

DAVEY

Swimming Pool Heat Pumps DN1-50-2, DN1-80-2, DN1-100-2, DN3-120-2

Installation and Operating Instructions



WARNING: Failure to follow these instructions and comply with all applicable codes may cause serious bodily injury and/or property damage.

The installation of this product should be carried out by a person knowledgeable in swimming pool plumbing requirements following the installation instructions provided in this manual.

Please pass these instructions on to the operator of this equipment.

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Congratulations on the purchase of your Davey heat pump. It is designed and manufactured in Canada and is renowned for its efficiency and reliability.



In accordance with AS/NZS 60335.2.41 we are obligated to inform you that this Davey heat pump is not to be used by children, or infirm persons and must not be used as a toy by children. Please ensure young children are supervised to ensure that they do not play with the heat pump.

1. How it works

The Davey heat pump is equipped with a large surface evaporator that allows heat to be extracted from the surrounding air. This heat is transferred to the pool water by the titanium heat exchanger. This method generates substantial energy savings compared to: a conventional electric resistance heater; and natural, or propane gas pool heaters.

1.1 Important Facts

- The Davey heat pump is designed to operate at water pressures ranging from 34kPa – 206kPa;
- The optimal water flow to maximise performance is 265L/min. Minimum required flow is 160L/min, maximum flow is 300L/min;
- Your pool pump should always be “on” when the Davey heat pump is in operation.

2. Installation

2.1 Installation Site

To get the best results from your Davey heat pump, its location is critical. The Davey heat pump takes hot air from its surroundings and transfers this heat through its heat exchanger, to the pool water.

The Davey heat pump must be installed on a level surface. Davey recommends a concrete slab, or stable pavers that are detached from the foundations of the building. The Davey heat pump should not be installed in an enclosed space (e.g. under a deck, or in a shed). The Davey heat pump is for outdoor installation only. To get the best performance from your unit, ensure 60cm of clearance around and 120cm above the Davey heat pump, see image 1.

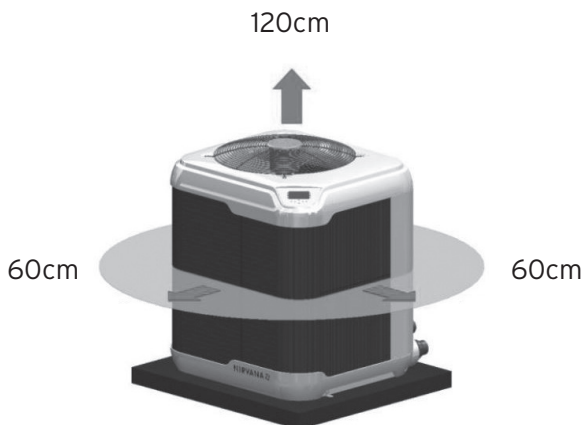


Image 1

2.2 Bypass System

Although a bypass system is not necessary for your Davey heat pump to operate properly, we strongly recommend the installation of a bypass system to make the maintenance and winterising of the Davey heat pump easier.

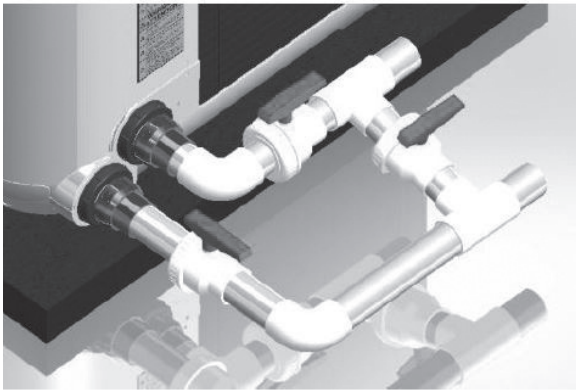
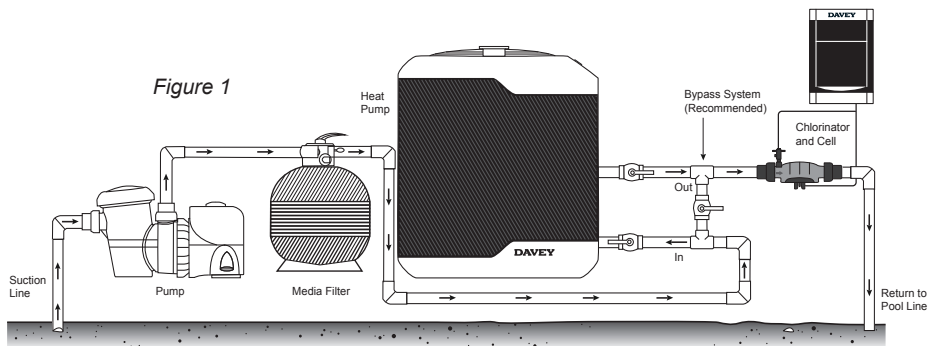


Image 2

2.3 Water Connection



For connections using a single pool pump:

- With your circulation pump connected to your filter, connect the discharge line of the filter to the inlet connector located on the base of the Davey heat pump.
- Connect the pool water return line to the discharge line located on the base of the Davey heat pump.

For connections using a secondary pool pump:

- Connect the pump discharge line to the inlet connector located on the base of the Davey heat pump
- Connect the pool water return line to the discharge connector located on the base of the Davey heat pump

Once all the connections have been made, turn the pool pump to “ON” to check water pressure and to ensure that connections are watertight. The flow rate should be between 160L/min – 300L/maximum. Correct water flow will significantly improve the performance and efficiency of the Davey heat pump.

Should the Davey heat pump be used in conjunction with a solar pool heating manifold, the water entering the Davey heat pump should first run through the solar absorber. Do not plumb the solar absorber after the Davey heat pump. Davey doesn't recommend this practice as solar absorbers can't typically accommodate the same flow rates as the Davey heat pump. The solar absorber may also act to cool water rather than heating, in cooler weather. A better practice would be to run separate flow circuits.

Should the Davey heat pump be used in conjunction with a Davey chlorinator, the chlorinator cell is required to be installed after the Davey heat pump. If the chlorinator cell is installed before the Davey heat pump this will allow heavily chlorinated water to enter the Davey heat pump. This will significantly shorten the life expectancy of the Davey heat pump and may void warranty.

2.4 Electrical Connection



WARNING: The electrical connection should be done by a qualified electrician according to national, state and local city codes or standards. The unit should be connected to a compatible RCD (Residual Current Device).

	DN1-50-2	DN1-80-2	DN1-100-2	DN3-120-2
Voltage (V AC)	240	240	240	415
Frequency (Hz)	50	50	50	50
Phase	Single	Single	Single	Three
Compressor starting current (A)	67	126	130	90.5
Current total (A)	14.7	23.2	28.6	13.7
Min circuit current (A)	21.5	34.5	40.0	15.7
Max circuit current (A)	30.0	40.0	50.0	20.0

Table 1

**Wiring diagram for models:
DN1-50-2, DN1-80-2, DN1-100-2**

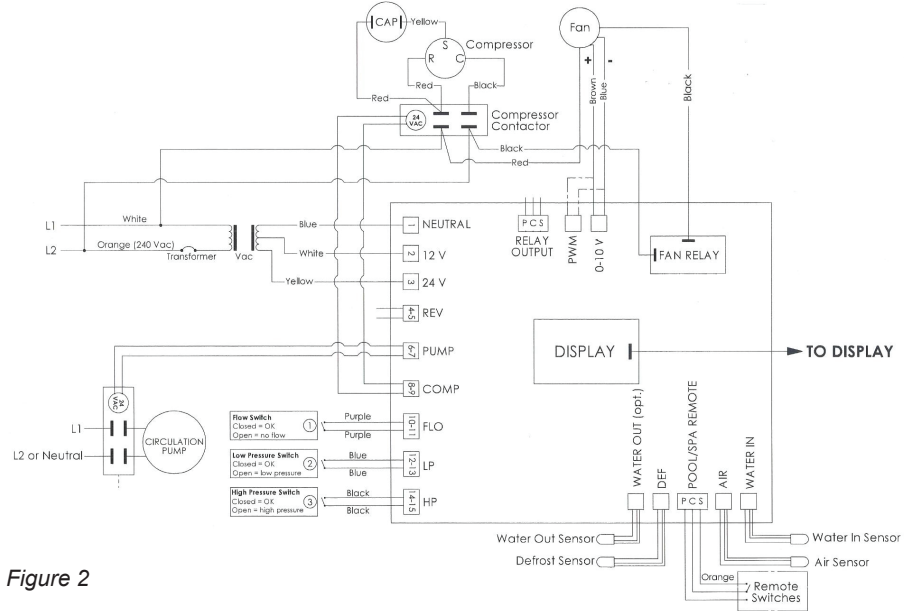


Figure 2

Wiring diagram for model: DN3-120-2

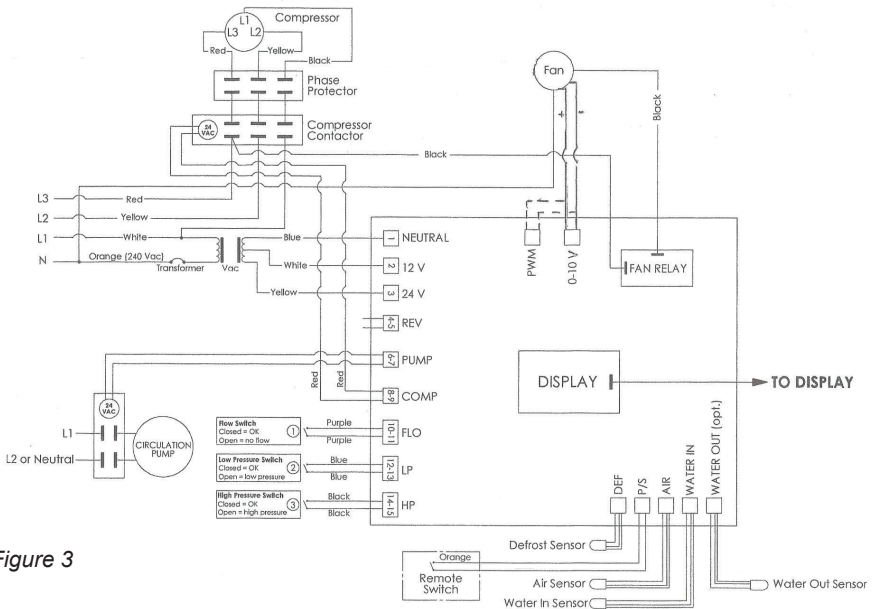


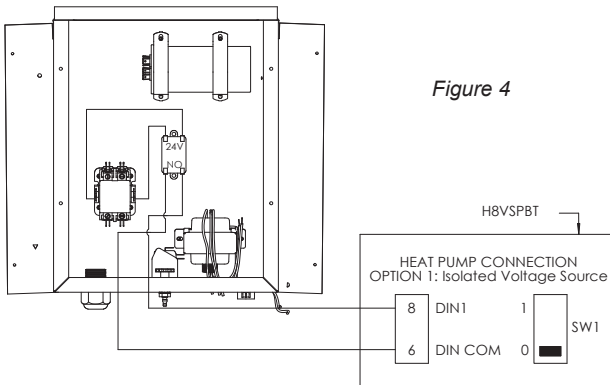
Figure 3

2.5 Connecting a Davey PM400BT pump

The following section should be read in conjunction with the installation and operating instructions of the Davey PM400BT pump. This option requires the installation of a secondary relay.

To achieve maximum heating efficiency from the Davey heat pump, connect a Davey PM400BT pump using an RJ45 cable. When connected and the Davey heat pump detects your pool needs to be heated, it sends a signal to turn the Davey PM400BT pump to full speed (or an overridden speed selected by you). You will need to purchase a separate relay to accommodate this. Specifications of relay required:

- 24V AC coil;
- No contact;
- Contact current: 1A minimum;
- Screw contacts preferred as they can be connected to the RJ45 network cable used to signal the Davey PM400BT pump more easily.



There is a 17.5mm rail available inside the Davey heat pump for the electrician to use to mount the relay. Alternatively, a panel mount relay may be used.

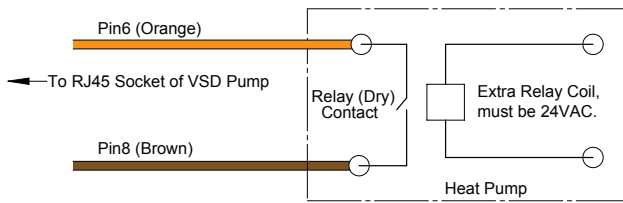
For this feature to work correctly, both the Davey heat pump and Davey PM400BT pump must be operating or able to operate at the same time.



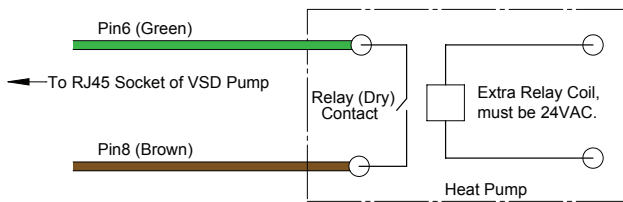
WARNING: The electrical connection should be done by a qualified electrician according to national, state and local city codes and standards.

The Davey heat pump uses a 24V AC contactor to turn on the compressor to operate. Depending on the system your chosen speed of the Davey PM400BT pump will require connections as shown in the following diagrams:

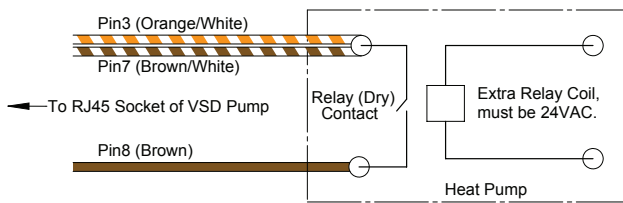
Davey PM400BT pump 50% speed using T-568A cable



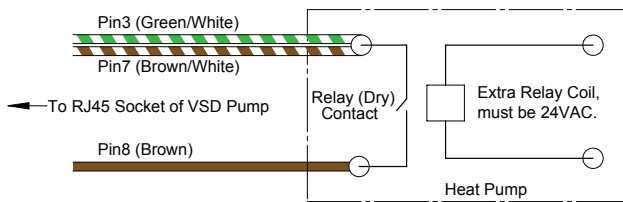
Davey PM400BT pump 50% speed using T-568B cable



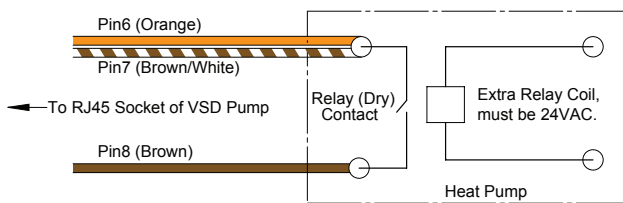
Davey PM400BT pump 67% speed using T-568A cable



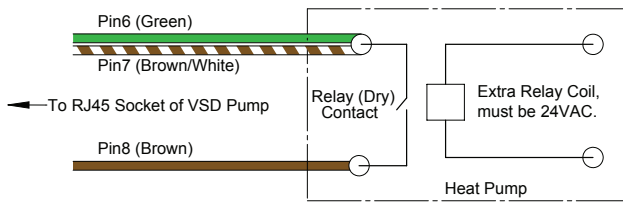
Davey PM400BT pump 67% speed using T-568B cable



Davey PM400BT pump 83% speed using T-568A cable



Davey PM400BT pump 83% speed using T-568B cable



Davey PM400BT pump 100% speed using either T-568A, or T-568B cable

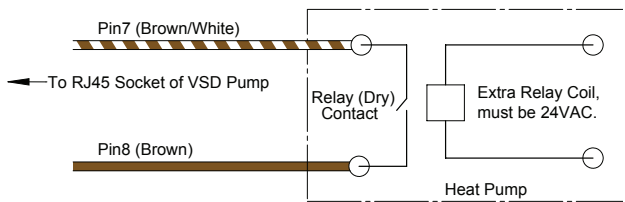


Figure 5

2.6 Settings

Electronic Display

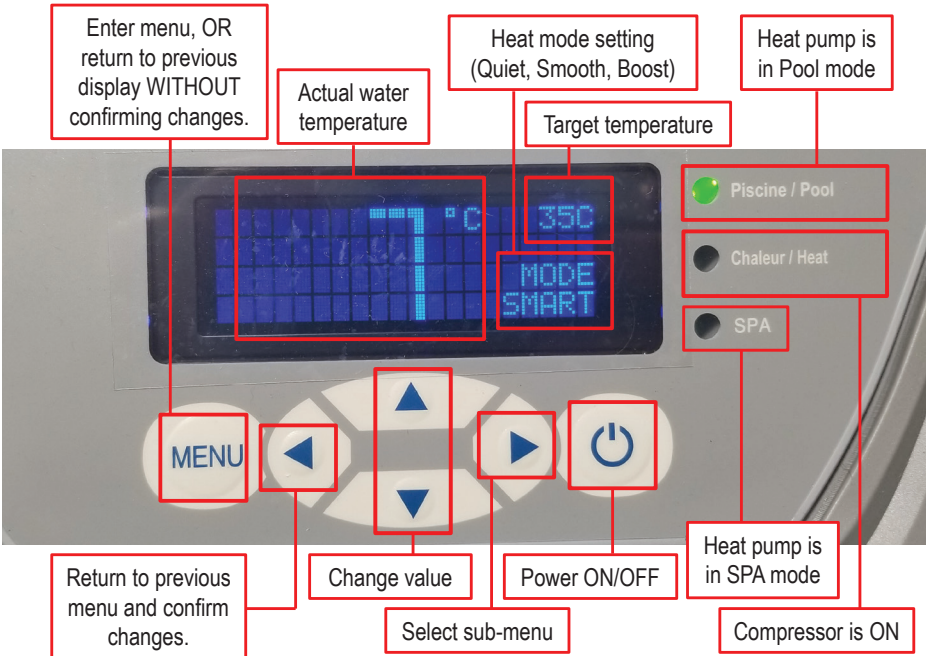


Image 3: Button layout

User Menu

Set Temperature -

Set the desired temperature of the POOL or the SPA.

Pool or Spa Mode -

Change between POOL and SPA modes.

Heat Mode -

Change between speed settings:

Quiet Mode - Keeps the fan speed lower to reduce noise when it is warm outside - This mode does not work below 15.5°C - If temperature drops below 15.5°C, heat pump will return to SMART mode. Quiet Mode reduces heat pump BTU output due to reduced fan speed.

Smart Mode - Varies fan speed according to outside temperature to produce the best COP possible. As temperatures get colder, fan speed increases. As temperatures get warmer, fan speed decreases,

Boost Mode - Fan speed is increased to improve BTU output of the heat pump.

Daily Timers

Timers ON/OFF -

This activates the heat pump timer function - Make sure clock is set.

Start Heating Time -

Set the time of day when the heat pump turns on. The heat pump relay (optional) is activated whenever heat is ON.

Stop Heating Time -

Set the time of day when the heat pump turns off.

Start Pump Time -

Available if using pump relay (optional). Set the time of day when the pool pump turns on.

Stop Pump Time -

Available if using pump relay (optional). Set the time of day when the pool pump turns off.

Set Clock Time -

Allows user to set clock time (Must be done every time the power is cut to the unit).

Settings

Min Outside Temp -

Allows user to set the minimum outside temperature that will turn the heat pump on. This allows users to save energy by not heating on days when temperatures are too low or avoids heating at night. Note that this setting may prevent the pool from reaching set temperature at certain times of the year.

Fahrenheit or Celsius -

Select temperature units – Fahrenheit or Celsius.

Change Language -

Set display language.

Defrosting Mode -

Defrosting is a normal cycle that takes a few minutes. During this process, the fan will be working while the compressor will be turned off.



WARNING: Improper installation, adjustment, service, maintenance or use can cause fire, electrical shock or other conditions which may cause injury or property damage. Consult a qualified technician or service agency for information or assistance. All service calls under warranty should be authorized by Davey Water Products.

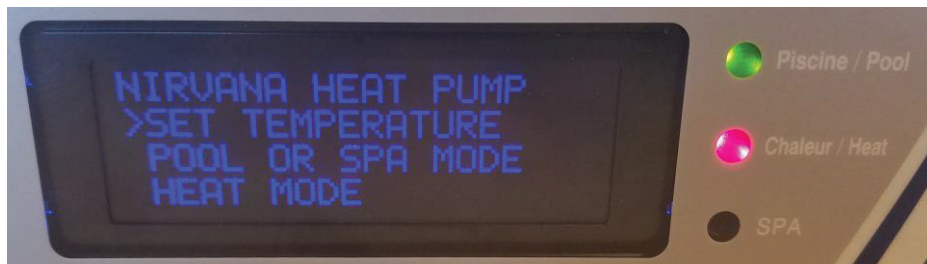


Image 4: User menu

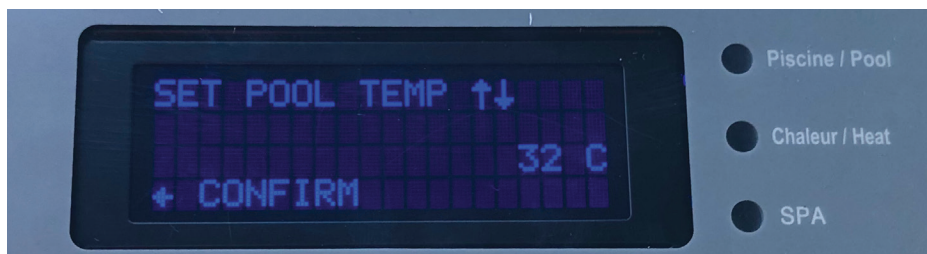


Image 5: Set Temperature Sub-Menu

2.7 FIL Mode (optional)

This option allows for the pool pump to be powered by the heat pump.

FIL mode OFF: This is the factory default setting and is used when the Davey heat pump does not power the circulation pump.

FIL mode ON: This option allows for the pool pump to be powered by the Davey heat pump. It requires the installation of a contactor in the Davey heat pump's electrical box and wiring to your circulation pump.

How to programme the FIL Mode timer:

FIL mode timer uses the same timer described in Settings (Daily Timers).



WARNING: The electrical connection should be done by a qualified electrician according to national, state and local city codes and standards.

The contactor must be connected to the PUMP connectors on the control board (shown below).

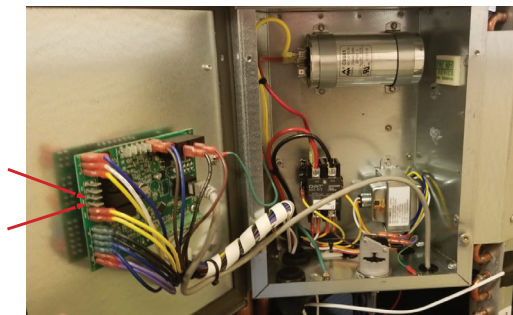


Image 6

Use terminals L1-L2 on the control board to power the breaker (shown below).



Image 7

The pump can then be wired to the other side of the contactor (shown below).

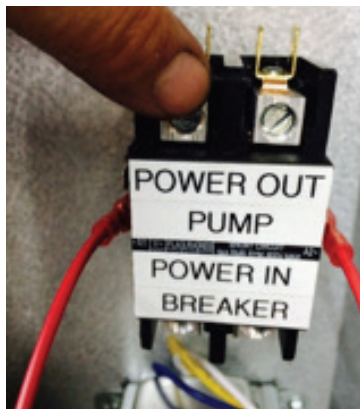


Image 8

3. Before Start-up

- ☐ Inspect the unit to ensure it is in good operating condition
- ☐ Clean the swimming pool filter
- ☐ Ensure water is balanced to recommended levels in water quality section of this manual (section 6)
- ☐ Ensure all Davey heat pump water inlets and outlets are correctly connected
- ☐ Turn on the circuit breaker, or isolation switch

4. Winterising

Winterising is required in conditions where any water inside the heater can drop below 0°C. In this situation, if not carried out, severe damage is likely to occur to the Davey heat pump.

1. Turn off the circuit breaker, or isolation switch;
2. Drain the Davey heat pump. Loosen all water connections;
3. Rinse the interior of the heat exchanger cylinder with a stream of tap water for about 15 minutes to remove any chlorine residue that could cause damage to the heat exchanger. Tilt the unit towards the back to remove all water from the unit.



WARNING: All water connections to the pool should be disconnected for winter to allow complete drainage of the Davey heat pump. The winterising must be done before air temperatures reach freezing point.



WARNING: The Davey heat pump should never be tilted more than 30-35°, even during transportation. Should this occur, allow the Davey heat pump to sit for 4 hours before turning on.

- Block water inlet and outlet with a cloth or plastic to prevent mice, or other animals from entering the unit.

5. Maintenance

5.1 Safety instructions

Always disconnect the Davey heat pump before:

- Opening the access door;
- Cleaning the cabinet, or evaporator.

To avoid the risk of injuries, or damage to the unit, never:

- Sit on the Davey heat pump, or place a heavy object on it;
- Put objects in, or on the protective grid.

The Davey heat pump requires professional maintenance and repair. Any “do-it-yourself” repairs on a unit within warranty period, may void the remainder of the manufacturer’s warranty. Maintenance, or adjustments other than those recommended in this owner’s manual should not be attempted. Contact Davey for any questions, or problem you may have with your unit.

5.2 Regular maintenance

- ☐ Inspect and clean the pool filter regularly to ensure adequate water flow to the Davey heat pump.
- ☐ Inspect the evaporator and rinse it using a garden hose. Wash, with a stream of water from top to bottom to remove any grass, leaves or other objects that could obstruct the evaporator.
- ☐ Clean the Davey heat pump casing with a mild soap (dishwashing liquid). Do not use abrasives, or bleach. Inspect the pool skimmer basket regularly. Never use the skimmer to add pool chemicals.
- ☐ Ensure water is balanced to recommended levels in water quality section of this manual (section 6). Chemical balance outside of recommended levels could result in damage to your unit and risks voiding warranty.



WARNING: To prevent injuries, death, or property damage, read and follow all instructions and warnings.

6. Water Quality

RECOMMENDED POOL WATER CHEMISTRY					
POOL WATER BALANCING	Free Chlorine (ppm)	pH	Total Alkalinity TA (ppm)	Calcium Hardness (ppm)	Stabiliser – Cyanuric Acid (ppm)
Ideal Reading / Range	1 – 3	Concrete & Tiled Pools: 7.4-7.6 Other Surfaces: 7.2-7.4	Concrete & Tiled Pools: 80-120. Other Surfaces: 125-150	Concrete & Tiled Pools: 200-275. Other Surfaces: 100-225	25 – 50
To Increase	Increase output of chlorinator. Add chlorine. Increase filtration time.	Add buffer or soda ash (Sodium Carbonate)	Add Sodium Bicarbonate	Add Calcium Chloride	Add Cyanuric Acid
To Decrease		Add Muriatic Acid	Add Muriatic Acid or Dry Acid	Partially drain & refill pool with lower hardness water to dilute	Partially drain & refill pool to dilute
Frequency of Testing	Weekly	Weekly	Weekly	Weekly	Regularly

Table 2

7. Troubleshooting

PROBLEM	CAUSE(S)	WHAT TO DO
WATER FLOW ERROR CHECK WATER FLOW INSIDE HEAT PUMP	<ul style="list-style-type: none"> • The water flow inside the Davey heat pump is insufficient; • The bypass valves are in the wrong position; • There is no water circulation inside the heat pump; • The flow switch is faulty. 	<ul style="list-style-type: none"> • Make sure that the circulating pump works; • Make sure the bypass valves are properly positioned; • Check the pool skimmer (no obstruction).
DEFROST MODE	<ul style="list-style-type: none"> • The heat pump is in de-icing mode. This Is Normal if outside temperatures are low 	<ul style="list-style-type: none"> • Wait until the end of the de-icing cycle. The heat pump will restart automatically.
ERROR LOW REFRIGERANT PRESSURE	<ul style="list-style-type: none"> • Ventilation on the evaporator is insufficient; • The fan does not work; • Refrigerant leak; • The outside temperature is too low. 	<ul style="list-style-type: none"> • Check the evaporator is not obstructed by pollen, grass, leaves etc. Refer to section 5 for safety instructions; • Be sure there is enough free space around the Davey heat pump. Refer to section 2; • Check that the fan is powered ON.
LOW PRESSURE FAILED 3 TIMES IN 1 HOUR RESET THE BREAKER	<ul style="list-style-type: none"> • The heat pump low switch has cut off three (3) times in the same hour for one of the reasons above.(code LP). 	<ul style="list-style-type: none"> • The heat pump will not re-start after one of the protection devices shuts it down for the third time in the same hour; • Close the circuit breaker to reset the heat pump.
ERROR HIGH REFRIGERANT PRESSURE	<ul style="list-style-type: none"> • The flow inside the Davey heat pump is insufficient; • The bypass valves are in the wrong position; • The water exit is blocked; • There is an obstruction in the refrigeration circuit (piping blocked). 	<ul style="list-style-type: none"> • Check whether there is adequate water circulation inside; • Check that the bypass valves are properly positioned; • Check if there is an object obstructing the water hose.
HIGH PRESSURE FAILED 3 TIMES IN 1 HOUR RESET THE BREAKER	<ul style="list-style-type: none"> • The heat pump high pressure switch has cut off three (3) times in the same hour for one of the reasons above (code HP). 	<ul style="list-style-type: none"> • The heat pump will not re-start after one of protection devices shuts it down for the third time in the same hour; • Close the circuit breaker to reset the heat pump.

PROBLEM	CAUSE(S)	WHAT TO DO
NO CONNECTION	<ul style="list-style-type: none"> The display and main boards are not communicating. 	<ul style="list-style-type: none"> Close the breaker switch and reopen it. If the problem is not resolved, the digital control will have to be changed. In this case, call your dealer.
DEFROST TEMPERATURE PROBE OPEN	<ul style="list-style-type: none"> The de-icing sensor is not properly connected or is not receiving power. 	<ul style="list-style-type: none"> Call your Installer on 1300 232 839.
DEFROST PROBE SHORT CIRCUIT	<ul style="list-style-type: none"> The de-icing sensor is defective. 	<ul style="list-style-type: none"> Call your Installer on 1300 232 839.
WATER TEMPERATURE PROBE OPEN	<ul style="list-style-type: none"> The water temperature sensor is not properly connected or is not receiving power. 	<ul style="list-style-type: none"> Call your Installer on 1300 232 839.
WATER TEMPERATURE PROBE SHORT CIRCUIT	<ul style="list-style-type: none"> The water temperature sensor is defective. 	<ul style="list-style-type: none"> Call your Installer on 1300 232 839.
AIR TEMPERATURE PROBE OPEN	<ul style="list-style-type: none"> The air temperature sensor is not properly connected or is not receiving power. 	<ul style="list-style-type: none"> Call your Installer on 1300 232 839.
AIR TEMPERATURE PROBE SHORT CIRCUIT	<ul style="list-style-type: none"> The air temperature sensor is defective. 	<ul style="list-style-type: none"> Call your Installer on 1300 232 839.
The fan is functioning, no code is displayed and the compressor does not start	<ul style="list-style-type: none"> Electrical problem in the compressor circuit; Capacitor defective; Compressor defective. 	<ul style="list-style-type: none"> Call your Installer on 1300 232 839.

Before placing a service call

There is always a possibility of condensation, especially on days with a high humidity level. If you see water near the heat pump, there's a good chance it comes from condensation. To make sure it is water from condensation you can shut the heat pump off, leaving the circulation pump running. Within a few hours, if you see that the water around the unit is drying up, it is indicative of normal condensation.

Before calling Davey Support, follow the steps below:

1. Make sure the circuit breaker or isolation switch is ON, the fuses are functional and the heat pump is connected properly (green light on the unit).
2. Make sure that the circulation pump is running at full capacity, has sufficient flow, and that the filter is clean.
3. Make sure that the water inlet and outlet are open and bypass valve is closed.
4. Check whether the temperature set is higher than the actual pool temperature.
5. Check that the plumbing is positioned in a way to enable sufficient water flow.
6. Check that the evaporator is not obstructed by pollen, leaves, grass, etc. (see maintenance for washing instructions).
7. When the temperature goes down to about 7°C, the heat pump may switch to de-icing mode; it will then start a cycle that stops the compressor while letting the fan continue running. Once the cycle is complete, it will resume normal operation.
8. Frost may appear on the evaporator during cold weather and this is normal; however, if there is 12mm of ice or more on the evaporator, contact Davey immediately.

If your heat pump does not operate properly after following these steps, contact your Dealer, Installer or Davey Support.

All replacements must be made using Davey parts to maintain your heat pump performance, durability and safety, as well as keeping your warranty valid.



WARNING: DO NOT modify or remove a safety device. The manufacturer disclaims all responsibility if installation or maintenance instructions are not followed or if electrical or mechanical components and/or safety devices have been modified in any way.

8. Davey Warranty

Davey Guarantee Period:

- Parts - Three Years
- Compressor - Five Years
- Titanium Heat Exchanger Coil - Ten Years
- Cabinet - Fifteen Years

See back page for further Davey Warranty information.

Davey Water Products Pty Ltd (Davey) warrants all products sold will be (under normal use and service) free of defects in material and workmanship for a minimum period of one (1) year from the date of original purchase by the customer as marked on the invoice, for specific warranty periods for all Davey products visit daveywater.com.

This warranty does not cover normal wear and tear or apply to a product that has:

- been subject to misuse, neglect, negligence, damage or accident
- been used, operated or maintained other than in accordance with Davey's instructions
- not been installed in accordance with the Installation Instructions or by suitably qualified personnel
- been modified or altered from original specifications or in any way not approved by Davey
- had repairs attempted or made by other than Davey or its authorised dealers
- been subject to abnormal conditions such as incorrect voltage supply, lightning or high voltage spikes, or damages from electrolytic action, cavitation, sand, corrosive, saline or abrasive liquids,

The Davey warranty does not cover replacement of any product consumables or defects in products and components that have been supplied to Davey by third parties (however Davey will provide reasonable assistance to obtain the benefit of any third-party warranty).

To make a warranty claim:

- If the product is suspected of being defective, stop using it and contact the original place of purchase. Alternatively, phone Davey Customer Service or send a letter to Davey as per the contact details below
- Provide evidence or proof of date of original purchase
- If requested, return the product and/or provide further information with respect to the claim. Returning the product to the place of purchase is at your cost and is your responsibility.
- The warranty claim will be assessed by Davey on the basis of their product knowledge and reasonable judgement and will be accepted if:
 - o a relevant defect is found
 - o the warranty claim is made during the relevant warranty period; and
 - o none of the excluded conditions listed above apply
- The customer will be notified of the warranty decision in writing and if found to be invalid the customer must organise collection of the product at their expense or authorise its disposal.

If the claim is found to be valid Davey will, at its option, repair or replace the product free of charge.

The Davey warranty is in addition to rights provided by local consumer law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

For any internet connected products the consumer is responsible for ensuring a stable internet connection. In the event of a network failure the consumer will need to address the concern with the service provider. Use of an App is not a substitute for the User's own vigilance in ensuring the product is working to expectation. Use of a Smart Product App is at the User's own risk. To the fullest extent permitted by law Davey disclaims any warranties regarding the accuracy, completeness or reliability of App data. Davey is not responsible for any direct or indirect loss, damage or costs to the User arising from its reliance on internet connectivity. The User indemnifies Davey against any claims or legal actions from them or others relying on internet connectivity or App data may bring in this regard.

Products presented for repair may be replaced by refurbished products of the same type rather than being repaired. Refurbished parts may be used to repair the products. The repair of your products may result in the loss of any user-generated data. Please ensure that you have made a copy of any data saved on your products.

To the fullest extent permitted by law or statute, Davey shall not be liable for any loss of profits or any consequential, indirect or special loss, damage or injury of any kind whatsoever arising directly or indirectly from Davey products. This limitation does not apply to any liability of Davey for failure to comply with a consumer guarantee applicable to your Davey product under local laws and does not affect any rights or remedies that may be available to you under local laws.

For a complete list of Davey Dealers visit our website (daveywater.com) or call:

DAVEY

Davey Water Products Pty Ltd
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daveywater.com

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