

CRYPTON

In tune with the future

Air conditioning service unit CAAS500



OPERATING INSTRUCTIONS

TES1453
09/2004

IMPORTANT

THIS MANUAL CONTAINS INFORMATION PERTINENT TO OPERATOR SAFETY.

READ THE ENTIRE MANUAL CAREFULLY BEFORE STARTING OR ATTEMPTING TO USE THE EQUIPMENT.

Every reasonable effort has been made to ensure that information within these Operating Instructions is correct at the time of release, but Crypton cannot accept responsibility for any errors that may occur.

The information in these Operating Instructions is subject to change without notice, and does not represent a commitment on the part of Crypton.

Service & Warranty

The reliability of this equipment is fully supported by our service agent. Please refer to the page at the end of this manual for full details.

Note:

Your attention is drawn to our Terms & Conditions of Sale. If a service engineer is called out under service warranty where, upon inspection and test the equipment is found to be in full working order and no fault found, the user is liable to be charged the cost incurred for this call out. Before calling out an engineer, ensure your equipment is faulty by checking its operation, particularly mains supply and fault codes/self test if applicable.

WARNING:

Do not attempt to operate this equipment unless you have read and understood these instructions.

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INTRODUCTION

This manual was drafted in accordance with the EEC Guidelines contained in Directive no. 392/89 as amended.

This manual contains important information pertinent to operator safety.

Read this manual through at least once before operating the CAAS500.

The manufacturer reserves the right to modify this manual and the machine itself with no prior notice. We therefore recommend checking any updates.

This manual must accompany the machine in case of sale or other transfer.

CARE OF THE MANUAL

This manual must be kept in a cool, dry place and must be kept for the entire life of the machine.

Take care not to damage this manual in whole or in part during consultation.

Do not remove pages from this manual. Do not write on the pages; space for notes is provided at the end of each chapter.

GENERAL INFORMATION

Machine identification information is printed on the data plate on the rear of the machine (see Figure 2)

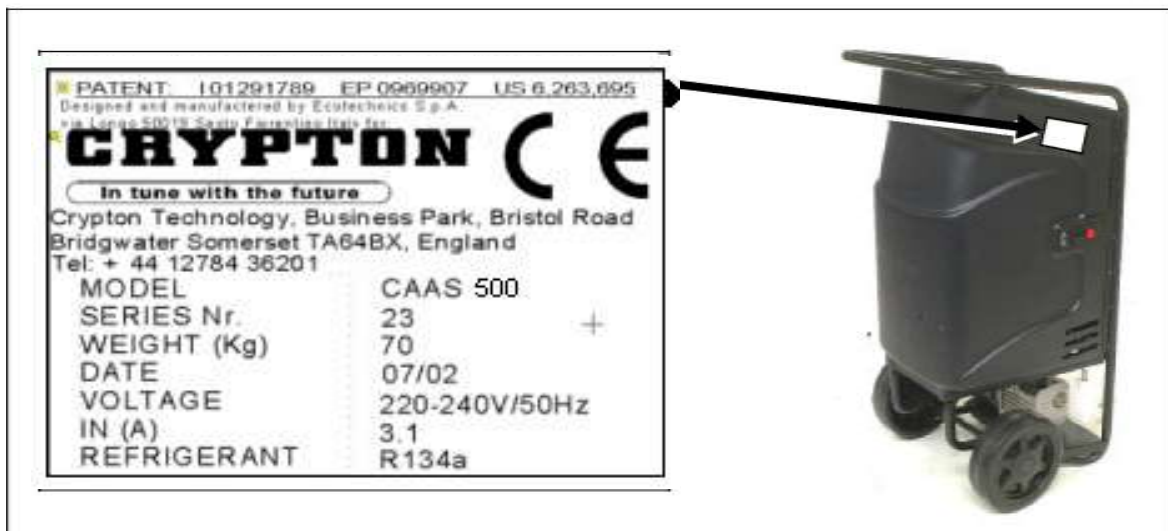


Figure 2: Example of a data plate with CE mark for the CAAS500

Overall machine dimensions:

Height:	1060 mm
Width:	500 mm
Depth:	520 mm
Weight:	70 Kg

Like any equipment with moving parts, the machine inevitably produces noise.

The construction system, paneling, and special provisions adopted by the Manufacturer are such that during work the average noise level of the machine is not in excess of 78 dB (A).

SAFETY RULES

The CAAS500 is a machine designed for use in recovering the R134a refrigerant fluid used in the air-conditioning (A/C) systems of motor vehicles. The CAAS500 is designed to be used by qualified personnel only; moreover, correct use of the machine will depend on the operator's knowledge of the information contained in this manual, including the basic safety rules set forth below:

Wear protective gloves and goggles.

Use only in well-ventilated work areas.

Do not expose the machine to direct sunlight or rain.

Before performing any operation, check the vehicle use and maintenance manual for the type of refrigerant fluid used by the A/C system.

Do NOT smoke in proximity to the machine while it is in operation

Do NOT use the CAAS500 in proximity to sources of heat, open flames or sparks.

Check whenever the engine is turned off that the ignition key is turned to the full OFF position.

Always close all the valves on the CAAS500 before connecting it to the A/C system of the vehicle.

Use only the hoses supplied and ensure that the RED hose and connector are used for the high pressure side and BLUE hose and connector used for the low pressure side of the A/C system.

Keep the connection hoses away from moving parts and rotating elements such as cooling fans, alternators, etc.

Keep the connection hoses away from hot objects and elements such as engine exhaust pipes, radiators, etc.

Fill the A/C system with the quantity of refrigerant recommended by the manufacturer.

Never exceed the stated quantity.

Check the oil levels at the beginning of each operation.

Before connecting the CAAS500, check that the mains electrical supply is 230V/50Hz.



Always top up with the correct quantity of oil.

Never fill the bottle to more than 80% of maximum capacity in order to leave an expansion chamber for absorbing any pressure increases.

Never tamper with the taps on the refrigerant bottle installed on-board the CAAS500.

Dispose of the oil extracted from the A/C system and from the vacuum pump in suitable containers for used oils.

Replace the filters punctually at the prescribed replacement times. Use only filters recommended by the manufacturer.

Use only the oils (ISO 68) recommended by the manufacturer.

Take care never to use the vacuum pump oil in the A/C system, or vice-versa.

Failure to observe any of the above safety precautions will invalidate all forms of guarantee on the CAAS500.

PRECAUTIONS FOR HANDLING AND USE OF REFRIGERANT

Refrigerant fluids expand to the gaseous state in standard environmental conditions. In order that they may be shipped and used they must be compressed into suitable bottles. We therefore recommend observing all the general precautions applicable to handling of pressurized containers.

In the case of R134a in particular, we suggest the following special precautions:

Avoid inhaling highly concentrated vapors even for short periods of time, since such vapors can cause loss of consciousness or death.

R134a is not flammable, but if the vapor is exposed to open flames or incandescent surfaces it may undergo thermal decomposition and form acid substances. The acrid and pungent odor of these products of decomposition is sufficient to signal their presence. We therefore recommend avoiding use of R134a near open flames and incandescent elements.

There exists no evidence of risks deriving from transdermal absorption of R134a. Nevertheless, due to the low boiling point of the liquid, it is advisable to wear protective garments such as to ensure that no jets of liquid or gas can come into contact with the skin.

The use of goggles to avoid contact with the eyes is especially recommended, since the refrigerant liquid or gas can cause freezing of the ocular fluids.

PRINCIPLES OF OPERATION

In a single series of operations, the CAAS500 permits recovering and recycling refrigerant fluids with no risk of releasing the fluids into the environment, and also permits purging the A/C system of humidity and deposits contained in the oil. The CAAS500 is equipped with a built-in evaporator/separator that removes oil and other impurities from the refrigerant fluid recovered from the A/C system and collects them in a container for that purpose. The fluid is then filtered and returned perfectly recycled to the bottle installed on the CAAS500.

The unit also permits running certain operational and seal tests on the A/C system.

SETUP

The CAAS500 is supplied fully assembled and tested. For reasons linked to shipping, assembly of the hoses for connection to the A/C system is left to the user. Connect the hose with the BLUE quick-connect coupling on the male threaded connector labeled LOW PRESSURE and the hose with the RED quick-connect coupling on the male threaded connector labeled HIGH PRESSURE, as shown in Figure 3.

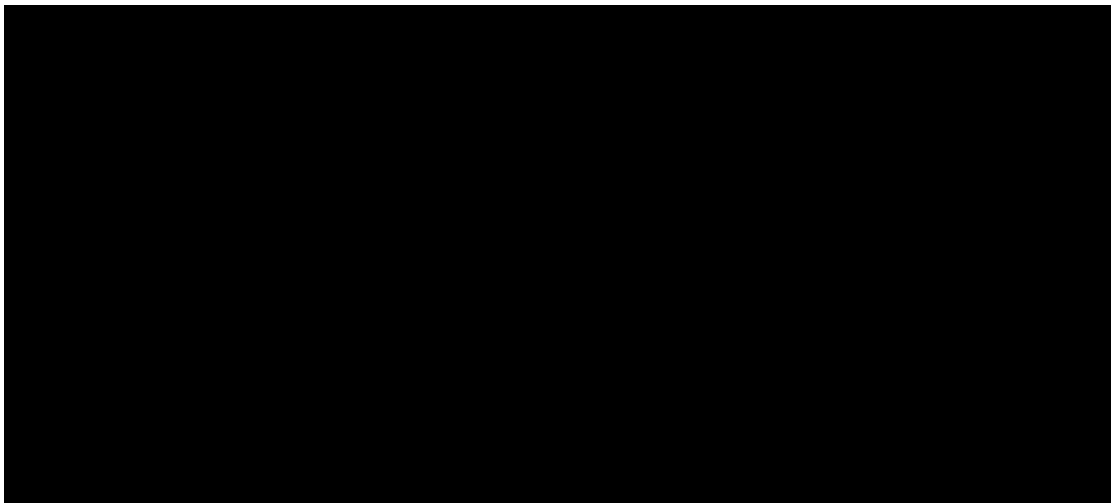


Figure 3: Detail of the front panel of the machine, showing the high- and low-pressure quick-connect couplings.

Referring to Figure 4, remove the protection screws (1 and 2) from underneath the scale plate. Conserve the screws and replace them whenever the machine must be moved.

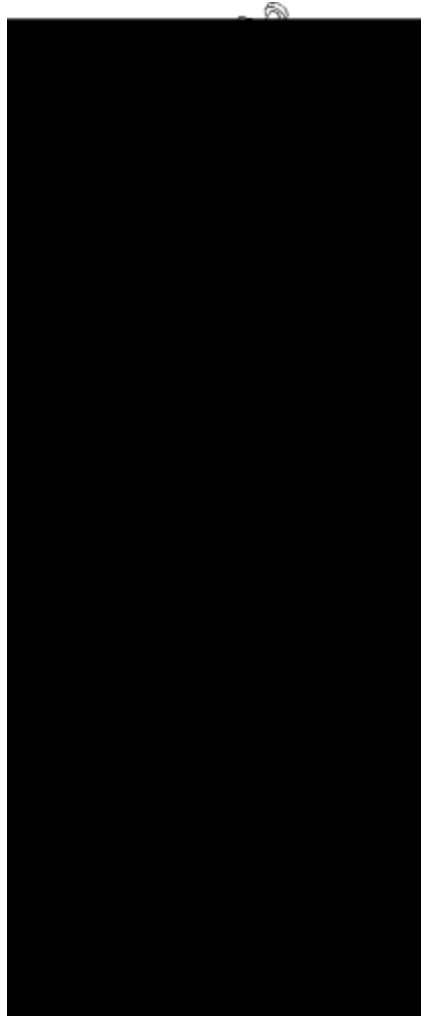


Figure 4: Rear view of the machine. Screws 1 and 2 must be re-inserted every time the machine is moved

THE MACHINE

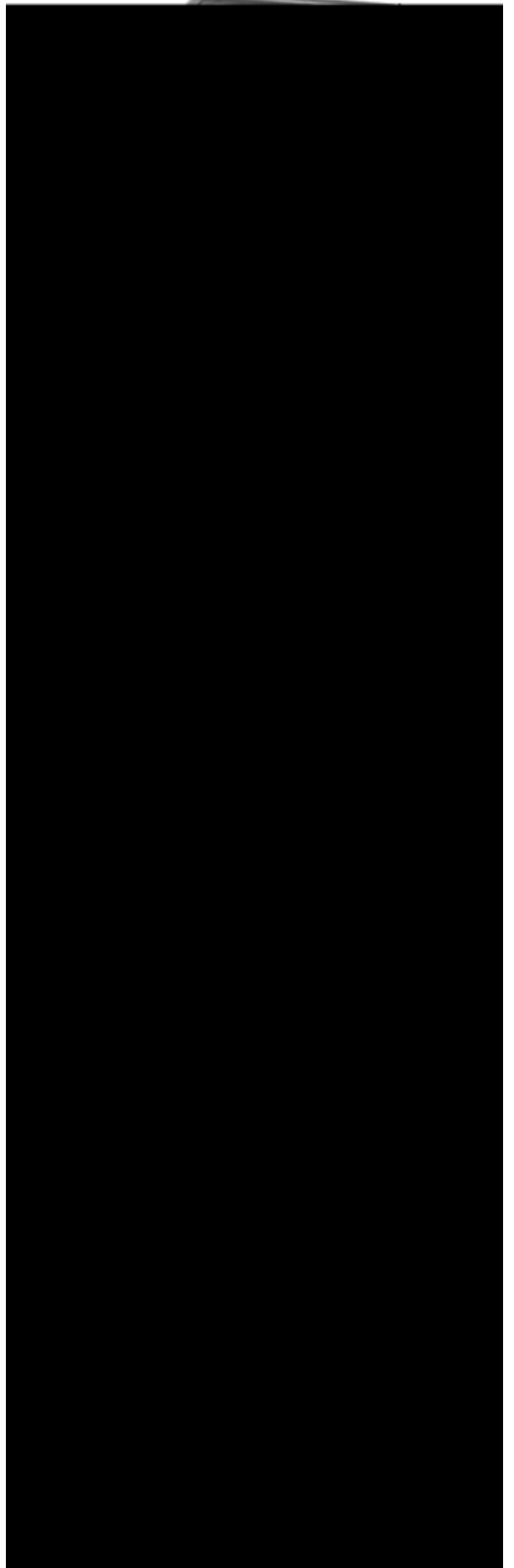
BASIC COMPONENTS

Refer to Figure 5:

- a) Control console
- b) Taps
- g) Handle
- l) High/Low Pressure threaded connectors n) Top-up oil container

Refer to Figure 6:

- d) Bottle
- e) Drying filters
- o) Electronic scale
- r) Heating resistance



Refer to Figure 7:

- i) Main switch
- j) Socket for electrical supply plug
- k) Fuse
- m) Used oil container
- p) Serial port

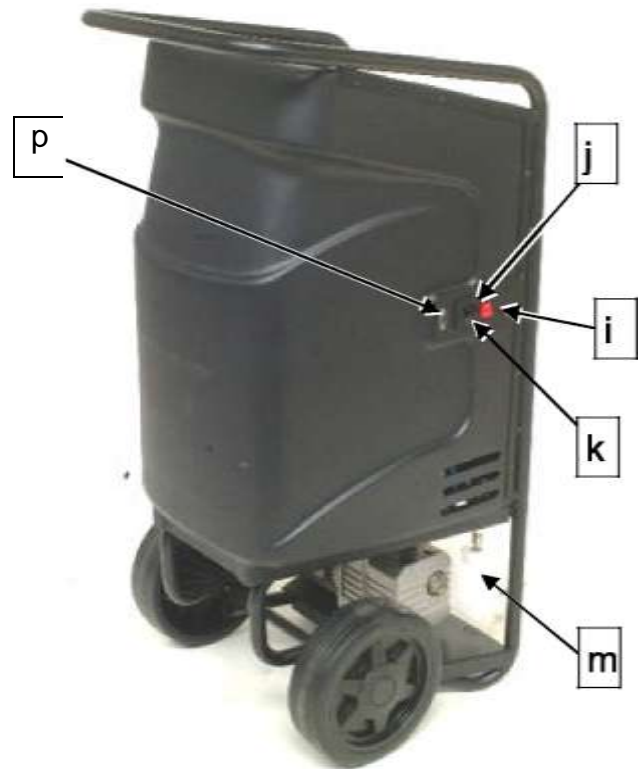


Figure 7: Principal machine components
(right side view)

Refer to Figure 8:

- c) Humidity gage
- f) Vacuum pump
- h) Wheels

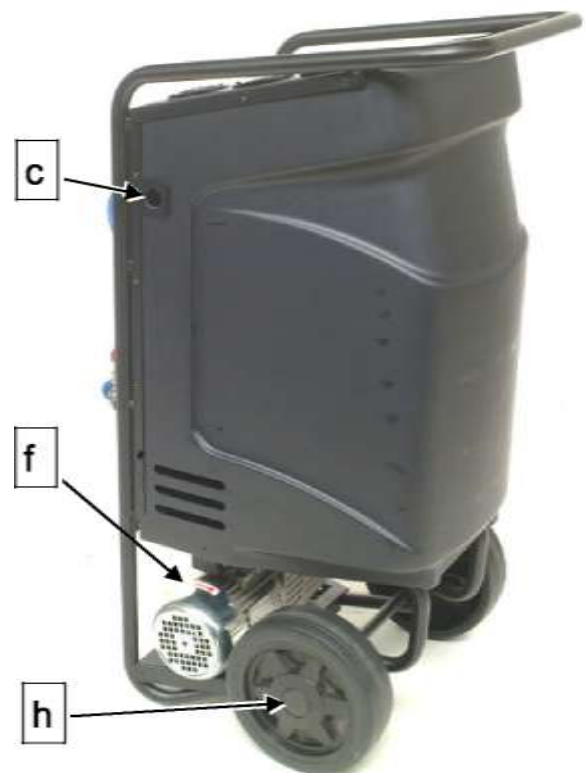


Figure 8: Principal machine components
(left side view)

CONTROLS AND CONTROL SYSTEM

Refer to Figure 9:

- (A1) High pressure gage for A/C system
- (A2) Low pressure gage for A/C system
- (A4) Pressure gage for bottle refrigerant pressure (A6) Emergency/alarms panel
- (A7) Display
- (A8) Operations selector panel
- (A9) Pushbuttons for modifying and starting/stopping operations

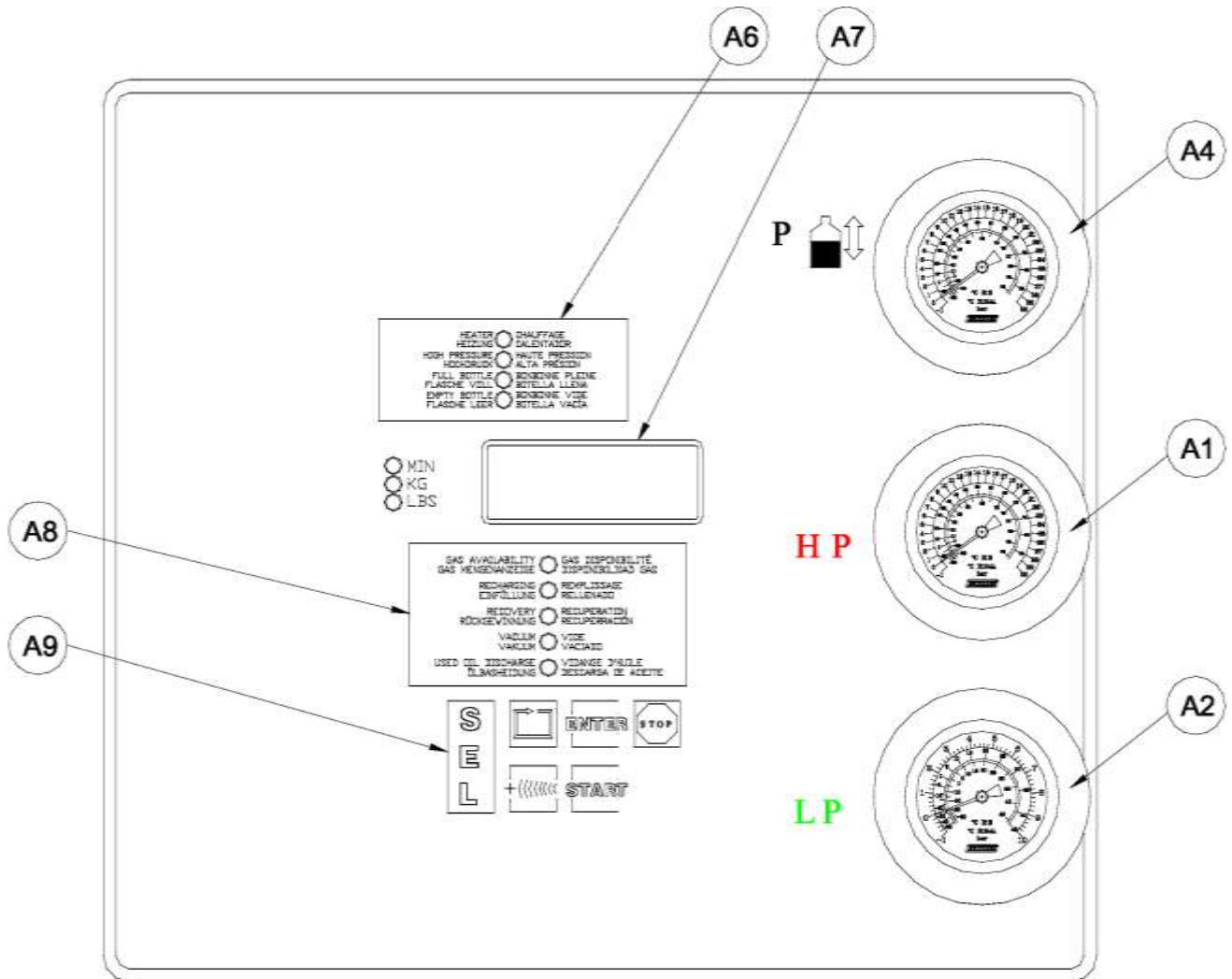


Figure 9: Control console diagram

FUNCTION SELECTOR KEYBOARD

Refer to Figure 10:

(T1) Availability LED indicator: when lit, the display reports the quantity of refrigerant fluid contained in the bottle.

(T2) Charging LED indicator (flashes during the CHARGING phase). (T3) Recovery LED indicator (flashes during the RECOVERY phase). (T4) Vacuum LED indicator (flashes during the VACUUM phase).


(T5) Oil Discharge indicator (flashes during the OIL DISCHARGE phase).

(T6) SEL key: Selects the operation to be performed. Every time this key is pressed one of the LEDs from T1 through T4 will light in sequence; the LED alongside each operation indicates that the operation may be started or that it is being performed (flashing LED).



Figure 10: Operations selection keyboard

(T7) + key: Each time this key is pressed during the operations relative to setting the time and the quantity, the value of the flashing digit on the display will be increased by one unit.

(T8)  key: Each time this key is pressed while a display value is flashing during the operations relative to setting the time and the quantity, a different digit will be selected for modification (selected digit will flash).

(T9) ENTER key: Pressing this key when a LED corresponding to an operation is lit but not flashing will permit modifying the times and the fluid quantities. Upon completion of modification, press the key again to confirm the datum

(T10) START key: Pressing this key will start the operation indicated by the lighted LED (T11) STOP key: Pressing this key will stop the operation indicated by the flashing LED.

(T13) Display: According to the operation selected, displays the time or refrigerant quantity values.

STATUS AND ALARM PANEL

See Figure 11:



Figure 11: Status and Alarm Panel

(C1) HEATER ON: Lights to indicate that the electrical resistance of the *CAAS500* is heating the bottle to maintain fluid pressure between 5.5 and 8 bar. The resistance does not operate during the RECOVERY phase of operation

(C2) HIGH PRESSURE: Lights and emits an acoustic signal when the pressure of the fluid in the circuit exceeds 17.5 bar. The RECOVERY operation is automatically interrupted.

(C3) FULL BOTTLE: Lights and emits an acoustic signal when the bottle is filled to more than 80% of maximum capacity; that is, 9.5 kg. The RECOVERY operation is automatically interrupted.

(C4) EMPTY BOTTLE: Lights and emits an acoustic signal when the quantity of refrigerant fluid contained in the bottle is low (2 kg). Charging will be automatically interrupted in order to avoid the emission of condensable gases. Fill the bottle according to the procedure described in the ROUTINE MAINTENANCE section.

PRELIMINARY OPERATIONS

Check that switch (i) is set to position 0.

Check that all the CAAS500 taps are closed

Connect the CAAS500 to the electrical supply and switch on

Check that the vacuum pump oil level indicator shows at least one-half full. If the level is lower, add oil as explained in the MAINTENANCE section.

Check that in the top-up oil container (n) there are at least 100 cc of the oil recommended by the manufacturer of the vehicle A/C system.

Check the level of the oil in container (m).

Check on the CAAS500 display that there are at least 3 kg of refrigerant in the bottle. Should this not be the case, fill the CAAS500 bottle from an external bottle of appropriate refrigerant following the procedure described in the ROUTINE MAINTENANCE section.

RECOVERY/RECYCLING PHASE

Connect the hoses to the A/C system with the quick-connect couplings, bearing in mind that BLUE must be connected to the low-pressure side and RED to high pressure. If the A/C system is equipped with a single quick-connect coupling for high or low pressure, connect only the relative hose.

Start the vehicle engine and switch on the air conditioner. Allow both to run for about 10 minutes with the passenger compartment fan at full speed.

Switch off the engine; if possible, keep the air conditioner fan running at maximum speed for the entire recovery phase

Open the high- and low-pressure taps (or, in the case of a single coupling, only the relative tap).

Press and hold the SEL key until the LED corresponding to "Recovery" lights; then press START. At this point the RECOVERY/RECYCLING phase will begin; the "Recovery" LED will flash. During this phase the amount of refrigerant recovered from the system will be displayed, in kilograms. Upon completion of the recovery phase the CAAS500 will stop and automatically discharge the used oil recovered from the A/C system during recovery. The oil discharge operation lasts 3 (three) minutes. If during this time residual refrigeration fluid in the A/C system should increase the pressure, the CAAS500 will automatically recommence recovering the refrigerant.


Switch off the air conditioner fan and if necessary turn the vehicle ignition key to the full OFF position

At this point, all of the refrigerant contained in the A/C system will have been recovered and recycled; there remains to extract the air and the residual humidity from the A/C system by creating a vacuum.

VACUUM PHASE

Upon completion of the RECOVERY phase the CAAS500 will automatically proceed to the vacuum phase. It is nevertheless possible to start the vacuum phase directly by opening the high- and low-pressure taps, pressing the SEL key until the LED corresponding to "Vacuum" lights, and then pressing START.

The preset vacuum time is 25 minutes (recommended for the majority of A/C systems), but may be modified as explained below. Press SEL until the "Vacuum" LED lights, then press ENTER; at this point the first digit on the left of the display will begin to flash. Press the key until the desired digit appears.

Likewise, press the  and + keys to change the other digits. When setting is complete, press the ENTER key to confirm the vacuum time value.

During the vacuum phase, the display will clock its duration. Leave the CAAS500 running until the display reads 0000 and the pump stops automatically.

Close all the taps and read the vacuum value on pressure gages (A1) and (A2). Wait for about 2 minutes, then check that the pressure has not increased during the interval. An increase in pressure signals leaks in the A/C system. Locate and eliminate the leaks; repeat the vacuum phase.

NEW OIL REINTEGRATION

Measure the quantity of oil extracted from the A/C system and check that the new oil container (n) contains at least 20 cc more than this quantity

Open the high- and low-pressure taps (or in the case of a single coupling, only the relative tap).

Open the tap of the new oil container and keep it open until the quantity of oil extracted during the recovery phase has been replaced.

When the correct quantity has been reintegrated, close the new oil tap.

ATTENTION: the level of the oil in the container will fall, and consequently the quantity must be calculated by subtraction

Upon termination of the oil reintegration operation you may go on to the refrigerant fluid charging/reintegration phase.


CHARGING/REINTEGRATION PHASE

During this phase, the refrigerant fluid is returned to the A/C system circuit.

Press the SEL key until the “Charging” LED lights.

Proceed as described below to set the quantity of refrigerant fluid to be charged.

Press the ENTER key. The first digit on the left of the display will begin to flash.

Press the **+** key until the desired value appears. Likewise, press the  and **+** keys to change the values of the other digits.

Press ENTER when setting is completed to confirm the values. The quantity of fluid required for filling the system is usually reported on a data plate in the engine compartment of the vehicle. If the quantity is not known, consult the relevant system operating and maintenance manuals.

Open the high- and low-pressure taps (if previously closed) and press the START key.

ATTENTION: If the pressure in the bottle is higher than 8 bar, open the low pressure tap only halfway (ca. 45° rotation) in order to avoid possible negative effects on the A/C system.

The machine will stop automatically when the preset quantity has been charged.

Close the high- and low-pressure taps.

Start the vehicle motor and switch on the A/C system and allow both to run for at least 3 minutes. At this point the system will be at steady state and it will be possible to check the high and low pressure values on the relative pressure gages. Refer to the table in the Appendix for the pressure values.

Disconnect **ONLY** the high-pressure quick-connect coupling (if necessary, switch the engine off). Then, with the A/C system still running, open the high- and lowpressure taps to force the A/C system to draw up the refrigerant contained in the hoses.

After about 1 (one) minute, disconnect the low-pressure couplings the CAAS500 from the vehicle A/C system and switch off the engine. Turn the main switch (i) to the 0 position.

ATTENTION: Should the pressure in the bottle be insufficient to charge the A/C system, it will be necessary to force the system to take up the fluid by suction. With the quickconnect couplings attached, **CLOSE** the high-pressure tap and run the A/C system with the low-pressure tap open

In the case of a single high-pressure coupling, charge about 100g in excess of the required quantity, since this amount will remain in the high-pressure hose at the end of the operation.

ROUTINE MAINTENANCE

FILLING THE CAAS500 BOTTLE

This operation must be performed whenever the available refrigerant in the bottle is less than 3 kg and must in any case be performed when the “empty bottle” indicator lights on the control console.

IMPORTANT: Never tamper with the taps on the CAAS500 bottle.

Procure a bottle of gas identical to that contained in the CAAS500 bottle; connect it to the high-pressure hose of the CAAS500.

Open the tap of the external bottle and the high-pressure tap of the CAAS500.

If the external bottle is not supplied with a suction device, turn it upside down to obtain a higher delivery rate.

Switch the CAAS500 on, then hold down the SEL key until the LED corresponding to “Recovery” lights.

Press the START key to start the CAAS500. The display will indicate the quantity of refrigerant transferred to the bottle on board the machine.

Close the tap of the external bottle when the quantity transferred is 0.50 kg less than the final quantity desired.

Allow the CAAS500 to recover the fluid remaining in the hose.

The “Recovery” LED will cease flashing when the CAAS500 will have recovered all the fluid from the hose. The CAAS500 will stop automatically.

Close the high-pressure tap on the CAAS500, press the STOP key, and disconnect the external bottle.

VACUUM PUMP

Perform the operations listed below on a routine basis in order to ensure good operation of the vacuum pump.

Oil top-up

Oil change Decontamination

When topping-up or replacing the pump oil, use only the oil recommended by the manufacturer. Contact the distributor for information concerning the correct type of oil.

M.1) Oil top-up

This operation must be performed when the level of the oil falls to less than half on the indicator (4 - Figure 12).

To refill the oil, perform the steps listed below in the order given.

Disconnect the CAAS500 from the mains supply.

Locate the oil cap (3) and screw it off. The oil will be added through the hole in which the oil cap was lodged (3).

Add oil a little at a time, waiting for the level to rise before each successive addition, until the oil level is about ½ cm above the red mark on the indicator (4).

Replace the oil cap (3) and tighten down.



Figure 12: Vacuum pump diagram

M.2) Oil change

The vacuum pump oil must be replaced every 150 working hours and in any case every time the refrigerant filters are replaced. The oil must also be changed whenever it changes color due to absorption of humidity. Before beginning the oil change procedure, procure a container of at least 500 cc capacity in which to collect the used oil. The pump contains about 500 cc of oil. Use only suitable ISO68 oils (Contact your vacuum pump distributor for specific information).

Disconnect the CAAS500 from the mains supply.

Unscrew the filling cap (3).

Unscrew the drain cap (5).

Allow all the oil to run out.

Close the drain cap (5).

Pour in new oil through the filling hole (3 - opened previously) until the level rises to the midpoint on the indicator (4).

Replace and tighten the filling cap (3).

M.3) Decontamination

Dark or turbid oil or an increase in the oil level are signs that the oil has been contaminated by foreign substances.

In these cases proceed as outlined below.

Disconnect the CAAS500 from the mains supply.

Unscrew the ballast valve (2 - Fig. 12) by 2 (two) turns.

Reconnect the CAAS500 to mains supply.

Run the vacuum phase for one hour on the hoses, with the taps open.

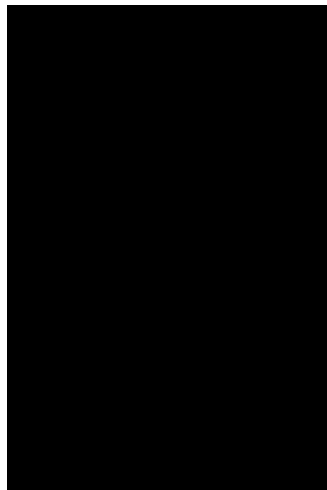
Disconnect the CAAS500 from mains supply..

Should decontamination not return the oil to its original state (light color and no traces of emulsion), change the oil.

REPLACING THE DRYER FILTERS

Replace the filters whenever the CAAS500 gives the service alarm [SERV] during the first ten seconds of operation or whenever the humidity gage ("c" in Fig. 8) signals the presence of humidity in the circuit (inner circle yellow. Before performing any operation, check that the replacement filters are the same types as those installed on the CAAS500.

Then proceed as follows:



Disconnect the CAAS500 from mains supply.

Put on gloves and safety goggles.

Remove the rear plastic cover.

Close the taps of the on-board bottle

Working slowly and carefully, unscrew the couplings at the inlet and outlet to the filters.

Loosen the filter clamps.

Replace the filters, taking care to insert them in the correct direction.

Tighten the clamps and the couplings at the inlet and outlet to the filters.

Open the taps of the on-board bottle.

Replace the rear plastic cover.

Reconnect and switch on the CAAS500.

During the first 10 seconds (when the service alarm [SERV] is displayed), press the SEL key.

Type in the filter code to cancel the alarm (use the + and  keys).

Recover about 500g of gas to charge the machine circuit.

Switch off the CAAS500

Disconnect the CAAS500 from mains supply.

FILLING THE NEW OIL TANK

It is good practice to fill the oil tank whenever the oil level falls below 100 cc in order to guarantee that there will be sufficient oil for topping up during successive operations.

Types of oil: use only synthetic oils. Always refer to the information provided by the system manufacturer.

Procedure. Remove the tank, complete with cap, after disconnecting the quick-connect coupling on the upper part. Unscrew the cap and fill the tank with the correct quantity of suitable type and grade oil for compressors. Screw the cap back on, replace the tank, and reconnect the quick-connect coupling.

EMPTYING THE USED OIL TANK

This operation must be performed whenever the oil level exceeds 200 cc. Procedure: remove the tank from its lodging and unscrew the cap; empty the tank into a container for used oils, Replace the cap and replace the container in its lodging.

SPECIAL MAINTENANCE OPERATIONS

CALIBRATING THE ELECTRONIC SCALE

This operation should be performed when the scale values displayed are out of line with known values.

The operations listed below must be performed with the maximum attention and care. Always observe the precautions outlined in this section.



- Always place the weights carefully on the scale plate, one at a time.
- Always place the weights the center of the scale plate.

Proceed as explained below to calibrate the scale (refer to Figure 4).

Disconnect the CAAS500 from mains supply.

Procure a known reference weight (16 or 18 kg).

Remove the plastic cover on the rear of the machine to access the CAAS500 bottle.

Close the blue and red taps on the bottle. Unscrew the bottle lock nut (3, Fig. 4).

Separate the heating coil (4, Fig. 4) from the bottle (do not touch or disconnect the wires of the resistance coil).

Remove the bottle (5, Fig. 4) from its seat, leaving the resistance around the scale plate.

Rest the bottle on a stand at least 40 cm in height.

Switch on the CAAS500. Be careful not to touch any electrical wires.

Wait at least 10 seconds.

Press the **+** and  keys simultaneously and hold down for about 5 seconds.

The value displayed at this point will correspond to the scale zero value.

Press down lightly on the scale plate; the value should increase. If it does not, replace the charge cell.

Press the ENTER key to memorize the value. (In this phase, take care that nothing touches the scale plate).

Place the reference weight (16 or 18 kg) carefully at the center of the scale plate and check that the displayed value increases accordingly.

Press the SEL key and use the + and  keys to type in the 4 figures of the reference weight.

Press ENTER. The display reading should be the reference weight minus the weight of the empty bottle (ca. 6.1 kg).

Remove the reference weight.

Switch off the CAAS500 and disconnect from mains supply.

Replace the bottle in its seat on the scale plate.

Switch on the CAAS500, taking care not to touch any electrical wires.

Check calibration: place a known 0.5 kg or 1 kg reference weight on the bottle and check that the displayed availability value increases by the value of the known reference weight $\pm 2\%$. Remove the reference weight.

Switch off the CAAS500 and disconnect from mains supply. Screw down the bottle lock nut (3, Fig. 4).

Open the red and blue bottle taps.

Replace the rear plastic cover.

ADDITIONAL SETTINGS

CHANGING THE UNITS OF MEASURE (kg > lbs or lbs > kg)

Switch on the CAAS500.

Press the SEL, START, and ENTER keys simultaneously. The machine will change from one system of units of measurement to the other.

INDICATIVE PRESSURE VALUES

Table of optimum pressure values (for reference only)

Ambient temp. [°C]	R134a Low Pressure [bar]		High Pressure [bar]	
	min	max	min	max
15.5	0.5	1	9.5	13
21	0.5	1	12	17.5
26.5	0.5	1	14	20.5
32	0.5	1	16	24
38	0.5	2	18.5	25.5
43	0.5	2.3	22	28

Notes:

