



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Installation, Operation & Service Manual

A03

DOCUMENT DETAILS

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CHANGE LOG

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PRODUCT SPECIFICATIONS

ADMINISTRATIVE DATA

CAD assembly dwg no.	MA165
Standard model numbers	A030509
	A031009
	A031709

PHYSICAL ATTRIBUTES

Physical dimensions (mm)	W550 x D540 x 713
Construction	Sheet steel gauge 1.5mm Epoxy polyester powder coat
Mounting type	Castors, 2 swivel, 2 braked
Acceptable environment	Indoors or outdoors sheltered
Weight (kg)	65
Noise level (dB(A)@1m)	≤65
Toolless access	No

TEMPERATURE CONTROL ATTRIBUTES

Technology	Air blast
Control method	SA00024 Proportional Fan Speed
Temperature stability	±0.5°C
Cooling capacity (flow 5°K above ambient)	1.5kW
Cooling capacity (flow 10°K above ambient)	3kW
Cooling capacity (flow 20°K above ambient)	6kW
Maximum ambient	+50°C
Design flowrate	5L/min
Maximum THR (Total Heat Rejection)	Applied load, plus power in

WATER CIRCUIT ATTRIBUTES

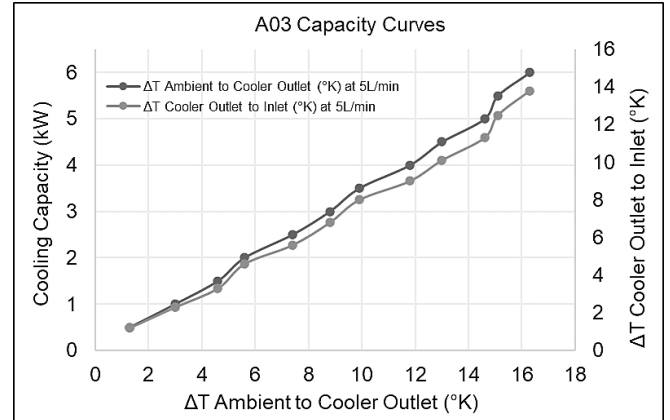
Max. return line temp	+65°C
System volume (L)	5L
Pump options	P5, P10, P17
Pressure relief	Spring loaded PRV
Standard fittings	1/2" BSPPF
Standard chem. compat.	Tap water, water-glycol mix

ELECTRICAL ATTRIBUTES

9-spec	4A (208-230Vac 1~/2~ 50/60Hz)
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SAFETY INTERLOCKS, STANDARDS & INDICATORS

Physical interface	On/off via MCB rocker switch PID controller display
Cooling system	Single 300mm axial fan PED-compliant coils
Water system	Fluid level switch Pump motor UL-approved Pump motor thermal overload
Fusing and circuit breaking	Miniature circuit breaker
Overcurrent fault-cleared restart mode	Manual restart
Interlock-restored restart mode	Automatic
Emergency off	Not present
Approvals	CE





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SAFETY NOTICES

For your safety, we draw your attention to the following warning and caution marks throughout the manual. Warning symbols can be found on the unit. Ensure you have read through all warnings before starting the unit. The safe operation of ATC products always remains the responsibility of the operator. This equipment is intended to be used as a liquid temperature conditioning device – it requires no external pump, nor any further manipulation of temperature. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Failure to comply with a 'warning' may result in personal injury or death. ATC does not accept any liability for injury caused through use of this equipment.



Caution; Failure to comply with a caution will invalidate product warranty and absolve ATC from any liability, howsoever caused, and could result in permanent damage to equipment.



Caution; Filling/topping up of the tank should only be undertaken with the unit switched off, to prevent back-filling of the fluid.



Caution; This product contains no user-serviceable parts. Repair and service requires specialized knowledge and tools to be provided by ATC or its local agent. Any unauthorized tampering with the heat exchanger system automatically invalidates warranty.



Warning; Hot and cold surfaces are present during operation. Take caution and care when touching pump during operation.



Warning; Water pressures of up to 10 bar during operation.



Warning; Water and electricity near one another. Always ensure the unit is isolated before service. The product is protected from overcurrent by MCB (miniature circuit breaker). Never bypass this component.



During fault diagnostics and maintenance, it may be necessary to remove panels, which expose the operator to the dangers of pressurized systems, hot or cold pipes and electrical circuits. Only qualified personnel who are aware and equipped to deal with these systems should only carry out such work.



Any temporary electrical supply to the chiller should be correctly earthed and connected through an earth leakage trip.



In case of unexpected coolant leakage, safety glasses should always be worn when the chiller is operated with the covers removed.



Under no circumstances leave the cooler unattended with the side panels removed.



Never alter settings of pressure switches, overloads, circuit breakers or any safety device without first consulting Applied Thermal Control.



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INCLUDED ANNEXES

Specific technical product information is provided in the following series of annexes.

Annex A-5 210226 Shipping & Unpacking - Weighing over 60kg, on castors

Annex B-2 210303 Site & Environmental Requirements for A-Series

Annex C-6 210302 Installation - Generic air-cooled with half inch fittings

Annex D-3 201007 Fluid handling & startup procedures - Generic

Annex E-5 210301 KR1 & KR3 - how to use

Annex E-5G 210205 KR3 Program A03NS404

Annex F-3 201007 PD pump using discrete PRV

Annex G-10 210302 Troubleshooting - Generic initial for A-Series

Annex H-1 191121 End-user maintenance - air-cooled units with water as fluid

Annex I-5 210302 Maintenance for technicians - Generic non-refrigerated units

Annex J-5 200706 Compliance Statement - Conflict Minerals

Annex J-6 210212 EU DoC A-series

Annex J-7 200715 Compliance Statement - REACH

Annex J-8 200827 Compliance Statement - POPs

Annex J-10 201111 Compliance Statement - RoHS

Annex K-1 200623 Standard warranty terms of ATC

Annex L-12 210115 SA00012 Volt Free Contacts

Annex L-24E 210301 SA00024E Proportional fan speed control for A-Series

Annex M-7 210301 Recommended spares, A Series

Annex N-2 210301 Variable position flowswitch 2-7Lmin 61-348

Annex R-3 200203 SDS Hexid A4 v6.3



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Annex A-5

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UNPACKING UNITS WEIGHING OVER 60kg (133lbs) ON CASTORS

Please check that both the packaging and the unit are undamaged. If there is any doubt, it is vital that you inform both ATC and the carrier. There are no hidden shipping bolts or other fixings. You should inspect the packaging for signs of transit damage before signing for the unit, and if possible, unpack the unit before signing. Once you have signed for the goods, ATC cannot be held responsible for any transit damage subsequently found.

As the unit weighs >60kg, ATC recommends it should be lifted with slings through the underside, using a forklift or overhead crane. ATC highly recommends that it is not manually lifted, and that safe slinging and lifting practices are adhered to.

Remove the unit from its original packaging and ensure that there is no packaging left around the cooling ducts. There is no internal product packaging that requires the chiller to be opened.

Please retain all packaging in the unlikely event that the chiller needs to be returned to our local representatives.



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SITE & ENVIRONMENTAL REQUIREMENTS FOR A01, A03, A08 & A12-SERIES

This guide applies to certain A-Series products only. Please find below the requirements for all services and conditions necessary for years of trouble-free running. If you require more detail, please contact ATC for support on sales@app-therm.com or using the contact information at the top of this page.

GUIDANCE

- 1 **Storage temperature range.** Without process fluids, -20°C to +70°C.
 - 2 **Storage humidity range.** Non-condensing, relative humidity 5% to 95%. Before starting product, allow product to acclimate for 24h in location of use when storing outside *operating* humidity range.
 - 3 **Operating temperature range.** With appropriate process fluids, -20°C to +65°C.
 - 4 **Operating humidity range.** 80% for ambient temperatures up to +31°C (+88°F), decreasing linearly to 50% relative humidity at +40°C (+104°F) ambient temperature.
 - 5 **Hard, level surface.** A level surface is important for ensuring proper filling and allowing air to escape.
- | | Model | Electrical | Voltage range | Voltage tolerance | Current | Frequency | Supply |
|---|-------|------------|---------------|-------------------|--------------|-----------|------------------|
| 6 | A01 | -Uspec | 100-240Vac | ±10% | 1-0.5A (L-N) | 50/60Hz | L/N/E or L1/L2/E |
| | A03 | -9spec | 208-230Vac | ±10% | 4A (L-N) | 50/60Hz | L/N/E or L1/L2/E |
| | A08 | -3spec | 400Vac | ±5% | 5.2A (L-L) | 50/60Hz | L1/L2/L3/N/E |
| | A08 | -8spec | 208Vac | ±5% | TBC | 60Hz | L1/L2/L3/E |
| | A08 | -9spec | 208-230Vac | ±10% | 5A (L-N) | 50/60Hz | L/N/E or L1/L2/E |
| | A12 | -3spec | 400Vac | ±5% | 6.9A (L-L) | 50/60Hz | L1/L2/L3/N/E |
| | A12 | -8spec | 208Vac | ±5% | TBC | 60Hz | L1/L2/L3/E |
| | A12 | -9spec | 208-230Vac | ±10% | TBC | 50/60Hz | L/N/E or L1/L2/E |
- 7 **Clearance.** Clearance is required to;
 - a) Ensure the on/off switch on the front face is unobstructed to allow access in case of emergency.
 - b) Fit hoses and electrical supply to the rear of the unit allowing recommended bending radii.
 - c) Allow maintenance access points on top and side panels to be removed.
 - d) Allow process to take place – A01/A03 air-on face is the front of unit – 0.5m is recommended – the coolest, cleanest air that can be provided will improve performance. A08/A12 air-on face is the right-hand side. Air-off faces are every other vented face – 0.5m clearance is recommended on at least 1, preferably 2 of the rear, left and right sides.
 - 8 **Plumbing.** Tubing, piping or hose must be clean and compatible with the fluid to be used. The product is compatible with deionized water, tap water and water-glycol mixtures such as Hexid A4 and A6. Ensure the connected pipework is suitable for handling up to 20L/min at system pressure ≥6bar.
 - 9 **Indoor use only.** Altitude up to 2000m above sea level. Ensure the unit has adequate ventilation.
 - 10 **Installation category.** Transient overvoltage category II; Pollution degree 2. Temporary overvoltages occurring on mains supply are acceptable within limits defined in the categories.

-  Caution; Always use ATC recommended fluids in our products – many sealing compounds and materials are present and unapproved fluids have the potential to corrode your application and damage seals.
-  Caution; Do not use inadequately rated wiring. Consult an electrician if you are unsure.
-  Caution; The safety of any system incorporating the equipment is the responsibility of the assembler of the system.
-  Caution; Do not replace detachable mains cords with inadequately rated cords. Contact ATC for appropriately rated products.



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INSTALLATION FOR AIR-COOLED UNITS WITH 1/2" BSPPF FITTINGS

This guide applies to the following product groups;

- K-Series, R-Series and G-Series refrigerated units, where heatload is rejected to air.
- A-Series airblast units, where heatload is rejected to air.

HOSE RECOMMENDATIONS

Having ensured that your installation meets all site requirements, it is best practice that the fluid lines between your application and the chiller have the following characteristics.

- 1 Short in length** – this reduces friction-based pressure drop and addition ambient heat load.
- 2 Large diameter bore** – at least 12mm (1/2”).
- 3 Free from 90° bends** – to limit the effects of water hammer. If this cannot be avoided, sharp changes of direction should be minimized so far as possible. Doing this correctly can yield higher pump performance and extend time between maintenance intervals. It will also reduce electrical energy consumption.
- 4 Clean** – If your installation is to existing pipe work, it is good practice to flush the system with either a commercially available central heating cleaner or 5% acetic acid solution. The system should be flushed clean with tap water to remove all traces of cleaner prior to filling the system. Failing this, it is recommended to use a domestic bleach in solution with tap water, diluted to the point where the bleach can longer be smelled by human nose.
- 5 Opaque, ideally black** – to inhibit light passing through the tube and algae building up. Alternatively, solid ABS or copper pipe can be used where application chemistry allows.
- 6 Insulation, where low temperature process is planned** – the process line from chiller to application contains the feed of low temperature fluid. Insulation prevents heat from entering this line and can promote better stability. Uninsulated return lines are helpful where free cooling can be obtained by allowing heat to transfer to air – likewise, insulating the return line is helpful if the fluid temperature is below ambient.



Caution; Never use transparent tubing. UV light will pass through, prompting growth of organic contamination.

CONNECTING ADAPTERS TO PRODUCT BULKHEAD FITTINGS

- 1** Standard units are supplied with 1/2” British Standard Pipe Parallel Female (BSPPF) threads (also known as G threads (ISO228)) by default. These fittings are not valved and will ‘drop’ the volume of the system if left open to atmosphere.
- 2** Ensure the appropriate thread sealants are used in the fitting of adapters to hose. For metallic mating parts, we recommend Loctite 577. For plastic adaptors such as those supplied with the product, we recommend using ~8-12mm wide PTFE tape, wrapped around the male thread before tightening.
- 3** Ensure that the system is correctly connected. The ‘donut’ labels around the ports are clearly marked with inlet and outlet symbols and function in both English and French language. Ports marked as outlet means fluid leaves the product and must be connected to the process inlet.
- 4** Check all joints are tight and leak free.
- 5** Where this product is incorporated into other equipment, it is the responsibility of the assembler to ensure safety.



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BACKFILLING

- 1 In situations where the chiller is situated physically lower than the application being cooled, fluid will apply pressure to the water circuit of the product.
- 2 The weakest seal is normally the tank lid, and this is typically where fluid will escape the unit.
- 3 Ideally, the product will be located higher or level with the product water-line. If this is not possible, a non-return solenoid valve kit can be installed as an optional standard assembly.
- 4 Please raise any questions with the sales team on sales@app-therm.com.



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FILLING A SYSTEM

- a) **Check all application valves are open, including solenoid valves and variable position valves.**
 - i) The product will require an open water circuit to pump into.
 - ii) Any obstructions can increase the time, or entirely prevent the bleeding of air from the system.
- b) **Remove the cap from the tank lid on the top of the product.**
 - i) Fill the tank to just underneath the bottom of the filling port.
- c) **Turn your attention to the main power switch.**
 - i) Immediately after toggling this switch assuming that the power cord is connected and turned on at the wall the product will begin to pump water.
 - ii) Leave the product to run until it cuts out on the level switch interlock.
 - iii) Turn the unit off at the mains switch.
 - iv) Fill the tank again to lift the level switches.
 - v) Start the product again until the unit cuts out again.



Caution; Do not run the pump dry. Do not deadhead the pump.

- d) **Repeat steps at c) until the chiller tank water level (if visible) doesn't drop, and the chiller doesn't cut-out on its level switches.**
- e) **With the unit now running;**
 - i) Leave the cap off the tank for >30mins to allow air to escape, or very loosely screwed on to prevent water splashing out of the tank if the unit has a 'flow through' design.
- f) **Check the application and tubing for signs of leaks whilst the chiller is running.**
 - i) Replace the tank lid fully when satisfied the system is full and bled of air.

DRAINING A SYSTEM

- a) **Isolate the unit. Have a suitable bucket or drain on-hand.**
 - i) Remove the tank lid to allow air into the system.
 - ii) Disconnect hoses individually. Be aware hoses as well as the unit are filled with fluid.
 - iii) Consider using the red transport plugs to block product ports to give yourself time to empty hoses before continuing to empty the product.
- b) **Local rules affect where fluid can be disposed of.**
 - i) Ensure hazardous products do not enter the water course and are reclaimed from the unit for professional disposal.



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BASIC PROGRAMMING GUIDE KR3 (ALL MODELS)

This guide may apply to your product if you require general navigation advice and help accessing settings. If you are planning to change the settings in any way, you may need a copy of the existing settings which are model dependent, signified by a letter on the end of Annex E-5, i.e. Annex E-5A.

DISPLAY CONTENTS DURING NORMAL OPERATION

- 1 Physical navigation buttons, up, down, return and enter.
- 2 8888.8 is the actual read value on input sensor.
- 3 888.8 is the setpoint value.
- 4 Rectangles bottom left 1-4 display when output is active.
- 5 MAN LED shows in manual mode (fixed output value).
- 6 °C or °F shows units as settable in the 'inP' group.
- 7 AL LED appears when output is beyond a set alarm point.



ACCESS TO SETTINGS

- 8 Push the return button for more than 5 seconds. The upper display will show PASS while the lower display will show 0.
- 9 Using up and down buttons set the programmed password – full access is granted by entering '40'. ATC are not responsible for damage either to the chiller or the connected equipment as a result of changing parameters without ATC's oversight.
- 10 During parameter modification the instrument continues to perform process control. In certain conditions, when a configuration change can produce a significant change to the process, it is advisable to temporarily stop the controller from controlling during the programming procedure (control outputs will be OFF). A password equal to 2000 + the programmed value (i.e. 2000 + 40 = 2040). The control will restart automatically when the configuration procedure will be manually closed.
- 11 Push the return button. If the password is correct the display will show the acronym of the first parameter group 'inP'. Push button for more than 5 seconds, the instrument will come back to the "standard display".
- 12 The configuration parameters are collected in various groups. Every group defines all parameters related with a specific function (control, alarms, output functions).
- 13 Push return button for more than 5 seconds, the instrument will come back to the "standard display". For specific settings and guidance, review the controller datasheets provided by ATC. If you are not in receipt of these, please contact ATC using the information in the header of this document.

GENERAL NAVIGATION

- 14 Return button; A short press allows to exit from the current parameter group and select a new parameter group. A long press allows you to close the configuration parameter procedure (the instrument will come back to the "standard display").
- 15 Enter button; When the upper display is showing a group and the lower display is blank, this key allows to enter in the selected group. When the upper display is showing a parameter and the lower display is showing its value, this key allows to store the selected value for the current parameter and access the next parameter within the same group.
- 16 Up button; Allows to increase the value of the selected parameter.
- 17 Down button; Allows to decrease the value of the selected parameter.
- 18 Pushing both Return and Enter buttons moves back to the previous group. Press return first to start. The selection of the group is cyclic (on a carousel), so it is possible to move back around to the group you require.



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PROGRAM PURPOSE

Internal part number	EA894 / EA902
Manufacturer part number	KR1
Program purpose	1) STANDARD PROGRAM FOR ALL MACHINES WITH A KR1 CONTROLLER

PROGRAM

Group inP		Group 'out'		Group 'AL1'		Group 'AL2'	
Setting	Value	Setting	Value	Setting	Value	Setting	Value
SEnS	Pt1	o1.F	See Table 1	AL1t	LHdo	AL2t	nonE
dP	1	o1.AL		Ab1	0	Ab2	n/a
SSc	n/a	o1.Ac		AL1L	-10.0	AL2L	n/a
FSc	n/a	o2F		AL1H	10.0	AL2H	n/a
Unit	°c	o2.AL		AL1	n/a	AL2	n/a
FiL	10	o2Ac	HAL1	1.0	HAL2	n/a	
inE	our	o4F	See Table 2	AL1d	oFF	AL2d	n/a
oPE	100	o4.AL		AL1o	0	AL2o	n/a
io4.F	out4	o4Ac					
diF1	oFF						
diF2	n/a						
di.A	0						
Group 'AL3'		Group 'LbA'		Group 'rEG'		Group 'SP'	
Setting	Value	Setting	Value	Setting	Value	Setting	Value
AL3t	nonE	LbAt	oFF	cont	See Table 3	nSP	n/a
Ab3	n/a	LbSt	n/a	Auto		SPLL	See Table 4
AL3L	n/a	LbAS	n/a	tunE		SPHL	
AL3H	n/a	LbcA	n/a	Aut.r		SP	20
AL3	n/a			SELF		SP2	n/a
HAL3	n/a			HSEt		SP3	n/a
AL3d	n/a			cPdt		SP4	n/a
AL3o	n/a			Pb		A.SP	SP1
				ti		SP.rt	trin
				td		SPLr	Loc
				Fuoc		SP.u	inF
				tcH		SP.d	inF
				rcG			
				tcc			
				rS			
				Str.t		n/a	
				db.S	n/a		
				od	n/a		
				St.P	0		
				SSt	oFF		
				SS.tH	999.9		



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Table 1 – Group ‘out’ settings by Machine Model

Setting	A-series	G-series	K-series	R-series	W-series
o1.F	nonE	c.rEG	c.rEG	c.rEG	AL
o1.AL	n/a	n/a	n/a	n/a	1
o1.Ac	n/a	dir	dir	dir	rEU
o2F	AL	AL	AL	AL	c.rEG
o2.AL	1	1	1	1	n/a
o2Ac	rEU	rEU	rEU	rEU	dir

Table 2 - Group ‘out’ settings by heating requirement

	Heater	No Heater
o4F	H.rEG	nonE
o4.AL	n/a	n/a
o4Ac	dir	n/a

Table 3 – Group ‘rEG’ settings by Machine Model

Setting	A-series	G-series	K-series	R-series	W-series
cont	Pid	Pid	Pid	Pid	On.FA
Auto	0	0	0	0	n/a
tunE	oFF	oFF	oFF	oFF	n/a
Aut.r	n/a	n/a	n/a	n/a	n/a
SELF	n/a	n/a	n/a	n/a	n/a
HSEt	n/a	n/a	n/a	n/a	2
cPdt	n/a	n/a	n/a	n/a	n/a
Pb	19.5	15	15	15	n/a
ti	54	60	60	60	n/a
td	1	1	1	1	n/a
Fuoc	0.5	0.42	0.42	0.42	n/a
tcH	0.2	0.2	0.2	0.2	0.2
rcG	1.00	1.00	1.00	1.00	n/a
tcc	2	7	7	7	30
rS	0	0	0	0	n/a

Table 4 – Group ‘SP’ temperature settings by Machine Specification

Setting	Standard			Low Temp Pack (SA2)			Heater Pack (SA3)									
	A-series	G/K/R-series	W-series	-20°C	-15°C	-10°C	+45°C	+50°C	+55°C	+60°C	+65°C	+70°C	+75°C	+80°C	+85°C	+90°C
SPLL	10.0	4.0	5.0	-20.0	-15.0	-10.0	Standard or as per low temperature pack									
SPHL	55.0	35.0	25.0	Standard or as heater pack			45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0

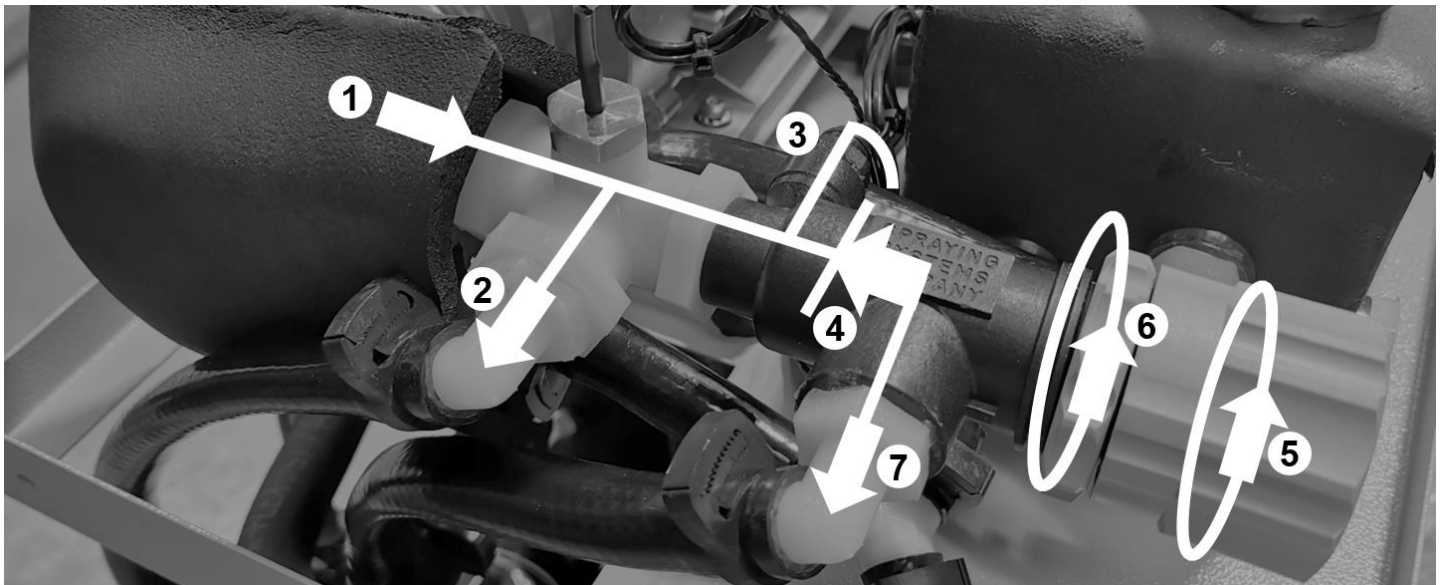


DOCUMENT DETAILS

Date	7/OCT/2020	Author(s)	MJH	Page	1 / 2	Revision	1
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POSITIVE DISPLACEMENT PUMPS & DISCRETE PRESSURE RELIEF VALVE

This arrangement comprises a positive displacement pump (most commonly a rotary vane type) with a spring-loaded pressure relief valve to provide better overpressure setting control with minimal flow losses compared to fixed orifice bypasses/reliefs. This annex describes ATC's default settings and how to adjust the system.



It is important to understand the basic principle that all else being equal, higher flow results in a higher demand for pressure. The motor generates the power required to turn the pump head and create that pressure. The more restrictive a water circuit is, the higher the pressure required to maintain flowrate. Positive displacement pumps are designed to generate high pressure and are mechanically tight - their RPM dictates flowrate. See image;

- 1) Pump discharge** – fluid leaves the pump head and enters the gauge-tee assembly. It passes the temperature sensor at the tee, and when the pressure relief is inactive, fluid heads towards no. 2.
- 2) Outlet to process** – fluid heads out of the product to the application. Whatever restrictions lie downstream, fluid leaving this point has not passed through the pressure relief valve.
- 3) Pressure gauge connection** – connection to a pressure gauge on the front panel of the product. This displays the pressure in the water circuit, *at the pump outlet, not the application which will be lower.*
- 4) Pressure Relief Valve (PRV)** – spring tension in the body of the PRV determines whether fluid travels through point 2 or passes through to point 7.
- 5) PRV adjustment knob** – rotate clockwise to increase maximum delivery pressure. Rotate anti-clockwise to limit maximum delivery pressure.
- 6) PRV adjustment locknut** – release this locknut to adjust no.5. Ensure it is tightened once adjustments are made. If it is not, vibration may cause the adjustment knob to move on itself.
- 7) Bypass flow outlet** – where the pressure requirement to overcome restrictions downstream of no.2 rises to be higher than the setting at no.5, the spring inside no.4 will compress and allow liquid to start bleeding through to no.7. It is important to understand that the nature of the spring means there can be no black and white point for pressure relief setting – the spring will slowly compress and bleed flow until all flow passes through no.7. When fully bypassing, all flow stays inside the chiller to protect the application.



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Annex F-3

DOCUMENT DETAILS

Date	7/OCT/2020	Author(s)	MJH	Page	2 / 2	Revision	1
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SETTING THE PRESSURE RELIEF VALVE (BYPASS)

Unless otherwise agreed at point of sale, the default setting for this type of pump and PRV arrangement is 3.33bar (50psi). In the absence of external calibrated pressure gauges, it's possible to use the chiller itself to set this value;

- 8) **Isolate the chiller** – always isolate before performing work.
- 9) **Disconnect from the application if already connected** – review the draining procedure in Annex D.
- 10) **Connect the chiller's process inlet to process outlet** – a short run of hose around 1-2m (3-6ft) will be adequate.
- 11) **Start the chiller and follow the fill process from Annex D** – fluid will now be running through a short loop with very low pressure required to overcome the restriction.
- 12) **With the chiller running, very slowly kink the short run of hose fitted above** – this simulates a blocked application – this is known as 'deadheading' the pump. Without PRV, the pump motor would stall or hoses might blow off. Watch the pressure gauge climb as you apply the kink.
- 13) **The pressure gauge will eventually stop climbing with the hose fully kinked** – note the value; this is the setting of the PRV where all flow is bypassed.
- 14) **Refer to points 5) and 6) above to adjust if required** – contact ATC if you're unsure over whether your desired setting is reasonable for the product you have.



Applied Thermal Control Ltd
 39 Hayhill Industrial Estate
 Barrow-upon-Soar, Loughborough
 LE12 8LD, United Kingdom
 +44 (0) 1530 839 998
 Service@thermalexchange.co.uk
 Support@app-therm.com

Operating Manual; Troubleshooting Annex G-10

DOCUMENT DETAILS

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A-SERIES GENERIC INITIAL TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE
Unit not running	Check the tank is filled past the level switch to ensure it can run.
	Check temperature of fluid and pump motor. In the case of these reaching temperatures that could cause damage, the unit will switch off.
	Check overload state and ensure internal fuses have continuity.
	Check pump motor interlock chain.
	Check supply is at correct voltage.
Noisy operation	Air in the system the has not purged causing pump vanes to rattle (where fitted).
	Bearing failure in fan or pump motor causes grinding / intermittent knocking noise.
	Fan blade is running off center and grinding against coil housing.
Fluid lines becoming fouled / containing biological matter	Not using opaque tubing can lead to UV light passing through the tubing, prompting growth of organisms.
	Not following maintenance schedule for cleaning/flushing.
Fluid seen leaking from system	Fluid may be incompatible with the materials used in chiller construction. Contact ATC to ensure the fluid is compatible.
	Rapid changes in system temperature can cause some materials to change shape at a faster rate than others and open leak paths. Contact ATC to discuss alternative materials and parts in water circuit construction if your temperature range goes beyond the standard for this product range.
	In case of centrifugal pump being fitted, minimum head of 2bar has not been observed.
Poor cooling capacity (undercooling)	Excess application thermal heat load. See Annex G-2 for a description on how to calculate this.
	Ambient air temperature has increased from nominal requirement, or flow has reduced from cooling fan.
	Process fluid pump high flowrate can yield a low delta T, i.e. outlet temperature to application will be higher than desired and return temperature will be lower than nominal. Cooling capacity will be the same.
Excess cooling capacity (overcooling)	Reduction in flowrate in an airblast system without process temperature control can yield outlet temperature much closer to ambient (lower) than system design nominals. For nominals, please contact sales@app-therm.com.
	One or more component in failure mode generating heat beyond that which the cooler can reject.
	Cooler oversized at point of design or thermal load overestimated – this can be remedied by blocking part of the cooling coil.



Applied Thermal Control Ltd
 39 Hayhill Industrial Estate
 Barrow-upon-Soar, Loughborough
 LE12 8LD, United Kingdom
 +44 (0) 1530 839 998
 Service@thermalexchange.co.uk
 Support@app-therm.com

Operating Manual; Maintenance for End-Users

Annex H-1

DOCUMENT DETAILS

Date November 2019

Compiled by MJH

Revision 1

PERIODIC MAINTENANCE REQUIREMENTS BY END USER



Caution; Failure to carry out service at the specified intervals may permanently damage your equipment.

Print this sheet out and display close to the chiller to maximize the visibility of maintenance requirements.

Weekly	Week 1	Week 2	Week 3	Week 4
Check fluid level – top up as required.				

Monthly	J	F	M	A	M	J	J	A	S	O	N	D
Check the condenser is free from dust or accumulation of debris.												

Annually	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
Drain process fluid and replace with fresh fluid.								
Check for fluid leaks throughout chiller and application.								
Clear any debris from inside the chiller.								

A vacuum cleaner is recommended for cleaning out the condenser, while soft cloths and IPA are recommended for cleaning metallic surfaces. If any spillages have occurred, best practice is to allow the water to evaporate off and wipe up remaining glycol residue with a cloth. Always clean with power supply isolated.



Caution; Never blow out the condenser with compressed air.



Caution; If the mains lead is lost or damaged, contact ATC who will be able to supply a replacement of the correct specification.



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Operating Manual; Maintenance for Technicians

Annex I-5

DOCUMENT DETAILS

Date	2/MAR/2021	Author(s)	MJH	Page	1 / 1	Revision	2
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MAINTENANCE FOR TECHNICIANS; GENERIC NON-REFRIGERATED UNITS

This guide may apply to your product if you have an X-Series (X, XF, XR) or A-Series product. The guidance below is designed to be non-specific and to raise awareness of potential dangers for a trained engineer carrying out service work.

GUIDANCE



Warning; during operation component temperatures can exceed +70°C, take care when opening unit.



Warning; After switching off, the cooling fan blades continue to rotate (A-Series only). Do not attempt servicing whilst the blades are rotating.



Warning; All products contain water and electricity in close proximity. Ensure the unit is isolated before service. Never bypass overcurrent protection on the mains supply. Never bypass fuses or circuit breakers.

1

Following service or repair by a trained technician, ensure any electrical connections that may have been disturbed are given the 'tug-test'.

2

Ensure earth bonding conductors are re-attached.

3

Ensure the correct fuses are in place.

4

Ensure the mains cord being used is to specification and is free from damage.

5

Subject the unit to a PAT test to ensure the unit is safe before running.

6

Ensure there are no leaks inside or outside the unit.

7

Using the wiring schematic for guidance, simulate faults to check each interlock's function.



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Operating Manual; Declarations & Approvals Annex J-5

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	01
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CONFLICT MINERALS COMPLIANCE STATEMENT

Applied Thermal Control (ATC) adheres to and embraces the ethical values that support our everyday activities. As an expression of these principles and ethical values, ATC adheres to the principle of responsible sourcing of components containing precious and non-precious metals and metal salts in compliance with applicable laws and regulations.

The metals considered are Tantalum (Ta), Tungsten (W), Tin (Sn) and Gold (Au). ATC actively sources components from suppliers known to be reputable and could demonstrate compliance upon request with the Conflict Minerals acts and guidelines.

ATC uses Gold and Tin in electrical components, on PCBs and in rotating machinery, as governed by technical requirements of products. These metals could potentially originate from conflict mineral sites. As many of our suppliers do not purchase these metals direct from smelters, both they and ATC must rely heavily on information that will be provided by their suppliers to determine the source and chain of the metals in those products.

ATC is committed to working with its customers and supply chain to meet the customer's specification and requirements with regards to traceability, sourcing requirements and restrictions. ATC commits that, to the best of our knowledge, our suppliers are complying with the conflict minerals act as stated in their documentation. These statements are reviewed, and updates obtained as required.

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Operating Manual; Declarations & Approvals

Annex J-6

DOCUMENT DETAILS

Date	6/APR/2022	Author(s)	MJH	Page	1 / 1	Revision	1
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EU DECLARATION OF CONFORMITY

Document layout; Governed by Machinery Directive 2006/42/EC, Annex II.

REGISTERED BUSINESS ADDRESS

Applied Thermal Control Ltd, 39 Hayhill Industrial Estate, Barrow-upon-Soar, Loughborough, LE12 8LD, UK.

AUTHORISATION TO COMPILE THE TECHNICAL FILE

Mitchell Howard, address as above

DESCRIPTION & IDENTIFICATION OF MACHINERY

Generic denomination;	A-Series
Function;	Recirculating airblast cooler
Model;	All with 'A' prefix.
Type;	Air-cooled heat exchanger
Serial number;	
Commercial name;	As above.

NOTIFIED BODY

Not applicable

QUALITY ASSURANCE SYSTEM

QMS International Ltd, Muspole Court, Muspole Street, Norwich, NR3 1DJ, UK. ASCB Registered; 201409-2

DECLARATION

Applied Thermal Control declares that the machinery described above fulfils all the relevant provisions of the directives and standards below.

Directive	Harmonised Standards applied
Machinery Directive 2006/42/EC (inclusive Low Voltage Directive 2014/35/EU)	EN ISO 12100:2010 (MD) BS EN 61010-1:2010+A1:2019 (LVD)
EMC Directive 2014/30/EU	IEC 61000-6-2:2005 IEC 61000-6-4:2006 +A1:2011
RoHS Directive 2011/65/EU (RoHS 2) RoHS Directive (EU) 2015/863 (RoHS 3)	EN IEC 63000:2018
Pressure Equipment Directive (2014/68/EC)	Out of Scope. Sound Engineering Practice (SEP) applied.

PERSON EMPOWERED TO DRAW UP DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 6/APR/2022



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Annex J-7

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	01
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WHAT IS THE REACH REGULATION 1907/2006?

REACH is a regulation of the European Union, adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. REACH places the burden of proof on companies. To comply with the regulation, companies must identify and manage the risks linked to the substances they manufacture and market in the EU. They have to demonstrate to ECHA how the substance can be safely used, and they must communicate the risk management measures to the users. If the risks cannot be managed, authorities can restrict the use of substances in different ways. In the long run, the most hazardous substances should be substituted with less dangerous ones. REACH stands for Registration, Evaluation, Authorization and Restriction of Chemicals. It entered into force on 1/JUN/2007.

REACH 'ARTICLE' COMPLIANCE CONSIDERATIONS

REACH ANNEX XVII COMPLIANCE

Substances under Annex XVII are restricted either in full (not to be used at all) or for specific uses (can be used in some uses but cannot be used in identified uses).

Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

REACH ANNEX XIV COMPLIANCE

Substances under Annex XIV require authorization to use in the EU after sunset date, require communication to downstream recipients when over threshold (0.1% w/w at article level) and require notification to ECHA when SVHC over threshold and imported over 1000kg annually and use not already registered.

Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

SVHC LIST COMPLIANCE

Substances of Very High Concern (SVHC) require communication to downstream recipients when over threshold (0.1% w/w at the article level), notification to the European Chemicals Agency (ECHA) when SVHC over threshold and when imported over 1000kg annually and use not already registered.

Applied Thermal Control has contacted all our suppliers and to the best of our knowledge, none of the articles that we sell intentionally contain any of the Annex XVII substances currently on the candidate list in concentrations of >0.1% by weight.

DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Operating Manual; Declarations & Approvals Annex J-8

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	01
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WHAT IS THE POPs REGULATION 2019/1021?

POPs stands for persistent organic pollutants. In Europe, the global Stockholm Convention is implemented through POPs legislation. POPs are organic substances that persist in the environment, accumulate in living organisms and pose a risk to our health and the environment. They can be transported by air, water or migratory species across international borders, reaching regions where they have never been produced or used. International risk management is necessary as no region can manage the risks posed by these substances alone.

The European Parliament (and Council) issued regulation 2019/1021 on 20/JUN/2019, and further amended (regulation 2020/784) on 8/APR/2020.

POPs LISTED UNDER INITIAL REGULATION 2019/1021

Pesticides;

Aldrin, Chlordane, DDT, Dieldrin, Endrin, Heptachlor, Hexachlorobenzene, Mirex, Toxaphene.

Industrial Chemicals;

Hexachlorobenzene, Polychlorinated Biphenyls (PCBs).

Industrial Chemical Byproducts;

Hexachlorobenzene byproducts;

Polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), and PCBs.

POPs LISTED UNDER AMENDMENT 2020/784

Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds.

POPs COMPLIANCE STATEMENT

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully POPs compliant in accordance with regulations and amendments above mentioned.

DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021



Annex J-10

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	MJH	Page	1 / 1	Revision	02
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WHAT IS THE RoHS DIRECTIVE?

The RoHS Directive places restrictions on the use of certain hazardous substances in electrical and electronic equipment (EEE). RoHS compliance has been required for many years, however in 2014 it became a mandatory requirement under CE Marking. ATC products do not clearly fall within any of the existing categories of equipment, but as of 23/JUL/2019, all EEE not covered falls within scope of the directive. In contrast to RoHS 1, RoHS 2 is a CE marking Directive, and requires, for finished EEE, the use of the CE mark on the product to show compliance. The responsibility for affixing the CE mark resides with the manufacturer.

RoHS 1 2002/95/EC

Adopted in February 2003 by the EU and taking effect on 1/JUL/2006, RoHS 1 restricted the use of 6 hazardous materials;

- 1) Lead (Pb)
- 2) Mercury (Hg)
- 3) Cadmium (Cd)
- 4) Hexavalent Chromium (Cr6+)
- 5) Polybrominated Biphenyls (PBB)
- 6) Polybrominated Diphenyl Ether (PBDE)

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully RoHS 1 compliant.

RoHS 2 2011/65/EU

Adopted in July 2011 by the EU and taking effect on 2/JAN/2013, RoHS 2 expands the scope of RoHS 1 by adding new categories. RoHS 2 compliance is required to CE mark the product. Compliance with RoHS 2 is mandatory from 22/JUL/2019.

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully RoHS 2 compliant.

RoHS 3 2015/863/EU

Adopted in 2015 by the EU and taking effect from 22/JUL/2019, RoHS 3 adds four additional substances to RoHS 1's list.

- 1) Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
- 2) Benzyl butyl phthalate (BBP): < 1000 ppm
- 3) Dibutyl phthalate (DBP): < 1000 ppm
- 4) Di-isobutyl phthalate (DIBP): < 1000 ppm

We certify that to the best of our knowledge, based upon up-to-date information from our suppliers, all products supplied by Applied Thermal Control are fully RoHS 3 compliant.

DECLARATION

Robert Poniatowski, CEO
Signed in Barrow-upon-Soar, UK, date 03/FEB/2021



Applied Thermal Control Ltd
39 Hayhill Industrial Estate
Barrow-upon-Soar, Loughborough
LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

DOCUMENT DETAILS

Date	03/FEB/2021	Author(s)	RW, MJH	Page	1 / 1	Revision	02
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WARRANTY TERMS

Please visit the website warranty registration page to ensure ATC can offer you the best possible support;

<https://www.app-therm.com/warranty-registration/>

a) For how long is my ATC product warrantied?

ATC provides a comprehensive return to base 2-year parts, 1-year labor warranty from delivery as standard on all new equipment, provided it has been installed and operated in accordance with the manual.

b) Where will ATC fulfill the product warranty?

ATC's standard warranty terms are Return to Base (RTB) – issues with chillers are often easily solvable over the phone or email, or by reviewing ATC's technical guidance on the web and in the product manual. On occasion, at the discretion of ATC, goods may be serviced on site FOC or a service loan unit may be supplied. Warranty cover excludes the cost of travel by engineers and loan unit rental charges. Obtaining onsite service for a product, even in full warranty, is a chargeable service.

c) Who is liable for shipping charges in the event of warranty failure?

During the **first year** of the warranty period, freight costs for shipping to ATC are for the customer's account. Freight costs for shipping from ATC are for ATC's account.

During the **second year** of the warranty, freight costs to and from ATC are for the customer's account.

d) I'm experiencing problems with my chiller. It's within warranty – what do I do next?

Contact ATC to discuss the issue you are having. The contact details in the header of this document are an ideal place to start. Be sure to have your model number and serial number on-hand to aid those attempting to solve remotely.

e) Telephone support couldn't fix my chiller – what do I do next?

An RMA form must be completed. This allows both the end-user and ATC to clarify your details, to set the party responsible for shipping costs, and to set a different return address if desired. Shipping advice is provided, and the end-user must sign a declaration that states the unit is safe to handle. Return the form by email for fastest response.

f) What happens if my chiller failed outside warranty or requires non-warranty repair work?

A purchase order will be requested to cover an initial inspection – this will only be invoiced if the inspection shows there is no fault. If packaging is required, i.e. a crate, a separate charge will be levied. If the end user prefers ATC to arrange a collection, a shipping charge may be levied.

g) Our process must continue running – can we have a loan unit whilst our chiller is in repair?

ATC hold several standard air-cooled chillers at the factory for the sole purpose of offering for loan – these are available on a first-come, first-serve basis. Models up-to 3kW capacity are available.



Annex L-3

DOCUMENT DETAILS

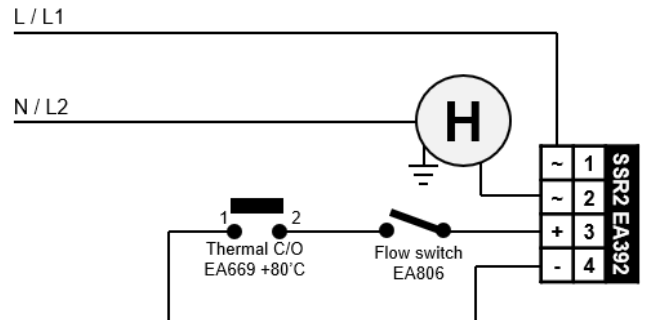
Date	30/NOV/2021	Author(s)	MJH	Page	1 / 1	Revision	1
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HEATER PACK COMMON FEATURES

This guide may apply to your product if you purchased standard option SA00003. Cartridge heaters are used to accelerate the heating of process fluid beyond that which can be achieved with heat of compression alone.

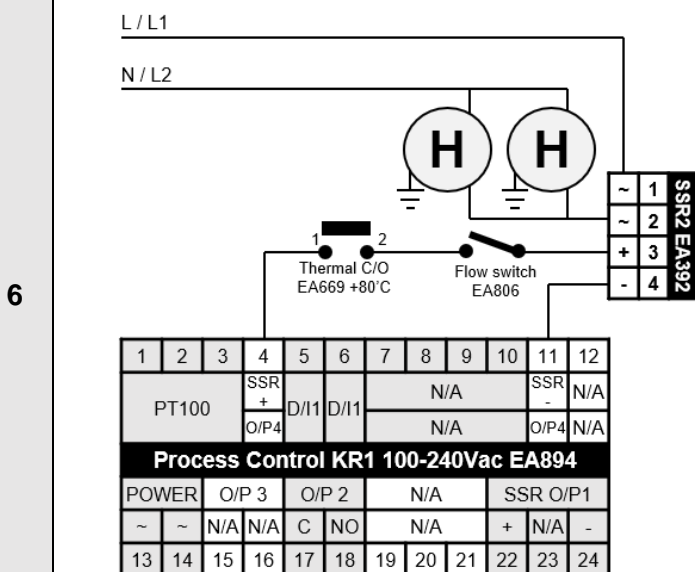
GENERAL SINGLE HEATER WIRING

- Heater packs are generally applied to standard units in the same way, regardless of product specification, heater pack capacity or temperature.
- The controller (EA849 in this case) carries two solid state relay (SSR) outputs. The first is used for cooling and the second is used for heating.
- Low voltage 12Vdc comes from both cooling and heating outputs to their own SSRs. Pictured right, is terminals 4+11 connected to terminals 3 and 4 of the SSR EA392.
- In series with the positive side of the circuit are a thermal cutout, normally mounted on the tank within which the heaters are installed, and a flow switch.
- Either of the devices opening in fault state result in the SSR failing to close. Heater(s) are installed with the SSR contacts in series with the live(s) that feed the heater(s), preventing it running.

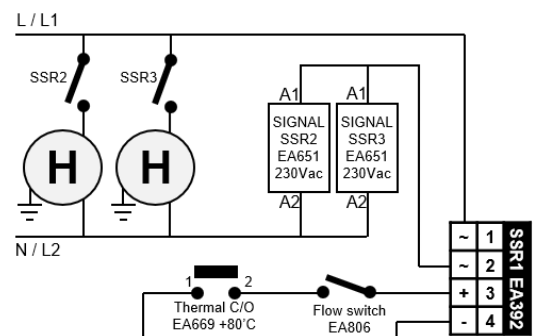


1	2	3	4	5	6	7	8	9	10	11	12
PT100		SSR +	D/I1	D/I1	N/A		N/A		SSR -	N/A	
		O/P4							O/P4		
Process Control KR1 100-240Vac EA894											
POWER		O/P 3	O/P 2	N/A		N/A		SSR O/P1			
~	~	N/A	N/A	C	NO	N/A		+	N/A	-	
13	14	15	16	17	18	19	20	21	22	23	24

MULTIPLE HEATERS



1	2	3	4	5	6	7	8	9	10	11	12
PT100		SSR +	D/I1	D/I1	N/A		N/A		SSR -	N/A	
		O/P4							O/P4		
Process Control KR1 100-240Vac EA894											
POWER		O/P 3	O/P 2	N/A		N/A		SSR O/P1			
~	~	N/A	N/A	C	NO	N/A		+	N/A	-	
13	14	15	16	17	18	19	20	21	22	23	24



1	2	3	4	5	6	7	8	9	10	11	12
PT100		SSR +	D/I1	D/I1	N/A		N/A		SSR -	N/A	
		O/P4							O/P4		
Process Control KR1 100-240Vac EA894											
POWER		O/P 3	O/P 2	N/A		N/A		SSR O/P1			
~	~	N/A	N/A	C	NO	N/A		+	N/A	-	
13	14	15	16	17	18	19	20	21	22	23	24

In the above, the low voltage control SSR has a contact side capable of supporting the current pulled by two heaters in parallel.

In the above, the low voltage control SSR drives two more SSRs whose contacts drive the heaters. This allows the controllers to drive more, higher-powered heaters.



Applied Thermal Control Ltd
 39 Hayhill Industrial Estate
 Barrow-upon-Soar, Loughborough
 LE12 8LD, United Kingdom
 +44 (0) 1530 839 998
 Service@thermalexchange.co.uk
 Support@app-therm.com

Operating Manual; Recommended Spares

Annex M-7

DOCUMENT DETAILS

Date	9/SEP/2022	Author(s)	MJH	Page	1 / 2	Revision	4
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RECOMMENDED SPARES FOR A-SERIES

Recommended spares include all rotating machinery (i.e. motors, fans), all sacrificial elements (i.e. fuses) and parts that users interact with (dials, fittings). Pricing is available from sales@app-therm.com.

A01 (MA485 CHASSIS)

PN	Description	QTY
EA770	Appliance inlet module	1
EA044	CORDSET – UK BS1363 to C13, 2m, right angle head (to suit appliance C14)	1
EA507	FUSE – T5A H250V UL-OK (FS1+2)	2
EA769	FUSE – T4A H250V UL-OK (FS3)	1
EA506	FUSE – T2A H250V UL-OK (FS4)	1
EA815	PSU – universal input, 24VDC 350W output	1
EA781	Level switch	1
EA834	Relay	1
WA696	Pump – PC6 (A01061U)	1
WA697	Pump – PC3 (A01032U)	1
RA287	Fan – 172mm axial frame fan 24Vdc	1

A03 (MA165 CHASSIS)

PN	Description	QTY
EA513	FUSE - T0.5A L250V UL-OK	1
EA626	Circuit Breaker 2 pole 10	1
WA319	Pump head – P10	1
EA517	Pump motor 230V 1/2~ for PD pumps P5 P10 P15	1
RA320	FAN ASSY - 300mm 4pole fixed speed PSC motor (fixed speed models)	1
EA846	FAN ASSY - 300mm 1700RPM EC motor 0-10Vdc (variable speed models)	1
EA586	Sensor PT100B, 1/4" BSP	1
	Controller – KR3 (variable speed models)	1
EA781	Level switch	1

A08 & A12 STANDARD -0SPEC & -3SPEC MODELS

PN	Description	QTY
EA643	Overload 4-6.3A	1
EA101	Auxiliary contact	1
EA252	No volt release (undervoltage trip)	1
EA781	Level switch	1
EA517	Pump motor 230V 1/2~ for PD pumps P5 P10 P17	1
EA617	Pump motor 400V 3~ for PD pumps P5 P10 P17	1
WA319	Pump head – P10	1
WA318	Pump head – P17	1
WA781	Pump – Turbine 17L/min@5bar 400V 3~ 50Hz	1
RA116	FAN – EC motor (fixed speed models)	4 / 6
EA779	Lamp 230Vac 1/2~	1
EA208	Fan – PSC motor, high flow 2pole.	4 / 6



Applied Thermal Control Ltd
 39 Hayhill Industrial Estate
 Barrow-upon-Soar, Loughborough
 LE12 8LD, United Kingdom
 +44 (0) 1530 839 998
 Service@thermalexchange.co.uk
 Support@app-therm.com

Operating Manual; Recommended Spares

Annex M-7

DOCUMENT DETAILS

Date	9/SEP/2022	Author(s)	MJH	Page	2 / 2	Revision	4
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A08NS420 ADDITIONAL PARTS

PN	Description	QTY
EA895	Fans – 3~ 400V	1
64-415	Low voltage PSU, input 180-550Vac 1/2~	1
EA816	Control – Z31 24Vdc (for on-off control, OR simple temperature display OR VFCs)	1
EA092	Flow switch	1
EA896	Supply lamp, white, 24Vdc	1
EA834	Relay	3
EA781	Level switch	1
EA812	Contactora 12A/phase 5.5kW 24Vdc coil	1

A40 (MA407 CHASSIS)

PN	Description	QTY
63-589	PUMP P40	1
WA911	PUMP P80	1
WA884	PUMP P150	1
EA379	Switch-Level 20C to +100C	1
EA643	Overload; 4-6.3A/phase	1
EA793	PSU; 100-240Vac input	1
EA812	Potentiometer	1
EA824	Contactora; 5.5kW 12A	1
EA848	Fuse; F0.5A H250V UL-OK	1
EA942	Fan; Guard mount; non-UL	1
WA308	Pressure gauge w/ clamp	1
60-811/C	Lamp; Round; LED; 22mm	1
63-319/B	Inverter; 1ph - 3ph	1
70-152	Valve; brass; gate	1
61-100/B	Push Button; Body - 1 x N/O contact	1
61-101/B	Push Button; Body - 1 x N/C contact	1
61-102/B	Push Button; Head; 22mm - latching; red	1
61-329	Switch-Rotary; Head 22mm - 2 Position; stay put	1
73-344	Valve; Poly; quarter turn	1



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LE12 8LD, United Kingdom
+44 (0) 1530 839 998
Service@thermalexchange.co.uk
Support@app-therm.com

Operating Manual; NS Water Circuit

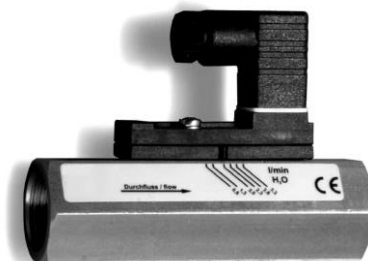
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NS WATER CIRCUIT; VARIABLE POSITION FLOWSWITCH 2-7L/min 61-348

Where ATC's EA092 standard fixed position flowswitch is not appropriate, the PN 61-348 may be applicable. This sheet highlights how it works, how to adjust and limits on its use. Typical application is similar to EA092 however; a) for low viscosity liquids, b) small switch hysteresis, c) small dimensions. Its advantages lie in the complete stainless steel design, universal mounting position and pressure of up to 350bar and temperatures up to +100°C. These are ideal for monitoring the flow of low viscosity liquids, i.e., in cooling circuits and laser systems, for pump monitoring, compressors and many other applications.



MODE OF OPERATION

- 1 This device operates according to the principle of the variable area flow meter. A float is moved by the flow of the medium and its integrated magnets generate a magnetic field. The position of the float is determined by the switching contact. The float is returned to its initial position by a spring, so that the device can also be operated in other installation positions (i.e. horizontal).
- 2 The devices are calibrated for installation with flow from bottom to top and have their greatest accuracy with vertical installation. Since the weight of the float influences the measurement result, deviations occur in other installation positions.

ADJUSTMENT OF THE SWITCHING POINT

- 3 Loosen the locking screw of the switching contact.
- 4 Move the switching contact until the arrow on the switching contact coincides with the desired switching point. The switching point corresponds to the falling flow rate value where the circuit opens.
- 5 Retighten the locking screw of the switch contact.

ELECTRICAL PROPERTIES

- 6 This product is rated for maximum of 230Vac and 3A current, although 60VA must not be exceeded.

MAINTENANCE & CARE

- 7 Due to the small number of moving parts, this device requires very little maintenance. However, regular functional checks and maintenance not only increase the service life, but also that of the entire system
- 8 The maintenance intervals depend on a) contamination of the medium, b) environment conditions (i.e. vibrations). At least the following points must be checked during maintenance;
 - a) Function of the switching contact
 - b) Tightness of the device
 - c) Mobility of the float
- 9 The float motion and the switching contact function can be checked by changing the flow rate and monitoring the switching state of the switching contact. In most cases, rinsing with a clean medium is sufficient for cleaning. In stubborn cases (i.e. limescale deposits) it can be cleaned with commercially available cleaners, provided these do not attack the materials of the device (full stainless 1.4571)

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID
Conforming to Directive 1907/2006/EC

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1.	Product Name	Hexid A4
1.2.	Manufacturer	Applied Thermal Control Limited 39 Hayhill Industrial Estate, Barrow upon Soar, Leicestershire, LE12 8LD. United Kingdom. www.app-therm.com
1.3.	Telephone Number	+44(0)1530 839998
1.4.	Email	sales@app-therm.com
1.5.	Emergency Telephone Number	+44(0)1530 839998
1.6.	Intended/Recommended Use	Heat Transfer Fluid

SECTION 2: HAZARDS IDENTIFICATION

- 2.1. Classification of the substance or mixture
The product is not classified as dangerous according to Regulation (EC) No. 1272/2008.
This mixture is not classified as dangerous according to Directive 1999/45/EC.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

- 3.1. Chemical Nature Water (CAS 7732-18-5), not classified.
Propylene glycol (CAS 57-55-6) (REACH 01-2119456809-23)
(EINECS 200-338-0) not classified.
Fluorescein (trace) and biocide (trace) not classified.
- 3.2. Food Grade

SECTION 4: FIRST AID MEASURES

- 4.1. General advise No special precautions required. Treat symptomatically.
- 4.1. Eye Contact Rinse thoroughly with plenty of water, also under the eyelids. Remove contact lenses after a few minutes and continue rinsing. If symptoms persist, call a physician.
- 4.2. Skin Contact Wash off immediately with plenty of water. If skin irritation persists, call a physician.
- 4.3. Inhalation Remove to fresh air. If symptoms persist, call a physician.
- 4.4. Ingestion Rinse mouth with water. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

SECTION 5: FIREFIGHTING MEASURES

- 5.1. Extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Water spray, foam, dry powder or CO2. Alcohol-resistant foam
- 5.2. Unsuitable extinguishing Media
High volume water jet. Do not use a solid water stream as it may scatter and spread fire.
- 5.3. Specific hazards during firefighting
In fire conditions, toxic decomposition products may be formed (see also section 10). In combustion, emits fumes, smoke, carbon dioxide (CO2) and carbon monoxide (CO). Heating will cause a pressure rise - with severe risk of bursting and explosion, Violent steam generation or eruption may occur upon application of direct water to hot liquids.
- 5.4. Advice for firefighters
In the event of fire, wear self-contained breathing apparatus. Wear personal protective equipment. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. Keep containers cool by spraying with water if exposed to fire. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Burning fluids may be extinguished by dilution with water

SAFETY DATA SHEET

HEXID A4 HEAT TRANSFER FLUID

Conforming to Directive 1907/2006/EC

SECTION 6: ACCIDENTAL RELEASE MEASURES

- 6.1. Personal precautions
Use personal protective equipment. Avoid contact with skin and eyes. Keep unnecessary and unprotected personnel from entering the area.
- 6.2. Precaution to protect the environment
Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
- 6.3. Clean-up procedures
Contain the spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). Keep in suitable, closed containers for disposal. Dike the area of spill to prevent spreading and pump liquid to salvage tank. Treat recovered material as described in section 13 Disposal considerations.

SECTION 7: HANDLING AND STORAGE

- 7.1. Precautions for safe handling
Keep container tightly closed. Handle in accordance with good industrial hygiene and safety practice. Spills of these organic materials on hot fibrous insulations may lead to lowering of the auto-ignition temperatures possibly resulting in spontaneous combustion.
- 7.2. Conditions for safe storage
Keep only in the original container.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

- 8.1. Control parameters
Component: Propane-1,2-diol CAS-No. 57-55-6
Other Occupational Exposure Limit Values EH40 WEL, Time Weighted Average (TWA);, Total vapour and particulates.150 ppm, 474 mg/m³
EH40 WEL, Time Weighted Average (TWA);, Particulate.10 mg/m³
ELV (IE), Time Weighted Average (TWA);, Total vapour and particulates.150 ppm, 470 mg/m³
ELV (IE), Time Weighted Average (TWA);, Particulate.10 mg/m³
- 8.2. Exposure controls/Appropriate engineering controls
Local exhaust. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
- Personal protective equipment
Respiratory protection Suitable respiratory protective device Combination filter: A-P2
Filter Type Combined particulates and organic vapour type
Hand protection Category short time exposure Break through time > 10 min
Protective index Class 1 When prolonged exposure is expected: Break through time > 120 min
Protective index Class 4 Observe the information of the glove manufacturers on permeability.
Protective gloves should be chosen according to Workplace Safety Assessment.
Gloves recommended according to EN 374 (protection against chemicals).
- Material Chemical resistant gloves made of butyl rubber or nitrile rubber category III according to EN 374.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

- | | | |
|------|-----------------------------|--------------------------------|
| 9.1 | Appearance at 20°C | Fluorescent green clear liquid |
| 9.2 | Odour | Almost odourless |
| 9.3 | Flash point | Boils without flashing |
| 9.4 | Ignition temperature | Not Available |
| 9.5 | Flammability Limit | Not Available |
| 9.6 | Oxidizing Properties | Not Available |
| 9.7 | Auto flammability | 450°C |
| 9.8 | Density at 25°C | ~1.036g/cm ³ |
| 9.9 | pH (as is) | 7 |
| 9.10 | Boiling point | 102°C |
| 9.7 | Auto flammability | 450°C |
| 9.8 | Solubility in water | Miscible |
| 9.9 | Freezing point | -21°C |
| 9.10 | Specific Heat Capacity | 3.78kJ/kg °K |
| 9.11 | Viscosity, Kinetic, at 25°C | 3.51mPa.s |

SAFETY DATA SHEET
HEXID A4 HEAT TRANSFER FLUID
Conforming to Directive 1907/2006/EC

SECTION 10: STABILITY AND REACTIVITY

- 10.1. Reactivity
Stable under recommended storage conditions. No dangerous reaction known under conditions of normal use.
- 10.2. Chemical stability
No decomposition if stored and applied as directed. Stable under recommended storage conditions.
Hygroscopic.
- 10.3. Hazardous reactions
Hazardous polymerisation does not occur.
- 10.4. Conditions to avoid
Generation of gas from decomposition causes pressure in closed systems. Keep away from direct sunlight. Avoid high temperatures. Avoid temperatures exceeding the decomposition temperature. Avoid UV light.
- 10.5. Materials to avoid
Strong acids, Strong bases, Strong oxidizing agents.
- 10.6. Hazardous decomposition products
Aldehydes, Alcohols, Ether, Organic acids.

SECTION 11: TOXICOLOGICAL INFORMATION

- 11.1. Toxicity Oral
LD50 : > 20000 mg/kg (rat) This product can present a small hazard if large quantities are swallowed.
- 11.2. Inhalation
LC50 : 6.15 mg/l (rat; 4 h; vapour) At ambient temperature the exposure to vapours is minimal due to a low volatility rate. Inhalation may cause irritation to the nose, throat, upper respiratory tract and lungs. No deaths occurred
- 11.3. Dermal
LD50 : > 20000 mg/kg (rabbit) Prolonged skin contact is unlikely to result in absorption of harmful amounts. Skin irritation by prolonged exposure is unlikely. Repeated contact may cause flaking and softening of skin.
- 11.4. Eyes
Slight irritation is possible. Direct contact with eyes may cause temporary irritation. Corneal injury is unlikely.
- 11.5. Sensitisation
Patch test on human volunteers did not demonstrate sensitisation properties.
- 11.6. CMR Carcinogenicity
Animal testing did not show any carcinogenic effects. Information given is based on data obtained from similar substances.
- 11.7. Mutagenicity
No data available.
- 11.8. Reproductive toxicity
No data available.
- 11.9. Specific Target Organ Toxicity
Single exposure no data available. Repeated exposure no data available.
- 11.10. Other toxic properties
Repeated dose toxicity. In rare cases, repeated excessive exposure to propylene glycol may cause central nervous system effects. Aspiration hazard Due to its physical properties, the substance does probably not pose any aspiration hazard.
- 11.11. Other relevant toxicity information
Handle in accordance with good industrial hygiene and safety practice.
- 11.12. Experience with human exposure
Health injuries are not known or expected under normal use.

SAFETY DATA SHEET

HEXID A4 HEAT TRANSFER FLUID

Conforming to Directive 1907/2006/EC

SECTION 12: ECOLOGICAL INFORMATION

- 12.1. Acute toxicity
 Fish - LC50 : 40613 mg/l (Oncorhynchus mykiss; 96 h) (static test)
 Daphnia and other aquatic invertebrates - LC50 : 18340 mg/l (Ceriodaphnia Dubia (water flea); 48 h) (static test)
 Algae - ErC50 : 19000 mg/l (Pseudokirchneriella subcapitata (green algae); 96 h) (Growth inhibition)
 Bacteria - NOEC : > 20000 mg/l (Pseudomonas putida; 18 h) Chronic toxicity
 Aquatic invertebrates - NOEC : 13020 mg/l (Ceriodaphnia Dubia (water flea); 7 d) (semi-static test)
- 12.2. Persistence and degradability
 Biodegradability 81 % (anaerobic; Exposure Time: 28 d)(OECD 301 F)
 Readily biodegradable 96 % (anaerobic; Exposure Time: 64 d)(OECD 306.)
- 12.3. Bioaccumulative potential
 BCF - 0.09 estimated Low bioaccumulative potential
- 12.4. Mobility
 Estimated Koc < 1, indicating very high soil mobility.
- 12.5. PBT and vPvB assessment
 Not a PBT or vPvB substance or mixture
- 12.6. Other adverse effects
 Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. This substance is not in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

SECTION 13: DISPOSAL CONSIDERATION

- 13.1. Waste treatment methods
 Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.
- 13.2. Contaminated packaging
 Empty contaminated packaging thoroughly. They can be recycled after thorough and proper cleaning. Packaging that cannot be cleaned are to be disposed of in the same manner as the product.
- 13.3. European Waste Catalogue Number
 No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: TRANSPORT INFORMATION

- Not dangerous goods for ADR, RID, IMDG and IATA.
- 14.1. EEC Regulations
 UNNO None Class None Packing Group None
 Road & Rail Transport (ADR & RID) NoneIMDG Not Applicable ICAO None
- 14.2. Export commodity code
 39074000
 Classification - Polycarbonates.
- 14.3. Weight and dimensions
 5Kg per 5 litre container. 19x14x29cm.
- 14.4. Manufactured in the United Kingdom

SECTION 15: REGULATORY INFORMATION

- | | | |
|------|------------------------|---------------------------------------|
| 15.1 | Classification | Not classified as hazardous to users. |
| 15.2 | CAS No. | 57556 |
| 15.3 | Risk or Safety phrases | None |
| 15.4 | Labelling | None |

SECTION 16: OTHER INFORMATION

Key literature references and sources for data taken from supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet. Other information - The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.