THE HANDSOME HANDYMAN'S GUIDE TO RADIATOR REPAIR

JONACO MECHANICS DEPARTMENT

Brought to you in part by JONACO's B&R Department.

Introduction to Radiator Repair

Welcome to the wonderful world of radiator repair! By opening this manual, you have embarked on a fantastic journey of wonder and discovery. Radiators are an unknowable art, whose design and origins have been lost to time.

While many claim to be experts, and may even sustain long and successful careers working with radiators, the truth is we are all reaching in the dark. Radiators are magic, no one knows for sure how they work, much like birds. Aviankind have graciously allowed us to coexist with them, and even deigned to dazzle us with their majestic flight abilities, but have yet to bestow the secrets of their powers to us. It's impossible to fully understand how such meaty creatures can fly, just as it's impossible to fully understand how water can be used to heat metal. And anyone who claims they do understand are charlatans who will be purified in the righteous fires of the Echidna's shallows of doubt.

Come with me as we venture into the unknown, and explore the mysteries of hydronic heating.

Identifying the Problem

When repairing a radiator there are many issues that must be accounted for. Pipes needs tightening, PSI levels need adjustment. The safest way to ensure everything is in working order is to follow this order of operations.

1. Identify the type of radiator you are working on.(*Check the number of pressure valves, hot tanks, diamant cores, etc.)*
2. Re-connect the pipes from the Cold Tank to the Diamant Core.
3. Re-connect the pipes from the Diamant Core to the Hot Tank.
4. Adjust the PSI being received by the Core and the Hot Tank by adjusting the Pressure Valves to reduce the pressure as desired by the individual model.

Common Types of Radiators

Hummingbird Radiator

Most often used in small portable heaters, these minimally designed units are beginner friendly and easy to work on.

Core Components: 2 Pressure Valves, L01 Cold Tank, C-bD1 Diamant Core, CT-2r Hot Tank,

Barn Owl Radiator

These average size radiators are wall mounted and used for heating homes and businesses. While a bit more complex than the Hummingbird model it's the status quo of JONACO radiators.

Core Components: 8 Pressure Valves, L04 Cold Tank, C-dD3 Diamant Core, CT-6s Hot Tank,

Albatross Radiator

The largest of the mid range products, this radiator focuses not on heating, but rather cooling the power core of large machines. Every Jonabot in the ridge is installed with an Albatross to help maintain their delicate dual power cores.

Core Components: 5 Pressure Valves, L-15 Cold Tank, C-pD1 Diamant Core (right), C-pD8 Diamant Core (left), CT-2s Hot Tank

Thunderbird Radiator

Our largest JONACO radiator to date. The Thunderbird is the most ambitious radiator ever designed. Engineered specifically for blimp and dirigible engines, this behemoth is no easy task for even a team of repairmen to handle.

Core Components: 12 Pressure Valves, L-08 Tank, L-07 Tank, L-07 Tank, L-07 Tank, C-gD8 Core, C-bD3 Core, C-pD8 Core, CT-6r Hot Tank, CT-2t Hot Tank, CT-2r Hot Tank.

How Each Part Works

Core Cooling Jacket: *This receives cold liquid from the cold tank and distributes it around the diamant core to help keep it cool and stop it from overheating. The sum pressure of all inputs must stay within the diamant cores upper and lower bounds.*

Diamant Core: *Water must be fed into the cooling jacket, and drawn out from the diamant core. The core will heat cold liquid, increasing the pressure by a fixed coefficient determined by the diamant core model.*

Cold Tank: *A Cold Tank has a fixed output pressure of cold liquid, which it divides evenly between all pipes flowing out of it.*

Hot Tank: *A Hot Tank has several input pipes, through which it accepts hot liquid to be cooled down. The pressure of the Hot Tank must be kept between an upper and lower bound. These bounds are different depending on the Hot Tank model (as described in the equipment section.)*

Pipes: *Pipes are used to run water from point A to B.*

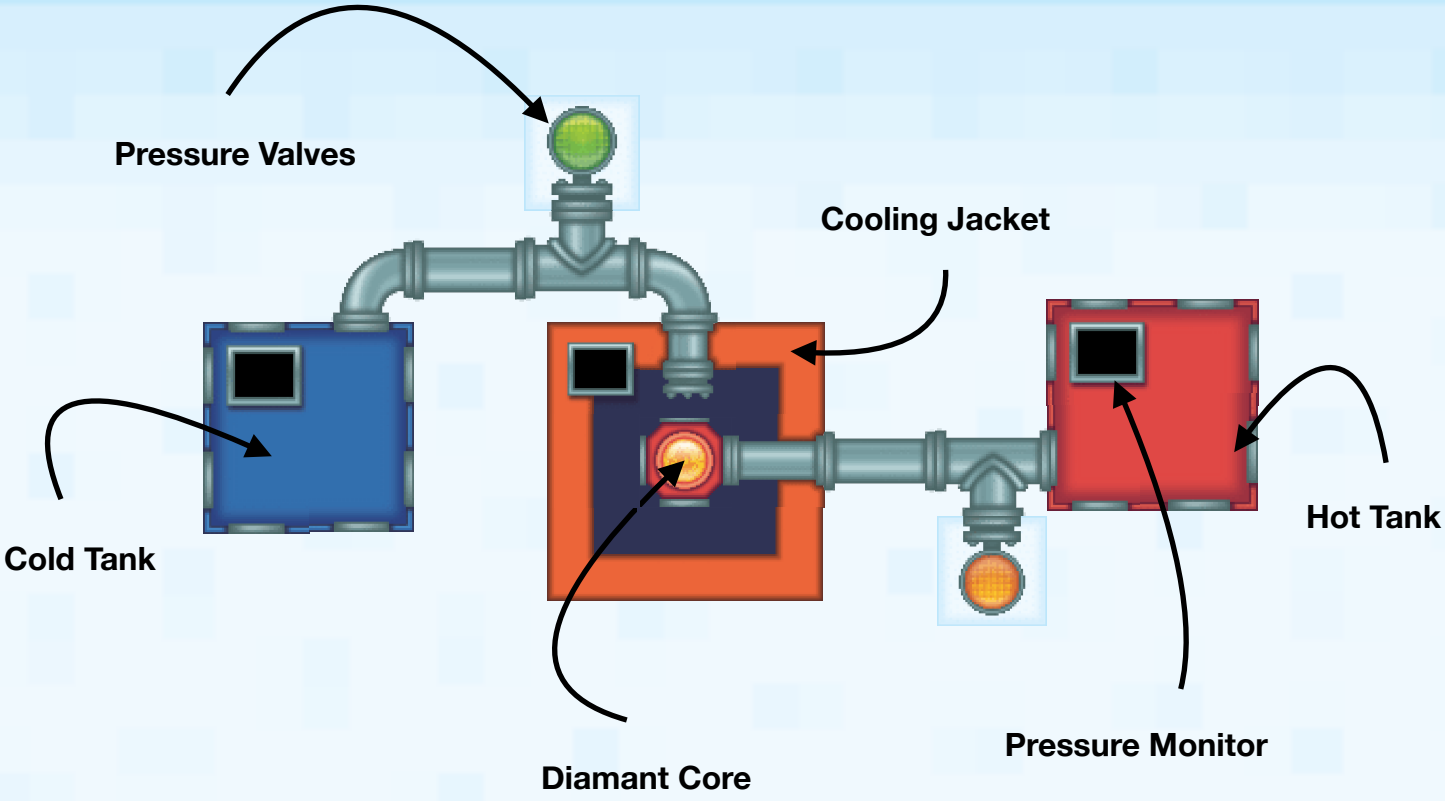
If a pipe splits in 2, then the pressure will remain the same in both pipes.

If 2 pipes merge into 1, then the resulting pressure in the merged pipe will be the sum of the 2 incoming pipes.

(50psi+50psi = 100psi)

All pipes must be connected. There can't be any dead-ends that aren't attached to another pipe, a pressure valve, an input, or an output. There cannot be any completely detached sections of pipe and there can't be any loops in the pipe.

Pressure Valve: *A Valve can be connected to a T junction pipe to turn it into a tap. You can make it reduce the psi by 20%, 50% or 100% of the water flowing through that section of pipe.*

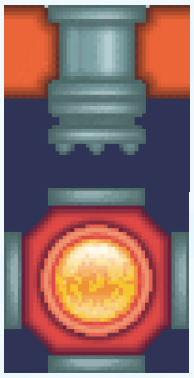


100% Pressure Flow

50% Pressure Flow

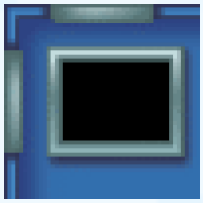
20% Pressure Flow

Cold liquid from the cold tank enters here.

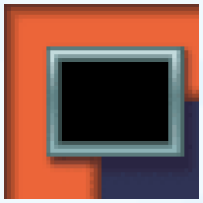


Warm liquid exits here and is sent to the Hot Tank

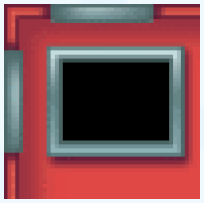
Displays total pressure being output by the Cold Tank



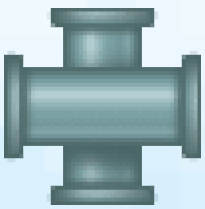
Displays total pressure the core is receiving before applying the coefficient



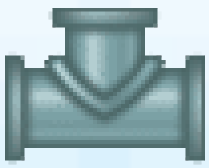
Displays total pressure that the Hot Tank is receiving from the core.



These crossing pipes allows different paths to overlap each other.



This pipe is used to join two paths together or to connect a pressure valve to the system.



Diamant Core Models

Model ID	Lower Bound	Upper Bound	Coefficient
C-bD1	45psi	55psi	3
C-bD3	180psi	200psi	2
C-dD3	120psi	140psi	2
C-pD8	550psi	600psi	0.8
C-pD1	420psi	450psi	1.2
C-gD8	900psi	1,000psi	2.5

Cold Tank Models

Model ID	Total Output
L-01	100psi
L-04	200psi
L-07	540psi
L-11	795psi
L-08	1,600psi
L-15	1,800psi

Hot Tank Models

Model ID	Lower Bound	Upper Bound
CT-2r	70psi	80psi
CT-6s	30psi	50psi
CT-2s	180psi	200psi
CT-6r	280psi	300psi
CT-2t	1,150psi	1,200psi

Core Principles

JONACO takes great pride in our wide variety of radiator units. From home heating to engine cooling we can do anything we want! However everything wears down eventually (except for Jonas-obviously,) so every radiator is designed with a remote patching system. No matter where you are, a JONACO handyman like you can repair a radiator from the comfort of your own home provided you have access to your grindstone app!

The basic idea of a how JONACO radiators works is as follows:

1. *Water from the **cold Tank** must be fed into the **cooling Jacket** surrounding the core.*
2. *The **diamant core's** pressure will be the sum of all inputs fed into the Cooling Jacket. It must be balanced between the upper and lower bounds using the pressure valves. The bounds are described in the diamant Core equipment section.*
3. *The core will then heat the cold liquid, increasing the pressure by a fixed coefficient determined by the diamant core model.*

e.g. Core pressure coefficient: 2

Cold Tank Inputs 100psi into the Cooling Jacket.

*Core Output Pressure: 2 x*100psi = 200psi*

1. *The core will output hot liquid evenly divided between all its outputs. This hot liquid must be fed to the Hot Tank to eventually be recycled.*
2. *Hot Tanks must also be balanced between the upper and lower bounds using **pressure valves** as described in their equipment section.*

e.g. *Core Output Pressure:* 200psi*

Hot Tank Bound Range: 70-80psi*

Valve 1: Reduce core output by 50%, Pressure: 100psi

Valve 2: Reduce core output by 20%, Pressure: 80psi