



User Manual Cyclone

Revision 8.6

March, 2021

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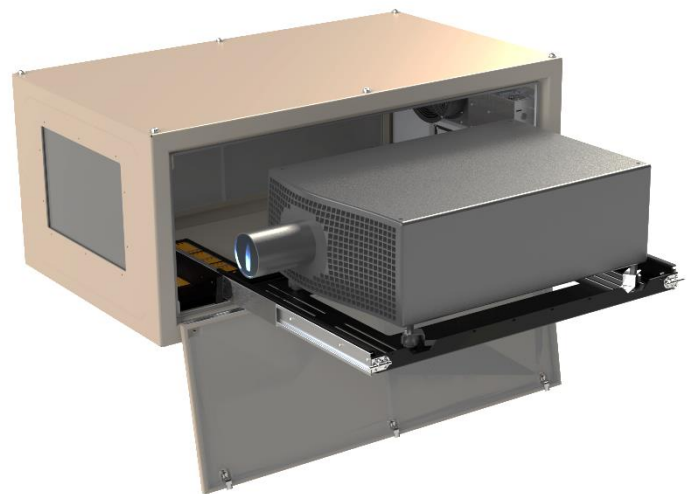


Table of Contents

Table of Contents.....	2
Approvals – Europe	6
Approvals – China	7
Introduction	8
IMPORTANT: Safety Advisories	8
Installation.....	9
Dimensions, Weights & Rigging Points.....	9
Access Clearance	10
Snow Clearance	10
Mounting Hardware Options	11
Mounting Bolts	11
Mounting Options – Unistrut Kit	11
Mounting Options – Stacking Kit	12
Mounting Options – Swivel Stacking Kit.....	12
Cyclovator 2 Tilt Kit.....	13
SAFETY WARNING.....	13
Cyclovator – Unistrut Mounting Rails.....	13
Cyclovator – Inlet Cowl	13
Fixing the Cyclovator in Place	14
Mounting the Enclosure.....	15
Setting the Show Position Stop.....	16
ActiveCool™ Cooling System	17
Salt Fog Filter Kit Installation	18
Anti-Vibration kit Installation.....	19
Condensate Drain Hose.....	19
Important – Note these Warnings:.....	20
ActiveCool Internal Filter	20
Mounting Hole Patterns.....	21
Connecting the Air Hoses.....	21
Power Connection	21
ActiveCool Temperature Gradient	22
ActiveCool Control Settings	23
Set the ON/OFF Switch.....	24
ActiveCool Troubleshooting Guide	25
Basic Troubleshooting.....	25
Advanced Troubleshooting.....	25
Cyclone User Manual	2

ActiveCool dimensions	27
Using AC Assist with Cyclone Enclosures	28
Estimating Heat Loads	28
Connecting to the Enclosure(s)	28
Connecting Air Hoses	29
Manifolds and Dampers	30
AC Assist Dimensions	31
Wiring the Enclosure	32
Power Wiring	32
SAFETY NOTICE	32
Electrical Standards	32
AC Supply Voltage	32
Wiring Access	33
One or Two Power Circuits?	34
Single Feed Power Termination	35
Split Feed Power Termination	35
North America 208V, Japan 200V Single Feed	36
North America 208V, Japan 200V Split Feed	36
International, 230V Single Feed	37
International, 230V Split Feed	37
Remote Monitoring Connections	38
RS485 (DMX/RDM) Cable Terminations	39
Line Termination Switch Settings	40
DEC4 Ethernet Adapter – 51.EN	41
Default Configuration	41
Additional Support	41
Tempest Equipment Management Protocol	42
Projector Power Control using DMX512	43
DMX/RDM Network, using JESE RDM-TRI	44
Positive Pressure Fan Control Option	45
Digital Enclosure Control	46
Schematic	46
DEC4 Main Functions	47
Firmware Revision	47
Factory Settings – Data Modes	47
Hardware Indicators & Fuses	48
Operating Modes	49
RDM Only Monitor (Factory Default)	49

RDM+DMX Control	49
RDM+DMX Service	49
DEC4 Control Parameters	50
Control Interface	51
User Interface LCD Display.....	52
Control Interface Operation	52
Control Menu.....	53
Set Data Options.....	53
Set Temp Units	54
Set Temp Ranges	54
Set Max Humidity	54
Set Lamp On Point.....	54
Reset Lamp Hours.....	54
Set Fan Function	55
Status Display.....	55
Safe Mode	56
Safe Mode – What to do:.....	56
DEC4 Firmware Updates	58
Direct Firmware Update (System Control Board only)	58
Indirect Firmware Updates	62
Requirements	62
Installation Procedure	62
Mounting the Projector.....	67
Projector Mounting - Landscape	67
Projector Mounting – Landscape, Feet-up	68
Projector Mounting – Portrait/8 rigging points	68
Projector Mounting – Portrait/4 rigging points	70
Projector-specific Mounting	71
Christie D4K-40 RGB - Landscape	71
Christie D4K-40 RGB – Portrait	72
DPI Insight 4K	73
UST Projector Mounts	73
Important: Check Lamp-on Current	74
Connect Projector and Aux Equipment.....	74
Projector Connector Types	75
Routine Maintenance	76
Clean Port Glass.....	76
Check Filter	76



Check Temperature/Humidity Sensor	77
For After Sales Support	77
Troubleshooting.....	78
Warranty	79
Appendix – TEMP Protocol.....	80
Physical Layer.....	80
Developer’s Guide	80

Approvals – Europe



CERTIFICATE AND DECLARATION OF CONFORMITY
FOR CE MARKING

Tempest Lighting, Inc.

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www.tempest.biz

Tempest Lighting, Inc. declares that their

Cyclone Projector Enclosure Series 55.xxx.xx

complies with the Essential Requirements of the following EU Directives:

Low Voltage Directive 2014/35/EU Test Report 60065-6500-01-14

Electromagnetic Compatibility Directive 2014/30/EU Test Report 61000-6500-03-14

and further conforms with the following EU Harmonized Standards:

EN 60065 : 2014/AC:2016 Test Report 60065-6500-01-16

EN 60529:1991/AC:2016-12 Test Report 60529-6500-02-16

EN 61000-6-3:2007+A1:2011 Test Report 61000-6500-03-14

EN61000-6-1:2007 Test Report 61000-6500-03-14

EN55015:2019/A11:2020 Test Report 61000-6500-03-14

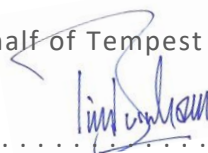
Dated: 21st September 2020

Position of signatory: President

Name of Signatory: Tim Burnham

Signed below:

on behalf of Tempest Lighting, Inc.



Approvals – China



强制性认证目录外产品确认书
Confirmation Letter for Products
Outside the Scope of China Compulsory Certificate

Ref. No: CL-TEMPEST-160818-1

申请人: Applicant: Tempest Lighting Inc.		地址: Address: 11845 Wicks St., Los Angeles, CA 91352 United States	
生产厂名称: Factory: Tempest Lighting, Inc.		地址: Address: 11845 Wicks St., Los Angeles, CA 91352, USA	
产品名称: Product Name: 投影仪外壳, 灯具外壳 Projector Enclosures Moving Light Enclosures Lighting Enclosures	型号: Model: 18xx.IN, 19xx.IN, 2xxx.IN, 66xx.IN, 52.xxx.IN, 53.xxx.IN, 54.xxx.IN, 55.xxx.IN, 56.xxx.IN	商标: Trademark: Tornado, Twister, Thunder, Blizzard, Whispr, Typhoon, Cyclone, Tacit	
产品标准: Standard: /		HS code: 9405.99.0000	
产品描述(包括使用场所) Product Description (utilization of product) : Enclosures for high-powered luminaires and video projectors for outdoor use and indoor noise attenuation. For professional use only. 产品为用于户外和室内噪声衰减大功率灯具和视频投影仪的外壳。仅供专业使用。			
确认意见 Conclusion: According to the product description, the models above are out of CCC scope 基于产品描述, 如上型号的产品在中国强制性产品目录之外。 本确认书的有效有效期至: August 18th, 2017 Validity Period			



Introduction

Thank you for purchasing a Tempest enclosure! We have worked hard to provide you with the very best product available for its purpose, and we shall continue to do everything possible to ensure that it works well for you for many years to come.

Please read this manual before starting work!

In the event of difficulty, please contact your Tempest reseller or Tempest direct:

info@tempest.biz

+1 818 787 8984

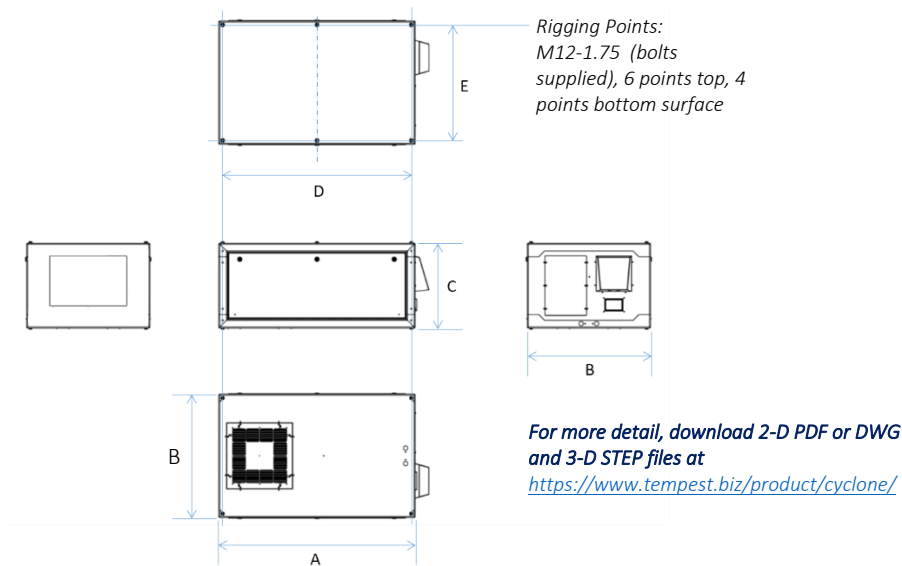
We will do everything we can to help you get the very best results from your Tempest enclosure.

IMPORTANT: Safety Advisories

- All installation and rigging work done must where applicable be designed and built in accordance with norms and standards of the local authority having jurisdiction of the installation site. It is the responsibility of the installer to obtain such approvals as may be required to achieve full compliance.
- All electrical work must be carried out by a suitably licensed electrical contractor in full compliance with local electrical standards.
- Lifting: some enclosures and the equipment inside them may be heavy. Use properly rated lifting equipment where appropriate and never attempt to carry out work with fewer than the number of workers needed to lift safely.
- It is the responsibility of the installer to ensure that all local building, safety and electrical codes are strictly adhered to in the installation of this enclosure. Tempest Lighting, Inc., its employees and agents are in no way responsible for damage arising from failure to follow either the instructions in this manual or building, safety and electrical codes prevailing at the installation location.
- Do not attempt to install or operate the enclosure before fully reading and understanding this manual
- Never allow anyone who has not read this manual to open the enclosure or perform maintenance on the projector within.
- Never leave the enclosure unattended when open.
- Always make sure all bolts and latches are tight and safety locks are in place after performing any form of maintenance on the unit.
- Do not open any electrical boxes until power has been shut off to all supply lines to the enclosure (including the one powering the projector).
- Do not open the enclosure in wet weather.

Installation

Dimensions, Weights & Rigging Points



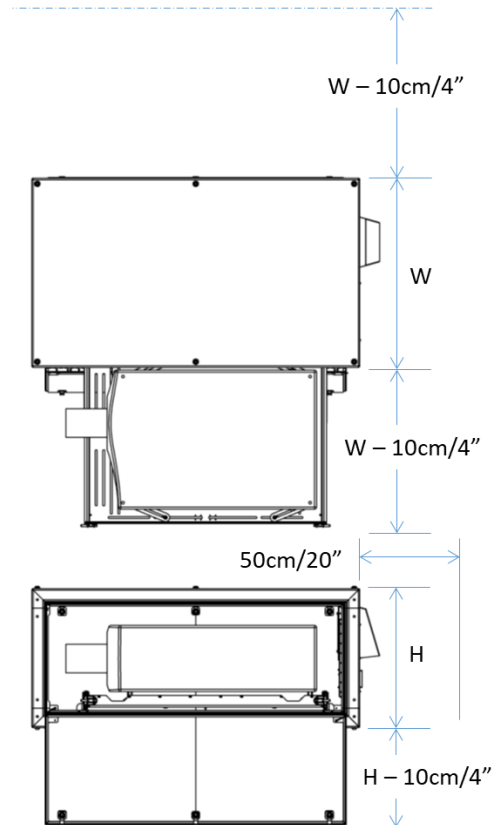
We are adding models all the time – check our web site for submittal drawings or consult factory for models not shown here

Cyclone	A in	A mm	B in	B mm	C in	Cmm	D in	D mm	E in	E mm	W lb	W kg
55.210L	51	1,295	32	813	22	559	49	1,245	30	762	177	80
55.210P	51	1,295	25	635	34	864	49	1,245	23	584	213	97
55.240L	53	1,346	34	864	26	660	51	1,295	32	813	230	105
55.240P	53	1,346	25	635	34	864	51	1,295	23	584	222	101
55.250L	51	1,295	37	940	24	610	49	1,245	35	889	223	101
55.250P	51	1,295	25	635	41	1,041	49	1,245	23	584	257	117
55.305L	51	1,295	34	864	24	610	49	1,245	32	813	205	93
55.305P	51	1,295	25	635	36	914	49	1,245	23	584	226	103
55.310L	59	1,499	34	864	25	635	57	1,448	32	813	247	112
55.310P	59	1,499	25	635	36	914	57	1,448	23	584	261	119
55.314L	58	1,473	37	940	27	686	56	1,422	35	889	285	130
55.314P	58	1,473	25	635	40	1,016	56	1,422	23	584	271	123
55.320L	67	1,702	37	940	25	635	65	1,651	35	889	305	139
55.320P	67	1,702	25	635	38	965	65	1,651	23	584	313	142
55.324LAC	58	1,473	37	940	34	864	56	1,422	35	889	359	163
55.324PAC	58	1,473	30	762	41	1,041	56	1,422	28	711	351	160
55.525L	67	1,702	37	940	29	737	65	1,651	35	889	354	161
55.525P	67	1,702	30	762	40	1,016	65	1,651	28	711	376	171
55.525LAC	67	1,702	37	940	33	838	65	1,651	35	889	402	183
55.525PAC	67	1,702	30	762	44	1,118	65	1,651	28	711	415	189

Access Clearance

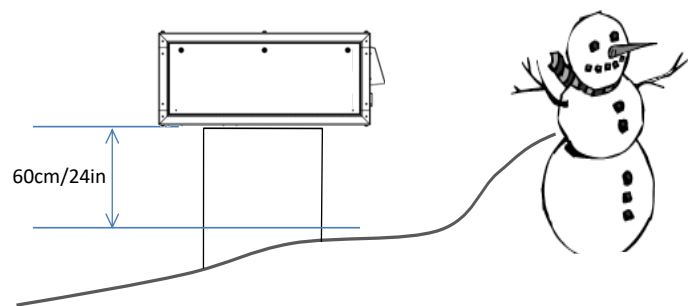
Observe these minimum access clearances shown around your enclosure.

Enclosures may be placed side-by-side, with the projector slides opposite, but we recommend allowing clearance for service access on both sides wherever possible.



Snow Clearance

In areas where snow is likely, make sure the base of the enclosure is at least 24" [60cm] above highest potential snow drift level.



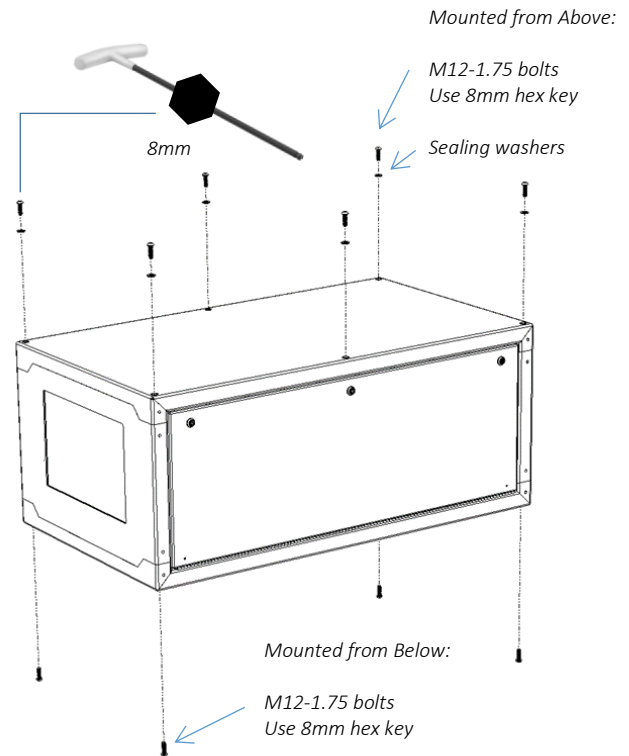
Mounting Hardware Options

Mounting Bolts

- Each Enclosure must be mounted with at least FOUR points (six points if hanging)
- All mountings must be made using the M12 threaded holes on the top or bottom of the enclosure.
- Be sure to use the sealing washers supplied for any top fixings.
- Use an 8mm hex key to secure the M12 socket cap screws provided.
- Tempest recommends the use of stainless steel mounting hardware.
- Make sure the inlet filter has at least 75mm/3in clearance below.

IMPORTANT SAFETY NOTICE

Installer must ensure that all mounting points are secure and conform to local safety regulations. Tempest Lighting Inc. accepts no responsibility for damage or injury arising from inappropriate or unsafe installation.

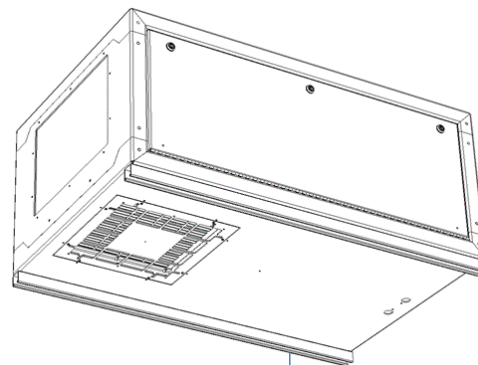


Mounting Options – Unistrut Kit

If mounting positions for the corner bolts are not convenient, use the Unistrut Kit (55.UR.xxx) to add two Unistrut rails to the top or bottom of the enclosure.

Using industry-standard Unistrut hardware, the enclosure may now be attached at any point along the Unistrut rails.

Note: Unistrut rails are required for use with the Cyclovator mount – see below...



Unistrut Rails may be mounted above or below

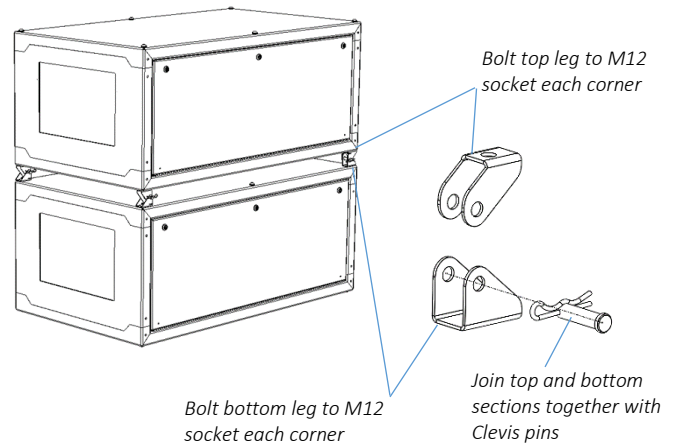
Mounting Options – Stacking Kit

Cyclone G4 may be stacked up to three units high, using the 51.SK stacking Kit. You will need the total number of Cyclones to be stacked, minus one stacking kit(s).

So, for a stack of three enclosures, order 3-1=2 stacking kits.

Note: Cyclone enclosures must be of the same model to stack in this way.

51.SK Stacking Kit (set of four, for one enclosure)

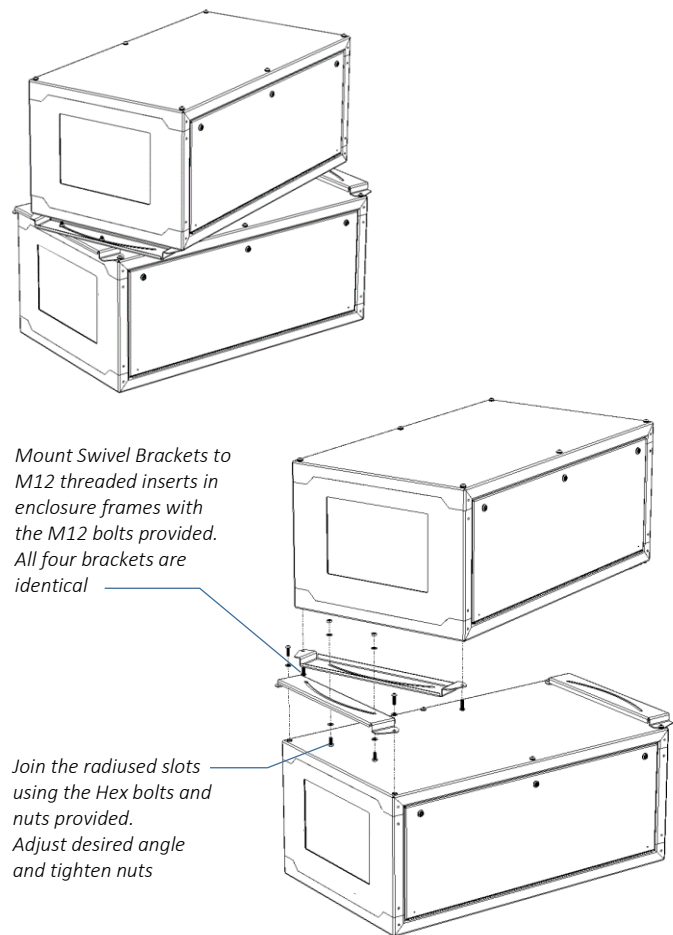


Mounting Options – Swivel Stacking Kit

Cyclone G4 may be stacked two units high, with beams up to 40° apart, using the Swivel Stacking Kit. Enclosures must be the same model.

This is very useful for edge-blending across a wide area with a limited number of rigging positions.

51.SS.xxx (where xxx is the Cyclone model number) Swivel stacking kit for two G4 Cyclone enclosures



Cyclovator 2 Tilt Kit

SAFETY WARNING

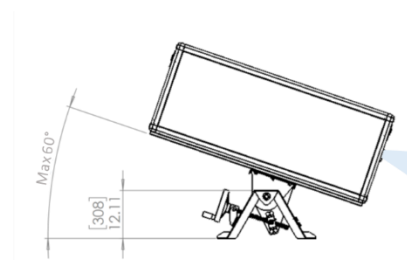
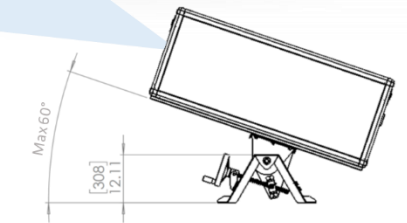
IT IS A SAFETY REQUIREMENT that Cyclone enclosures with front or rear slide be horizontal any time you slide the projector out for service. IT IS DANGEROUS to do this if the enclosure is not horizontal, and MAY CAUSE DAMAGE TO THE PROJECTOR OR INFLICT SERIOUS INJURY TO PERSONNEL. Tempest Lighting Inc., its agents and employees, will not be liable for consequences of failure to heed this safety warning.

Cyclovator 2 may be used for any G3 or G4 Cyclone enclosure.

The enclosure may be installed at ground level, projecting up (up onto a building, for example)...

...or, on a rooftop, projecting downwards.

In either case, the maximum tilt angle is 60°.



Cyclovator – Unistrut Mounting Rails

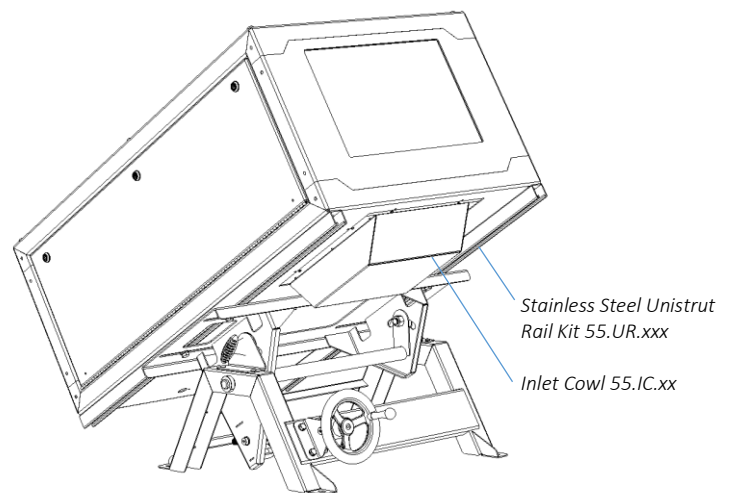
When Cyclone G4 is used with the Cyclovator Tilt Kit, the Unistrut Kit (55.UR.xxx) is required to attach the enclosure to the Cyclovator.

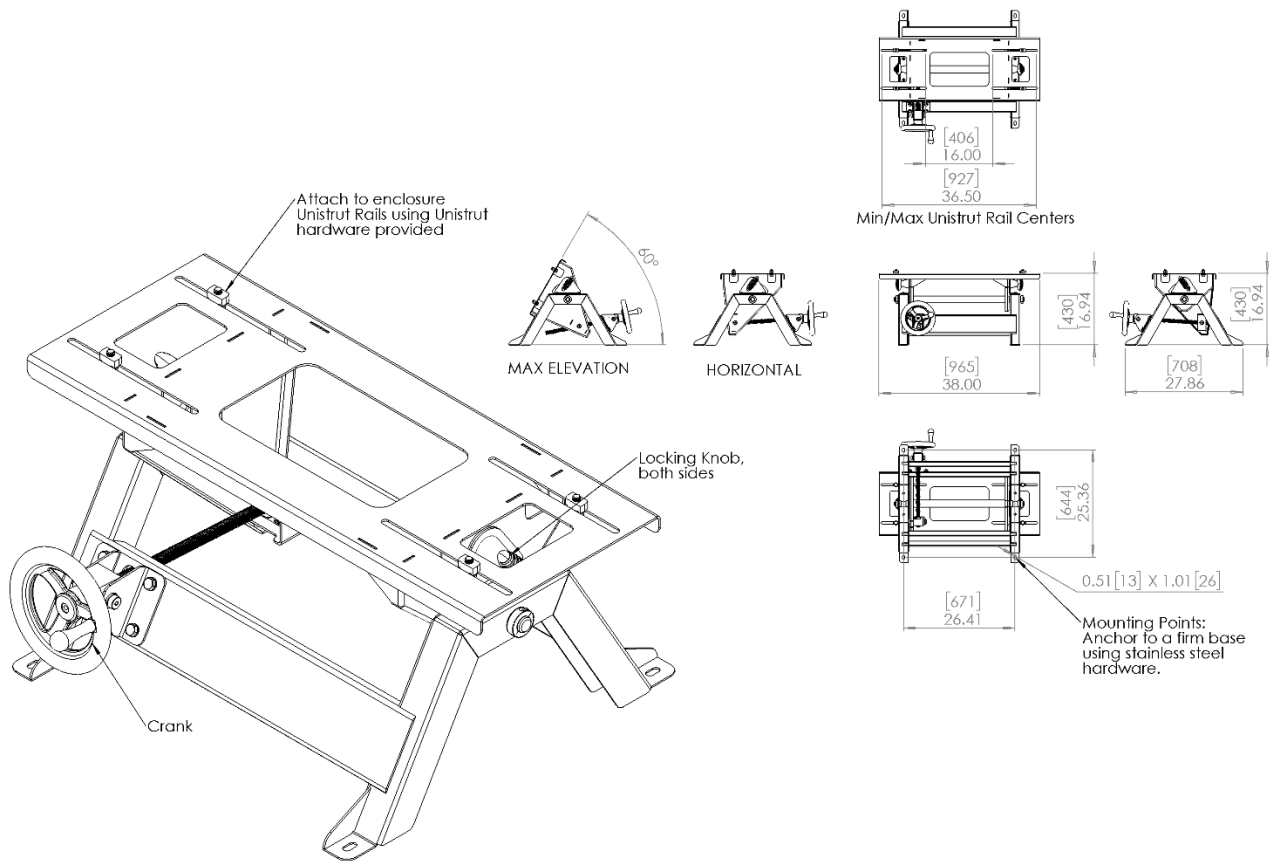
'xxx' is the Cyclone model number.

Cyclovator – Inlet Cowl

When Cyclone G4 is used with the Cyclovator Tilt Kit, with a tilt angle greater than 40°, use the inlet cowl 55.IC.xx to protect the inlet filter from weather.

'xx' is the filter size in inches – 15 for 55.200-350, 22 for 55.400 and up.

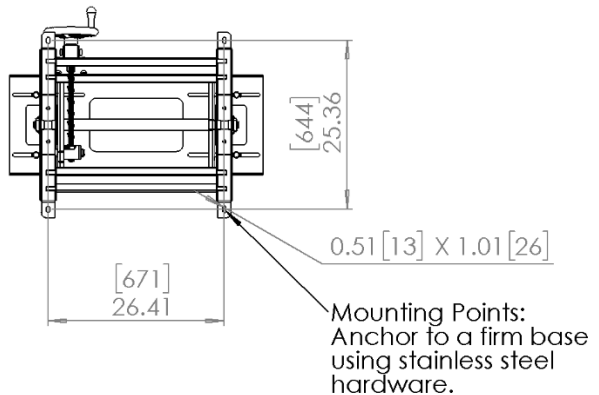




Fixing the Cyclovator in Place

The Cyclovator MUST be firmly attached to the ground, or a suitable mounting structure, using four stainless steel M12 (or US ½" size) bolts or anchors (not supplied).

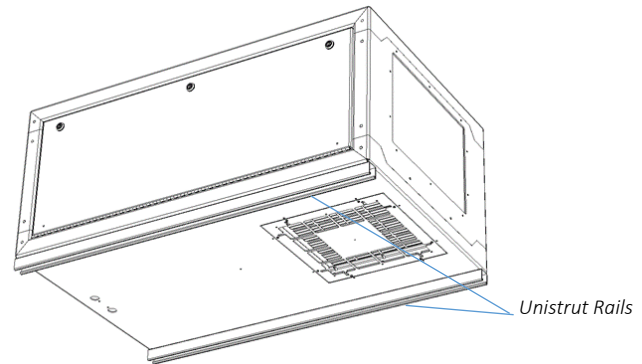
Suitable substrates include concrete pads, steel frameworks, roof beams. All mountings must comply with all relevant building and safety norms in the jurisdiction of the final installation. It is the responsibility of the installer to obtain approval from a structural engineer or other competent person for all such installations, and to adhere strictly to local building and safety codes at all times.



Mounting the Enclosure

(a)

Make sure that the Unistrut rails are attached securely to the 4 (or 6) M12 threaded sockets on the bottom of the enclosure frame.

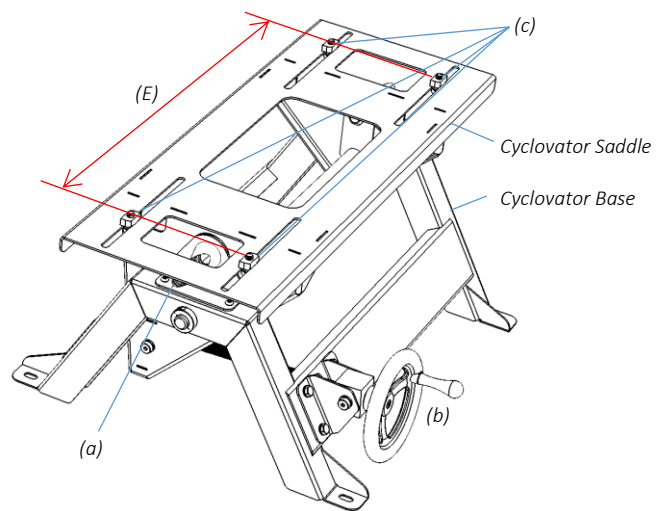
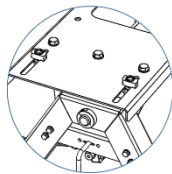


Set the Cyclovator to its horizontal position:

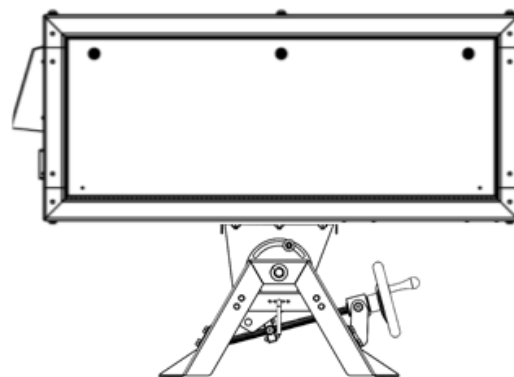
1. Loosen the two locking knobs (a)
2. Turn the crank handle (b) until the Cyclovator saddle is horizontal
3. Tighten the two locking knobs (a)

Align the channel spring nuts (c):

4. The distance (E) between the channel nuts should be the same as dimension E in the installation page (the distance between centers of the Unistrut channels)
5. Loosen the channel nut bolts and align the channel nuts with their long sides parallel with the end of the Cyclovator saddle:



6. Carefully set the Cyclone enclosure on the Cyclovator saddle, so that the channel nuts are INSIDE the Unistrut rails.
7. PUSH UP and tighten the four M12 channel nut bolts, so that the channel nuts lock in the Unistrut channels.
8. Loosen the locking knobs and turn the crank handle to test movement.



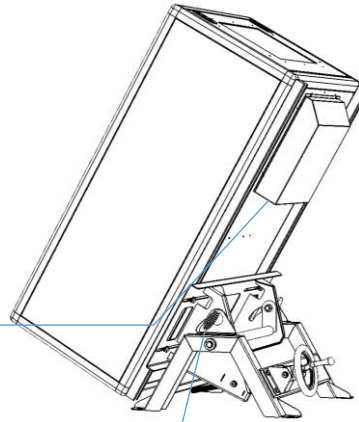
Steep Angles:

FIRST, MAKE SURE THE CYCLOVATOR IS SECURELY FIXED TO THE GROUND.

For steep projection angles, loosen the four channel nut bolts and carefully slide the enclosure in the direction that will be 'UP'.

The center of gravity will still be roughly centered in show position, but you will have to work a bit harder to crank the enclosure up to its show trim!

It is important to use the Inlet Cowl accessory for angles above 40°.



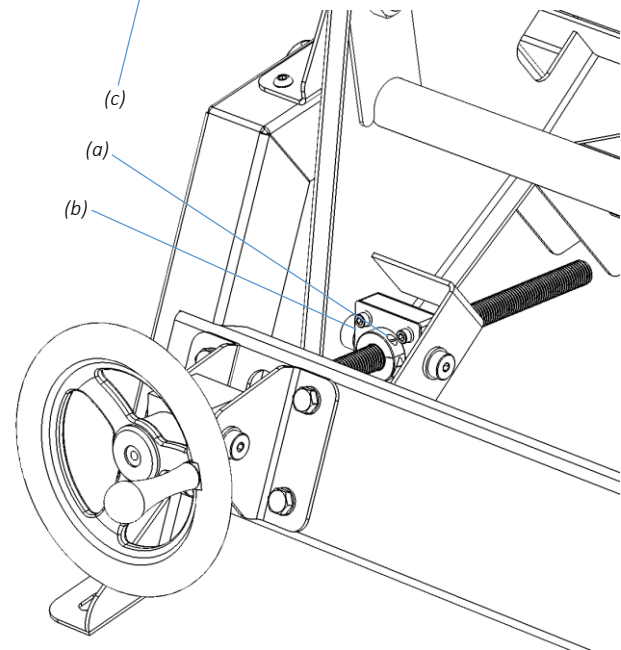
Setting the Show Position Stop

Cyclovator gives you a locator for your show position, for accurate show positioning.

With the Cyclovator in Show position:

1. Loosen the Locking Collar set screw (a)
2. Slide the Locking Collar firmly against the Acme Nut Plate (b)
3. Tighten the Locking Collar set screw (a)
4. You now have two reference locations:
 - Horizontal
 - Show

ALWAYS MAKE SURE THAT BOTH LOCKING KNOBS (c) ARE LOOSE WHEN RAISING/LOWERING THE CYCLOVATOR, AND TIGHT WHEN IN SHOW OR SERVICE POSITION.



ActiveCool™ Cooling System

Tempest ActiveCool is a closed-loop cooling solution designed to keep sensitive laser projectors at a constant temperature in any outdoor environment.

ActiveCool comprises the following main components:

1. Cooler Unit
2. Flow hose (150mm/6in padded hose)
3. Return hose (250mm/10in padded hose)
4. Power cable (connects to PowerCon True TOP outlet on enclosure chassis)
5. Power relay added to enclosure controller
6. Internal recirculation fan

ActiveCool operation is automatic. Simply connect to the cyclone enclosure, and set the desired temperature, and the cooler will run automatically when:

- a) The DEC controller senses that the projector has come out of standby mode
- b) The projector is off but the upper temperature setting has been reached (normally during daytime in hot sun).

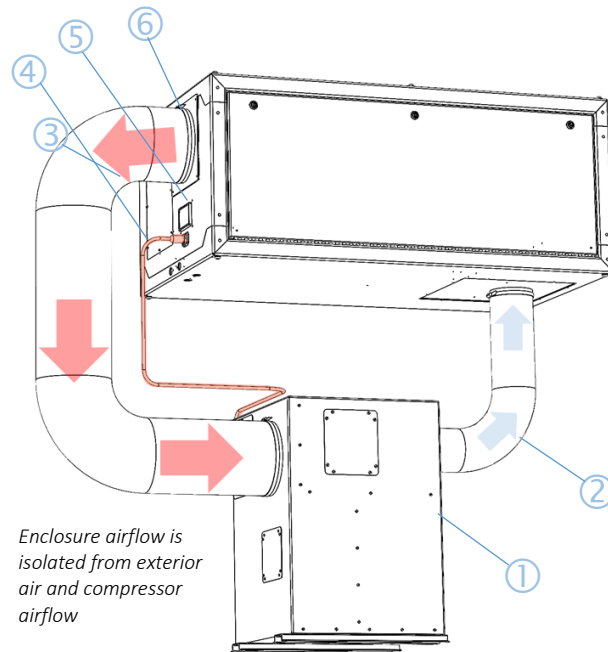
The cooler will maintain an air temperature inside the enclosure within a few degrees of the target temperature set in the ActiveCool controller.

Internal and External Airflows

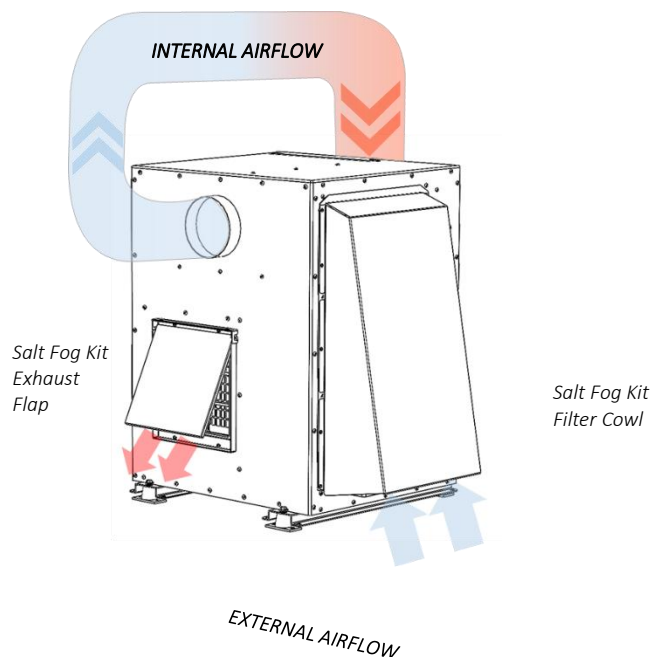
The internal airflow (shown above) is isolated from outside air, so filtering is not required. The internal air is also de-humidified by the cooler action.

The external (compressor) airflow is subject to local atmospheric conditions; in locations subject to salt air (beaches or ships), chlorine (pool areas) or pollution (city centers), the Salt Fog filter kit should be used. This protects the compressor and other cooler components from airborne contaminants.

The Salt Fog Kit also comes with a large cowl, to protect the filter from rain and wind-blown dust and sand – strongly recommended in desert conditions. A door, operated by air pressure, protects the compressor exhaust from contamination when the cooler is not running.

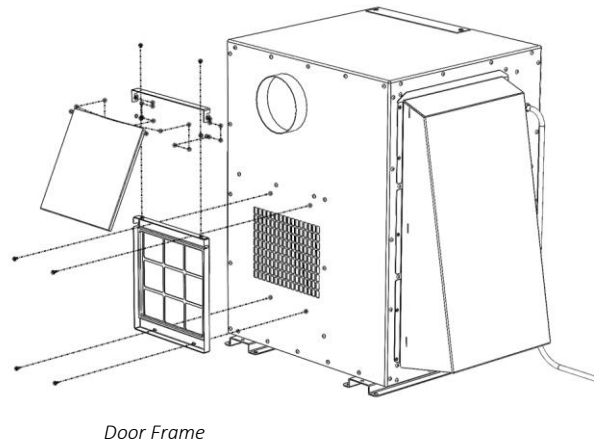
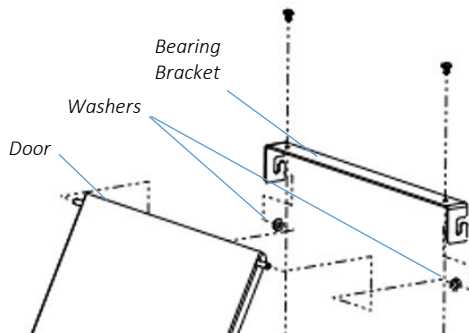
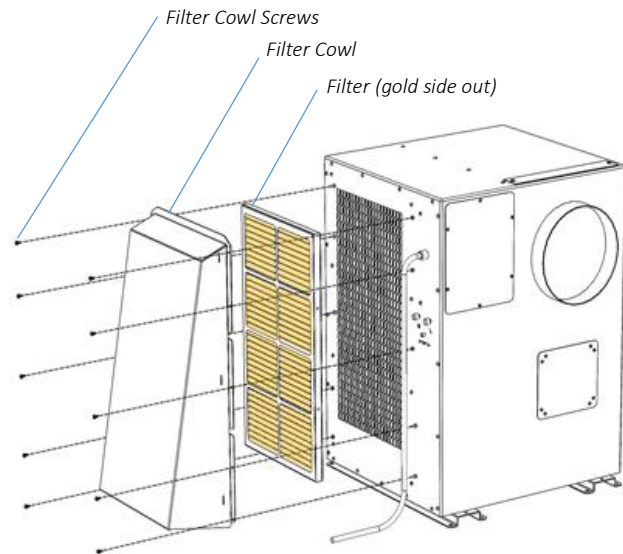


Note: Enclosure hose connection points may vary.



Salt Fog Filter Kit Installation

1. Remove the screws around the condenser inlet and exhaust grilles.
2. Fit the salt fog filter (gold side out) inside the louver box.
3. Attach the filter/louver assembly to the cooler, using the screws removed in step 1.
4. Mount the exhaust door frame onto the condenser exhaust grille with the four screws provided.
5. Assemble the door, washers and stainless steel bearing, and fix to the door frame with the two screws provided. **MAKE SURE THE WASHERS ARE BETWEEN THE DOOR AND THE INSIDE OF THE DOOR FRAME.**



Anti-Vibration kit Installation

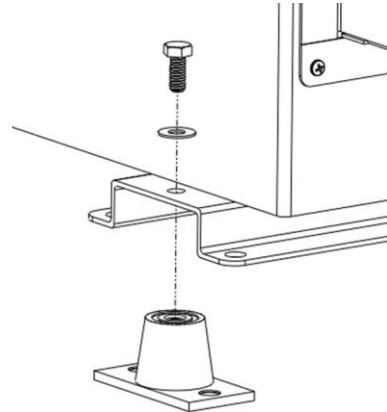
To avoid possible picture 'wobble', Tempest recommends the use of the optional anti-vibration mounting kit when:

- a) The cooler is mounted on the same structure as the projector enclosure, AND
- b) The projection throw is over 50m (150ft)

This should not be needed if the above conditions are not met.

Mount the four vibration pads to the middle holes in the cooler feet, using the hardware provided.

Mount the vibration standoffs to your structure using 8mm hardware (not supplied).

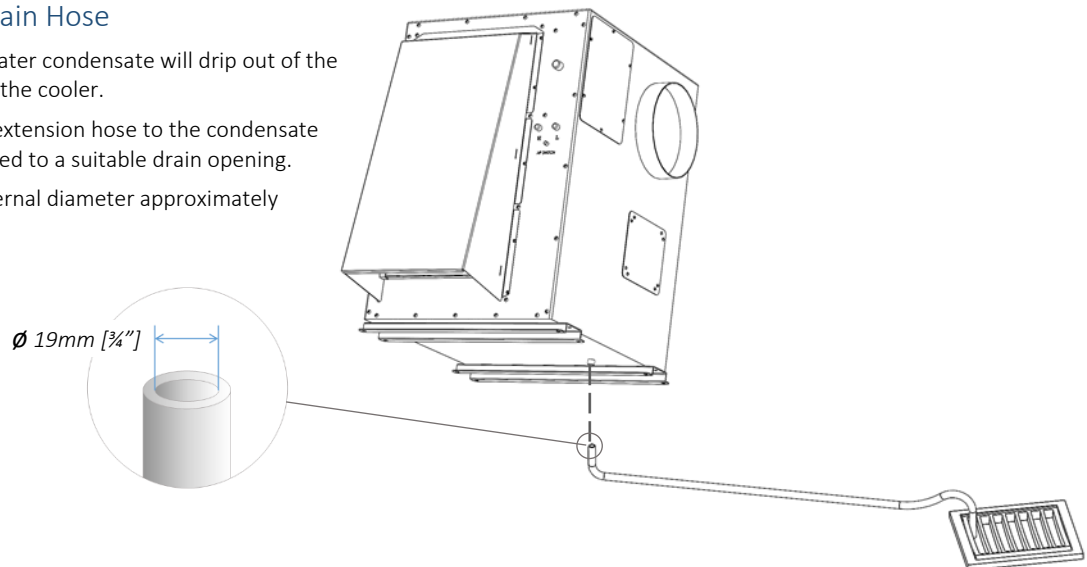


Condensate Drain Hose

Small amounts of water condensate will drip out of the drain in the base of the cooler.

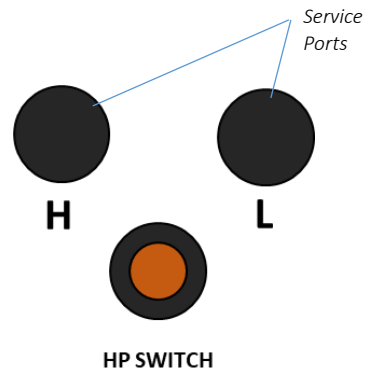
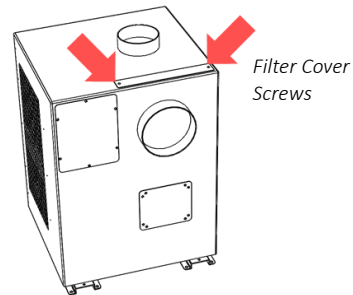
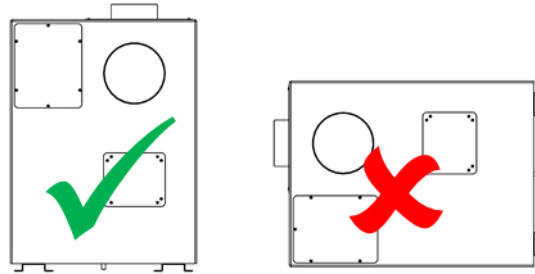
You may attach an extension hose to the condensate drain hose, connected to a suitable drain opening.

Use a hose with internal diameter approximately 19mm [$\frac{3}{4}$ "].



Important – Note these Warnings:

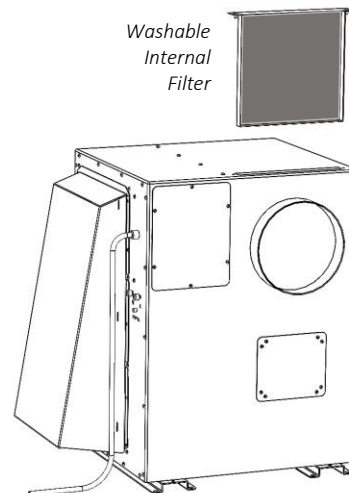
- 1) Always keep unit in upright position. Do not lay unit down. *If the unit is laid down, the unit must be placed upright and not turned on for at least 4 hours, or compressor damage may occur, due to compressor oil displacement.*
- 2) Filter should be checked and cleaned as needed or at least once every 3 months. Remove filter from slot on top of unit by turning the 2 latch screws. The Tempest part # 55.ACFA.
- 3) If the hot air discharge flow is blocked from the intake or exhaust grilles, the unit will alarm and shut down to alert operators of the condition, correct the blocked air flow issue and press the **High Pressure** (HP) reset button located on back of unit, next to the service ports, which will clear the alarm. The unit will restart after a 3 minute time delay.



ActiveCool Internal Filter

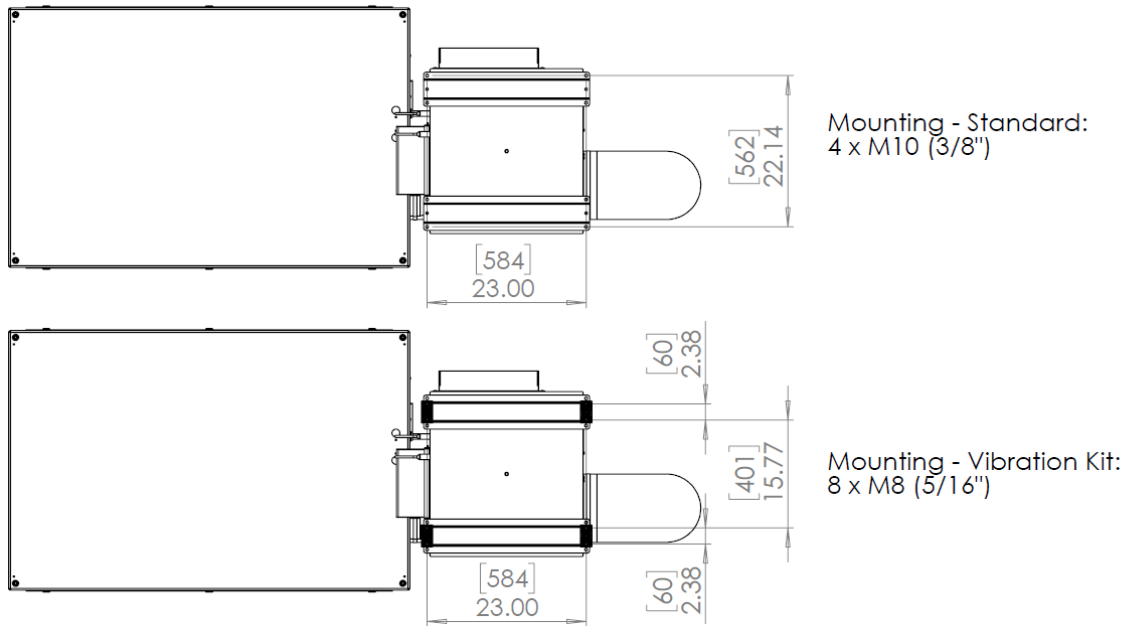
Check the cooler filter regularly for dust and dirt. It may be cleaned using water and a mild detergent.

Replacement part # 12-FILTERFRM



Mounting Hole Patterns

Hole patterns and mounting hardware (not included) are different for coolers with and without anti-vibration kits:



Connecting the Air Hoses

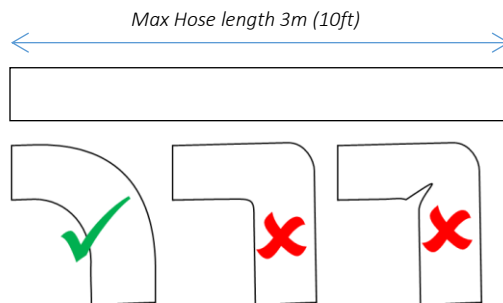
Cut the flow and return hoses to length and connect to the hose flanges on the cooler and enclosure, as shown above, using the stainless-steel hose clamps supplied.

Please note:

- Keep hoses as short as possible
- Avoid sharp bends where possible
- Make sure there are no kinks or obstructions to the air hoses.

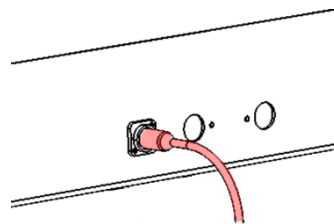
IMPORTANT:

Hoses supplied are 4m long. Trim to desired length on site. Maximum air hose length is 3m (10ft); there is no minimum. Install the cooler close enough to the Cyclone enclosure for the shortest hose length possible, avoiding sharp bends and kinks.



Power Connection

Plug the ActiveCool power cable into the Neutrik PowerCon True TOP outlet provided (note, the **TOP** – Total Outdoor Protection – connector is fully outdoor-rated).



Power Connector location may vary

ActiveCool Temperature Gradient

It is important to understand the relationship between the three temperature settings in the ActiveCool, enclosure and projector. They are all different.

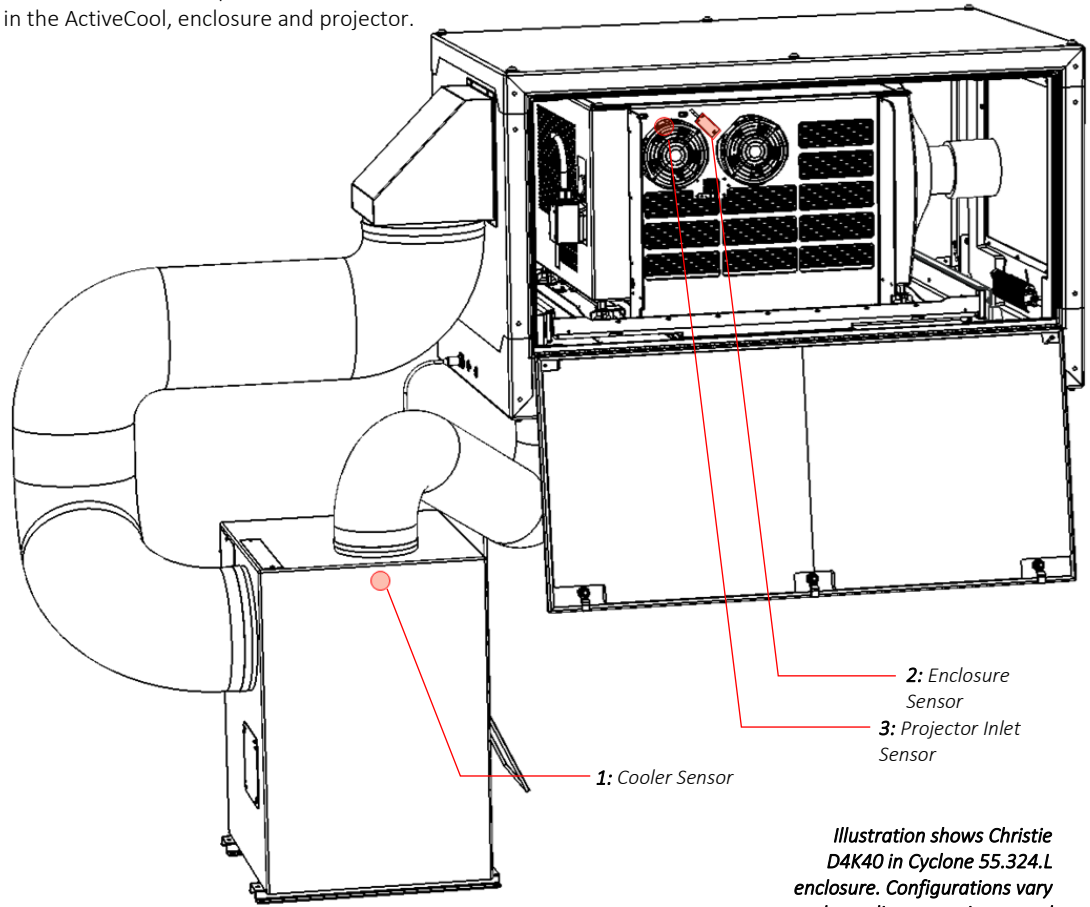


Illustration shows Christie D4K40 in Cyclone 55.324.L enclosure. Configurations vary depending on projector and enclosure type.

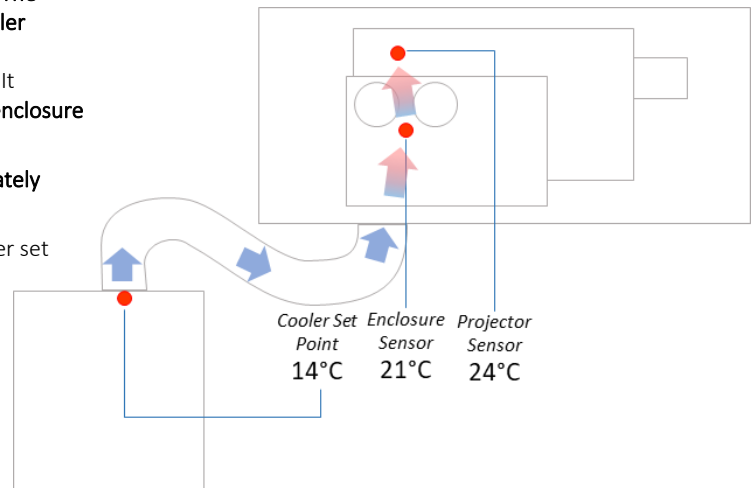
1. The **cooler sensor** is in the cool air flow, and is used to regulate the cooler cool air temperature
2. The **enclosure sensor** is in the inlet fan box on the side of the projector (under the projector in portrait enclosures). **The enclosure sensor is typically 6-7°C higher than the cooler sensor.**
3. The **projector inlet sensor** is inside the projector inlet. It typically reports temperatures **2-3°C higher than the enclosure sensor.**

This means that the cooler set point must be set approximately 10°C LOWER than the desired projector inlet temperature.

For example, for an inlet temperature of 24°C, set the cooler set point at 14°C.

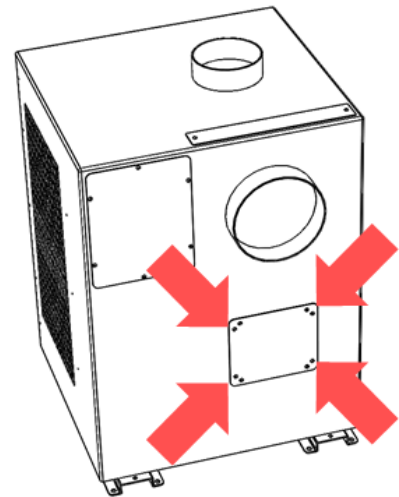
These values will differ in different site conditions.

Example:



ActiveCool Control Settings

Remove the control cover, located below the return air ring:



Set your controller: The controller is factory set at 14°C (57°F) and will be displaying the current cool air temperature.

To check or change these settings:

PRESS [SET]. C is displayed. Use \uparrow or \downarrow to toggle between Celsius and Fahrenheit, the letter C or F is then displayed.

PRESS [SET] again, the current **TARGET TEMPERATURE** (set point) is displayed. Use \uparrow or \downarrow to change the target cool air temperature. *Note: For best results always set the unit to a realistic temperature that it can maintain.*

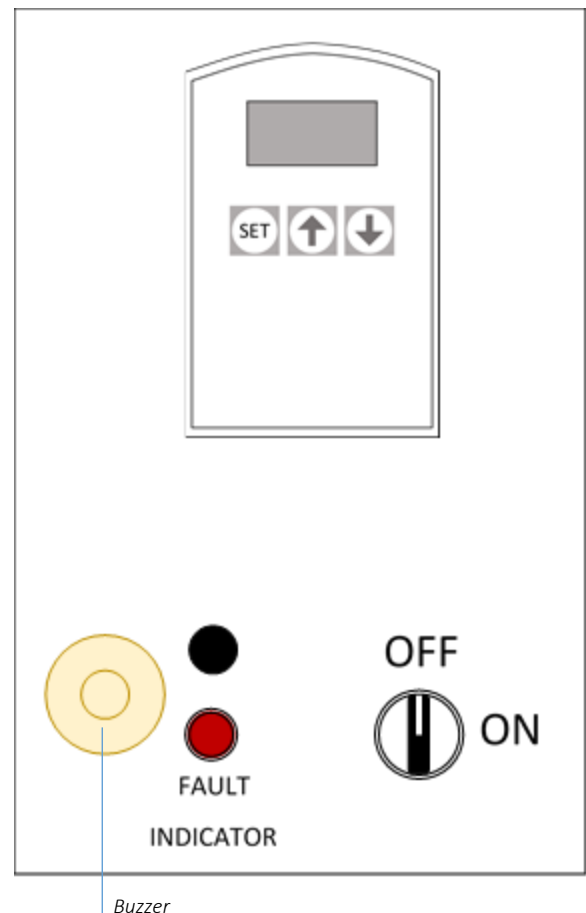
PRESS [SET] again. The number **1** is displayed, with the message (DIF1). This is the temperature difference (hysteresis) setting – **DO NOT CHANGE**.

PRESS [SET] again. Display shows **C1** (cooling mode) – **DO NOT CHANGE**. (the alternate setting is H1, meaning heat mode).

PRESS [SET] again. The display shows (d1), and **0**. This is the delay setting – **DO NOT CHANGE**.

PRESS [SET] again. The unit displays the current air temperature at the cooler sensor. This is the default display and the control will always reset to this display automatically. *This completes the “set” cycle routine.*

Important: All sites are different! Check the projector intake air temperature from the projector control system, and adjust the ActiveCool cooler set point to find the optimum setting for your installation.



In the event of a fault, the buzzer will sound, and the fault indicator light will be lit.

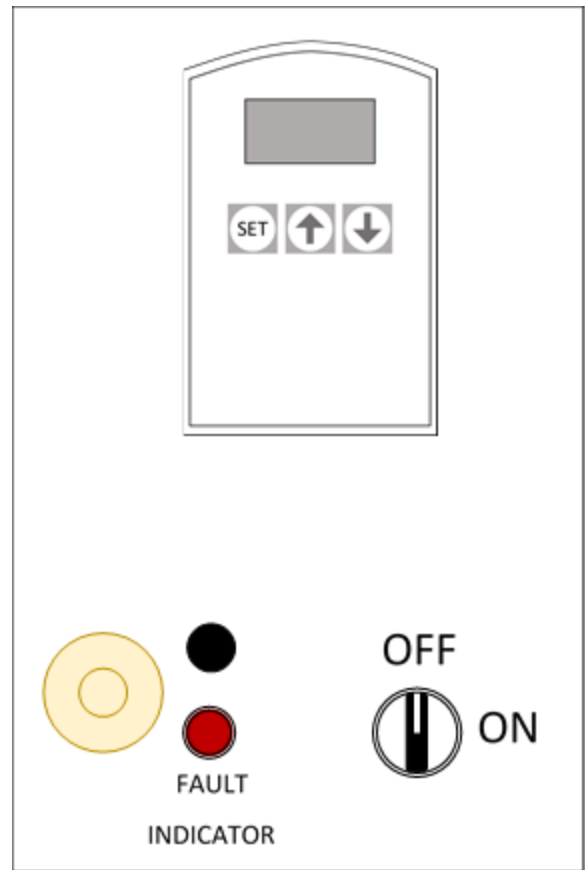
Set the ON/OFF Switch

Turn the **ON/OFF selector switch** to **ON**. The evaporator fan starts and a short time delay activates before the compressor starts. This prevents compressor damage due to short cycling.

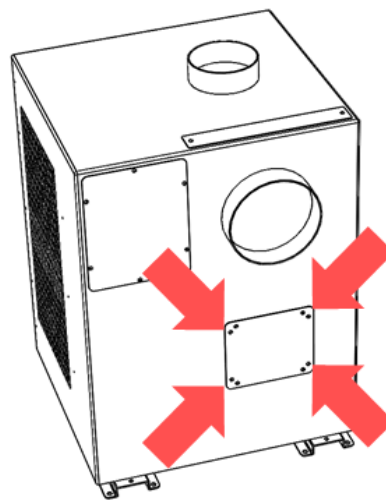
Note that the evaporator fan and the compressor are on continuously when the selector switch is in the ON position and the Cyclone DEC enclosure controller energizes the Cooler power outlet.

For normal operation, leave the ON/OFF switch in the ON position. The enclosure controller will switch the cooler on and off automatically as needed.

To disable the cooler, turn the selector switch to the OFF position.



Replace the control cover. Your ActiveCool system is now ready for use.



ActiveCool Troubleshooting Guide

Basic Troubleshooting

FAULT	POSSIBLE CAUSE	POSSIBLE SOLUTION
System sounds audible alarm when turned ON. Supply air fan is on	A condition exists with the mechanical system involving high or low pressure.	See advanced troubleshooting in the next section.
System starts up but is not operating in the selected mode	System is in time out; control is set above supply air temperature or control is adjusted out of operating parameters.	Wait 3 minutes, review operations guide. Set up control
Power is supplied but control is blank	Low voltage circuit is not engaged	Verify incoming power to contactor, reset switch on low voltage transformer if equipped. Check transformer for output power.
Control displays and operates but unit is not on when selector switch is in on position.	Incoming power is not correct. ON/OFF switch fault	Verify incoming power to contactor, correct as needed. Check ON/OFF switch function, replace or repair as needed
Cool air flow is limited, water is dripping from the front of the system	Supply or return duct is collapsed, blocked or not installed, filters need to be replaced and/or the evaporator coil is freezing as a result of the above.	Verify that supply and return duct are installed to specification, remove or add duct as needed, check air filter for blockage. Restart when thawed.

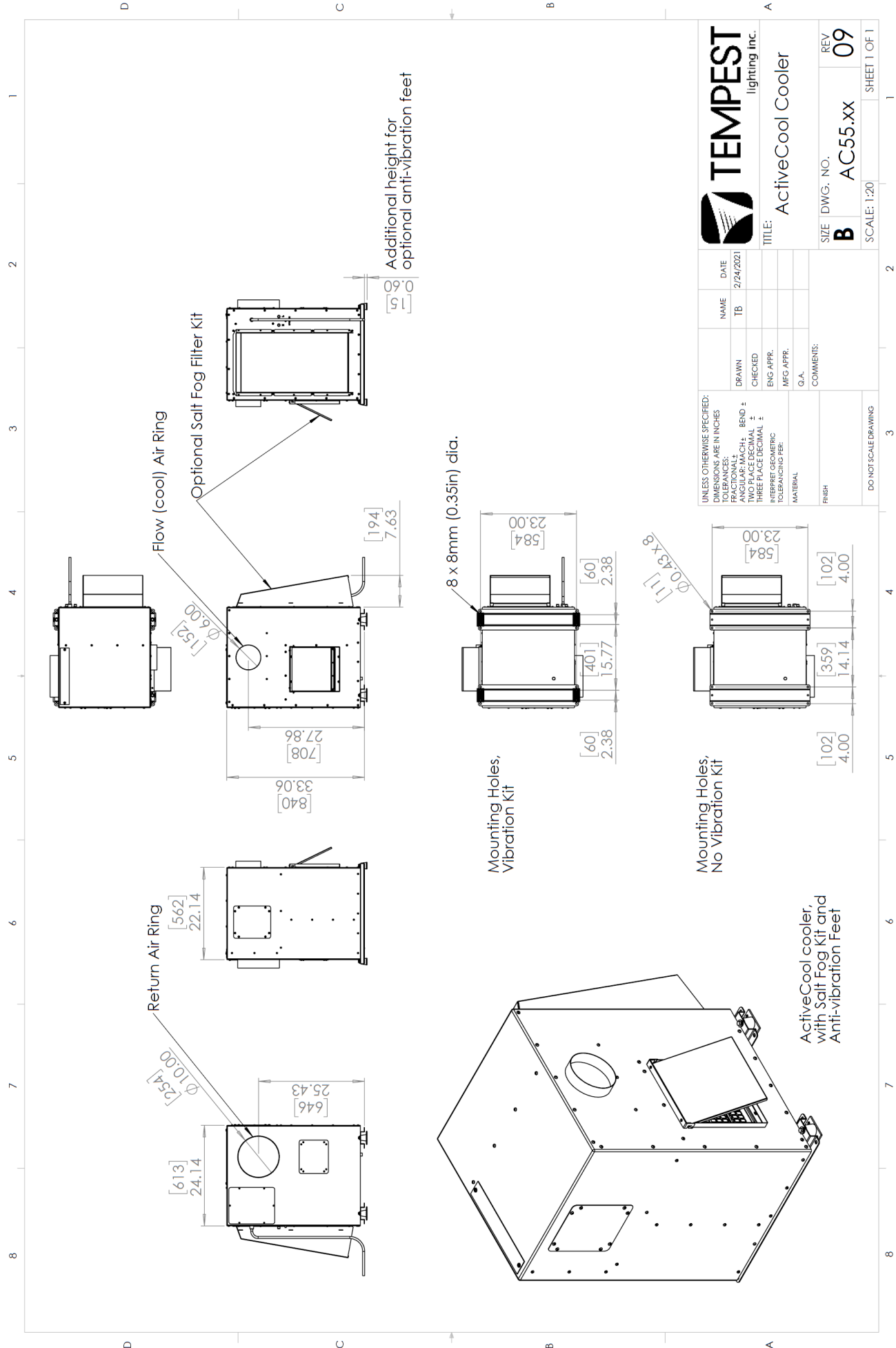
Advanced Troubleshooting

FAULT	POSSIBLE CAUSE	POSSIBLE SOLUTION
System sounds audible alarm when turned to ON, supply air fan is on.	a) Mechanical system has detected high water level in the condensate pump.	Inspect condensate pump for overflow and proper operation, check condensate line for clog or crimping. Resets automatically upon correction.
	b) Mechanical system has detected high pressure.	Correct condition with air flow in or out of the condenser, check condenser motor for proper operation. High pressure switch requires manual reset; the High Pressure Reset switch is located on the back of the system next to the power cable and is labeled High Pressure Reset. Push in to reset, switch will click if activated. Allow pressures to equalize for 5 minutes before reset.

c) Mechanical system has detected low pressure.

Install service gauges to view pressure readings below 20 psi. Check for icing on the evaporator coil or low return air temperature. Resets automatically upon repair or thawing.

FAULT	POSSIBLE CAUSE	POSSIBLE SOLUTION
Chatter or hum is heard from the control box while unit is operating.	Incoming source power is poor, low voltage component is faulty.	This is not adjustable, check for proper voltage selection, and correct incoming power.
Evaporator coil is freezing in cool mode.	Low or restricted air flow. Filter blocked, unit constantly on, unable to achieve set point. Low return air temperature out of factory specifications. Service door open or off, mechanical system malfunction.	Review duct engineering , direct return air duct to area of highest heat load, replace air filters , adjust set point to allow unit to cycle, add KwiKool system, close service compartment door, Install service gauges to view pressures
Control Displays E1	Appears when up or down key is pressed when not in programming mode.	Operate in program mode. If E1 appears when no keys are pressed, reset by disconnecting power and restarting. If E1 fails to clear, control must be replaced.
Control displays E2	Appears when control settings are not properly stored in memory.	Check all settings and correct if necessary.
Control displays EP	Appears when the probe is open, shorted or sensing a temperature that is out of range.	Check to see if the sensed temperature is out of range. If not, check for probe damage by comparing it to a known ambient temperature
Control displays EE	Appears if the EEPROM data has been corrupted.	Control must be replaced Call 1-800-KwiKool
Control displays CL	Appears if calibration mode has been entered.	Remove power to the control for at least 5 seconds. Reapply power. If the CL message still appears, Control must be replaced Call 1-800-KwiKool.



TEMPEST lighting inc.

TITLE: ActiveCool Cooler

SIZE DWG. NO. **B** AC55.XX REV **09**

SCALE: 1:20 SHEET 1 OF 1

NAME	DATE
TB	2/24/2021
DRAWN	
CHECKED	
ENG APPR.	
MFG APPR.	
Q.A.	
COMMENTS:	
FINISH	

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 TOLERANCES:
 FRACTIONAL: ±
 ANGULAR: MACH ± BEND ±
 TWO PLACE DECIMAL ±
 THREE PLACE DECIMAL ±
 SURF FINISH: PER
 TOLERANCING PER
 MATERIAL
 FINISH

DO NOT SCALE DRAWING

Using AC Assist with Cyclone Enclosures

Tempest AC Assist is a robust outdoor rated spot cooler, available in 50Hz and 60Hz versions, that can be used economically with up to four Tempest Cyclone, Typhoon or Blizzard enclosures. AC Assist is different from ActiveCool, and blends cooled air with outside air through Blizzard’s inlet filter, reducing the projector inlet air temperature by as much as 12°C.

The AC Assist may be ordered either with a single cool air duct for one enclosure, or with a manifold for 2, 3 or 4 cool air ducts, for up to four enclosures.

Estimating Heat Loads

Tempest AC Assist is rated at 14,000btu, and should be matched to projector heat loads between 1 and 1.6 x that rating. Use this table as a rough guide, and keep in mind that cooling will be affected by both heat load and ambient temperature.

	Cooler btu	Min Projector btu/hr [watts] *	Max Projector btu/hr [watts]
1 Enclosure	14,000	14,000 [4,000W]	23,000 [6,500W]
2 Enclosures	14,000	7,000 [2,000W]	11,500 [3,300W]
3 Enclosures	14,000	4,650 [1,350W]	8,000 [2,250W]
4 Enclosures	14,000	3,500 [1,000W]	5,750 [1,650W]

** For guidance only – it is safe to use a lower projector load*

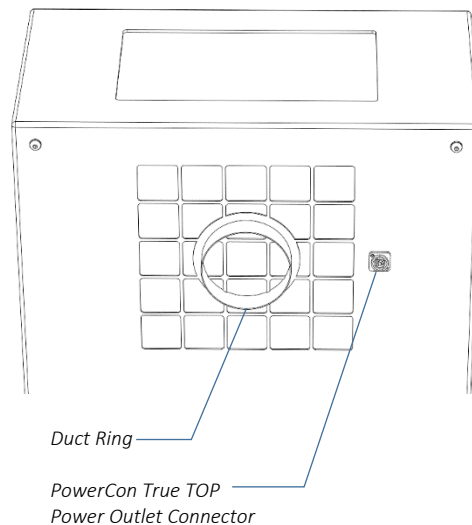
Connecting to the Enclosure(s)

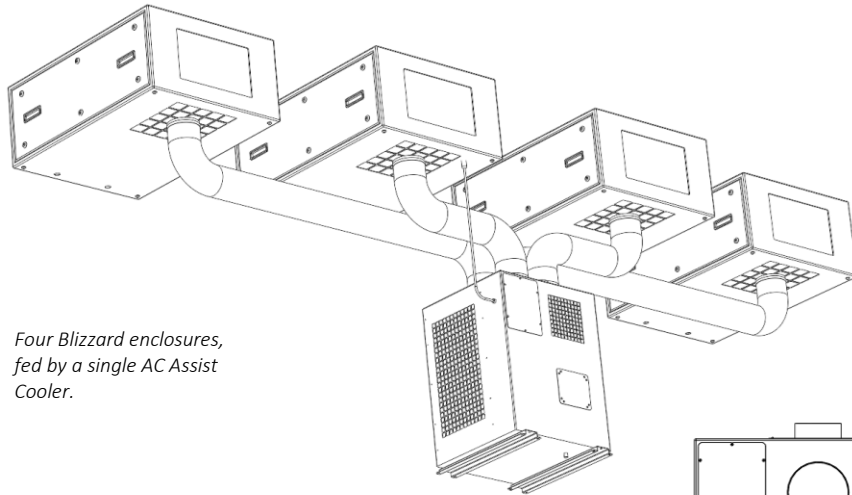
When using AC Assist, one of the connected enclosures will be designated the **Master Enclosure**.

The Master Enclosure:

1. is factory set as Split Feed (see the Wiring section)
2. ...requires a 3,000W supply to the Enclosure feed terminals
3. ...incorporates a Neutrik PowerCon True TOP (outdoor rated) connector next to the projector inlet filter, for the AC Assist cooler power Cord.
4. ...controls the AC Assist cooler, switching it on when either the projector in the Master Enclosure is running, or when the temperature in the Master Enclosure reaches the Upper Temperature setting (see the DEC4 Control section of this manual)

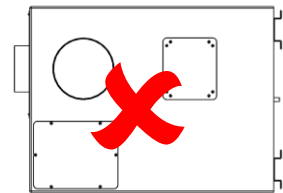
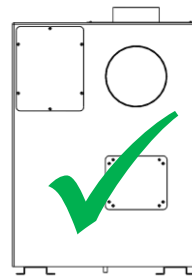
All enclosures to be connected to the AC Assist cooler have a 150mm (6in) duct adapter ring in the middle of the inlet filter grille for the insulated cool air duct hose from the AC Assist cooler.





*Four Blizzard enclosures,
fed by a single AC Assist
Cooler.*

Important: The AC Assist Cooler MUST be installed on a level surface, in vertical orientation.

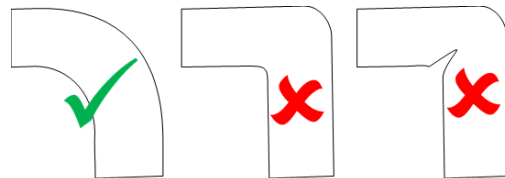


Connecting Air Hoses

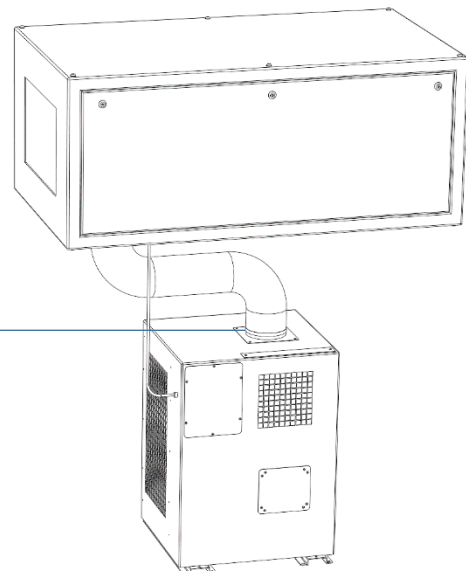
Each enclosure to be connected is supplied with a 4m insulated air hose.

If using more than one enclosure with your AC Assist cooler, locate the cooler centrally, so that the hose runs are as similar, and as short, as possible.

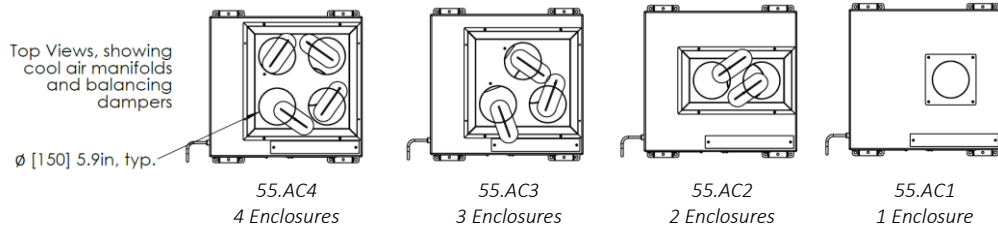
IMPORTANT: Avoid sharp bends and kinks:



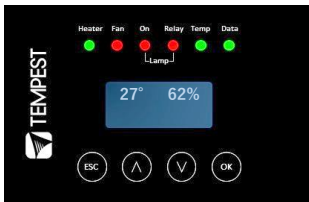
Use the stainless-steel hose clamps provided to secure both ends or the air hos(es).



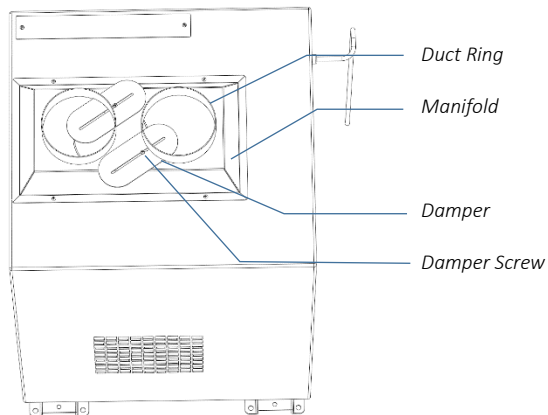
Manifolds and Dampers

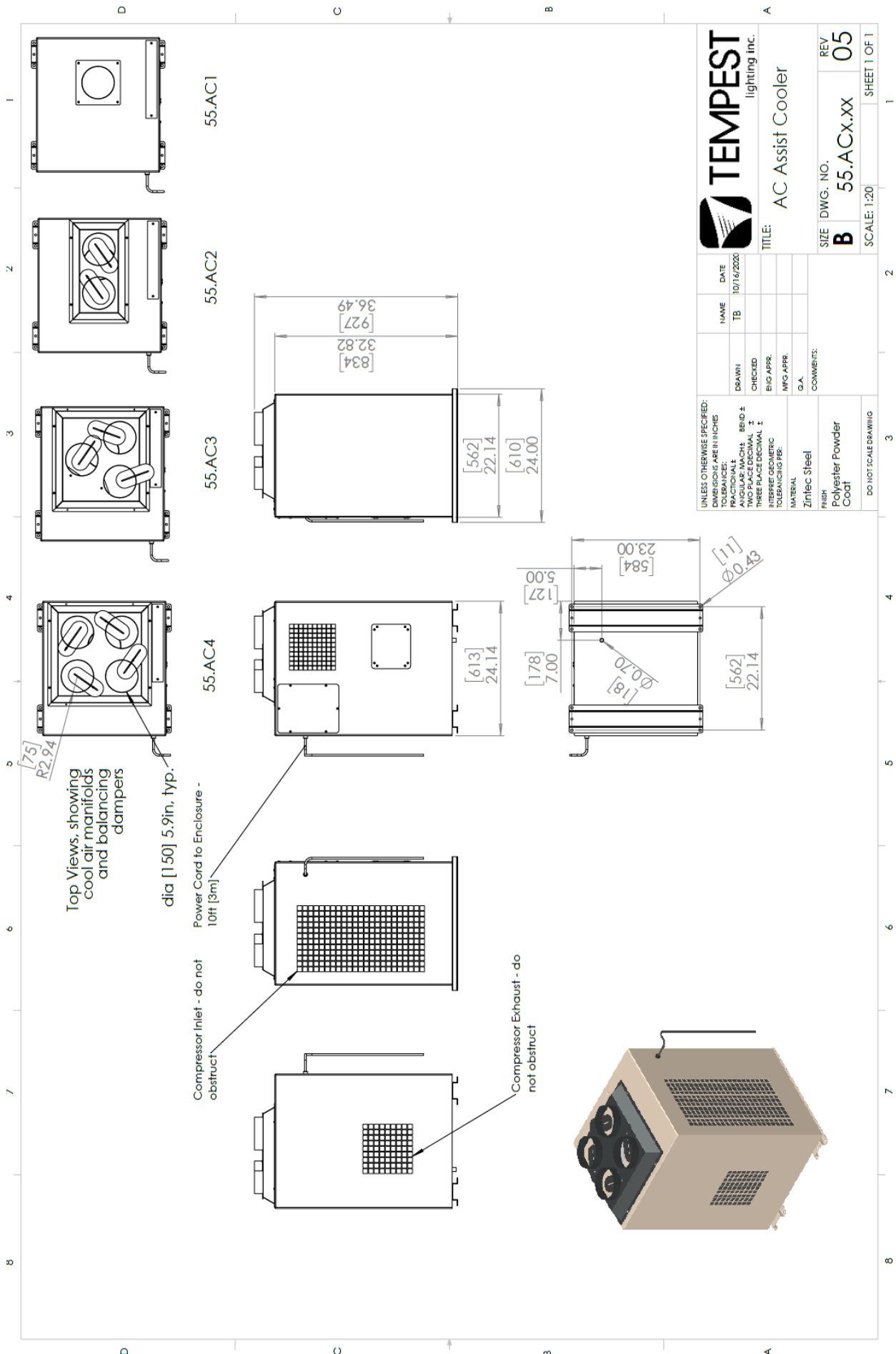


AC Assist models 55.AC2, 55.AC3 and 55.AC4 are equipped with manifolds on the top of the cooler, splitting the cool air flow to the appropriate number of enclosures. The manifolds include a simple damper for each outlet. It is important to balance the airflow to multiple enclosures by adjusting the dampers.



1. With all projectors running, monitor the temperature display on the back of each enclosure.
2. Start with all dampers open (pulled out) for maximum airflow, and balance by gradually closing the dampers feeding the cooler enclosure(s).
3. When all enclosure temperatures are approximately balanced, tighten the damper screws to lock in place.





TEMPEST lighting inc.

TITLE: AC Assist Cooler

SIZE DWG. NO. REV 55.ACx.xx 05

SCALE: 1:20 SHEET 1 OF 1

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS: ± 1/16 DECIMALS: ± 0.005 ANGULAR: ± 0.0004 TWO PLACE DECIMAL: ± 0.01 THREE PLACE DECIMAL: ± 0.001 INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL: Zintec Steel FINISH: Polyester Powder Coat	NAME: TB	DATE: 10/16/2020
DRAWN:	CHECKED:	ENG APPR.:
MFG APPR.:	G.A.:	COMMENTS:

DO NOT SCALE DRAWING

Wiring the Enclosure

Power Wiring

SAFETY NOTICE

All power wiring must be performed by a competent electrician, appropriately licensed in the jurisdiction where the installation takes place. All electrical work must be done in full compliance with all electrical and safety norms applicable to the installation site. Isolate all power feeds before opening the enclosure.

Tempest Lighting, Inc., its employees and agents will not be held responsible for damage or injury caused by disregarding this notice.

Electrical Standards

Important:

Enclosure model numbers including **.US** are for use in countries using US and Japanese style electrical systems:

200-208VAC 50/60Hz

Enclosure model numbers including **.IN** are for use in countries using European style electrical systems:

220-250VAC 50/60Hz

Note:

- (1) Fans and Heaters are rated 200-250V
- (2) Electronics are autosensing for any voltage 90-265VAC, 50/60Hz
- (3) ActiveCool and AC Assist Coolers are 200-250VAC, but supplied in 50Hz and 60Hz versions

AC Supply Voltage

Tempest Cyclone enclosures require supply voltage in the nominal range 200-250VAC, 50/60Hz.

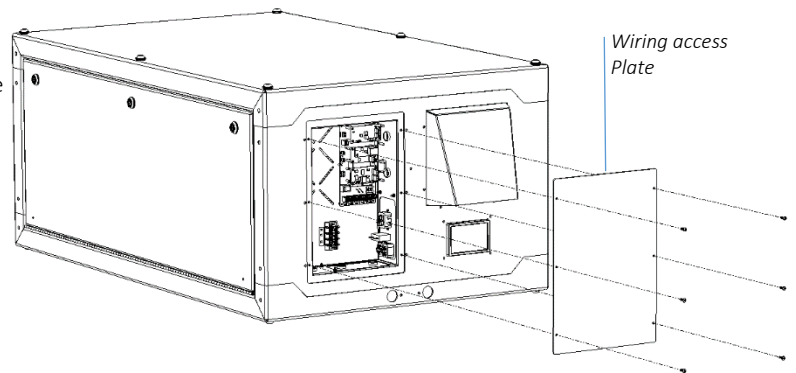
Tempest G4 enclosures are very tolerant of supply voltage variations:

- DEC4 controller has a universal power supply and operates on 90-265VAC
- Enclosure fans and heaters are rated 200-250VAC. Fans are over-dimensioned to cool adequately down to 200V, and heaters compensate thermostatically by increasing duty cycle on lower supply voltages.

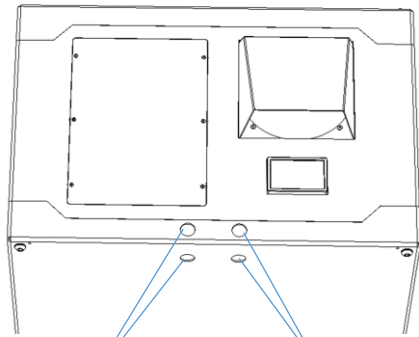
Wiring Access

Remove the wiring access plate on the rear surface.

Locate the conduit entry holes on the back and underside of the enclosure – you may use either set of conduit entries, depending on your installation needs.



Note: Rear Panel layout may vary



Conduit Entry:
AC Power

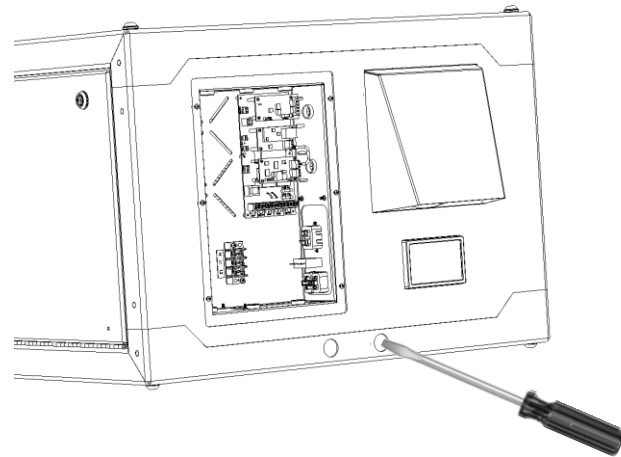
Conduit Entry:
Signal

Use a screwdriver – and tap lightly with a hammer if needed – to open the conduit knockouts.

Conduit openings accept PG21 (International) and 3/4" NPT (North America) conduit fittings.

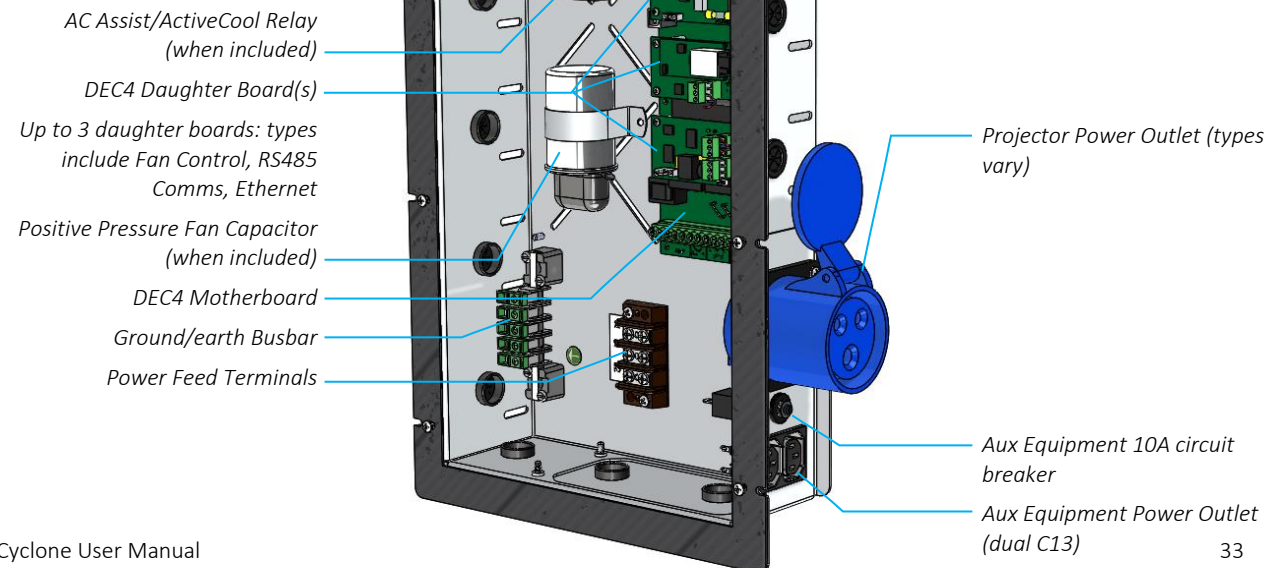
Use permanent or flexible outdoor rated conduit to connect power and signal cables to your Cyclone enclosure.

ALWAYS RUN POWER AND SIGNAL CABLES IN SEPARATE CONDUITS.



Identify the following parts:

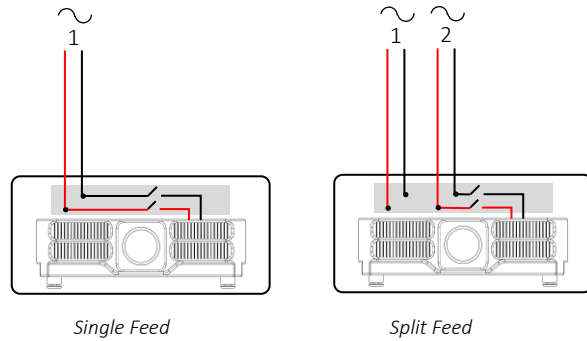
Note: Component layout may vary



One or Two Power Circuits?

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

Tip: most people use single feed.



Single Feed

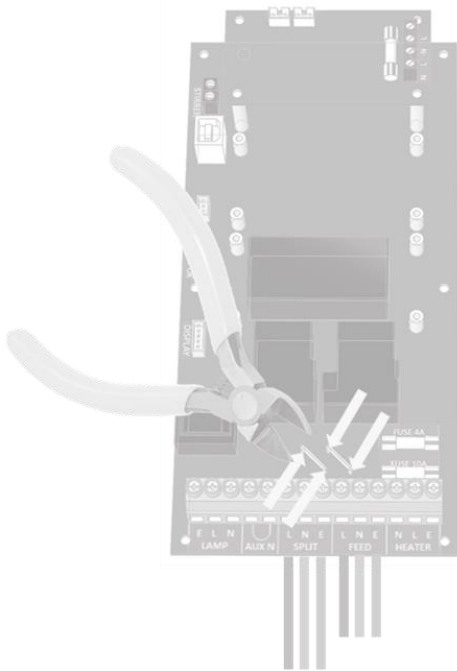
- Enclosure and projector are permanently on.
- Enclosure and Projector must be rated for the same voltage.
- Supply must be rated for projector current plus 200 watts.
- Supply must be permanently ON.

Split feed

- Enclosure power (FEED) must be permanently ON.
- Projector power (SPLIT) may be switched off.
- Enclosure power must be rated for 1,000 watts.
- Projector power must be rated for the projector (see projector manual).

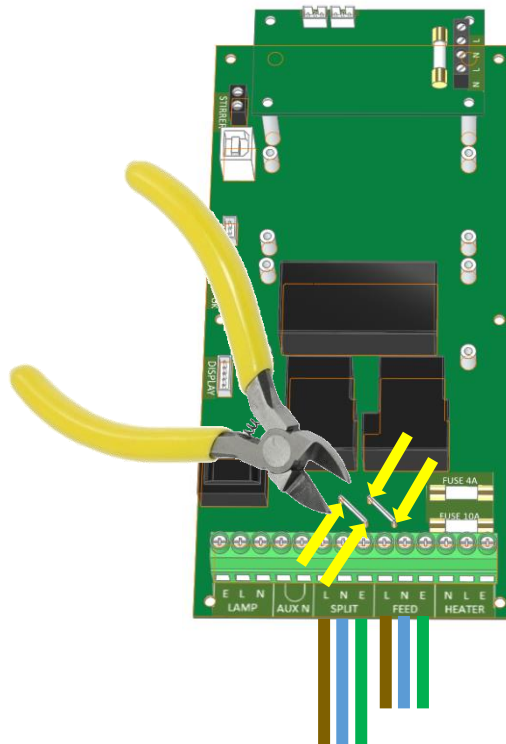
Projector and enclosure power must be same voltage.

For **single feed** wiring, **no modification** to the DEC4 Controller motherboard is needed.



IMPORTANT:

For **split feed** wiring, use a side cutter to cut both AC links at both ends:



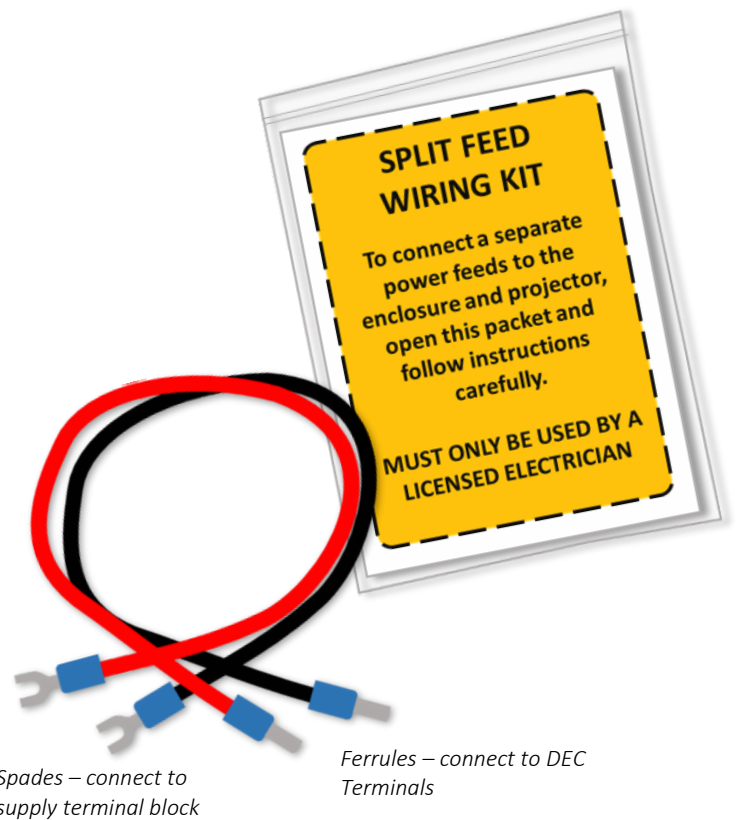
Single Feed Power Termination

- Connect Earth/Ground wire to Ground Terminal
- Connect Live and Neutral to the terminals marked L and N ENCLOSURE
- **IMPORTANT: Use only copper wire, rated to comply with local electrical codes. Terminal Screw Torque Setting 0.5Nm/4.5in lb.**

SEE DIAGRAMS ON FOLLOWING PAGES

Split Feed Power Termination

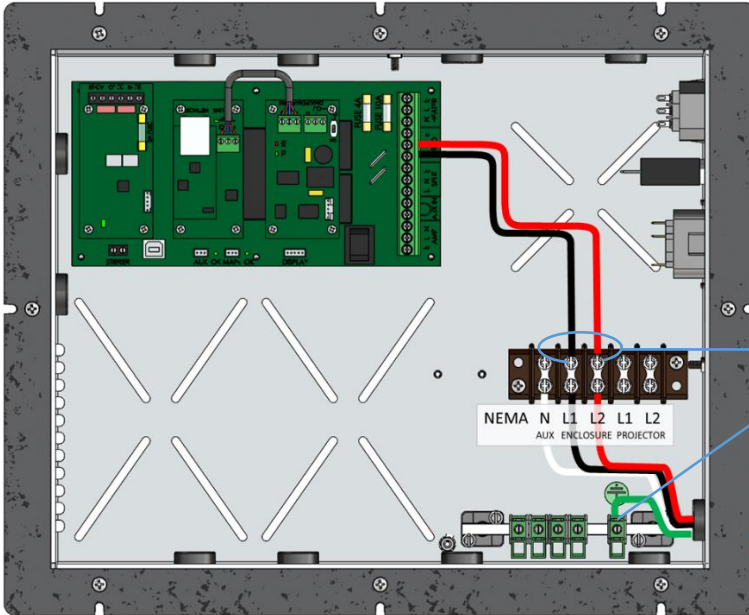
- **STOP!** Did you cut the power links? See above.
- Connect Earth/Ground wire to Ground Terminal
- Connect Enclosure feed to the terminals marked L and N ENCLOSURE
- Connect Projector feed to the terminals marked L and N PROJECTOR
- Open the Split Feed Wiring Kit – it contains two short cables to link the PROJECTOR supply terminals to the DEC SPLIT terminals:



- Connect Split feed wires provided between L and N PROJECTOR and motherboard L and N SPLIT terminals
- **IMPORTANT: Use only copper wire, rated to comply with local electrical codes. Terminal Screw Torque Setting 0.5Nm/4.5in lb.**

SEE DIAGRAMS ON FOLLOWING PAGES

North America 208V, Japan 200V Single Feed



Single Feed

200-208VAC Single-Phase (2 hots)

Protective Earth (ground)

10A Neutral for 120V Aux power

Fuse/Circuit breaker rating: Projector power plus 200W (Max 30A)

Factory Installed feeds

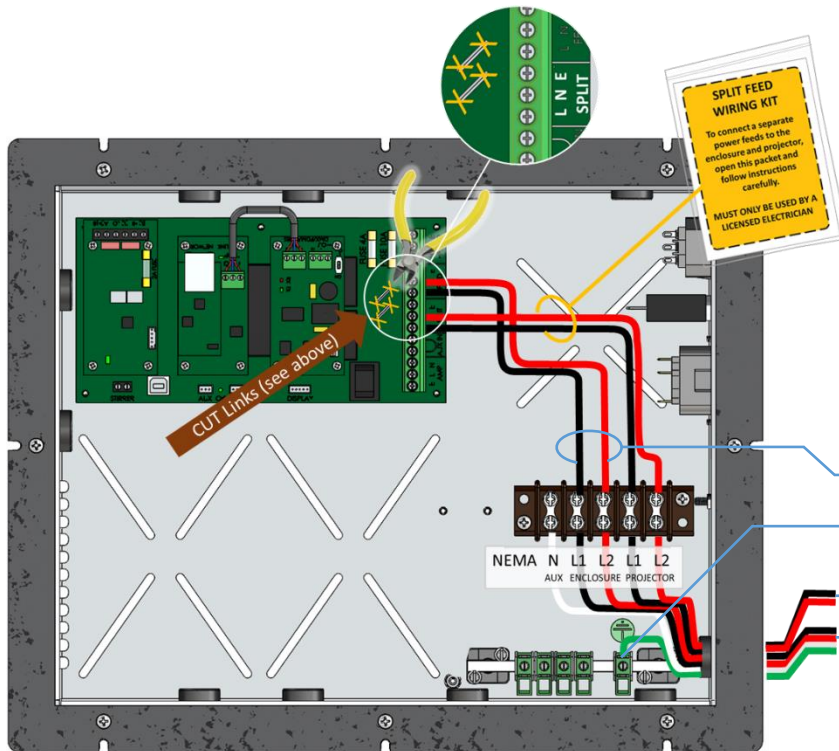
Supply Ground Terminal

User-installed Supply wiring

IMPORTANT: Use only copper wire, rated to comply with local electrical codes. Terminal Screw Torque Setting 0.5Nm/4.5in lb.

(for clarity, internal wiring not shown)

North America 208V, Japan 200V Split Feed



Split Feed

Enclosure: 10A 200-208VAC Single-Phase (2 hots)

10A Neutral for 120V Aux power

Protective Earth (ground)

Projector: 200-208VAC Single-Phase (2 hots)

Fuse/Circuit breaker: Projector power rating (Max 30A)

Factory Installed feeds

Supply Ground Terminal

User-installed Supply wiring:

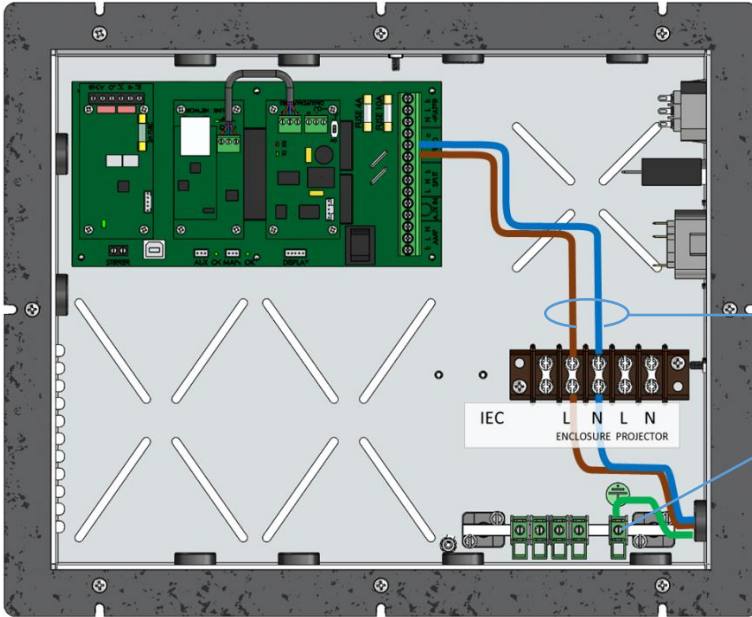
Projector

Enclosure

IMPORTANT: Use only copper wire, rated to comply with local electrical codes. Terminal Screw Torque Setting 0.5Nm/4.5in lb.

(for clarity, internal wiring not shown)

International, 230V Single Feed



Single Feed

230VAC Single-Phase (L + N)

Protective Earth (ground)

Fuse/Circuit breaker rating: Projector power plus 200W (Max 30A)

Factory Installed feeds

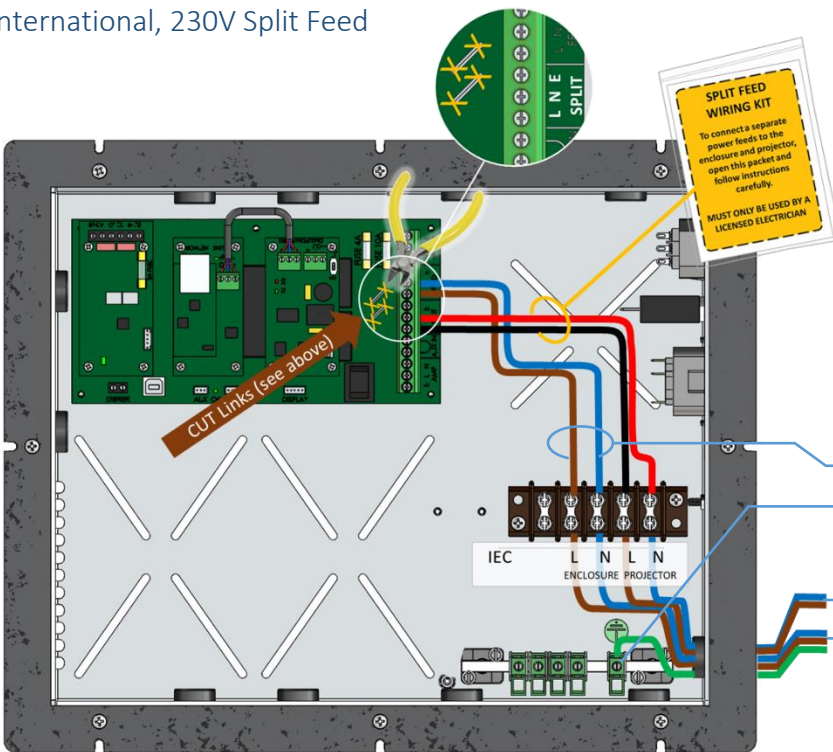
Supply Ground Terminal

User-installed Supply wiring

IMPORTANT: Use only copper wire, rated to comply with local electrical codes. Terminal Screw Torque Setting 0.5Nm/4.5in lb.

(for clarity, internal wiring not shown)

International, 230V Split Feed



Split Feed

Enclosure: 10A 230VAC Single-Phase (L + N)

Protective Earth (ground)

Projector: 230VAC Single-Phase (L + N)

Fuse/Circuit breaker: Projector power rating (Max 30A)

Factory Installed feeds

Supply Ground Terminal

User-installed Supply wiring:

Projector

Enclosure

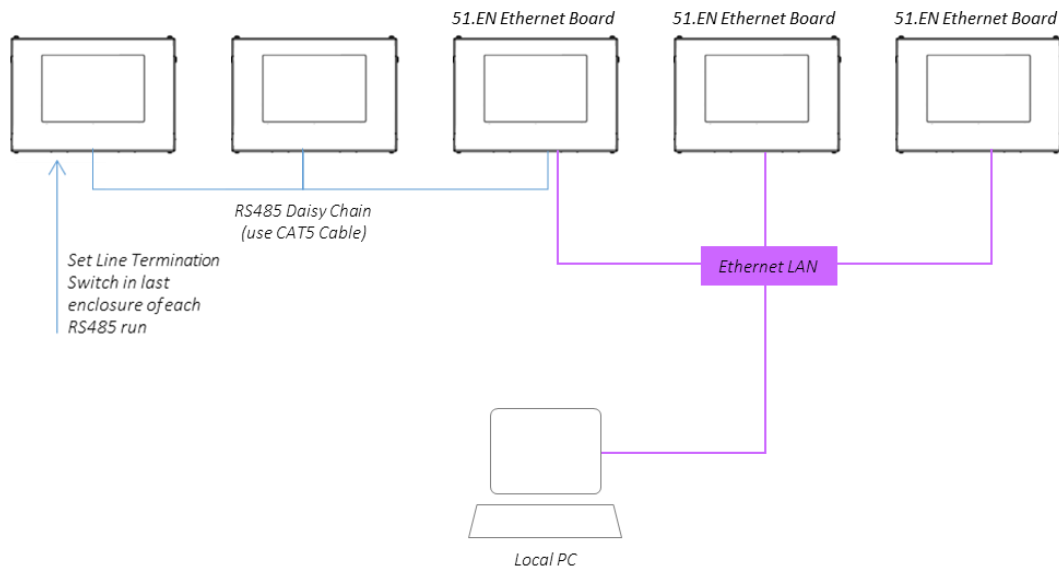
IMPORTANT: Use only copper wire, rated to comply with local electrical codes. Terminal Screw Torque Setting 0.5Nm/4.5in lb.

(for clarity, internal wiring not shown)

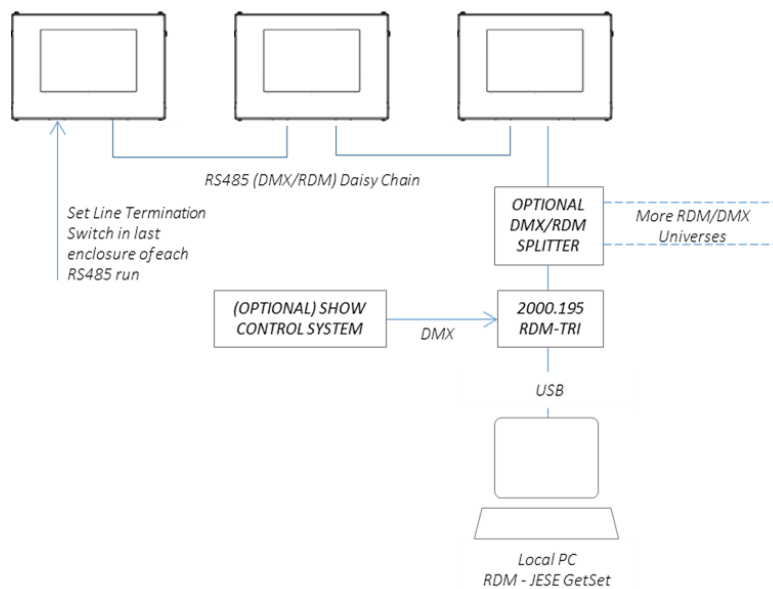
Remote Monitoring Connections

Tempest enclosures optionally support three types of remote monitoring:

1. Direct via Ethernet, using Tempest TEMP protocol (see Appendix – TEMP Protocol)
Requires 51.EN Ethernet board in each enclosure
2. Grouped via RS485, using an Ethernet board and Tempest TEMP protocol (see Appendix – TEMP Protocol)
Requires 51.EN Ethernet board in one enclosure



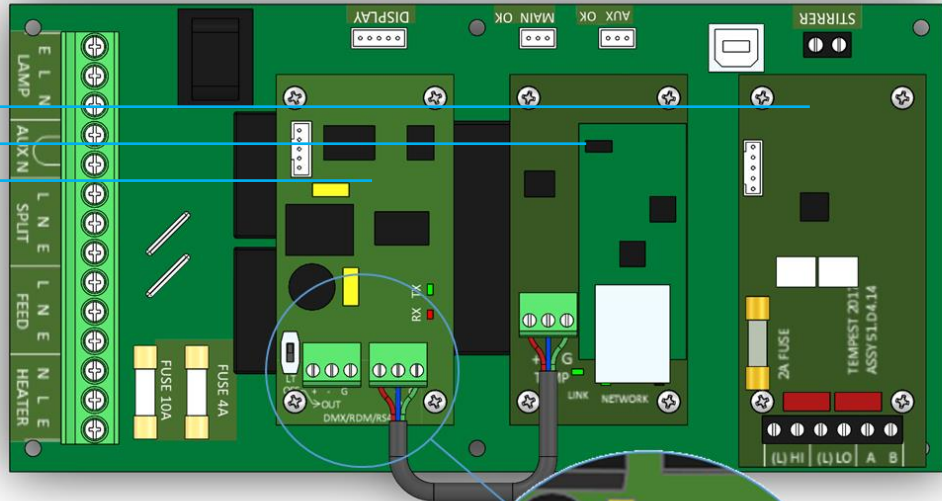
3. Grouped via RS485, using DMX/RDM and JESE GetSet



RS485 (DMX/RDM) Cable Terminations

DECA System Control Board, with three typical Daughter Boards:

1. AC Fan Controller
2. Ethernet Bridge
3. RS485 Comms



Loop a shielded twisted pair cable (eg Belden 9841, though many people now use a CAT5e cable) from the control/monitoring point, around all enclosures.

Maximum total cable length is 1,200M (4,000ft). For longer runs and wildly distributed systems, use a DMX/RDM splitter (make sure that it supports RDM) and multiple cable runs.

Use the termination switch to terminate each RS485 cable run at the last enclosure on each run.

RS485 Line Termination (LT) Switch:

TERMINATED



Data + Data - Common Data + Data - Common

DATA OUT DATA IN

Terminal Screw Torque Setting 0.5Nm/4.5in-lb



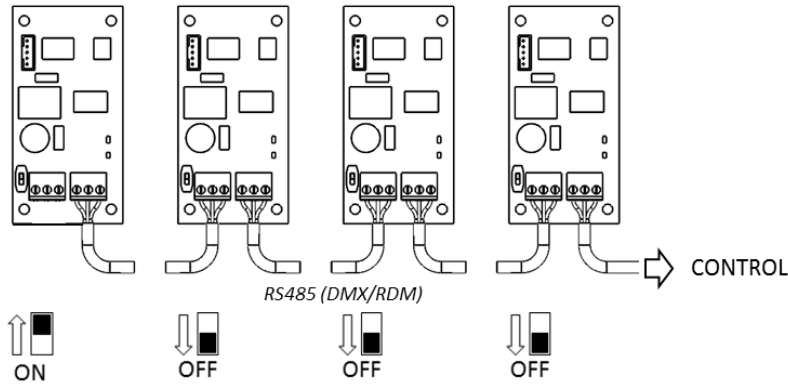
Tempest recommends the JESE SH8 DMX/RDM Splitter for large or complex RS485 networks.

JESE RDM-TXI interface connects to a PC via USB to monitor and control a network of Tempest enclosures.
Tempest Item # 2000.195

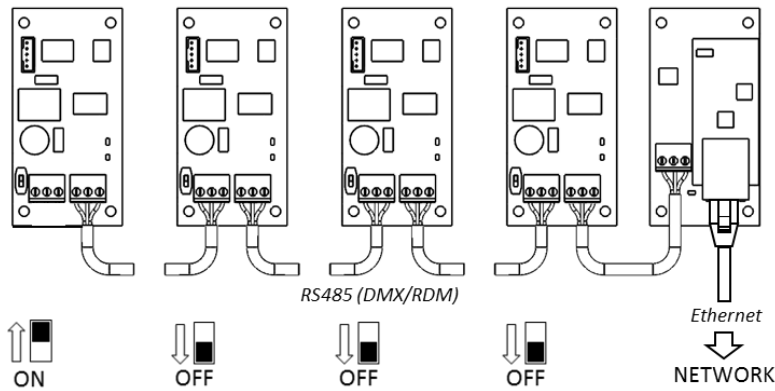


Line Termination Switch Settings

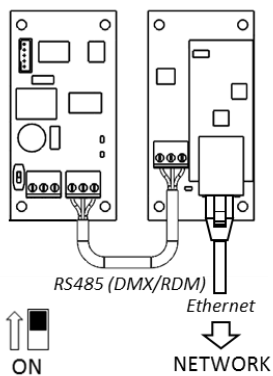
1. DMX/RDM control over RS485:



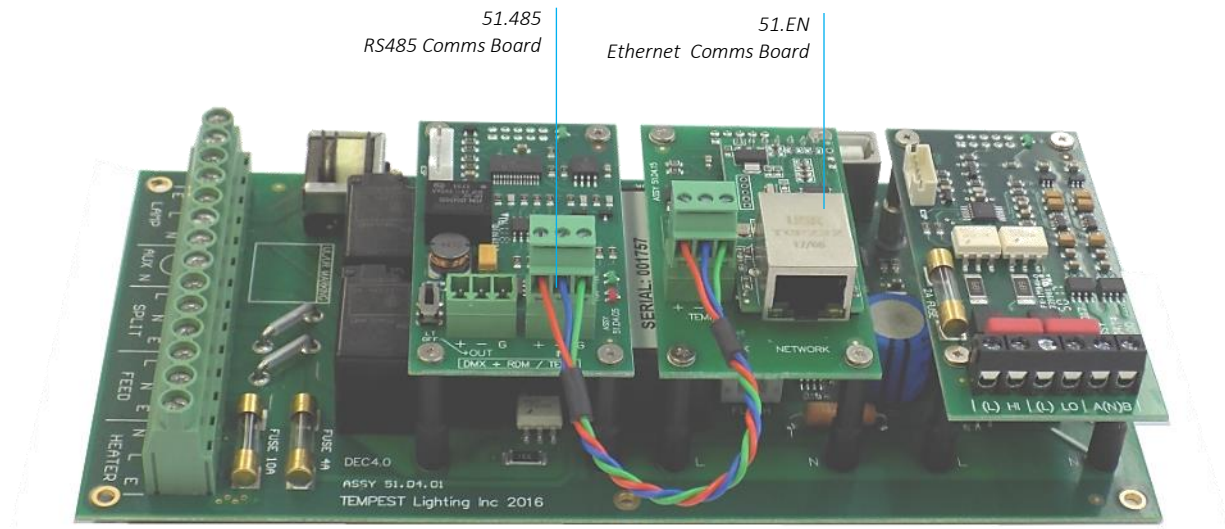
2. TEMP Control of an enclosure group via Ethernet



3. TEMP Control of a single enclosure via Ethernet



DEC4 Ethernet Adapter – 51.EN



As a default, DEC4 communicates using DMX512 and RDM, over RS485.

With the addition of the 51.EN Ethernet board, any DEC4 – or any group of DEC4 boards connected using RS485 – may be connected to an Ethernet network – see above.

Default Configuration

The bridge module is supplied in DHCP TCP port server configuration, with all traffic on port 3308. These settings may be changed with a web browser on port 80 at the DHCP assigned address. Login to the home page using 'admin' for user name as password.

The bridges may be discovered with a UDP broadcast on port 1500 and a payload of

(Hex) 30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39

30 31 32 33 34 35 36 37 38 39 30 31 32 33 34 35 36 37 38 39

The bridge will respond from its DHCP address

Additional Support

The network IP is developed by Jinan USR, more details and software configuration utilities may be found by visiting their web site at <https://www.usriot.com>

Tempest Equipment Management Protocol

TEMP allows you to access status information and set configuration values on DEC3.3 and DEC 4 enclosure controllers, using the 51.EN Ethernet Adapter, over an Ethernet network.

Download the Developer Guide at
www.tempest.biz/tech_support

IMPORTANT:

Tempest warrants that, if correctly implemented, TEMP will provide a reliable and accurate method of monitoring Tempest DEC3 and 4 controllers over an Ethernet network. However, the integrator is entirely responsible for the connection between the Ethernet Bridge and the network.

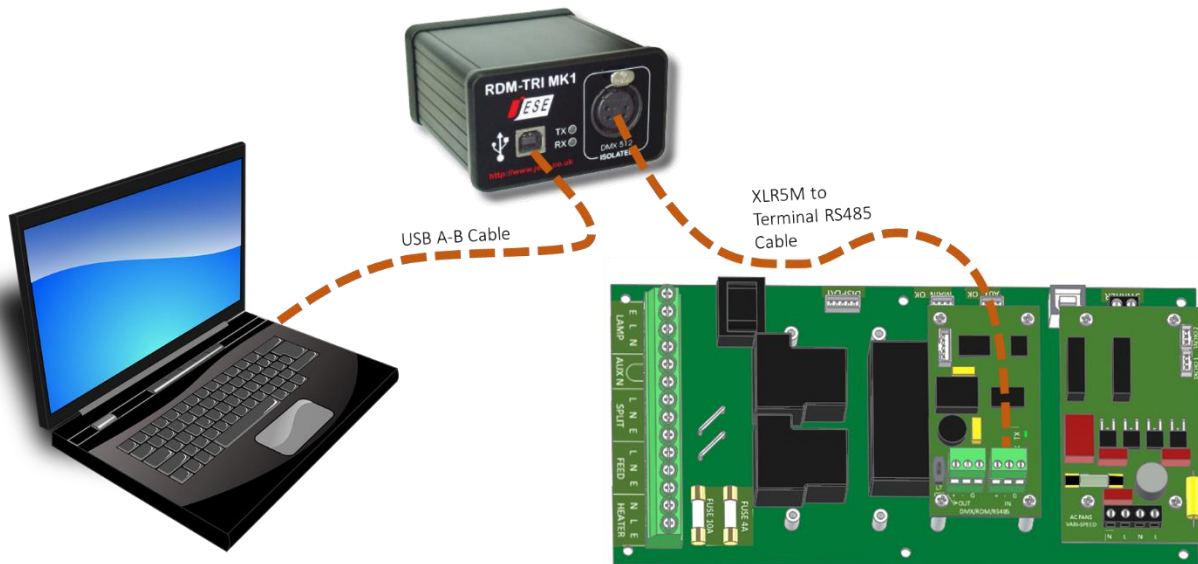
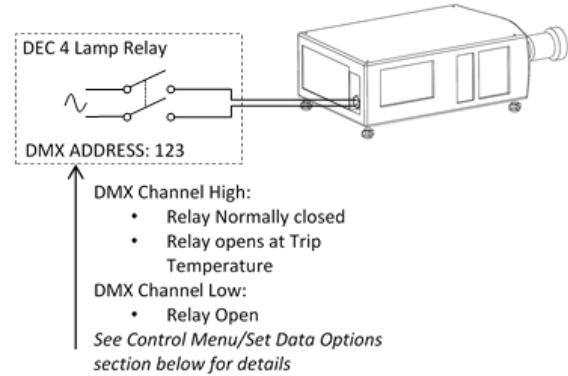


Projector Power Control using DMX512

The DEC4 controller includes a 30A 2-pole relay that protects the enclosed equipment in the event of a serious high temperature event by cutting off power. In 3-phase enclosures this is augmented by a 4-pole contactor.

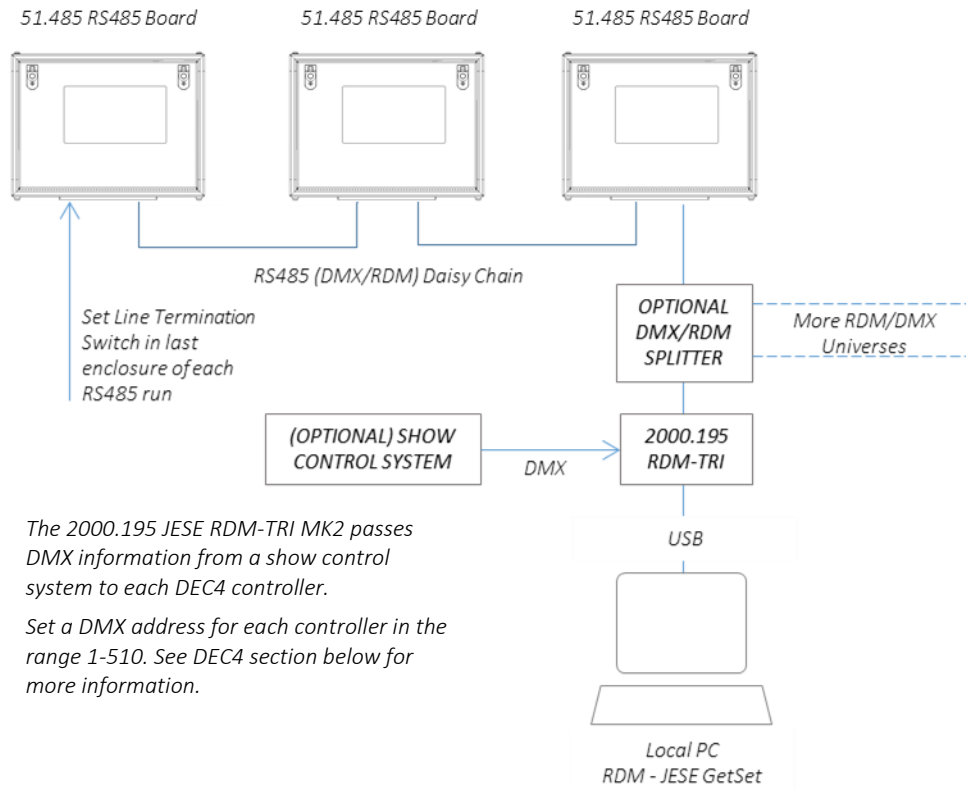
You may use DMX512 (a popular entertainment industry protocol running on RS485, originally intended to control lighting system dimmers) to control power to the projector inside the enclosure. This is very useful in hot locations, where the projector may be stressed by being held in standby mode all day under hot sun. By powering the projector down it will tolerate much higher temperatures without harm.

Tempest recommends the JESE RDM-TRI interface to monitor enclosure status in any installation and control the enclosure power relay in smaller systems.



More complex installations are very likely to include some kind of show control system that will certainly include DMX control. This is the preferred method of controlling power to the projectors.

DMX/RDM Network, using JESE RDM-TRI



The 2000.195 JESE RDM-TRI MK2 passes DMX information from a show control system to each DEC4 controller.

Set a DMX address for each controller in the range 1-510. See DEC4 section below for more information.

Positive Pressure Fan Control Option

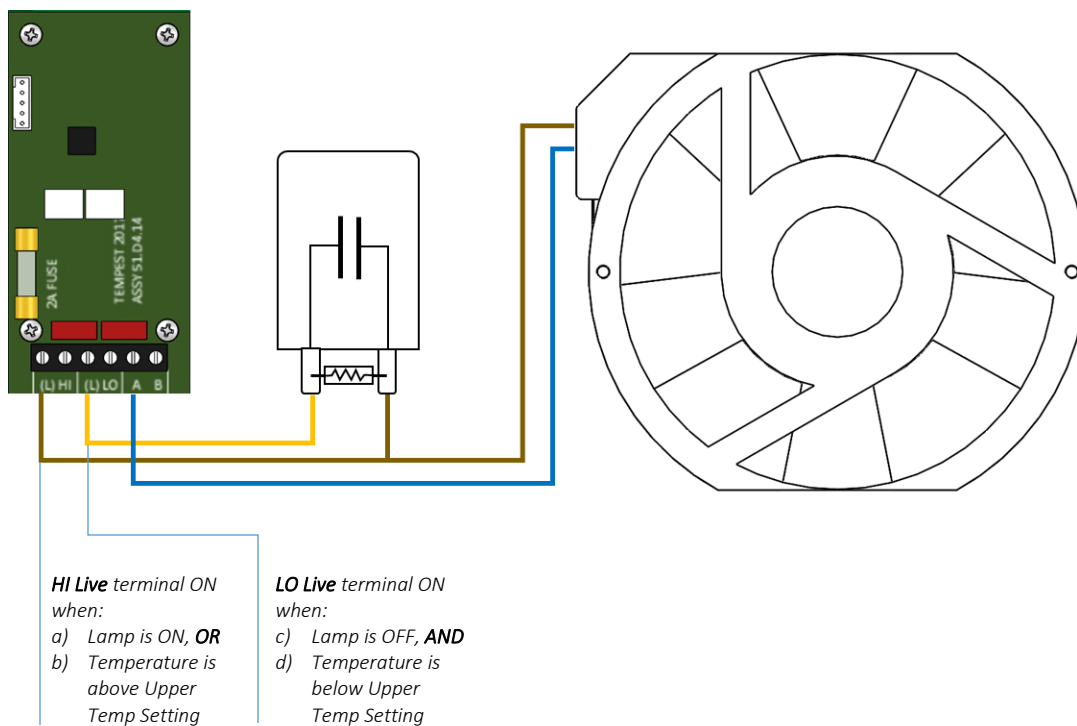
When the Positive Pressure (51.PP) option is ordered, the enclosure fan function is changed.

- Normally the enclosure fan(s) will run only when either the projector/luminaire lamp is on, or if the daytime temperature in the enclosure exceeds the DEC Upper Temperature setting. At all other times the fan is OFF.
- With the Positive Pressure option, when the fan would normally be off, it is instead powered via a capacitor that lowers the operating voltage so that the fan continues to run at a low level, maintaining positive pressure in the enclosure and preventing harmful contaminants from entering through the exhaust path.

Fan Control Board

Capacitor

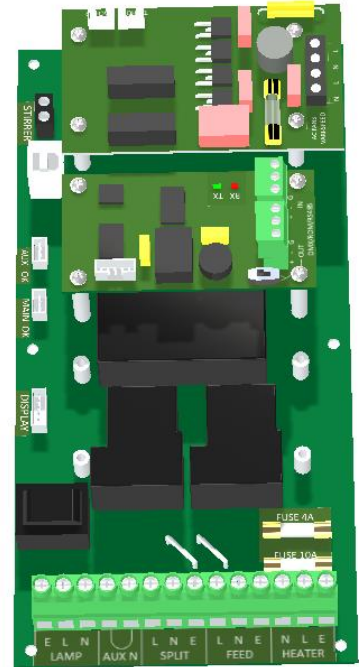
Fan



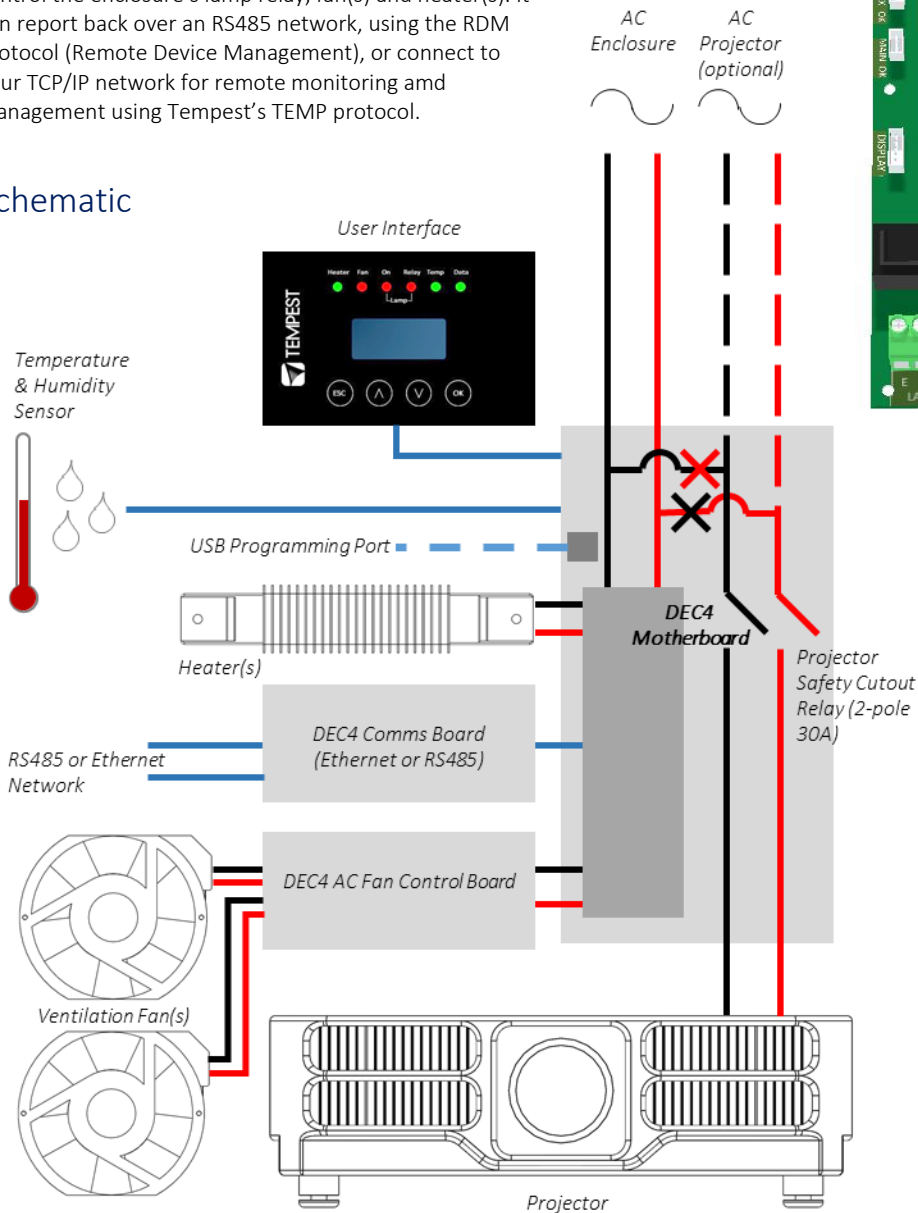
Digital Enclosure Control

DEC4™ – that’s Digital Enclosure Control, fourth Generation – 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. DEC4 monitors internal and external 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 an RS485 network, using the RDM protocol (Remote Device Management), or connect to your TCP/IP network for remote monitoring and management using Tempest’s TEMP protocol.

Typical DEC4 configuration, with Motherboard, fan control board and RS485 comms board



Schematic



DEC4 Main Functions

Firmware Revision

This manual covers DEC4 Firmware revision 2.03.000 and higher.

To check the Firmware revision, on the User Interface menu, go to Status Display/Firmware.

1. Sense current to projector (lamp on/off)
2. Record lamp hours
3. Monitor temperature and relative humidity inside Enclosure
4. Monitor temperature outside enclosure
5. Maintain internal temperature at safe operating level
6. Maintain relative humidity within safe limits to prevent condensation
7. Isolate projector in case of unsafe temperature
8. Report status over RS485, RDM, TCP/IP
9. Maintain positive pressure (optional) 24/7 to prevent ingress of salt air and other contaminants through the exhaust path
10. Circulates air internally to prevent hot and cold spots when projector is idle

DEC4's patented Goldilocks™ algorithm uses a combination of sensors, 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.

DEC4 constantly monitors the following parameters:

- Projector/Luminaire current
- Line Voltage
- External Temperature
- Internal Temperature
- Internal Relative Humidity

Factory Settings – Data Modes

In most applications, DEC4 will operate correctly with its factory default settings, in Basic operating mode.

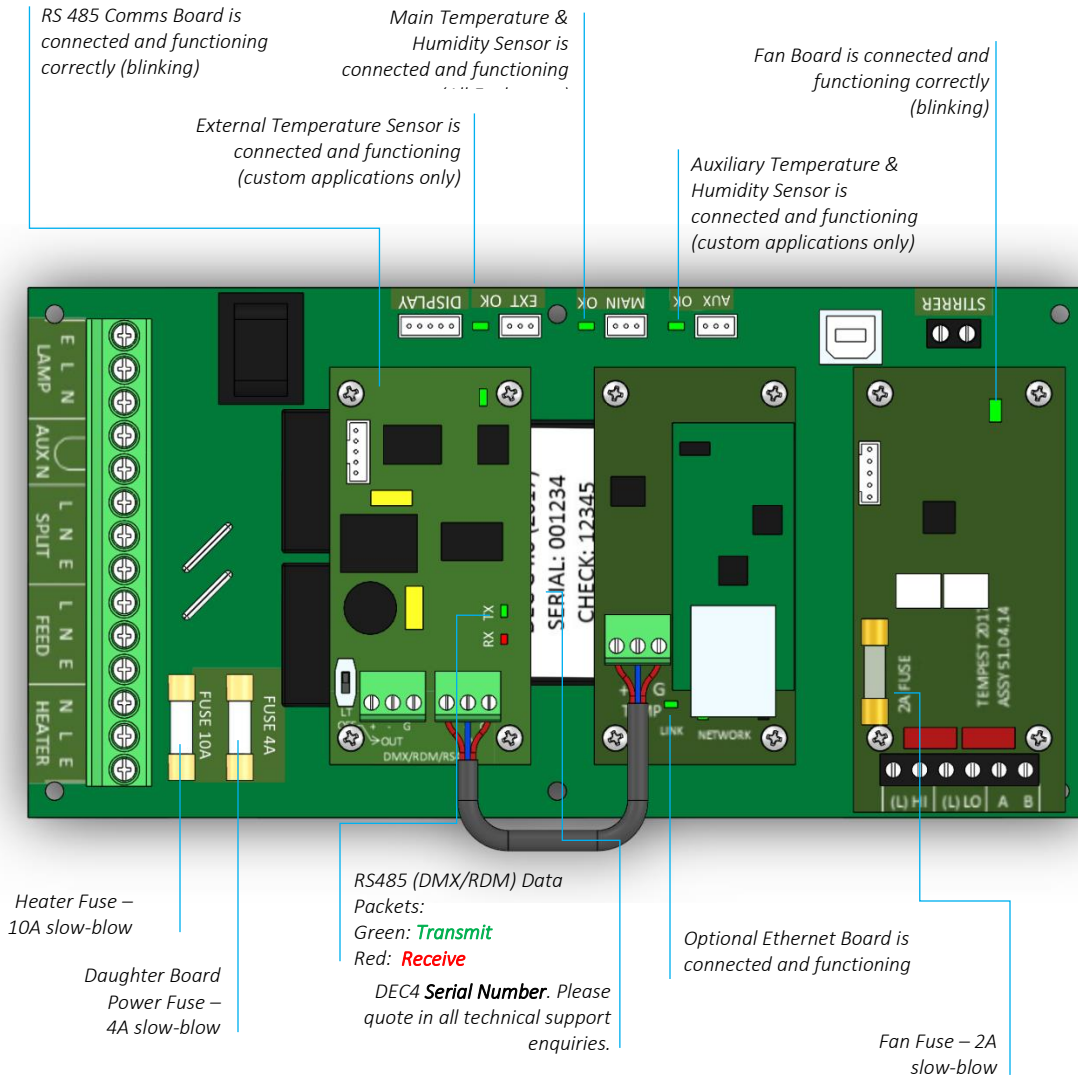
You do not need to do anything. Please skip to the next section.

- Standard default temperature and humidity settings
- DMX, RDM and Remote Monitoring disabled
- Best for standalone operation

If your needs are more complex, read on.



Hardware Indicators & Fuses



Operating Modes

RDM Only Monitor (Factory Default)

- Supports RDM monitoring over RS485 if present
- Supports TEMP monitoring if present
- RDM Status Reporting over RS485
- RDM Configuration – settings may be changed remotely or at the enclosure user interface.
- No DMX control

RDM+DMX Control

- 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 projector malfunction
- RDM Status Reporting over RS485
- RDM Configuration – settings may be changed remotely or at the enclosure user interface.
- 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.

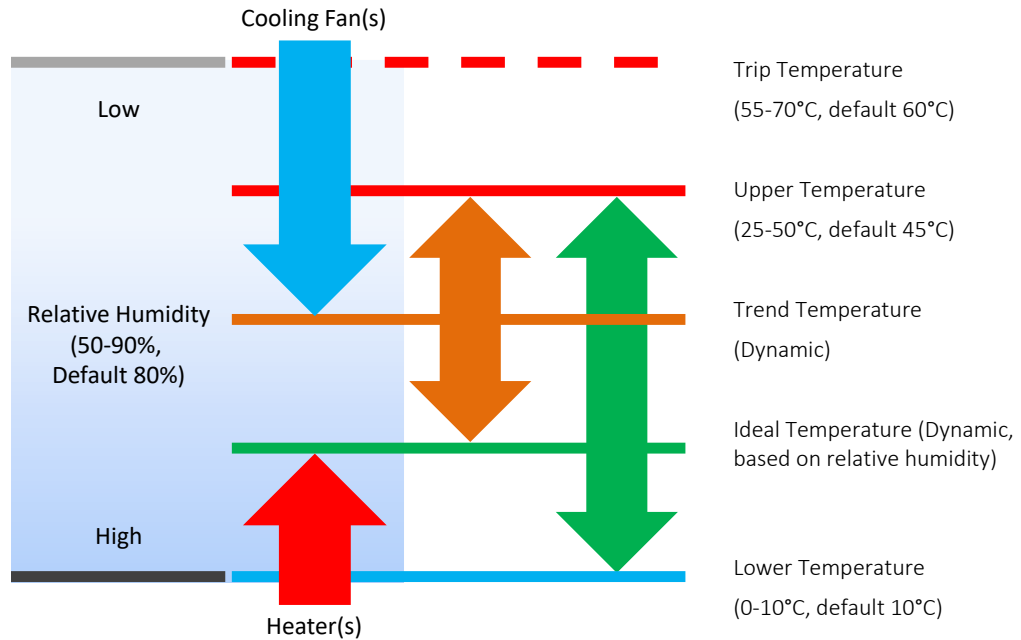
RDM+DMX Service

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)
- RDM Status Reporting over RS485
- RDM Configuration – settings may be changed remotely or at the enclosure user interface.
- ***Service mode is ONLY for troubleshooting – DO NOT use Service mode for normal operation.***

DEC4 Control Parameters

Temperature and Humidity Ranges

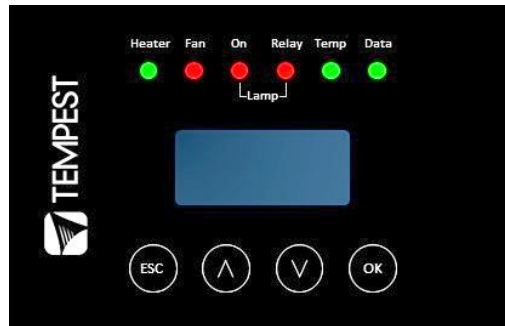


Notes:

- 1 In moving light enclosures the temperature sensor is located in the exhaust airflow. Temperatures shown may be higher than those around the projector.
- 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.

Control Interface

LED Indicators



Heater	ON (Green) 	Heater is ON, to maintain lower temperature level or to prevent condensation
	ON (Amber) 	Enclosure is temporarily outside the Goldilocks zone, and DEC is working to restore it
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. <i>NOTE: Fan LED will not light if no fan is detected</i>
	Lamp On	ON (Green) 
Lamp Relay	OFF 	Current sensing shows lamp is OFF Lamp hour counter is not running
	ON (Green) 	Lamp relay is closed (normal) Projector power receptacle is energized
Temp	ON (Red) 	Lamp relay is open due to over-temperature event. Projector power receptacle is isolated.
	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
Data	FLASHING (Red) 	Temperature is above Trip level Projector power is isolated
	OFF 	Data not used in present Mode. OR DEC4 is in RDM + DMX Control Mode and no valid data packet has been detected.
	ON (GREEN) 	Good data packet received.
	ON (RED) 	RDM + DMX Control Mode: Data Fail. A previously good data signal has failed.

User Interface LCD Display

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

RDM Only Monitor Mode

28 °C	47%	<i>internal temperature, relative humidity line voltage, lamp status</i>
209V	OFF	

RDM+DMX Control Mode RDM+DMX Service Mode

28 °C	47%	<i>internal temperature, relative humidity line voltage, lamp status</i>
209V	OFF	

Alternating with:

DMX: 001	<i>DMX Start Address DMX Status</i>
No DMX	

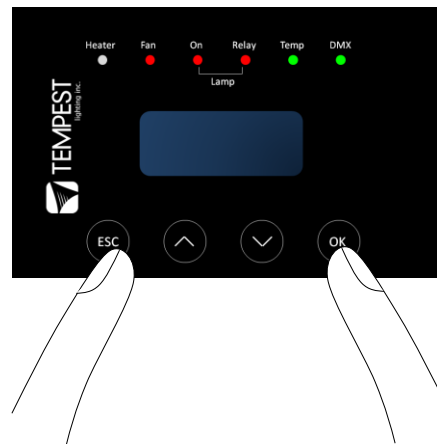
(Alternating DMX Display requires a DMX signal to be present)

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, or **OK** to confirm settings (**↵**).
- To exit and LOCK, hold **ESC** for 5 seconds.

Menu will time out and the display will lock after ten minutes.



Control Menu

Set Data Options

SET DATA MODE

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

RDM Only Monitor	DEFAULT	Supports RDM or TEMP if connected. No DMX Control.
RDM+DMX Service		Service mode – 3 DMX slots, starting with the DMX address set <i>Important: Please ensure that DEC4 is NOT left in Service Mode.</i>
RDM+DMX Control		DMX (set 1 address for lamp relay) plus RDM

SET DATA ADDRESS (in RDM Only Monitor, RDM+DMX Service or RDM+DMX Control 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 DATA CURVE

DMX Curves affect the way the fixture relay is controlled in RDM+DMX 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 DATA 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 10°C, permissible range 0-10°C).

SET TEMP UPPER (maximum desired daytime temperature)

(default 45°C, permissible range 25-50°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

Sets highest desired Relative Humidity: Default 85%, permissible range 80-90%.

Note that, when the projector/luminaire lamp is OFF, the enclosure heaters will switch on to raise the temperature and lower the risk of condensation. We recommend setting the highest Max Humidity that works in your location, to avoid unnecessary heater use.

Set Lamp On Point

The lamp current at which DEC detects the projector/luminaire lamp is running. Default is 1 Amp, which allows for most equipment fans and power supplies to run without changing the air in the enclosure. Lamp on point may be set in 0.1 Amp increments between 0.2 Amps and 2.0 Amps.

If the enclosure fans never turn off, the Lamp On point is probably set below the standby current draw of the projector/luminaire. Check the standby current draw on the display and set the Lamp on Current higher.

Reset Lamp Hours

Reset each time you change the lamp in the projector.

Make this a part of your maintenance instructions.

Set Fan Function

SET FAN TEST

To test the enclosure fan(s), press [OK]

The enclosure fan will run

The Display Fan LED lights green

DEC Beeps

To stop the fan test, press [ESC]

Status Display

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

- a) Humidity – relative humidity in %
- b) Internal temperature, in degrees C or F
- c) External Temperature (custom enclosures with external temperature sensors only)
- d) PCB temperature (this will usually be significantly higher than air temperature)
- e) Voltage – line Voltage reaching the DEC
- f) Current being drawn by projector/light, in Amps
- g) Lamp Hours elapsed since last reset
- h) Firmware version
- i) UID – unique system ID number

Safe Mode

In certain circumstances, the DEC User Interface may display the message SAFE MODE. This can happen if the Humidity sensor stops reporting, or reports an extreme value, indicating the probability of a sensor error. This situation may arise either because of a faulty sensor* or in conditions of extremely high absolute humidity.



In SAFE MODE, the normal Goldilocks operation is temporarily suspended, and the enclosure works to return the internal environment to a condition from which normal operation may be resumed.

SAFE MODE is SAFE! It indicates that attention may be needed, but not that your equipment is at risk.

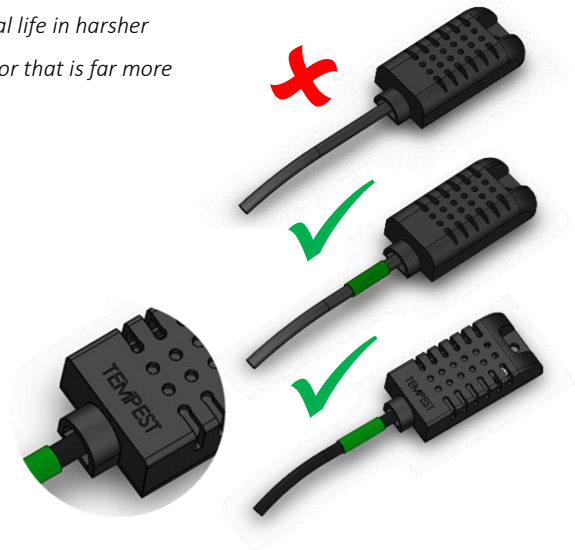
** Some sensors shipped before mid-2017 have had a limited operational life in harsher conditions. Tempest has since developed a new class of capacitive sensor that is far more resilient, especially in demanding conditions.*

The new class of sensors (MG Type) have either:

- a) A piece of green tape on the sensor cable

And/or

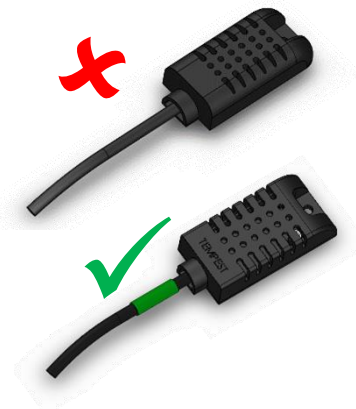
- b) TEMPEST logo on the plastic sensor case



Safe Mode – What to do:

If you see **SAFE MODE** on your User Interface Display:

1. Check the temperature/humidity sensor:
 - a. If it does NOT have either a Tempest logo or a piece of green tape on the cable, contact Tempest for a free-of-charge replacement. If you have more than one enclosure, we suggest replacing the sensors on ALL your enclosures.
2. If the sensor has either a Tempest logo or a piece of green tape on the cable, then:



- a. Check that the sensor cable is not damaged and that it is plugged in to the header on the DEC Mother board labeled MAIN
- b. Check the actual climate conditions – could the absolute humidity be close to 100%? If it is, SAFE MODE is operating correctly, and all is well.



DEC4 Firmware Updates

From time to time Tempest may introduce new DEC4 firmware for feature enhancements and bug fixes. Please note that the main System Control Board (SCB) and the various optional daughter boards each have their own firmware, and it will be good practice to update all firmware in an enclosure for optimal performance and interoperability.

- System Control Board firmware may be updated DIRECTLY using JESE JUST software and a USB cable, or INDIRECTLY, over an RDM network, using JESE GetSet software and a JESE RDM-TRI interface.
- Fan board firmware is extremely simple and is unlikely to require updating.
- RS485 Board (51.485) firmware may be updated over an RDM network, using JESE GetSet software and a JESE RDM-TRI interface.

All required files are available for download at <https://www.tempest.biz/tech-support/>

Direct Firmware Update (System Control Board only)

Requirements

Windows Laptop / PC, Windows XP through Windows 10 A standard USB A to B cable



Latest version of JUST application (download from <https://www.tempest.biz/tech-support/>)

A copy of the firmware file to upload (download from <https://www.tempest.biz/tech-support/>)

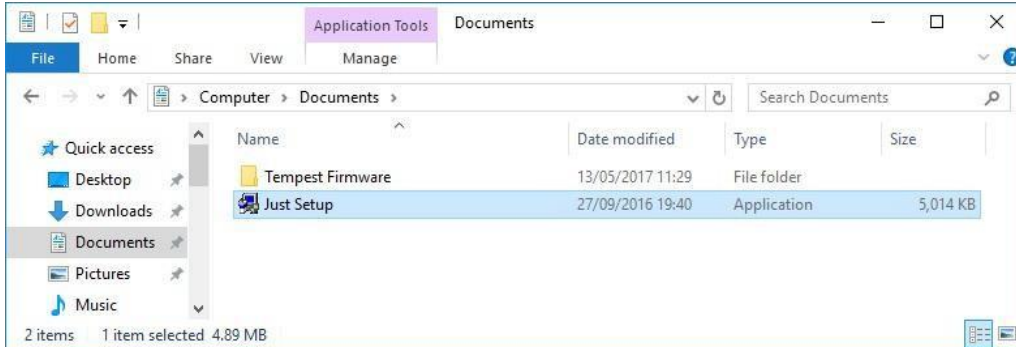
Powered Target DEC4 SCB

Preliminaries

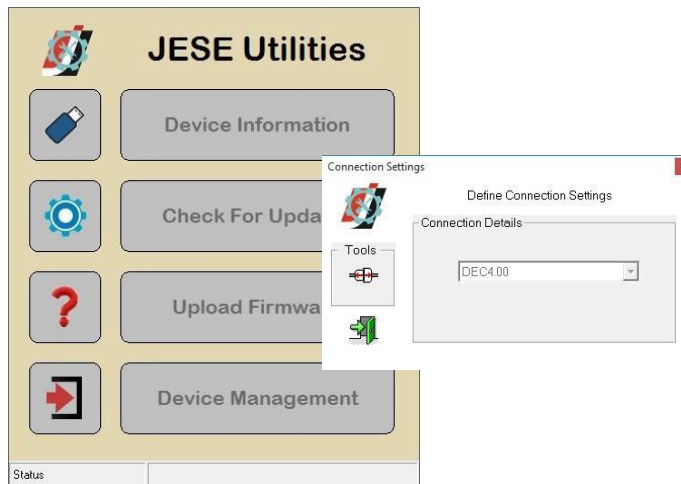
1. Power up the target DEC4 System Control Board and connect the USB Port to the PC or laptop.



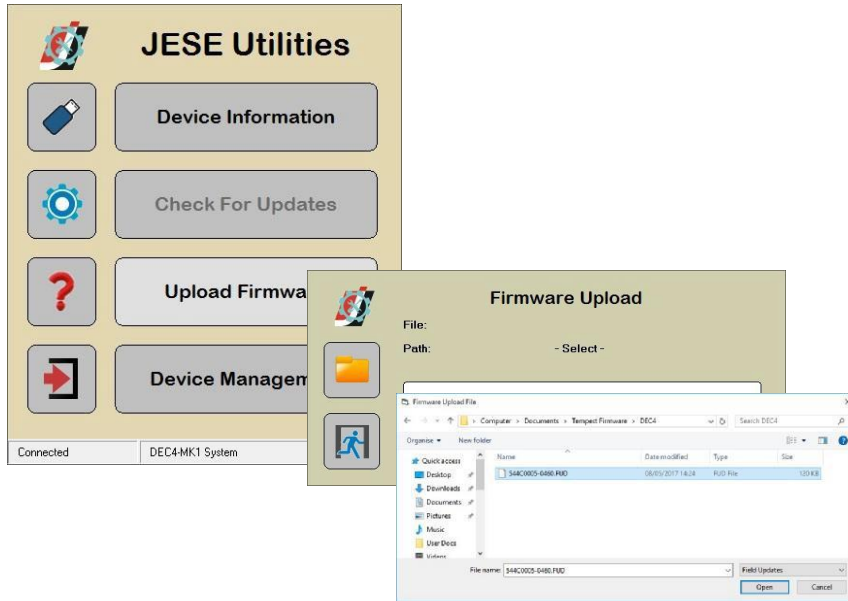
2. If not already installed, install the latest version of JUST. **IMPORTANT: If this is the first time using JUST, the PC MUST be connected to a live System Control Board for the installation to complete correctly.**



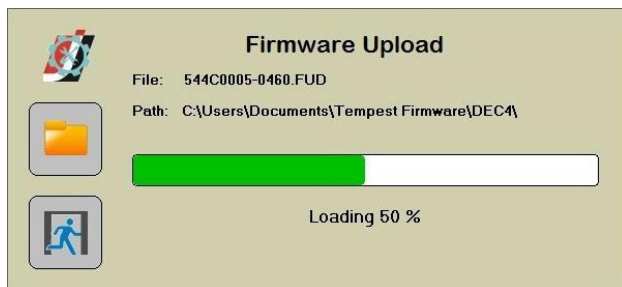
3. Run JUST and select the top left USB connection Icon. Select the DEC4 from the Connection Details option and click the connect/plug icon. Having connected, close the connection window.



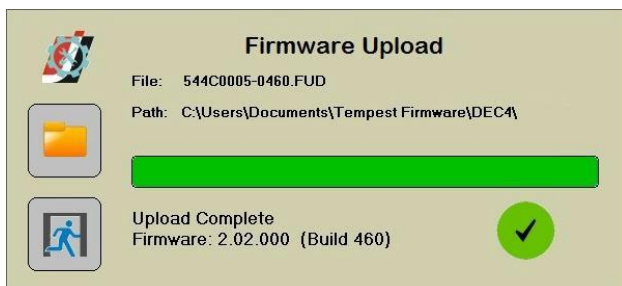
- From the main window, select the 'Upload Firmware' option. Select the file icon and navigate to the firmware file to upload



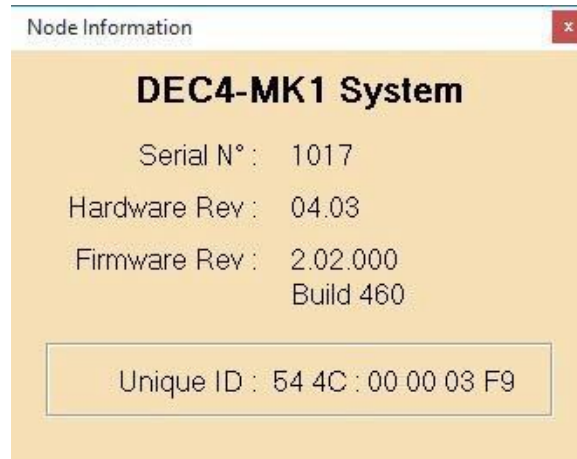
- On selection, the firmware upload will begin and run until complete.



- On completion of the upload, dismiss the upload window and return to the main window.



7. The details of the SCB and firmware version may be viewed and verified by selecting the 'Device Information' option



8. Close the application and disconnect the USB Cable from the SCB

- END -

Indirect Firmware Updates

Requirements

Windows Laptop / PC, Windows XP through Windows 10

A JESE RDM-TRI or RDM-TXI interface and USB connection (available from Tempest).

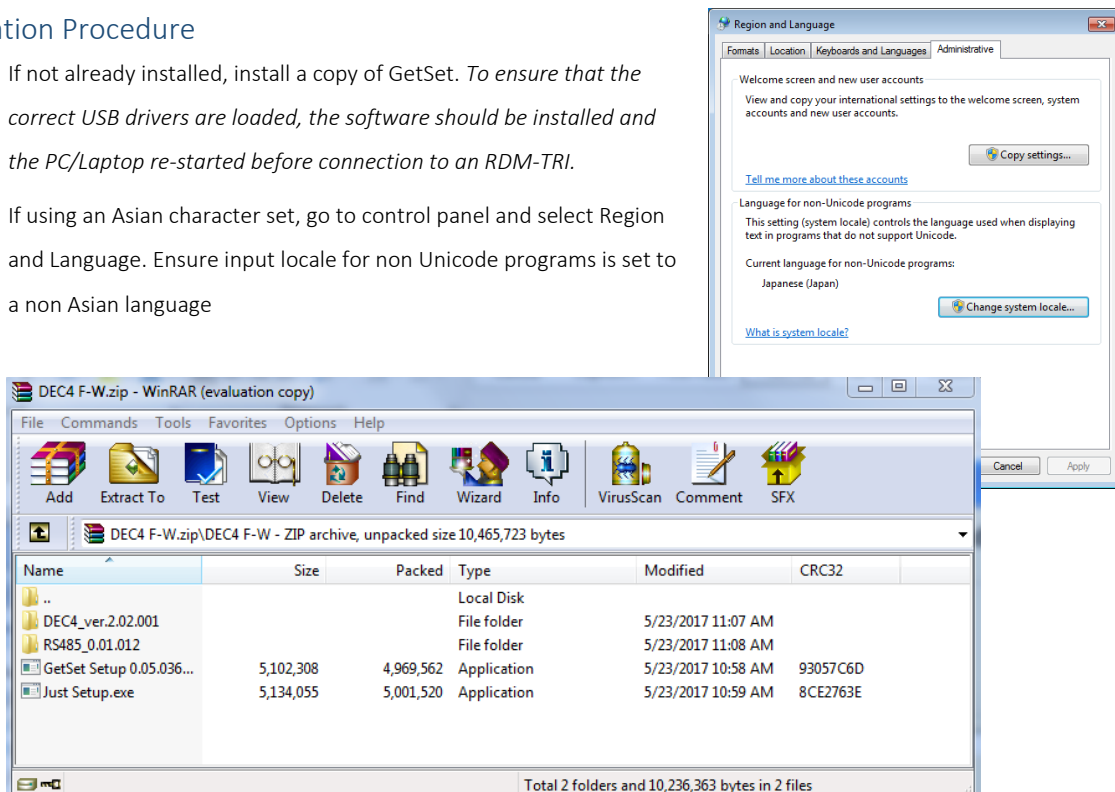
An installed version of the JESE GetSet RDM configuration utility.

A copy of the firmware file(s) to upload, available for download from www.tempest.biz/tech_support.

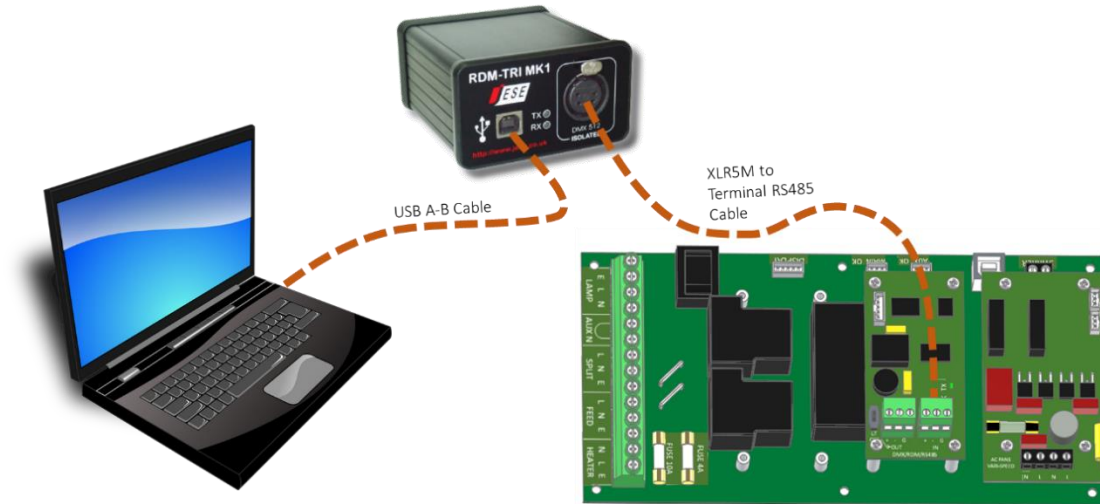
Powered Target DEC4 with 51.485 RS485 communication interface card.

Installation Procedure

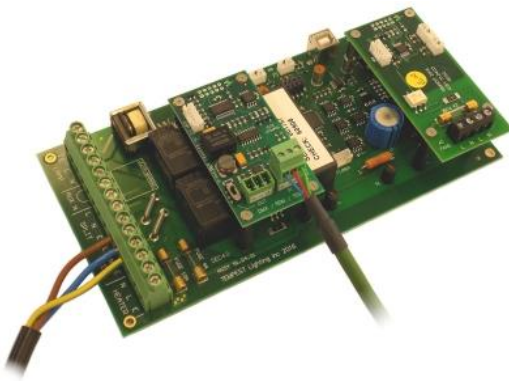
1. If not already installed, install a copy of GetSet. *To ensure that the correct USB drivers are loaded, the software should be installed and the PC/Laptop re-started before connection to an RDM-TRI.*
2. If using an Asian character set, go to control panel and select Region and Language. Ensure input locale for non Unicode programs is set to a non Asian language



3. Plug your RDM-TRI in to your PC and connect to the RS485 connection on the DEC4 communications board with the fly lead, as shown below.

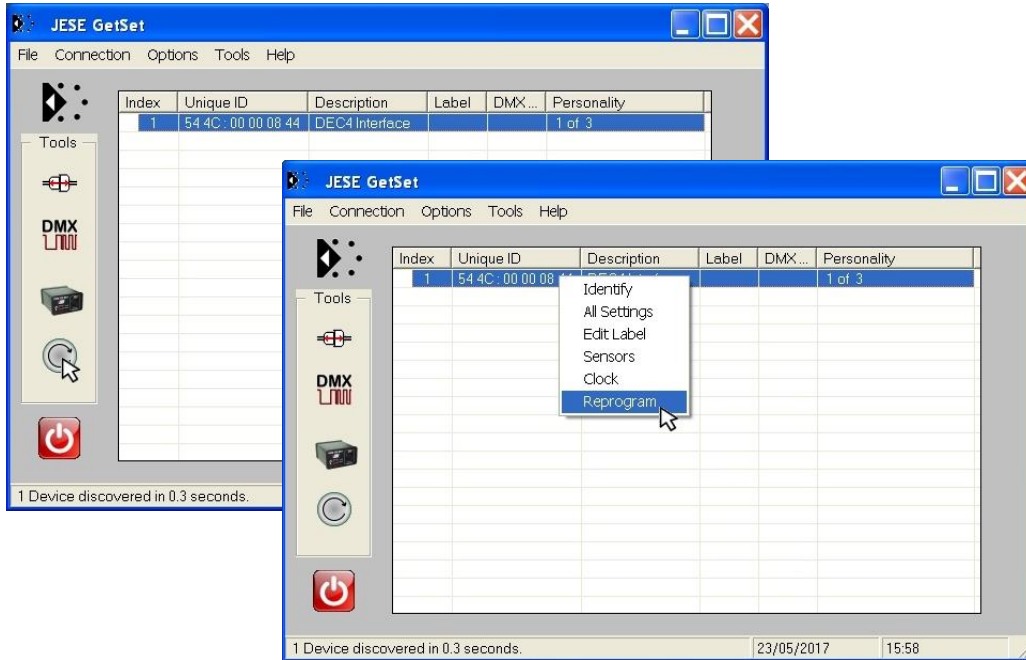


4. Power up the target SCB, ideally with mains power, or alternatively, with a USB power adaptor connected to the USB Port on the SCB.

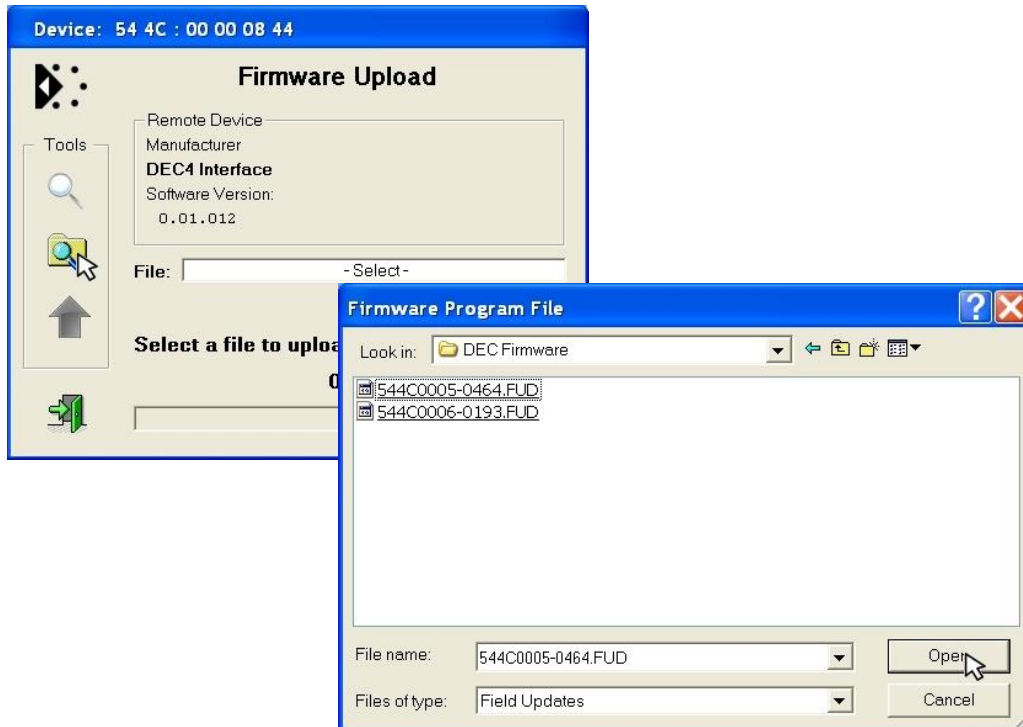


5. On older revisions of DEC Firmware, if the elected DEC 'DATA MODE' is set to 'RS485 TEMP', select 'RDM MONITOR' mode using the DEC user display. On more recent revisions of Firmware, the appropriate mode will be automatically selected.
6. Open the GetSet application, connect to the RDM-TRI and discover the DEC. To run discovery, click the Icon indicated below

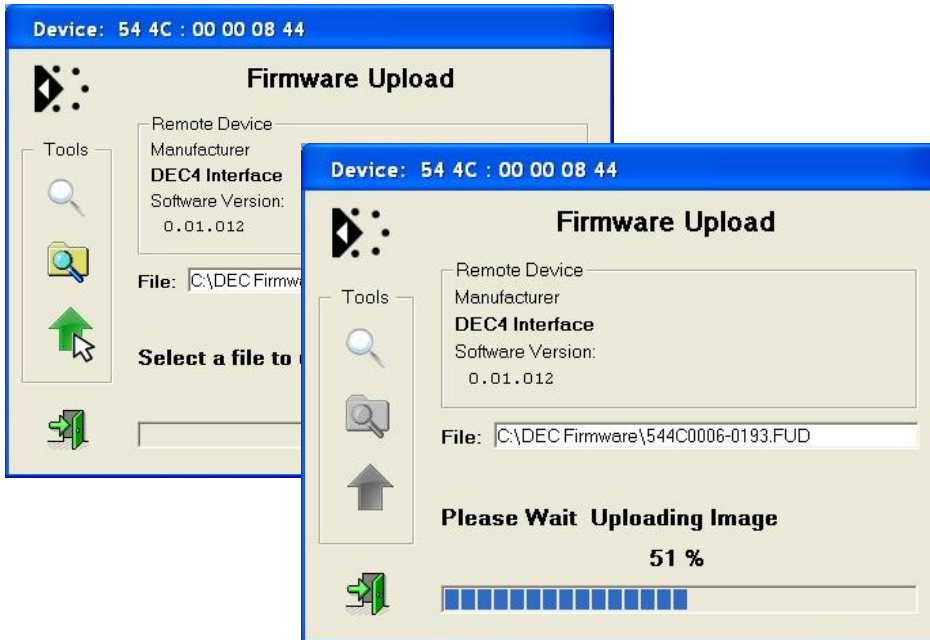
- Right click on the highlighted item in the list view and select 'Reprogram' from the popup menu. This will open the firmware upload tool.



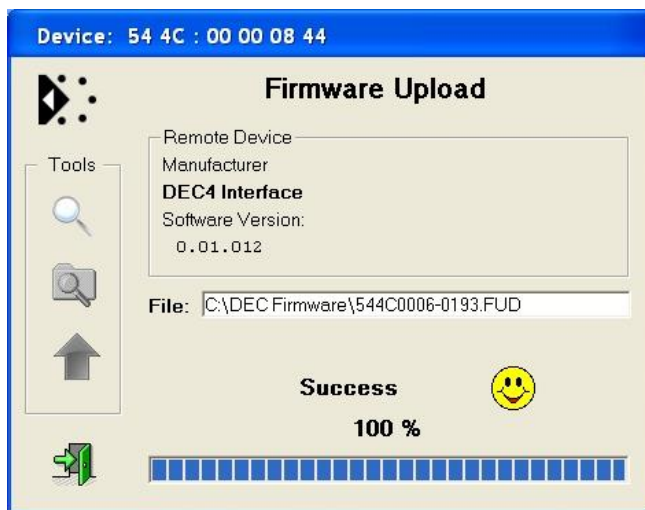
- In the Firmware upload handler, search for a file to upload by clicking the file icon. Find and select the file to load and click the Open button.



- On returning to the File upload tool window, select the green upload arrow to initiate the upload process. The upload will start.



- On successful completion of upload and restart, the firmware upload is complete.



Repeat from stage 8 to 11 for each additional file to upload.

On completion of the upload, dismiss the upload window and return to the main window.

Close the application and disconnect the USB Cable from the SCB



Important:

If the Tempest enclosures are connected to an RDM interface or controller, set the DATA MODE for each enclosure as follows:

RDM MONITOR ONLY To view status information over RDM

RDM + CONTROL To monitor and over RDM and control the Lamp/Projector relays via DMX

If the enclosures are connected to an Ethernet network for monitoring using TEMP (Tempest Equipment Management Protocol) then the appropriate mode is RDM MONITOR ONLY.

Mounting the Projector

Projector Mounting - Landscape

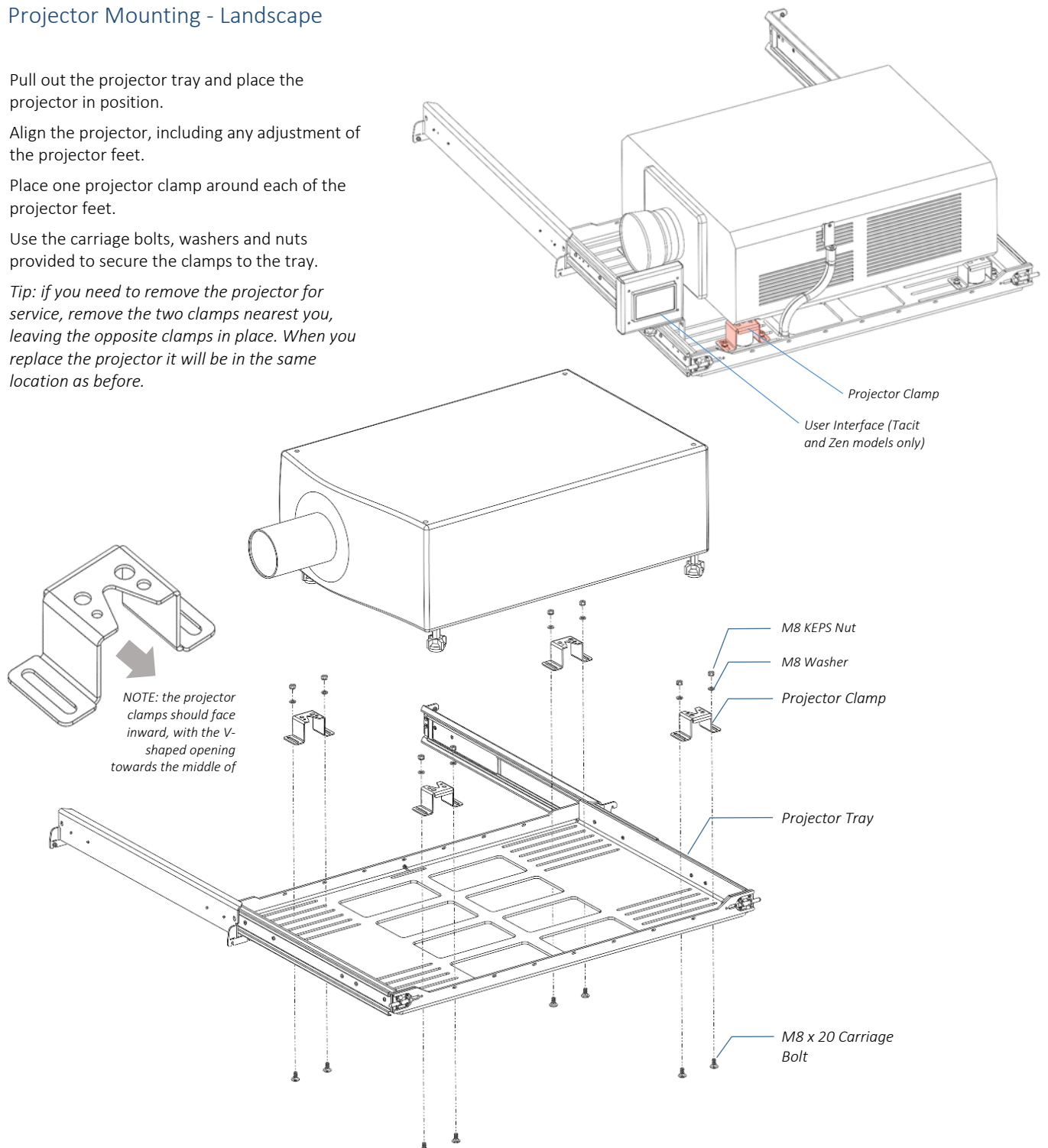
Pull out the projector tray and place the projector in position.

Align the projector, including any adjustment of the projector feet.

Place one projector clamp around each of the projector feet.

Use the carriage bolts, washers and nuts provided to secure the clamps to the tray.

Tip: if you need to remove the projector for service, remove the two clamps nearest you, leaving the opposite clamps in place. When you replace the projector it will be in the same location as before.



Projector Mounting – Landscape, Feet-up

You may specify Cyclone enclosures for feet-up (ceiling-style) projector mounting. In this case the sliding tray is mounted under the enclosure top cover, and the projector hangs from the tray.

You can secure the projector tray, using the same projector clamps, in two ways:

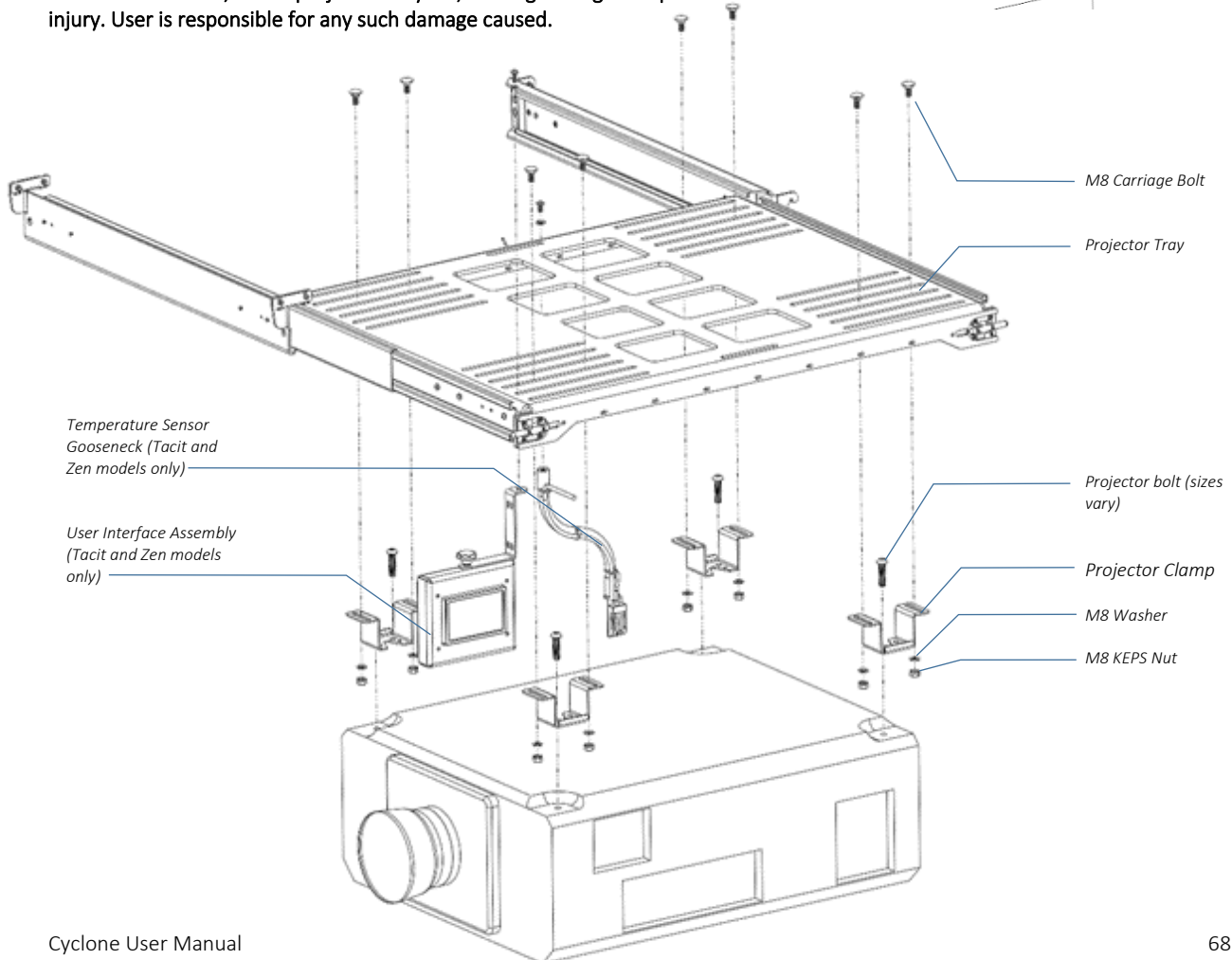
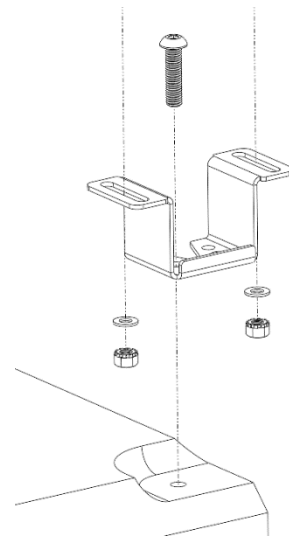
Recommended – fixed, but no projector feet adjustment:

1. Remove the projector feet
2. Replace each foot with one projector clamp, and an appropriate bolt (usually M10 or M12)
3. Note that each clamp has a clearance hole for M6, M8, M10 and M12 threads
4. Bolt the four projector clamps to the projector tray, using the eight M8 carriage bolts, washers and nuts provided

With feet adjustment:

1. Leave the projector feet in place and mount the projector in the same way as shown above (landscape, feet down).
2. Now, the projector feet are hanging inside the projector clamps, and you may adjust the feet for tilt and roll adjustment.

IMPORTANT: In this case, the V-shaped openings in the projector clamps MUST face inwards, or the projector may fall, causing damage and potential injury. User is responsible for any such damage caused.

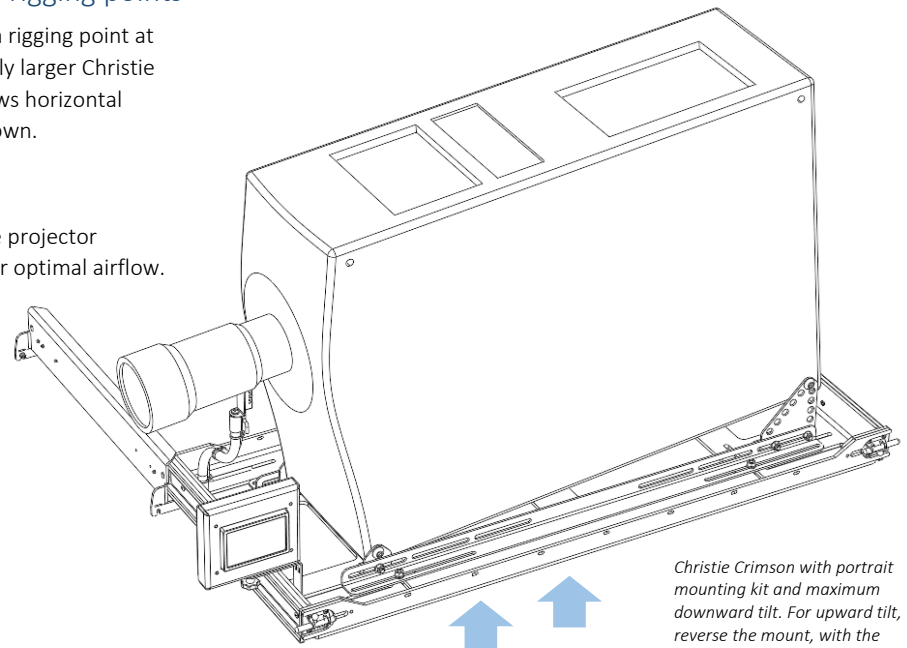


Projector Mounting – Portrait/8 rigging points

This mounting style is for projectors with a rigging point at each corner of the projector chassis (mainly larger Christie projectors). The portrait mounting kit allows horizontal mounting and tilt up to 6 degrees up or down.

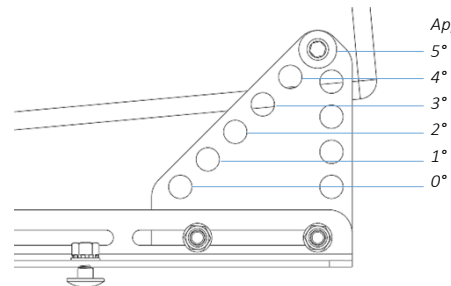
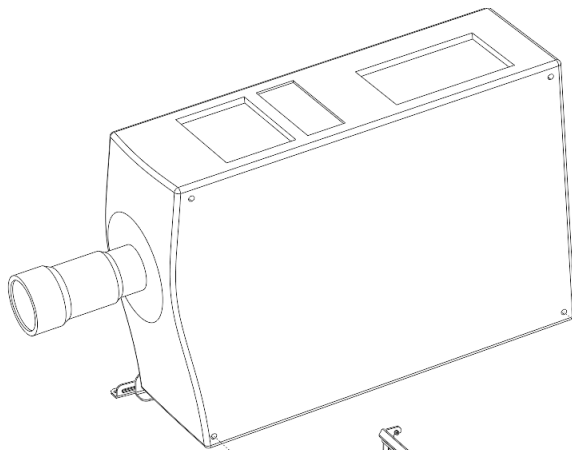
IMPORTANT:

Projectors with air inlets on the side of the projector chassis: The inlet side **MUST** face down, for optimal airflow.



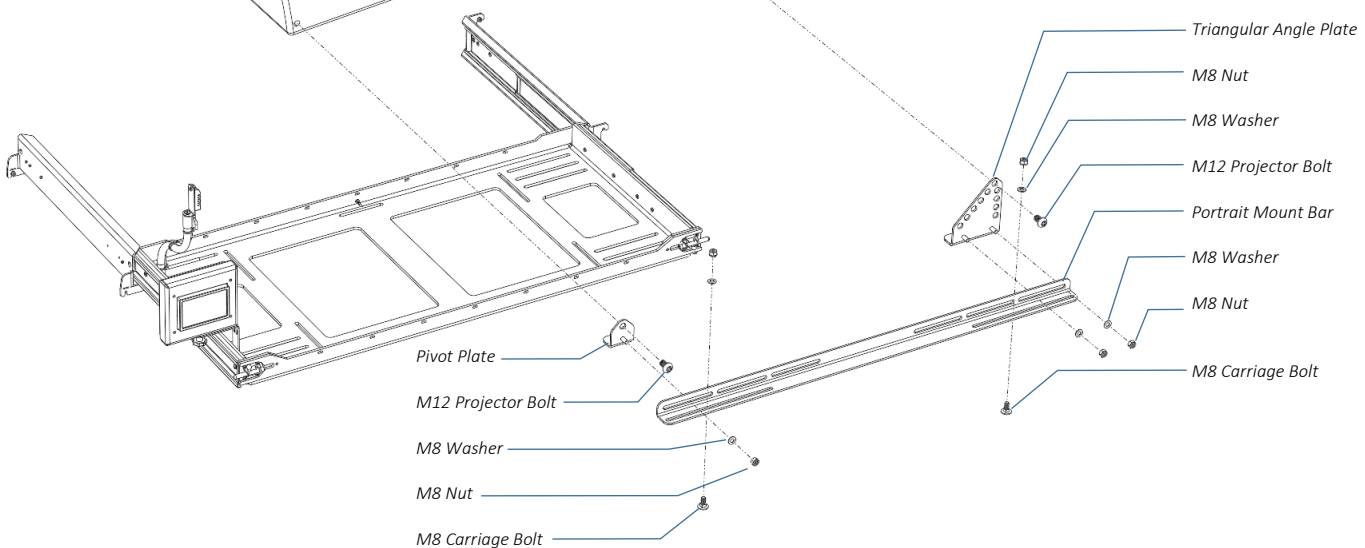
Christie Crimson with portrait mounting kit and maximum downward tilt. For upward tilt, reverse the mount, with the triangular plate at the front.

Side air inlets?
Make sure they face **DOWN**



Approximate Tilt Angles:

5°
4°
3°
2°
1°
0°



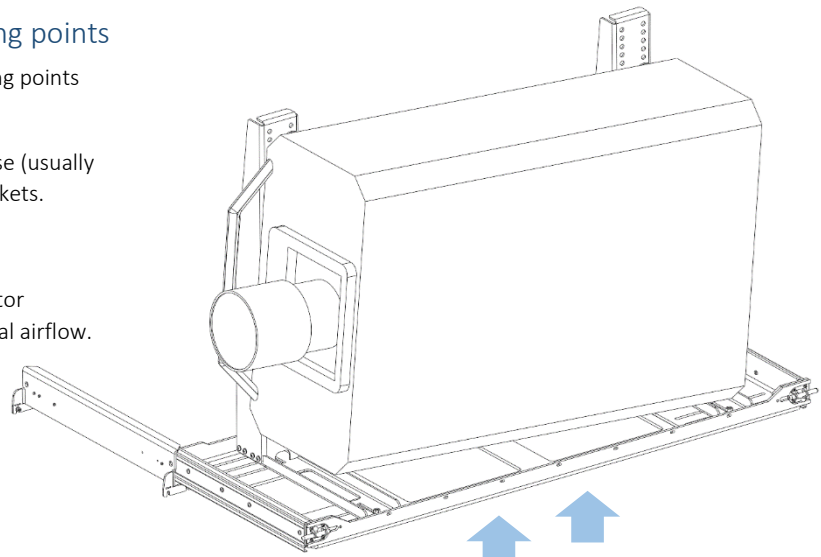
Projector Mounting – Portrait/4 rigging points

This mounting style is for projectors with no rigging points on top of the chassis (most projectors).

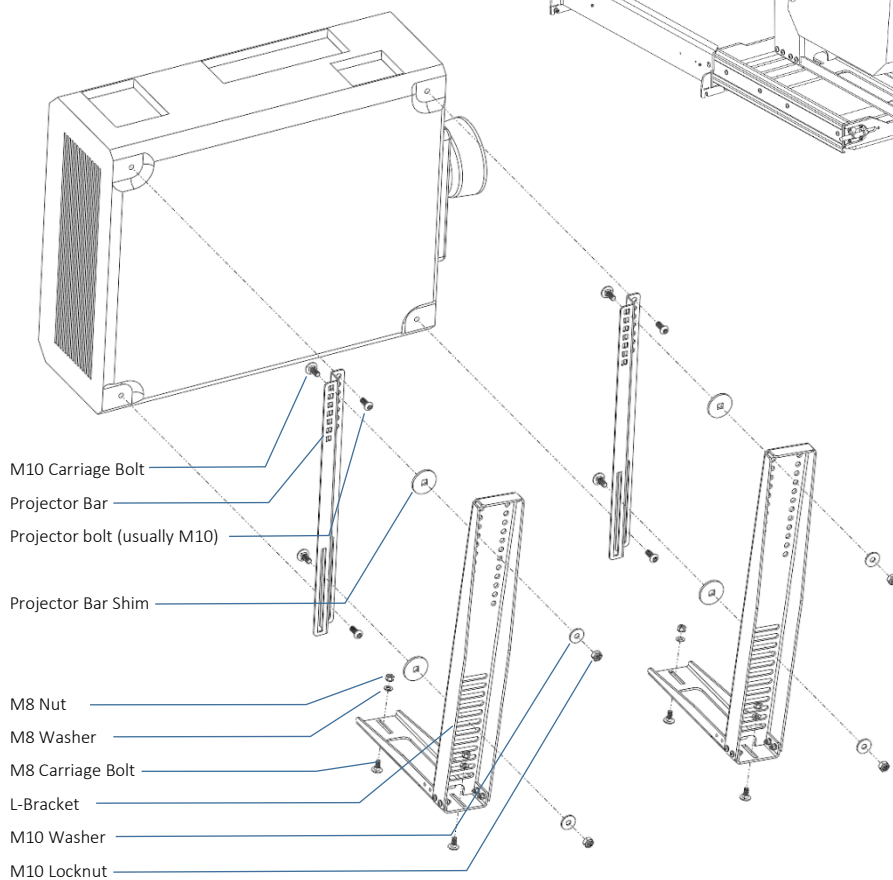
In all cases, first remove the projector feet, and use (usually M10) bolts to fix to the two Portrait mount L-Brackets.

IMPORTANT:

Projectors with air inlets on the side of the projector chassis: The inlet side **MUST** face down, for optimal airflow.



Side air inlets?
Make sure they face **DOWN**

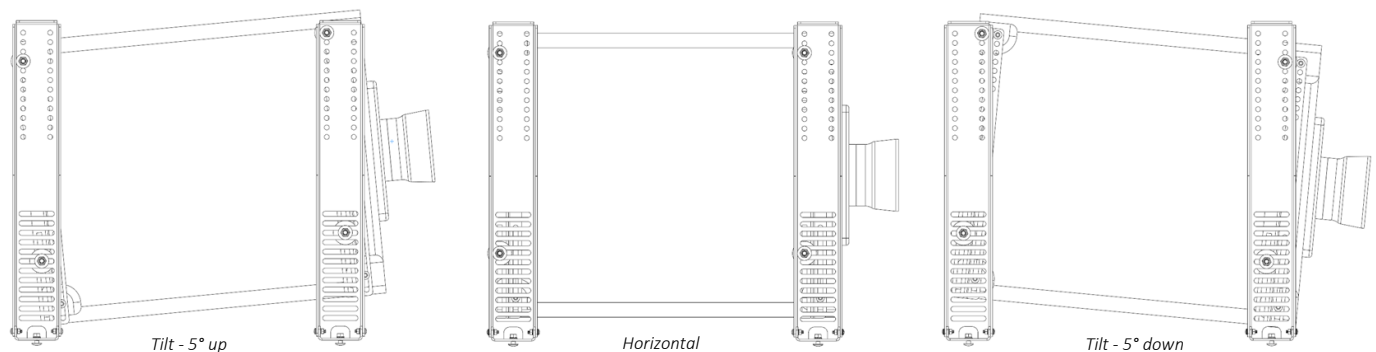


- M10 Carriage Bolt
- Projector Bar
- Projector bolt (usually M10)
- Projector Bar Shim
- M8 Nut
- M8 Washer
- M8 Carriage Bolt
- L-Bracket
- M10 Washer
- M10 Locknut

It's easier to do this with the projector lying on its back on a soft surface:

1. Remove projector feet
2. Mount Projector Bars to projector base
3. Mount projector bars to L-Brackets
 - a. Consider desired tilt angle: UP, DOWN or HORIZONTAL
 - b. Each mounting hole step is approximately 1.5 degrees (depending on projector size)
 - c. Check that the L-bracket bases are level
4. Mount the assembly onto the projector tray and fix in place with the M8 carriage bolts supplied

The mounting kit provides considerable flexibility – some trial and error may be needed to find the optimum mounting angle.



Projector-specific Mounting

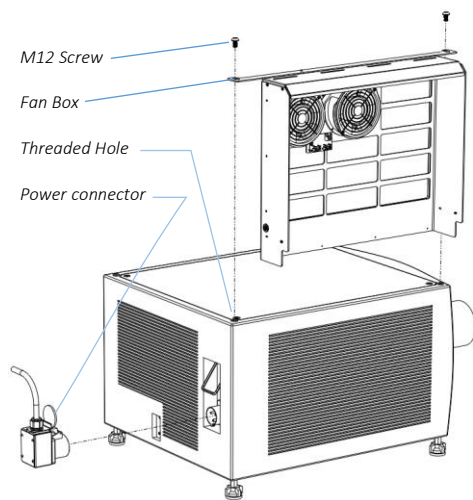
All Cyclone enclosures are projector specific. Some projectors require special mounts and/or exhaust baffles. *Be sure to check for your projector in the Projector-specific information below.*

Christie D4K-40 RGB - Landscape

WARNING: This projector is HEAVY. You will need at least four people or a mechanical lifting device to install it in the enclosure. Do not attempt to lift the projector if in any doubt about your lifting capacity.

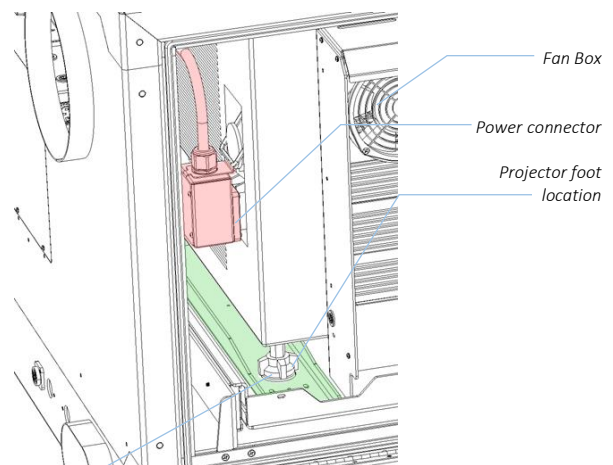
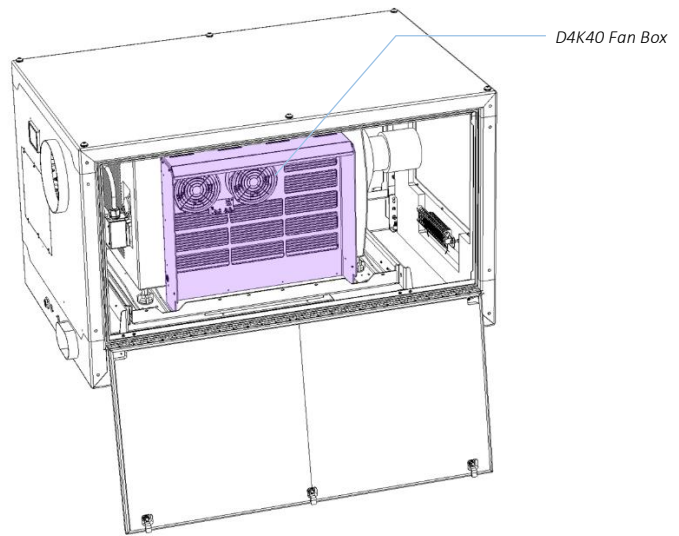
Tempest provides a special internal fan box to hang on the right side of the projector, to ensure delivery of adequate inlet airflow, required for landscape versions only.

Install the Fan box using the M12 screws provided, into the M12 threaded holes in the top of the projector, as shown here.



All D4K40 enclosures are supplied with a power pigtail with a 90-degree IEC309 female connector to mate to the projector power inlet.

Note: Locate the D4K40 projector feet in the round openings provided in the projector tray. This is important for optimal airflow.



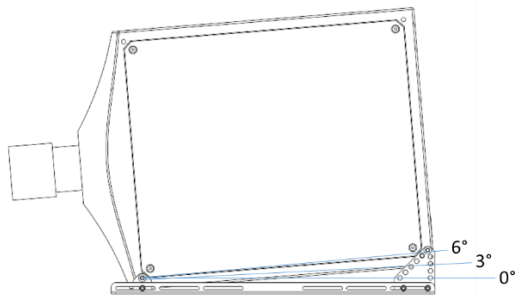
Christie D4K-40 RGB – Portrait

WARNING: This projector is **HEAVY**. You will need at least four people or a mechanical lifting device to install it in the enclosure. Do not attempt to lift the projector if in any doubt about your lifting capacity.

Tempest provides a custom projector mount, with the ability to install the projector either horizontal or at a tilt angle up to 6° up or down.

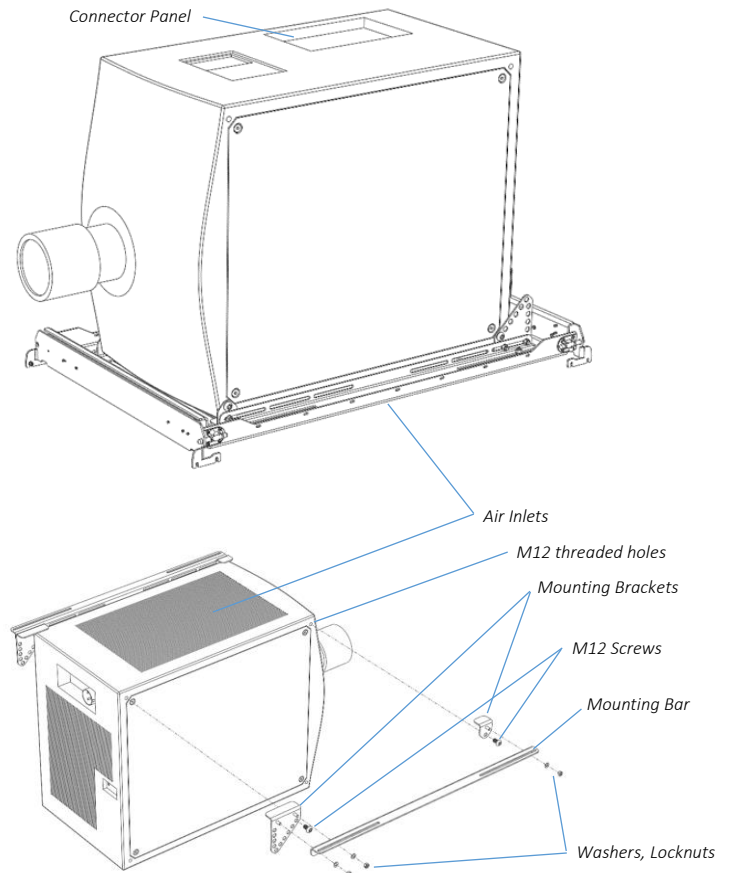
IMPORTANT: The projector **MUST** be installed air inlet down, connector panel up, as shown. Installing any other way will lead to overheating.

1. Set the projector on the ground, with the connector panel **DOWN** and the air inlet **UP**.
2. Bolt the mounting brackets and mounting bars to the M12 threaded holes in the projector chassis, as shown:
3. NOTE: the holes in the triangular bracket are set 1.5° apart, so you can set the projector either horizontal, or tilted up to 6°. It is much easier to do this now than when the projector is installed!

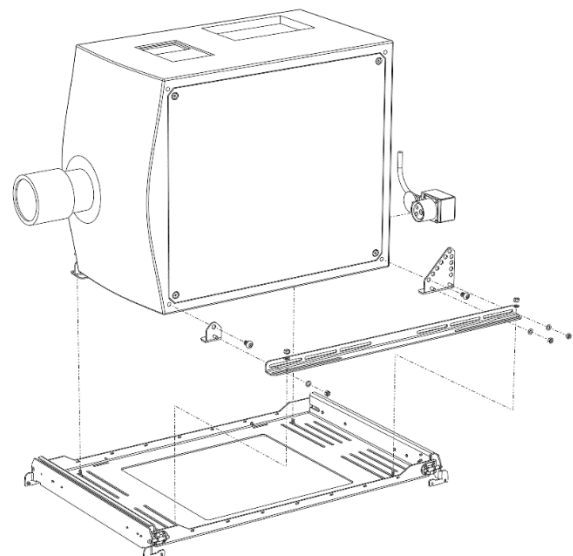


4. Now, flip the projector and set onto the enclosure tray.
5. Adjust position so the front of the lens is about 25mm (1in) from the port glass.
6. Bolt the Mounting Bars to the Projector Tray with the carriage bolts, nuts and washers supplied

For clarity, illustrations show the projector tray assembly removed from the enclosure.



The illustrations here show the projector tilted DOWN. If you need to tilt UP, install the triangular bracket to the FRONT.

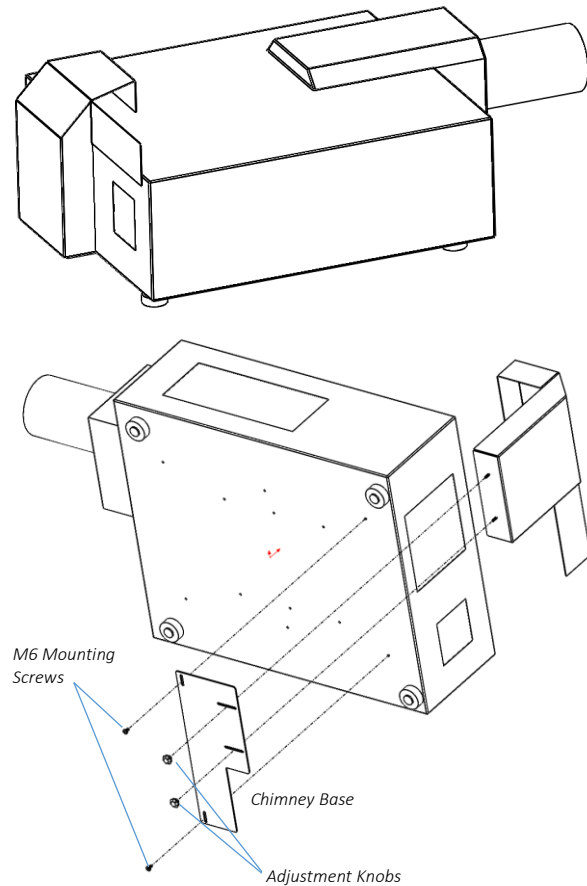


DPI Insight 4K

The lamp exhaust from this projector requires a special chimney (provided) to separate the rear inlet from hot rear exhaust air.

Adjust so that the sliding sides of the chimney are seated snugly around the projector lamp exhaust (a vertical slot in the back of the projector).

Failure to follow this step will very likely lead to hot air recirculating and serious overheating.



UST Projector Mounts

Most UST enclosures are completely custom, and will have their own specific mounting hardware and instructions.

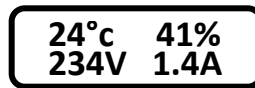
Important: Check Lamp-on Current

When the projector is installed and connected, check the current displayed on the User Interface, with the projector lamp(s) **OFF**. If the current is 1.0A or higher, set the Lamp On Current to a setting higher than the actual displayed.

Example:

Standby Current = 1.4A

Set Lamp-On Current to 1.7A

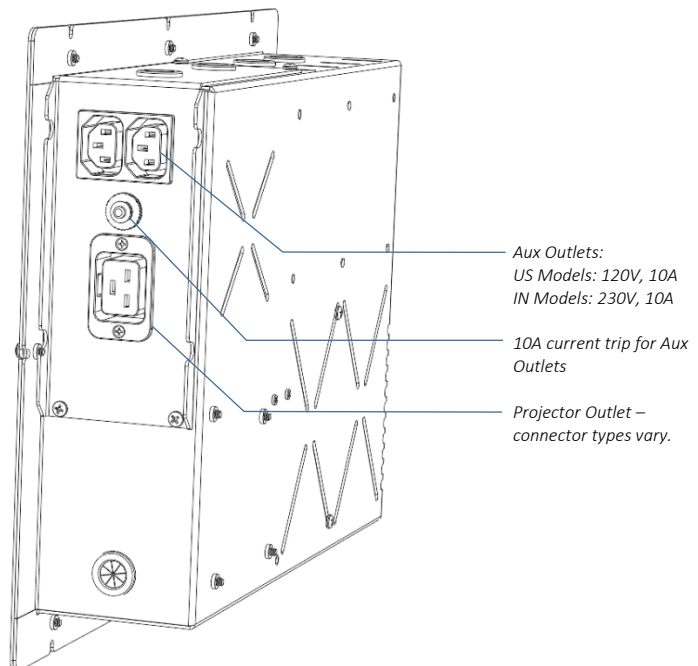


If the Lamp-on current is set lower than the projector's actual standby current, the DEC will think the projector lamp is always on, and the fan(s) will never turn off.

See Control Menu/Set Lamp-On Point above.

Connect Projector and Aux Equipment

- (1) Feed the projector power and signal cables through the cable management track
- (2) Connect the projector power cable into the Projector Outlet
- (3) Connect all cables and test projector
- (4) Install any auxiliary equipment – there is usually plenty of room under the projector tray
- (5) Connect aux equipment power supplies to the C13 outlets on the DEC box. Use the supplied rewirable C14 plugs if necessary.



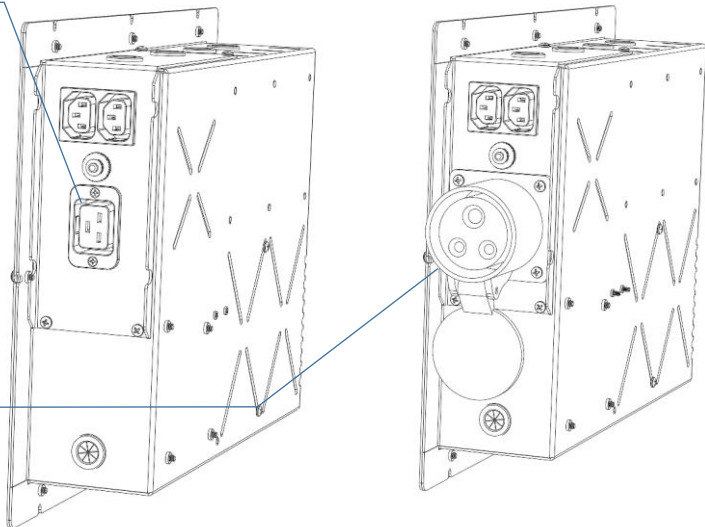
YOU MUST CONNECT THE PROJECTOR TO THE PROJECTOR OUTLET. IF THE PROJECTOR FEED BYPASSES THE DEC CONTROLLER, THE VENTILATION SYSTEM WILL NOT WORK AND THE PROJECTOR WILL OVERHEAT.

Projector Connector Types

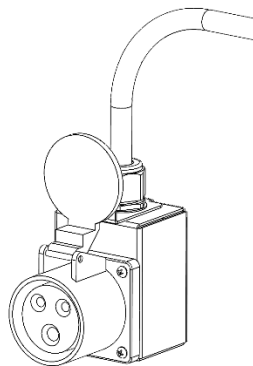
Various Types of projector power outlets are used, in the enclosure models below:

1. IEC 60320 C19 20Amp (C19)
 - a. 55.210.x
 - b. 55.305.x
 - c. Some 55.310.x
 - d. 55.250.x
 - e. 55.320.x

2. IEC 60309 (formerly IEC 309, often known in North America as Pin & Sleeve) 30/32A, 2P+E, 230V (blue)
 - a. Some 56.310.x



3. IEC60309 Pigtail – for Christie Boxer, D4K40 and some DPI models. Tempest supplies a space-saving line female connector assembly on a flexible pigtail, to mount directly to the projector power inlet



Note: contact Tempest at time of ordering to request different projector outlet types if desired.

Routine Maintenance

Check the following every six months:

Clean Port Glass

Clean port glass using a window cleaning fluid or detergent. Use a soft, lint free cloth.

Check Filter

In most cases the filter will be good for 1-2 years. If the filter becomes clogged the temperature inside the enclosure will start to rise. This is an indication that the filter must be changed.

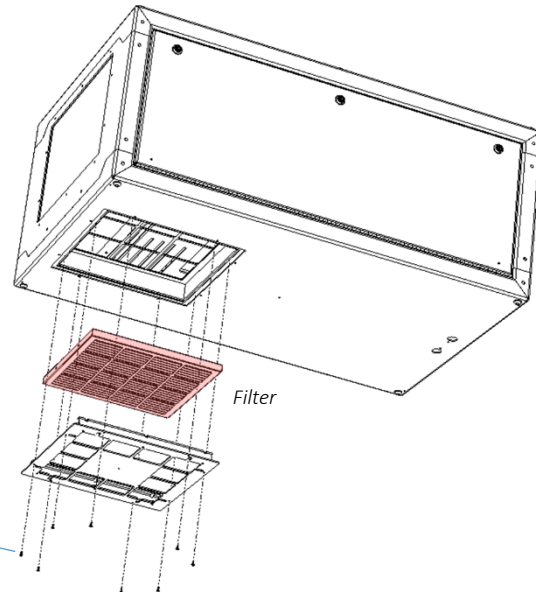
Part Numbers:

51.HF.15 Cyclone 55.200-350 Replacement Filter

51.HF.22 Cyclone 55.400 and up Replacement Filter

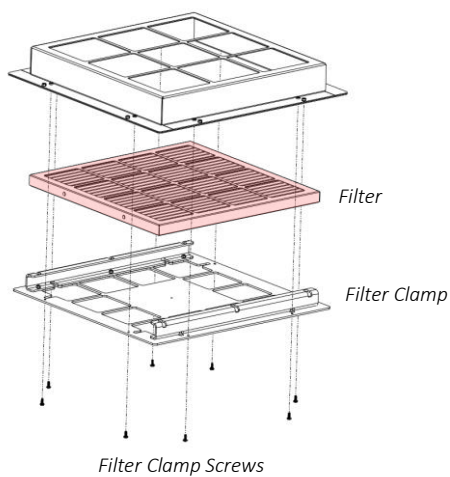
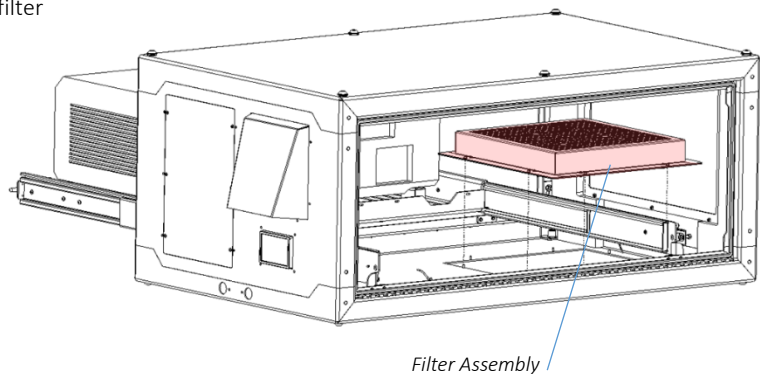
To replace filter from below

1. Remove the filter clamp screws.
2. The filter will drop out.
3. Replace filter and filter clamp.



To replace the filter from inside the enclosure

1. Slide the projector tray out
2. Remove the eight M4 nuts holding the filter assembly
3. Remove the filter assembly
4. Remove the filter clamp screws
5. Replace the filter and filter clamp
6. Replace the filter assembly



Check Temperature/Humidity Sensor

If the sensor above the port glass is defective, the controller may not operate correctly. A defective sensor will result in one of three messages appearing on the DEC user interface.

If you see any of these messages, contact Tempest for a replacement sensor.

RH: 5%

RH: 100%

RH: ####

For After Sales Support

Contact your Tempest dealer or email info@tempest.biz

Troubleshooting

Projector does not have power:	<ol style="list-style-type: none">1. Check Projector power switch2. Check projector is plugged into DEC4 projector outlet3. Check that enclosure feed circuit is on4. Check DEC4 User Interface leds are on. If feed circuit is on and UI leds are off, check feed wiring to DEC terminals and meter DEC4 projector outlet for power5. If UI lamp led is on and DEC4 projector outlet is live, there is a projector fault.
Enclosure overheats:	<ol style="list-style-type: none">1. Is the projector connected to the DEC4 projector receptacle? If the projector is powered independently the controller has no way to know when to turn on the exhaust fans!2. Is the filter clogged or obstructed?3. Check that the Fan led on the UI is on when the projector is running. If not, then the projector is probably not connected to the DEC (see 1).4. If the fan led is on, check that the fan is running. If not, check fan wiring. If wiring is ok, fan may be faulty.5. Check the UI display for RH (relative humidity) message. If display reads RH 5%, RH 100%, or RH####, there is a sensor fault. Contact Tempest for a replacement sensor.
Dirt/Debris inside enclosure	<ol style="list-style-type: none">1. Filter is either missing or damaged?2. Filter is not properly seated3. Side panels or back door is not firmly latched
Water in enclosure	<ol style="list-style-type: none">1. Check the drain holes in the bottom of the enclosure. If they become blocked, and water that gets in cannot escape.2. Check seals around side panels and back door
Fan LED is on but fans do not operate	<p>The exhaust fan is protected by a 20mm 4A slow-blow fuse on the DEC4 motherboard, and a secondary fuse on the fan board. In very exceptional cases it is possible that either fuse could fail. Check visually.</p> <p>The fuse is protected with a clear resin sealant and soldered to the circuit board. With care, you can de-solder the fuse and replace it, but we recommend replacing the DEC4 motherboard to maintain the integrity of the board's conformal coating.</p>
Heater LED is on but heater does not operate	<p>The heater is protected by a 20mm 10A slow-blow fuse on the DEC4 motherboard. In very exceptional cases it is possible that it could fail. Check visually.</p> <p>The fuse is protected with a clear resin sealant and soldered to the circuit board. With care, you can de-solder the fuse and replace it, but we recommend replacing the DEC4 motherboard to maintain the integrity of the board's conformal coating.</p>
None of the above?	Contact info@tempest.biz

Warranty

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"): twenty four (24) months from the date of shipment by Seller. Seller may provide additional years of warranty coverage beyond 12 months, at the rate of 2.5% of the net sale price per year, up to a total of three 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.

Appendix – TEMP Protocol

AVAILABLE TO SPECIAL ORDER

Tempest can optionally provide a firmware load that facilitates TEMP over RS485, suitable for interfacing to an Ethernet adapter. TEMP is a lightweight proprietary ASCII based protocol, intended for rapid integration into management systems. With TEMP and a suitable RS485 to Ethernet adaptor connected to the DEC DMX connectors, your DEC may be configured and monitored over an IP network.

Please contact factory for ordering information.

Physical Layer

1. EITHER: Use a 51.EN Ethernet daughter board plugged directly to the DEC4 motherboard, connected to your TCP/IP network.
2. OR: Use a 51.485 RS485 daughter board on each of a number of DEC4 motherboards, connected in a daisy-chain, and use a 51.EN Ethernet board on the first DEC4 to connect to your TCP/IP network.

Developer's Guide

Download the Developer Guide [here](#):