



## **K SERIES CHILLERS**

**Kt1**

### **STANDARD MODELS**

### **INSTRUCTION MANUAL**

Issue 2.0



Applied Thermal Control Ltd.  
Garden Court, Gee Road  
Whitwick, Leicestershire  
LE67 4NB

Tel: +44 (0) 1530 839998

Fax: +44 (0) 1530 813786

---

Contents

1.0	Introduction	3
	Safety notices	4
1.1	Warranty registration	5
1.2	Unpacking	5
1.3	Site requirements	6
2.0	Installation	6
	Voltage selection	7
3.0	Operation	9
4.0	Maintenance and service requirements	11
4.1	Troubleshooting	12
5.0	Warranty terms and conditions	13
5.1	Return of goods procedure	14
6.0	Dimensions and performance	15
7.0	EC Declaration of Conformity	16
8.0	Returned Material documentation	17

---

## ***1.0 Introduction***

---

By selecting a K series chiller you have invested in many years experience in the design and manufacture of precision temperature control instrumentation.

ATC has built your K series chiller without compromise to meet the objectives of performance and reliability. Please read this manual carefully to ensure you understand the operation of the machine and how to use the unit safely and efficiently.

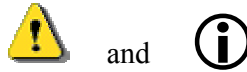
If you have any questions regarding installation or repair of this unit please contact ATC direct.

Applied Thermal Control Ltd.  
Garden Court  
Gee Road  
Whitwick,  
LE67 4NB


Tel: +44 (0) 1530 839998  
Fax: +44 (0) 1530 813786  
e-mail: [sales@app-therm.com](mailto:sales@app-therm.com)


## Safety


For your safety we draw your attention to the following **Warning** and **Caution** statements throughout the manual, identified by the symbols...





respectively. The safe operation of a KT series chiller remains the responsibility of the operator at all times.


 **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.*


 **Warning:** *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.*


 **Warning:** No user serviceable parts.


 **Warning:** Very hot surfaces, in excess of 100°C


 **Warning:** Very cold surfaces and gases, lower than -40°C. Severe frostbite hazard.


 **Warning:** Opening the refrigeration system may expose the operative to toxic and corrosive compounds (HF). Take protective measures including suitable eye protection.

 **Warning:** Gases may exceed 300 psi (20 bar) during operation.

 **Warning:** All refrigerants do not support combustion and are asphyxiating gases.

 **Warning:** After switching off, the fan blades continue to rotate. Do not attempt service whilst the blades are rotating.

 **Warning:** All chillers contain water and electricity in close proximity. Always ensure the unit is isolated before service. **The Kt1 has an on-off switch and two protective fuses. Never bypass these components.**

 **Caution:** Filling/topping up of the tank should only be undertaken with the unit switched off, to prevent backflooding of the fluid.

- i** **Caution:** The high integrity refrigeration system contains no user-serviceable parts. Repair and service requires specialised knowledge and tools. Any unauthorised tampering with the refrigeration system automatically invalidates warranty.

---

### ***1.1 Warranty registration***

- i** **Caution:** The warranty registration card must be completed and returned in order to activate cover. Failure to do so will limit warranty to three months from date of despatch from ATC.

---

### ***1.2 Unpacking***

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 before making a claim on 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.

Remove the unit from its original packaging and ensure that there is no packaging left around the cooling ducts.

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

### 1.3 Site requirements

- **Hard, level surface.** Ideally smooth to allow freewheeling of castors, which are designed for indoor use.
- **Clean, dust free environment.** Air-cooled chillers move large volumes of air, and large amounts of air-borne contamination will result in fouling of the condenser, reducing the capacity of the unit and in extreme cases causing a system shut-down.
- **Non-condensing ambient,** from +4°C to +40°C. Cooling capacity is lost above 30°C.
- **Electrical supply** single phase 208VAC  $\pm 10\%$  (60Hz) 5A, 230VAC  $\pm 10\%$  (50Hz) 6A, 220VAC  $\pm 10\%$  (60Hz) 4.7A.
- Electrical terminations.
  - Live: Brown
  - Neutral: Blue
  - Earth: Green/yellow
- **Clearance** front and rear of the unit at least 250mm.
- **Plumbing** to be clean and compatible with the fluid to be used. It is advisable that the minimum of right angle bends and compression fittings are used. See also section 2.0

### 2.0 Installation

Having ensured that your installation meets all of the site requirements identified in section 1.3, it is best practice that the fluid lines between your application and the chiller have the following characteristics:

- *Short*
- *Large diameter* (ideally at least 12mm internal diameter)
- *Free from right angle bends,* to suppress water hammer

- **Opaque**, ideally black, to inhibit growth of algae. Alternatively, use solid copper or welded ABS. **Caution:** Never use transparent tubing.
- **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.

All connections should be made using either the ATC ‘easy clamp’ or a jubilee type clip. Where threaded or compression type fluid joints are to be made, always use a suitable jointing compound such as PTFE tape.

#### ***Voltage selection***

- **Caution:** If your Kt1 series chiller is rated for multi voltage and dual frequency operation, it is essential that the voltage selector switch on the chiller is set to match the voltage and frequency available at your site.

The voltage selector switch can be found on the front of the chiller. Access is gained by removing the two knobs on the front panel to expose the selector switch. Confirm the required voltage setting, then always replace the cover for normal operation.

Having ensured that the system is correctly connected, with the inlets and outlets having the correct orientation relative to your application, all joints tight and leak free, and with the unit isolated from the electrical supply, prepare to fill the unit with Hexid fluid.

Hexid fluids are the preferred coolant choice as they provide excellent corrosion protection, freeze protection, algae inhibition and good heat transfer properties.

- **Caution:** Always use ATC recommended fluids in your K series chiller. Never use other anti-freeze mixtures, as they may corrode your application and will damage the K series pump seals.

*Filling procedure*

1. Check all valves are open, including solenoid valves located in your application.
2. Remove the screw cap from the tank
3. Fill with Hexid to 30mm below the rim of the tank neck.
4. Switch the unit on.
5. Wait while the fluid level drops in the tank.
6. Switch the unit off.
7. Repeat steps 3 to 5 until all of the air has been purged from the system.
8. Top up to 30mm below the rim of the tank neck to ensure the level switch is made.
9. Check the system carefully for leaks, including the inside of your application. The system is now ready to be run.



**Warning:** Always isolate the chiller from the electrical supply when filling the tank.

---



### 3.0 Operation

Kt1 chiller has been configured to provide temperature stability to  $\pm 0.1^{\circ}\text{C}$ .

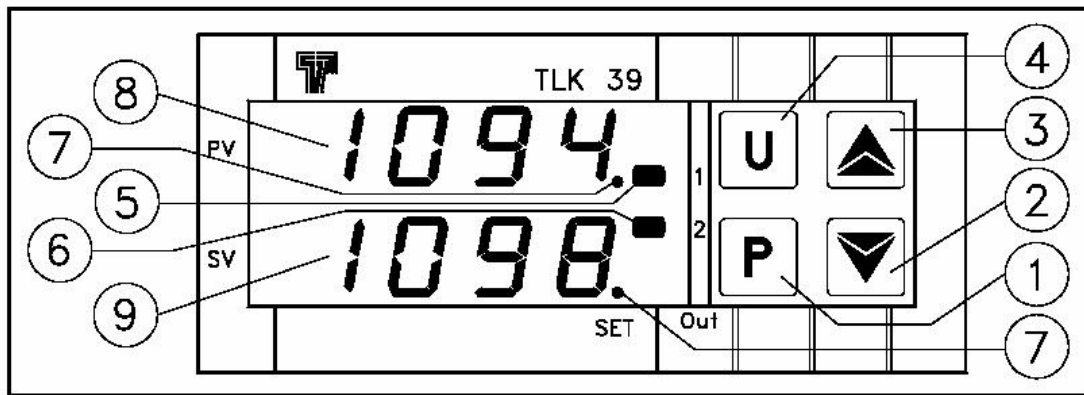
The chiller includes a dual digital display, high/low temperature and low fluid level alarms.

High temperature alarm:  $10^{\circ}\text{C}$  above set point

Low temperature alarm:  $10^{\circ}\text{C}$  below set point

Low fluid alarm / No flow alarm: Neon indication (off)

K series chillers are fitted with a high performance 3 term PID controller, which is capable of controlling the set temperature to within  $0.1^{\circ}\text{C}$  of the set point.



*Adjusting the set point*

### 3.1 FRONT PANEL DESCRIPTION

**1 - Key P** This is used to access the programming parameters and to confirm selection.

**2 - Key DOWN** This is used to decrease the values to be set and to select the parameters. If the key is held down, the user returns to the previous programming level until he exits the programming mode. Outside the programming mode it permits visualisation of the current measured by the TAHB input.

**3 - Key UP** This is used to increase the values to be set and to select the parameters. If the key is held down, the user returns to the previous programming level until he exits the programming mode. Outside the programming mode it permits visualisation of the output control power.

**4 - Key U** This is a key with a function programmable by par. "USRbn". It can be set to : Activate Auto-tuning and Self-tuning functions, swap the instrument to manual control, silence the alarm, change the active Set Point, deactivate control.

**5 - Led OUT1** indicates the state of output OUT1

**6 - Led OUT2** indicates the state of output OUT2

**7 - Led SET** when flashing, it indicates access to the programming mode.

**8 - Led. AT/ST** indicates that the Self-tuning function is activated (light on) or that Auto-tuning (flashing) is in progress.

**9 - Display PV** It normally indicates the process value

**10 - Display SV** It normally indicates the active Set value, it however it can be programmed, on par. "diSP", to visualize other values.

### 3.2 - FAST PROGRAMMING OF THE SET POINT

This procedure permits rapid programming of the active Set Point and possibly the alarm thresholds.

Push key 'p', then release it and the display will visualise 'SP n' (where n is the number of the Set Point active at that moment) and the programmed value.

To modify the value, press 'UP' key to increase it or the 'DOWN' key to decrease it.

These keys change the value one digit at a time but if they are pressed for more than one second, the value increases or decreases rapidly and, after two seconds in the same condition, the changing speed increases in order to allow the desired value to be reached rapidly.

Once the desired value has been reached, by pushing key P it is possible to exit by the fast programming mode or it is possible to visualise the alarm thresholds.

To exit the fast Set programming it is necessary to push key P, after the visualisation of the last Set Point, or alternatively if no key is pressed for approx. 15 seconds, the display will return to normal functioning automatically.

### TLK 39 Controller error messages

Error	Reason	Action
----	Probe interrupted	Verify the correct connection between probe and instrument and then verify the correct functioning of the probe
uuuu	The measured variable is under the probe's limits (under-range)	
oooo	The measured variable is over the probe's limits (over-range)	
ErAt	Auto-tuning not possible because the process value is higher (with "Func" =HEAT) than [SP-  SP/2] or lower (with "Func" =Cool) than [SP+  SP/2].	Swap the instrument to OFF control (OFF) and then to automatic control (rEG) in order to make the error message disappear. Once the error has been found, try to repeat the auto-tuning.
noAt	Auto-tuning not finished within 12 hours	Check the functioning of probe and actuator and try to repeat the auto-tuning.
LbA	Loop control interrupted (Loop break alarm)	Check the working of probe and actuator and swap the instrument to (rEG) control
ErEP	Possible anomaly of the EEPROM memory	Push key "P"

### Fluid flow and pressure

Kt1 series chillers contain a high pressure volumetric pump capable of 150 psi. All units are supplied with a pre-set maximum of 50 psi. Pressures above this will cause the internal safety bypass valve to open, protecting your application from potentially dangerous pressures.

It is possible for customers to change the operating pressure of the chiller, as follows:

1. Remove the cover from the chiller by removing screws on each side, and two at the rear.
2. With the chiller running, release the locking nut on the pressure relief valve; a grey valve located at the right side of the chiller, as viewed from the front.
3. Turn the valve knob anticlockwise to reduce the flow/pressure, clockwise to increase the flow/pressure.
4. The pressure can be observed on the gauge on the front panel.



#### Caution:

Changing the flow/pressure with the pressure relief valve will also change the preset pressure safety setpoint. This will move to a lower pressure than the factory setting when decreasing the flow/pressure, and to a higher pressure when increasing the flow/pressure.



**Caution:**

When the flow/pressure is manually increased with the pressure relief valve, the safety provided by the valve will be effected at higher pressures than standard. For this reason, please ensure that it is safe for your application to operate at pressures in excess of 50 psi, even if the pressure setting on the chiller reads lower than this. A blockage in your application could result in the pressure exceeding the raised safety pressure, and while the Kt1 series chiller is tested to 120 psi, your application may not be safe at this pressure.

We recommend that *pressures exceeding 100psi must never be used.*

#### 4.0 Maintenance and service requirements



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

Interval	Actions
Weekly	Check fluid level
Monthly	Check the condenser (air intake) is free from obstructions or accumulations of debris. Cleaning may be achieved with a domestic vacuum cleaner with brush attachment.*
Annually	Change the fluid. Check for fluid leaks throughout the whole system. Check the condenser for fouling.



\* **Caution:** Never blow the condenser out with compressed air.

## 4.1 Troubleshooting

Symptom	Causes
Compressor not running, but fan running	<p>Is the controller displaying an alarm?</p> <p>If there is no obvious cause, check...</p> <ul style="list-style-type: none"> <li>• The condenser is clean</li> <li>• Ambient not too high</li> <li>• No temporary power failure</li> </ul> <p>The likely cause is the compressor's internal protection has been activated and should restart in five minutes.</p>
Noisy operation / High fluid pressure And/or low flow	<p>Check:</p> <ul style="list-style-type: none"> <li>• Pump filter, if fitted</li> <li>• No restrictions in the pipe work</li> <li>• Operating coolant pressure set too low</li> </ul> <p>Clean fluid path with weak detergent solution, flush and replace fluid with correct Hexid fluid.</p>
Fluid lines becoming fouled brown or green	<p>Algae contamination.</p> <p>Clean system with weak detergent solution, replace fluid lines with opaque (ideally black) lines to inhibit algae growth. Use Hexid fluid.</p>
Fluid seen leaking from system	<p>Under high humidity conditions, fluid may appear to be leaking from the system. This is usually just condensation, but it is always prudent to check for fluid leaks.</p>
Poor fluid flow	<p>Check:</p> <ul style="list-style-type: none"> <li>• Blocked filter – this is located under the hex nut on the pump body, when fitted.</li> </ul> <p>Flush with clean water, replace fluid with Hexid.</p>
Poor cooling	<p>Almost always caused by blocked condenser.</p> <p>Clean with soft brush or vacuum cleaner with brush attachment</p> <p>Continued failure may indicate high ambient or excessive load applied to the unit. Check these first</p>

---

## ***5.0 Warranty terms and conditions***

---

- i. ATC provides a comprehensive return to base **2 year parts, 1 year labour warranty** from delivery as standard on all new K series chillers, provided that they have been installed and operated in accordance with this manual.
- ii. At the discretion of ATC, goods may be serviced on site or a service loan unit may be supplied. Warranty cover excludes the cost of travel by engineers and loan unit rental charges.
- iii. During the first year of the warranty period, freight costs to and from ATC are for ATC's account.
- iv. During the second year of the warranty, freight costs to and from ATC are for the customer's account.
- v. A purchase order is required on the Returned Material Declaration Form, which will only be charged to if there is any non-warranty work involved, or if the original packaging is not available and either an empty crate is required and/or new packaging for the repaired unit is required.

### *Registration*

Please complete the warranty registration and return to ATC for initiation of warranty cover.

---

## ***5.1 Return of goods procedure***

---

If the unit is damaged during transit, or subsequently develop a fault requiring its return to ATC, the following procedure must be followed.

1. Call the ATC service point
  - You will be issued with a Return Materials Authorisation number ('Q number') and a Return Machine Declaration (RMD) form by fax. A copy of the RMD form is in section 8.0 of this manual.
2. Return the completed RMD form to ATC by fax, together with your purchase order number.
3. Pack the returning item securely, enclosing a copy of the completed RMD form, and ensure that the packaging is clearly labelled with the Q number. Neither ATC nor your shipper will be liable for any damage incurred in transit.
4. Upon receipt of the completed RMD form, an engineer will be allocated or a service loan unit\* will be despatched if available.

\* Please note that ATC will raise an invoice as part of the service loan procedure, and you will receive a credit against this upon the safe return of the loan unit.

*Address for return units:*

Applied Thermal Control Ltd.  
Goods Inward  
Garden Court  
Gee Road  
Whitwick  
LE67 4NB

Tel: +44 (0) 1530 839998

---

## 6.0 Dimensions and performance

	<b>Kt1</b>
Cooling Capacity At 20°C set point and 20°C ambient	1000 Watts
Dimensions H x W x D	490 x 370 x 560 mm
Weight	60 Kg
Temperature range	4°C - 35°C
Pumps available	P5, P10
LED temperature display	1°C resolution standard. 0.1°C option.
Temperature control	Autotune P.I.D.
Pressure gauge	Standard
Fluid connections	3/8" and 1/2" barb supplied Custom connections available
Temperature stability	0.1°C
Power requirements	6 Amps, 230V 50Hz
Warranty	2 years parts, 1 year labour





***EC Declaration of Conformity***

Applied Thermal Control Ltd.

Garden Court  
Gee Road  
Whitwick  
Leicestershire, LE67 4NB  
UK

**K series chiller range (all standard configurations)**

Serial Number: .....

The equipment meets the requirements of EEC Directive 73/23/EEC  
as amended by 93/68/EEC

Meets the directive on Electromagnetic compatibility  
89-336-EEC Specifications EN50081-1 (1992) (Emissions)  
and EN50082-1 (1992) Immunity

Signed

Norman White  
Director

Geoff Cox  
General Manager

In case of repair requirement, please complete both parts of the form, and fax to ATC

**PART 1: RETURNED MATERIAL DECLARATION FORM**

Returns Number: **Q0** - \_\_\_\_

Your Name and Address:

.....  
.....  
.....  
.....

Your purchase order number:

.....

Machine part number:

Machine serial number:

.....  
.....

Collection for return to ATC – please tick one:

ATC to arrange shipment

Customer to arrange shipment

Reason for return:

.....

If faulty, list symptoms:

.....

Address for delivery of machine  
(if different from 1, above):

.....  
.....  
.....  
.....

Please note that a minimum non-refundable inspection fee of £60 will be charged on all equipment returned for repair with the exception of equipment still under warranty.

**PART 2: HEALTH & SAFETY DECLARATION**

Machine part number:

.....

Machine serial number:

.....

I, ....., of ....., confirm that the above unit is free from chemical, biological or nuclear hazard and that the unit presents no physical hazard, including electrical.

Signed and dated:

.....

