## INSTALLATION MANUAL

FOR FIXED INSTALLATION COMMERCIAL AND RESIDENTIAL EVAPORATIVE AIR CONDITIONERS



Safety

**Installation Summary** 

Installation Details

**Water Connection** 

**Electrical Connections** 

**Operating Adjustments** 

**Troubleshooting Guide** 

Service

# "EA" series

PLEASE KEEP THESE INSTRUCTIONS FOR FUTURE REFERENCE





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#### **EMPLOYER AND EMPLOYEE RESPONSIBILITIES**

The installation and maintenance of evaporative air conditioning units at height has the potential to create Occupational Health and Safety issues for those involved. Installers are advised to ensure they are familiar with the relevant State and Federal legislation, such as Acts, Regulations, approved Codes of Practice and Australian Standards, which offer practical guidance on these health and safety issues. Compliance with these regulations will require appropriate work practices, equipment, training and qualifications of workers.

Seeley International provides the following information as a guide to contractors and employees to assist in minimising risk whilst working at height.

#### **Installer and Maintenance Contractors**

A risk assessment is an essential element that should be conducted before the commencement of work, to identify and eliminate the risk of falls or to minimise these risks by implementing control measures.

#### Risk Assessment

A risk assessment of all hazardous tasks is required under legislation.

There is no need for this to be a complicated process, it just is a matter of looking at the job to be done and considering what action(s) are necessary so the person doing the job does not injure themselves.

This should be considered in terms of:

- What are the chances of an incident happening?
- What could the possible consequence be?
- What can you do to reduce, or better still, completely get rid of the risk?

#### Some points to consider:

- What is the best and safest access to the roof and working areas?
- If a worker is alone, who knows they are there and if they get into difficulty, how can they summon help? (Call some one on the ground? Mobile phone? etc.)
- What condition is the roof in? Should the trusses, underside or surface be checked?
- Does the worker have appropriate foot wear? (Flat sole jogger type is advisable)
- Are all power cables / extension leads safe and appropriately rated?
- Are all ladders, tools and equipment suitable in good condition?
- Where ladders are to be used, is there a firm, stable base for them to stand on? Can they be tied or secured in some way at the top? Is the top of the ladder clear of electricity supply cables?
- Is there a roof anchor to attach a harness and lanyard to? If so, instruction should be issued for the use of an approved harness or only suitably trained people used.
- Are all tools and materials being used, prevented from slipping and falling onto a person at ground level? Is the area below the work area suitably protected to prevent persons walking in this area?
- Does the work schedule take into account weather conditions, allowing for work to be suspended in high winds, thunder storms/lightning or other types of weather giving wet, slippery surfaces?
- Is there an on-going safety check system of harnesses, ropes, ladders and access/lifting equipment and where they exist on roofs, anchor points before the commencement of work?
- Is there a system which prevents employees from working on roofs if they are unwell or under the influence of drugs or alcohol?
- Are there any special conditions to consider i.e. excessive roof pitch, limited ground area, fragile roof, electrical power lines?

#### OTHER IMPORTANT REQUIREMENTS

Never force parts to fit because all parts are designed to fit together easily without undue force.

Never drill any holes in the primary base surface or side walls of the bottom tank (reservoir) of the cooler.

Check the proposed cooler location, to ensure that it is structurally capable of supporting the weight of the cooler, or provide an adequate alternate load bearing structure.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

Please read this manual properly and carefully, your failure to do so could result in injury to you or damage to the cooler and property.

Disconnect electrical power at the fuse or circuit breaker box before you begin installing or servicing the cooler. Turn off the isolating switch located inside the cooler before you begin installing or servicing the cooler.

Installation of the cooler must conform to local electrical and water supply and environmental codes, rules and regulations and to applicable National Standards.

Wear rubber soled shoes when working on the roof of your building.

Do not install or service the cooler during rain, high wind or severe weather conditions.

Keep children a safe distance from your working area. Children should be instructed not to enter the cooler cabinet under any circumstances, nor to climb onto the roof area where you may be working.

If you work with power tools, wear protective eyewear and gloves.

Always ensure that electrical power cords are safe to use with such equipment.

Do not take risks in raising the cooler to the roof for installing. Use safe equipment and never try to raise the cooler alone, always have assistance. Failure to take such precautions could result in damage to the cooler and the building or to yourself.

Never drain the cooler onto the roof. Connect a hose from the drain fitting to a drain or gutter. Water residue could stain the roof or cause you to slip.

#### **SUMMARY**

- Check correct unit supplied (2 speed/variable, size, discharge direction, etc).
- Remove external packaging.
- Remove the filter pads (side panel) to check parts supplied and locate Installation Instructions and Owner's Operating Instructions.
- Locate duct transition pieces and mounting frame (large down discharge units).
- Locate control kit (some packed in separate carton).
- Assemble transition pieces and locate into base of air conditioner (down discharge units only).
- Confirm location of unit (on roof) that corresponds with plan.
- Make a hole in roof between two rafters at the point where unit is required.
- Install and secure ductwork dropper or bend on which unit will be mounted.
- Replace roofing material and seal around the duct.
- Position and secure unit onto ductwork, ensure it is level and install support frame.
- Connect electrical supply and control system in accordance with instructions and regulations.
- Following installation of ductwork complete the operating adjustments.
- Commission and test the installation and complete the Installation Checklist (see rear page).
- Leave site clean and tidy.

## REMOVE AND REPLACE FILTER PAD FRAMES

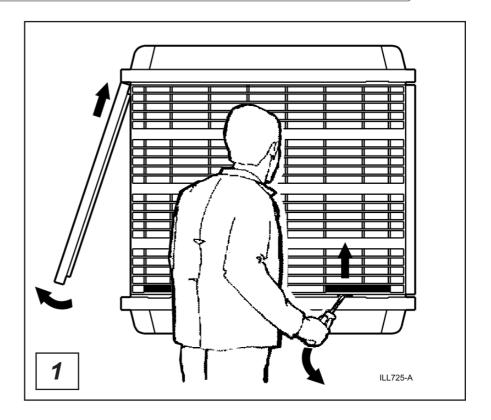
Each frame is clipped into the cooler and is removable by use of a medium screwdriver (Fig. 1). Insert the screwdriver into the slots at the base of the frame and lever downwards. The frame is now free to be slid down and out of the cooler cabinet.

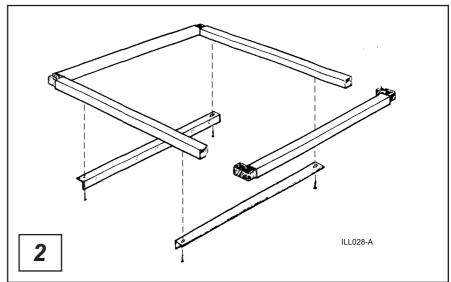
To replace the frame ensure that it is the right way up, ie. with the water channel upwards. Fit the frame in at the top of the cabinet and then at the bottom (Fig. 1). The frame should clip into the cooler with a couple of sharp smacks with the hand at the two points where the screwdriver was used. If it will not go fully back into place use the screwdriver again and insert it between the bottom of the frame and the tank wall at the centre, and lever upwards, until the frame locks into place. (reverse of removal).

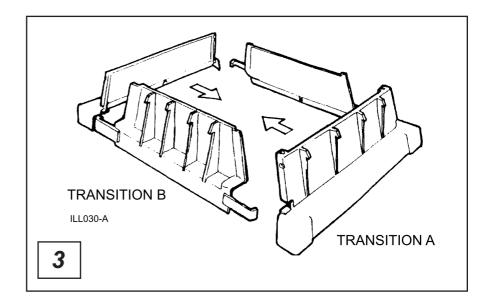
#### **MOUNTING THE COOLER**

A mounting frame is not necessary for the EA70D down discharge cooler because the model is designed to be fixed directly to the vertical duct, providing that it is capable of supporting the cooler. The size of the air outlet on this model is 450mm x 450mm and it may be necessary to provide a duct adaptor to size the main ductwork down to this opening dimension.

For down discharge coolers EA90D, EA120D and EA150D it is permissible for the cooler to be supported entirely by the ductwork, provided the ductwork is capable of supporting the cooler. Use the plastic adaptor supplied (outlet size 550mm x 550mm), but you must also fit the additional support frame supplied. (Figs. 2 and 3).







#### **PRECAUTIONS**

Note: Lifting and installing the cooler is made easier by removing the filter pad frames first. They can be replaced at the very end of the installing procedure.

You can slide the cooler from one place to another if you wish but lifting and carrying is better. It is recommended that at least two (2) people carry the cooler whenever it needs to be moved.

**Do not drop the cooler.** Always handle with care.

For lifting or pulling purposes when using ropes or slings, always apply the ropes around the full cabinet or the blower housing and never tie them to any of the four posts.

Never force parts to fit because all parts are designed to fit together easily without undue force.

#### **LOCATION AND ORIENTATION**

Check the proposed cooler location first, to ensure that it is structurally capable of supporting the weight of the cooler.

Plastic coolers are lighter than their metal-made counterparts but they need adequate support. **The operating weight** of the largest cooler in our range is about **110 Kgs**.

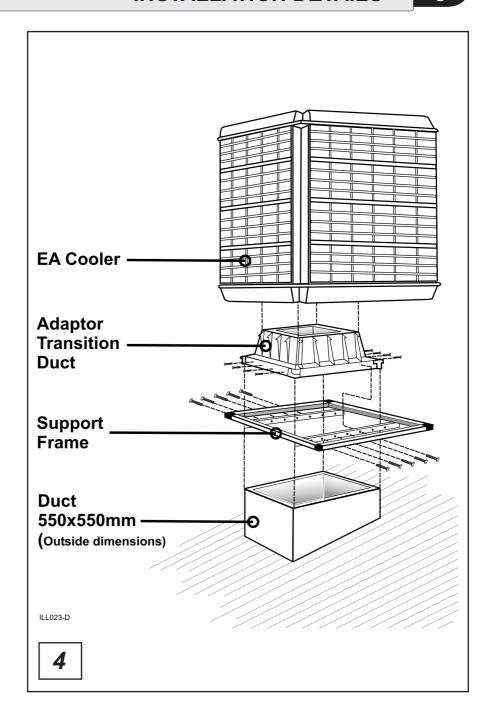
Always locate the cooler where it will received a plentiful supply of fresh air and not in a recess where it may be starved for air or where the air is polluted.

## Always be sure that the cooler is level after installation.

Allow for adequate access around the cooler for maintenance. Provision must be made for access to electricity, water supplies and drains.

It is essential that water cannot enter the building as a result of inadequate sealing (caulking or flashing) of the mounting stand, ductwork system and service pipes (electricity, water).

Never drill any holes in the primary base surface of the bottom reservoir of the cooler nor in the side walls of the tank. Special instructions are provided later which show where holes may be drilled for mounting and for water and electricity entry. (See Electrical, Installation and Water Installation).

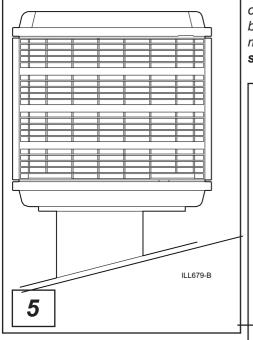


It is necessary to securely mount the cooler onto the roof or wall so that the cooler is rigid and level.

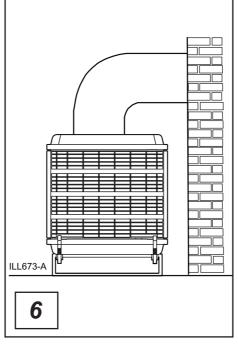
Side and top discharge coolers require a purpose built mounting frame, either to support the cooler from below or to support it from the wall. Always ensure that the mounting frame for a side discharge cooler gives support to the cooler across the centre of the underside of the cooler as well as around the perimeter. The cooler can be fastened to the mounting frame with accessory ratchet clips.

Side discharge coolers are factory fitted with a canvas flexible connection. Connect the canvas outlet to the fixed ductwork in accordance with current practice and seal properly all round.

Side discharge coolers can be connected directly to the ductwork by screwing through the duct flange into the side wall of the cooler. Seal the duct to the cooler all round with suitable compound.



Down Discharge - Fig. 5 shows a down discharge cooler being used on a sloping roof. For the larger models a purpose built support frame must be used as specified in 'Mounting the Cooler'. Seal thoroughly at all roof penetrations.



#### **VORTEX BAFFLES**

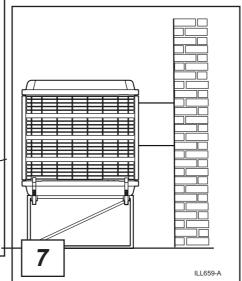
Two black plastic baffles are supplied\* and must be fitted to the blower housing. The baffles simply clip into each side of the blower housing, low down, into two holes provided, by pushing them in with the hands. Insert them in such a way that they slope downwards.

\*The larger top discharge units do not have baffles.

#### **MOTOR PULLEY AND BELT**

At the end of the installation work, adjustments need to be made on the motor pulley and belt tension. See later instructions.

Top Discharge - Fig. 6 shows a top discharge cooler being used where neither side or down would be suitable. The cooler should be mounted on a stand and located where plenty of fresh air is available. Allow sufficient clearance between the cooler and the building for future pad removal and maintenance. The external ductwork should be thermally insulated.



Side Discharge - Fig. 7 shows a side discharge cooler being used where the air duct penetrates directly through a wall. The cooler may be located on a stand at ground level or on a raised platform, and the wall construction may be of any type. Always seal carefully around the wall penetration to prevent ingress of water and wind.

#### **WATER INSTALLATION**

A permanent water supply is required to be connected to the float valve which is factory fitted inside the cooler.

#### **WATER REQUIREMENTS**

Installation of the Cooler water supply must conform to local plumbing rules, regulations and standards:

AS/NZS 3500.1

The following specifications for water supply are reauired:

Water Connections: 1/2" BSP

Water Supply: 800 kPa (115 psi) MAXIMUM Water Supply Temperature: 40°C MAXIMUM

Important! If the water pressure exceeds this maximum specification then a pressure reducing valve is required and must be supplied and fitted by the installer.

The float valve controls the level of water in the tank automatically.

The water connection point for **down discharge** coolers is located on the underside of the tank at the point where the float valve nipple protrudes from the bottom (Fig 9).

For side discharge coolers the water line must be fed through a hole drilled in the blank front panel. Some side discharge coolers may have the hole already factory drilled.

For top discharge units the water line is fed up through a hole drilled in any corner of the tank adjacent to the position of the vertical corner posts (Fig. 8).

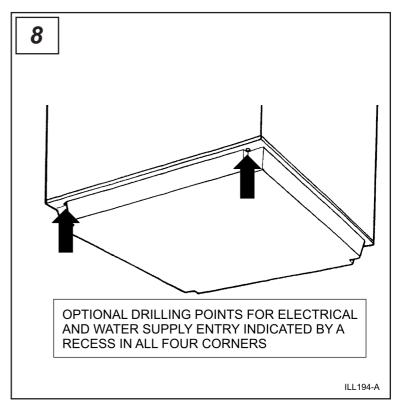
For 13mm copper pipe drill a 16mm hole.

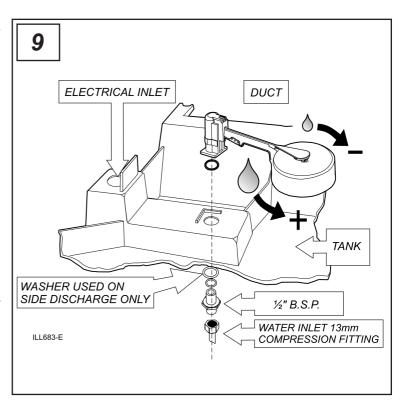
Install a manual water shut-off valve external to, and in the vicinity of the cooler. This allows the water supply line from the valve to the float valve to be drained before winter to avoid freezing and splitting of the line, and to isolate the water supply whenever work needs to be done on the cooler. Do not fit the shut-off valve directly onto the nipple.

NOTE: The float valve has a plastic threaded nipple for connecting to the water supply line. DO NOT over tighten the water supply fittings to the nipple as you may damage the plastic thread. (Fig. 9).

Always ensure that the copper pipe connection to the float valve does not place sideways strain onto the float valve. Run the pipe straight into the valve.

Drain water from the overflow/bleed outlet must be carried away through a pipe to a suitable discharge point on the building or property. (According to Local Regulation).





#### **FLOAT VALVE**

of the water level is accomplished by cooler and is factory fitted into its rotating the large float on the end of the correct location. float arm (Fig. 10)

#### **WATER LEVEL**

Rotate the large float clockwise until it press the release button whilst twisting reaches the limit of it's travel without the pump body clockwise, lift the pump coming off the arm (Fig. 9).

Turn on the water supply and allow the tank to fill with water. The float valve will eventually stop the water from entering the cooler. Wait for this to happen and observe the water level.

Rotate the float anti-clockwise a small amount to let more water in and observe the level. Continue the procedure until the water level remains at about 15mm below the top lip of the bleed-off tray.

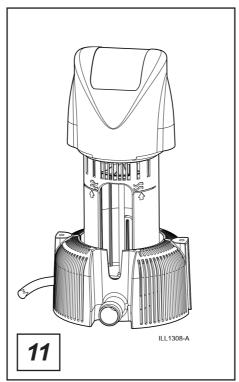
It is advisable to check the water level again after the float valve seal has "bedded" in. After the unit has been sitting for a period of time with pressure on the float valve, drain and refill the tank. A small amount of movement in the float arm can make a difference in the amount of water in the tank.

The water level should never be adjusted with the cooler and pump running because the water in the pads will run back into the tank and might overflow.

#### **WATER PUMP**

season.

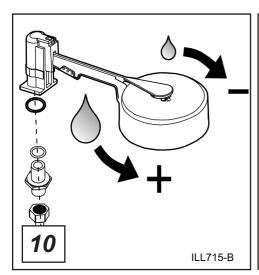
body out of the filter.

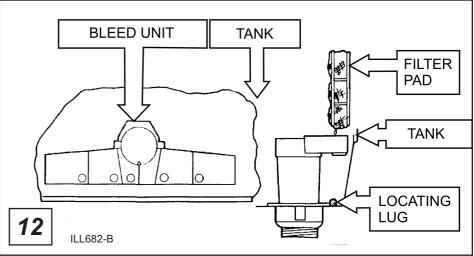


#### **BLEED-OFF FITTING**

The float valve is factory fitted. Adjustment The water pump is supplied with the A special plastic 'bleed-off' fitting is supplied with every cooler. This fitting has a three fold function. It acts as an The pump's filter and impellor housing overflow, a drain and a bleed-off. The should be cleaned at the start of each bleed-off fitting comprises a small tray which collects water from under one of To remove the pump body from the filter, the filter pads and drains this small quantity of water. A large hole (50mm diameter) is pre-drilled in the base of the tank. The fitting should be installed at this position (Fig. 12). Make sure that it is correctly located in relation to filter pad frame and that the large 'O'ring is on before placing it into the hole. The nut must be screwed up tightly underneath the cooler. The drain pipe must be in accordance with Local Regulations.

> Once the bleed-off fitting is correctly installed it will act as an overflow if the water level reaches an unsafe height and it will act as a bleed-off to allow a small amount of water to drain off continuously so as to limit the build up of salts in the water. By unclipping the 2 plastic spring clips the tray can be lifted away from the bottom hexagonal nut and this will let the water drain away completely. Do not lose the O-ring fitted to the bleed-tray funnel.





The 2 control options available with EA units are as follows:

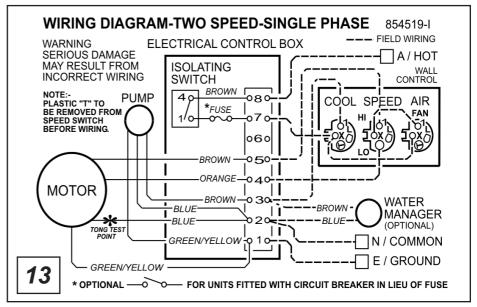
- (1) Two speed Single Phase Control.
- (2) Standard Variable Speed Control.

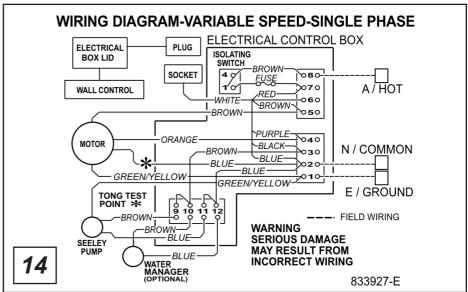
Note: It is a requirement of Seeley International that all Braemar units be wired by a dedicated circuit to the distribution board with a separate fuse or circuit breaker.

Note: For installations where two or more units are connected to one controller, the connections must be such that no loop currents can flow between windings of the motors, e.g. low speed windings must not be connected together while the motors are running at high speed. Please refer to the manufacturer if a wiring diagram is required.

For additional safety ALL Braemar Rooftop Coolers are fitted with Slow Blow fuses.

Should a fuse need to be replaced ONLY use the fuse assembly numbers shown in the table (see below right).





Model	Motor	Fuse	Fuse Assy No.
EA90	560 W	5 amp	831 824
EA120	750 W	8 amp	831 831
EA150	1500W	10 amp	831 848

## MOTOR LOW SPEED - FOR VARIABLE SPEED COOLERS ONLY

This adjustment is not always necessary. Variable speed coolers are factory set and will usually function correctly across a wide speed range without any further adjustment. However, sometimes it is necessary to adjust the speed control.

After the motor power has been set to full load, observe the speed variation of the cooler when the indoor variable speed control is moved between maximum and minimum speeds. There should be an easily recognisable difference. If there is a very small difference, proceed as follows:

Set the indoor controller to minimum speed (full anti-clockwise rotation).

Remove the lid from the electrical box inside the cooler and locate the small potentiometer labelled 'set min. speed' (Fig. 15).

To adjust the low speed, turn the potentiometer screw with a small insulated screwdriver. With only the blower running, NOT the pump, turn the potentiometer anti-clockwise until the blower slows down to a speed at which the belt is making approximately one (1) revolution per second or the motor is revolving at minimum of 600 rpm. (measured with a tachometer).

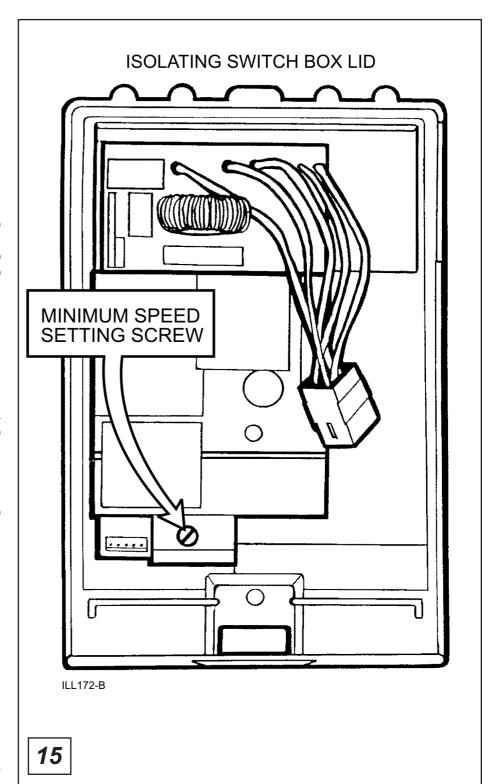
#### **CAUTION:**

Speeds below 600 rpm may cause the motor to overheat.

Replace the lid and all covers.

## INSTALLATION/SERVICE HINTS FOR VARIABLE SPEED COOLERS

If the unit will only run on high speed, check that the motor pulley has been set to load the motor to nameplate amps. The variable speed system will only work if the motor is loaded.



#### **BLEED-OFF**

All Evaporative Air Coolers should be equipped with a bleed-off function which will reduce the level of salt build up in the tank.

To set the bleed-off refer to Fig. 16 and proceed as follows:

- (1) Remove the pad frame adjacent to the bleed-off assembly.
- (2) Fit all the plastic plugs into the bleed tray.
- (3) Replace the pad frame and start the cooler on high speed with the pump running. Wait a few minutes for the cooler to reach full performance.
- (4) Measure the amount of water running to drain (underneath the cooler).

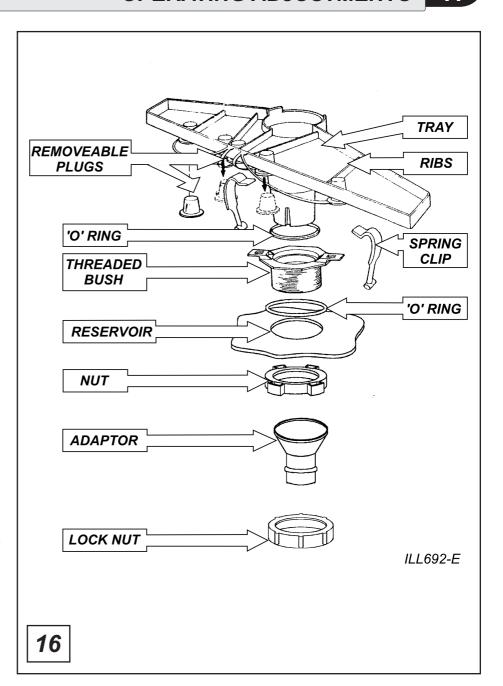
The recommended bleed rate is about half the peak evaporation rate so that operation during off peak periods will provide sufficient wastage to maintain an acceptable minimum concentration in the base tank. The bleed is approximately three litres per hour per 1000 m3/hr. of air flow for each 15°C ambient wet bulb depression. It is not a precise adjustment.

Typical bleed rates for coolers operating in areas with 15°C ambient wet bulb depression are:

EA90 0.3 litres/minute
EA120 0.4 litres/minute
EA150 0.5 litres/minute

With all plugs inserted, bleed is maximum. If you decide that the amount of bleed is too much, then remove plug/s from the bleed tray one at a time until the desired amount is achieved. With all the plugs removed a minimum amount of bleed will still occur as determined by the manufacturer.

NOTE: Bleed adjustment cannot be precise because operating conditions vary continually.



#### **MOTOR POWER (AMPS)**

be adjusted to ensure that the motor is pulley in the opposite manner. running at its rated capacity.

Before setting motor current please adjustments are complete. ensure that:

- (1) All ducting and registers are in place.
- (2) Windows and doors in rooms to be cooled are open sufficiently.
- (3) Any exhaust fans in the building are turned on.
- (4) Any other coolers installed in the building are turned off.
- (5)All pad frames except the one on the motor side are in place.

Set the cooler running at highest speed, halves of the pulley must be closer but without the pump running.

Allow 10 minutes for the motor to reach operating temperature. Measure the To decrease the blower speed and motor current in amps using a 'Tong therefore decrease the motor amps, the Tester' (Fig. 17). This must be done by a two halves of the pulley must be further qualified electrician.

Check the measured amps with the motor nameplate rating. If the measured amps When an adjustment is made, replace are less than the nameplate amps, the the locking cap (secure with screw) adiustable pulley should be altered to and the belt then check the amps. make the motor drive the blower faster and thereby deliver the full cooler Smaller adjustments should be made capability to your installation. The each time you approach the desired measured amps should be equal to or setting. See heading 'Belt Tension'. close to, but never more than, the nameplate amps. See heading 'Pulley (Sheave) Adjustment' following.

If the measured amps are greater than **BELT TENSION** the nameplate amps the blower must The motor pulley and belt tension need to be slowed down by adjusting the same Belt tension is important because if it is

#### **PULLEY (SHEAVE) ADJUSTMENT**

Pulley adjustment is made with the cooler switched off. Never attempt this There are two adjusting bolts for adjustment with the cooler securing screw and cap from the pulley. rotating it on it's thread.

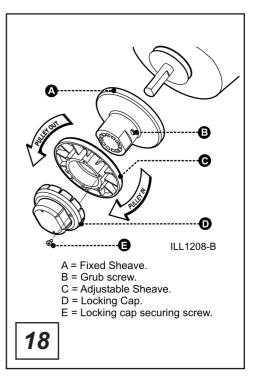
Remove the drive belt.

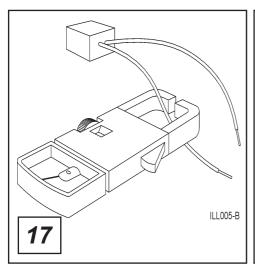
To increase the blower speed and therefore increase the amps, the two together, ie. turn the adjustable sheave clockwise.

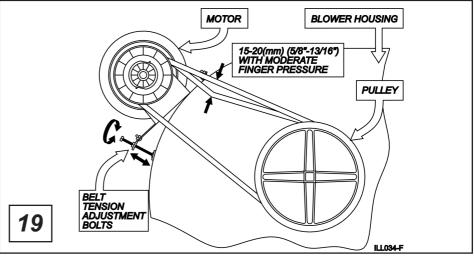
apart, ie. turn the adjustable sheave anti-clockwise.

too tight you will get excessive belt and bearing wear. If it is too loose you will get Replace all covers when the belt slip with accompanying noise and loss of cooler performance. The belt tension should be adjusted so that the maximum deflection is 15mm-20mm (Fig. 19).

adjusting belt tension. These are located operating. To adjust the pulley the on the motor mounting plate (Fig. 19). To locking cap must be removed. Remove make the adjustment, loosen off the nuts on the two adjusting bolts on the motor (Fig. 18). The adjustable sheave of the mounting plate and tighten or slacken the pulley is now free to be adjusted by belt tension. When the adjustment is correct, tighten the locking nuts again.







## TROUBLESHOOTING GUIDE

#### **PROBLEM**

Inadequate Cooling

#### **PROBABLE CAUSE**

Under-sized cooler. Under-sized ducts.

Clogged or dirty cooling pads.

Dry pads or lack of water while cooler is

Insufficient air discharge openings or inadequate exhaust from building, causing

Excessive resistance from poorly located

Excessive ambient humidity (see also item

Noisy cooler. Fan out of balance due to dirt. etc.

> Air distribution system creating too much back pressure, or changes of direction too sudden, or grilles too small.

Pump fails to operate.

Pump motor failure.

Fan fails to start. Main power circuit breaker tripped or fuse

Fan motor burned out.

Check fault condition via the tri-colour LED on

Pump runs but no water circulation.

Pump runs but pads lack water.

Continuous overflow of water

Water being blown into the building.

Unpleasant odour.

operating.

high humidity and discomfort.

backdraft damper.

above re inadequate exhaust).

Clean the fan.

Pump circuit breaker tripped.

blown.

Low system voltage.

electronic module. Controller failed.

Insufficient water in pan. Water hoses blocked. Pump strainer blocked.

Float valve adjustment not correct.

Heavy pad deposits.

Auto Drain Valve malfunctioning

Loose water hose connections.

Water hose broken. Cover not fitted on float valve.

Pads not fitted correctly into pad frames. Water level too low, causing pump to create fountain that is being sucked into air stream.

Incorrect or damaged pads fitted.

New cooler pads.

Cooler located near source of unpleasant

odour.

Algae in pan water.

Pads remain wet after shut down.

Heavy pad deposits.

SUGGESTED REMEDY

Replace with larger cooler. Replace with larger ducts. Clean or replace pads.

Check water distribution system for possible obstruction in hoses. Check

pump.

Make sure there is adequate provision for exhausting stale air from building (open windows and doors).

Remove backdraft damper and substitute manual slide damper.

On days during summer when ambient humidity is high the cooler will not reduce the temperature as much as on drier days. There is no remedy except to shut off the

pump.

Have contractor re-evaluate his design; use bends instead of elbows; change grille sizes.

Check pump for faults. Replace if

necessary.

Replace pump.

Check cause of overload. Reset circuit breaker or replace fuse. Adjust motor amp setting if necessary.

Replace motor.

Consult with power supply authority.

Rectify fault as indicated and restart the

cooler. (Refer Pg. 15-16) Replace controller.

Adjust float level.

Check and clean out blockage.

Clean pump strainer.

Adjust float valve. Clean or replace pads. Check and remedy function.

Tighten all connections.

Replace any cracked or broken hoses. Install correct cover on float valve to

prevent spray.

Make sure pads properly installed.

Increase water level.

Replace with manufacturer's recommended pads.

Drain pan, refill, run pump for a while. Remove source of odour or relocate

cooler.

Drain pan, clean thoroughly with strong cleansing agent, refill, change pads. Run fan on "vent" for 10 minutes after

cooling cycle to dry pads out.

Clean or replace pads.

## INSTALLATION CHECKLIST 14

Owners Name:	☐ Cooler level and secure.		
Telephone:			
Address:	☐ Ductwork and air distribution checked and outlets correctly set.		
Dealer:	☐ Control switch correctly installed.		
Installer:	☐ Belt tension and alignment correctly adjusted.		
Date Installed:	from pulley side)		
Model No.:			
Serial No.:			
Motor Type:			
Motor HP:	lowamps _		
	☐ Motor and pump correctly plugged into sockets.		
	☐ Motor pulley adjusted and tight on shaft.		
SERVICE ENQUIRIES: Contact your local Dealer or Installer for assistance.	☐ Drain/overflow fitting correctly installed.		
	☐ Water level and float adjustment checked.		
	☐ Pump runs and water evenly distributed to all cooling pads.		
	☐ All control functions checked.		
	☐ Owner instructed on correct operating procedure and supplied with operating instructions.		
	Signed by Installer:		





#### 1300 650 644

For all your Braemar warranty and service needs.
Or contact your local Braemar dealer direct.

### 1300 650 399

For Technical Support regarding the installation of this cooler.



Evaporative Air Cooling Manual. Seeley International Pty Ltd, Adelaide, South Australia. ACN 054 687 035. As the policy of the company is one of continuous product improvement, all specifications are subject to change without notice.

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