



Innovation and Leading Technology

ecopure

SOLVENT RECYCLERS SR 30-30V & 60-60V



MODEL SR30 PART # 325030

MODEL SR60 PART # 325060

MODEL SR30V PART # 324022

MODEL SR60V PART # 324026

-  Warranty
-  Safety
-  Operation

-  Service Parts
-  Accessory Information
-  Registration Form



CSA Listed Mark - Canada / United States
Conforms to UL2208
Certified to CSA C22.2 No. 30

INSTRUCTION MANUAL & PARTS



Table of contents

Page

ECO LIMITED WARRANTY	4
SOLVENT RECYCLER SPECIFICATIONS	5
SAFETY AND WARNINGS	6
SAFETY AND WARNINGS (CONT'D)	7
SAFETY RULES (CONT'D)	8
SAFETY RULES (CONT'D)	9
OPERATING PRINCIPLES OF THE DISTILLATION UNIT	10
AIMS (CONT'D)	11
WARNING FOR THE DISTILLATION UNIT	12
PROTECTION OF THE NATURAL ENVIRONMENT.....	13
DISTILLER ELECTRICAL CONNECTIONS	14
INSTALLATION DRAWINGS AS PER NFA CODES (CONT'D).....	15
KEYBOARD OPERATIONS	16
KEYBOARD OPERATIONS (CONT'D).....	17
STARTING PROCEDURES.....	18
SELECTING TEMPERATURE AND DURATION OF THE CYCLE.....	19
STARTING THE UNIT	20
FLAMMABLE SOLVENTS	21
NON - FLAMMABLE CHLORINATED SOLVENTS	22
THERMIC OIL CHANGING PROCEDURE	23
DEFECTS, CAUSES AND REMEDIES (CONT'D).....	24
DEFECTS, CAUSES AND REMEDIES (CONT'D).....	25

Table of contents

	Page
SR30 - SCHEMATIC OF UNIT.....	26
SR60 - SCHEMATIC OF UNIT.....	27
SCHEMATIC OF UNIT - TOP PART SR30	28
SCHEMATIC OF UNIT - TOP PART SR60	29
SCHEMATIC OF UNIT - OIL CHANBER SR30 & SR60.....	30
SCHEMATIC OF UNIT - BACK OF UNIT SR30V.....	31
SCHEMATIC OF UNIT - CONTROL BOARD	32
SCHEMATIC OF UNIT SR30 - POWER SUPPLY KIT (307050).....	33
ELECTRICAL DRAWING SR30 WITH ONE HEATER OF 2500 W	34
ELECTRICAL DRAWING SR60 WITH ONE HEATER OF 5000 W	35
VACUUM OPTION DIAGRAM.....	36
VACUUM DISTILLATION SECTION (OPTION).....	37
VACUUM DISTILLATION SECTION (OPTION) CONT'D	38
VACUUM DISTILLATION SECTION (OPTION) END	39
VACUUM DISTILLATION — OPERATING PRINCIPAL DRAWING	40
INSTALLATION (AT VACUUM CONDITION)	41
SR30 VACUUM DISTILLATION SECTION (OPTION) CONT'D.....	42
SR60 VACUUM DISTILLATION SECTION (OPTION) CONT'D.....	43
VACUUM INSTALLATION	44
IMPORTANT ADVICE	45
DEFECTS, CAUSES AND REMEDIES (CONT'D).....	46
WARRANTY INFORMATION / TECHNICAL ASSIATANCE	47
ECO WARRANTY REGISTRATION.....	48



ECO LIMITED WARRANTY

ECO warrants all equipment listed in this manual which is manufactured by ECO and bearing its name, to be free from defects in material and workmanship on the date of sale by an authorized ECO distributor to the original purchaser for use. Notwithstanding any special, extended or limited warranty published by ECO will, for a period of TWELVE (12) months on the complete system, and TWELVE (12) months on the air diaphragm pump from the date of sale, repair or replace any part of the equipment determined by ECO to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with ECO's written recommendations.

This warranty does not cover, and ECO shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-ECO component parts. Nor shall ECO be liable for malfunction, damage or wear caused by the incompatibility with ECO equipment with structures, accessories, equipment or materials not supplied by ECO, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by ECO.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized ECO distributor for verification of the claimed defect. If the claimed defect is verified, ECO will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser, transportation prepaid. If the inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

ECO's sole obligation and the buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought forward within one (1) year of the date of sale.

ECO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY IST. These items sold, but not manufactured by ECO (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. ECO will provide the purchaser with reasonable assistance in making any claim for breach of these warranties.

LIMITATION OF LIABILITY

In no event will ECO be liable for indirect, incidental, special or consequential damages resulting from ECO supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of ECO, or otherwise.

Report all accidents or "near misses" which involve ECO products to:

- **Technical Assistance**

The following items are not covered under the ECO warranty policy:

- Seal or packing and hose replacement due to normal wears.

Defective material or workmanship is not considered normal wear.

ECO Information

All written and visual data contained in this document reflects the latest product information available at the time of publication. ECO reserves the right to make changes at any time without notice.

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SOLVENT RECYCLER SPECIFICATIONS

SPECIFICATIONS	SR 30		SR 60	
Units system	Imperial	Metric	Imperial	Metric
Geometrical capacity of boiler	9 US gal	35 L	18 US gal	67 L
Useful capacity of boiler	8 USgal	30 L	16 US gal	60 L
Operating temperature	104°-360°F	40°-180°C	104°-360°F	40°-180°C
Solvent protection	Class 1, Div. 1, Group D			
Solvent temperature	class 310 °C			
Absolute operating pressure	223 – 1,000 hPa			
	170 –760 mmHg			
	-0.223 – 1 bar			
Relative operating pressure	-776 – 0 hPa			
	-590 – 0 mmHg			
	-0.776 – 0 bar			
Time per cycle of distillation	3.5 to 4.5 hours (estimate)			
Yield	85% — 97%			
Cooling system	Motor Fan 1/8 hp		Motor Fan 1/2 hp	
Boiler material	Stainless steel AISI 304			
Cover material	Stainless steel AISI 304			
Condenser material	Copper (standard) / Stainless steel (optional)			
Voltage	240 V – 1 Ph – 60 Hz		240 V – 1 Ph – 60 Hz	
Power consumption	2560 W		5320 W	
Amperage	11.9 A		23.4 A	
Thermic oil capacity	2.7 gal	10 L	5.3 gal	20 L
Dimensions	26" L x 26" D x 62" H	mm : 650x 650 x 1550	30" L x 32" D x 76" H	mm : 750x 800 x 1900
Weight	350 lb	159 lb	578 lb	263 lb
Warranty	12 months standard warranty additional 12 months extension with returned warranty card			

SAFETY AND WARNINGS

GENERAL SAFETY

1. Carefully inspect the shipping crate for any signs of transport damage. The damage to the crate often indicates possibility of transport damage to the equipment inside.
2. Carefully remove your ECO Recycler Cabinet from the shipping crate.
3. Check your equipment immediately to ensure that it is free of transport damage. Report any transport damage to the carrier without delay for possible claim procedures. ECO Industry inc. is not responsible for damage to equipment after it leaves our warehouse.
4. Check the equipment list and compare it with the parts you have received. If any parts are missing, contact the supplier you purchased the equipment from.

Before operating the ECO Recycler Cabinet, read this Instruction Manual completely. All ECO products are engineered and manufactured to the highest performance standards and have been subjected to detail testing before shipment from the factory.

DANGER AND WARNING LABELS



1. Presence of flammable vapors and solvents
2. No smoking or metal grinding nearby
3. Keep away from open flames
4. Wear breathing mask
5. Observe warnings at all times.
6. Read the Instruction Manual carefully.
7. Wear solvent-proof rubber gloves.
8. Wear protective eyewear before use.

SAFETY AND WARNINGS (CONT'D)

WARNING

« **READ ALL INSTRUCTIONS** » Failure to follow the **SAFETY RULES** identified by a **BULLET** (●) symbol listed **BELOW** and other safety precautions may result in serious personal injury.
« **SAVE THESE INSTRUCTIONS** »

GENERAL SAFETY RULES

- **KEEP WORK AREA CLEAN.**
- **KEEP CHILDREN AWAY.** Do not let visitors come in contact with the equipment. All visitors should be kept away from the work area.

PERSONAL SAFETY

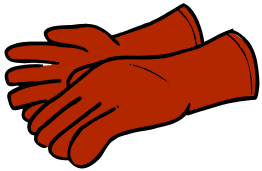
- **DRESS PROPERLY.** Do not wear loose clothing or jewelry. They can be caught in the moving parts. Wear protective hair covering to contain long hair.
- **USE SAFETY EQUIPMENT. WEAR SAFETY GOGGLES** or glasses with side shields.
- **STAY ALERT. USE YOUR COMMON SENSE.** Concentrate on what you are doing. Do not operate the unit when you are tired or under the influence of drugs or alcohols.
- **DO NOT OVERREACH.** Keep proper footing and balance at all times.

UNIT USE AND CARE

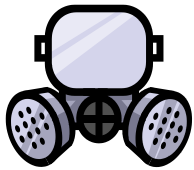
- **DO NOT FORCE THE UNIT.** It will perform better and safer at the rate for which it was designed.
- **THE USE OF ANY OTHER ACCESSORIES** not specified in this manual may create a hazard.
- **CLOSE THE MAIN AIR SUPPLY VALVE AND MAIN POWER DISCONNECT BEFORE SERVICING** or when not in use.
- **DO NOT ALTER OR MISUSE THE UNIT.** These units are precision built. Any alteration or modification not specified is misuse and may result in a dangerous situation.

Only trained repairmen should attempt (●) **ALL REPAIRS**, electrical or mechanical. Contact the nearest ECO a repair service facility. Use only ECO replacement parts, any other parts may create a hazard.

SAFETY RULES (CONT'D)

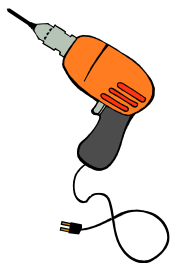


- **THE OPERATOR MUST WEAR** protective water-proof rubber gloves to prevent contact between his hands and the products used for washing.



- **THE OPERATOR MUST WEAR** protective eyewear to prevent spatter from coming in contact with his eyes.

- **STAY ALERT** at the start of the wash cycle. Make sure the liquid solution is not «corrosive» or flammable. Immediately stop the using and replace the solvent whenever you note signs of corrosion on the unit.
- **IF EYES COME IN CONTACT WITH SOLVENTS** rinse thoroughly with water.
- **BEFORE USING** the Solvent Recycler, make sure that all safety devices are in perfect operating condition.
- **BECOME FAMILIAR WITH THE CONTROLS** and their functions before commencing work.
- **BE CAREFUL** when you load or unload the solvent in the unit. Make sure you do not splash or spill the contents on the workshop floor.
- **THE OPERATOR MUST PERIODICALLY** check the level of the solvent contained in the equipment to be sure to not run this pump dry.



- **DO NOT USE ELECTRICAL OR PNEUMATICAL TOOLS WITH THE UNIT. AVOID GASEOUS AREAS.** Do not operate portable electric tools in explosive atmospheres in the presence of flammable liquids or gases. Motors in these tools normally spark, and do not scrape or scratch the machine with metal objects; the sparks might ignite fumes.

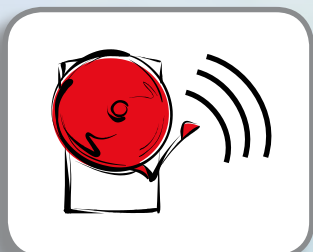
- **DO NOT ALLOW FAMILIARITY GAINED FROM FREQUENT USE OF YOUR WASHER TO BECOME COMPLACENCE.** Always remember that a careless fraction of a second is sufficient to inflict severe injury.
- **DO NOT ALTER OR MISUSE THE UNIT.** Any alteration or modifications is a misuse and may result in serious personal injuries.

SAFETY RULES (CONT'D)

- **COMPLY WITH LAWS IN THE COUNTRY** where the washer is installed regarding the use and disposal of the products used to wash clean objects.



- **FIRE EXTINGUISHING SYSTEMS** must be installed in the same room or close to the unit in case of emergency. These appliances must be kept efficient and inspected every year by a certified person.



- **THE INSTALLATION SITE MUST PERMIT PERSONNEL TO EASILY AND QUICKLY MOVE AWAY FROM DANGER ZONES IN CASE OF AN EMERGENCY.**

- **DO NOT USE THE UNIT TO** wash or degrease objects designed to come in contact with food.

- **COMPLY WITH LAWS IN THE COUNTRY** where the Solvent Recycler is installed regarding the use and disposal of the products used to wash clean objects.



- **DO NOT USE UNSTABLE REACTIVE** avoid distilling solvent that may include unstable reactives, such as nitrocellulose.

THINK SAFETY! SAFETY IS A COMBINATION OF THE OPERATOR'S COMMON SENSE, KNOWLEDGE OF THE SAFETY AND OPERATING INSTRUCTIONS AND ALERTNESS AT ALL TIMES WHEN THE UNIT IS BEING USED.

OPERATING PRINCIPLES OF THE DISTILLATION UNIT

This PLC controlled solvent recycler, will recycle many different types of solvents that have been contaminated by paints, pigments, inks, greases, oils, etc. Through the simple distillation process, the distiller separates the contaminants from the original solvent.

The boiling of the polluted solvents consists of a boiler surrounded by a reservoir containing thermal oil, heated by an electrical resistance. The solvent vapors produced in the boiler are eventually conveyed in an solvent cooled drum and then brought back to their liquid state. The cooled solvent is gathered in a clean stainless steel collecting tank, ready to be re-used again. The process does not alter the characteristics of the distilled solvent. Consequently, the operation can be performed endlessly.

The residues remains inside the boiler and can be unloaded when cold. It is recommended to use a liner bag (Part #300006 for SR 30, #300019 for SR 60, for information contact the authorized reseller) to be placed inside the boiler. These bags facilitate the unloading of residues at the end of the distillation cycle.

The cycle is completely automatic. The operator only has to close the lid, touch the START button and remove the residues at the end of the cycle.

In case of malfunction, abnormal increase of temperature or power failure, the cycle is automatically STOPPED and the recycler CANNOT be re-started until the problem has been resolved.

AIMS

The aims that can be achieved with ECO distillation units are :

1. Solvent recycling with the highest yield possible.
2. Obtaining «special» and not «toxic and noxious» residues.
3. Reducing intervention times and operator discomforts.

As « Solvent / Contamination product » topologies are so different that there is no such rule valid for all cases, we will try to summarize providing general information that may be useful to you. Experience will later on help you find the most adequate method of meeting your requirements.



The products to be recycled normally consist of :

Solvent or Reducer + Contaminated Products

● Solvent

« Solvent » defines the liquid, which, without reacting chemically, dissolves other substances (solutes), forming a solution.

As every solvent has its own boiling temperature, we must (in order to distill the solvents) set the thermostat at a higher working temperature of about 10°C to 50°C (30°F to 80°F) than the boiling point.

● Reducer

A mixture of solvent is defined as a « reducer ».

As every solvent component in the mixture has its own boiling temperature, in order to proceed to the distillation of a reducer, set the thermostat at a working temperature of about 10°C to 50°C (30°F to 80°F) higher than the boiling point of the most high-boiling solvent.

AIMS (CONT'D)

● Chlorinated Solvents (these solvents can be recycled with the SR30V-SR60V-SR120V or SR180V only)

Chlorinated Solvents are **non-flammable solvents**, generally utilized for cleaning and degreasing metal surfaces. Normally, these types of solvents are polluted by **oil, grease**, etc.

Atmospheric pressure distillation of chlorinated solvents will result in a partial recovery, leaving a distillation residue containing about 20% of solvents. This occurs when the oil contents in the boiling solution increases; therefore the mixture distillation temperature rises.

These solvents are thermalable, meaning that when they exceed their specific critical temperature they decompose causing the formation of hydrochloric acid. This acidifies the product and therefore cannot be reused. When operating with atmospheric pressure, and reaching this critical temperature, we shall have distilled only 80% of the solvent.

Operating with a vacuum will allow you to achieve a yield of 100%, as you do not reach the critical temperature (vacuum kit is optional).

● Liquid Polluting Products

The most common liquid contamination products are :

Oil, Ink and Water

The presence of liquid contamination may (in the distillation phase) drag contaminants into the clean product, leaving traces in the distillate.

For different types of oil and ink with particularly high boiling temperature, this problem normally does not occur and the process of separation may be obtained with a simple distillation.

If there is «**water**» in the contaminated product, you **must recycle** with a **fractional distillation**. This operation is not possible with a simple distillation process.

Unloading a liquid polluting product from the distiller presents no problem. It is possible to obtain a complete separation of the polluting product from the reducer.

This complete separation is not possible when **Chlorinated Solvents** are to be distilled under atmospheric pressure.

For these solvents it is necessary to proceed with a «**vacuum**» distillation. This process allows you to obtain a residue without solvent.

● Solid Polluting Products

The most common solid polluting products are :

Resins, Pigments, Paints, Polymers, Glue, Powder, Grease, etc.

Solid polluting products, according to their nature, already classified as «toxic and noxious» have the advantage (in comparison to liquid contamination products). They can be unloaded into controlled waste dumps, as they do not release toxic substances into the ground. However, this is on the condition that the percentage of solvent will not exceed that of the Concentration Limit (CL) – a value legally stabilized for different types of solvents used in different Countries.

By distillation, and this is another considerable advantage, you can obtain an extremely pure distilled product as there will be no contaminants dragged into the distilled product.

The disadvantage, in comparison with liquid polluting products, is a greater difficulty in cleaning the distillation unit.

Leave a minimal percentage of solvent (3-10%) with the contaminants in the solution of residue, in order to obtain a semi-solid residue, and therefore will be easily discharged.

These percentages, however, are greater than the Concentration Limit (CL) accepted for the disposal in controlled dumps.

WARNING FOR THE DISTILLATION UNIT

The operating staff must be fully instructed on the use and function of the unit as well as on the correct application of the protection devices. The instructions must be repeated in regular intervals.

It is essential to keep the Instruction Manual inside the door slot or close to the unit.

Operator must wear anti-static clothes, avoiding clothes made of synthetic material (nylon, rayon, etc.).

Open the cover only after the unit has cooled down, with the control board indicating less than 100°C (212°F).

When unloading residues, it is recommended to use solvent resistant gloves and an anti-vapor mask.

Do not use any metallic tools as they could provoke sparks.

The unit must undergo a revision and control according to its grade of use. Maintenance must be carried out by qualified personnel and according to the indications of the Manufacturer.

It is important to pay attention to the control of the security installations: thermostats, flow controls, thermocouple detectors, switches of safety levels, aspirators, etc.

Before using a distillation unit, which has been out of use for a long time, it must be checked and brought back into optimal condition in order to guarantee the operator's security at all times.

According to the type of liquid to be distilled and the kind of operation to be performed, it is important to adopt adequate personal protection rules.

If you are not using plastic bags, the residues must be cleaned with tools that do not provoke sparks.

The cover works as a safety valve. If you notice steam leaking from the cover, immediately shut down the recycler and consult page 19, « **Defects, Causes and Remedies** ». In any case, never modify in any way the parts on top of the cover or block the cover in order to avoid the steam from leaking.

Nitrocellulose which is an ester of cellulose and nitric acid and is a component in many lacquers, inks, adhesives and cements cannot be recycled. It automatically **ignites** at 135°-166°C (275°-330°F) and can be extremely volatile.

It is important to clean the boiler thoroughly after each cycle, as a build up of residue will stop the transmission of heat and cause a malfunction.

If repairs are necessary shut off the power supply **IMMEDIATELY**.

Do not smoke, cause sparks or use open flames near the recycler.

This unit is for use in a 40°C (104°F) environment with no forced ventilation. Under these conditions, the unit shall be spaced a minimum space according to national regulation from potential sources of ignition such as electrical receptacles, switches, pilot light fixtures, contacts and other similar equipment that can produce sparks. If the equipment is used in higher ambient temperatures an increase in spacing from sources of ignition shall be considered.

This unit has been tested for use with the solvents indicated in the Instruction Manual (see tables on pages 21-22, « **Flammable Solvents and Non-Flammable Chlorinated Solvents** »).

PROTECTION OF THE NATURAL ENVIRONMENT

The user must provide protection of the environment so that the recycler may not be the cause for emission of vapors or odors and that the residues are treated and disposed of in a correct way as per local laws regarding waste residues.

Installation

If the unit is installed in a small closed room like 10' x 10' than it has sufficient natural or artificial air ventilation. If installed in explosion proof room or mixing room for paint ink... there is no need to had additional ventilation.

Places and zones with sufficient artificial air ventilation are those with such ventilation capacity as to change air circulation ten times per hour. The outlet of the unloading air channels must be placed in a way that the evacuation of emerging vapors does not cause any form of danger.

Complete air circulation should be provided in case of artificial air ventilation.

Air ventilators or their motors should be explosion proof.

Make sure that the emergency exit is easily accessible.

The distillation unit must be positioned near one door that leads to an exit door.

Place a fire extinguisher near the unit (for fire type B and C).

Keep a distance of at least 24 inches between the unit and any object to allow the recycler to cool off, and be able to perform the maintenance if necessary.

Place the unit on a flat surface away from heat, sparks and any source of flames.

Connect permanently the unit to an efficient grounding pole.

Place a container of at least twice the capacity of the boiler, 15 gallons or more for the A8, 30 Gallons or more for the A15.

The power outlet is located on the back of the unit. The SR30 unit should be permanently connected into a 240 volt single phase, 15 amps explosion proof electrical line. The SR60 unit should be permanently connected into a 240 volt single phase, 30 amps explosion proof electrical line

When service or maintenance work is required, disconnect the main breaker switch before servicing or for maintenance work.

DISTILLER ELECTRICAL CONNECTIONS

Provide for the installation of an adequate (CSA or U-L approved as per NFPA regulation and local authorities).

For the current and voltage specifications, refer to the nameplate on the right side panel.

It is suggested to locate the above-mentioned electrical box, at a height of 5 to 6 feet from the floor.

N.B. : An adequate explosion installation must be provided for the solvent recycler and all other components around (for example: protection type Class 1, Div. 1, Group D, with increased safety).

Once the electrical connections are complete, open the main breaker for the recycler and the keyboard light will be « **ON** ».

Each time the power is closed and re-opened, the ECO electronic keyboard will self-test itself. During **5 seconds**, all 5 lights and all 5 digits of 7 segment lights will stay on. Then the keyboard will display its own programming version (example: r 6.0) for a few seconds and then the thermometer light will stay « **ON** » and the actual temperature of the thermic oil will be displayed.

The control board is « **READY** » for instructions.

Installation drawings as per NFA codes

DATA & SPECS

Electrical Requirements

Amp Draw listed for entire unit — including motor and heating element

Model	Full load Amp Draw			Location	
	220V	480V	600V	Non-classified area	In mix room/ classified area
SR 30	11.7	—	—	<ul style="list-style-type: none"> General purpose disconnect Min. 5 ft away from unit Min 18" off the floor 	Explosion proof disconnect required
SR 60	23.4	—	—		
SR 120	—	14.5	11.3		
SR 180	—	20.8	15.0		

Air Requirements

Item	Air Line Specifications	cfm	Notes
Gun cleaner	3/8" @ 100 psi	20	Factory set at 85-90 psi
SR30V-60V	3/8" @ 100 psi	5	
SR120V-180V	1/2" @ 100 psi	10	

Oil

Model	Capacity	Description
SR 30	10 liters oil	ECO Thermic Heat Transfer Oil
SR 60	20 liters oil	Part # 330066 — 4 liters
SR 120	55 liters oil	Part # 330067 — 10 liters
SR 180	55 liters oil	Part # 330068 — 20 liters

Recycler Bags

Model	Part number
SR 30	300006
SR 60	300019
SR 120	300008
SR 180	300009

Filters

Item	Model	Description
Gun washer	GWMA	20" x 25" Fiberglass filter
	GWM	

CODE INFORMATION

ECO offers a complete line of spray gun cleaners and solvents recyclers that conform to the requirements of :

- NFPA-33 Standard for spray application using flammable and combustible materials.
- NFPA-30 flammable and combustible liquid code
- IFC : International Fire Code

The recycler has been certified and listed :

- UL 2208 standard for solvent distillation unit

The recycler has been reviewed and approved by :


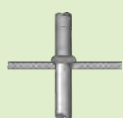

- CSA for U.S. & Canada requirements report #154896

Conformity of all these requirements is dependent upon the manner in which the equipment is installed. The contractor will make certain that all of the electrical wiring and conduit, piping, gas supply, roof penetrations, automatic fire protection systems, and the location of the equipment within the building also conforms to the cited codes and the other references.

EXHAUST INFORMATION

Model	Description	Preferred exhaust option	Notes
GWA	3" diam. exhaust	Separate Exhaust stack (see below)	Exhaust must run straight out and vertical of the gun cleaner for approx. 3-4 ft before making any offsets
GWM GWMA	6" diam. exhaust	Attach to mix room exhaust or separate exhaust stack (see below)	

EXHAUST OPTION

<p>Attach to mix room exhaust</p>  <p>Mix room duct</p> <ul style="list-style-type: none"> - The preferred method is to make connection to the suction side of the blower. - If connection is required to be on the push side of the blower, use a gravity damper. Connection should be made of an angle + or > 45 degrees. 	<p>Separate exhaust stack</p>  <ul style="list-style-type: none"> - This will require an additional roof penetration
<p>Exhaust flex connector — GWM / GWA</p>  <p>Use flex duct connector for 2-3 feet. This will allow future service access to control panel.</p>	

EXCLUSIVE RIGHTS

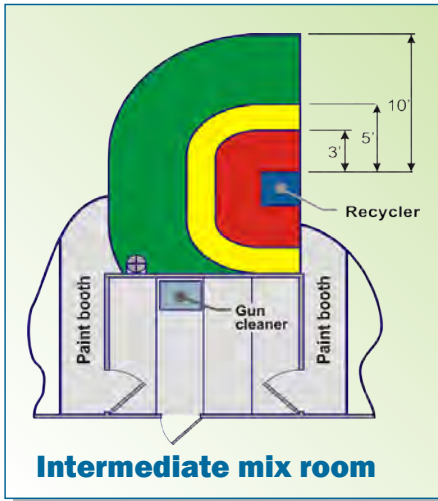
This drawing is the exclusive property of ECO inc. and informations contained herein can be used only when specifically authorized by ECO inc. Possession of this drawing does not authorize use nor transmission to any other organisation.

GENERAL ARRANGEMENT

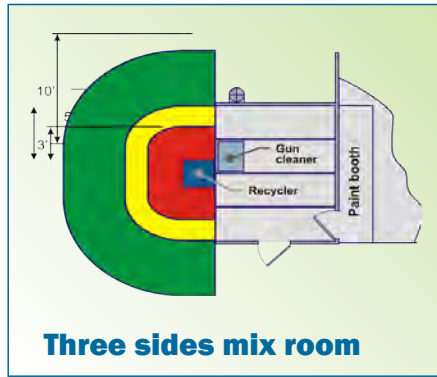


4160 Industrial Blvd. Laval, Quebec, H7L 6H1
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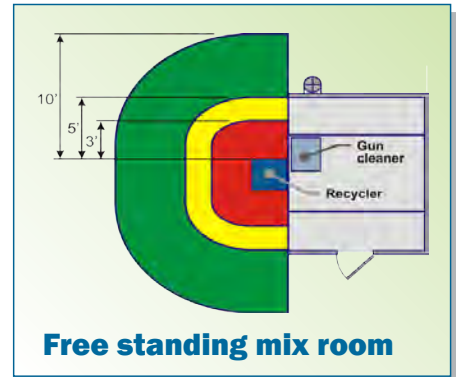
INSTALLATION DRAWINGS AS PER NFA CODES (CONT'D)



Intermediate mix room



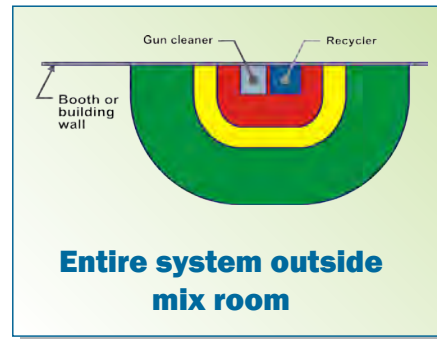
Three sides mix room



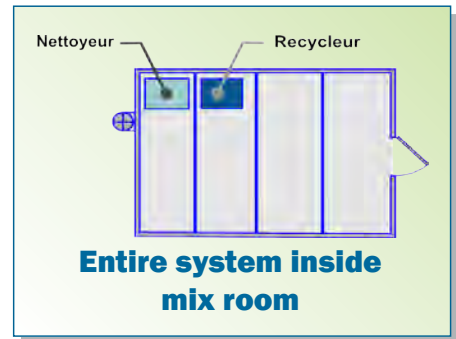
Free standing mix room

Legend

- Class 1 - Div 1
- Class 1 - Div 2
- Class 1 - Div 2 18" High only



Entire system outside mix room



Entire system inside mix room



Classification zones as per :

- A) NFPA 33 standard for spray application using flammable and combustible materials, sections 4.3.5
 - B) International fire code, chapter 34 flammable and combustible liquids 3403.1.1
- Zone requirements apply to both gun cleaners and recyclers together and stand alone.

EXCLUSIVE RIGHTS

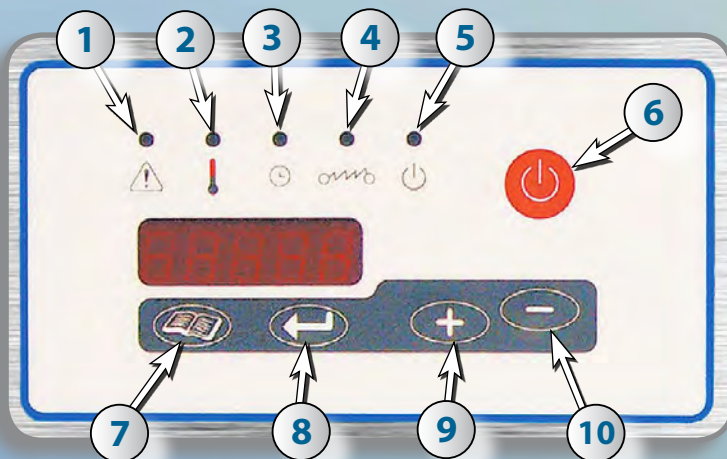
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GENERAL ARRANGEMENT



4160 Industrial Blvd. Laval, Quebec, H7L 6H1
Tel.: 1 800 -361-1185 / 450 963-2200 Fax : 450 963-5122

Keyboard operations



Keyboard Symbols :

1. Trouble
2. Temperature
3. Time
4. Electric Heater
5. Start/Stop (light)
6. Start/stop (button)
7. Menu
8. Enter
9. Increase
10. Decrease

KEYBOARD OPERATIONS

This ECO temperature control board has been designed to control the different cycles during the distillation operation. It controls the temperature of the thermic oil, vapors and the distillate solvent coming out of the condenser. It uses this information to maintain a constant temperature, starts the cooling fan to cool the vapors coming off the condenser and stops the cycle if necessary.

Two heat sensors are used to read different temperatures. The thermic oil and the distillate solvent temperatures are captured using two thermocouples (because of high temperatures rising up to 175°C (343°F)). These sensors assure precision of the readings of the temperatures of $\pm 1^\circ\text{C}$ ($\pm 2^\circ\text{F}$).

The ECO board also totals the number of hours of operation of the recycler. **For every 2000 (two thousand) hours of operation, the display code «OIL» will appear to remind you that it is time to replace the thermic oil follow the steps on page 23 to 25.** The code «OIL» will remain displayed for ten (10) hours and then will disappear.

The display board consists of 5 digits of 7 segments, of 5 independent LEDs and of 5 touch-tone keys (7, 8, 9, 10 and 11) to operate the distiller. The operator can program the temperature, select the amount of time for the cycle, start or stop the cycle, choose Celsius or Fahrenheit degrees, and if necessary, display every code to verify the operation of the distiller in case of problems.

The safety devices will stop the cycle in case one of the sensors detects any trouble. The **TROUBLE** light will be displayed. The distiller **CANNOT** be re-started until the problem has been resolved.





There are two **TROUBLE** codes that can be displayed if a problem occurs :

- **O HI** code indicates that the **OIL** temperature is too **HIGH**.
- **L HI** code indicates that the recycled **SOLVENT** temperature is too **HIGH**.
- **S HI** code indicates that the recycled **SLUDGE** temperature is too **HIGH (OPTIONAL)**


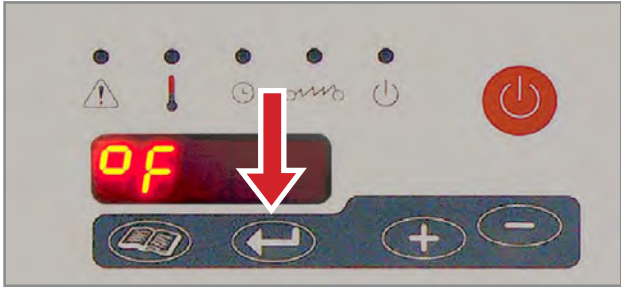

The **TROUBLE** code can be erased by touching the + key (9) for each code. Once all the codes have been erased, the display returns to normal and the **TROUBLE** light disappears.

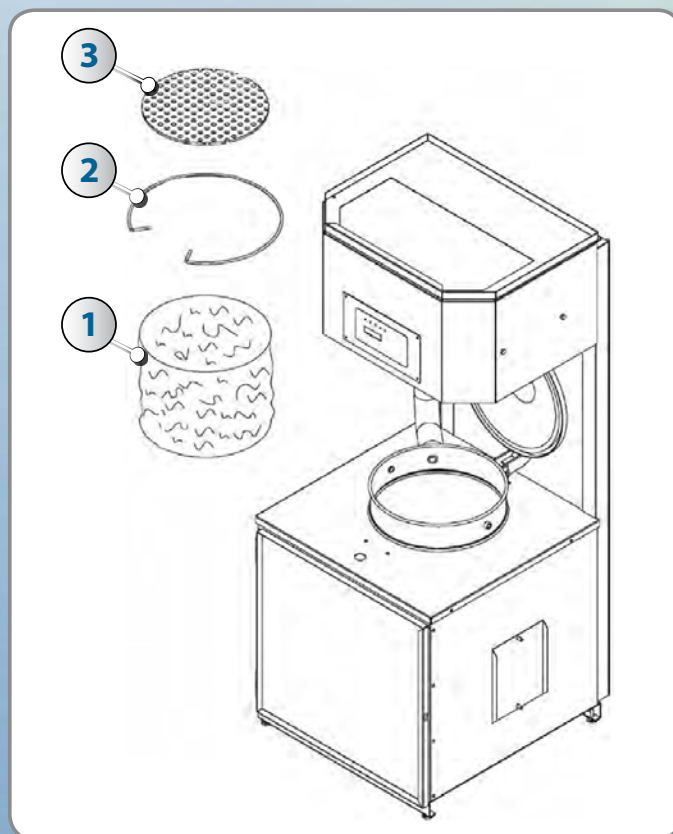
SELECTION BETWEEN CELSIUS AND FAHRENHEIT MODE

All units manufactured by ECO are programmed in **CELSIUS**.

Press	Indication	Result of the keyboard
	<p>Step 1 – Press + Press and hold the Plus sign for 7 seconds</p>	
	<p>Step 2 – Press - Press and hold the Minus sign once</p>	

KEYBOARD OPERATIONS (CONT'D)

Press	Indication	Result of the keyboard
	<p>Step 3 - Press the Arrow</p> <p>Confirm by pressing the arrow sign you are now in Fahrenheit</p>	
	<p>Now set up time and temperature (see page 21)</p>	



1. Preparation

NOTE : All **ECO** recyclers are pre-tested and are shipped with thermic oil in it and are ready to be used.

- A. Install a clean container (twice the capacity or greater than the boiler) on the left end side where the clear tube comes from the outlet of the condenser.
- B. The clean container must have an air vent to allow normal fill-up.
- C. You must use a metallic container, and it must be connected to the ground clip supplied with the unit.

2. Plastic bag installation steps

- A. Pull the bottom corner of the bag inwards.
- B. Insert the plastic bag in the boiler # 1
- C. Insert the retaining ring # 2 - SR30 (Part # 323113)
SR60 (Part # 323122)
- D. Optional foam grill # 3, SR30 (Part # 324022)
- E. Optional foam grill # 3 SR60 (Part # 324026)

STARTING PROCEDURES

3. Filling up the Recycler

- A. Open the cover and fill the boiler with dirty solvents up to approximately 1 inch (25 mm) below the grooved slot mark indicating the maximum level.
- B. Before closing the cover, verify the condition of the lid gasket. **It is recommended to change the oil for SR30 (330067 - 10 liter container), for SR60 (330068 - 20 liter container) & the cover seal for SR30 (304018) for SR60 (304023), SR60 with vacuum (304024) every 2000 hours of work or every year whichever comes first. See page 28 for oil change procedures.**

- C. According to the type of solvent to be distilled, you must use the proper cover gasket.

Part # 304018 (8 Gal. / 30 Liters) Gasket Orange Color

Part # 304023 (15 Gal. / 60 Liters) Gasket Orange Color

Part # 304024 (24 Gal. / 60 Liters) Gasket Black Color



Using a non-suitable gasket will cause vapors to leak from the cover. Some solvents, during the boiling phase, create a quantity of foam that a correct separation of the solvent from the polluting product is not possible; in fact, in these cases, the distillate will still be dirty. To avoid this inconvenience, it unnecessary to use the anti-foam kit (part # 324023 for model SR30 V) OR (part # 324026 for model SR60 V).

Pay the utmost attention while the residues are drying. Some polluting products with an increase of temperature tend to carbonize with a considerable discharge of smoke from the distiller.

In case this occurs, press the (START / STOP) button to end the cycle.

In this case it is not possible to dry the residues at atmospheric pressure; proceeding to the vacuum distillation phase may solve the problem. This technique allows you to operate at a much lower temperature.

Opening the cover before the distillation cycle is complete will cause the gasket to swell. You must wait at least **one hour**.

- D. Close and secure the cover properly. Your cover acts as a safety valve. **NEVER** modify the cover mechanism and **NEVER** use any tools to tighten the cover.

Selecting temperature and duration of the cycle

Before starting the cycle, you must select between **CELSIUS** and **FAHRENHEIT** temperatures. Temperature settings are determined by the **BOILING POINT** of the solvent to be reclaimed. The boiling points shown are for **NEW SOLVENTS**.



To recycle contaminated solvents, the temperature setting **MUST BE** 10°C to 50°C (30°F to 80°F) **HIGHER** than the boiling point Starting with 10°C / 30°F for the first batch increasing by until 10°C / 30°F proper setting is obtain.

NOTE : The temperature setting starting point indications will vary according to the solvent used and the percentage of contaminants in the solvent.

SELECTING TEMPERATURE AND DURATION OF THE CYCLE

Press	Indication	Result of the keyboard
	<p>Thermometer light is ON.</p> <p>Keyboard will display the actual temperature of the thermic oil.</p>	
	<p>Thermometer light flashes.</p> <p>You have the option to select the temperature for the cycle by pressing keys.</p> <p> or </p>	
	<p>You have the option to select your own amount of time for the cycle by pressing keys :</p> <p> or </p> <p>Recycler will automatically stop when time has expired.</p>	
	<p>Clock light is ON.</p> <p>The total amount of working hours of the recycler since day one will be displayed.</p> <p>This cannot be changed.</p> <p>For every 2,000 hours of operation the message OIL will flash to notify you to change the thermic oil.</p>	
	<p>Thermometer light is ON.</p> <p>Keyboard will display the actual temperature of the thermic oil.</p>	

STARTING THE UNIT

Press	Indication	Result of the keyboard
	<p>Press the START/STOP key. ON light will go on.</p> <p>Electric element will start heating the thermic oil.</p> <p>Element light will go on.</p>	

During the distillation cycle

- A.** Every 5 seconds, the keyboard will display 3 different readings:
 1. Selected boiling temperature: (Thermometer light will flash).
 2. Amount of time selected for that cycle: (Clock light will flash).
 3. Elapsed time since starting the unit: Clock light will be on).
- B.** Cooling fan will start turning.
- C.** Recycled solvents will start dripping approximately one hour after the start-up.
- D.** At the end of the cycle, the ON light will flash AND a count down timer will show the cool timeperiod remaining on the control board for 60 minutes. During the cool down time the heating element will be off but the cooling fan will remain on during the cooling period. When cycle is finish Board will indicate -END-.
- E.** The cooling fan will automatically shut off at the end of the cooling cycle.

At the end of the cycle

- The keyboard will display the total elapsed time for that cycle.
- All lights will shut off except the ON light.
- Wait at least one hour before opening the cover.
- You can now remove the residues.
- Press the stop key.



FLAMMABLE SOLVENTS

SOLVENT TYPE	Distillation Temperature		Temperature Class	Ignition Temperature		Seal Silicone	Condenser Type	
	°C	°F		°C	°F		cop	s/st
Acetone	56	133	T2	535	995	A	A	A
Alcohol Amyl	145	293	T2			A		B
Alcohol Butyl	118	244	T2			A	A	A
Alcohol Ethyl	79	175	T2	362		A	A	A
Amyl Acetate	126-155	259-311	T2	375	707	A	A	A
Benzol (Benzene)	80	176	T-1	498	1040	A	B	B
Butanol (Butyl Alcohol)	118	244	T2	366	691	A	A	A
Butyl Acetate	128	262	T-2	370	698	A	B	A
Cabinol	65	149	T-2	385	725	A	B	A
Cellosolve Acetate	156	313	T-2	377	711	A	B	A
Cyclohexanone	155	311	T-2	419	786	A	B	A
Dimethylformamide (DMF)	153*	307*	T-2	445	833	A	A	A
Ethyl Acetate	79	174	T-2	427	801	A	A	A
Ethyl Alcohol (Ethanol)	79	175	T-2			A	A	A
Ethyl Benzene	136	277	T-1	466	871	A	A	A
Ethyl Glycol Acetate	156	313	T-2	377	711	A	A	A
Iso Amyl Acetate	125-155	257-311	T-2	w375	707	A		A
Iso Butyl Acetate	104-119	219-246	T-2	420	788	A		
Iso Butyl Alcohol	111	232	T-2	430	806	A		
Iso Propane	83	181	T-2	400	752	A	B	A
Iso Propyl Acetate	89	192	T-2	460	860	A	A	A
Iso Propyl Alcohol	83	181	T-2	400	752	A		A
Iso Propyl Glycol	143	289	T-2	345	653	A		
Lacquer Solvents	140	284	T2	535	995	A	A	A
Methyl Acetate	58	136w	T-2	454	850	A	B	A
Methyl Cellosolve Acetate	156	313	T-2	377	711	A	B	A
Methyl Ethyl Ketone (M.E.K.)	80	176	T-1	530	986	A	A	A
Methyl Glycol Acetate	137-152	278-305	T-2	380	716	A	A	A
Methyl Isobutyl Ketone (M.I.B.K.)	117	243	T-1	459	858	A	B	A
N. Butyl	118	244	T2	366	691	A		A
Pentanol	138	280	T2	327	621	A		A
Propanol	98	208	T2	371	700	A		A
Propyl Alcohol	98	208	T2	371	700	A	A	A
Propyle Acetate	101	214	T2	450	850	A	A	A
Paint Thinner	140	284	T2	535	995	A	B	B
Sec. Butyl Alcohol	101	214	T2	390	734	A		A
Toluol	110	231	T1	480	905	A	A	A
White Spirit	150-175*	302-374*	T2	353	489	A	A	A
Varsol	150*	302*	T2	351	487	A	A	A
Xylol (Xylene)	144*	291*	T1	463	907	A	A	B

NON - FLAMMABLE CHLORINATED SOLVENTS

SOLVENT TYPE	Distillation Temperature		Temperature Class	Ignition Temperature		Seal Silicone	Condenser Type	
	°C	°F		°C	°F		cop	s/st
1,1,1, Trichloroethane- (Methyl Chloroform)	74*	165*				A		A
n-Propyl Chloride	47*	117*				A		A
Isopropyl chloride	40*	104*				A		A
Methylene chloride	40*	106*				A		A
Dichloroethylene	37*	99*				A		B
Ethylene dichloride	84*	183*				A		A
Monochlorobenzene	133*	273*				A		A
Propylene dichloride	98*	208*				A		A
Chloroform	61*	142*				A		A
Trichloroethylene	92*	198*				A		A
Trichloroethane	115*	239*				A		A
Ortho dichlorobenzene	182*	361*				A		A
1.2.3. trichloropropane	158*	317*				A		A
Carbon tetrachloride	78*	172*				A		A
Perchloroethylene	122*	254*				A		A
Tetrachloroethane	147*	297*				A		A

! WARNING !

The information and data set forth in this catalog or the information disclosed by a representative is for your general information only. Many factors influence the resistance of materials to corrosion, such as temperature, concentration, aeration and contaminants.

A – Recommended

B – Not Recommended

*** – Vacuum distillation only**

Blank – Information not available

THERMIC OIL CHANGING PROCEDURE



It is recommended to change the oil (330067 for SR30 or 330068 for SR60) & the cover seal (304018 for SR30) or (304024 (black) for SR60) every 2000 hours of work or every year whichever comes first. See page 29 for oil change procedures.

1. Remove the overflow valve # (1) and remove the plug on the ball valve # (2) and open the breather valve # (3)
2. Place the empty oil collector container below the ball valve # (2) on open the valve to remove the used oil.
3. When empty, close the ball valve # (2), remove the container and re-install the plug on the ball valve # (2).
4. Install a funnel on (1) and pour new thermic oil into the funnel until full.
5. Close the ball valve (3) and re-install the vent tube plug on the ball valve (3) and the overflow valve (1).

Defects, causes and remedies

Distillation at Atmospheric Pressure

Defects	Causes	Remedies
Unit heats but does not distill	Boiler is dirty.	Clean the boiler.
	Reducer boiling temperature is higher than the temperature set on the control panel.	Set a higher temperature on the control panel.
	Reducer boiling temperature is higher than distiller's maximum working temperature.	Use a reducer with a lower boiling temperature or vacuum distill with the suitable kit (optional).
	Thermic oil is worn out.	Change thermic oil.
	Lack of thermic oil.	Add thermic oil
Smoke comes out from the cover.	Polluting products overheating.	Reduce time and/or working temperature.
	Polluting products decomposing.	Possibly vacuum distill with the suitable kit.
	Dirt on cover gasket.	Clean cover gasket.
Cover gasket swells.	Cover is opened while distiller is hot.	Open the cover one hour after the cycle is complete
	The cover gasket is not suitable for the type of solvent to be distilled	Mount the suitable gasket (see page 26).

DEFECTS, CAUSES AND REMEDIES (CONT'D)

Distillation at Atmospheric Pressure

Defects	Causes	Remedies
Solvent leaks from the gasket.	Worn out gasket.	Replace the gasket.
	Vapor manifold is clogged	Using a funnel, pour in clean solvent, wash vapor tube and blow air into the tube.
	Vapor condenser is clogged.	Replace the condenser.
Unit is in operation mode but does not heat. Indicator light is ON.	Temperature is set at zero.	Increase the operating time.
	Burnt out heater.	Set a higher temperature on the control panel
	Mechanical thermostats is defective.	Change the faulty thermostat.
	Thermocouple sensor is defective	Change the faulty thermocouple
Distills only part of the dirty solvent.	Insufficient operating time selected.	Increase the operating time.
	The undistilled fraction has a boiling temperature higher than the temperature set on the control panel.	Set a higher temperature on the control panel.
	Solvent-boiling temperature is higher than the distiller's maximum working temperature.	Convert to a lower boiling solvent or use a vacuum operated unit.
Trouble light flashes and horn signals a problem	Distillate temperature is over 40°C (104°F).	
	Ventilator motor burns out.	Replace the ventilator motor.
	Vapor condenser internally dirty	Clean by compressed air jet.
	Vapor condenser externally scaled.	Wash it, by pouring clean solvent with a funnel into manifold
	The security thermostat is defective.	Replace the thermostat
Distillate comes out dirty	Loaded with a quantity superior to the maximum.	Load with the exact quantity.
	Solvent foams.	Wait at least 48 hours after utilizing the solvent before starting the next distillation
	Temperature set on control panel too high.	Reduce working temperature.
	Vapor manifold or condenser dirty.	Wash it by pouring clean solvent with a funnel into manifold

DEFECTS, CAUSES AND REMEDIES (CONT'D)

Distillation at Atmospheric Pressure

Defects	Causes	Remedies
<p>Distillate assumes a greenish color.</p> <p>Condenser is becoming corroded.</p>	Distilling solvents or reducers in general.	
	The solvent is acidic.	Replace copper condenser with a stainless steel condenser.
	Distilling a chlorinated solvent.	Set the correct working temperature
	Temperature set on the control panel is higher than the temperature indicated.	Replace the solvent immediately.
<p>Distillation time is more than 4 hours.</p>	Solvent acidifies. If the temperature set on the control panel is correct, acidification occurred during process before distillation	Replace the solvent.
	There is a considerable percentage of water in the dirty solvent	Add thermic oil.
	Lack of thermic oil.	Change thermic oil.
	Thermic oil is worn out.	Remove thermic oil and clean the heater.
	Heater is scaled.	

SR30 - SCHEMATIC OF UNIT



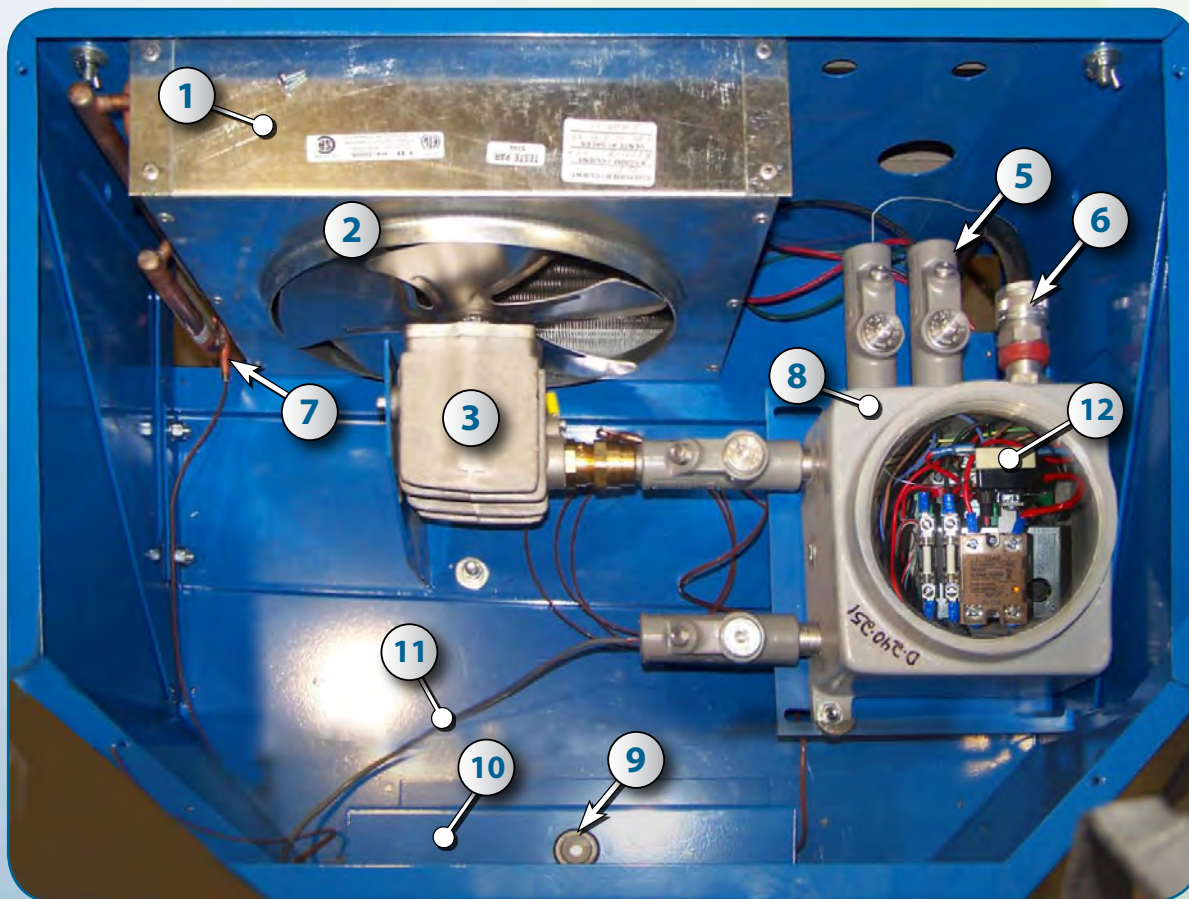
Nb	PART #	DESCRIPTION	Qty	Nb	PART #	DESCRIPTION	Qty
1	323063	STAINLESS STEEL 3/8" PLUG	1	8A	301018	COVER	1
2	324512	NYLON HOSE 3/8"	4	8B	304018	ORANGE GASKET	1
3	323006	BALL VALVE 1/4"	1	9	331011	WARNING SYMBOLS STICKER	1
4	331001	WARNING STICKER	1	10	323117	DOOR LOCK	1
5	612427	LEVELERS	4	11	330020	CSA NAME PLATE	1
6	307003	KEYBOARD	1	12		ECOPURE STICKER	1
7	323114	COMPLETE HANDLE	1				

SR60 - SCHEMATIC OF UNIT



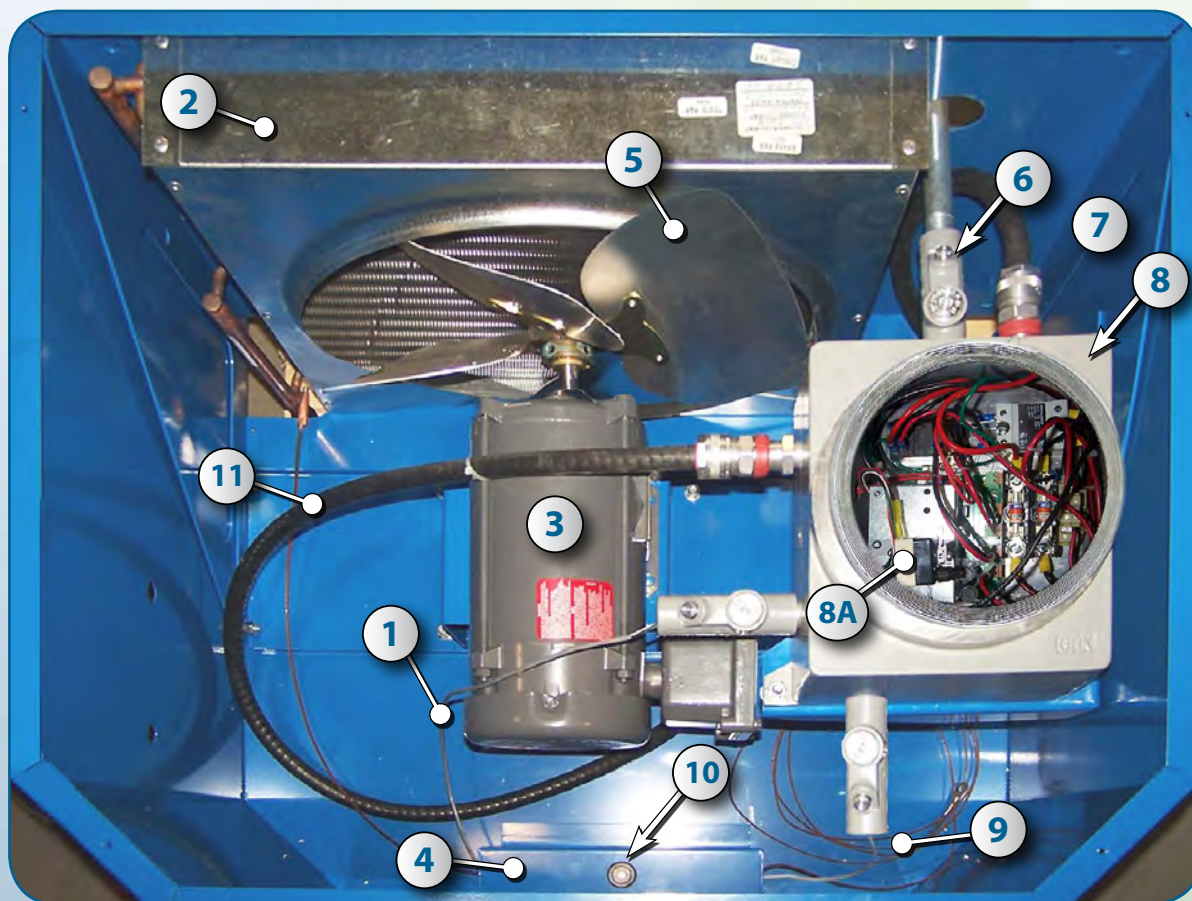
Nb	PART #	DESCRIPTION	Qty	Nb	PART #	DESCRIPTION	Qty
1	323063	STAINLESS STEEL 3/8" PLUG	1	7	323118	COMPLETE HANDLE	1
2	324512	NYLON HOSE 3/8"	4	8A	301026	COVER	1
3	323006	BALL VALVE 1/4"	1	8B	304024	BLACK GASKET	1
4	331001	WARNING STICKER	1	9	331011	WARNING SYMBOLS STICKER	1
5	323076	LEVELERS	4	10	323117	DOOR LOCK	1
6	307003	KEYBOARD	1	11	_____	ECOPURE STICKER	1

SCHEMATIC OF UNIT - TOP PART SR30



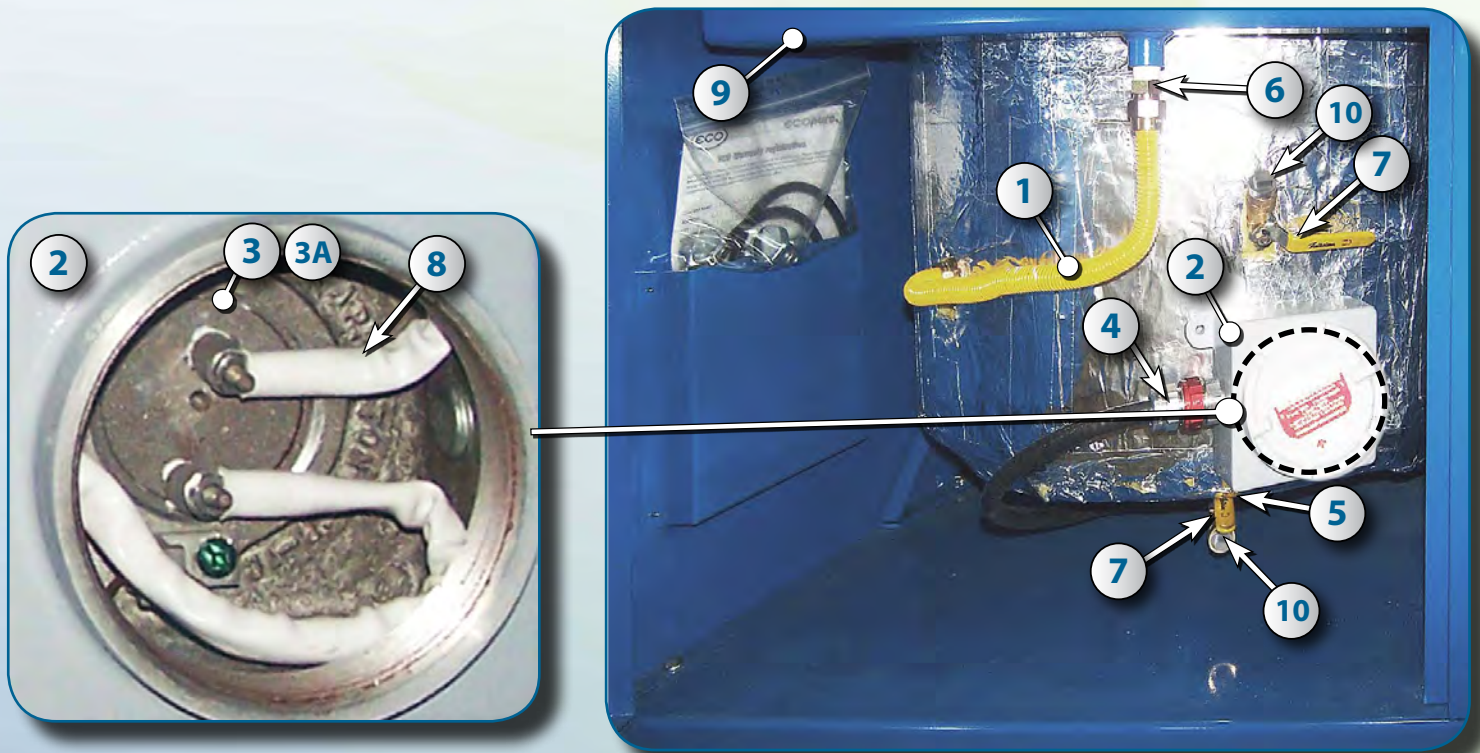
Nb	PART #	DESCRIPTION	Qty	Nb	PART #	DESCRIPTION	Qty
1	305004	COPPER CONDENSOR	1	7	307123	TEMPERATURE SENSOR FOR SOLVENT	1
2	303003	MOTOR FAN	1	8	322001	EXPLOSION PROOF BOX	1
3	303001	MOTOR	1	9	307016	AUDIBLE ALARM	1
5	322012	EXPLOSION PROOF EYS FITTING	4	10	307041	CONTROL BOARD	1
6	322004	TECK CONNECTOR	2	11	307127	COMMUNICATION CABLE	1
				12	308005	HIGH LIMIT THERMOSTAT	1

SCHEMATIC OF UNIT - TOP PART SR60



Nb	PART #	DESCRIPTION	Qty	Nb	PART #	DESCRIPTION	Qty
1	307127	COMMUNICATION CABLE	1	7	322004	CONNECTOR TECK	2
2	305005	COPPER CONDENSOR	1	8	322033	EXPLOSION PROOF BOX	1
3	303024	MOTOR	1	8A	308005	HIGH LIMIT THERMOSTAT	1
4	307041	CONTROL BOARD	1	9	307122	OIL HEAT SENSOR	1
5	303012	MOTOR FAN BLADE	1	10	307016	AUDIBLE ALARM	1
6	322012	EYS FITTING	2	11	NPN	TECK CABLE	1

SCHEMATIC OF UNIT - OIL CHAMBER SR30 & SR60



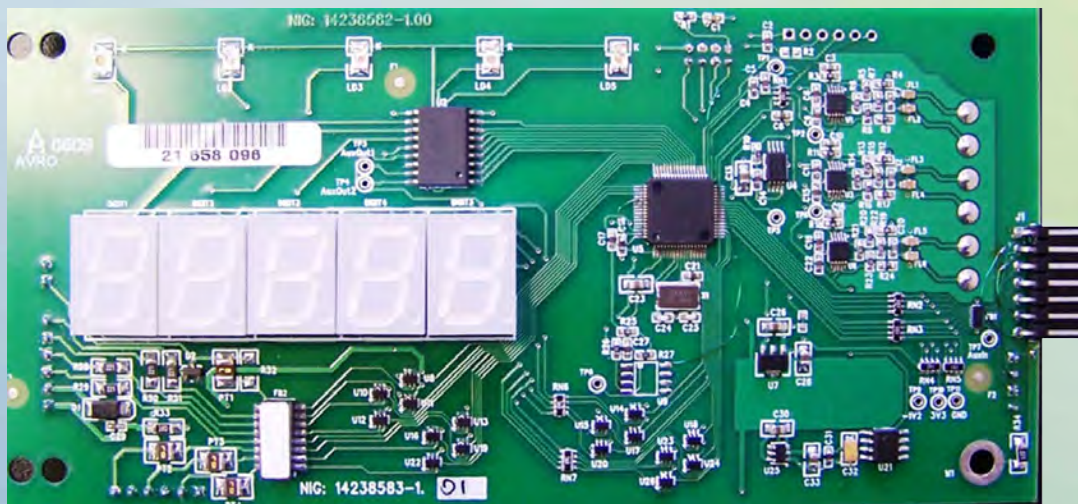
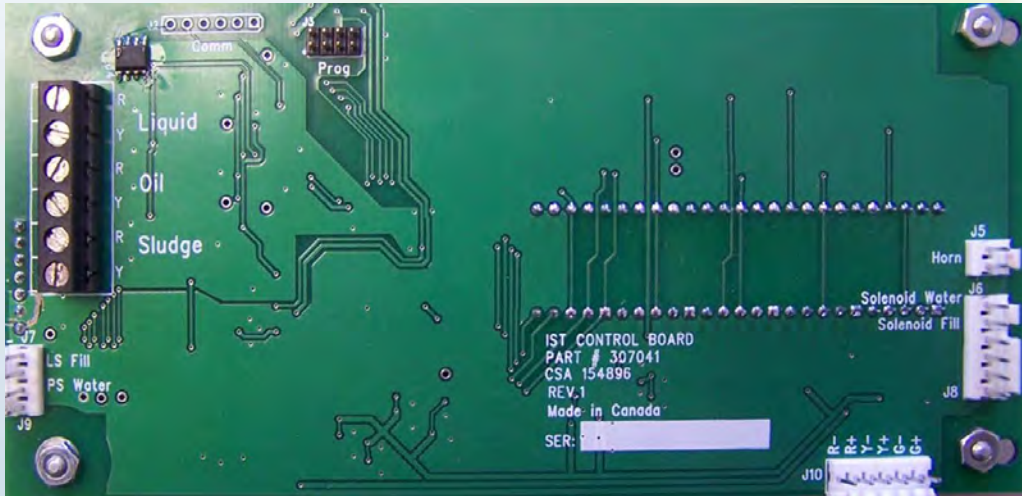
Nb	PART #	DESCRIPTION	Qty	Nb	PART #	DESCRIPTION	Qty
1	323152	OIL FLEXIBLE TUBE	1	6	NPN	NIPPLE	1
2	322002	EXPLOSION PROOF BOX	1	7	608102	BALL VALVE ½"	2
3	302002	SR30 HEATER	1	8	NPN	INSULATION SHEATH	-
3A	302004	SR60 HEATER	1	9	320032	SR30 OVERFLOW TANK	1
4	322004	1/2" KILLARK TECK CONNECTOR	1	9A	320042	SR60 OVERFLOW TANK	1
5	323527	LONG NIPPLE ½" X 8"	1	10	323522	½" INOX PLUG	2

SCHEMATIC OF UNIT - BACK OF UNIT SR30V



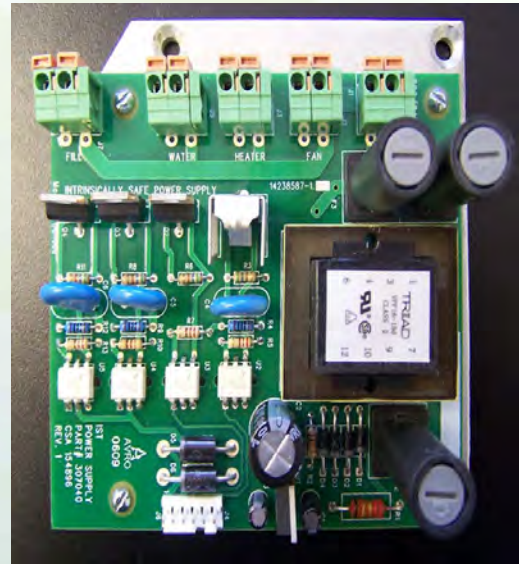
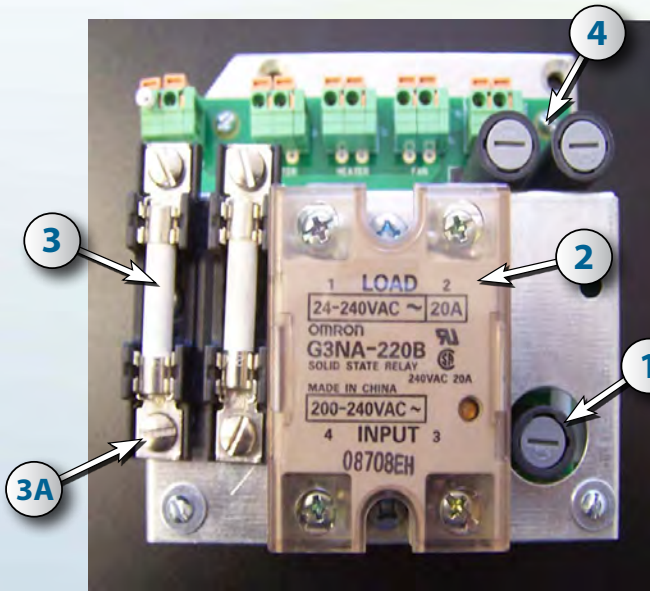
Nb	PART #	DESCRIPTION	Qty
1	322006	JUNCTION BOX (EXPL. PROOF)	1
2	323086	GROUND CABLE WITH CLIP	1

SCHEMATIC OF UNIT - CONTROL BOARD



Nb	PART #	DESCRIPTION	Qty
1	307041	CONTROL BOARD	1

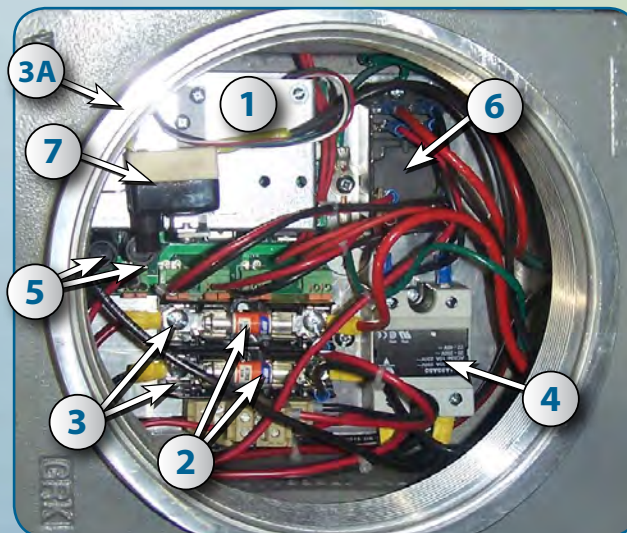
SCHEMATIC OF UNIT SR30 - POWER SUPPLY KIT (307050)



Nb	PART #	DESCRIPTION	Qty
1	307131	FUSE	1
2	303053	SOLID STATE RELAY	1
3	616922	FUSE	2

Nb	PART #	DESCRIPTION	Qty
3A	307017	FUSE HOLDER	2
4	307130	FUSE	2

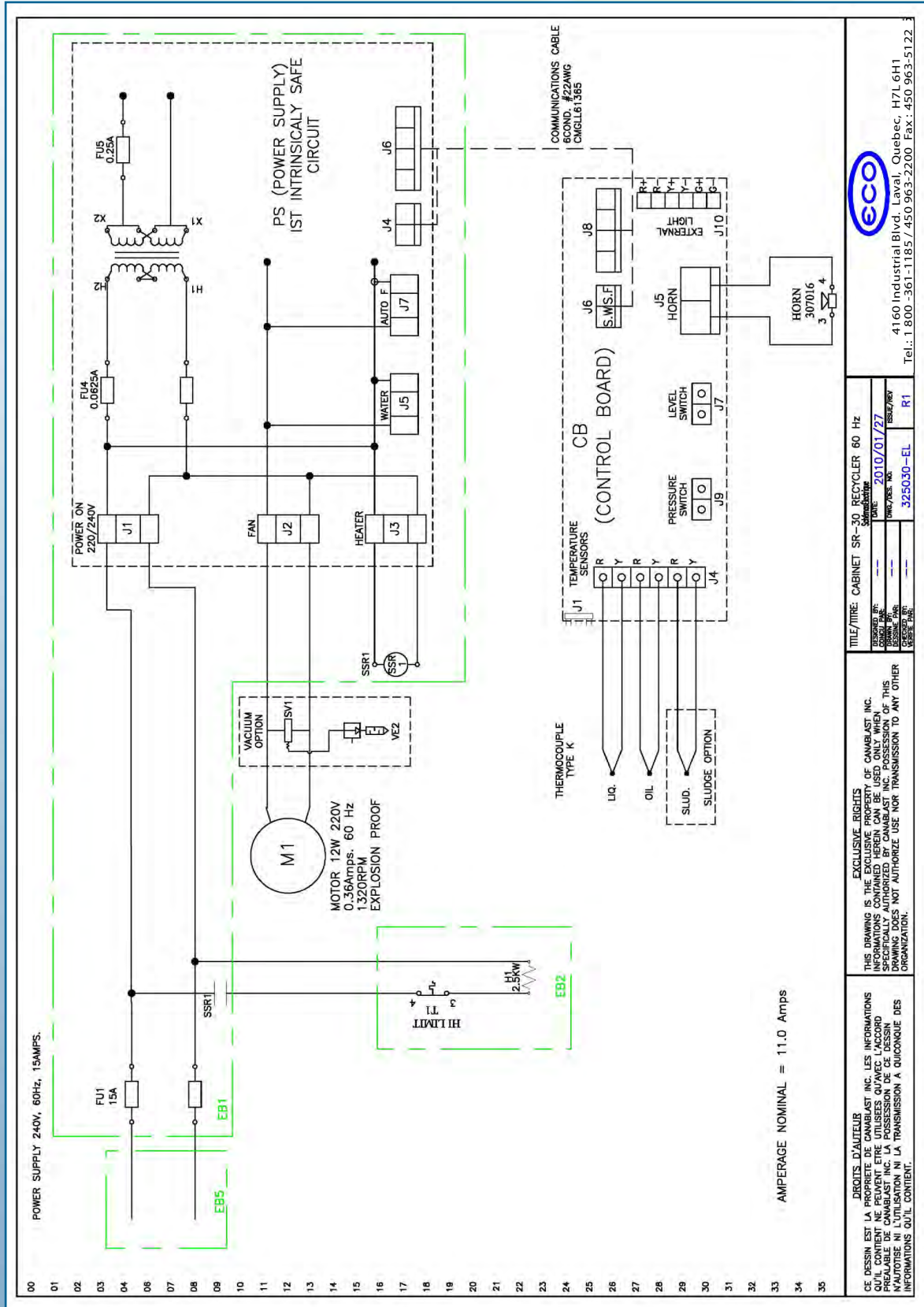
Schematic of unit SR60 - Power supply kit (307051)



Nb	PART #	DESCRIPTION	Qty
1	330009	INTRINSICALLY SAFE BARRIER	1
2	917725	FUSE	2
3	917738	FUSE HOLDER	2
3A	307131	FUSE	1

Nb	PART #	DESCRIPTION	Qty
4	314059	OVERLOAD SOLID STATE RELAY	1
5	307130	FUSE	2
6	303056	RELAY	1
7	308004	HIGH LIMIT SWITCH	1

ELECTRICAL DRAWING SR30 WITH ONE HEATER OF 2500 W



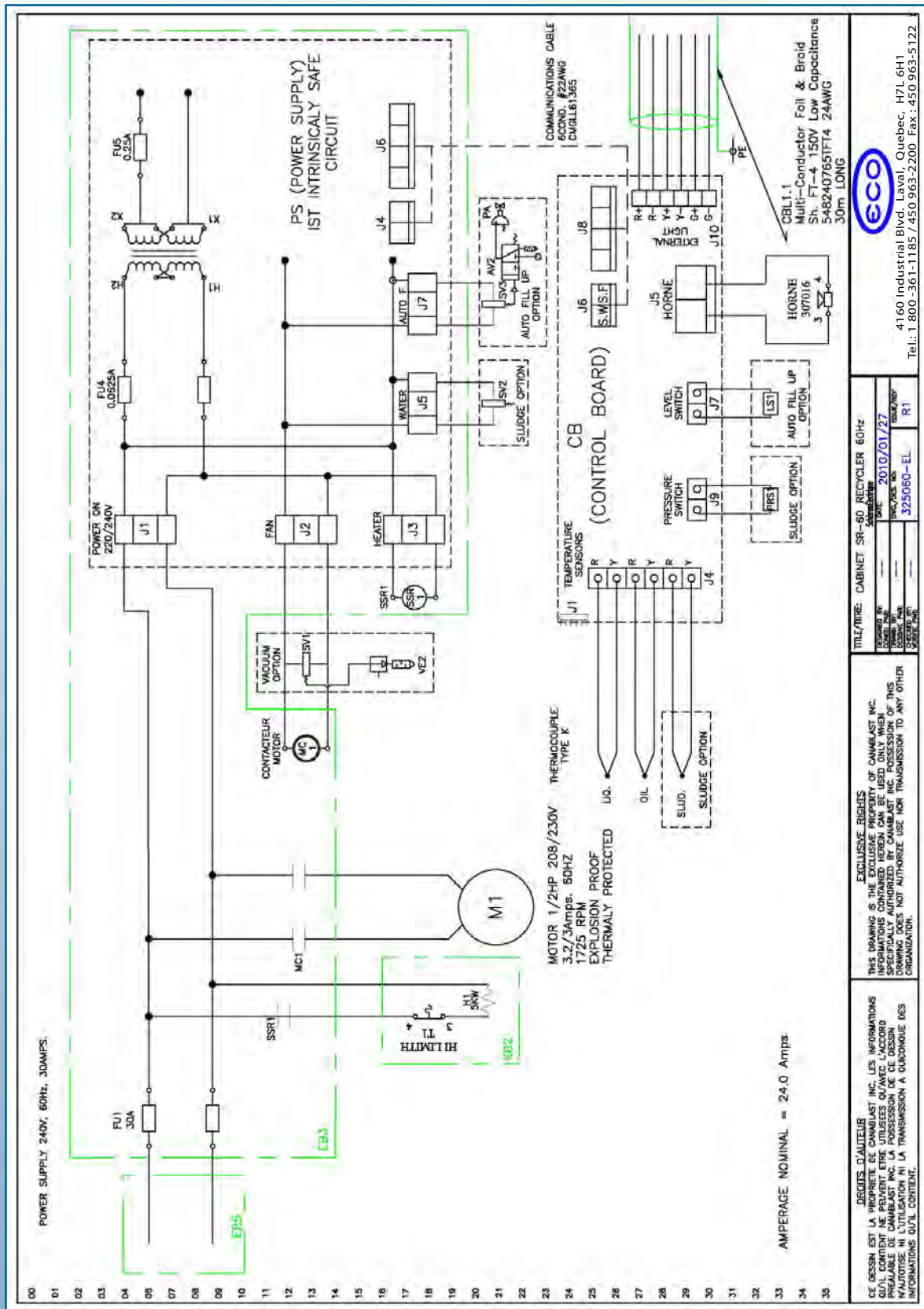
TITLE/TYPE CABINET SR-30 RECYCLER 60 Hz	
DESIGNER: [blank]	DATE: 10/01/97
DRAWN BY: [blank]	SCALE: 1:1
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DATE: 10/01/97	325030-EL

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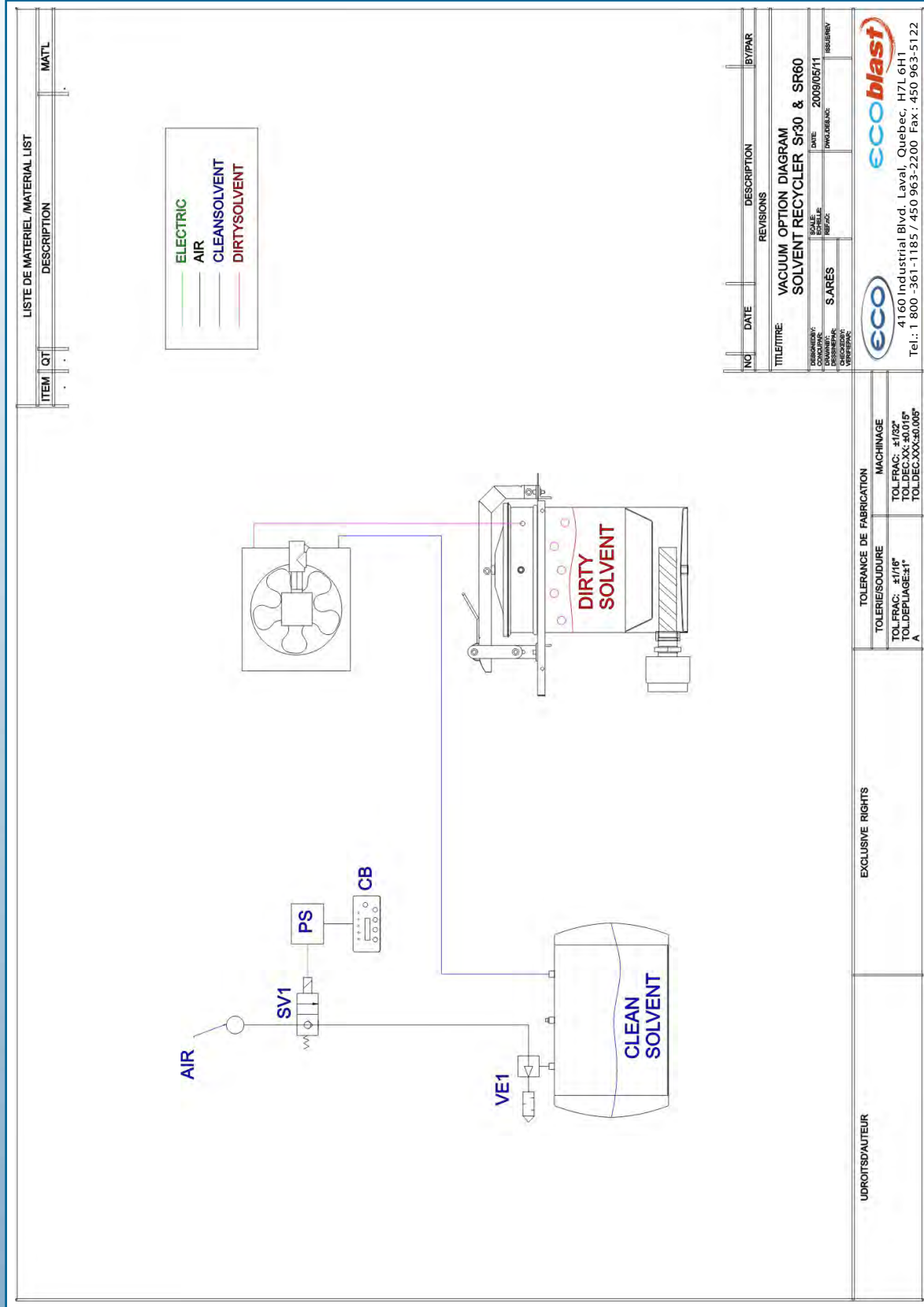
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ELECTRICAL DRAWING SR60 WITH ONE HEATER OF 5000 W



VACUUM OPTION DIAGRAM



VACUUM DISTILLATION SECTION (OPTION)



The boiling temperature of the solvents reported on pages 9-10 measured for atmospheric pressure operation of 1,000 hPa (760 mm Hg).

It is well known that by reducing the pressure, the boiling temperature of any substance is reduced.

When vacuum is created inside the distillation appliance, the boiling temperature is considerably reduced.

With Units SR30 & SR30-V, operating with vacuum, the distillation temperature is reduced about 30%.

Vacuum distillation is recommended in the following cases :

1. When processing solvents with a boiling temperature greater than 70°C (158°F).
2. Compulsory when processing solvents with a boiling temperature greater than 60°C (140°F). Operating at a higher temperature can create problems on the cover seal
3. When processing solvents with ignition point too close to their boiling temperature can create a hazard or the solvent can degenerate and become an acid base and therefore cannot be re-used.
4. When processing chlorinated solvents. Atmospheric pressure distillation allows only a partial recovery of these solvents; at the end of the process the residues will still contain 20% of solvents.

This occurs due to the fact that as long as the distillation process takes place, the percentage of oil in the boiling solvent increases, so does the boiling temperature.

These solvents have specific critical temperatures which once exceeded, provoke the decomposition of the solvents, causing the formation of hydrochloric acid with the consequent acidity of the product, it will be impossible to re-use it. Operating with atmospheric pressure, once critical temperature is reached will distill only 80% of the solvent. With vacuum distillation it is possible to achieve a yield of 100% without reaching the critical temperature.

VACUUM DISTILLATION SECTION (OPTION) CONT'D

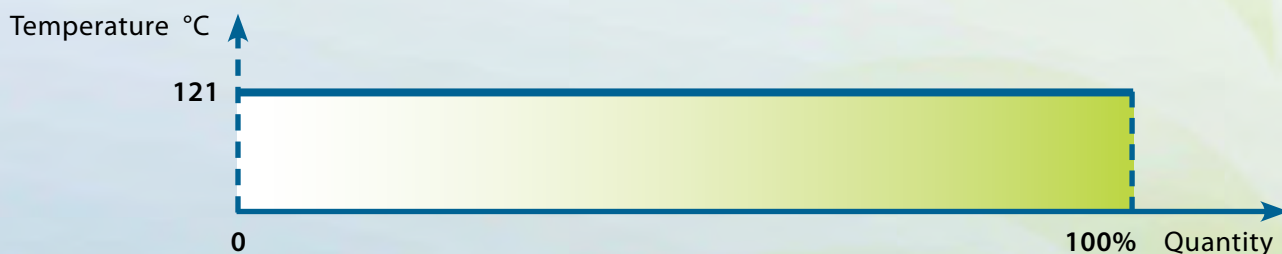
Examples

Product to be distilled :

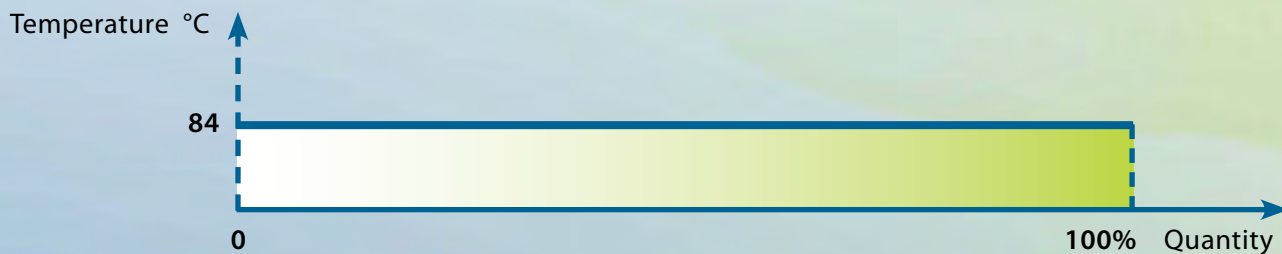
Perchloroethylene

Distillation temperature at atmospheric pressure :	121°C
Distillation temperature at vacuum condition (223 hPa) :	84°C
Critical temperature of decomposition :	150°C

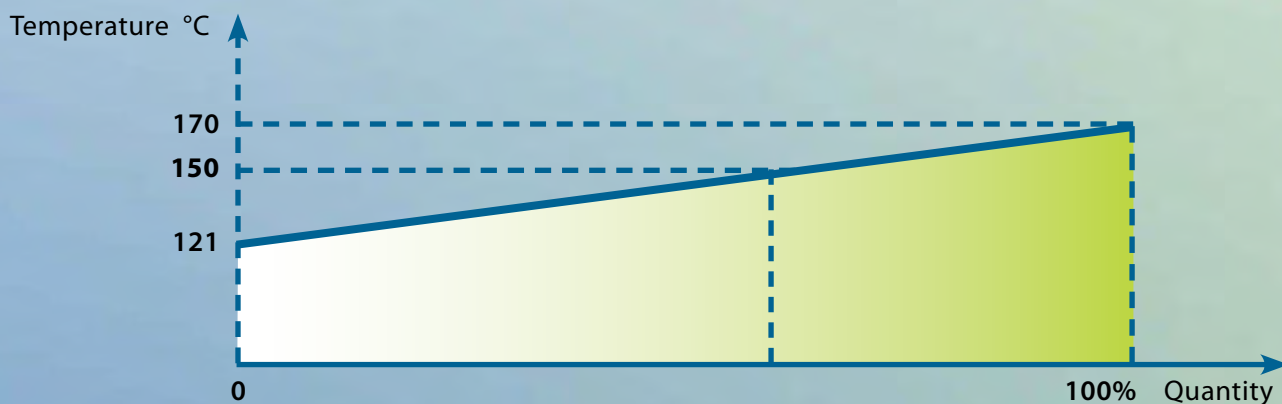
A. Boiling range of clean perchloroethylene at atmospheric pressure: 1,000 hPa.



B. Boiling range of clean perchloroethylene at vacuum condition: 223 hPa

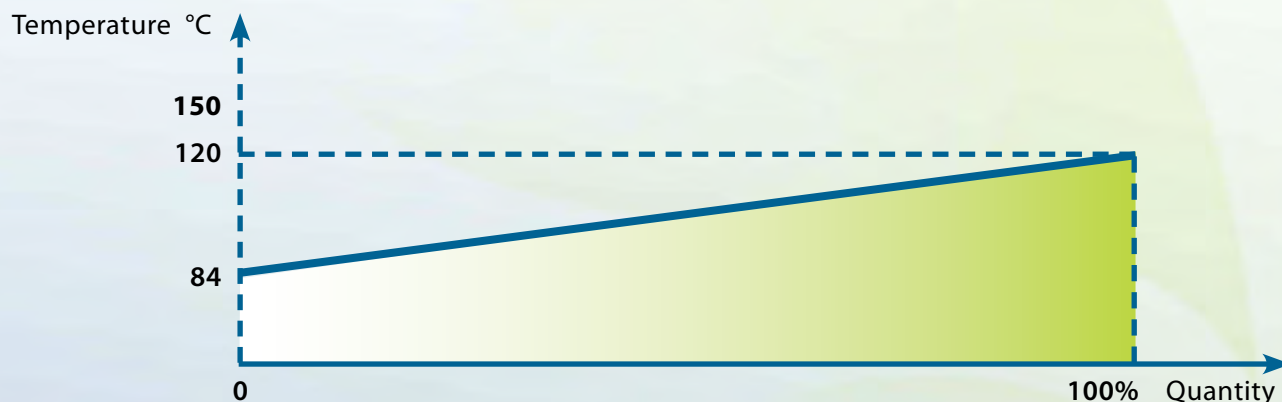


C. Boiling range at atmospheric pressure (1,000 hPa) of a mixture of 90% perchloroethylene + 10% of oil.



VACUUM DISTILLATION SECTION (OPTION) END

D. Distillation temperature at vacuum condition (223 hPa) of a mixture of 90% perchloroethylene + 10% of oil.



GRAPHIC (A) – (B)

The distillation temperature of a clean solvent remains the same until the process of the whole cycle is complete.

GRAPHIC (C) – (D)

The distillation temperature of the contaminated solvents increases during the process; this variation depends on the degree of contamination and on the type of contaminating substances.

GRAPHIC (C)

Once a temperature of 150°C (302°F) is reached, which is the critical non-supportable temperature, only 80% of perchloroethylene will be recovered.

GRAPHIC (D)

Operating with vacuum condition, 100% of perchloroethylene will be recovered when set at 120°C (248°F) and very far from the critical temperature of 150°C (302°F).

When distilling chlorinated solvents, the vacuum distillation is indispensable; this type of process is also necessary for minimal quantities of contaminants because of two specific reasons:

1. Yields 100%.
2. If the residual oil is contaminated with more than 2% of solvent, those oil waste-recycling companies authorized for the waste collections will not accept it.

VACUUM DISTILLATION – OPERATING PRINCIPAL DRAWING

Before reading this section, it is compulsory to read the previous section regarding the distillation at atmospheric pressure.

Unlike what occurs during atmospheric distillation, the distillation unit and the distillate collection tank are a single body.

A pneumatic vacuum generator joined at the solvent recovery tank provides the creation of the vacuum circuit.

Boiler Condenser Tank

The vacuum generator is fed with compressed air with a pressure of 70-100 P.s.i. with a maximum negative pressure of -27 P.s.i., -590 mm Hg.

NOTE : WITH VACUUM DISTILLATION IT IS POSSIBLE TO DISTILL SOLVENTS WITH DISTILLATION TEMPERATURE HIGHER THAN 60°C (140°F) AT ATMOSPHERIC PRESSURE.

For example, distilling at vacuum condition the Acetone, which has a distillation temperature of 56°C (133°F) at atmospheric pressure, will reach a boiling point of 39°C (101°F). Considering that the condenser is by air, if the temperature result is higher than 20°C (70°F) you will obtain a partial condensation of the solvent with an emission of Acetone vapor in the air.

Operating methods

**DISTILLATION : AT ATMOSPHERIC PRESSURE
DRYING :**

When processing solvents with distillation temperature lower than 60°C (140°F), polluted with liquid products.

**DISTILLATION : AT ATMOSPHERIC PRESSURE
DRYING : AT VACUUM CONDITIONS**

When processing solvents with distillation temperature lower than 60°C (140°F), polluted with solid products.

**DISTILLATION : AT VACUUM CONDITIONS
DRYING :**

In this case the process of the solvent reducers distillation temperatures between 60°-200°C (140°-392°F), and polluted with liquid products.

INSTALLATION (AT VACUUM CONDITION)

1. Connect the solenoid inlet to the compressed air circuit with a nylon tube of 3/8 inches.

PRESSURE OF COMPRESSED AIR : **4 bar**
CONSUMPTION OF AIR : **32 L/min**

2. Connect the solenoid outlet to the vacuum generator with a plastic tube of 3/8 inches.
3. Connect the distillate collection tank to the vapor condenser utilizing a rubber anti-solvent tube, avoiding any bend downwards.
4. When distilling flammable solvents, connect the distillate container to the grounding clip.
5. Turn off the distillate-unloading valve.

Starting operations

NOTE : During vacuum distillation some solvents foam with a consequent pollution of the distillate and vapors may leak from the cover.

The problem can be eliminated as follows :

- Utilize anti-foam discs.
- Reduce about 20% of the loading of solvent to be distillate.
- Reduce the compressed air pressure at the vacuum pump. In that way the vacuum will be reduced.
- Reduce the working temperature.
- Wait at least 48 hours after utilizing the solvent before starting the next distillation.

When filling up, pay attention not to pour solvent into the vapor manifold. The first solvent can come out dirty.

SR30 VACUUM DISTILLATION SECTION (OPTION) CONT'D



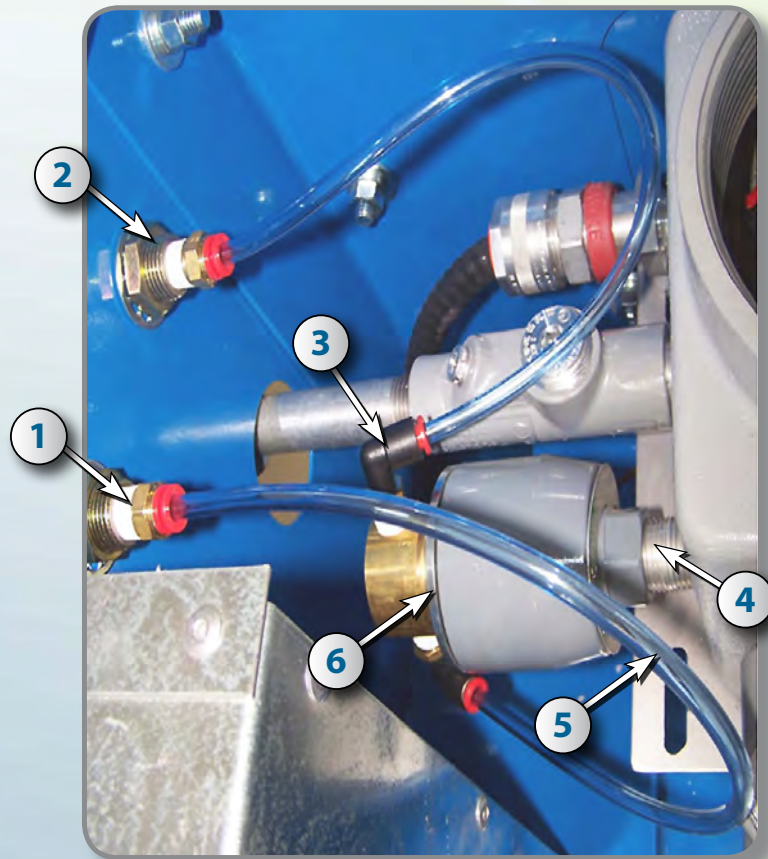
Nb	PART #	DESCRIPTION	Qty	Nb	PART #	DESCRIPTION	Qty
1	323130	1/4" NPT X 3/8" COMPRESSION FITTING	1	6	323514	STAINLESS STEEL 1/4" PLUG	2
2	324001	VACUUM GAUGE	1	7	323518	45° STAINLESS STEEL 1/4" ELBOW	1
3	632202	1/4" BRASS NIPPLE	5	8	323006	1/4" BALL VALVE	1
4	324002	VACUUM GENERATOR	1	9	323131	90° 1/4" NPT X 3/8" COMPRESSION FITTING	2
5	324567	1/4" CROSS	1	10	324512	3/8" NYLON HOSE (2 FEET ON VACUUM & 4 FEET ON RECYCLER)	6

SR60 VACUUM DISTILLATION SECTION (OPTION) CONT'D



Nb	PART #	DESCRIPTION	Qty	Nb	PART #	DESCRIPTION	Qty
1	323131	1/4" NPT X 3/8" 90° COMPRESSION FITTING	1	7	323189	45° 1/4" BRASS ELBOW	1
2	324001	VACUUM GAUGE	1	8	608102	1/2" BALL VALVE	1
3	632202	1/4" BRASS NIPPLE	5	9	323131	90° 1/4" NPT X 3/8" COMPRESSION FITTING	2
3A	323167	NIPPLE REDUCER 3/4" TO 1/4"	5	10	324512	3/8" NYLON HOSE (2 FEET ON VACUUM & 4 FEET ON RECYCLER)	6
4	324002	VACUUM GENERATOR	1				
5	632226	1/4" TEE	1				

VACUUM INSTALLATION



Nb	PART #	DESCRIPTION	Qty
1	325558	1/4" PUSH IN FITTING	2
2	324632	1/2" BULK HEAD FITTING	2
3	324560	90° 1/4" PUSH IN FITTING	4

Nb	PART #	DESCRIPTION	Qty
4	322013	ALUMINIUM 1/2" NIPPLE	1
5	324571	POLYURETHANE HOSE 1/4" (SOLD BY FOOT)	6.5
6	324003	SOLENOID VALVE	1



Nb	PART #	DESCRIPTION	Qty
1	911021	REGULATOR GAUGE	1
2	324562	REGULATOR	1
3	324560	1/4" PUSH IN FITTING	2

IMPORTANT ADVICE

1. Some solvents during the boiling phase create such a quantity of foam that a correct separation of the solvent from the polluting product is not possible; in fact, in this case, the distillate will still be dirty. To avoid this inconvenience, it will be necessary to obtain an anti-foam kit supplied as an option.

ANTI-FOAM KIT FOR : MODEL SR30 & SR60

2. Pay the utmost attention while the residue is drying; some polluting products with an increase of temperature tend to carbonize with a considerable discharge of smoke from the apparatus.

IN CASE THIS OCCURS, IMMEDIATELY PRESS THE START / STOP KEY TO STOP THE CYCLE.

In this case it is not possible to proceed to drying at atmospheric pressure; the problem may be solved by proceeding to the distillation phase at atmospheric pressure and to the phase of drying under vacuum; this technique will allow you to operate at a much lower temperature.

3. Opening the cover one hour before the distillation cycle is complete will cause the gasket to swell.

4. Do not rotate and shake the unit once loaded or when operating.

5. The cover acts as a safety valve. In case vapors come out of the cover stop the unit **IMMEDIATELY** and consult the table on page 23 to 25, « **Defects, Causes and Remedies** ».

DO NOT MISHANDLE THE COVER LOCKING SYSTEM OR LOCK THE COVER IN ORDER TO AVOID LEAKING.

6. Clean the diathermic oil expansion vessel only with a « wet » rag to avoid generating sparks.

DEFECTS, CAUSES AND REMEDIES (CONT'D)

Distillation at Atmospheric Pressure

Defects	Causes	Remedies
No vacuum protection	Lack of compressed air.	Adjust the air pressure.
	Lack of compressed air circuit.	Check the connection.
	Distilling a chlorinated solvent.	Turn off the distillate-unloading tap.
	The rubber tube of connection to distillate container is not perfectly connected.	Check the connection towards the condenser and connection on rapid clutch.
	Rubber tube deteriorated.	Change the rubber tube.
	Lack of distillate level control.	Check the connections.
	The cover does not have a perfect seal.	Place the cover correctly on the shoulder of the boiler.
	Cover gasket deteriorated.	Replace the gasket.
	Solenoid defected.	Replace the solenoid.
	Vacuum pump damaged.	Change the vacuum pump.
During the distillation distillate comes out dirty.	Solvent foams.	Use anti-foaming discs, see page 17.
		Load less quantity of solvent.
		Reduce working temperature.
		Reduce the compressed air feeding.
		Wait at least 48 hours after utilizing the solvent before starting the next distillation.
During drying distillate pigments.	Draws polluted products.	Separate the distillation phase than the drying ones. At the end of the distillation discharge the distillate tank and proceed to dry. At the end of drying wash the tank.



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