

K-STAR

K-STAR ELECTRIC POOL/SPA HEATERS INSTALLATION AND OPERATION MANUAL

APPROVED FOR RESIDENTIAL USE IN CANADA

MECHANICAL MODELS:

K-5, K-10, K-15
(Regular Elements)

K-5-TT, K-10-TT, K-15TT
(Titanium Elements)

DIGITAL MODELS:

K-5-D-TT, K-10-D-TT, K-15-D-TT
(Titanium Elements)



**ALL MODELS
1 PHASE, 240 VOLT**



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READ AND FOLLOW ALL INSTRUCTIONS PRIOR TO INSTALLATION

IMPORTANT

THE K-STAR ELECTRIC HEATER IS DESIGNED FOR RESIDENTIAL ABOVE GROUND ALUMINUM/STEEL WALL POOLS AND RESIDENTIAL SPAS ONLY.

THE K-STAR ELECTRIC HEATER IS NOT TO BE INSTALLED ON SOFT SIDED OR INFLATABLE POOLS OR SPAS!

WARRANTY SHALL BE CONSIDERED VOID IF THE K-STAR ELECTRIC HEATER IS:

- **INSTALLED ON SOFT SIDED POOLS / SPAS**
- **INSTALLED ON INFLATABLE POOLS / SPAS**
- **IMPROPER INSTALLATION**

WARNING

Risk of Electrical Shock

Improper installation will create an electrical hazard, which could result in death or serious injury to technician, installers, pool or spa users due to electrical shock, and may cause damage to property 's

All heater models are rated to operate ONLY on Single Phase, 240 Volt / 60 Hz power.

Always turn off the power at the main breaker prior to installation or service of heater.

Always keep area around the heater free of combustible materials.

INSTRUCTIONS PRIOR TO INSTALL

Before installing this product, ensure that the home has sufficient electrical power available to handle the maximum amperage load for the applicable heater model.

This electric heater must be installed by a licensed/certified electrician and/or a qualified pool technician in accordance with the Canadian electrical code (varies by province) including all applicable codes and ordinances in compliance with ESA (Electrical Safety Authority) and OESC (Ontario Electrical Safety Code).

GENERAL HEATER INSTALLATION - ALL MODELS (Mechanical + Digital)

Heater may be installed indoors or outdoors at least 3 m (10 ft.) away from water and 6 in (16 cm) from any object.

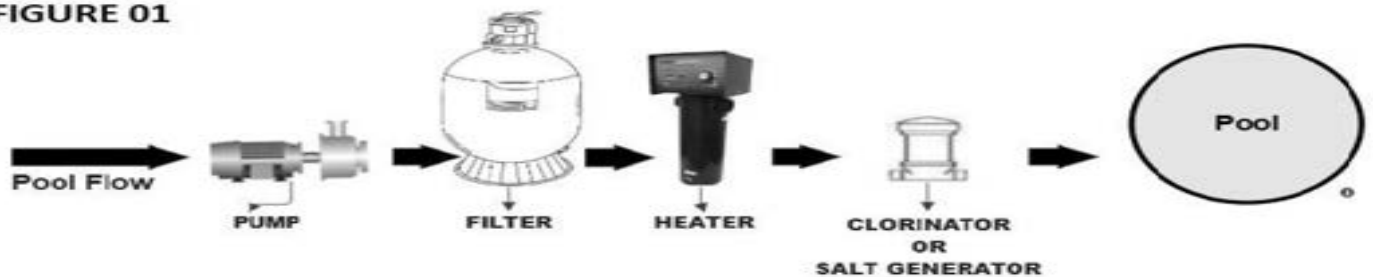
Heater needs to be installed in a vertical position and placed onto a solid flat base (do not suspend heater).

Ensure that the installation allows access for electrical and plumbing connections with the thermostat control facing front.

Heater cannot be installed in combination with any timers.

Heater must be installed after the filter and before the chlorinator and/or salt generator (**Figure 01**)

FIGURE 01



If pool/spa is equipped with a salt generator, only **TITANIUM** models are to be used. Salt generator should not operate higher than 3.0 ppm (Ideal range between 2.6 – 3.0 ppm).

PLUMBING INSTALLATION - ALL MODELS (Mechanical + Digital)

Plumbing connections need to be hand-tightened only (do not over-tighten!) to avoid risk of damage to internal welded PVC fittings and tank, as this could result in damage to the PVC fittings or the tank (not covered under manufacturer warranty policy).

Step 1 Installation of PVC parts:

Install _____ s _____ of PVC straight pipe (not supplied) on inlet and outlet side of tank as shown under **Figure 02**. The installation of the male adapters with extra straight PVC pipe shall be such that all water entering and leaving the heater flows through it to allow the build-up of the correct water pressure within the tank (refer to **Page 10 + 11 – Pressure switch** and for **Table 01** Flow Rate Chart).

Note:

DO NOT install elbow fittings directly to the male adapters on inlet and outlet side of the tank. This would result in reduced water flow through the tank and does not allow the build-up of proper water pressure inside the tank.

Step 2 Installation Instructions :

Installing a "union" to the PVC piping at the water inlet side as well as installing a "single union ball valve" to the PVC piping at the water outlet side of the heater, as shown under **Figure 02** below, is recommended.

Adding the single union ball valve on the outlet side of the heater, will help to ensure proper back-pressure for the required flow rate (refer to **Table 01** Flow Rate Chart on page 11).

allow for easy disconnection of the heater for servicing and winterization.

FIGURE 02
(Applies to all Models)



Step 3 Installation of Bypass:

It is important to use a single union ball valve in combination with the bypass.

Pumps with higher gpm (gallons per minute) ratings, will require the installation of a bypass behind the heater (see **Figure 03**) to reduce water flow to **max gpm** of heater as per **Table 01**.

FIGURE 03
(Applies to all Models)

Important: install bypass behind / around the heater not over top!



Step 4 – Optional - Installation of Leakage Current Collectors:

Leakage current collectors (not supplied with purchase) may be required with your heater installation. Consult your local Electrical Safety Authority (ESA) or the Ontario Electrical Safety Code (OESC) to determine if leakage current collectors are mandatory in your province.

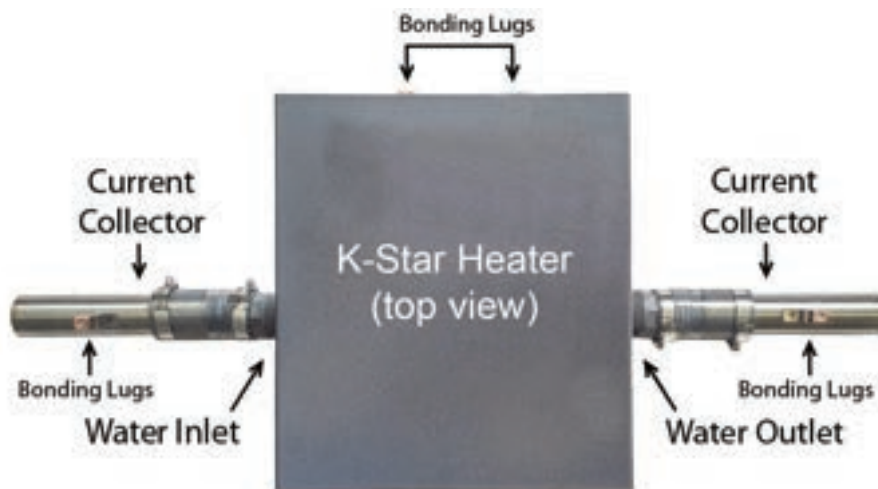
Note:

As per the Canadian Electrical Code, leakage current collectors are only required for HOT TUB/SPA applications.

Install leakage current collectors (purchased separately – Part # KSCC) as per **Figure 04** before permanently positioning heater. Install a leakage current collector at the water inlet, and another at the water outlet side of the heater. The installation of the collectors shall be such that all water entering and leaving the heater flows through the two collectors.

The Installation of leakage current collectors needs to be hand-tightened only (do not over-tighten!) to avoid risk of damage to internal welded PVC fittings and tank, as this could result in damage to the PVC fitting/s or the tank (not covered under our warranty policy).

FIGURE 04



After current collectors are installed, continue to follow plumbing instructions (Step 1 thru 3) as well as refer to **Figure 02 + Figure 03** above.

NOTE:

After plumbing connections have been completed, and prior to the electrical connection of the Current Collectors (see page 7 – Grounding, point b), start the pump to allow water to run thru the heater for at least 5-10 minutes. This process is necessary to remove all air (air pockets) throughout the lines.

ELECTRICAL INSTALLATION – ALL MODELS (Mechanical + Digital)

Electrical work must be performed by a licensed/certified electrician.

Electrical installation has to be in compliance with:

- Canadian Electrical Code (varies by province)
- ESA (Electrical Safety Authority)
- OESC (Ontario Electrical Safety Code)

As per ESA (Electrical Safety Authority) and the OESC (Ontario Electrical Safety Code) Rule 68-068 requires electrical equipment located within the confines of the pool walls or within 3 m (9.8 ft.) of the inside walls of the pool to be GFCI (Class A Type) protected unless the electrical equipment is suitably separated from the pool area by a fence, wall, or other permanent barrier.

When a heater or pool/spa pump is located more than 3 m (9.8 ft.) away, or is isolated by a suitable barrier supplying a spa/hot tub that shares common water circulation with a pool, the OESC does not require GFCI protection unless it is required by the manufacturer. Although Rule 68-070 (7) requires spas/hot tubs to be protected by a GFCI, the spa/hot tub is part of the swimming pool and, therefore, is inspected as part of the pool.

TABLE 02 Electrical specifications for all heater models (Mechanical + Digital):

All Models Mechanical + Digital	PHASE	Volts	KW	Amps	Breaker Panel (240V)	Wire Gauge (Copper Only)	Current Collector Ground Wire (Copper Only)
K-5 K-5-TT K-5-D-TT	1	240	5	21 A	30 A	10	10
K-10 K-10-TT K-10-D-TT	1	240	10	42 A	60 A	6	6
K-15 K-15-TT K-15-D-TT	1	240	15	63 A	100 A	Use supply conductor suitable for 75° C	Use supply conductor suitable for 75° C

CAUTION: Ensure that the correct breaker size and wire gauge is being used as outlined in Table 02 above. Ensure that all of the electrical wire connections are correct and are tight and secure. Ensure that the heater has been connected to ground in accordance with applicable electrical codes. Failure to comply will void manufacturer warranty.

GROUNDING:

In accordance with the Canadian Electrical Code, all electric heaters must be grounded to reduce electrical shock.

a) Breaker Panel to Heater:

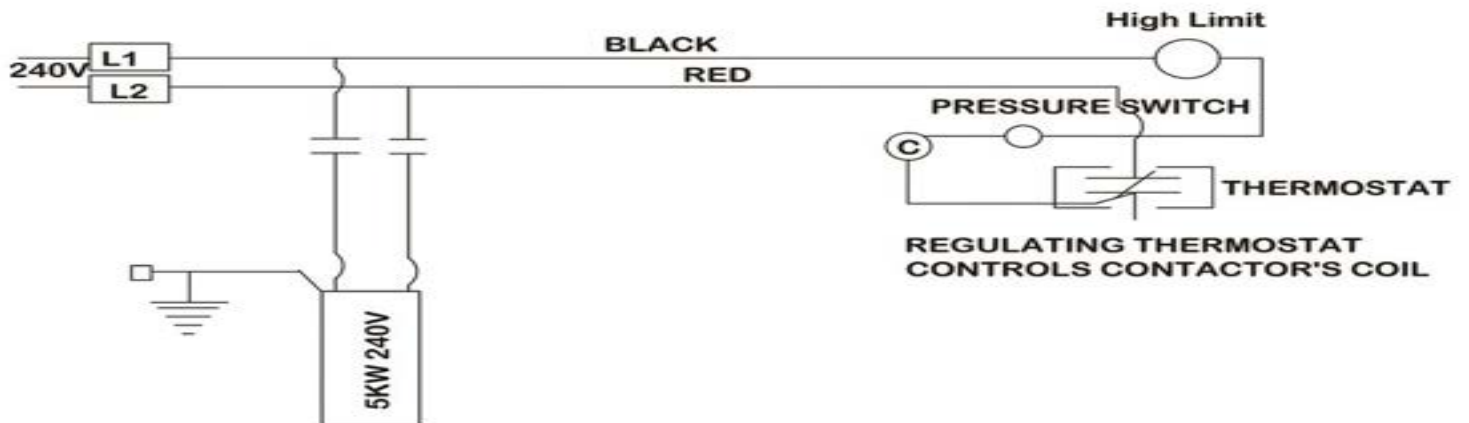
Connect the grounding wire (green wire or bare copper wire) from the breaker panel to the inside of the heater, marked

b) Leakage Current Collectors to Heater (if used):

Run two (2) individual bare copper wires from each leakage current collectors to the back of the heater marked

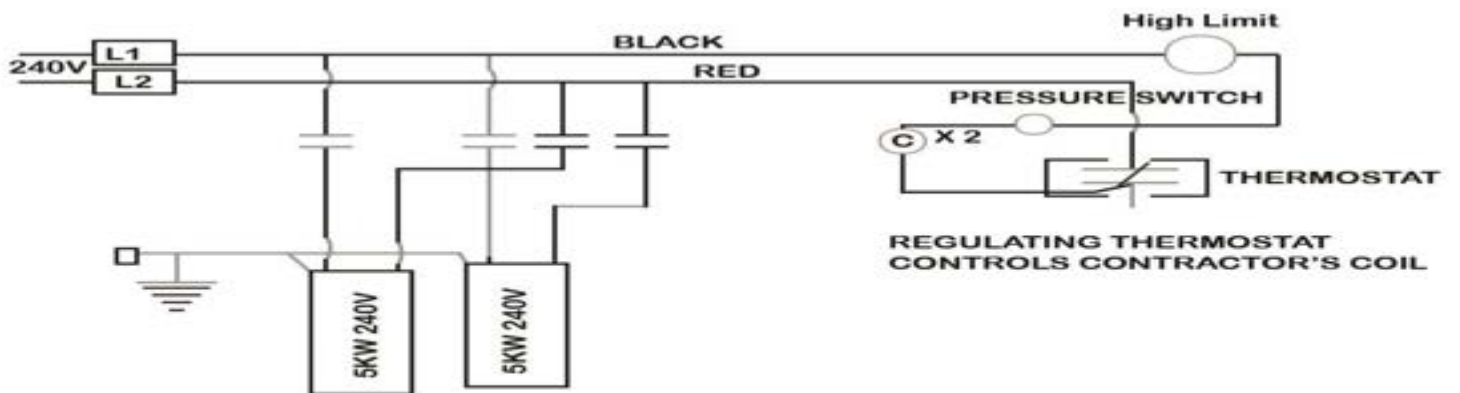
WIRING DIAGRAMS

MECHANICAL Model K5 / K-5-TT



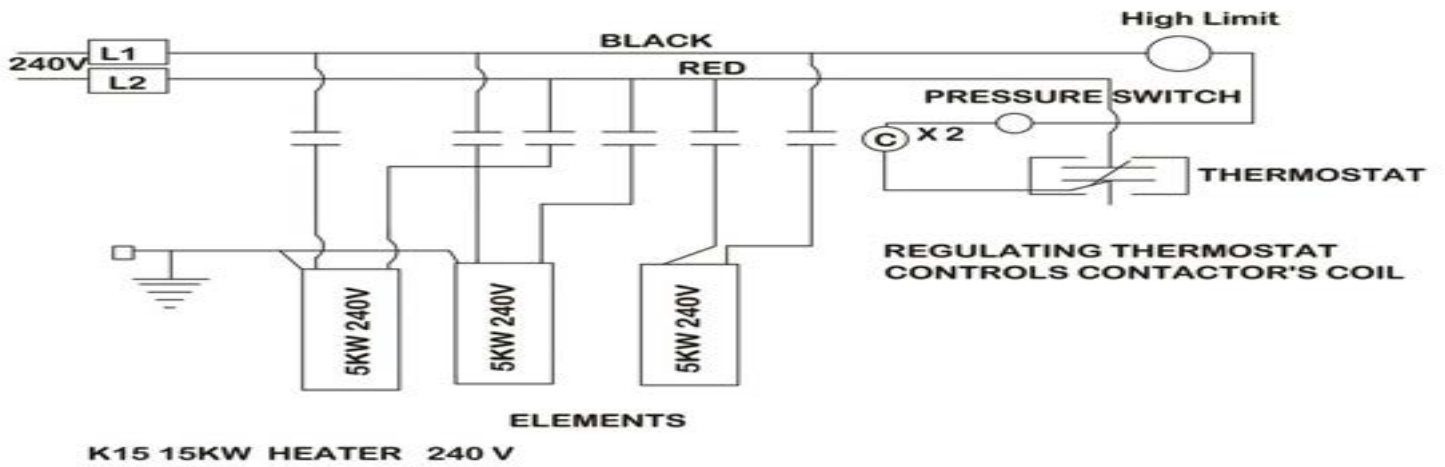
K5 5KW HEATER 240 V

MECHANICAL Model K10 / K-10-TT

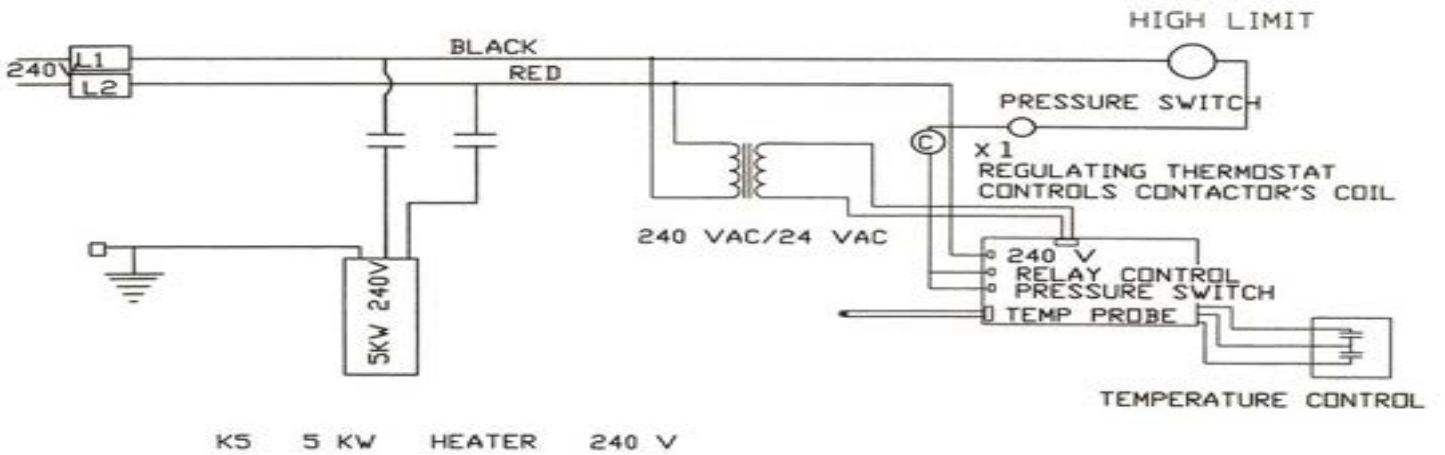


K10 10KW HEATER 240V

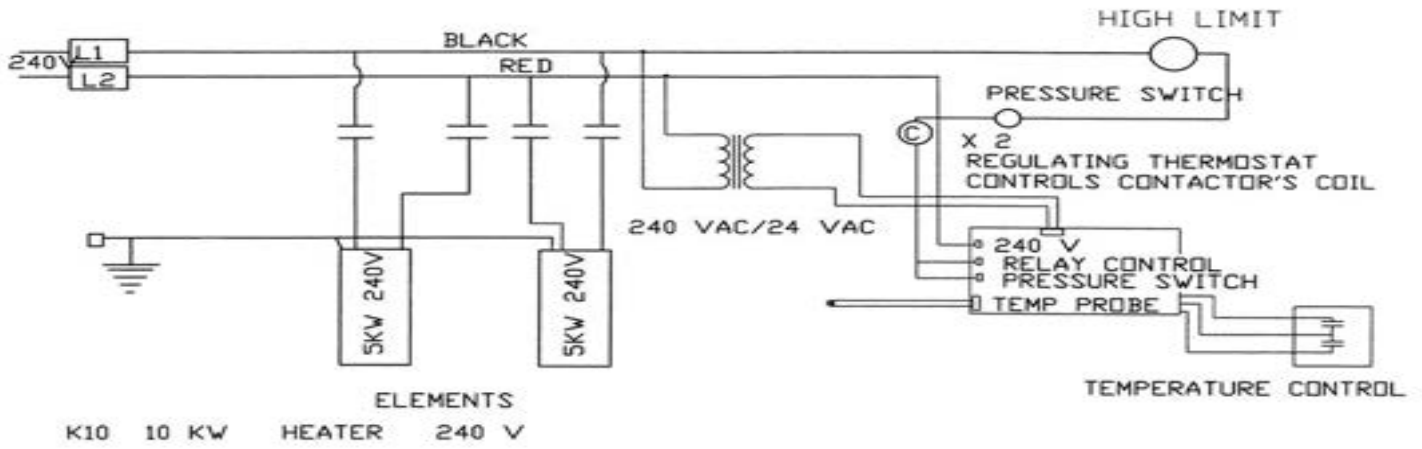
MECHANICAL Model K15 / K-15-TT



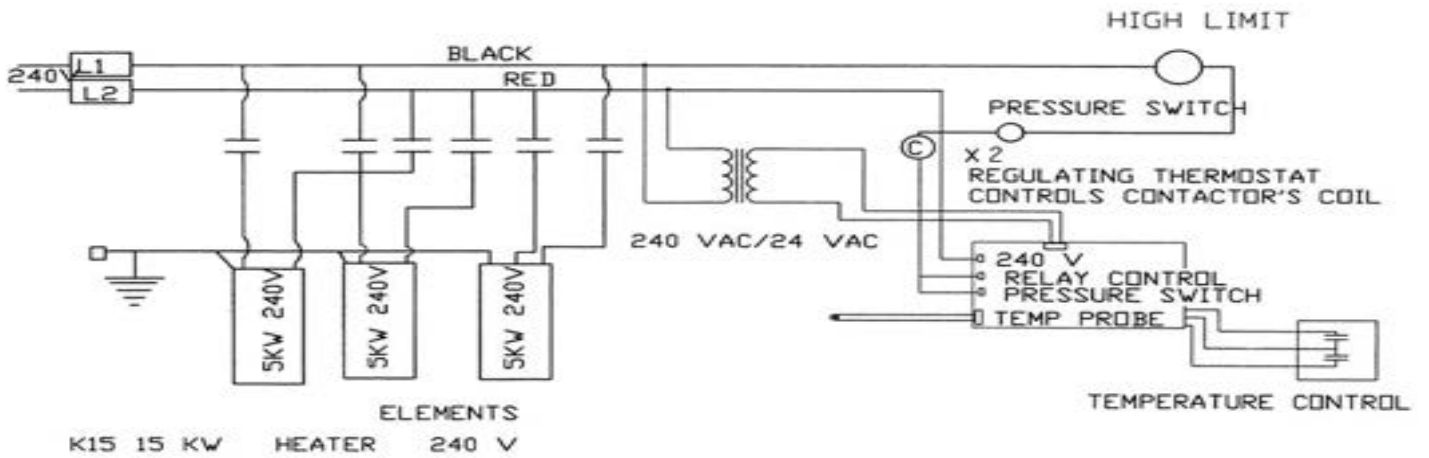
DIGITAL Model K-5-D-TT



DIGITAL Model K-10-D-TT



DIGITAL Model K-15-D-TT



OPERATING INSTRUCTIONS for all MECHANICAL MODELS

Operating water temperature at the time of start-up has to be at a minimum of 60° F (15° C)!

IMPORTANT: Instructions must be strictly followed for warranty to be valid.

Step 1 Turn on Pump:

Pool/Spa **PUMP** has to be **TURNED ON**, before starting the heater. Water **must** be circulating at all times while heater is running (allow pressure in tank to build up see Step 3).

Step 2 Mechanical Thermostat:

Turn the thermostat control knob (see **Figure 05** picture of thermostat knob Part #: KK) clockwise to maximum position, to start up the heater.
(Follow point 3 + 4 prior to adjusting the thermostat knob to the desired operating temperature)

Step 3 Activate Pressure Switch:

The Internal pressure switch will only be activated once the correct water pressure (flow/gpm) has been able to build up inside the tank (refer to **Table 01** Flow Rate Chart on page 11). This will activate the heating elements.

Important: Once the correct water flow/pressure has built up, the red indicator light will turn on (see Step 4). Otherwise the heater will not be able to activate the heating elements.

The pressure switch is pre-set by the factory and can be adjusted (only if required). By turning the control knob up or down (see **Figure 05** picture of pressure switch Part #: KSPS).

Step 4 Activate Indicator Light:

The red indicator light will only light up, once Step 3 has been followed to establish the correct water pressure within the heater tank (see **Figure 05** picture of red indicator light Part #: KIL).

Note: Connection of main electrical power to the heater does not turn on the indicator light!

Step 5 Desired Temperature Setting:

Once the heater is operating (Step1 to 4 have been followed), adjust the thermostat control to the desired water temperature.

The thermostat temperature ranges from 70°F to 104°F/20°C to 40°C.

Summary of Step 1 to 5:

Turn on Pool/Spa pump. Water has to be circulating through the heater tank at all times. Turn the thermostat control knob to the maximum position. The internal pressure switch will then be activated. Heater needs to build up correct pressure inside the tank, which will turn on the red indicator light. This will allow the elements to begin heating up. Adjust thermostat knob to desired water temperature.

TABLE 01 – Flow Rate Chart

Manufacturer recommended Flow Rates (as shown below for each heater model) is necessary to allow sufficient water flow through the tank. This is to ensure the proper operation of the heater. Lower or higher water flow can result in the heater not being able to start heating.

K-Star Heater All Models Mechanical & Digital	Max GPM Flow Rate
K-5 / K-5-TT / K-5-D-TT	8
K-10 / K-10-TT / K-10-D-TT	10
K-15 / K-15-TT / K-15-D-TT	10

It is important to always have adequate water flow moving through the heater to avoid the heating elements from running dry.

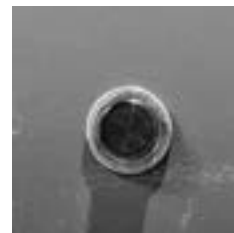
FIGURE 05



Part #: KK



Part#: KSPS



Part #: KIL



HIGH LIMIT RESET (High Limit Control):

The high limit control reset (see **Figure 06** picture of high limit control Part #: 5KWH) is designed to open the control circuit and cut-off the power in the event of an excessive rise in temperature. Temperatures above the maximum range of the thermostat may cause the high limit reset to trip.

The high limit reset can also trip if the pump is being switched off (no water flow through the heater tank).

In the event that the high limit control has tripped, follow the steps as outlined below:

Step 1: Turn off the main breaker for heater (disconnect power).

Step 2: Allow the water temperature to cool down (water temperature drop is required) in order to reset the high limit control.

Step 3: Ensure the pump is turned on and correct water flow is running through the heater tank.

Step 4 s s (located on the front panel of the heater as per **Figure 06** below), which will activate the high limit control.

Step 5: Turn on main breaker for heater (connect power).

FIGURE 06



See PAGE 17 for Replacement Parts List all Mechanical Models

Digital installation and operating instructions

PLUMBING INSTALLATION - for all **DIGITAL MODELS** – follow same installation guideline as outlined on Page 3, 4 & 5.

ELECTRICAL INSTALLATION - for all **DIGITAL MODELS** – follow same installation guideline as outlined on Page 6, 7, 8 & 9.

OPERATING INSTRUCTIONS for all DIGITAL MODELS

Operating water temperature at time of start-up has to be at a minimum of 70°F (20°C)!

IMPORTANT: Instructions must be strictly followed for warranty to be valid.

Step 1 Turn on Pump:

Pool/Spa **PUMP** has to be **TURNED ON**, before starting the heater. Water **must** be circulating at all times while heater is running (allow pressure in tank to build up see Step 2).

Step 2 Activate Pressure Switch:

The Internal pressure switch will only be activated once the correct water pressure (flow/gpm) has been able to build up inside the tank (refer to **Table 01** Flow Rate Chart on page 11). This will activate the heating elements.

Important: If the correct water pressure has not been built up inside tank, the LED board will read ____ and will not allow to set the temperature mode as outlined under Step 3.

Once the correct water flow/pressure has been built up inside the tank, the LED board will display the temperature reading (see Step 3).

The pressure switch is pre-set by the factory and can be adjusted (only if required) by turning the small wheel up or down (see **Figure 05** picture of pressure switch Part #: KSPS).

Step 3 Setting of Digital Thermostat:

Once the correct water pressure has been built up (see Step 2) the heater LED board will show either one of the readings as outlined below:

- a) Temperature mode: **F** (Fahrenheit) with current water temperature reading.
- b) Temperature mode: **C** (Celsius) with current water temperature reading

Note: a small red led light (dot) comes on at the bottom left of the LED board, indicating temperature mode C (Celsius) has been chosen.

- c) The word **O.F.F.**

Once heater LED board has been initiated (a, b or c) continue with point 3 (selecting Scale) to set the desired temperature for pool/spa mode.

3. Selecting SC = SCALE

- a) Press and hold **POOL/SPA** button for three seconds and release when the display shows (will show only for brief second and will display either F or C).
- b) Press **UP** or **DOWN** button to toggle between Fahrenheit and Celsius mode.
- c) Press **POOL/SPA** button to accept your selection F or C.

4. Selecting rA = RANGE: Choosing POOL or SPA Mode

- a) After SC (point 3) has been completed, the display will show **rA** for brief second.
- b) Press **UP** or **DOWN** button to toggle between **P** (for Pool) or **S** (for Spa) mode.

Note: a small red led light (dot) comes on at the top left of the LED board, indicating Spa mode has been chosen (no light indicated if Pool mode is chosen).

- c) Press **POOL/SPA** button to accept your application.
- d) After **rA** is completed the LED board will read - - - for one second and will then display **O.F.F.**

5. Changing Temperature Set Point (Desired Temperature Setting)

- a) Press or hold **UP** (arrow up) or **DOWN** (arrow down) button to increase or decrease to the desired temperature setting.
- b) Once desired Pool or Spa temperature has been set, the heater will start up.

Note: after 5 seconds (without pressing any buttons) the unit will automatically display the actual water temperature.

Digital Thermostat Factory Settings:

Pool Mode: Factory set point from 70°F/20°C to maximum set point of 88°F/31°C

Spa Mode: Factory set point from 70°F/20°C to maximum set point of 104°F/40°C

Important:

If water temperature is below the lowest set point of the digital thermostat factory setting (70°F/20°C) the LED board will show **O.F.F.** (Operating water temperature at time of start-up has to be a minimum of 70°F/20°C).

4. ERROR Codes / Troubleshooting – Digital Thermostat

(Pressure Switch) indicating:

- HIGH / LOW or NO water pressure is detected.

Factory set pressure switch might need to be adjusted by turning the small wheel (located in the middle of the pressure switch) clockwise or counter clockwise.

Clockwise = increase water pressure; Counter clockwise = decrease water pressure.

.O. indicating:

- Low water temperature is detected!

The water temperature is below the minimum set-point of the factory set temperature of 70°F/20°C. Therefore, the water temperature needs to be increased to reach the required minimum temperature set-point of the digital thermostat.

.I. indicating:

- High water temperature is detected (**H.I.**)! Heater will automatically go into lock mode (**L.O.C.**) LED board will immediately be disabled built-in safety feature - !

Note:

LED board , until issue is resolved - follow below steps.

Water temperature reading is above the maximum set-point of the factory set temperature of 104°F/40°C and will turn off the heater for safety. The LED board will now read **O.F.F.** and is immediately followed by:

- a) displaying **H.I.**
- b) displaying **L.O.C.**

This indicates that the heater LED board is now locked.
No manual temperature adjustment can be made at this point.

Heater will remain in lock mode (LED board will toggle between H.I. and L.O.C.) even if the main power at breaker panel is turned on/off.

It is important for the water temperature to **decrease** to the original programmed customer setting (or original minimum factory setting) prior to clearing the error code.

Once the water temperature has decreased, the LED board can be cleared by pressing the UP or DOWN button to set to desired water temperature. Press the **UP** or **DOWN** button to decrease or increase desired water temperature.

If unit remains in **L.O.C.** mode and the temperature cannot be adjusted, this could mean that the high limit (part #: 5KWH) has tripped and needs to be reset or replaced.

The condition is part of the safety/security feature of this heater and is to ensure the user will physically check that the thermostat and high limit control are in optimal operating condition before turning the heater back on.

MAINTENANCE of all Heater Models – Mechanical + Digital

The K-STAR pool/spa heater was designed for your residential pool/spa application. Always ensure to keep your water chemistry balanced by regularly checking/testing water chemistry.

When using a chlorinator, install it downstream from the heater at a lower level than the heater outlet. This is to prevent concentrated chemicals from back-siphoning into the heater. Back-siphoning is most likely to occur when the pump stops, creating a pressure-suction differential.

Do NOT sanitize the pool/spa by putting chlorine tablets or sticks into the skimmer(s) when the pump is off. This will cause a high concentration of chlorine to enter the heater, which could cause corrosion to the heating elements.

Three key items that can cause problems to your pool/spa heater element(s) and/or exposed thermostat sensor, are as follows:

1. Improper PH levels
2. Disinfectant residual (free chlorine, free bromine)
3. Total alkalinity.

The above items, if not kept properly balanced, can shorten the life of the heater and cause permanent damage.

Balancing of water chemistry crucial to keep PH level balanced to protect heater from damage!

If PH is too high (alkaline levels too high):

- this will greatly lower the ability of chlorine to destroy bacteria and algae
- this will cause coating/scaling/build-up of contaminants to occur on the heating element(s)
- this will cause damage to the heating elements (swelling up/split open)

If PH is too low (high acid levels):

- can cause excessive eye burning sensation or skin irritation
- will cause corrosion/pitting of heating elements (can occur within 24 -48 hours)
- filter may become blocked

Main water chemistry parameters should be:

- The ideal PH level for pool water is 7.4 – 7.6 ppm
- The ideal calcium hardness level is 200 – 400 ppm
- The ideal chlorine level in a pool/spa is 2.8 ppm
- The ideal bromine level in a pool/spa is 3 – 5 ppm
- The ideal salt level in a pool is between 2200 – 2800 ppm.

CAUTION:

Do not test for PH levels when,

- a) the chlorine residual value is reading 3.0 ppm or higher or if using bromine,
- b) the bromine residual value is reading 6.0 ppm or higher.

Please visit your local pool/spa supply store for help in properly balancing your water chemistry.

NOTICE:

Failure to maintain proper water chemistry parameters will result in premature failure of heater components and/or complete failure of heater. This will void the warranty.

WINTERIZING INSTRUCTIONS **All Models: MECHANICAL + DIGITAL**

Follow Steps 1 to 7 below to ensure proper winterization and storage of heater.
Failure to comply will void manufacturer's warranty.

Step 1) Turn the thermostat to the **OFF** position.

Step 2) Turn **OFF** the power at the main breaker for the heater.

Step 3) If unit is equipped with a bypass system as per **Figure 03**, divert 3-Way-Valve to bypass the heater completely and close Single-Union-Ball-Valve.

Step 4) Drain heater tank completely by removing the drain plug (located at bottom of tank).
It is important to ensure that no residual water is left inside the tank.

Step 5) After complete drainage of tank (step 4), the drain plug must be left out all winter!
Note: Store drain plug in safe place; needed for spring start-up!

This is necessary to avoid PVC heater tank from freezing (which would cause damage/cracking of tank at spring start-up).

Step 6) Disconnect plumbing connections from Inlet and Outlet side of heater tank to remove the heater completely from the system for winter storage.

Step 7) Store heater indoors throughout the winter months.

SAVE THESE INSTRUCTIONS

WARRANTY POLICY

K-STAR ELECTRIC Pool/Spa Heaters carry a one year limited warranty from the date of purchase / install.

Exception: Factory installed heating elements carry a limited 90 day warranty from date of heater installation.

All warranty claims must have factory authorization prior to returning the defective product.

All claims must include: Model Number, Serial Number and Proof of Purchase.

Consolidated Pool & Spa Industries Inc. will repair and/or replace the defective heater and/or defective components at its discretion during this warranty period.

All defective products must be returned prepaid.

Consolidated Pool & Spa Industries Inc. will not be responsible for labour charges.

The above warranty shall be considered void if:

1. Unit is installed on soft-sided or inflatable pools/spas.
2. Installation instructions are not followed (improper installation).
3. Unit is powered without any water circulation.
4. Unit has been mishandled.
5. Corrosion of the unit's internal parts occurs by unit being exposed to a salt water system, a system that uses salt to create a sanitizer (applies to all Non-Titanium Heater Models only).
6. Improper water chemistry
7. Unit is improperly winterized.
8. Products were purchased outside Canada.



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REPLACEMENT PARTS LIST FOR MECHANICAL MODELS
(K5, K10, K15, K-5-TT, K-10-TT, K-15-TT)

PART #	DESCRIPTION
5KWE	5 KW Element - 1 PH, 240 V
5KWE-TT	5 KW TITANIUM Element - 1 PH, 240 V
5KWH	5 KW High Limit Control, SS
5KWT	5 KW Thermostat, SS
KTHW	Thermowell
KSCONT-2P	Contactora 2 Pole, 1 PH, 240 V
KSCONT-3P	Contactora 3 Pole, 1 PH, 240 V
KSPS	Pressure Switch
KTB	Terminal Block only
KIL	Indicator Light
KK	Thermostat Knob
KTDB	Drain Plug
KSCC	Current Collector
KST-5/10/15	Replacement Water Tank (all K-Star Heater Models)

REPLACEMENT PARTS LIST FOR DIGITAL MODELS
(K-5-D-TT, K-10-D-TT, K-15-D-TT)

PART #	DESCRIPTION
5KWE	5 KW Element - 1 PH, 240 V
5KWE-TT	5 KW TITANIUM Element - 1 PH, 240 V
5KWH	5 KW High Limit Control, SS
KDCB	Digital Circuit board c/w Temperature Probe (used on all Digital K-Star Heater Models)
KKDM	Keypad membrane only (used on all Digital K-Star Heater Models)
KDBL	Ballast/Transformer only - used for digital circuit board
KTHW	Thermowell
KSCONT-2P	Contactora 2 Pole, 1 PH, 240 V
KSCONT-3P	Contactora 3 Pole, 1 PH, 240 V
KSPS	Pressure Switch
KTB	Terminal Block only
KTDB	Drain Plug
KSCC	Current Collector
KST-5/10/15	Replacement Water Tank (all K-Star Heater Models)