# ENGINE HEATING PRODUCTS

## Large Circulation Heating Systems
### Model 112 - 3 to12 kW

## General Description

The 112 is a coolant heating system designed for engines ranging in size from 15-100Ltr. The 2.2 m3/hr pump-driven 112 offers more efficient heating than thermosiphon tank heaters, delivering uniform heating throughout the entire engine. On larger engines, one 112 eliminates the need for two thermo-siphon heaters.

Forced circulation of the coolant extends element life and offers a significant reduction in electrical consumption. Lower outlet temperatures result in extended hoselife requiring less heater maintenance.

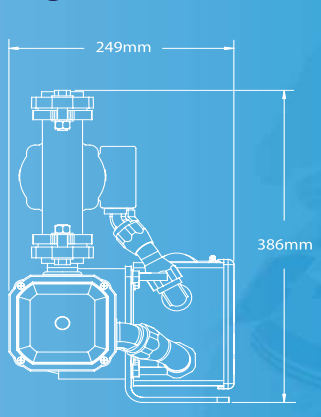
The 112 features a low-watt density heating element and adjustable thermostat with optional temperature settings. The compact design requires minimal space for mounting and requires less installation time and material compared to configurations with two tank heaters.

## Features

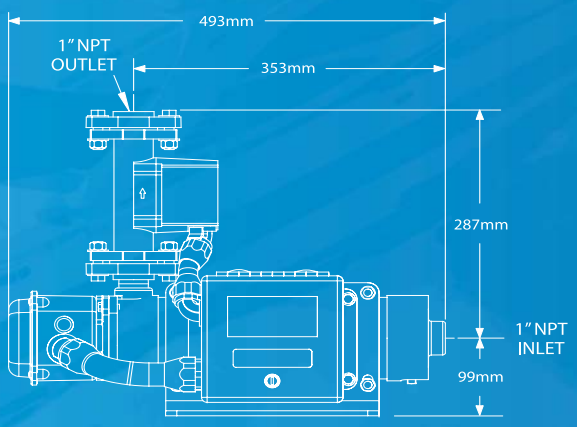
- Internally Prewired ready to Hook Up
- Multiple thermostat settings (32°-55°C)
- Forced circulation provides uniform engine heating
- Reduced outlet temperature - extends hose life
- Reduced electrical consumption
- Includes all required controls for automatic operation
- Compact design - simple to install

| Engine Size (L) | Model Number | Wattage | Voltage | Phase | Hertz | Total Amps |
|---|---|---|---|---|---|---|
| 15 - 30 | 112-312016 | 3000 | 120 | 1 | 60 | 27.0 |
| | 112-320816 | 3000 | 208 | 1 | 60 | 16.4 |
| | 112-322015 | 3000 | 220 | 1 | 50 | 15.6 |
| | 112-324016 | 3000 | 240 | 1 | 60 | 14.5 |
| 25 - 50 | 112-620816 | 6000 | 208 | 1 | 60 | 30.8 |
| | 112-622015 | 6000 | 220 | 1 | 50 | 29.3 |
| | 112-624016 | 6000 | 240 | 1 | 60 | 27.0 |
| | 112-648016 | 6000 | 480 | 1 | 60 | 14.5 |
| 50 - 75 | 112-920816 | 9000 | 208 | 1 | 60 | 45.3 |
| | 112-922015 | 9000 | 220 | 1 | 50 | 42.9 |
| | 112-924016 | 9000 | 240 | 1 | 60 | 39.5 |
| | 112-948016 | 9000 | 480 | 1 | 60 | 20.8 |
| 75 - 100 | 112-1220816 | 12000 | 208 | 1 | 60 | 59.7 |
| | 112-1222015 | 12000 | 220 | 1 | 50 | 56.5 |
| | 112-1224016 | 12000 | 240 | 1 | 60 | 52.0 |
| | 112-1248016 | 12000 | 480 | 1 | 60 | 27.0 |

## System Drawing




1Ø
240v or less




Shipping Weight: 16.8kg

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# ENGINE HEATING PRODUCTS

## Large Circulation Heating Systems
### Model 312 - 3 to12 kW

## General Description

The 312 is a coolant heating system designed for engines ranging in size from 15-100Ltr. The 2.2 m3/hr pump-driven 312 offers more efficient heating than thermosiphon tank heaters, delivering uniform heating throughout the entire engine. On larger engines, one 312 eliminates the need for two thermo-siphon heaters.

Forced circulation of the coolant extends element life and offers a significant reduction in electrical consumption. Lower outlet temperatures result in extended hoselife requiring less heater maintenance.

The 312 features a low-watt density heating element and adjustable thermostat with optional temperature settings. The compact design requires minimal space for mounting and requires less installation time and material compared to configurations with two tank heaters.

## Features

- Internally Prewired ready to Hook Up
- Multiple thermostat settings(38°-49°C)
- Forced circulation provides uniform engine heating
- Reduced outlet temperature - extends hose life
- Reduced electrical consumption
- Includes all required controls for automatic operation
- Compact design - simple to install

| Engine Size (L) | Model Number | Wattage | Voltage | Phase | Hertz | Total Amps |
|---|---|---|---|---|---|---|
| 25 - 50 | 312-620835 | 6000 | 208 | 3 | 50 | 17.1 |
| | 312-638035 | 6000 | 380 | 3 | 50 | 11.1 |
| | 312-640035 | 6000 | 400 | 3 | 50 | 8.9 |
| | 312-644036 | 6000 | 440 | 3 | 60 | 8.1 |
| | 312-648036 | 6000 | 480 | 3 | 60 | 7.4 |
| | 312-657536 | 6000 | 575 | 3 | 60 | 6.2 |
| 50 - 75 | 312-920835 | 9000 | 208 | 3 | 50 | 25.4 |
| | 312-938035 | 9000 | 380 | 3 | 50 | 15.7 |
| | 312-940035 | 9000 | 400 | 3 | 50 | 13.2 |
| | 312-944036 | 9000 | 440 | 3 | 60 | 12.2 |
| | 312-948036 | 9000 | 480 | 3 | 60 | 11.0 |
| | 312-957536 | 9000 | 575 | 3 | 60 | 9.2 |
| 75 - 100 | 312-1220835 | 12000 | 208 | 3 | 50 | 33.7 |
| | 312-1238035 | 12000 | 380 | 3 | 50 | 20.3 |
| | 312-1240035 | 12000 | 400 | 3 | 50 | 17.5 |
| | 312-1244036 | 12000 | 440 | 3 | 60 | 15.9 |
| | 312-1248036 | 12000 | 480 | 3 | 60 | 14.6 |
| | 312-1257536 | 12000 | 575 | 3 | 60 | 12.2 |

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# ENGINE HEATING PRODUCTS

## System Overview

Shown are standard Type 112 & 312 heating system configurations. This circulating heating system consists of a coolant heating tank, heating element, Coolant thermostat, a centrifugal pump, a control box with electro-mechanical controls and a mounting bracket.

## Basic System Operation

Upon energizing the system, engine coolant is circulated via the centrifugal pump, through the heating tank and back to the engine. The pump stays on and continues this circulation process even when the heating elements are off to ensure uniform engine temperatures. The thermostat cycles the heating element on and off based on coolant temperature. A 24VDC signal is required to de-energize the system when the engine is running.

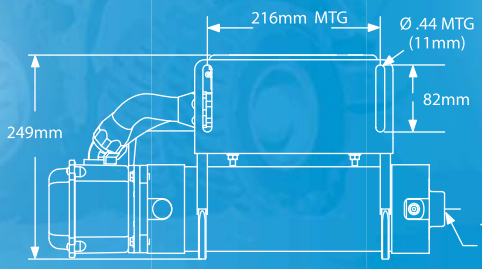
## System Mounting Requirements

The Type 112 & 312 heating system must be mounted in the horizontal position. *The pump shaft must be in the horizontal position at all times for proper lubrication and cooling of shaft end bearing*. Refer to drawing on page 2.

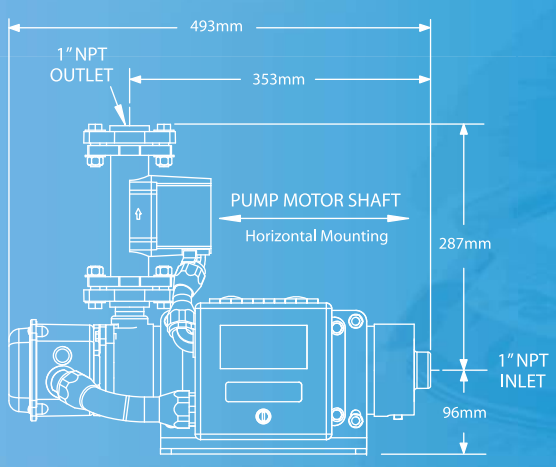
Be sure to mount the system as low as possible in reference to the engine coolant level.

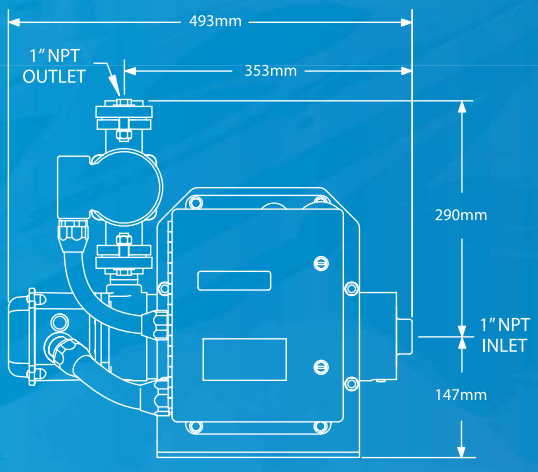
**DO NOT mount the heating system directly to the engine** (the system must be isolated from engine vibration). **DO NOT mount directly to the skid if the engine is not isolated from the skid.**

**Standard Single Phase Systems**




**Standard Three Phase Systems**

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# ENGINE HEATING PRODUCTS

## System Installation

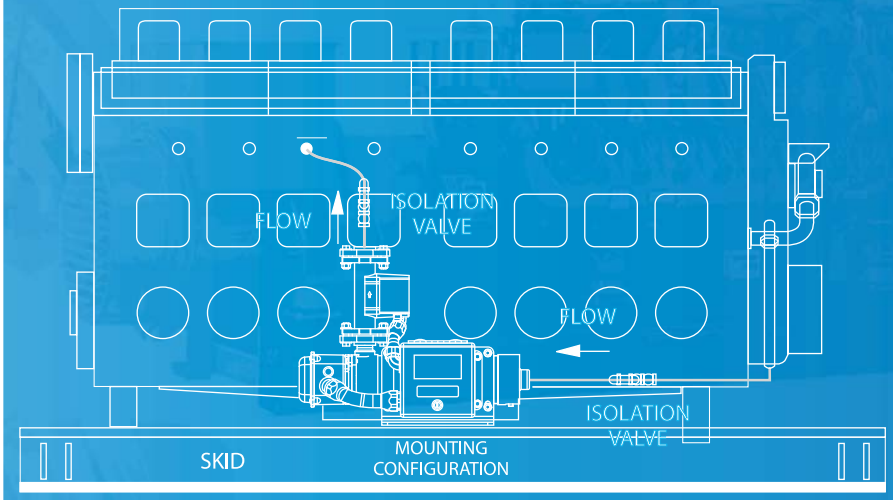
***— Coolant Supply Line —***

Connect a MINIMUM 1-inch N.P.T. coolant supply hose or pipe from the main coolant drain of the engine to the inlet of the heating system. Drawing coolant from a location low in the coolant system will ensure head pressure to the pump. The supply line must remain level or angle downward to eliminate air pockets. When approaching a plumbing obstacle, go around the obstacle instead of over it.

***— Coolant Discharge Line —***

Connect a MINIMUM 1-inch N.P.T. coolant return hose or pipe from the outlet of the heating system to the highest possible location on the engine coolant syetem at the furthest possible location from the suction line.
This connection enables heated coolant to be circulated through the entire engine.

**Typical type 112 & 312 heating system installation**




**NOTE:** Your system may be configured with optional, non-restrictive shut-off valves in the coolant lines allowing maintenance on the heating system without draining the engine coolant. ***Isolation Valves - PRP203011-000***

**NOTE:** If the heating system is plumbed with rigid pipe, use flexible lines near the heating system long enough to provide freedom from vibration in all directions.

## Coolant Requirements

The heating system is designed for use with a 50/50 mixture of low-silicate antifreeze and distilled water. Pre-mixed products are recommended. If not using a pre-mixed solution, ensure that the liquids are well mixed prior to filling the engine's cooling system. Do not exceed a concentration of more than 60% antifreeze as element failure can result.

**NOTE:** After the heating system is mounted and the engine is refilled with coolant, loosen outlet flange at pump to bleed the air out of the system. DO NOT ENERGIZE THE HEATING SYSTEM AT THIS TIME. Run the engine until it reaches normal operating temperature to eliminate trapped air that may still be present in the engine.

## System Wiring

**OPERATION OF THE SYSTEM DURING ENGINE OPERATION MAY CAUSE DAMAGE TO THE HEATER.**

**THE HEATING ELEMENT PACKAGE IS PRE-WIRED SPECIFIC TO THE SYSTEM WATTAGE AND VOLTAGE. ALTERING THE SUPPLIED WIRING CONFIGURATION CAN RESULT IN HEATER FAILURE.**

**ALL CONNECTIONS IN THE JUNCTION BOX SHOULD BE CHECKED DURING INSTALLATION. VIBRATION DURING SHIPMENT CAN CAUSE SCREWS TO LOOSEN. ALL CONNECTIONS IN THE JUNCTION BOX SHOULD BE CHECKED AT ENGINE SERVICE INTERVALS. VIBRATION CAN CAUSE CONNECTIONS TO LOOSEN.**

**WIRING TO HEATING SYSTEM TO BE PERFORMED BY A QUALIFIED ELECTRICIAN AND CONFORM TO ALL NATIONAL, STATE AND LOCAL ELECTRICAL CODES.**

**DISCONNECT ALL POWER SOURCES PRIOR TO PERFORMING ANY MAINTENANCE ON THE HEATING SYSTEM**

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# ENGINE HEATING PRODUCTS

## Main Power Wiring

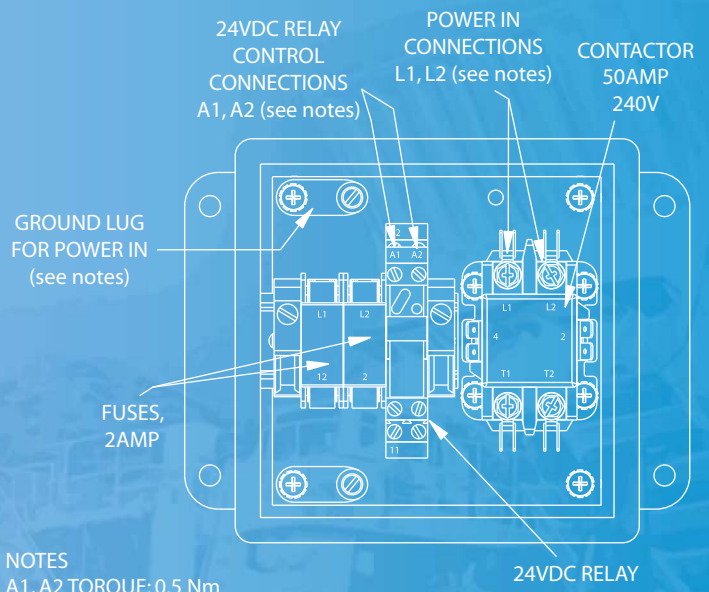
Connect the specified voltage and phase to the terminal blocks located in the main control box of the heating system. A user-supplied circuit breaker (rated at the appropriate amperage) is required for use in the main power feed line. For 3 phase applications, the terminal blocks are labeled L1, L2 and L3. For single phase applications, use terminal blocks labeled L1 and L2 (2-pole contactor, no transformer) or L1 and L3 (3-pole contactor, with transformer).

## 24 VDC Shutdown

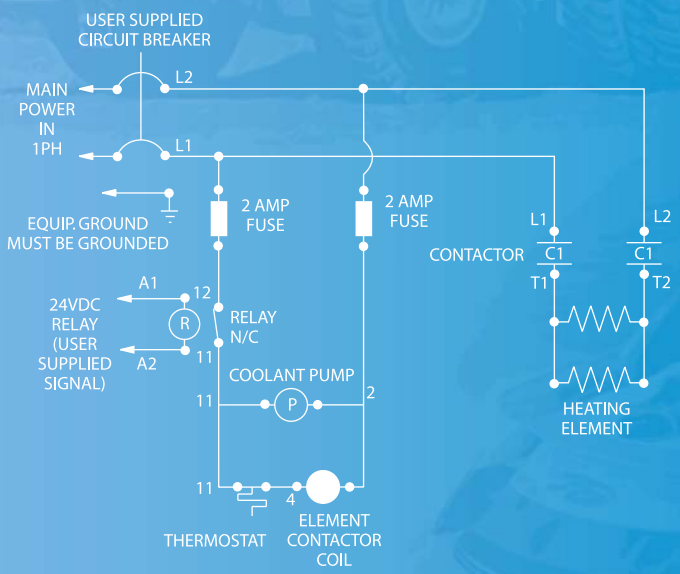
Connect a user-supplied source of 24 VDC electricity to the terminal blocks labeled A1 and A2 in the control box. When present, this 24 VDC shutdown signal will disable the heating system to prevent operation while the engine is running.

The standard heating systems are wired such that the relay is normally closed (a 24 VDC signal when the engine is running disables the heating system).

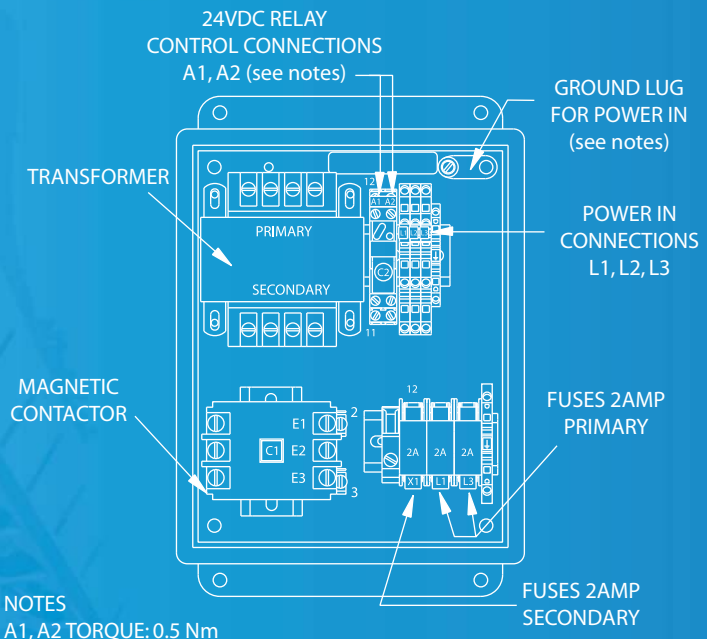
### Standard Single Phase Systems



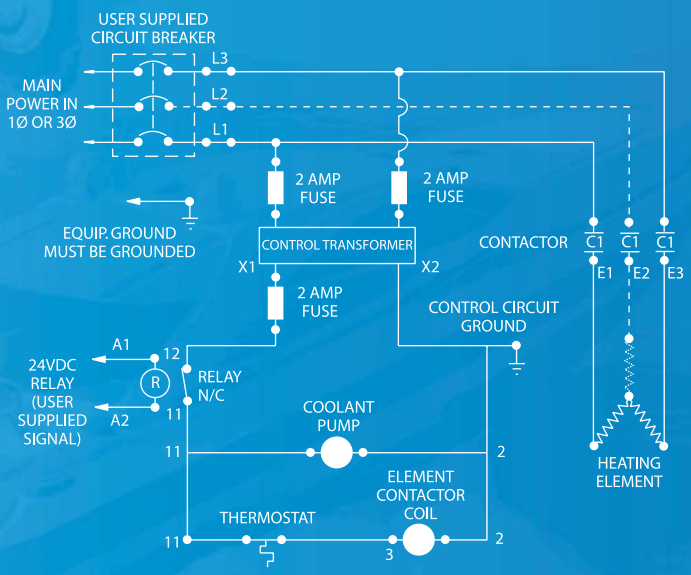

NOTES
A1, A2 TORQUE: 0.5 Nm
L1, L2 TORQUE IF BINDING SCREW: 2.3 Nm
L1, L2 TORQUE IF LUG: 4.5 Nm
GROUND LUG TORQUE: 0.7 Nm




### Standard Three Phase Systems




NOTES
A1, A2 TORQUE: 0.5 Nm
GROUND LUG TORQUE: 0.7 Nm

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# ENGINE HEATING PRODUCTS

## System Start-Up Check List

After system installation has been completed, follow these steps for proper coolant heating system start-up.

**Step 1** Check and tighten all electrical and plumbing connections.

**OPERATION OF HEATING SYSTEM WITH CLOSED ISOLATION VALVES COULD RESULT IN SERIOUS INJURY**

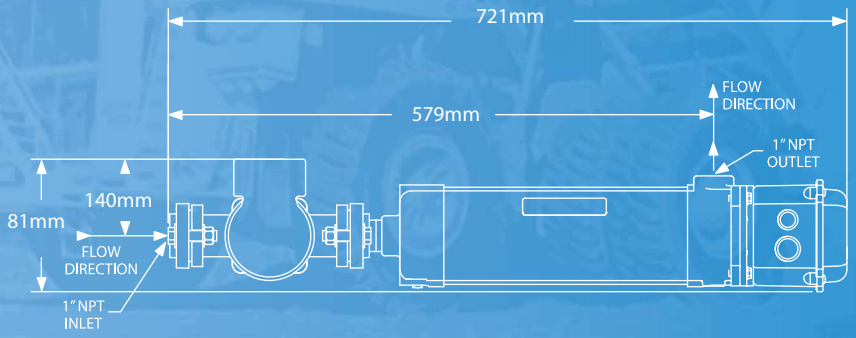
**Step 2** Ensure isolation valves are open before starting system.

**Step 3** After the heating system is mounted and the engine is refilled with coolant, loosen outlet flange at pump to bleed the air out of the system. DO NOT ENERGIZE THE HEATING SYSTEM AT THIS TIME. Run the engine until it reaches normal operating temperature to eliminate trapped air that may still be present in the engine's cooling system.

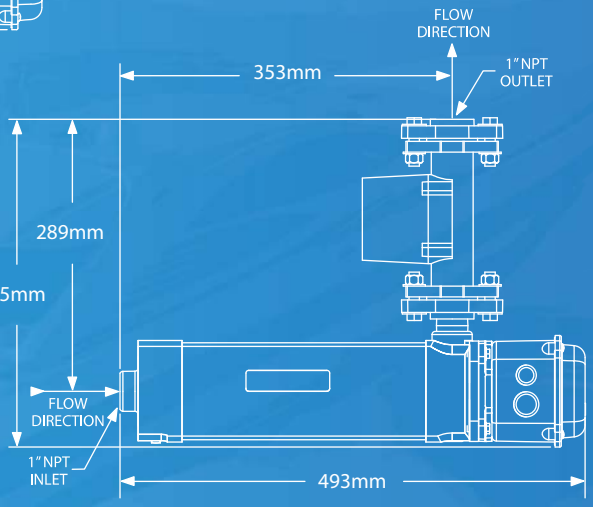
**Step 4** Standard systems are equipped with a fixed thermostat that is pre-set at 49 C.

## Optional type 112 / 312 Configurations Without Controls

For these systems, the end user/installer is responsible for providing the necessary controls needed to operate the heaters per the wiring diagrams on page 2. The system thermostat cycles the heating element on and off. When the heating system is energized the pump should run continuously. An appropriate shut-off device must be in place to de-engergize the heating system upon engine start-up.




Type 112 / 312 without Controls (Pump at Inlet)




Type 112 / 312 without Controls (Pump at Outlet)

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