

---

---

# **POLAR-CONTROLLER™**

## **Operating Instructions**

---

---

**P/N 100101 (120 VAC)**

**P/N 100106 (230 VAC)**

**Thank you for purchasing this POLAR CONTROLLER™**

- **As you will notice from the table of contents, the manual for your new product is quite extensive.**
- **To guarantee perfect and successful work with this machine, please take some time to read the manual carefully.**
- **And finally, we believe you will enjoy years of great smoke effects if you care for and maintain your POLAR CONTROLLER™.**

**CITC**

**1420 80<sup>th</sup> St. S.W., Ste. D**

**Everett, WA 98203**

**(888) 786-CITC 425-776-4950, FX 5129**

**[www.citcfx.com](http://www.citcfx.com)**

# Contents

<b>1. Set of Equipment Supplied</b>	<b>3</b>
<b>2. Accessories</b>	<b>3</b>
<b>3. Description</b>	<b>4</b>
<b>4. Safety Instructions</b>	<b>4</b>
<b>5. Operating the Polar Controller™</b>	<b>5</b>
<b>5.1 Selecting the Location</b>	
<b>5.2 Rest Period before Operating</b>	
<b>5.3 Electrical Power Requirements</b>	
<b>5.4 Hooking things up</b>	
<b>5.5 Operating the machine</b>	
<b>5.6 DMX Control and Remote Control Conflict</b>	
<b>5.7 Rest Period</b>	
<b>5.8 Shut Down</b>	
<b>5.9 Troubleshooting</b>	
<b>5.10 Notes on DMX Operation</b>	
<b>6. Service and Maintenance</b>	<b>10</b>
<b>7. Technical Data</b>	<b>11</b>
<b>8. Warranty Conditions</b>	<b>12</b>

## **1. Set of Equipment Supplied**

- **1 Polar Controller™ w/DMX On board**
- **1 Remote Control Unit**
- **Double-hose outlet manifold**
- **Two 5" X 8ft fog tubes with 45° elbows**

## **2. Accessories**

**CITC Low-Ground Fog Fluid™ in 1 gal. container (P/N 150490-B)**

**CITC Low-Ground Fog Fluid™ in 5 gal. Cubitainer (P/N 150490-C)**

**DMX is now included in the operation of the refrigeration system**

**Please check whether all the products you ordered are supplied.**

### 3. Description of the POLAR CONTROLLER™

The POLAR CONTROLLER™ is CITC's new low-ground fogging system. No CO<sub>2</sub>, no dry ice, and no separate fog machine needed! In 10 minutes the Polar Controller™ can create an incredible 7000 cubic feet of thick, white, dry, low-ground fog. The extra dry fog leaves no mess, no residue and has DMX on board! The Polar Controller™ combines a fog generation machine with on-board refrigeration to chill the fog. The chilled fog is heavier than air, causing it to stay close to the ground.

The following sequence produces fog:

- o Preheating the fog generator for 7 – 8 minutes.
- o Running the refrigeration unit and the fans to cool the two eight-foot tubes for about three minutes
- o Then run fluid pump to produce fog for a several minutes
- o Set output to be at the 100% output for longest fog. Use blast or higher for temporary shorter periods.
- o Refrigerator can remain on if not in high humidity (might freeze). Note: Fogger is always ready and output can be varied.

### 4. Safety instructions

**WARNING: Read and understand all labels and operating instructions before attempting installation.**

- o **Never open the machine** as this voids your warranty! Do not attempt to remove the cover as several components are connected and this will damage the unit, voiding your warranty.
- o **Risk of electrical shock-** This device is supplied with a grounding conductor. To reduce risk of electrical shock, connect only to properly grounded, grounding type receptacles. Never remove the third prong from the plug. This machine requires TWO separate 120V/20Amp circuits (or two separate 230V/13 amp circuits) for operation. During Polar Controller™ operation these two circuits should be dedicated to the Polar Controller™. If you have any doubts about the capacity or grounding of your existing circuits, consult a qualified electrician.
- o **Risk of slipping and falling-** Take care to be sure drip pan is in place. Empty it regularly and inspect it for cracks. Also, setting the volume knob above marked 100% on remote or 70% on DMX can result in slippery accumulations on the floor in front of the tubes. Immediately clean up any drips or spills on the floor as fog fluid is very slippery!
- o Never operate the pump without fluid passing through the tube. This could cause the pump to overheat and damage the piston. Operating the pump without fluid is not covered under warranty.
- o Do not expose to water or wet conditions. It is not recommended to use this unit in high humidity areas or areas of high salt content or oxidation. Corrosive conditions may cause circuits to short or not operate properly. Contact CITC with any questions you have regarding this issue.
- o Do not store Polar Controller™ in freezing conditions.

## 5. Operating the POLAR CONTROLLER™

### 5.1 Selecting the Location

Secure a good location for the machine to rest solidly on the floor separated from the output so that the output of the machine will not be vacuumed back into the back of the machine to cause heating up of the low-ground fluid. It is possible to place a barrier to stop or block flow of fog back into the unit. Bear in mind that the unit uses two 8ft output tubes. The actual location of unit will be some distance behind the point where the fog appears. Try to lay the tubes out as straight as possible and leave an open area out in front. Do not bend the hoses in any sharp angle as this would cause back pressure and reduce fog output. Any 90° turn in tubing reduces output by 1/3, lay-out needs to be clean and smooth, each avenue of slow down in air flow reduces output by an additional 10%.

### 5.2 Rest period before operating

The machine needs to rest for at least a 20-minute period after any kind of movement, especially, if it has been tilted more than a 20° angle.

### 5.3 Electrical Power Requirements

This machine requires TWO separate 120V/20Amp (or 230V/13A) circuits for operation. During Polar Controller™ operation these two circuits should be dedicated to the Polar Controller™. If you have any doubts about the capacity or grounding of your existing circuits, consult a qualified electrician.

### 5.4 Hooking things up

1. Included: the fluid tubing, filter and bottle cap. The fluid supply connector is located on the side of the unit. The small round plastic opening will allow you to insert the tubing. Insert it only deep enough to make a good connection but not forcing it to where it may collapse the end of the tube. Once the tubing is connected, place the filter in the bottom of the container of CITC Low-ground Fogging Fluid and screw the cap on, making sure that the vent hole is opened and not blocked to allow the air ventilation and evacuation of fluid .
2. Included with your packet are two (2) eight foot tubes, the double 4" adapter to screw onto the front and the 45° elbows. Screw on the double 4" adapter to the front outlet by using the eight (8) assembly screws being sure that it is tight (not overtight). Place the small side of the curved pipes onto the 4" outlets so that it is a nice tight fit. Attach the 5" tubing to the large end. If you need to remove the hose, take off the entire elbow from the machine, which is an easy connection. It may not need to have any kind of clamp on there to hold it in place, unless stretching the hose requires it be attached with sheet-metal screws.
3. Attach the elbows so that they are pointing in a downward position unless you're going to split the output and have one output going one way and the output going the other. You can then have one elbow facing off at a 45° angle but still pointing in a downward

position. Lay the tube along the floor keeping it on the floor away from any hot lights. Do not bend the tubes into sharp 90° angles. The straighter the hose the better the flow.

4. The cooler the tube, the longer the low ground fog fluid will stay low to the ground. Once you have established where the tubing is going to go, you may want to screw it down to the floor or anchor it somehow to keep it from moving so that it stays in the same general area and is stretched out completely.

## 5.5 Operating the machine

1. Plug in the fogger remote to the input XLR inlet on the side of the fogger unit. Set the volume output dial on the remote to OFF (counter clockwise).
2. Turn on the fogger power switch on the side next to this connection near the back, checking to see the switch illuminates, indicating your power is on. Wait approximately 7-8 minutes for the unit to be ready to produce fog. The green ready LED will illuminate on the remote when ready.
3. While waiting for warm up, plug in the remote for the compressor cooler unit in the back. Then, turn on the main compressor unit power switch located at the rear on the other side. It should also illuminate. Press the red button on the remote to turn on the remote. Now press the green button to start the cooler and fans. Wait three minutes for the cooler to cool down before fogging. Once you turn the compressor on, it is best to leave it on. Short operation of the refrigeration unit is bad for the compressor. When you turn off the cooling unit, wait ten minutes before restarting (compressor needs to neutralize).
4. Now you are finally ready to generate fog. Fog volume can be controlled with the Fogger Remote Control or at the DMX control board. Small amounts of fog may be produced up to large amounts. The majority of the adjustment range available is from about 50% to 70% setting on the remote or DMX control.
5. **Note:** turning the pump output higher than about 100% (above blast) may overwhelm the cooling and release the fog too quickly. The fog will not stay on the ground. If at first the pump makes a loud noise, watch to see if the fluid is being drawn through the tube. If is not, check the tubing connection to be sure it is tight. Push it all the way in, look for bubbles or an air leak. Try again. Do not let the pump run dry as this would cause it to burn up.
6. As the unit is producing fog, you will note the dryness of the fog coming from the unit. If you were to put your hand 18" to 24" away from the unit, it would be completely dry. This is very important aspect of the type of fog that is needed in order to keep a dry floor.
7. Underneath the fog machine is a pullout tray, which captures any runoff fog fluids that accumulate inside the chamber. Be sure this tray is checked periodically and it is not too full. After 4-8 hours of operation, there should be 1/8" fluid level in the bottom of the unit that has accumulated. This is to keep the fog dry. After use, be sure to remove and empty the tray. If more, you may have to pull out and empty.
8. The fan expands the fog to two 5" adapter openings, not just one. Do not plug up one of the adapters trying to increase pressure because this will cause an increase in the

backpressure and cause a buildup of residue. Backpressure can cause a severe amount of condensation and will create problems for you later on down the road.

9. Periodically check the floor to be sure it is dry. Clean up any spills as this is very slippery.

## 5.6 DMX Control and Remote Control Conflict

While under DMX control, you will be able to adjust the fog levels up and down. Do not use the remote control, as it is overridden by the DMX control. (See instructions 3.10 on how to use the DMX for more information.) Use caution by keeping the volume control at 70% or lower so as not to overheat the cooling mechanism.

## 5.7 Rest Period

Operation of this machine needs to be on the basis of 20 minute minimum and 120 minute maximum time on before a 10-minute rest period to allow the chill generator to chill again. In high humidity, freezing ice will stop the fog from flowing through the machine. Stop fog for a 10-minute rest period, it is only necessary to turn the pump control dial on the remote to the full off (CCW) position and shut off the red button remote for the refrigeration system. This also keeps the fog fan turned off. The rest period does require you to turn off the refrigeration portion of the Polar Controller™ or either of the power switches. After a 10-minute rest period you should be ready to go again. Note: If the refrigeration unit doesn't get cold, shut down the cooling unit completely for ½ hour. The unit has overheated. The compressor will automatically reset once it is cooled off.

## 5.8 Shut down

When finished with the machine, clean the tube and pump by operating the unit while running a pint of 5% vinegar/distilled water mix through the pump and then rinse with a pint of distilled water. This will keep the piston in the pump from becoming stuck. At the same time, it will help clean the fins inside the cooling unit from all of the fog fluids that have been run through the unit. When finished, water should remain in the fluid tubing line. Remove tray and empty, then reinstall.

## 5.9 Troubleshooting

- **If the pump does not draw fluid into the fogging unit**, be sure the unit is warm and ready to operate with the green light on. Then check the bottle to see that the tubing intake is in the fluid, not above the fluid. Check electrical power to the machine. If still not working, try holding up tubing, remove filter and push, blow or use a turkey baster to force the fluid inside the pump. Try again to see if it will pump now. Check to hear any sound coming from the pump side (nearest the top). A slight vibrating sound should be heard if the pump is pumping fluid. A loud knocking sound will be heard if only air is in the line and fluid has not come in yet. Force fluid through the line to get it started. This is called "priming" and the line needs to be full of fluid for the fog mechanism to work.
- **If the fog is coming back to the unit** and being blown into the machine, place shields or curtains across the top front of the opening of the fog to separate the fog going out with the fogger unit. Use plastic shields (accessory available), or cardboard or any wall to separate them.

- **If the fog is wet** this is usually caused by turning up the volume too high. Only operate at 100% (below blast on the remote control) or below 75% on the DMX fog.
- **If the fog rises** this is usually caused by turning up the volume too high, or not enough refrigeration (see section 3.7). Only operate at 100% (below blast on the remote control) or below 75% on the DMX fog. For short periods you can blast higher amounts of fog, but continuous use will cause residue accumulation (see section 4.3) and raise the temperature in the chiller causing rising fog. A 30-minute shutdown may be necessary to cool the compressor. Shut off the refrigeration switch (left side) for 30 minutes and wait.
- **If the fogger or chiller circuit breaker blows** you most likely have one of the following three fault conditions:
  1. **Low Line Voltage:** occasionally the power company will be providing a voltage at the lower end of the acceptable range, but most likely, this fault is caused by using extension cords that are too long and of inadequate wire gauge. The 120V Polar Controller™ requires a 20 amp circuit, so the extension cord should be at least 12 awg (14 awg is too small). The 230V Polar Controller™ requires a 10 amp circuit, so the extension cord should be at least 14 awg (16 awg is too small).
  2. **Running too long in continuous operation:** refer to section 3.7 to learn about the Polar Controller's™ duty cycle limitations. The **Rest Period** is important to avoid overheating the compressor in the chiller. You may pop the breaker on the compressor or activate the over-temp breaker on the compressor motor by running the unit too long. In either case the unit needs to be shut down for about 30 minutes to cool off. Then you can try resetting the chiller circuit breaker. The over-temp breaker auto-resets.
  3. **Internal short:** If you are sure the voltage is adequate (90% of nominal) and you have let the unit cool off, then resetting the breaker should get it running again. If the breaker immediately pops again, then you probably have an internal short, which will require factory service. See the section at the end of this booklet on service returns.

## 5.10 Notes on DMX Operation

### 1. Polar Controller™ and DMX

CITC's Polar Controller™ Fog Unit has one DMX channel with 5-pin XLR to control on/off and volume output of fog (there is no timer on this DMX).

The refrigeration unit has DMX. You may plug in the 5 pin XLR connector to the DMX function and set the address for the correct address. This will turn on/off the cooling portion (chiller) of the low-ground fogger when DMX control is above 50%. This unit uses 5-pin XLR connectors.

## 2. DMX Addressing

Each DMX'd unit will occupy a unique DMX address on the DMX chain. By adjusting the dip switches on the side of the fog machine near the DMX cable plug-ins, the user may assign any convenient address to the machine.

DMX addresses are configured by adding the dip switch numbers together to total the number required. For example, Dip Switch 1 + 6 = 33. Your DMX channel would be 33.

Dip Switch	1	2	3	4	5	6	7	8	9
Channel #	1	2	4	8	16	32	64	128	256

“Input” and “Output” designations on the DMX plugs are arbitrary (i.e., you can use the input plug for output and visa-versa). It is not necessary to attempt converting your DMX line’s connector to female/male to match the appropriate socket on the plug. As long as it is looped in/out, it will work.

## 3. Operating the fogger with DMX

Attach a DMX cable (5-pin XLR) from your control console to the upper “in” female connector located on the back of the fogger. Between the values 0 – 49% there is little or no fog output. Above the 50% value the fog comes on. Between the values of 50 to 70% the volume of fog output is regulated, with 50% being the fog startup and minimum volume of fog produced and 75% (showing on the remote) approaching the maximum. The volume output rises as the DMX value is increased. In the range from 70% to 100%, the machine will operate at maximum output, or the “Blast” output. Do not operate on blast for more than a few minutes or you may overheat the fog, causing it to rise.

0 – 49%	=	Off
50%	=	Low Fog
55 – 75%	=	Volume Control
75 – 100%	=	Maximum Blast Output for shorter periods of time

## 4. Hooking up the DMX for the chiller

Daisy chain a second 5-pin XLR cable from the vacant connector on the fogger to the DMX 5 pin XLR connector on the back of the cooler. Set the address for the same address as the channel selected on the fogging unit. Assigning this to the same address as the fogger will give you one channel of DMX for control, since the cooler DMX will also come on over 50%. Now when operation begins, do not go below 50% for stopping the cooler unless you need to stop the fans from pushing the fog further down the stage. When the DMX receives a value from 0 to 49%, the refrigeration unit and fan is OFF. A value 50% and above will turn it on. Once your setting has been adjusted, you may turn it on at this level each time you activate the channel.

0 – 49% = Off  
50 – 100% = On

## 6. Service and Maintenance

### 6.1 Emptying the tray

Take care to be sure drip pan is in place. Empty it regularly and inspect it for cracks. Immediately clean up any drips or spills on floor as fog fluid is very slippery!

### 6.2 Shut down and storage

When finished with the machine, clean the tube and pump by operating the unit while running a pint of 5% vinegar/distilled water mix through the pump and then rinse with a pint of distilled water. This will keep the piston in the pump from becoming stuck. At the same time, it will help clean the fins inside the cooling unit from all of the fog fluids that have been run through the unit. When finished, water should remain in the tubing line. Remove tray and empty, then reinstall. Check for fluid accumulation just inside nozzle openings (see 4.2 below). It is not necessary to have the large hoses attached while in the cleaning process.

### 6.3 Fluid buildup inside nozzle opening

If fog is too wet, which results from running a lot on “blast” or setting the volume setting above 70%, there can be a buildup of fluid inside the unit on the floor just behind the two 4” outlets. This can be dried out by removing the hoses and reaching in through the 4” openings with a paper towel. It is especially important to dry this out if you are going to be putting the unit into storage.

### 6.4 Fluid buildup inside hoses

If fog is too wet, you will also get a fluid buildup inside the hoses, where it collects in the corrugations. If you need to relocate the hoses you should take care to avoid getting slippery fog fluid on the floor.

### 6.5 The cooling unit

In the event that the system must be recharged with freon use R-408A @ 1.75#. Be sure air has not permeated the system or moisture can enter and render the cooling system unrepairable. This type of repair will void any warranty.

## 7. Technical Data

Polar Controller™ Technical Data P/N 100101 (230V P/N 100106)	
Type of Fog	Thick, white, dry, low-ground fog
Weight w/fogger	197 lbs. / 90 kg.
Weight w/o fogger	159 lbs. / 72 kg.
Size w/fogger	40" x 24" x 20" (102cm x 61cm x 51cm)
Size w/o fogger	33" x 24" x 20" (84cm x 61cm x 51cm)
Shipping Weight w/fogger	201 lbs. (92 kg)
Shipping Weight w/o fogger	163 lbs. (74 kg)
Shipping Box Size	44" x 26" x 24" (112cm x 66cm x 61cm)
DMX	Built in DMX, 1 channel, 5-pin XLR
Fluid	CITC's Low Ground Fogging Fluid (water-based) P/N 150490
Warm Up Time	5-10 minutes
Continuous Fog	Up to 120 minutes at a time
Heating unit	1500 w
Electrical Supply	2 x 120 VAC, 20 A, 60 Hz or 2 x 230 VAC, 10 A, 50 Hz
2 circuit breakers	15A – 250V
Wheels	Included
Limited Warranty	One year when using CITC fluid
Rev: 9/19/07	

## 8. Limited Warranty Conditions

This limited warranty guarantees to the original purchaser that this product shall be free of defects in material and workmanship, under normal use, for a period of one year from the date of purchase shown on the sales receipt. This warranty covers parts and labor providing the product is returned to CITC in the original shipping carton and packaging. The warranty for electrical is a (90) NINETY DAY limited warranty.

Damage resulting from shipping, accidents, misuse, negligence, unauthorized repairs or modification is not covered by this warranty. Using any fluid other than what is recommended for this machine will void warranty. No liability is accepted for injury or for loss, damage or expense resulting from any interruption whatsoever in the operation of the product or from any consequential loss arising there from. No liability is accepted for normal wear and tear.

We wish to satisfy YOU, our customer, and have implemented many measures to prevent problems and assure customer satisfaction. However, should you need a missing part or have a functional problem with your product, please call (888) 786-CITC from 7:30 am – 4:00 pm (Pacific Time) Monday – Friday, except for holidays. Our customer service department will respond to your problems immediately.

Please have the following information available when you call:

Model and Serial Number

Where and when the product was purchased

Nature of the problem

---

Subject to the following conditions, CITC will repair any defect or fault in the unit if it is caused by a proven factory defect within one year of delivery to the end user.

Insignificant deviations of the regular product quality does not guarantee replacement rights, nor do faults or defects caused by water, by generally abnormal environment conditions or Force Majeure:

1. Faulty parts will be repaired or replaced (manufacturer's choice) with correct parts. Faulty units must be shipped to CITC at customer's expense. An RMA# must come with the unit.
2. The customer loses all rights for limited warranty services, if any repairs or adjustments are done to the units by unauthorized persons and/or if spare parts are used, which are not approved by CITC. The right of limited warranty service is also lost if a fluid other than appropriate CITC fluid has been used or if units are sent to in with full fluid bottles.
3. Freight costs to and from CITC when under the limited warranty services are the responsibility of the customer. Customer must place appropriate insurance on return of product. However, if product is returned due to factory defect within the first 30

days of receipt, CITC will cover the cost of returning the repaired unit to the customer.

4. Limited warranty services do not cause an extension of the limited warranty time or the start of a new limited warranty time. The warranty of replaced parts ends with the limited warranty time of the whole unit.
5. If a defect/fault can not be repaired by us in a satisfactory time, we will, within 30 days after sale of the unit, either:

Replace the whole unit for free or take back the whole unit and refund the purchase price.

6. Further claims, especially for damages, losses etc. outside the unit are excluded.
7. Your limited warranty coverage is based on completion of the warranty card and returning it with your proof of purchase within 30 days of purchase.

**Your limited warranty coverage is based on completion of the warranty card and returning it with your proof of purchase within 30 days of purchase. If you should send the unit for service, do not forget to remove any liquid from the fluid bottle, and place unit in original box. Obtain your RMA# by calling CITC. Payment arrangements for repair must be made before receiving RMA # in case unit is not covered under Limited Warranty.**

**Send unit to:**

CITC  
RMA # XXXXXX  
1420 80<sup>th</sup> Street SW Suite #D  
Everett, WA 98036  
Tel: (888) 786-CITC or (425) 776-4950  
Fax: (425) 776-5129  
Website: [www.citcfx.com](http://www.citcfx.com)  
E-mail: [info@citcfx.com](mailto:info@citcfx.com)



1420 80<sup>th</sup> St. SW Suite #D ✧ Everett, WA ✧ 98203  
425-776-4950 ✧ FAX: 425-776-5129  
[www.citcfx.com](http://www.citcfx.com) ✧ [info@citcfx.com](mailto:info@citcfx.com)

Sept. 2008