



# SOLVENT RECYCLER



**FOR.S.25A**

**I. MANUAL**

**DECLARACION DE CONFORMIDAD “CE”  
“EC” DECLARATION OF CONFORMITY**

**MODELO / MODEL FORS.25A**

Este producto cumple con la siguiente directiva de la Comunidad Europea.

This Product complies with the following European Community Directive.

Directiva 98/37/CEE y 94/9/CEE sobre máquinas.  
Machinery Directive 98/37/EC and 94/9/EC Directive.

APROBADO POR /  
APPROVED BY

AITOR ORTIZ

FECHA / DATE

MBP, S.L. figura inscrita en el Registro Industrial del País Vasco con el N° 01/8030 y cumple los requisitos para el desarrollo de su actividad comercial.

MBP, S.L. is registered in the Industrial Register of the Basque Country with the N° 01/8030.

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This use and maintenance guide has been drawn up in conformity with the following regulations:

Reference **DIRECTIVE 89/392/CEE** and subsequent modifications relative to the European Community Machinery Standards.

Reference **STANDARDS UNI EN 292/1 AND 292/2 -1992** concerning instructions of use.

### **WARRANTY TERMS:**

The solvent recycler is covered by a one year warranty starting from the delivery date. MBP undertakes free of charge, to carry out repairs and to replace parts found to have manufacturing defects, at its premises in Vitoria-Gasteiz.

The warranty does not cover parts subject to normal wear, including switches, relays, indicator lights, seals, etc.

Should the system need repairs under the warranty, the customer shall send the system or the part that requires replacement to MBP. CARRIAGE PAID, by previous agreement. After evaluating the real warranty conditions, MBP shall take steps to correct the defect and send the part/system back to the customer CARRIAGE PAID.

### **RESPONSIBILITY**

MBP, disclaims total responsibility for:

- Improper use of the recycler
- The system being used by unauthorised and/or untrained personnel
- Total or partial non-observance of the instructions
- Power supply defects
- Lack of maintenance
- Unauthorised modifications or repairs
- Use of non-original spare parts
- Force majeure events such as: flooding, fire, earthquakes, etc...

	<b>FORS 25</b>
Tank capacity	20 litres
Power supply	220V/1/50 Hz
Controls	low voltage 24 V
Power	2,00 KW
Operating temperature	50:170°C
Indirect heating through diathermic oil	THERMIA
Diathermic oil capacity	10 litres
Cooling	Ventilated by forced air



fig.1

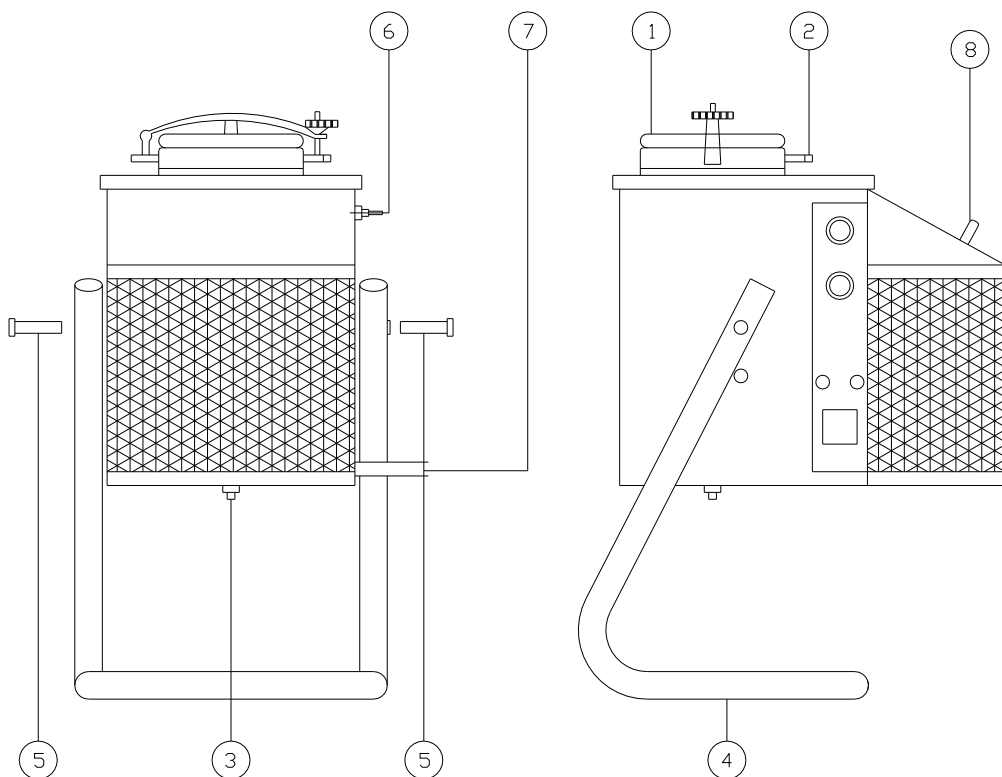


fig.2

- 1.- Tank cover
- 2.- Diathermic oil vent cap
- 3.- Oil drain
- 4.- Support
- 5.- Fixing screw
- 6.- Safety valve
- 7.- Recycled solvent outlet pipe
- 8.- Handle



# TABLE OF MOST COMMON SOLVENTS

Thinner and solvent	Boiling point °C	Solvent thermostat	Heating thermostat
Butyl acetate n.	126.3°C	112°C	159°C
Butyl acetate sec.	112.2°C	98°C	152°C
Ethyl-glycol acetate	156.4°C	137°C	183°C
Ethyl acetate	77°C	66°C	114°C
Methyl-glycol-acetate	138°C	124°C	163°C
Isobutyl acetate	117°C	104°C	154°C
Isopropyl acetate	89.4°C	78°C	124°C
Methylacetate	57°C	47°C	106°C
Propyl acetate	97-102°C	85-90°C	132-134°C
Aceton	56.1°C	46°C	105°C
Methyl ethyl ketone	78-85°C	67-74°C	115-122°C
Butyl alcohol	117°C	104°C	154°C
Butyl alcohol sec	99.5°C	87°C	134°C
Pure spirits of turpentine	150°C	131°C	180°C
Ethyl alcohol	78°C	67°C	115°C
Isobutyl alcohol	107°C	95°C	135°C
Isopropyl alcohol	82°C	71°C	120°C
Methyl alcohol	65°C	55°C	114°C
Cyclohexane	81°C	70°C	119°C
Cyclohexanone	156°C	137°C	183°C
Methylene chloride	40-42°C	31-33°C	90-92°C
Methyl chloride	40-60°C	31-50°C	90-110°C
Diacetonalcohol	150°C	131°C	180°C
Dichlorethane	84°C	73°C	121°C
Dichloropropane	96.4°C	74°C	132°C
Dimethylformamide	153°C	134°C	181°C
Ethyl ether	34-35°C	25-26°C	87-88°C
Freon 112	92.8°C	70°C	129°C
Ethylene glycol	135°C	118°C	161°C
Perchlorethylene	121°C	107°C	158°C
Toluene	109'5-110°C	96°C	136°C
Tetrachlorethane	145°C	126°C	176°C
Trichlorethylene	87°C	75°C	124°C
Trichloroethane	70-88°C	59-76°C	119-124°C
Xylene	137-139°C	122-124°C	171-173°C

**Note:**

These temperature data reported are based on clean solvent.

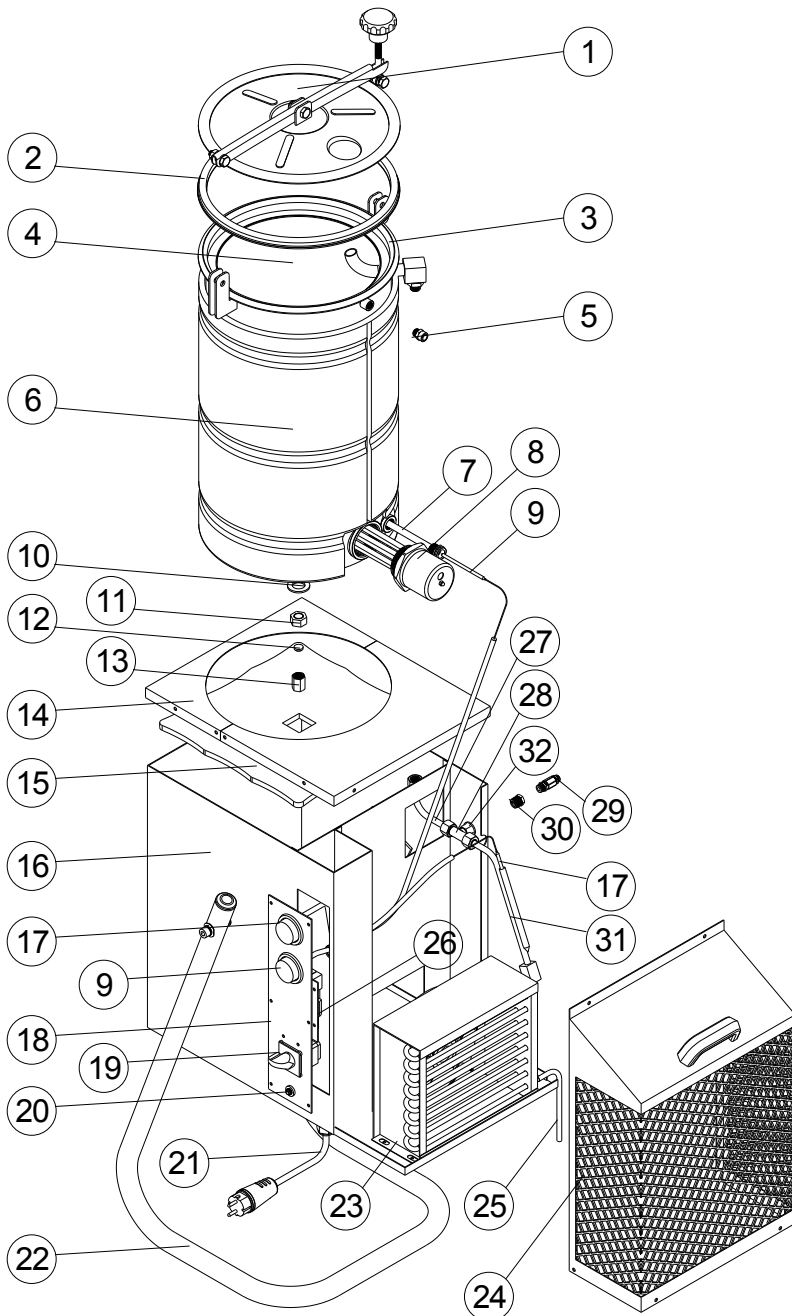


fig.3



N°	FORS 25A	DESCRIPTION	Q
1	RD.111.00	Cover with gasket	1
2	RD.100.01	Joint	1
3	RD.210.00	Solvent tank	1
4	FORS-20B	Bag	1
5	CNA.132	Diathermic oil vent cap	1
6	RD.200.02	Tank insulation	1
7	CEA.068	Brass cover	1
8	CEA.063	Electrical resistance	1
9	CEA.067	Thermostat heating	1
10	CAR.003	Washer	1
11	RD.100.05	Nut	1
12	3.110.02	Joint	1
13	RD.100.04	Cap	1
14	KIT.156	KIT. Covers	1
15	RD.200.03	Tank insulation	1
16	RD.221.00	Body	1
17	CEA.064	Distillation thermostat	1
18	RD.150.01	Control bord	1
19	CEA.071	Main switch	1
20	CEA.072	Circuit breaker	1
21	RD.170.00	Power cable	1
22	RD.160.00	Support	1
23	KIT.157	Fan	1
24	RD.240.00	Guard	1
25	RD.100.06	Pipe	1
26	RD.151.00	Electronic card	1
27	RD.122.00	Cooler union vessel	1
28	CNA.124	Racor	1
29	CNC.014	Safety valve	1
30	CNA.052	Racor	1
31	RD.231.00	Cooper condenser	1
32	103.200.01	Racor	1

Read this guide carefully before starting up, operating and carrying out maintenance operations on the system.

**Non-observance of the most elementary care and safety precautions is almost always the main cause of industrial injuries.**

- Use the machine within the established limits defined for its technical performance.
- All operating and maintenance operations must be carried out by qualified personnel, according to the regulations concerning industrial accidents, although not specifically mentioned in the guide.
- Always keep the system's signals and protections against accidents in good condition; if they are removed during maintenance operations, they must be restored before starting the system again.
- Do not open the covers and guards while the system is in operation.
- Do not wear rings, wristwatches, jewellery and loose clothing which could get entangled in the moving parts; it is advisable to wear suitable clothing to prevent accidents. Always follow the safety instructions applicable.
- Do not tamper with the safety devices installed on the system.
- Clean the machine covers and control panels using a soft cloth soaked in a mild cleaning solution; do not use solvents such as alcohol or petrol as this may damage the system's surfaces.
- Do not use the system if it is damaged; inform the person in charge of maintenance regarding functioning faults.
- Do not carry out any operation without previous authorisation and do not allow unauthorised persons to handle the system.
- Disconnect the power supply before carrying out any maintenance operations on the electrical components.
- The control board must always be kept closed.

- Do not open the tank lid during the distillation cycle: you run the risk of being splashed with toxic gaseous substances at very high temperatures.
- Always wear gloves to protect the hands, a mask to avoid inhaling toxic substances and goggles for protecting the eyes, when loading or unloading the tank.
- Do not wear clothing that may cause electrostatic charges as this may lead to the solvent fumes catching fire.
- Do not smoke or use a naked flame near the machine while the machine is being used or while maintenance or other operations are being carried out.
- In the event of the system catching fire, disconnect the power supply immediately and put out the fire using a dust or CO2 fire extinguisher. Do not use water.

## SYMBOLS



DANGER OF ELECTROCUTION  
Presence of electrically powered components.



WARNING OF DANGER  
High temperatures and heat radiation.

The use of the individual protection equipment is obligatory while the solvent recycler is being manipulated. To be protected against serious injuries: eye injuries, inhalation of toxic vapors, burns,...



Obligatory use of  
protection glasses.



Obligatory use of  
mask.



Obligatory use of  
gloves.



## **DANGEROUS CHEMICAL REACTIONS**

The operator must have sufficient knowledge of the solvent 's characteristics and reactions, the dangers it can provoke and the precautions to be taken.

This information is contained in the technical and safety data sheet which must be supplied together with the solvent .

It is advisable to keep the solvent data sheets ( together with this guide if possible) within easy reach, ready for rapid consultation.

Only inflammable solvents belonging to explosive groups IIA and IIB and with self-ignition higher than 200 °C can be recycled.

The operator runs the risk of being exposed to dangerous chemical reactions if unsuitable solvents are introduced into the recycler .



## **PEROXIDES**

It is essential to avoid any reaction due to the presence of peroxides which may be formed in the absence of stabilisers and in the presence of oxygen. Solvents such as:

Tetrahydrofuran, Diethyl Ether, Disopropyl Ether, 1.4 Dioxane, Ethyl Cellosolve, Butyl Cellosolve.

The person who uses the solvents mentioned above must be aware of the possibility of formation of peroxides in the absence of stabilisers, as danger from these solvents is not restricted to the distillation process alone, but is also present during handling phases. The safety data sheet of such solvents must contain all the necessary information regarding formation of peroxides and the precautions to be taken (stabilisers, type, quantity and analysis methods).

## **NITRIC SUBSTANCES AND NITRATES**

**It is forbidden to use the system with substances and solvents which may cause reactions due to the heating of nitric substances (Nitromethane, Aromatic nitrates) and nitrates (Nitric Acid Ester) as there is risk of explosion.**



## NITROCELLULOSE

Special care must be exercised in the case of solvents contaminated with Nitrocellulose as a residual component, as in some types of ink or paint. The safety data sheets of products containing Nitrocellulose (paints, ink or other products) must indicate the contents.

### **For recycling solvents containing Nitrocellulose consideration the following points.**

- Never allow the temperature to exceed 120°C while heating the diathermic oil.
- Keep the recycler in an area away from the production area, from operating stations and other installations, preferably in the open, while ensuring adequate protection against atmospheric conditions.
- Never set the thermostats in such a manner as to cause drying of the residue.
- In the event of long term storage of cleaning solutions, there is a possibility of formation of peroxides. Therefore it is necessary to check the solution to detect the presence of peroxides before starting the distillation process. If they are present, appropriate steps must be adopted for their elimination.
- Unload the distillation residue at the end of each operating cycle in order to avoid build-up of residual sludge containing Nitrocellulose, since, the higher the concentration, the greater is the risk of dangerous conditions.
- Special care must be taken while disposing of distillation residue sludge containing Nitrocellulose. Use metallic containers with lids and dilute with a small amount of water to prevent the sludge from drying up completely (as this condition favours the self-ignition of Nitrocellulose).



## **EXOTHERMIC REACTIONS**

Avoid recovery of solvents or mixtures and pollutants which may produce exothermic reactions (reactions followed by development of uncontrolled heat).

Read the safety chart concerned carefully.

## **PRECAUTIONS AGAINST ELECTROSTATIC CHARGES**

The operator must not use clothing which could provoke electrostatic charges (for example, clothes made of synthetic fibres).

Clean the tank and other parts of the system using a slightly damp cloth (not made of synthetic fibres).

Ensure that the power supply system is equipped with a suitable earth lead.

The recycled solvent collection tank must be suitably designed and made, using materials that are not subject to electrostatic discharges.

In order to avoid the phenomenon of an electrostatic charge, it is advisable to connect the metallic solvent collection tank to an effective earthing system.

## **INSTALLATION**

The solvent recycler must be installed in a open and well ventilated place.

### **Atención!!**

To set the solvent recycler running, the instructions of this manual should be followed



## ADJUSTING THERMOSTATS

Before proceeding with this operation the operator must have his individual protection equipment, and must check the safety data sheet of the solvent to be recycled and ensure that the mixture formed with pollutants does not create the conditions for triggering off chemical reactions, and of course he has read and understood this manual.

The data concerning the solvent boiling point are contained in the technical and safety sheets and must be supplied together with the solvent .

Firsy you have to know the boiling point of the solvent, this information appears on the data sheets of the solvent.

When:

-Turn the distillation thermostat knob to 10°C-15°C less than the boiling point.

-Turn the heating thermostat knob to 40°C-50°C higher than the boiling point.

Example:

Example:

	BOILING Point	DISTILLATION THERMOSTAT	HEATING THERMOSTAT
Cleaning solvent Ref: 123	63°C	51°C	110°C





## **SWITCH ON**

**First: Ensure that the pipe (RD.100.06) is connected to the output**

- Turn the main switch (CEA.071) to position (1). Ensure that the red indicator lights up. If the red indicator does not light up, check the power cable (RD.170.00).
- Turn the main switch (CEA.071) from the position (1) until the starting position (Star). As the main switch is unstable, the knob automatically returns to the position (1). The green indicator lights up the cycle of distillation starts. At the same time fan (KIT.057) begins to run.

## **DISTILLATION CYCLE:**

The solvent recycler starts to work automatically. After a diathermic oil heating time. The boiling point is reached, the recycled solvent starts flowing out of the pipe (RD.100.06).

## **AUTOMATIC SHUT DOWD CYCLE**

At the end of the distillation cycle, automatically the green indicator light will turn off and the fan will stop.

## **MAINTENANCE**

**ATTENTION!!** Before starting maintenance is necessary:

- Turn off solvent recycler. Turn the main switch to position (0)
- Disconnect the plug from the socket.



The solvent recycler does not need a special maintenance, however, remember that:

- At the end of each distillation cycle unloading residues is required.
- Before opening the tank lid, wait until the diathermic oil temperature falls the tank lid and rim are subject to very high temperatures.
- It is advisable to keep the system casing and condenser free of or scale, in order to allow correct flow of the cooling air.

## **PLACING THE BAG**

- First loosen the locking knob and turn back the tank lip completely.
- Insert the bag in the tank, making sure it adheres to the walls.
- Pour the solvent to be recycled into the bag. Do not exceed the maximum level indicated by the internal rim.

Note: Make sure that the bag edge does not obstruct the evaporated solvent outlet hole.

- Close the tank, locking the lid with the locking knob.

Note:

Do not tighten the knob excessively not to bend the lid arm and damage the seal.

**Important.**

Should be used only bags provided by MBP, which are manufactured to withstand the heat and the solvent. The use of another type of bag can trigger damages on the recycler and/or a fire.



## UNLOADING RESIDUES

Before opening the tank lid, put the individual protection equipment, especially gloves that do not allow the passage of heat, mask to avoid inhaling fumes goggles to protect eyes, and ensure that the recycler is OFF.

Open the tank lid.

Important:

Do not put any part of your body at the opening tank when the tank lip is opened, because hot fumes will be released.

Take the bag containing the residue out of the tank. Use goggles.

The distillation residues are polluting products, so do not throw them away, but have them sent to the special collecting centres.



## **CHECKING RESIDUES**

If the residues are liquid and still contain solvent (solvent having a higher boiling point than that set) it is necessary to:

- Close the tank lid.
- Gradually increase the heating temperature setting.
- Verify that the diathermic oil vent cap is open ( only two laps).
- Restart the recycler.

### **Important:**

If there is a power outage automatically the recycler will place in the final cycle. Turning the main switch to “START” the machine started working.

## **SWITCH OFF AFTER USE**

Always, after a distillation cycle, turn the main switch to the position (0).

## **CLEANING**

Always the “CLEANING” is made while the recycler is stopped and unplugged. The operator must use the individual protection equipment.

It is important to remove the residue deposited on the tank. Bottom and walls, as this acts as an insulating material, thus lowering the system yield.

It is necessary at least every 12 months, clean the fan blades with compressed air.



## DIATHERMIC OIL CHANGE

Replace the diathermic oil after 1000 working hours, and in any case, NOT later than one year.

Procedure to follow:

- Use the individual protection equipment.
- Place a container under the oil drain.
- Remove the cap from the oil tank the oil will fall in the container that we put before. Sent the oil to the special collecting centres.
- Once the oil tank is empty put the cap.
- The new diathermic oil is introduced through the “Diathermic oil vent cap”, (10 liters) we must put teflon on the threads of the “Diathermic oil vent cap” before screwing.
- Keep the diathermic oil vent cap open.

TROUBLE	SOLUTION
The read indicator light does not switch on and the recycler does not start working.	Check that the electric plug is correctly inserted in its socket
	Verify the effective electric power presence at the intake.
	Check that the eventual main switch of the electric installation is connected.
	Verify the electric plug.
The recycler starts, works but does not heat.	Verify the heating element is functioning.
	Verify the heating thermostat.
The system does not distill the whole polluted solvent content.	Verify the thermostats.
The recycled solvent is hot.	Ensure that the electric fan works correctly.
	Ensure that the cooper condenser is not blocked by dust, scales, etc.
	Ensure that the temperature setting is right for the solvent to be recycled.
The recycler operates, but the recycled solvent does not flow out.	<p>Make sure the condenser is not blocked because of over filling of the tank. Procee as follows:</p> <ol style="list-style-type: none"> <li>a) Put the heating thermostat to 0 °C. Wait until the recycler is cool.</li> <li>b) Open the tank lid.</li> <li>c) Blow air into the solvent outlet pipe , making sure that the air passage is clear. Otherwise contact the MBP.</li> </ol>
	Check the tank lid seal.



## TROUBLE SHOOTING

TROUBLE	SOLUTION
The recycled solvent flowing out is dirty.	The tank has been filled beyond the level.
	The dirty solvent is mixed with foamy products, thus making it necessary to fill the tank with a smaller quantity of liquid.
	The condenser is partially blocked, blow air into the solvent outlet pipe , or carry out a recycling cycle with 5 litres of clean solvent.



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