



Made in Italy

# X CROSS

Automatic unit for Recovery,  
Recycling, Vacuum and Charge  
User's manual



# X CROSS

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**SUMMARY**

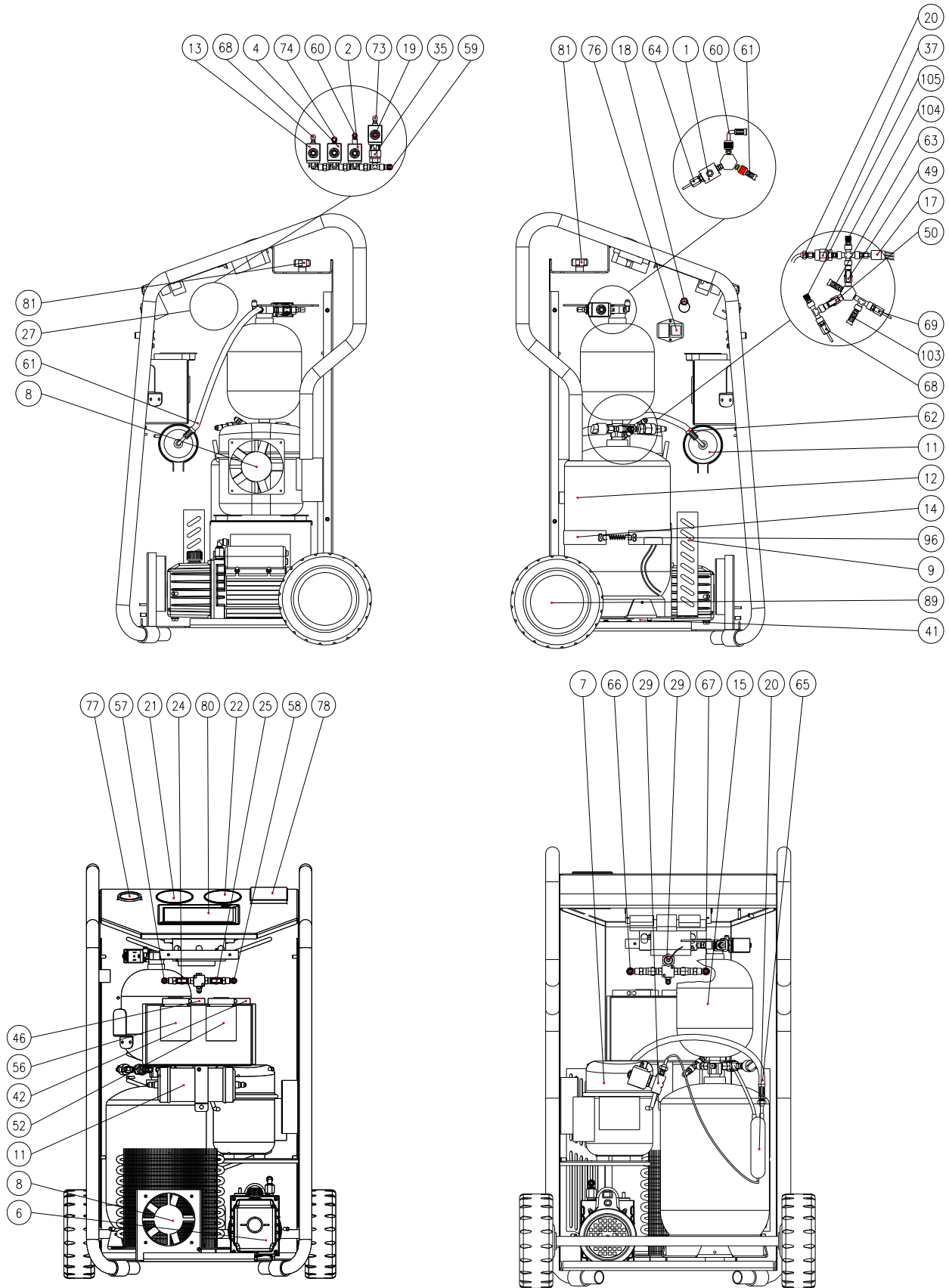
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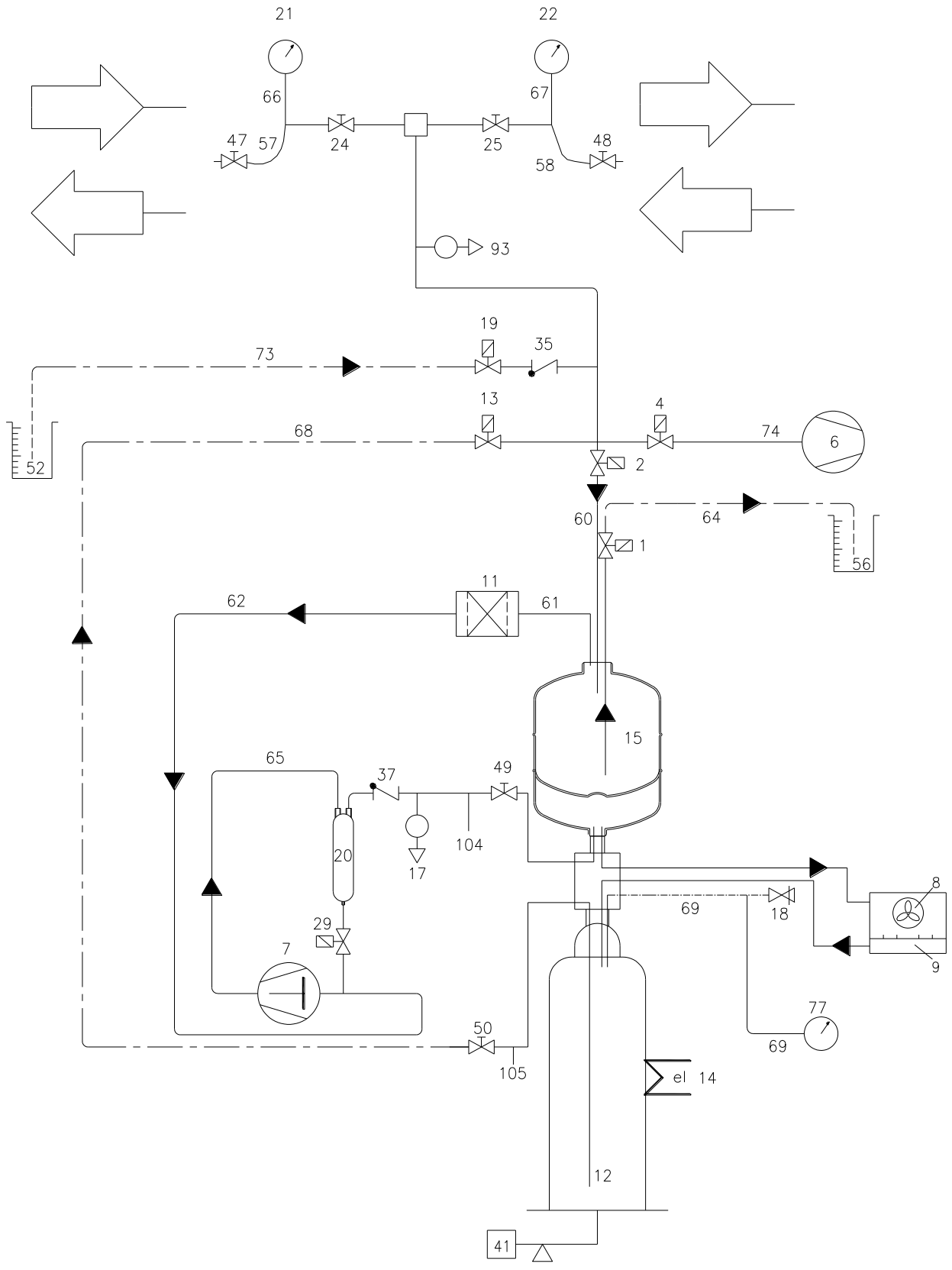
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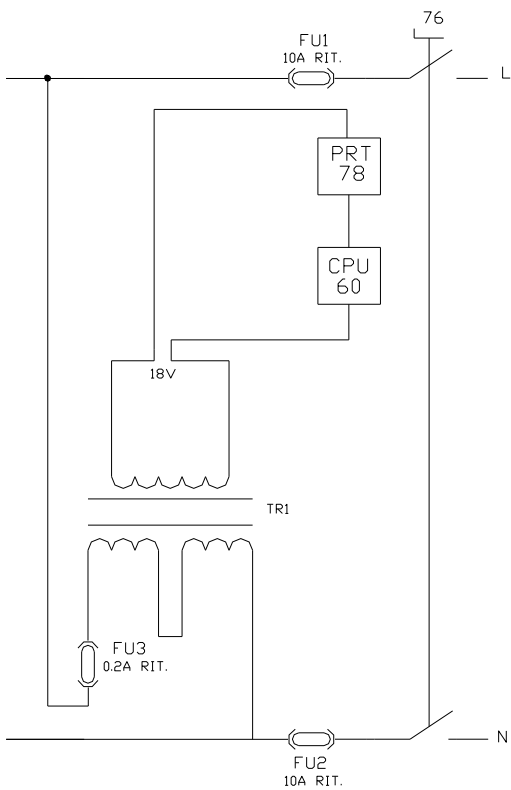
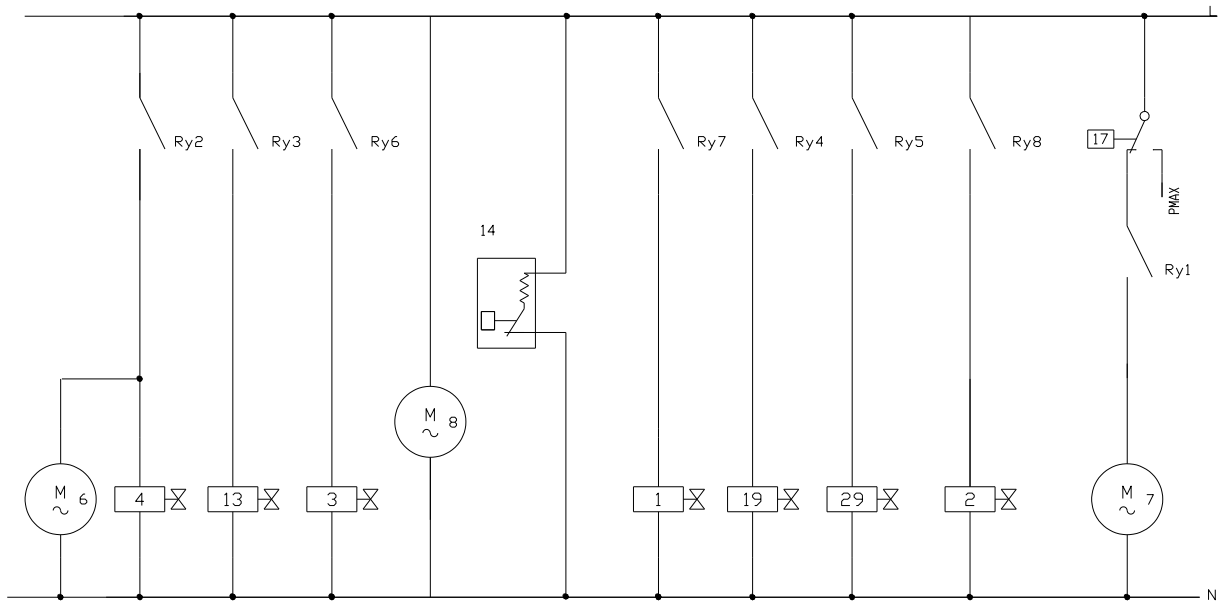
Layout drawing



Hydraulic diagram



Electric diagram



## Legend

<b>1</b>	Solenoid valve - oil discharge line	<b>56</b>	Oil discharge bottle
<b>2</b>	Solenoid valve - recovery line	<b>57</b>	LOW flexible hose
<b>4</b>	Solenoid valve - vacuum line	<b>58</b>	HIGH flexible hose
<b>6</b>	Vacuum pump	<b>59</b>	Connecting hose between valve block and manifold
<b>7</b>	Compressor	<b>60</b>	Valve assembly - distiller connecting hose
<b>8</b>	Motor-fan	<b>61</b>	Distiller – filter connectng hose
<b>9</b>	Condenser	<b>62</b>	Compressor suction hose
<b>11</b>	Filter drier	<b>63</b>	Inlet hose of condenser
<b>12</b>	Complete refrigerant bottle	<b>64</b>	Oil discharge capillary hose
<b>13</b>	Solenoid valve -refrigerant charging line	<b>65</b>	Compressor pressure hose
<b>14</b>	Heater belt with thermostat on the bottle	<b>66</b>	Capillary hose connecting LOW valve to LOW pressure gauge
<b>15</b>	Distiller/ separator	<b>67</b>	Capillary hose connecting HIGH valve to HIGH pressure gauge
<b>17</b>	Safety pressure switch	<b>68</b>	Refrigerant charge capillary tube
<b>18</b>	Safety valve	<b>69</b>	Safety valve connecting hose
<b>19</b>	Solenoid valve - oil charging line	<b>73</b>	Oil injection capillary tube
<b>20</b>	Oil separator complete compressor	<b>74</b>	Vacuum pump hose
<b>21</b>	LOW pressure gauge	<b>75</b>	Power cable
<b>22</b>	HIGH pressure gauge	<b>76</b>	Main power switch
<b>24</b>	Manual valve - LOW	<b>77</b>	Bottle pressure gauge
<b>25</b>	Manual valve - HIGH	<b>78</b>	Printer
<b>27</b>	Complete valve block	<b>80</b>	Electronic control board (with 7" touch screen)
<b>29</b>	Solenoid valve - oil return to compressor line	<b>81</b>	Handle to lock the refrigerant bottle
<b>35</b>	Check valve - oil charging line	<b>89</b>	Rear wheel
<b>37</b>	Check valve – compressor delivery line	<b>93</b>	Pressure sensor
<b>41</b>	Load cell - 100 kg (refrigerant)	<b>96</b>	Spring for heater belt
<b>42</b>	Load cell - 5 kg (oil charge)	<b>103</b>	Outlet hose of condenser
<b>46</b>	Load cell - 5 kg (oil discharge)	<b>104</b>	Bottle service connection (vapour)
<b>47</b>	LOW quick coupler	<b>105</b>	Bottle service connection (liquid)
<b>48</b>	HIGH quick coupler	<b>106</b>	Vacuum pump oil filler plug
<b>49</b>	Manual valve - bottle inlet	<b>107</b>	Vacuum pump sight glass
<b>50</b>	Manual valve - bottle outlet	<b>108</b>	Vacuum pump oil drain plug
<b>52</b>	Oil charging bottle	<b>111</b>	Auxiliary connection on LOW hose



## Safety precautions



- **Before using this recovery unit, make sure that the connections to the A/C air-conditioning system have been made correctly. In particular, make sure that the low pressure connection HAS NOT BEEN MADE on the “fuel pressure outlet”. In fact, some vehicles have the “fuel pressure outlet” with the same A/C system low pressure connection.**
- This equipment is designed for trained personnel only, who must know the refrigeration fundamentals, cooling systems, refrigerants and possible damage that pressurized equipment may cause.
- Use only with refrigerants HFO1234yf or R134a. The unit must not work with any other type of refrigerant.
- Refrigerant HFO-1234yf is classified as a flammable gas. Carefully read the safety data sheet of the refrigerant for a correct and suitable storage.
- Carefully read the instructions contained in this manual; strict observance of the procedures described is fundamental to the operator's safety, the perfect state of the unit and constant performances as declared.
- **The unit must always work under the operator's direct supervision**
- Do not operate the unit with different refrigerant than the one it has been designed for.
- Before performing any operation, make sure that the hoses used for connections have been previously evacuated and that they do not contain non-condensable gases.
- Avoid skin contact; the low boiling temperature of the refrigerant (about -30°C) can cause freezing.
- Avoid breathing refrigerant vapours.
- It is recommended to wear suitable protections like safety glasses and gloves; contact with refrigerant may cause blindness and other personal injuries.
- Do not operate near open flames and hot surfaces; the high temperatures decompose the refrigerant releasing toxic and caustic substances which are hazardous for the operator and the environment.
- Always make sure that the unit is connected to a suitably protected mains supply provided with an efficient earth connection.
- Before performing maintenance operations or when the unit will not be used for a long period of time, turn the unit off by turning the main switch to 0 and disconnect the power supply cord; absolutely follow the sequence of operations.
- Operate the unit only in locations with suitable ventilation and a high number of air changes.
- Before disconnecting the unit, make sure that the cycle has been completed and that all valves are closed in order to avoid release of refrigerant to the atmosphere.
- Never fill any tank with liquid refrigerant to more than 75% of its maximum capacity.
- During operations avoid release of refrigerant to the environment; this precaution is required by international environmental standards and is essential to avoid difficult leak detection in a refrigerant polluted environment.
- Protect the unit from dripping.
- Do not modify the calibration of safety valves and control systems.
- If you recover refrigerant from a cooling system equipped with a water evaporator and/or condenser, it is necessary to drain water from the evaporator and/or condenser or to keep the circulation pump running during the entire recovery operation in order to avoid frosting.
- Do not leave the unit connected to the power supply when not used.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance
- In case of damage to the power cord, please replace it immediately with an original spare supplied by Wigam.

**User's manual in other languages are available on WIGAM web site: [www.wigam.com](http://www.wigam.com)**



## 1. Introduction to recovery unit X-CROSS VARIANT

**X-CROSS VARIANT** unit permits quick and efficient recovery of refrigerant from the A/C system, refrigerant recycling, system evacuation, check for tightness, additive and lubricant injection, the subsequent charge with refrigerant and measurement of the operating pressures.

Thanks to the wide 7" screen, the unit is very versatile and is able to help the operator with information useful to perform the various operations.

Finally, the extra service connection on the low pressure hose allows the operator to add additives even after the refrigerant charging operation.

### 1.1 TECHNICAL SPECIFICATIONS

Model	X-CROSS Variant
Refrigerant	R134a / R1234yf
Maximum storage capacity	10 kg
Maximum recovery rate	0,3 kg/min
Power supply	230/1/50
Power input	1050 W
Storage temperature	-10 ÷ +50°C
Working temperature	0 ÷ 40 °C
Degree of protection	IP20
Noise level	< 70dB (A)
Refrigerant max charge	8 kg

### 1.2 UNIT'S COMPONENTS

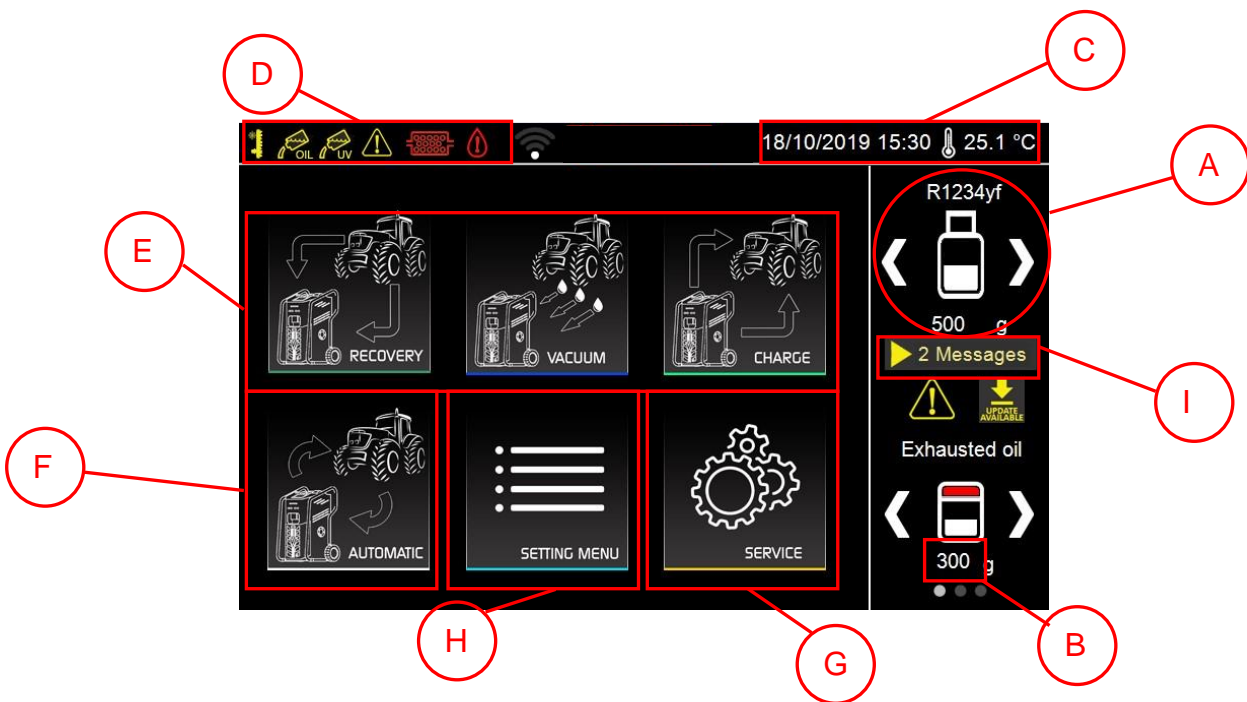
<b>Component</b>	<b>Features</b>
Compressor	Piston 9 cc recovery rate 0,3 kg/min
Vacuum pump	Rotary vane type and single stage, 100 l/min
Filter drier	Dehydrating capacity of 75 PPM of water
Flexible hoses	L= 2.5/5.0 meters with quick couplers
Fan	Axial type and high flow rate
Refrigerant bottle	Capacity of 10 kg with liquid and vapour connections
Distiller - Separator	High heat exchange distillation chamber with automatic flow control
Container of discharged oil	Capacity of 200 grams of oil, on load cell
Container of oil to charge	Capacity of 200 grams of oil, on load cell
Control module	7" Touch screen
Printer	Thermal



1.3 CONTROL MODULE

The unit has a wide 7” colour touch screen. The display shows the following information:

- Refrigerant quantity (kg/lb) inside the bottle (A)
- New oil quantity (g/oz) inside the bottle (it could be set for thermic, hybrid or electric car) (B)
- Exhaust oil quantity (g/oz) inside the bottle (B)
- Ambient temperature (°C/°F) (C)
- Hour and date (C)
- Alarm warnings and machines signals (D)
- Start functions (Recovery, Vacuum, Charge and Automatic) (E)
- Start Automatic function (F)
- Service (G)
- Menu (H)
- Access to messages and reports (I)



1.4 FUNCTIONING INDICATOR

On the front of the unit, there is the large operating indicator. It takes on different colours, based on the operations the equipment is performing.

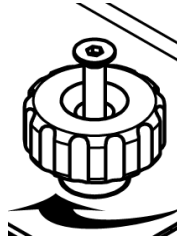
Light green		Recovery
Blue		Vacuum
Violet		Oil charge
Green		Refrigerant charge
Red		Alarm



## 2. Preparation for use of the X-CROSS VARIANT unit.

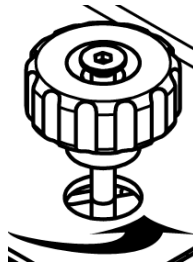
### 2.1 CYLINDER LOCKING AND UNLOCKING

The unit has an efficient cylinder locking system to facilitate movement over uneven terrain. When moving the machine, it is necessary to lock the cylinder. Turn the knob on the storage compartment clockwise until it comes to rest on the floor.



**⚠ WARNING!** Once the knob has come to a stop, avoid continuing to force it, lest you risk damaging the whole system.

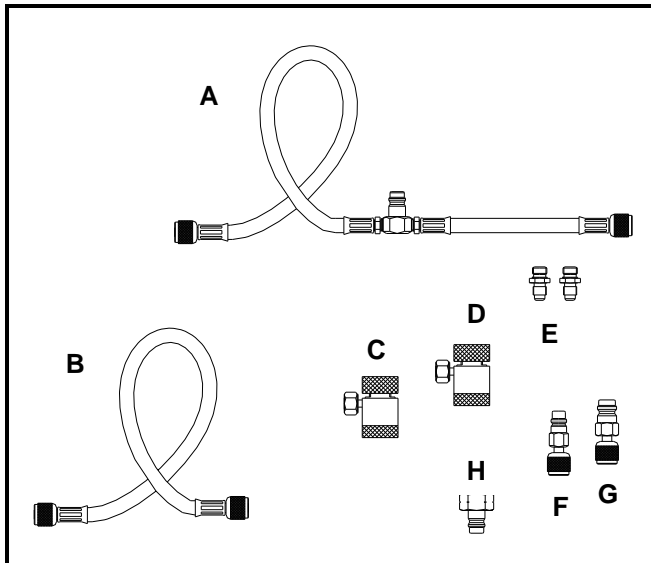
Before performing any operation, unlock the cylinder by turning the knob counterclockwise until the knob reaches the end of the stroke.



**⚠ WARNING!** It is essential that the scale be unlocked when the equipment is to be worked, in case the cylinder is not unlocked highly inaccurate charges will be made.

### 2.1 INSTALLING THE SUITABLE KIT OF HOSES AND COUPLERS

When you receive the unit, it is necessary to install the kit you have purchased for the refrigerant you want to use.



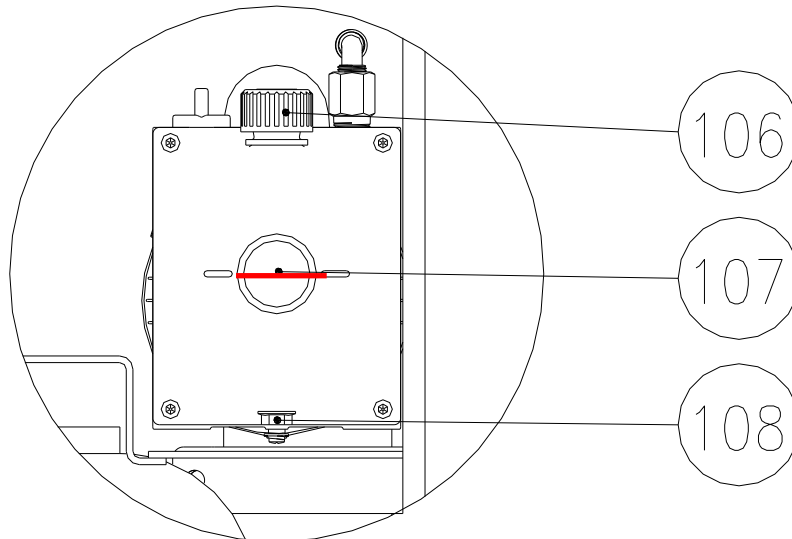
**Figure 1**

- a) Connect the blue hose (ref. A) and the red hose (ref. B) contained in the kit to the outer connections of the units. On the blue hose, there is the new service auxiliary connection ref. **111**.
- b) If you install the kit for R134a, it is necessary to use also the 2 adapters of the kit (ref.E).
- c) Connect the quick couplers to the ends of the two hoses.
- d) Connection (ref. H) must be connected to the virgin refrigerant bottle in order to connect it to the blue quick coupler during the filling phase of the unit (see chapter 2.4).
- e) Connection (ref. G) must be connected to the service connection (ref. 105) of the inner bottle in case of service operations.
- f) The connection (ref. F) must be connected to the service connection (ref. 104) in case of service operations.

## 2.2 CHECKING THE VACUUM PUMP OIL LEVEL

Before checking the oil level, the unit must be placed on a level surface and its power supply must be **turned off**.

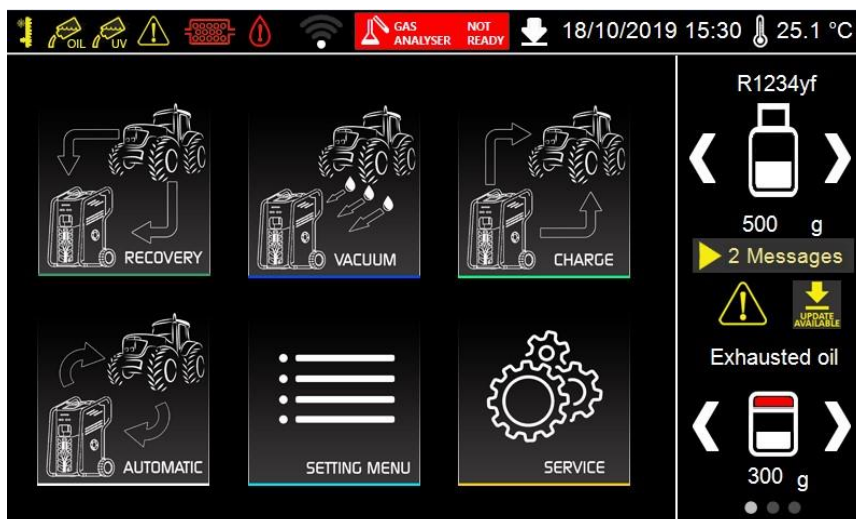
The user must check that the vacuum pump oil level covers half of the sight glass (see drawing below).



**Figure 2**

### 2.3 TURNING X-CROSS VARIANT ON FOR THE FIRST TIME

- a) Connect the unit to the power supply
- b) Place the **76** switch on position 1.
- c) The unit will automatically ask to select the interface language.
- d) Now, the unit will for the refrigerant you want to use.
- e) Then, the zeroing of all the scales will start. The process is completely automatic and will take about 30 seconds.
- f) At the end of the zeroing of the scales, the unit will suggest the operator to perform the periodical check of the equipment. It is recommended to do it, carefully following the information on the display.
- g) At the end of the process, the unit will show the standby screen.



## 2.2 FILLING REFRIGERANT INTO THE INTERNAL BOTTLE

The unit is supplied with no refrigerant inside. It is thus necessary to follow the below procedure to fill the exact quantity of refrigerant into the refrigerant bottle.

- a) Place the bottle containing refrigerant so that liquid refrigerant will come out (bottle with tube upright, bottle without tube upside down).
- b) Connect the male LP connection (supplied in the kit) to the refrigerant bottle (only in case the bottle is not equipped with a connection)
- c) Connect the quick coupler ref. 47 (blue) to the bottle containing refrigerant. Open the hand-wheel of the coupler.
- d) Open the 24 valve and close the 25 valve.
- e) Make sure the valve that the valve on external bottle is closed.
- f) Press the “**Vacuum**” button on the display (for more information about Vacuum process, please see the dedicated paragraph).
- g) Set 2 minutes of vacuum and evacuate the flexible hose, which connect the unit to the external bottle.
- h) At the end of vacuum process, come back in standby screen and slowly open the valve of the external refrigerant bottle.
- i) Press the “**Recovery**” button on the display (for more information about Recovery process, please see the dedicated paragraph)
- j) Select “Recovery from bottle” and set the quantity of refrigerant to recover (suggested 5.000 kg).
- k) Wait until the recovery cycle is completed. A beep will let the user know that the cycle is over and the quantity of recovered refrigerant will be displayed.

**⚠ IMPORTANT!** *In this moment, there is refrigerant in the hoses. Continue the procedure in order to prevent gas dispersion in the environment*

- l) Then the unit will inform the operator to disconnect the bottle in order to proceed with the recovery of the residual refrigerant from the hoses.
- m) Close the valve on the bottle containing refrigerant.
- n) Please recover the refrigerant from flexible hoses.
- o) Wait until the recovery cycle is completed; a beep will let the user know that the cycle is over and the quantity of recovered refrigerant will be displayed.

## 2.3 PERIODICAL CHECKS OF THE EQUIPMENT

The equipment needs to do the following periodical checks:

- Check of the presence of not condensable gases in the internal bottle
- Periodical check of the internal sensors
- Pressure test of the internal circuit

We recommend that the user will follow carefully the instruction that the unit shows in the display.

### 3. Using the unit X-CROSS VARIANT (Primary functions)

In the standby screen, the equipment informs the operator if the quantity of refrigerant, oils and additives are under the minimum level.

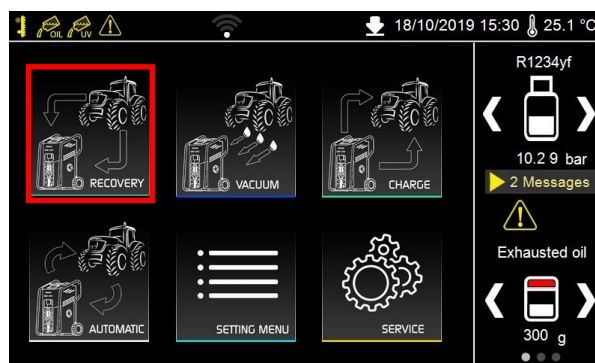
**⚠ IMPORTANT!** Periodically, the unit will perform the following checks at the startup:

Periodical check of the internal sensors	every 30 days
Check of the presence of not condensable gases in the internal bottle	every 10 days
Pressure test of the internal circuit	every 20 days



#### 3.1 REFRIGERANT RECOVERY

- a) Turn on the engine with closed hood
- b) Turn the air-conditioner on and have it run for some minutes
- c) Open the hood and set the air-conditioner fan to maximum speed
- d) Have the vehicle engine run slowly (800 - 1200 revolutions/min) for a few minutes
- e) Turn the vehicle engine off and have the air-conditioner fan run at maximum speed and start the recovery operations
- f) Turn the **76** switch to position 1.
- g) Press the **“Recovery”** button.



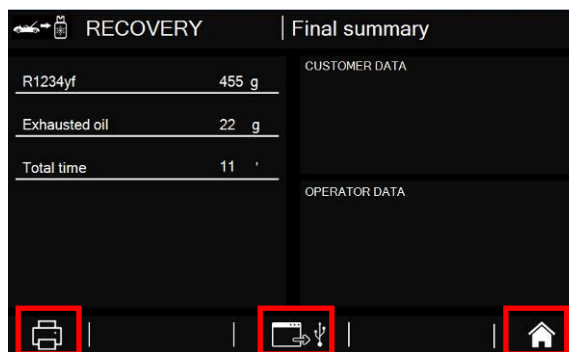
- h) Select **“Recovery from car”** and then set also **“Recovery test”**. We recommend to active every time the recovery test, in order to optimize the recovery cycle and to remove the bigger quantity of refrigerant from the A/C system.



- i) If necessary, the user can introduce also information about the customer; please click on the relative edit icon.



- j) It is also possible to introduce information about the operator who is working with the unit; please click on the relative edit icon.
- k) Connect the hoses to the A/C system, which needs a maintenance. Open the hand-wheels on the couplers.
- l) Open the **24** and **25** valves according to how the connection on the system was made
- m) Press **START** button to start the function.
- n) During the recovery process, the display will show the recovered quantity.
- o) In case of emergency, it is possible to leave the function by pressing the **STOP** button. The display will show the resume screen, with all the information of the cycle until the stop.
- p) During the cycle, the unit performs the automatic oil discharge.
- q) At the end of recovery process, automatically the recovery test will start, if the user has selected it. During the recovery test, the unit will check if the system has a rise of pressure, in order to restart the recovery process to optimize the recovered quantity.
- r) At the end of the process, the unit will inform the operator by an acoustic signal, and the display will show all the information about the performed cycle.



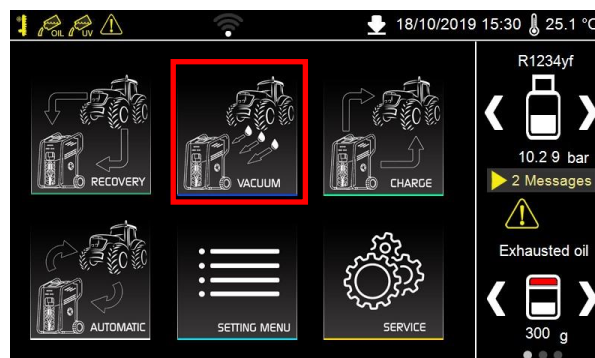
- s) In the final screen it is possible to print a report on printer or a report on USB stick.
- t) Press on "Home" button to come back in main menu.

**⚠ WARNING!** Do not pollute environment with oil; it is a special waste and must be disposed of according to the regulations in force.

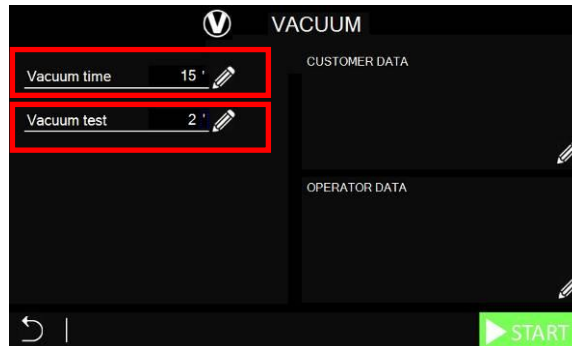
### 3.2 VACUUM AND VACUUM TEST



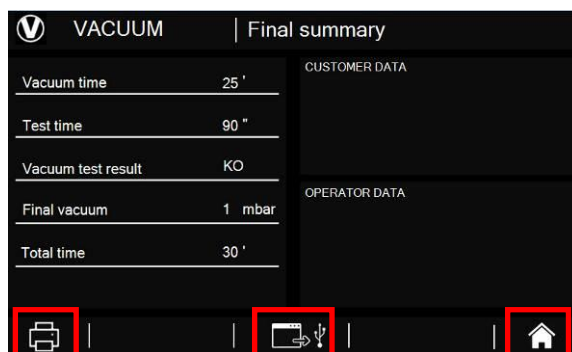
- a) Press the "**Vacuum**" button.



- b) Set the vacuum time by clicking on the relative edit icon. To perform an efficient service on A/C System, we recommend making a vacuum during 30'.
- c) The unit suggest 2 minutes for Vacuum test. In case the user needs to modify this value, please click on the relative edit icon.



- d) Connect the hoses to the A/C system, which needs a maintenance. Open the hand-wheels on the couplers.
- e) Open the **24** and **25** valves according to how the connection on the system was made
- f) Press **START** button to start the function.
- g) At the end of vacuum process, automatically the vacuum test will start. This test needs to check if any leakage is present in A/C circuit.
- h) In case of emergency, it is possible to leave the function by pressing the **STOP** button. The display will show the resume screen, with all the information of the cycle until the stop.
- i) During the execution of the vacuum cycle, the user can press the **SKIP** button, in order to stop the vacuum pump and to start directly with the vacuum test.
- j) At the end of vacuum test, in case that the unit check for any leakage, it will inform the operator by acoustic signal. The display will show all the information about the performed cycle.



- k) In the final screen it is possible to print a report on printer or a report on USB stick.
- l) Press on "Home" button to come back in main menu.



### 3.3 OIL – REFRIGERANT CHARGE

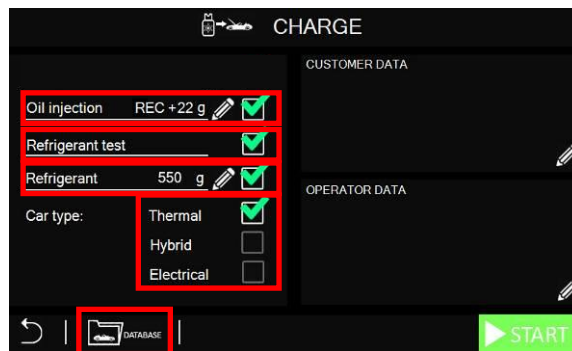


The unit X-CROSS Variant has been designed to work with thermal, hybrid and electric vehicles. To work in absolutely safety, every time that the unit works with a different type of vehicle, X-CROSS unit starts with an automatic flushing of the internal circuit, to avoid cross contamination of oils.

#### 3.3.1 EXECUTION OF CHARGING PROCESS

**⚠ WARNING!** *It is necessary to perform the charging process with A/C system already evacuated. In case that this operation was not successfully completed, the unit will inform the user by an alarm signal.*

- a) Press the “**Charge**” button



- b) Select the **Oil injection** checkbox to charge oil inside the A/C system. Please click on the relative edit icon to modify the quantity to charge. It is possible to charge the quantity of oil, which the unit has discharged during the recovery process [REC], and to add an additional quantity.

#### **Suggested quantities for refilling the A/C system with oil**

According to the type of A/C system component you have replaced, you need to fill in the lubricant quantity indicated below, even if no oil has been extracted during recovery.

Evaporator:	50cc
Condenser:	30cc
Filter:	10cc
Pipes:	10cc

In any case, the operator must follow the instructions of the A/C system manufacturer.

- c) Select the “**Refrigerant Test**” checkbox to use the first part of charged refrigerant (about 70 grams) to perform another test (after vacuum test successfully) before to start with the real charging process.
- d) Select the “**Refrigerant**” checkbox to charge refrigerant inside the A/C system. Please click on the relative edit icon to modify the quantity to charge.

- e) Finally select the type of vehicle: Thermal, Hybrid, and Electric. This information is very important because each type of car needs of its specific type of lubricant oil. It is necessary take care to have not cross contamination between the different oils passing from a vehicle to another. If necessary, the equipment's display will inform the operator that it is necessary to change oil type to introduce in the bottle; for this purpose, the unit will automatically start the flushing of the internal circuit.

**⚠ IMPORTANT:** If the unit inform the operator about the automatic procedure of flushing of the internal circuit, it must be realized before the connection of X-CROSS unit to the car!

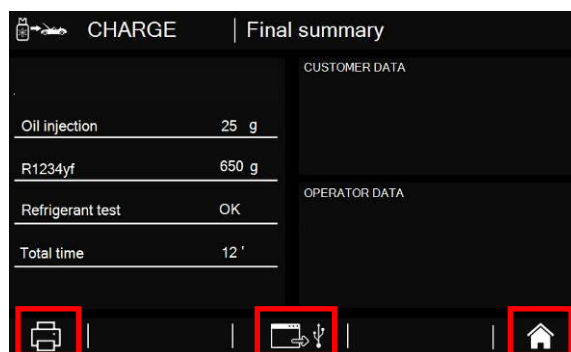
- f) The operator can also select all the information, directly form the Car's database. Reading this information about the selected car, the unit will directly set the correct quantity of refrigerant to charge in the A/C system.
- g) Connect the hoses to the A/C system on which you have to make the maintenance. Open the hand-wheels on the quick couplers.
- h) Open the **24** and **25** valves according to how the connection on the system was made
- i) Press the **START** button to start the function.
- j) The unit will proceed with the first phase of injection of oil.
- k) Then the unit will perform automatically an extra pressure test of the A/C system with the refrigerant. A known quantity of refrigerant is charged into the system and the unit checks if there is a drop of pressure or not.
- l) In case of emergency, it is possible to leave the function by pressing the **STOP** button. The display will show the resume screen, with all the information of the cycle until the stop.

**⚠ IMPORTANT!** *The pressure test with the refrigerant is an extra test the unit performs after the operator has already checked for possible leaks by means of the previous tests with nitrogen and/or Azoidro and after that with the tightness check in vacuum.*

- m) If the pressure test with refrigerant has ended successfully, you can proceed with the refrigerant charge. The charge is ended in a modulated way in order to optimize the quantity of refrigerant charged into the system.

**⚠ WARNING!** *A succession of "clicks" inside the unit are normal in this phase*

- n) When the function is completed, a beep will let the operator know that the cycle is over.
- o) If the operator set the option "Activation of pre-charge of flexible hose", available in menu setting (please see section 5.4 for more information) the unit will inform to the operator to disconnect the A/C system in order to recover the residual refrigerant from the hoses. Otherwise, X-CROSS unit will show directly the final screen and the operator has to do the procedure of disconnection (please see section 4.5 for more information).
- p) The display will show all the information of the process.



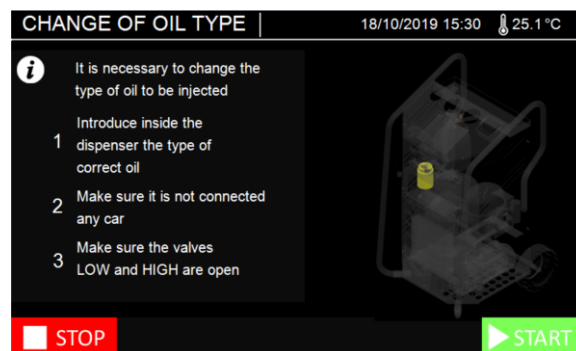
- q) In the final screen it is possible to print a report on printer or a report on USB stick.
- r) Press on "Home" button to come back in main menu.

### 3.3.2 FLUSHING OF THE INTERNAL CIRCUIT FOR OIL TYPE CHANGE

The X-CROSS is studied to work with 3 different typologies of vehicles:

- Thermal
- Hybrid
- Electric

If it is necessary, X-CROSS unit will inform the operator that it is necessary to substitute the oil type, so to flush the circuit.



Please go on following the information on the display.



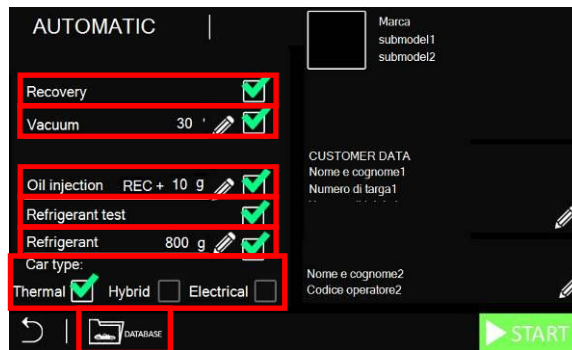
- ⚠ **WARNING!** If the oil dosimeter is not replaced, the procedure is completely inefficient. Provide to replace the oil dosimeter when the unit asks it during the procedure.
- ⚠ **WARNING!** If the quantity of oil is not enough for the flushing procedure (about 60 grams) the unit will inform the operator by means of an alarm.

The unit will perform the procedure automatically; after that, it will be possible to proceed with charging the system.



### 3.4 AUTOMATIC CYCLE

- a) Press the “**Automatic**” button



- b) The unit will perform the automatic recovery process, if refrigerant is present in the A/C system. It is not possible to deselect this function. If no refrigerant is present inside the A/C system, the unit will start directly the Vacuum process.
- c) Select the “**Vacuum**” checkbox to perform the vacuum and vacuum test of the system. Please click on the relative edit icon to modify the vacuum time. In the automatic cycle, the time of vacuum test is already set to the value of 3 minutes.
- d) Select the **Oil injection** checkbox to charge oil inside the A/C system. Please click on the relative edit icon to modify the quantity to charge. It is possible to charge the quantity of oil, which the unit has discharged during the recovery process [REC], and to add an additional quantity.

#### Suggested quantities for refilling the A/C system with oil

According to the type of A/C system component you have replaced, you need to fill in the lubricant quantity indicated below, even if no oil has been extracted during recovery.

Evaporator:	50cc
Condenser:	30cc
Filter:	10cc
Pipes:	10cc

In any case, the operator must follow the instructions of the A/C system manufacturer.

- e) Select the “**Refrigerant Test**” checkbox to use the first part of charged refrigerant (about 70 grams) to perform another test (after vacuum test successfully) before to start with the real charging process.
- f) Select the “**Refrigerant**” checkbox to charge refrigerant inside the A/C system. Please click on the relative edit icon to modify the quantity to charge.
- g) Finally select the type of vehicle: Thermal, Hybrid, and Electric. This information is very important because each type of car needs of its specific type of lubricant oil. It is necessary take care to have not cross contamination between the different oils passing from a vehicle to another. If necessary, the equipment’s display will inform the operator that it is necessary to change oil type to introduce in the bottle; for this purpose, the unit will automatically start the flushing of the internal circuit.

**⚠ IMPORTANT:** If the unit inform the operator about the automatic procedure of flushing of the internal circuit, it must be realized before the connection of X-CROSS unit to the car!




- h) The operator can also select all the information, directly form the Car's database. Reading this information about the selected car, the unit will directly set the correct quantity of refrigerant to charge in the A/C system.
- i) Connect the hoses to the A/C system, which needs a maintenance. Open the hand-wheels on the couplers.
- j) Open the **24** and **25** valves according to how the connection on the system was made.
- k) Press **START** button to start the function.
- l) The equipment will start the recovery cycle as first phase, then it will perform vacuum and vacuum test, and it proceed with the operation of oil injection (depending on the setting made).
- m) In case of emergency, it is possible to leave the function by pressing the **STOP** button. The display will show the resume screen, with all the information of the cycle until the stop.
- n) Then the unit will perform automatically an extra pressure test of the A/C system with the refrigerant. A known quantity of refrigerant is charged into the system and the unit checks if there is a drop of pressure or not.

**⚠ IMPORTANT!** *The pressure test with the refrigerant is an extra test the unit performs after the operator has already checked for possible leaks by means of the previous tests with nitrogen and/or Azoidro and after that with the tightness check in vacuum.*

- o) If the pressure test with refrigerant has ended successfully, you can proceed with the refrigerant charge. The charge is ended in a modulated way in order to optimize the quantity of refrigerant charged into the system.

**⚠ WARNING!** *A succession of "clicks" inside the unit are normal in this phase*

- p) When the function is completed, a beep will let the operator know that the cycle is over.
- q) If the operator set the option "Activation of pre-charge of flexible hose", available in menu setting (please see section 5.4 for more information) the unit will inform to the operator to disconnect the A/C system in order to recover the residual refrigerant from the hoses. Otherwise X-CROSS unit will show directly the final screen and the operator has to do the procedure of disconnection (please see section 4.5 for more information).
- r) The display will show all the information of the process.

AUTOMATIC		Final summary	
		CUSTOMER DATA	
Recovery	455 g		
Exhausted oil	22 g		
Vacuum time	25 '		
Vacuum test	KO		
		OPERATOR DATA	
Oil injection	25 g		
R1234yf	650 g		
Refrigerant test	OK		
Total time	45 '		
		      	

- s) In the final screen it is possible to print a report on printer or a report on USB stick.
- t) Press on "Home" button to come back in main menu.

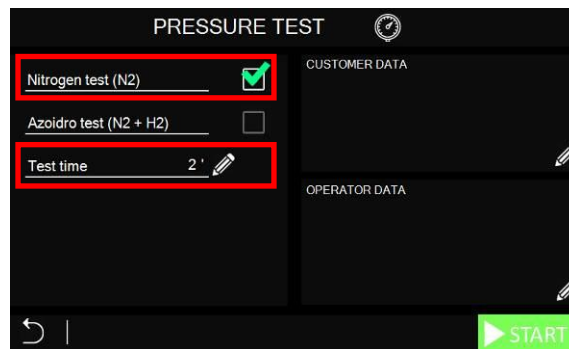
## 4. Using the unit X-CROSS VARIANT (Auxiliary functions)

### 4.1 PRESSURE TEST WITH NITROGEN OR AZOIDRO MIXTURE

The unit gives the opportunity to the user to perform a pressure test of the A/C system by means of nitrogen or by means of the Azoidro mixture (95% N<sub>2</sub> – 5% H<sub>2</sub>). The test is very important to be sure that the system is perfectly tight, before charging refrigerant.

#### 4.1.1 PRESSURE TEST WITH NITROGEN

- a) Press the “**Menu**” button
- b) Select “**Manual test N2/N2-H2**”



- c) Select “**Nitrogen test (N2)**” and set the test time clicking on the relative edit icon.
- d) Press “**START**” to start the function.  
The display show to the user the pressurization phase. We suggest to set the value of the pressure close to **13 bar (1.3 MPa)**.
- e) Open the **24** and **25** valves according to how the connection on the system was made.
- f) By means of a suitable nitrogen kit, connect to the service connection ref. **111** on the LP hose. Pressurize the A/C system to the pressure set.

**⚠ WARNING!** Pay close attention to the phase of the system pressurization with external equipment. Use exclusively WIGAM products

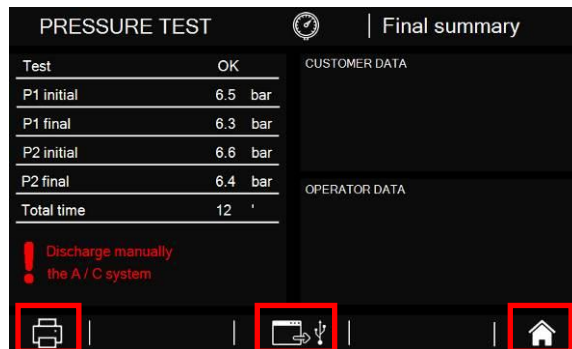
**⚠ WARNING!** Check carefully the value of the maximum pressure! The maximum admissible pressure is 20 bar (2.0 MPa).

- g) When the pressurization phase is over, disconnect the external pressurization system and wait for the pressure value to become stable, before performing the test.

**⚠ IMPORTANT!** The nitrogen that comes out of the bottle undergoes a thermic shock that causes a drop of pressure in the seconds following its introduction into the system. Before starting the test, wait a couple of minutes so that the nitrogen stabilizes to the ambient temperature.

- h) Press the “**TEST START**” button, to start the test of the system.
- i) A time countdown and the value of the pressure read by the unit’s low and high sensors will appear on the display.

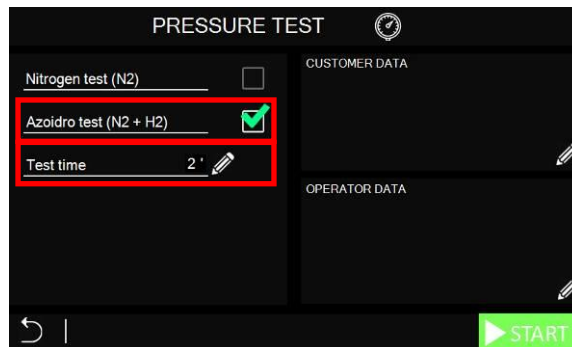
- j) Once the test is over, the unit inform the operator with visual and acoustic signal. Before continuing, it is necessary to discharge manually the residual nitrogen from the system. To make this operation, we suggest to unscrew one of the two connections with which the quick couplers are connected to the system (ex. **47** or **48**)



- k) In the final screen it is possible to print a report on printer or a report on USB stick.  
l) Press on "Home" button to come back in main menu.

#### 4.1.2 PRESSURE TEST WITH AZOIDRO MIXTURE

- a) Press the "Menu" button  
b) Select "Manual test N2/N2-H2"



- c) Select "Azoidro test (N2+H2)", and set the test time clicking on the relative edit icon.  
d) Press "START" to start the function.  
e) The display show to the user the pressurization phase. We suggest to set the value of the pressure close to **5 bar (0.5 MPa)**.  
m) Open the **24** and **25** valves according to how the connection on the system was made.  
n) By means of a suitable nitrogen kit, connect to the service connection ref. **111** on the LP hose. Pressurize the A/C system to the pressure set.

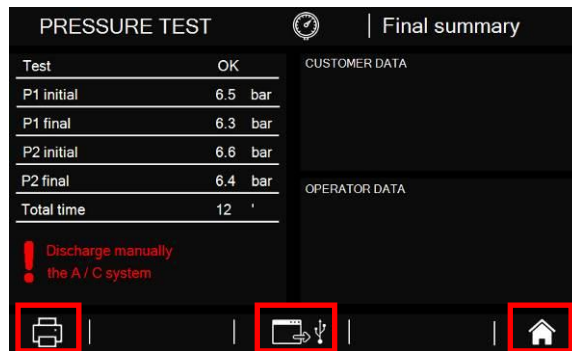
**⚠ WARNING!** Pay close attention to the phase of the system pressurization with external equipment. Use exclusively WIGAM products

**⚠ WARNING!** Check carefully the value of the maximum pressure! The maximum admissible pressure is 20 bar (2.0 MPa).

- o) When the pressurization phase is over, disconnect the external pressurization system and wait for the pressure value to become stable, before performing the test.

**⚠ IMPORTANT!** *The nitrogen that comes out of the bottle undergoes a thermic shock that causes a drop of pressure in the seconds following its introduction into the system. Before starting the test, wait a couple of minutes so that the nitrogen stabilizes to the ambient temperature.*

- f) Press the **“TEST START”** button to start the test with Azoidro of the system.
- g) A time countdown and the value of the pressure read by the unit’s low and high sensors will appear on the display; at the same time, the display will show the message “Check A/C system with leak detector”.
- h) It is necessary to check all the A/C system with leak detector studied for Azoidro mixture (**we suggest the use of VOYAGER leak detector**). The unit realize in the same time also the pressure test.
- i) Once the test is over, the unit inform the operator with visual and acoustic signal. Before continuing, it is necessary to discharge manually the residual the mixture from the system. To make this operation, we suggest to unscrew one of the two connections with which the quick couplers are connected to the system (ex. **47** or **48**)

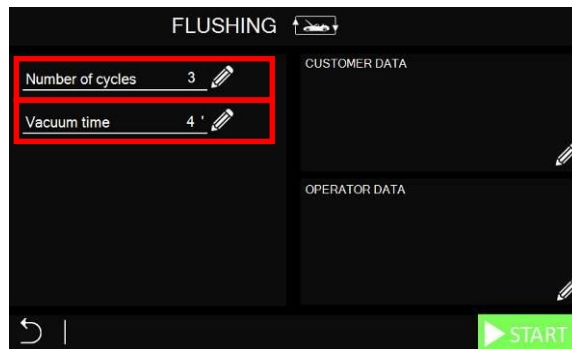


- a) In the final screen it is possible to print a report on printer or a report on USB stick.
- b) Press on “Home” button to come back in main menu.

4.2 FLUSHING

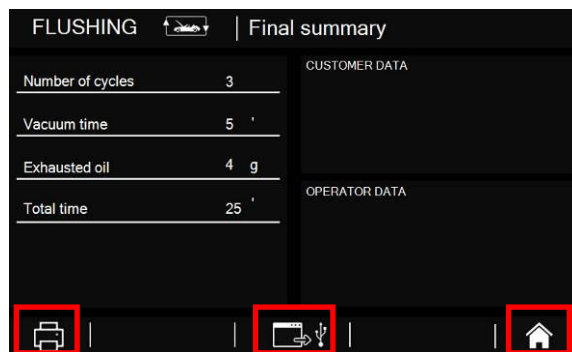
**⚠ IMPORTANT!** *It is necessary the A/C system was completely empty before to start the flushing function. If refrigerant is inside the A/C system, X-CROSS will inform the user through an alarm on the display.*

- a) Press the **“Menu”** button.
- b) Select **“Flushing”**





- c) Set the number of cycles clicking on the relative edit icon (3 cycles are suggested).
- d) Set the vacuum time clicking on the relative edit icon (4' are suggested).
- e) Connect the hoses to the A/C system, which needs a maintenance. Open the hand-wheels on the couplers.
- f) Open the **24** and **25** valves according to how the connection on the system was made.
- g) Press **START** button to start the function.
- h) During the execution of the phase, the display will inform the user about each operation.
- i) In case of emergency, it is possible to leave the function by pressing the **STOP** button. The display will show the resume screen, with all the information of the cycle until the stop.
- j) At the end of the process, the unit will inform the operator by an acoustic signal, and the display will show all the information about the performed cycle.



- k) In the final screen it is possible to print a report on printer or a report on USB stick.
- l) Press on "Home" button to come back in main menu

#### 4.3 CHECKING THE A/C SYSTEM OPERATING PRESSURES

Before servicing the vehicle or after, to check the quality of the service performed, it is possible to check the A/C system operating pressures.

- a) Make sure that the **24** and **25** valves are closed.
- b) Connect the **57** hose to the A/C system low pressure side.
- c) Connect the **58** hose to the A/C system high pressure side.
- d) Start the compressor of A/C system.
- e) Read on the blue gauge of low pressure on display the pressure and the relative evaporation temperature.
- f) Read on the red gauge of high pressure on display the pressure and the relative condensation temperature.
- g) Compare the read values with the information of the producer of the A/C system.

#### 4.4 INJECTION OF ADDITIVES THROUGH THE SERVICE CONNECTION ON THE BLUE HOSE

The auxiliary service connection on the LP blue hose allows the operator to connect to the system in an auxiliary way at any time, even when the unit has already been connected.

This opportunity can be very useful for the addition of additives//tracers after the refrigerant charge (that is, with system already in pressure).

- a) Make sure that the valves **24** and **25** are closed
- b) Connect the hoses to the A/C system which needs a maintenance. Open the hand-wheels on the quick couplers
- c) Start the air conditioning system of the vehicle and make sure that the A/C system compressor is running
- d) Connect the additives injection system to the connection ref. **111** situated on the LP hose
- e) Provide to the injection of additives/tracers
- f) Close the hand-wheel on the quick coupler **48** (red) and disconnect the HP hose **58** from the A/C system
- g) Make sure the hose **57** is connected to the A/C system
- h) Open the **24** and **25** valves so that the compressor of the system can suck all the liquid refrigerant
- i) As soon as the pressures on the high and low pressure gauges are the same and do not exceed 2÷3 bar, close the hand-wheel of the quick coupler ref. **47** (blue) and disconnect the hose **57** from the A/C system
- j) Carefully screw the protective caps on the A/C system service valves
- k) Using a leak detector, check the A/C system for leaks
- l) Turn the A/C system off, turn the motor of the vehicle off and close the hood. Start a recovery cycle to suck the remaining refrigerant from the hoses (see section 3.1 *Refrigerant recovery*). The unit is now immediately ready for the next operation.
- m) Close the valves **24** and **25**

**△ IMPORTANT!** *In case you inject additives with a system in pressure, make sure that the pressure in the injection spot is suitable to the type of injector used.*

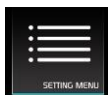
#### 4.5 DISCONNECTING THE UNIT FROM THE A/C SYSTEM

At the end of the charging function (when the function of pre-charge of flexible hoses is active) at the end of the checking of the operating pressures, or at the end of a manual injection of additives, some liquid refrigerant is still inside the hoses. In order to minimize the residual quantity of refrigerant inside the hoses, follow the below procedure of disconnection from the A/C system.

- a) Close the hand-wheel of the quick coupler ref. **48** (red) and disconnect the **58** hose from the A/C system
- b) Start the air conditioning system of the vehicle and make sure that the A/C system compressor is running.
- c) Make sure that the **57** hose is connected to the A/C system
- d) Open the **24** and **25** valves in order to have all the liquid refrigerant sucked by the A/C system
- e) As soon as the pressures on the high and low pressure gauges are the same and do not exceed 2÷3 bar, close the hand-wheel of the quick coupler ref. **47** (blue) and disconnect the **57** hose from the A/C system
- f) Carefully screw the protective caps on the A/C system service valves
- g) Using a leak detector, check the A/C system for leaks
- h) Turn the A/C system off, turn the motor of the vehicle off and close the hood. Start a recovery cycle to suck the remaining refrigerant from the hoses (see section 3.1 *Refrigerant recovery*). The unit is now immediately ready for the next operation.
- i) Just the assistance procedure is ended, turn the unit off (**76** switch position in position 0).

**△ IMPORTANT!** *The introduction of tracer additives and the following use of a UV leak detector will make it easier to locate the point of the possible leak in the future*





## 5. Menu auxiliary functions

Press the “**Menu**” button on standby screen, to select the auxiliary functions of the unit.

<b>Flushing</b>	Execution of flushing function of A/C system. <b>Please see paragraph 4.2.</b>
<b>Bottle pressure</b>	Function studied to check the pressure of internal bottle and remove manually the not condensable gases.
<b>Manual test N2/N2-H2</b>	Execution of manual functions of pressurization with nitrogen and AZOIDRO mixture. <b>Please see paragraph 4.1.</b>
<b>Internal pressure test</b>	Self-test of the internal circuit of X-CROSS to check the tightness of the system.
<b>Hoses length setting</b>	Possibility to activate the “pre-charge” of flexible hoses and to modify their length.
<b>Display brightness</b>	Regulation of brightness of display.
<b>Serial number</b>	Serial number of the unit and date of first installation.
<b>Data export</b>	Export of the last 20 services of the unit.
<b>Periodic sensor check</b>	Procedure of automatic verification of the equipment sensors.

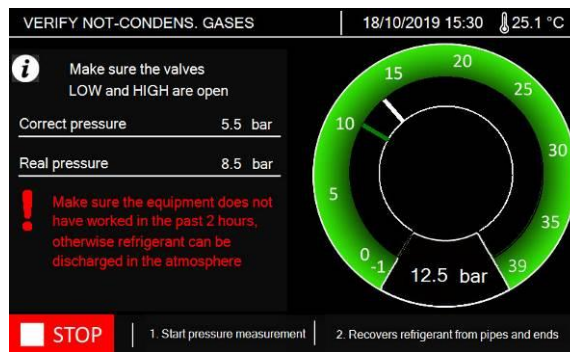
### 5.1 BOTTLE PRESSURE

This function has been studied to enable the operator to check the value of pressure of the internal bottle, so verify the presence of not condensable gases.

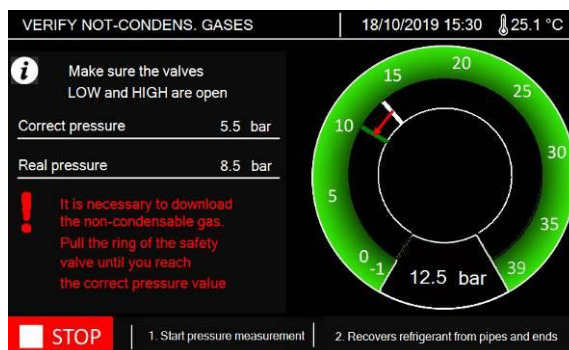
Make sure that no refrigerant is inside the flexible hoses before to start with the operation.

**⚠ IMPORTANT!** *Make sure the unit has been turned off for at least 2 hours before to start with measurement of internal bottle pressure. This checking was done to reduce accidental release into the atmosphere of refrigerant, during the manual operation of discharge of not condensable gases.*

**⚠ IMPORTANT!** *Every 10 days the equipment will ask to the user the checking of pressure in the internal bottle.*



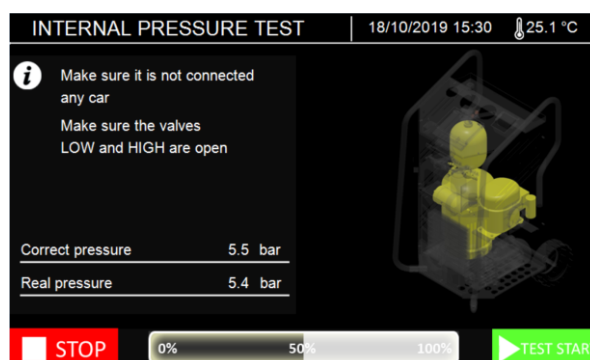
- Press **"1. Start pressure measurement"** to start to measure the pressure. The unit automatically will measure the pressure directly from the bottle.
- Just the measure is finished, the unit check if it is necessary to discharge the not condensable gases, the display will inform the operator; in the same time, the unit will emit a "bip" sound.
- The operator must move in the rear side of the unit and act on the ring of the safety valve, pulling it.



- The discharge of not condensable gases reduces the pressure of the bottle; when the pressure decreases, the frequency of the "bip" sound increases.
- When the target pressure has reached, the "bip" sound will stop, so the procedure is finished. Now it is necessary to recover the residual refrigerant from the flexible hoses. To do this, please press on **"2. Recovers refrigerant from pipes and ends"** button.
- Just the procedure is finished, press **Stop** to exit.

## 5.2 INTERNAL PRESSURE TEST

Periodically the unit will inform the operator to perform the self-test of the internal circuit to check the tightness of the system.



Press the **Start** button to start the function. If the unit reveals a abnormal decrease of pressure, it informs the operator on the display.

**⚠ IMPORTANT!** Every 20 days the unit ask to the user to perform the self-test of the internal circuit.

### 5.3 HOSE LENGTH SETTING AND PRE-CHARGE

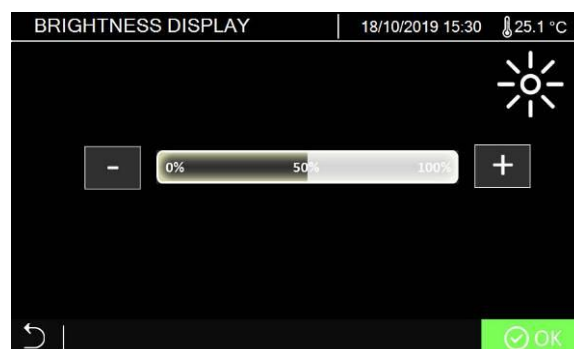
The default setting of X-CROSS unit is to work without pre-charge of flexible hoses; during the charging process, the unit does not add any refrigerant to compensate the length of the hoses. For this reason, at the end of charging process, it is necessary to do the procedure of disconnection from A/C system.

If the operator requests it, the function of pre-charge can be set. With the activation, the operator set also the correct length of the hoses. With this setting, the procedure of disconnection is not necessary anymore (see paragraph 4.5).



### 5.4 DISPLAY BRIGHTNESS

The operator can press “+” and “-” buttons, to regulate the brightness of the display.



## 6. Service procedure



<b>Choice of language</b>	Possibility to select the language of the display and of the printer report (only in X-CROSS/P version)
<b>Scale reset</b>	Function which reset all the electronic scales of the unit to zero (protected by password)
<b>Change parameters</b>	Modification of working parameters (only for qualified personnel, protected by password)
<b>Default parameters</b>	Recovery of working parameter to default (only for qualified personnel, protected by password)
<b>Clear used filter database</b>	(only for qualified personnel, protected by password)
<b>Date and time setting</b>	Modification of hour and date (protected by password 5688)
<b>Firmware update</b>	(only for qualified personnel, protected by password)
<b>Hour Meter / Maintenance</b>	Visualization of information of hours of use of the unit (protected by password)
<b>Internal bottle emptying</b>	Function studied to empty the internal bottle of refrigerant during maintenance (only for qualified personnel, protected by password)
<b>Refrigerant calibration reset</b>	Function studied to recovery the factory values of calibration of refrigerant scale, if it has any malfunctioning (only for qualified personnel, protected by password)
<b>Choice of measurement units</b>	Modify of unit of measurement (Metric o English)
<b>Change refrigerant</b>	Modification of refrigerant type (only for qualified personnel, protected by password)
<b>Temperature sensor calibration</b>	Calibration of temperature sensor (only for qualified personnel, protected by password)
<b>Calibration of pressure sensors</b>	Calibration of 2 (LOW and HIGH) pressure sensors (only for qualified personnel, protected by password)
<b>Scale calibration</b>	Calibration of the 4 electronic scales (only for qualified personnel, protected by password)
<b>Save calibration ref.</b>	(only for qualified personnel, protected by password)
<b>Component test</b>	(only for qualified personnel, protected by password)
<b>Wifi</b>	It allows you to set the information of the Wifi connection. Available only if installed as an option. (protected by password)

<b>MQTT</b>	It allows you to set the information of the MQTT server. Available only if installed as an option. (protected by password)
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## 6.1. HOUR METER / MAINTENANCE

Hour counter	18/10/2019 15:30	25.1°C
Total refrigerant recovered from the car	520	kg
Total refrigerant recovered from cylinder	850	kg
Total vacuum time performed	525	h
Total turn-on time	800	h
Partial refrigerant recovery from the car	120	kg
Partial vacuum time performed	50	h
Last oil change	25/09/2019 08:55	
Last filter change	25/09/2018	

In this screen, it is possible to check all the hour meter of the unit, but also to start manually the operation of maintenance as filter drier substitution and vacuum pump oil substitution.

The requested password to access to the hour meter screen is 5011.

During the operation of maintenance, the unit reset the “partial” hour meter. The “total” hour meters are not resettable from the user.

## 6.2. REFRIGERANT SCALE CALIBRATION RESET

**⚠ IMPORTANT!** *The operation of refrigerant calibration scale reset must be done only by qualified personnel*

If necessary, the unit allows the operator to recovery the factory calibration of the scale, without remove the refrigerant inside.

If necessary, contact the assistance team to do the procedure.

## 7. Routine maintenance

### 7.1 MATERIAL FOR ROUTINE MAINTENANCE

- n°1 filter direr, model XH412
- n°1 bottle mineral oil for vacuum pump, model K1L
- n°1 kit of gaskets, model G19020
- n°1 kit of gaskets, model OR-ZM/K

### 7.2 PERIODIC OPERATION

- a) **Check all swivel connections for tightening every 10 operations**
- b) Check the vacuum pump oil level; the oil must be changed at least every 70 hours of operation (the unit inform when it is necessary to do this operation). The pump must be off when checking the oil level. Anyway, the unit will inform the operator when the oil must be changed

### 7.3 CHANGING VACUUM PUMP OIL

The unit inform the operator when it is necessary to substitute the vacuum pump oil.



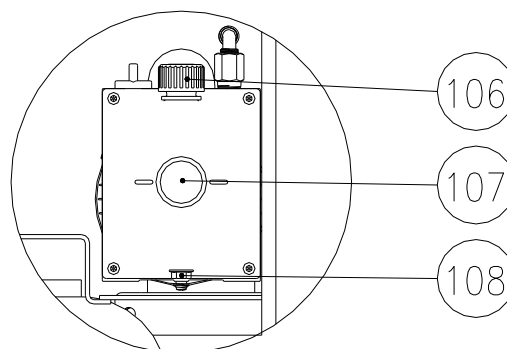
The substitution of the vacuum pump oil is very important. The oil also needs to be changed whenever it becomes cloudy. Contaminated oil reduces vacuum pump performances and irreversibly damages its mechanical components.

All draining and refilling operations must be performed when the pump is turned off

To avoid reduction of the pump efficiency and to maintain its performances, use only K1L oil for maintenance.

- a) Before draining the oil, have the pump run for at least 10 minutes with the **24** and **25** opened, but with flexible hoses and quick couplers properly installed.
- b) Turn the recovery unit off by turning the **76** switch to position 0 and disconnect the power cord; strictly observe the sequence of operations.
- c) Remove the panel over the vacuum pump (please see the picture on it) ref. **91**.
- d) Unscrew the drain plug ref. **108** located at the bottom of the pump.
- e) Completely drain the oil
- f) Screw the drain plug ref. **108** on again
- g) Unscrew the filler plug ref. **106** situated on top of the pump
- h) Slowly refill the pump with oil until the level covers half of the sight glass **107** located on the side of the pump
- i) Screw the oil plug **106** on again and re-install the previously removed plastic cover again
- j) When the oil change procedure is completed, turn the unit on by turning the **76** switch to position 1
- k) Follow the information of the display to reset the hour meter.

**⚠ WARNING!** Do not pollute environment with oil; it is a special waste and must be disposed of according to the regulations in force.



#### 7.4 REPLACING THE FILTER DRIER

The unit will inform directly the operator that it is necessary to replace the filter drier. The main display will inform with the relative icon.



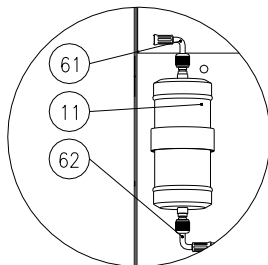


The unit is equipped with an automatic system of calculation, which allows to understand the saturation of the capacity of the filter, in function of the quantity of recovered refrigerant. Please follow the indication showed on the display.

During the substitution it is necessary introduce the serial number of the new filter; if the user does not introduce the serial number, it is not possible to go on with the procedure.

- a) Turn the recovery unit off by turning the **76** switch to position 0 and disconnect the power cord; strictly observe the sequence of operations
- b) Remove the panel **92** on the filter.
- c) Remove the old filter **11** by unscrewing connections ref. **61** and **62**

**⚠ IMPORTANT!** This equipment is designed for trained personnel only, who must know the refrigeration fundamentals, cooling systems, refrigerants and possible damage that pressurized equipment may cause



**⚠ WARNING!** Do not pollute environment with the used filter; it is a special waste and must be disposed of according to the regulations in force.

- d) Remove the gaskets from inside the hoses **61** and **62**
- e) Install new gaskets
- f) Install the new filter.
- g) Re-install the panel **92** on the filter.
- h) Plug in the unit and turn the **76** switch to position 1
- i) Follow the procedure on the display; at the end of it, the unit will perform an automatic vacuum on the filter line.

## 8. Troubleshooting

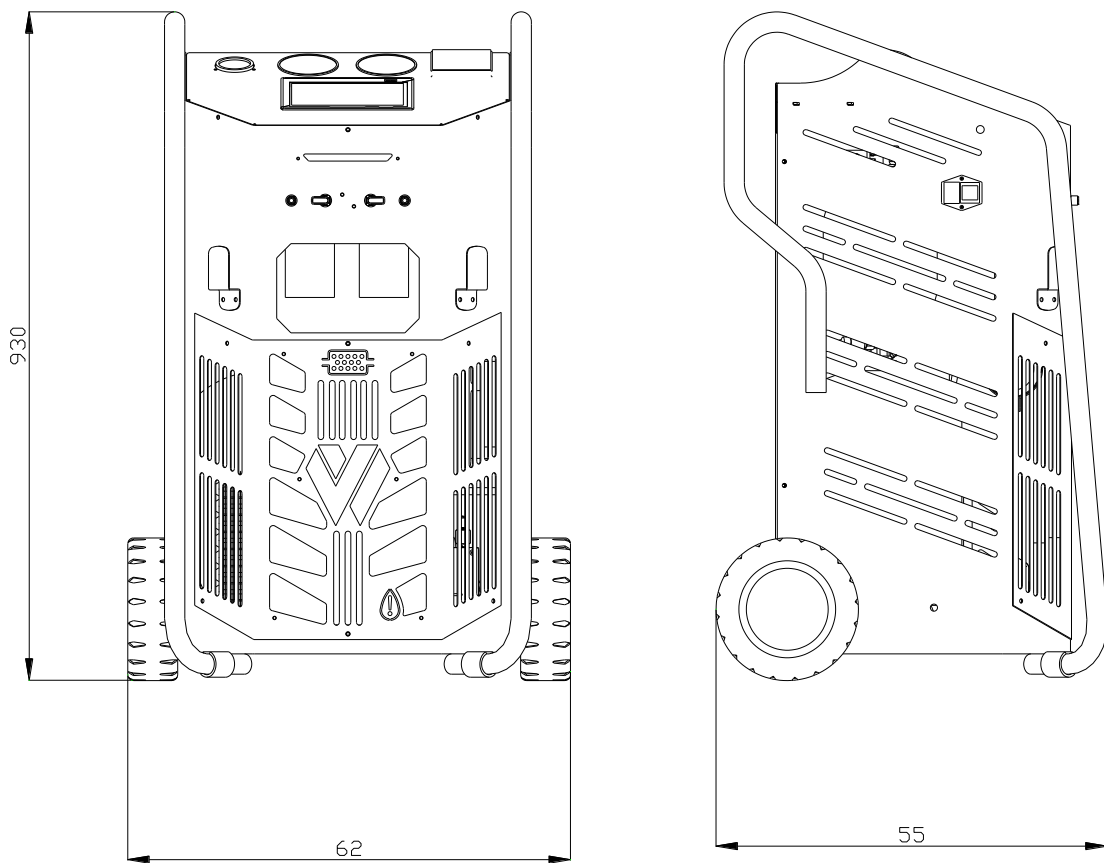
If there is a problem in the unit, this will be displayed with an alarm message.

Error code	Type of error	Solution
1	Maximum cylinder pressure reached	Make sure there is no closed cylinder valve. Probable presence of non-condensable gas in the cylinder
5	No refrigerant in the A / C system	Check that the system has no leakage
6	The cylinder has reached its maximum capacity	Check the correct quantity
8	Provide to empty it and continue the oil drain operation	Provide to empty it and continue the oil drain operation
9	The maximum number of recovery attempts has been reached	Check that there are areas of difficult recovery
12	Vacuum leak detected	Repeat the cycle and if necessary increase the vacuum time
13	A / C system not in vacuum	It is suggested to proceed with a vacuum operation
15	Pressure test with refrigerant failed	Verify if any leakage is present
18	A / C system not in vacuum	It is suggested to proceed with a vacuum operation
30	System leak detected with N2	Check for leaks, then perform a new pressure test

9. Accessories and spare parts

<b>Code</b>	<b>Description</b>
14015013	XH412 filter drier
14015042	XH412-A 1/4"M-M filter drier with alumina (optional)
12002003	K1 L mineral oil for vacuum pump, bottle of 1.000cc
12002006	Ester oil for compressor
14020014001	G19020 kit of gaskets for hoses with 1/4 sae - 10 pcs
14020109001	OR-ZM/K kit of gaskets for hoses with M12x1.5mm connections - 10pcs

10. Dimensions and weights



Net weight with empty cylinder

66 kg





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# CE Declaration of Conformity

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We, signers of this declaration, declare under our own exclusive responsibility, that unit, model :

## **X-CROSS VARIANT**

***and all its versions***

manufactured in our company and to be used for:

refrigerant gas recovery, recycling and charge

are planned according to the following directives prescriptions :

- **2006/42/CEE Machines directive**
- **2014/30/UE (Directive on electromagnetic compatibility)**
- **2014/35/UE Directive on low voltage**
- **IEC 34-11 (EN 60034) General standards on single phase electric, rotary machines**

**Technical booklet drawn up by WIGAM SPA**

Castel San Niccolò  
04/05/2023

Gastone Vangelisti  
(President)

A handwritten signature in black ink, appearing to read 'Gastone Vangelisti', written over a light blue horizontal line.

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*Síguenos en:*

**Follow us on:**



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