

INSTRUCTION MANUAL

MODEL RT490 REFRIGERATED CONDENSATION TRAP



The Model RT490 Refrigerated Condensation Trap condenses vapors of acid, aqueous, or organic solvents during vacuum evaporation, thereby protecting the vacuum pump. It is a reliable, high-speed, table-top unit with a cascaded, dual-compressor cooling system and microprocessor control for ease of operation.

**Caution. Read this manual carefully before operating the unit. You must follow the precautions to protect the Model RT490 and your vacuum pump.**

**Unpacking**

Carefully remove the unit from the shipping crate. Check each item against the packing slip. In case of damage, notify the carrier immediately and make sure that the carrier inspects and leaves an inspection report. Register any claims for shipping damage against the carrier or his agent. Save the shipping carton, at least until you begin operating the unit, in case you must return it for repair.

**Site Selection**

The RT490 is typically placed on a bench top. Locate it conveniently to a power outlet of the required voltage. The outlet must be on at least a 20 amp circuit. The RT490 draws high current when you switch it on. This means you should be sure that there is no other high power equipment on the same power line. Also be sure that other equipment on the same line will not be affected by a momentary drop in power.

**Adequate ventilation must be provided.** The RT490 is air-cooled and requires at least 4 inches of clearance at the rear and sides. It therefore takes a total of 26 inches of space on a bench at least 26.5 inches deep.

**The ambient temperature at the operating location must not exceed +90°F.**

**ASSEMBLY**

When you assemble the apparatus, you must include certain fixtures and accessories for effective operation and to prolong the life of the vacuum pump.

- **Glass Insert Trap.** Savant recommends the model GIT400 Glass Insert Trap for holding condensed vapors. The GIT400 allows rapid exchange between runs. It is easily cleaned. It protects the stainless steel trap chamber. **When evaporating corrosive (acid) vapors, a Savant GIT400 Glass Insert Trap must be installed.** The glass trap is connected to the concentrator and vacuum via 1/2" ID heavy wall tubing. Cryocool Heat Transfer Fluid should be added to the stainless steel trap chamber to carry heat away from the walls of the glass trap. Savant Quick-Fit Connectors allow easy changing of traps; one trap can be used while other is thawing.
- **Trap Closure.** You may trap vapors directly into the stainless steel trap chamber. To do this, you must install the Savant CP400 Closure Plate. It attaches to the silicone rubber gasket at the top of the trap chamber. This gasket must be clean in order to seal properly. Tubing to the concentrator and to the vacuum pump attach to the 1/2" fittings in the closure plate. **To minimize corrosion, clean the trap chamber and wipe it dry after every drying operation. Do not let more than 1500 ml accumulate in the trap chamber. Also wipe dry the rubber gasket; ice can form there which can cause vacuum leaks.**

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- **Chemical trap.** A chemical trap, such as the Savant SCT120, should be used to further protect the vacuum pump. Install the chemical trap between the refrigerated trap and the vacuum pump. Savant offers four different types of disposable cartridges to absorb residual vapors that escape the refrigerated trap. Use the:
  - 1) DC120W—When evaporating aqueous solvents.
  - 2) DC120A—When evaporating acid solvents.
  - 3) DC120M13—When evaporating organic solvent.
  - 4) DC120R—When evaporating radioactive samples.

### Routing the tubing

Connect the components as shown in the diagrams on the back page. The Savant QFK120-3 Quick-Fit Tubing Kit and the TP120 Tubing and Valving Package are designed for this apparatus and have all necessary fittings, tubes, and clamps.

The quick-fit tubing kit provides O-ring-sealed polypropylene fittings for vacuum tubing connections. They are especially suited for quick connection to and release from the glass insert trap. With the CP400 Closure Plate, the right angle fitting (1RQAT) provides more convenient connection and tubing layout than the straight fitting. **If you do not use quick-fit fittings, be sure that all lines are securely clamped, to ensure the best vacuum.**

Both the closure plate and the glass insert trap have an outer fitting and a center fitting. The center fitting is the inlet. Route the center fitting to the concentrator through the glass bleeder valve described below. Route the outer fitting to the vacuum pump intake (through the chemical trap, if present).

### Glass Bleeder Valve

(Savant GBV120) is included in the TP120 Tubing and Valving Package. This three-way valve is typically located near the concentrator. Keep the valve lightly lubricated with vacuum grease. The three modes of the valve are:

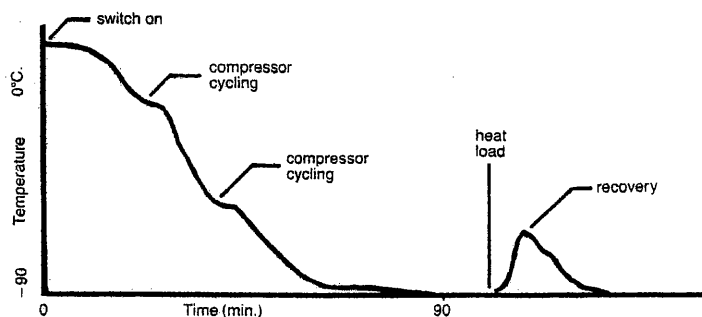
- **Normal operation.** When the valve head is in-line with the tubing, air can flow through the tubing (from the concentrator into the refrigerated trap).
- **End of drying run.** Turn the valve crossways so the "BLEED" arrow points to the concentrator. This bleeds the concentrator to atmosphere so you can lift the lid.
- **End of day.** As you shut off the RT490 (shutting off the vacuum pump), turn the valve crossways so the "BLEED" arrow points to the RT490. This bleeds the RT490 and vacuum pump to atmosphere. **You must do this at the end of a day to avoid drawing oil out of the vacuum pump into the apparatus.**

### PREPARING FOR OPERATION

Switch the RT490 off. Plug the RT490 into the wall outlet. Plug your vacuum pump into the outlet at the rear of the RT490. Switch the RT490 and the vacuum pump on. The RT490 will control power to the vacuum pump, to make sure the pump is off any time damaging vapors could reach it.

If you are using the glass insert trap, you must pour a heat transfer fluid into the stainless steel trap chamber. The heat transfer fluid carries heat away from the glass trap. A line scribed in the inside of the stainless steel trap indicates the approximate level of heat transfer fluid **when the glass trap is not present.** Carefully pour a sufficient amount of heat transfer fluid into the chamber. Either pre-measure 800 ml of heat transfer fluid or pour heat transfer fluid into the chamber until the liquid level reaches the scribed line. If there is already heat transfer fluid in the chamber, use the scribed line to determine the right amount of heat transfer fluid to add. **Always check for the formation of ice in the stainless steel trap which could hinder the chilling of the glass trap.** After preparing the chamber, install a clean, dry glass trap and fit the insulating cover onto the top of the chamber. Then attach the quick-fit connectors. Savant recommends use of either Savant Cryocool™ or reagent grade ethanol as the heat transfer fluid with this product.

### COOLING and RESPONSE TO LOAD Savant Model RT490 Refrigerated Trap



## OPERATION

After preparing the unit as described above, switch it on. **Immediately put your hand behind the unit and verify that you can feel air moving from the rear vent. If you cannot feel the air, switch off the RT490 at once. Operating the unit without a working fan, or with the air inlet or outlet blocked, will damage the unit.**

**Allow one hour for the RT490 to achieve ultra-low temperature (90 minutes if you are using the glass insert trap).**

### Front panel

The readout on the front panel usually displays the trap temperature. The "Pump On" light goes on whenever the RT490 applies power to the vacuum pump. When the "Pump On" light goes on, you can begin drying operations.

When you switch on the RT490, all the front panel lights come on for a few seconds as a test. In about 30 seconds, one of the two compressors in the RT490 starts. The RT490 operates one or both compressors as needed to achieve and maintain the ultra-low temperature. The digital readout shows the temperature of the trap, typically  $-90^{\circ}\text{C}$  or colder. During operation, the heat produced as solvent entering the trap may cause the trap temperature to rise.

On rare occasions, you will see "CO" (Compressors Off) on the front panel. This means the compressors have been on for a long time and the RT490 has shut them off for several minutes in order to equalize refrigerant pressures. This is a safety feature for optimal operation.

### Vibration

If the RT490 vibrates excessively, it may indicate a low line voltage. Check it with a voltmeter. The voltage should be above 108 volts for 120-volt units. The voltage should be above 209 volts for 220-volt units. Low line voltage tends to subject the unit to thermal overload.

## SERVICE

Always keep the unit clean and dry after use, especially around the rubber seals, so that it can maintain tight seals and a proper vacuum. If you are using a glass insert trap, verify the correct level of ethanol at the start of each day. Change the ethanol if ice begins to form in it and around the trap.

The refrigeration unit in the RT490 is a hermetically-sealed, dual-compressor system and does not require periodic maintenance. It can be serviced either by a local refrigeration repair service familiar with low-temperature systems, or by Savant Instruments, Inc. (Check with Savant before any repairs are begun.)

## WARRANTY

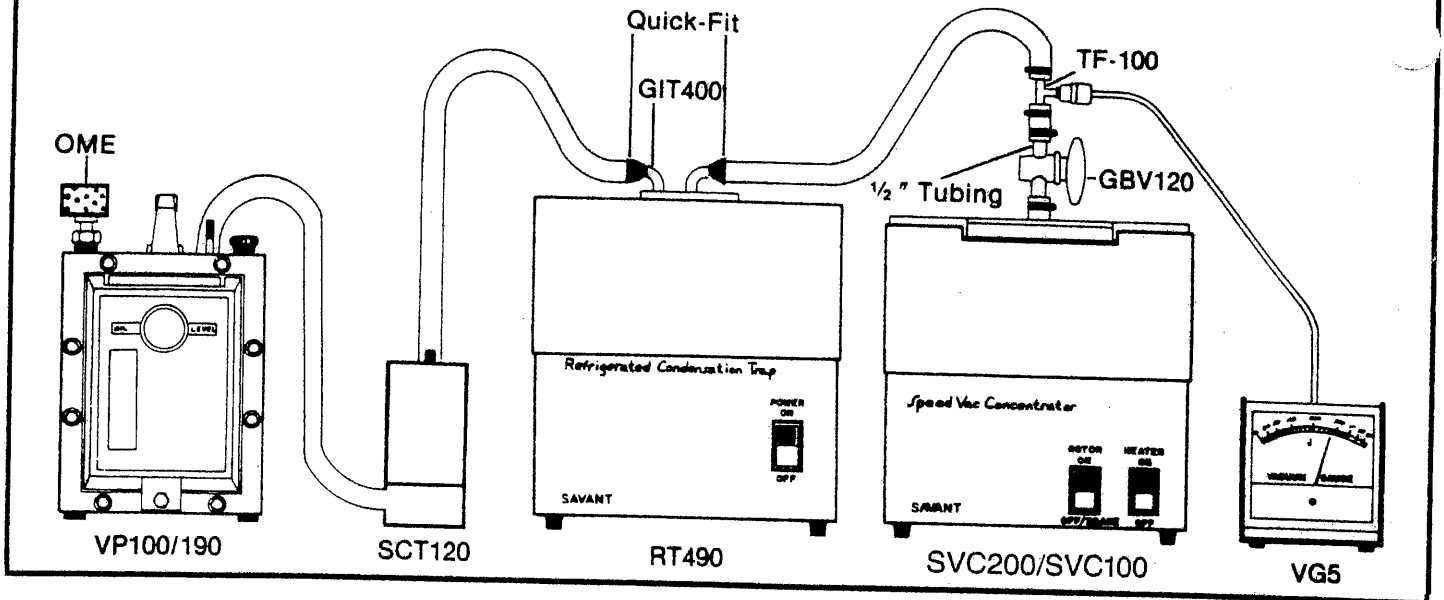
Savant's warranty is limited to defective materials and workmanship. Warranty work is subject to our inspection of the unit. The warranty obliges you to follow the precautions in this manual. Savant assumes no liability, express or implied, for your use of this equipment.

## SPECIFICATIONS

Input power	120 VAC, 50/60 Hz 6.0 ampere operating current 20.0 ampere maximum current at start-up
	220 VAC, 50/60 Hz 4.0 ampere operating current 10.0 ampere maximum current at start-up
Trapping capacity	GIT400 Glass Insert Trap: 1.2 litres Stainless steel chamber: 1.5 litres
Trap temperature	$-90^{\circ}\text{C}$
Operator controls	Power switch
Operator indicators	Trap temperature ("CO" indicating Compressors Off) Pump On light Pump Off light
Dimensions	Height 32 cm. (12.75 in.) Width 46 cm. (18 in.) Depth 57 cm. (22.50 inches) Weight 42 kg. (92 lbs.)
Vacuum Pump	Plugs into receptacle into back of refrigerated trap Automatic power shutoff to vacuum pump if cold temperature fails 0.5 HP maximum rating allowed on vacuum pump

### TYPICAL SYSTEM WITH GLASS TRAP

This system is best suited for mineral and organic acids. The illustration below shows components required for this system. Refer to listings for prices of component parts.



We recommend the addition of an alkali trap to protect the pump from excessive acid that could escape the trap under some conditions.

### TYPICAL SYSTEM WITH CLOSURE PLATE

This system should be used for non-corrosive solvent evaporation. The illustration below shows components required for this system. Refer to listings for prices of component parts.

