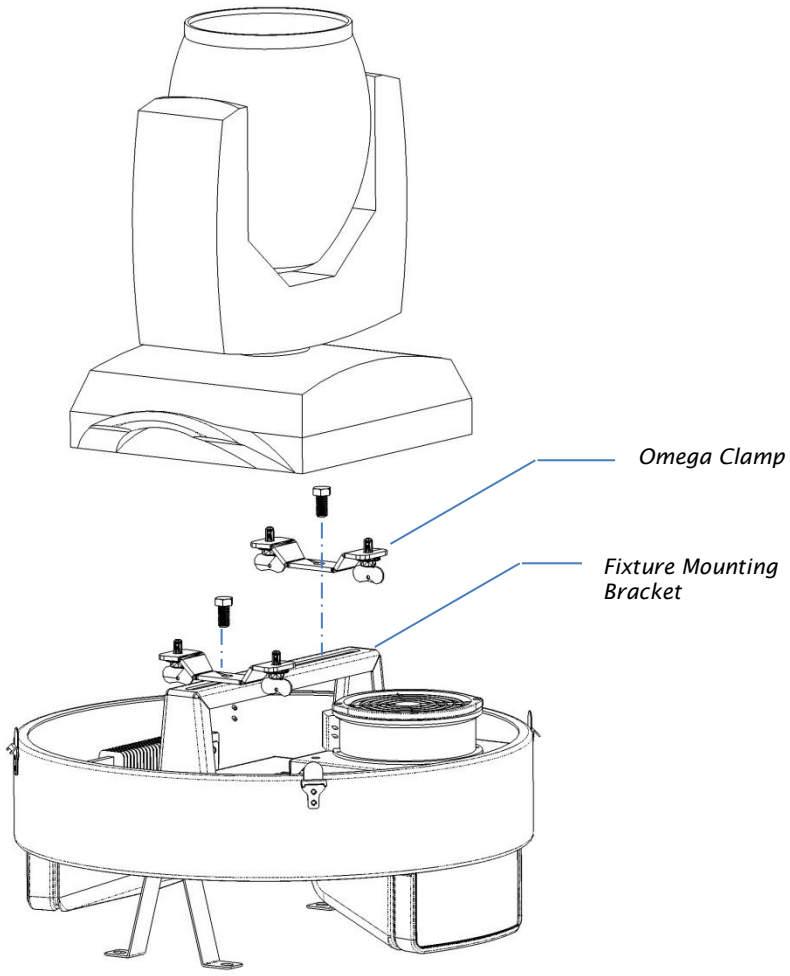
4 Tie down cables (to the luminaire or enclosure base) so that they will not come into contact with the heater or fans at any point.



Tornado 1900-1950

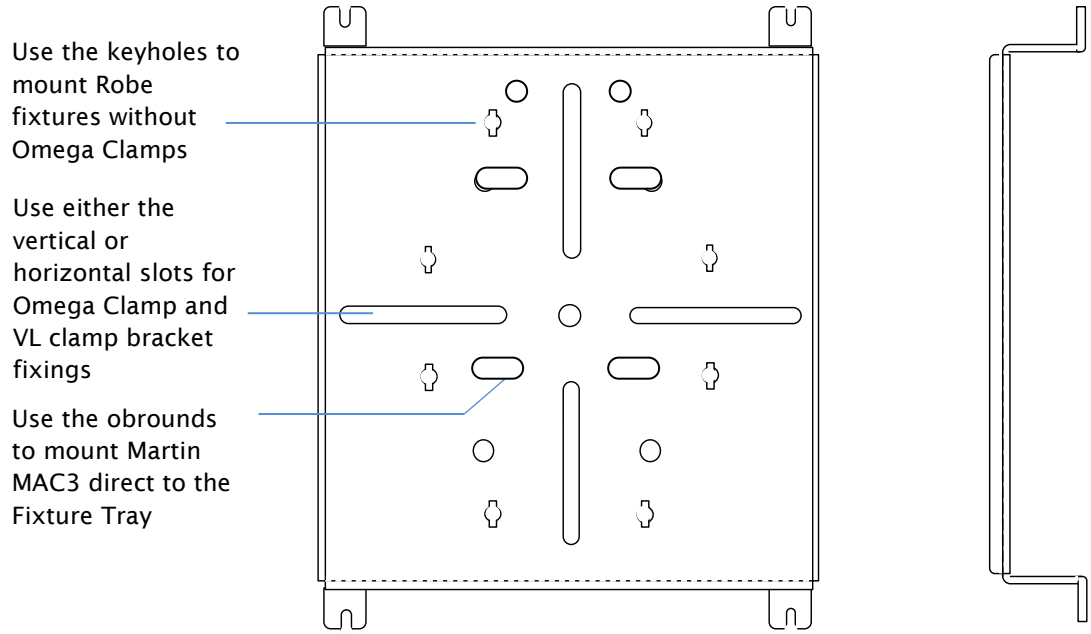
Mount the luminaire on its omega clamps on the fixture mounting Bracket.

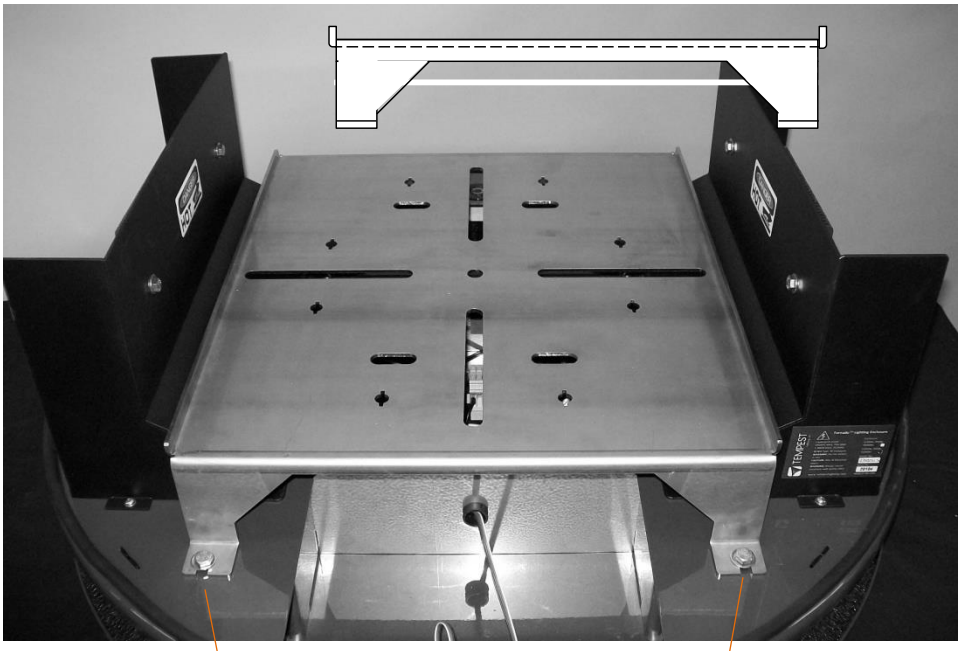
Note: *Depending on the size of the fixture base, it may be easier to remove the fixture bracket before attaching the omega clamps and luminaire.*



Tornado 2000, 2100, 2200, 2300

Fixture Tray



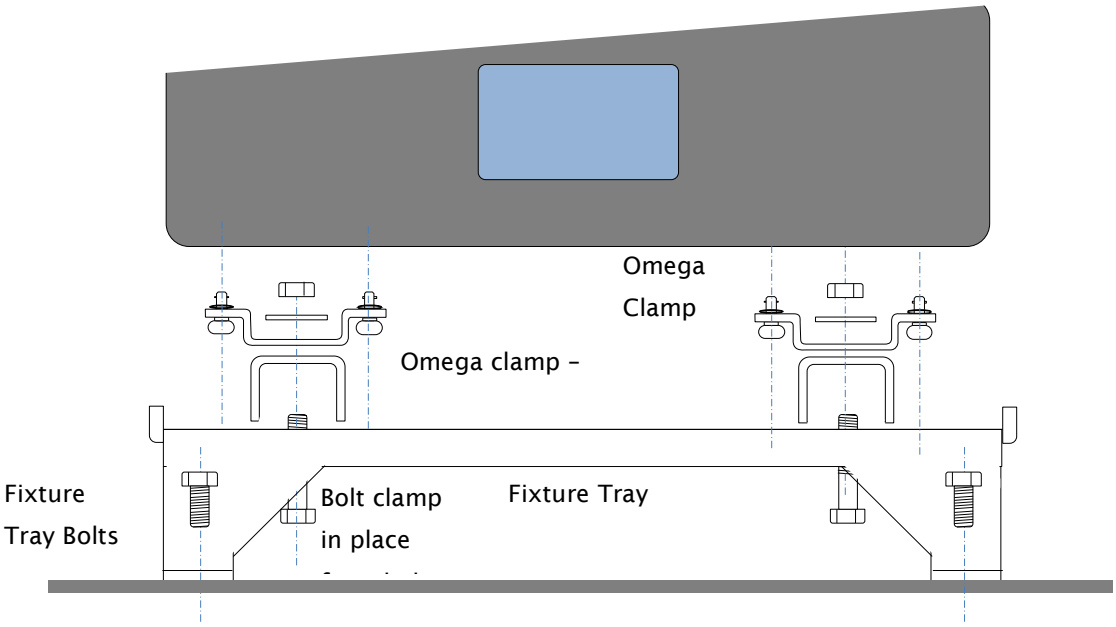


Luminaires with Omega Clamps

This applies to most luminaire types:

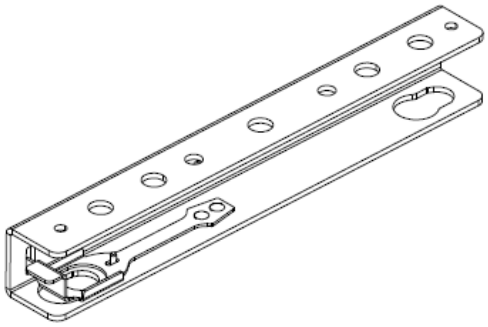
1. Remove the Fixture tray from the enclosure, as shown above.
2. Mount the Omega clamps securely onto the fixture base. Make sure that the fasteners lock positively in place.
3. Bolt the clamps to the fixture tray, using the Omega Clamp Spacers and the bolts provided. CHECK THAT THE FIXTURE IS CENTERED ON THE FIXTURE TRAY.
4. Replace the fixture tray/fixture assembly in the enclosure, and bolt firmly in place.

Diagram – Mounting with Omega Clamps and Clamp Spacers



Vari*Lites and the Vari*Lite Hook Bracket

Vari*Lites are provided with a Hook Bracket in place of an Omega Clamp.



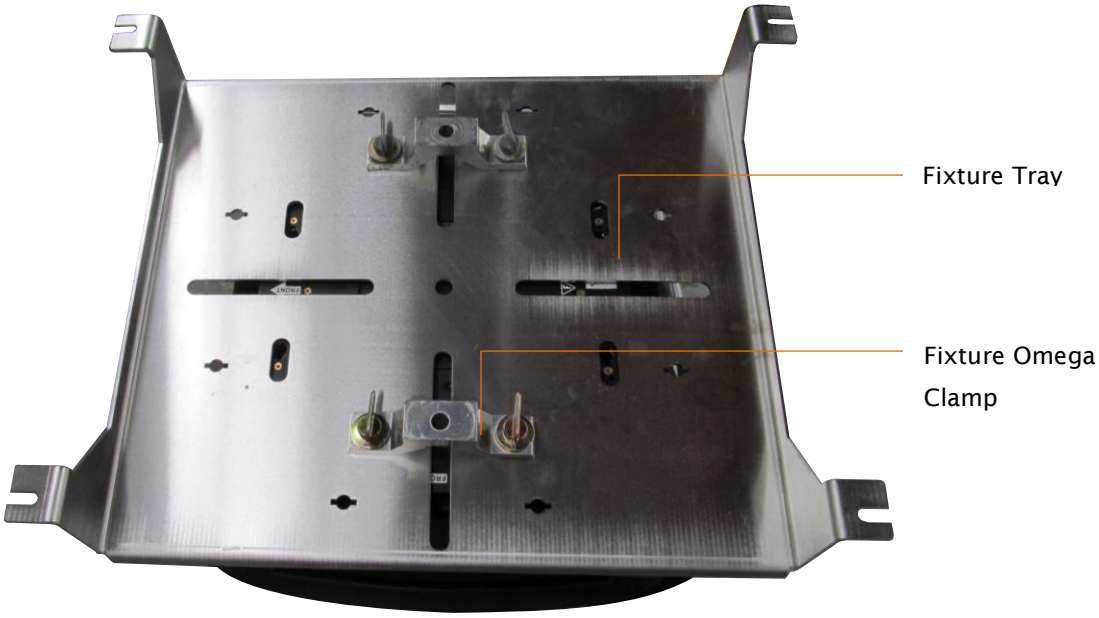
1. Attach the Hook Bracket to the VL fixture feet, following instructions provided by Vari*Lite.
5. Remove the Fixture tray from the enclosure, as shown above.
6. Bolt the Hook Brackets to the fixture tray, using the bolts provided. CHECK THAT THE FIXTURE IS CENTERED ON THE FIXTURE TRAY.

Replace the fixture tray/fixture assembly in the enclosure, and bolt firmly in place.

Martin MAC III and other tall Luminaires

The MACIII is too tall to use in a Tornado 2300 with Omega Clamps installed in the usual way. In this case, and in similar cases, the fixture must be secured in place with the omega clamp BELOW the fixture tray.

1. Remove the Fixture tray from the enclosure, as shown above.
2. Carefully place the fixture on its side on a flat surface, and identify the mounting holes in the Fixture Tray that line up with the fixture mounting locations.
3. Fit the quarter-turn fasteners through the Fixture Tray into the receptacles in the fixture base:
4. Mount the omega clamp into the quarter-turn sockets in the fixture base, through the holes provided in the fixture tray.
5. Make sure that all quarter-turn fasteners are fully rotated (clockwise) and positively locked, and that the luminaire is firmly attached to the fixture tray



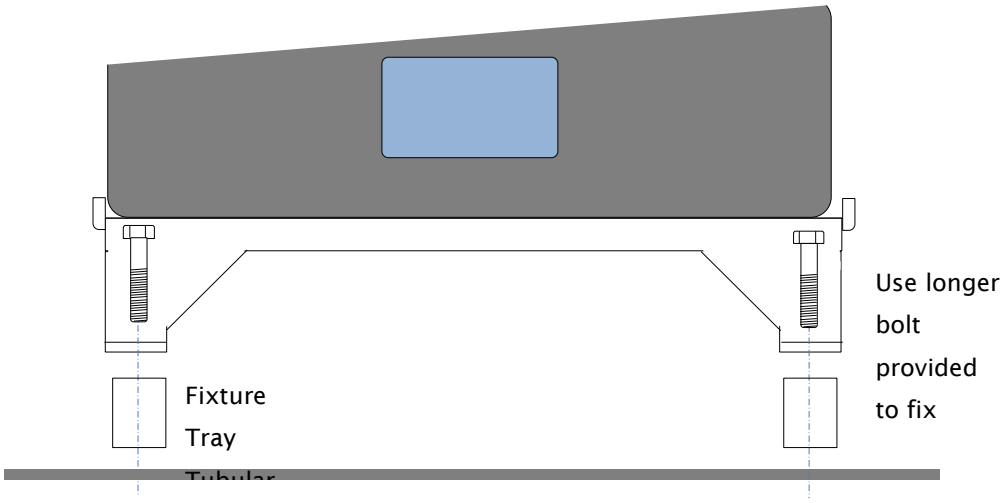
6. Replace the fixture tray/fixture assembly in the enclosure, and use the 5/16 bolts provided to secure firmly in place

Shorter Luminaires Requiring Bracket Standoffs

In order to align the center of the luminaire correctly in the Tornado enclosure, some fixtures need the Fixture tray to be raised. This is done with tubular standoffs that insert between the Fixture Tray and the enclosure Base. The installation procedure is the same as for any of the above, except that the fixture standoffs must be inserted when the Fixture Tray is remounted.

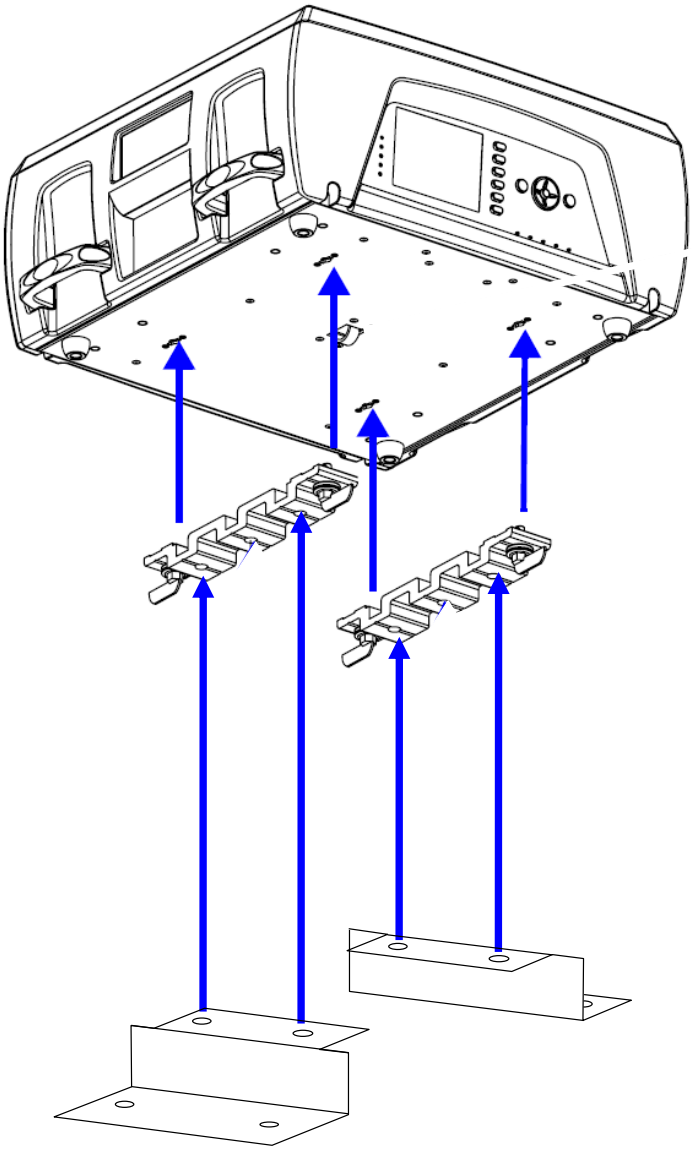
If the fixture you specified when you ordered your Tornado enclosure requires bracket standoffs, they will have been supplied. If none are supplied, your fixture does not require them.

Diagram – Fixture Tray Standoffs



Mounting the Luminaire – Tornado 2400

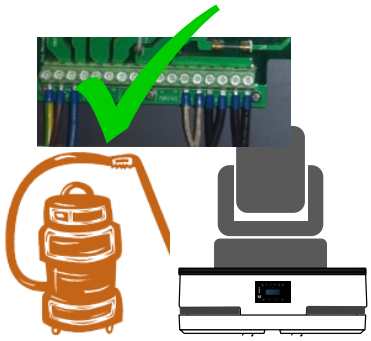
The Tornado 2400 is designed to house the Barco/High End Systems Showgun, Showbeam, Showpix and DL3 luminaires, all of which have the same base.
The Tornado 2400 is supplied with two heavy-duty mounting brackets, which bolt to the extruded clamps supplied with the Showgun/Showbeam/DL3 fixture.
Mount the clamps to the enclosure brackets, then set the fixture on the clamps and secure using the quarter-turn fasteners provided.



Note: DML1200 Fixture: When the Tornado 2400 is specified for the Barco DML1200, it will be supplied with a custom fixture mounting plate that bolts directly into the fixture base.

6 Closing up the Enclosure

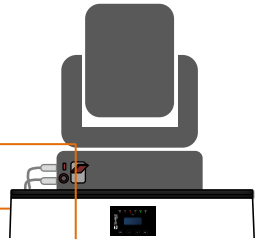
1 Check all electrical connections



2 Clear the enclosure and luminaire of all dust and debris.

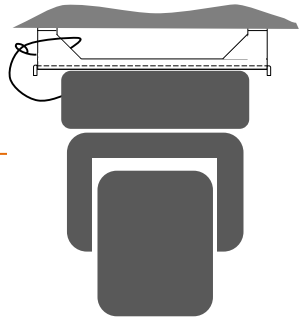
3 Check that the power switch on the luminaire is in the ON position.

4 Complete DMX control connections, following luminaire manufacturer's instructions.



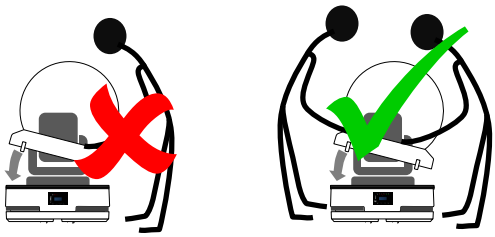
5 Test luminaire

6 Safety cable the luminaire to the Fixture Tray leg (horizontal and vertical enclosures).



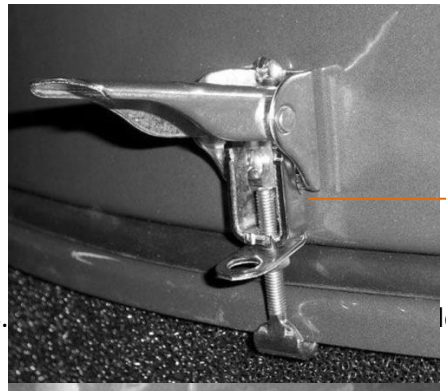
7 Tie down cables (to luminaire or mounting brackets) so that they will not touch heaters or fans.

8 Replace the globe assembly on the Tornado base. This requires two people.



Securing the Globe to the Tornado Enclosure Base

1. Using two people, lift the globe assembly in place.
2. As soon as the globe assembly is in place, secure the four latches, and insert padlocks in the locking rings, if required, for additional security.
3. IMPORTANT: The latch tension is adjustable, and has been set in the factory to assure a secure and weathertight seal. Check to make sure the tension is maintained.



Tension adjustment screw and locknut.

4. lock (not supplied) for additional security if desired.

Latch properly secured, with a caribiner in place.

Congratulations! Your system is now ready to check out.

7 Operation

- ⓘ Enclosure must receive power at all times. It is an active, climate-controlled enclosure, and will not provide proper protection for the luminaire inside if it is not connected to AC power.
- ⓘ Unless the enclosure or luminaire is undergoing routine maintenance, the globe should be in place and locked down at all times.
- ⓘ Only authorized personnel should open the enclosure (see maintenance warnings in the next section).
- ⓘ If the ambient temperature is high enough, the over-temperature shutdown feature may engage and temporarily cut off power to the luminaire. Once the temperature reaches acceptable levels, power will be automatically restored.
- ⓘ **Do not** routinely operate luminaire in full sun in warm weather. Black luminaires absorb a significant amount of energy from the sun and may overheat in these conditions. The enclosure has not been designed to protect the luminaire when running in this kind of extreme condition (outside lighting is generally used at night).

8 Routine Maintenance

It is very important to perform routine maintenance on both the enclosure and the luminaire within. Failure to do so may reduce lifetime for both the enclosure and the luminaire.

Note

Maintenance schedules depend on location and environment. The times given here are general guidelines for you to use. It is up to you to judge whether maintenance should be done more often. We do advise doing these tasks no less often than mentioned here.

Safety

- Although maintenance can be performed while the enclosure is powered, it is safer to carry it out with the power disconnected with proper lockout and tag out procedures followed.
- Be aware that once the enclosure has had power applied to it, the heater will get hot and the fans will start to turn. Make sure that your hands are clear of these areas before applying power to the enclosure.
- Only authorized personnel should perform maintenance on the enclosure or luminaire
- Do not service the unit in the rain or other adverse weather conditions (snow, sleet, high winds, etc.).
- Be aware that the globe is a large object that can be awkward to handle, especially when standing on a ladder or scaffolding.

Inspection Checklist: - Every Three (3) Months

- ☐ All weep (drain) holes should be clear
- ☐ All vents should be free of debris
- ☐ Enclosure should be free of debris both inside and out
- ☐ Bolts should be tight
- ☐ All safety cable should be in good condition
- ☐ Lid seal should be in good condition, Check seal inside and out for gaps.
- ☐ Globe should not be cracked
- ☐ Fans should be moving (it will be necessary to have the power on to check this), with corresponding indicator status

Except for the last two items (concerning globe and fan), problems with any of these things can be easily remedied. Contact technical support for problems with the last two items.

Air Filters - Every Three (3) Months

The air filters all around the base should be removed and cleaned on a regular basis. To remove filters, pull them directly out of their grooves. The filters can be cleaned by running water from a hose and do not require any special solution.

To reinstall, push filter back into place between the top and bottom base covers.

Case and Globe - As Needed

The outside of the case and globe should be cleaned as needed. Outside inspection should give you a good idea of when this is necessary. The case should be cleaned with a wet cloth and mild detergent (if necessary). Do not use a direct spray from a hose to clean the case. The globe can be

cleaned with any mild cleaner. It is also acceptable to treat globe with a product that keeps rain from adhering to its surface.

DO NOT USE hydrocarbon-based cleaners on the globe under any circumstances. They can severely damage the globe material.

Luminaire

Review the manufacturer's instructions for proper maintenance of your luminaire. Remember, the enclosure simply protects the luminaire and is not a substitute for regular maintenance.

9 Troubleshooting

This is a guide to the general symptoms, problems, and solutions that may occur during the lifetime of your enclosure. However, it is important to remember that problems may occur within the luminaire itself and these must also be considered.

Luminaire does not have power.

- Check power switch of luminaire. (Note: the following actions should be performed by a licensed electrician) If power is on, check wiring (including metering supply voltages, enclosure must receive 200-240VAC to operate properly). If LEDs on the DEC3 control panel controller are lit, check the Lamp Relay LED. If it is on, meter power in receptacle. If no power is present at the receptacle, contact technical support.
- If DEC controller is set to DMX mode, check that a DMX address has been set and that the DEC is receiving a valid DMX signal with the appropriate channel HIGH.
- If using SPLIT POWER FEEDS, check that both the MAIN and SPLIT feeds are energized.
- In case of over-temperature, the power disconnection is an intended function of the enclosure and is for the protection of the luminaire, which is not meant to operate in extreme conditions. In this case, the problem will only continue until temperature drops to acceptable levels. It is possible that the air intake or exhaust has become clogged, leading to higher temperatures inside the enclosure. Make sure that these areas are clear, the filters are clean, and the fans are working properly.

Luminaire turns on and off repeatedly

- Check that vent areas and airways are clear. If so, ambient temperature may be too high (see over-temperature note above) or luminaire may have internal problem.

Luminaire does not respond to DMX signal.

- Make sure that luminaire has power. If so, check DMX wiring. If not, see above.

Fans are not spinning.

- Fan cords may have become disconnected. Check connections between fan and cord.
- Fans may be obstructed. Shut off power to enclosure and check for obstructions. Turn power back on to see if fans will start spinning. If fans do not turn and display on temperature controller is lit, contact technical support. If fans do not turn display is not lit, then enclosure is not receiving power. Turn off all power and check wiring. If the wiring is correct, contact technical support.

Excessive debris in unit.

- Filter may not be fully pushed into groove. Make sure that it is in place around the whole unit.
- Excessive water in enclosure.
- Weep (drain) holes may be clogged. Clear them.

Latches do not latch properly.

- Closure of globe may be obstructed. Check to make sure seals are clear before replacing globe.

10 Limited Warranty

All sales are subject to the company's Standard Terms and Conditions, available for download at www.tempest.org. The following is an extract.

INSPECTION/WARRANTY/RETURNS.
A. Customer, at its sole expense, shall inspect all Goods promptly upon receipt and accept all Goods that conform to the specifications or catalog. All claims for any alleged defect in or failure of the Goods or Seller's performance to conform to the Contract, capable of discovery upon reasonable inspection, must be set forth in a written rejection notice detailing the alleged non-conformity, and be received by Seller within thirty (30) calendar days of Customer's receipt of the Goods. Failure by Customer to notify Seller of the alleged non-conformity within thirty (30) days will be conclusive proof that the Goods have been received by Customer without defects or damage, and in the quantities specified on the bill of lading and shall constitute an irrevocable acceptance of the Goods and a waiver of any such claim in connection with the Goods.
B. Seller warrants to Customer only that the Goods will be free from defects in material and workmanship at the time of delivery and, subject to the exceptions and conditions set forth below, for the following period (the "Warranty Period"): twelve (12) months from the date of shipment by Seller. Seller may provide additional years of warranty coverage beyond 12 month, at the rate of 2.5% of the net sale price per year, up to a total of four additional years' coverage beyond the standard 12 month warranty period. Seller will remedy a defect as set forth in paragraph 7 D, below, (the "Warranty"). The Warranty is subject to each of the following exceptions and conditions:
1. Customer must promptly (and in all events within the Warranty Period) notify Seller of any alleged defect in a written notice (the "Notice") which shall set forth the quantity, catalog number, finish, original purchase order number, Seller's invoice number on which Goods were originally billed and a statement of the alleged defect, along with digital photographs showing such defects where feasible.
2. The Warranty shall not apply: (i) to any claimed defect that was capable of discovery upon reasonable inspection and deemed to be waived under paragraph A, above; (ii) to any Goods that have been subject to misuse, abnormal service or handling, or altered or modified in design or construction; (iii) to any Goods repaired or serviced by any person other than Seller's authorized service personnel or to Goods installed other than according to installation instructions, or (iv) with respect to normal wear and tear.
3. Seller makes no Warranty with respect to parts or components that are not the product of Seller, and specifically makes no warranty whatsoever for equipment housed inside enclosure products manufactured by Seller.
4. The Warranty is Seller's exclusive warranty with respect to the Goods. Seller makes no warranties, guarantees or representations, express or implied, to Customer except as set forth in this section. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR USE OR FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED AND DISCLAIMED.
C. Seller will accept the return of Goods properly rejected under paragraph A, above, or as to which Notice of an alleged breach of Warranty has been timely given and such Goods may be returned to Seller, freight prepaid, but only upon Customer's receipt of Seller's written return material authorization ("RMA") and shipping instructions. The RMA shall be void if the Goods are not received within 45 days after issuance of the RMA. No deduction or credit in respect of any rejected or returned Goods shall be taken until Customer has received Seller's further written deduction or credit/authorization following Seller's inspection to confirm nonconformity or defect. Seller will charge to Customer any and all costs incurred by Seller in connection with the handling, shipping, inspection and disposition of any returned Goods that are determined by Seller not to have been nonconforming upon Delivery or as to which the warranty hereunder is not applicable.
D. UPON ANY PROPER RETURN PURSUANT TO PARAGRAPH C, ABOVE, WHETHER IN CONNECTION WITH A REJECTION OF GOODS OR AN ALLEGED BREACH OF WARRANTY AND BASED UPON THE CONDITIONS SET FORTH IN THIS PARAGRAPH 7, SELLER AGREES THAT IT WILL, AS THE SOLE AND EXCLUSIVE REMEDY UNDER THE CONTRACT OR OTHERWISE, FOR ANY NONCONFORMITY OR BREACH OF WARRANTY, AND AT SELLER'S SOLE ELECTION: (i) REPAIR SUCH GOODS; OR (ii) REPLACE SUCH GOODS.

11 Tempest Product Support

Step 1: First contact your local Dealer for support. Your dealer is best placed to respond quickly to your needs.

Step 2: If your dealer is unable to answer your questions please contact

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