

Cascade Accessory Product Manual

Volume 1.2

The logo for 'tecca' is rendered in a large, bold, lowercase sans-serif font. The letters are a light blue color with a thin, darker blue outline. The logo is positioned in the lower half of the page, centered horizontally. The background of the entire page is a composite image: the left side features a vertical strip of a bright orange and yellow lava flow, while the rest of the page shows a blue sky above a rugged, rocky mountain range.

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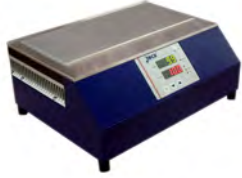
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Warnings

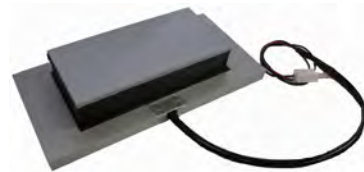
- Read and understand the manuals included with the product.
- Do not operate this product unless it is mounted on the appropriate AHP-1200CPV.
- This product can get very COLD and very HOT. CAUTION should be used at all times. Do not touch any surface which may be at an extreme temperature range.
- ALWAYS assume the plate is too hot to touch.
- This product should be serviced by a qualified technician.
- Caution: Risk of electrical shock. Always disconnect the power when performing any servicing.
- Exercise every possible caution while cooling or heating all types of materials. Follow all precautions necessary for the particular material.
- Do not operate the cascade without a sensor installed such that it accurately reflects the plate temperature.
- Use the external sensor feature with caution. There may be a significant time delay between the cold plate temperature and the sensor temperature causing potentially dangerous overheat or freezing conditions.
- Use caution when controlling the plate to a temperature equal to the ambient. The hot side heat sink can become hot. If this condition occurs adjust the fan speed to 99% continuous.
- Operation of the cascade beyond its limit of 100 C is possible but not advised.
- Do not heat or stir volatile materials.
- This product is not explosion or spark proof.
- Do not immerse the unit for cleaning. Use soft non abrasive cleaners suitable for painted surface and anodized aluminum.
- Do not puncture or damage the black sealant.
- Route the power and sensor leads with caution. Condensation may well occur and it does run down these wires if not routed with care.
- Do not clamp material to the cascade using the accessory clamps or in a similar fashion.

What are these things ???



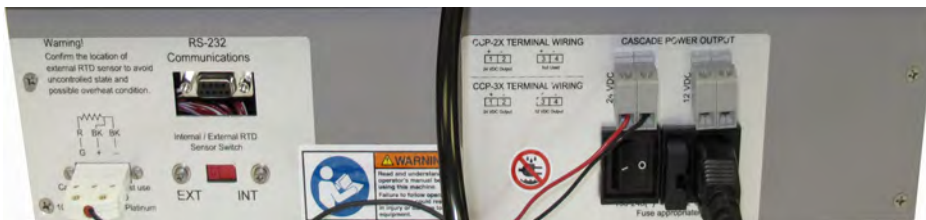
AHP-1200CPV/LHP-1200CPV
Cold/Warm Plate

CCP-21
Small second stage



CCP-22
Large 2nd stage

CCP-31
2nd and 3rd stage



CC-1200
Cascade
Control

And what do I do with them ??? ???

AHP-1200CPV

The AHP-1200CPV Hi Cap Cold/Warm Plate for Cascades (part #9-35EB-1-CAS) is the product the cascades are made to be used with. It is the base or first stage of the cascade. It provides the initial push to lower temperatures. It should always be on when the upper stages are operating. This version of the AHP-1200CPV includes the CC-1200 Control Cover, CH-1200 cover with hinge and a high capacity power supply to provide both power and temperature control to the upper stages. Cascades are typically attached to the cold plate with machine screws although they can be attached via side clamp accessories. This would require a top made to accommodate the side clamps.

CCP Cascades

The CCP accessories are the upper stages of the cascade and are what get to the lower temperatures. The first stage of the cascade is the AHP-1200CPV. The CCP-21 and CCP-22 are the second or top stage of two stage devices. The CCP-31 is the second and third (top) stage of three stage devices. These accessories can be powered and controlled by independent sources if desired. Alternatively power and control can come from the AHP-1200CPV Hi Cap Cold/Warm Plate for Cascades. The cascades themselves are made to get to temperatures below -10 C. They cool objects by direct contact. Insulation around the cascade and the device being cooled is important to minimize the thermal load. The cover included with the AHP-1200CPV provides a considerable level of insulation and when gasketed minimizes frost formation.

CC-1200 Cascade Control

The CC-1200 is the back panel on the AHP-1200CPV. It provides the means by which the AHP-1200CPV can control any of the upper stages when powered independently. It can also provide power to the upper. Internal to the AHP-1200CPV is an “h-bridge” relay set used in the control of the thermoelectrics. The back panel piggy backs on this h-bridge and uses it for the top stages.

General Information

Surfaces

Physical: The cascade and cold plate surfaces are critical to good performance. Don't scratch them. Set them down on clean soft surfaces. Do not drag them or ding them. Don't drop things on them or gouge them.

Thermal: Tests have shown that plain surface to surface contact provides the best performance. This is true only when the surfaces are in excellent condition. Thermal interface materials can be used to compensate for damages at the loss of a little ΔT .

Surface Prep

Don't forget to remove the clear plastic protective layer before use. If you've received an assembled system only the top plate will have plastic on it otherwise all critical surfaces should be protected.



If the surfaces have become damaged use a thermally conductive transfer medium. A thermally conductive pad is shown. Thermal transfer greases applied in a thin uniform layer work well but can be messy. A thermally conductive pad is included with each cascade.



Cascade Mounting - Notes

Tap Plate: A tap plate is an accessory for the AHP-1200CPV which provides threaded taps used to install the cascade. To install simply locate the cascade on the AHP-1200CPV, line up the thru holes and taps, install the screws and gradually tighten them, increasing the torque with each rotation. A tap plate is required for mounting the CC-21 Cascade.



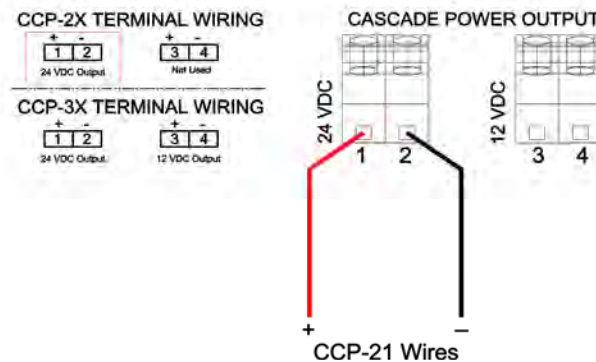
Accessory Plate Clamp:
ACP-1200 side clamps can also be used to secure the cascade to the AHP-1200CPV. Side holes in the units accept the clamp mounting screws to secure it in place. Top set screws are used to apply a slight pressure to the cascade securing it in place while avoiding undue compressive forces on the thermoelectrics. The clamps work only for the CCP-22 and CCP-31 Cascades.



Independently Powered and Controlled Cascade Wiring Notes

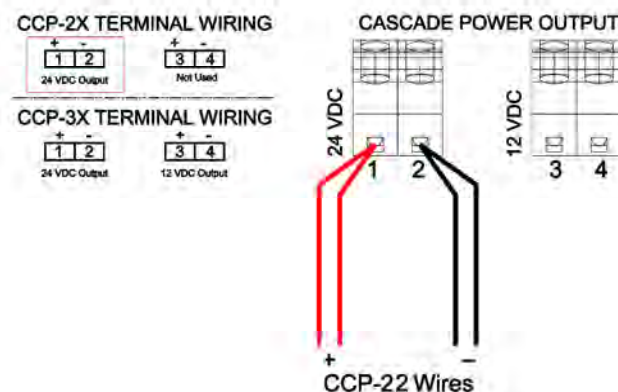
CCP21 Wiring Notes

CCP-21 Cascade: The CCP-21 cascade has a single set of leads, one black and one red. All cascades must be mounted on an operating AHP-1200CPV during operation. A 0 to 36 volt input can be applied to the leads with the polarity convention of cooling: red/positive and black/negative. Reversal of the polarity will cause heating on the top plate. Performance curves are based upon 24 VDC operation. Current draw at that voltage will be less than 3 amps. The input can be varied from 0 to 32 volts with the performance and current draw varying accordingly.



CCP-22 Wiring Notes

CCP-22 Cascade: The CCP-22 cascade has 4 leads, two black/whites and two reds. Connect the two black/white leads to terminal 2 and the two red leads to terminal 1 of the Cascade Power Output terminals on the CC-1200. All cascades must be mounted on an operating AHP-1200CPV during operation. Wiring is made according to the convention of cooling when red is positive and black is negative. Reversal of the polarity will cause heating on the top plate. Performance curves are based upon 24 VDC. Current draw under this condition will be less than 6 amps. The input can be varied from 0 to 32 volts with the performance and current draw varying accordingly.

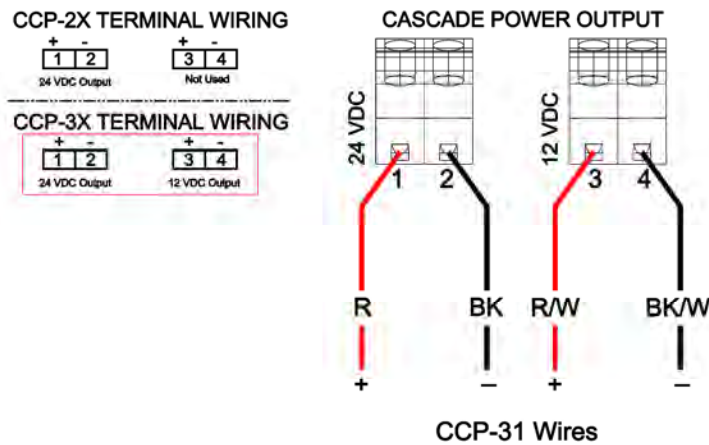


CCP-31 Wiring Notes

CCP-31 Cascade: The CCP-31 cascade has two sets of leads, one set with black and red leads and the second set with black/white and red/white leads. The black and red leads must be connected to the terminals 1 and 2 of the Cascade Power Output terminals on the CC-1200. The black/white and red/white leads must be connected to the terminals 3 and 4 of the Cascade Power Output terminals on the CC-1200.

All cascades must be mounted on an operating AHP-1200CPV during operation.

Wiring is made according to the convention of cooling when red is positive and black is negative. Reversal of the polarity will cause heating on the top plate. Performance curves are based upon 24 VDC. Current draw under this condition will be less than 7 amps. The input can be varied from 0 to 32 volts with the performance and current draw varying accordingly.



Cascade Control Notes

Temperature Sensor

Each cascade has an internal, three wire, 100 ohm, single element, Class A RTD for use in controlling the temperature of the plate. When used it must be connected to the control circuit or the back of the AHP-1200CPV with the switch in the EXT position. A different external sensor of the same type can be used for control at specific points rather than inside the top plate.

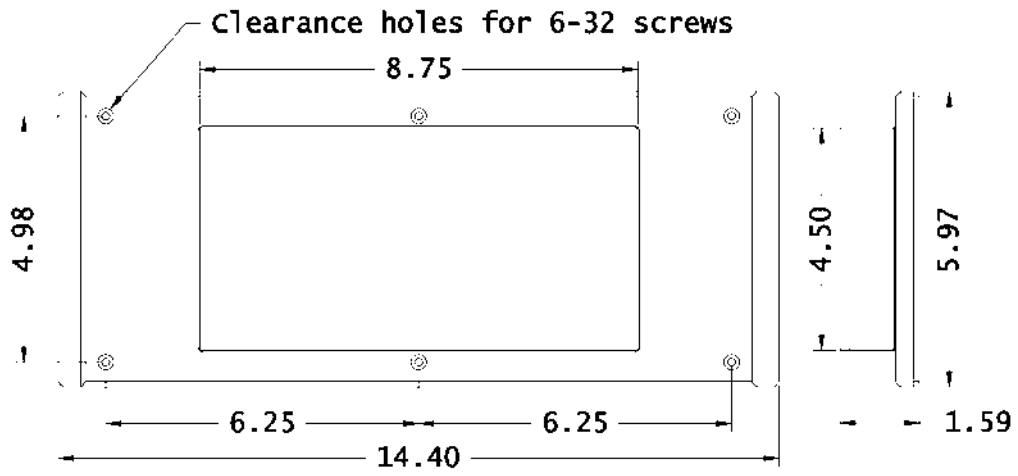
Caution!! Use the external sensor feature with caution. There may be a large time delay between the plate and the sensor temperatures causing overheating and under-cooling conditions. Fully evaluate the system conditions prior to and during the use of this feature.

Temperature Control

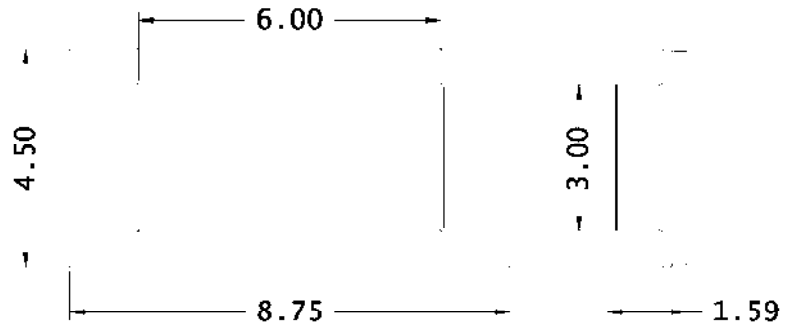
Each top stage of the various cascades can be controlled from the front panel when the appropriate AHP-1200CPV is used. All of the programming features of the AHP-1200CPV can be used such as ramping and soaking.

Each cascade can also be powered and controlled by independent sources. If you do so you can use the standard AHP-1200CPV HiCap with Tap plate. Do not use the external temperature sensor feature of the AHP-1200CPV. Set the sensor switch to INT. Adjust the temperature controller on the front panel for the minimum temperature to get the most cooling effect.

CCP-22



CCP-21



CCP-31

