IRIZAR iria

Workshop Manual

REVISÃO 4 – FORMATO Nº 159 – 14.09.2010

INDEX

1 HEADLIGHT SET OPENING AND LAMPS REPLACEMENT

Open up the front inspection cover.

Pull the head light front cover by the indicated section

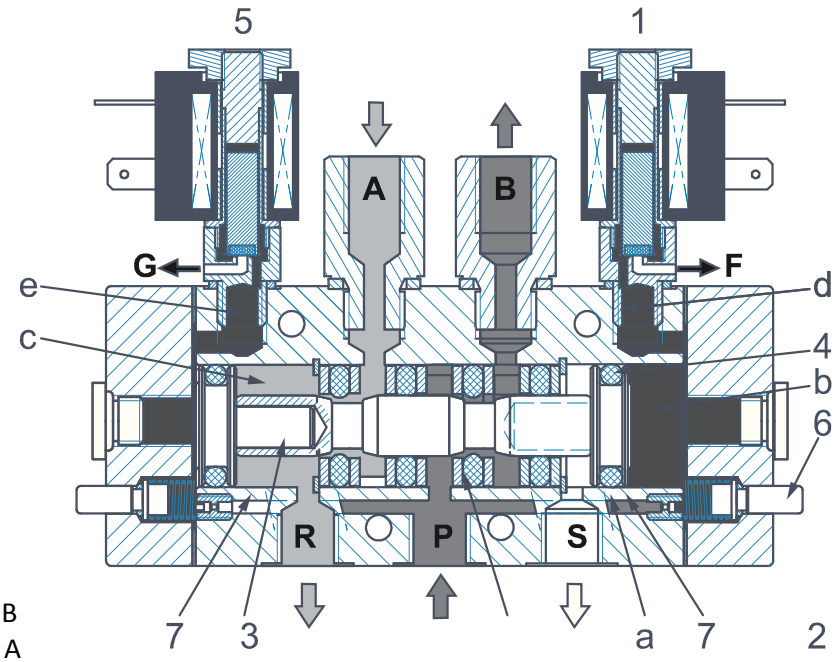
Turn the headlight set as indicated in the picture.

Remove the head light lamp by turning the lamp support

Important: When assemble the head light support back make sure the support is sealed to avoid water ingress.

2 FRONT AND CENTRE DOORS

2.1 VALVES



OPERATION

1. Solenoid
2. Sealing joints
3. Piston
4. O-Ring
5. Solenoid
6. Manual push-buttons
7. Regulators

P- Power supply connector
B- Cylinder outlet
A- Cylinder outlet
S- Discharge in the atmosphere from B
R- Discharge in the atmosphere from A
F- Discharge in the atmosphere from solenoid (1)
G- Discharge in the atmosphere from solenoid (5)

a- Passage to chambers b and c
b- Chamber
b- Chamber
d- Passage to solenoid (1)
e- Passage to solenoid (5)

The 5-way 2-position electrovalve conveys the pneumatic air flow to the corresponding opening or closing chambers of the actuating cylinder, while connecting the inactivated cylinder chamber with the atmosphere.

This valve is controlled by two solenoids (1 and 5) and there are also manual push-buttons (6) to be able to control it directly, in case of failure.

OPERATION:

Compressed air comes into the electrovalve through inlet P and, in the position shown in the figure, it goes out through B to the corresponding cylinder chamber. Air that comes through inlet P goes through passage a to chambers b and c and from there, it goes through passages d and e to the solenoid valves. Air remains

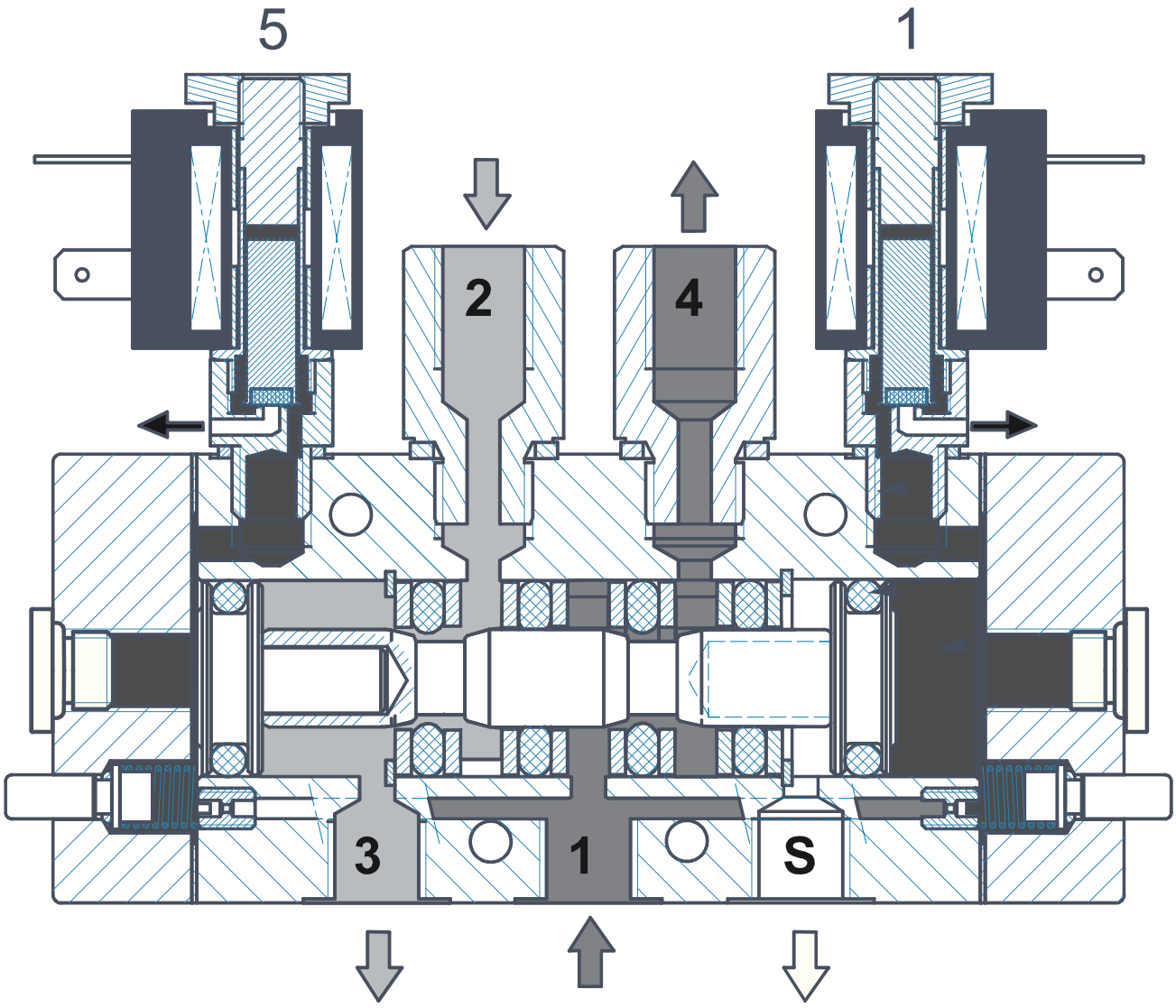
there compressed since solenoid valves (1 and 5) are placed in a way that block the discharge in the atmosphere through F and G. Mean while, the inactivated cylinder chamber is connected with the atmosphere through outlet A and discharge R.

In order to activate the electrovalve in the opposite direction to the figure, the solenoid (1) has to be activated by causing the discharge in the atmosphere from passage d and chamber b through F. When chamber b is connected with the atmosphere, the existing pressure in chamber c moves the piston (3) in the opposite direction to the figure. The piston is then placed in the sealing joints so that the air reverses its movement, going out through A and blocking the discharge R, while outlet (b) is connected with the atmosphere through S and the corresponding cylinder chamber. This activates the cylinder in the opposite direction.

When the solenoid is no longer activated, it returns to its normal position, thus blocking the discharge in the atmosphere from passage (d) and chamber (b).

The piston (3) remains motion less in each selected position and it does not change until the opposite solenoid is activated.

In case of emergency, the electrovalve can be activated manually, by means of push-button (6) which produces the discharge in the atmosphere from the corresponding chamber (b) or (c). This causes the piston to move because of pressure difference.

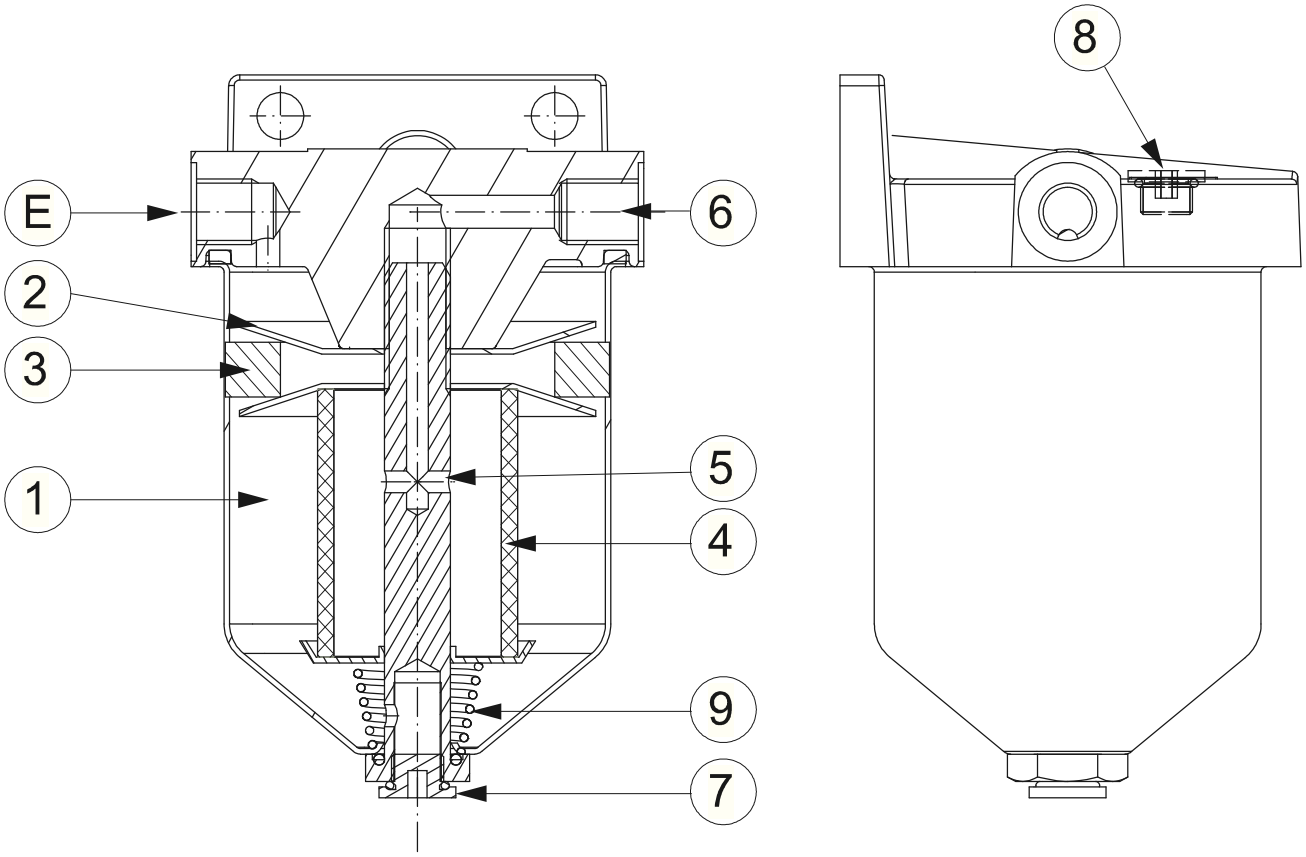


Unload

Feed

Piloting

2.2 DRIER FILTER



2.2.1 OPERATION

The filter is responsible not only for retaining the impurities and condensed water from the compressed air to be used, but also for lubricating the circuit.

The air comes into the filter by inlet E, going through the punched plate (2) and the compacted filter (3) that separates the big impurities.

Water is deposited by gravity at the bottom of the vessel, where there are about 10 cm3 of oil (see technical features). When the water level increases in the filter vessel, due to condensations of the air reheated by

the compressor, the level of the oil carried by the air increases, thus lubricating the whole system. The treated oil dissolves the paste formed in the valves and all is ejected by their discharges.

The oil treated with bisulfide repels water because of its water-repellent features, being cleaning and greasing very effective.

Since in many vehicles the air that arrives from the compressor carries not only water vapour but also dirty oil, an obstruction of the filter (3) and (4) is possible. The obstructed filter (3) works as a piston, gains the spring (9) letting the air go directly from(E) through (5) to outlet (6), thus allowing the vehicle to circulate.

Then the filtration continues in the second metallic filter (4), going back to the circuit by drill (5) to outlet (6).

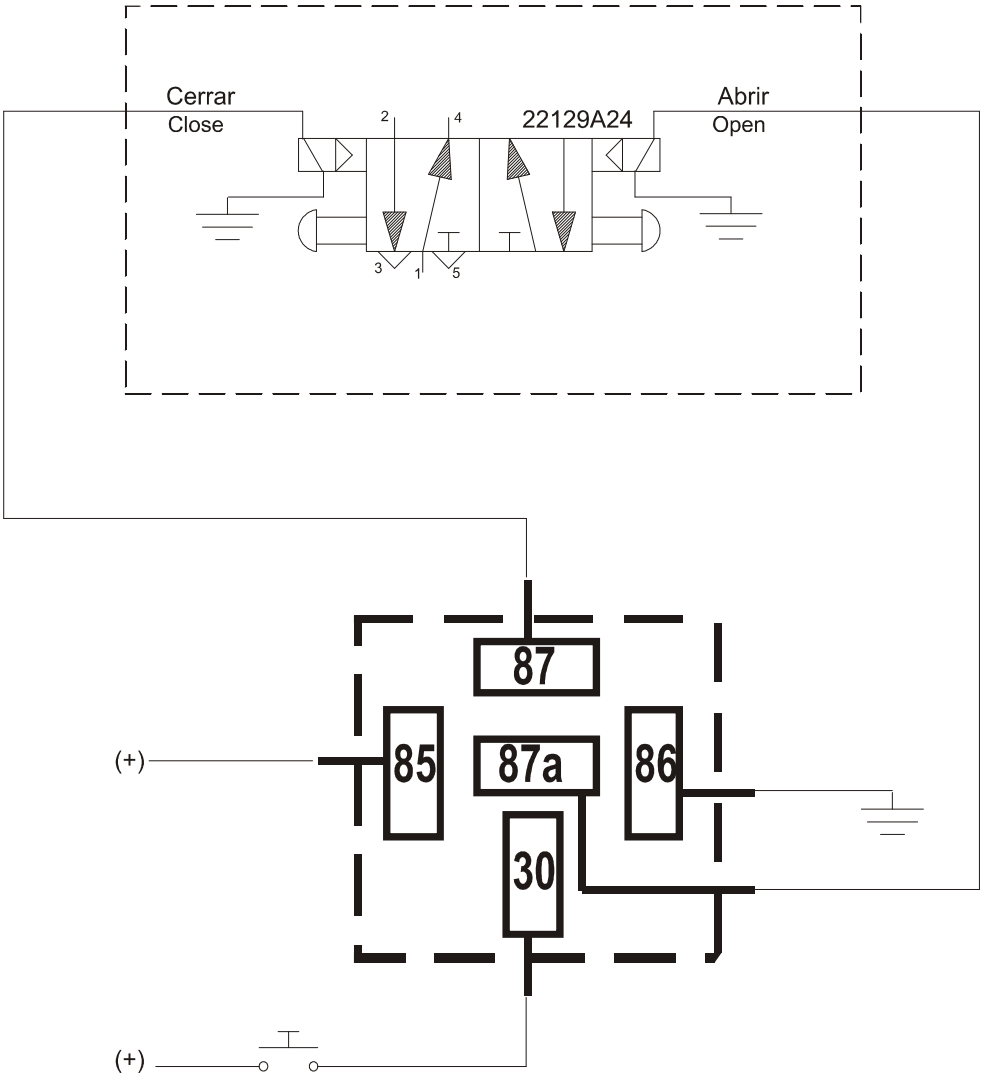
These filters have to be replaced or cleaned depending on the air impurity level.

Condensation accumulated at the bottom of the vessel (1) will be emptied through screw (7).

The oil filling to lubricate the pneumatic circuit is done through plug (8).

2.3 ELECTRONIC RELAY

2.3.1 CONNECTION AND OPERATION



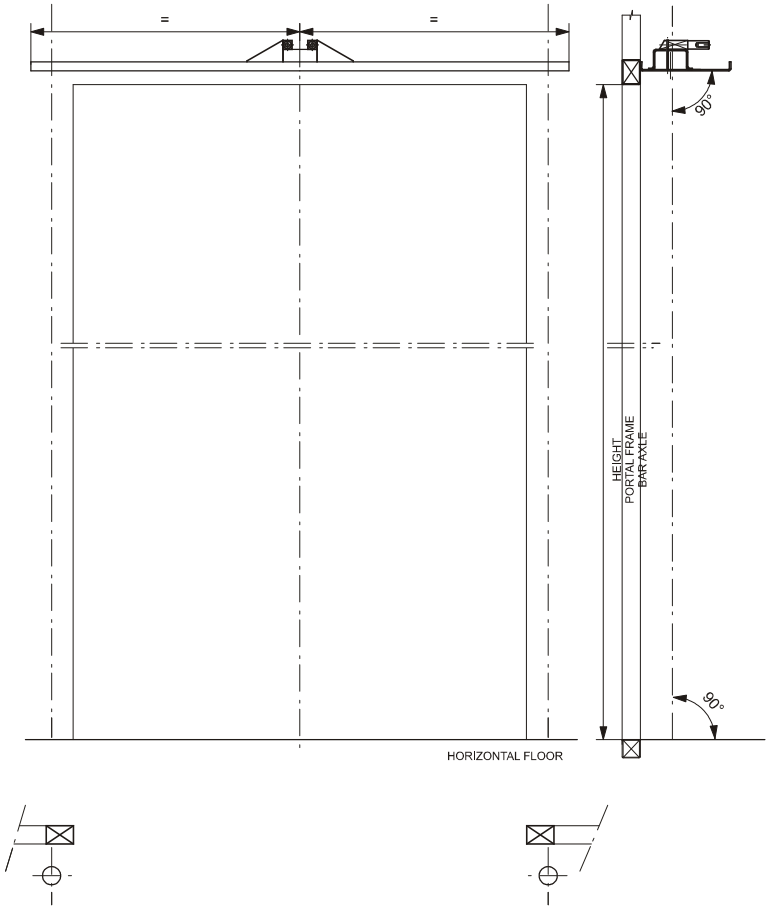
Properties:

30 - To open/close push-button
85 - To positive (12/24V.)
86 - To negative
87 - To close signal
87a- To open signal

2.4 INSTRUCTION FOR DOOR ASSEMBLING IN CASE OF DAMAGE

2.4.1 MECHANISM PLATE ASSEMBLING

- Centre the plate with the door hole. Rod axles must be equidistant to the door frame.
- Place the plate at the indicated height, measure 30mm.
- Incline the plate to the indicated degrees (the plate with the rod must form a 90 degree angle). Before definitively fixing the plate, see point 2, in order to ensure the 90 degrees indicated.
- Fix the plate definitively by welding. Minimum six beads of 20 mm equidistant along it. Fix it also at each end by means of a tie rod.
- The checking of the correct mounting is indicated in point 2.

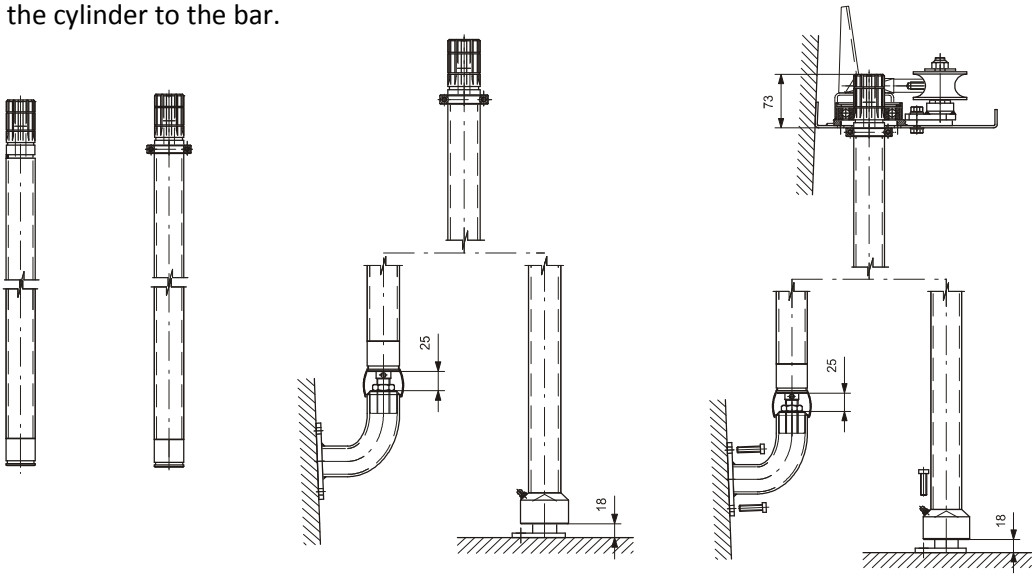


2.4.2 SEALING FRAMES ASSEMBLING

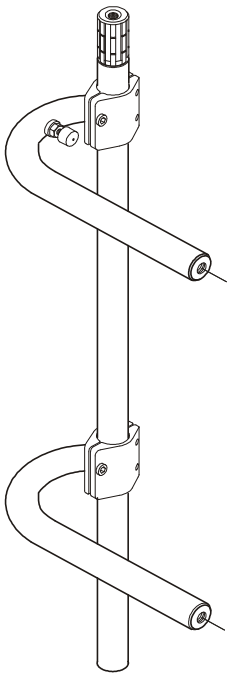
- Mount the aluminum and rubber profiles around the frame. Seal all union angles between rubbers with special sealing for rubber. Binding screws or fasteners must be placed equidistant with a minimum separation of 25cm.
- Recommended tightening torques: see attached list at the end of chapter one “Mechanical part”. Screw or fasteners are include by the customer.
- The checking of this mounting takes place by adjusting the door to the frame rubber.

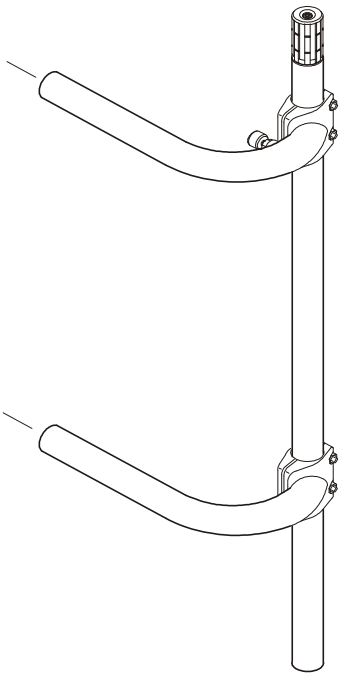
2.4.3 TURNING RODS ASSEMBLING

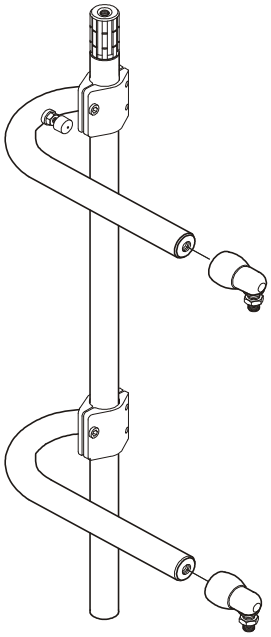
- Grease the striated axles slightly and the placement of the lower kits in abundance.
- Introduce the ring that adjusts the clearance of the bar for the striated part and screw at the corresponding height.
- Mount the lower turning kit in the bar.
- Introduce the striated axle in the plates turning kit and screw the lower turning kit to the floor.
- Check that the cylinders axle are totally hidden and then when pulled manually opens by 15mm. In this position place the spacer and the sprocket in the striated axle. This connects the cylinder to the bar.

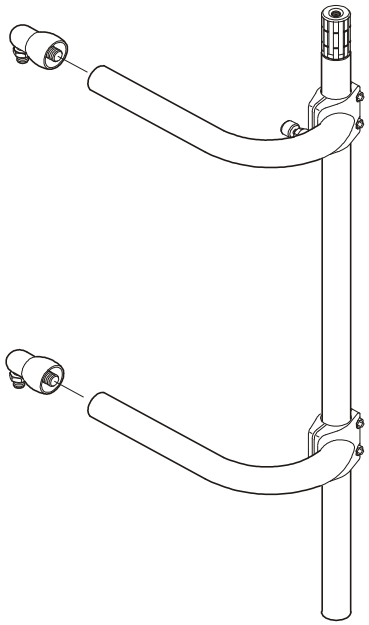


- Without moving the bar, first place the top bar that has the rubber stop, has to be in contact with the portal frame. The bar has to be mounted where indicated on the diagram. Then the lower arm is mounted where indicated in the diagram. Then the lower arm is mounted where indicated in the plan and parallel to the top bar.



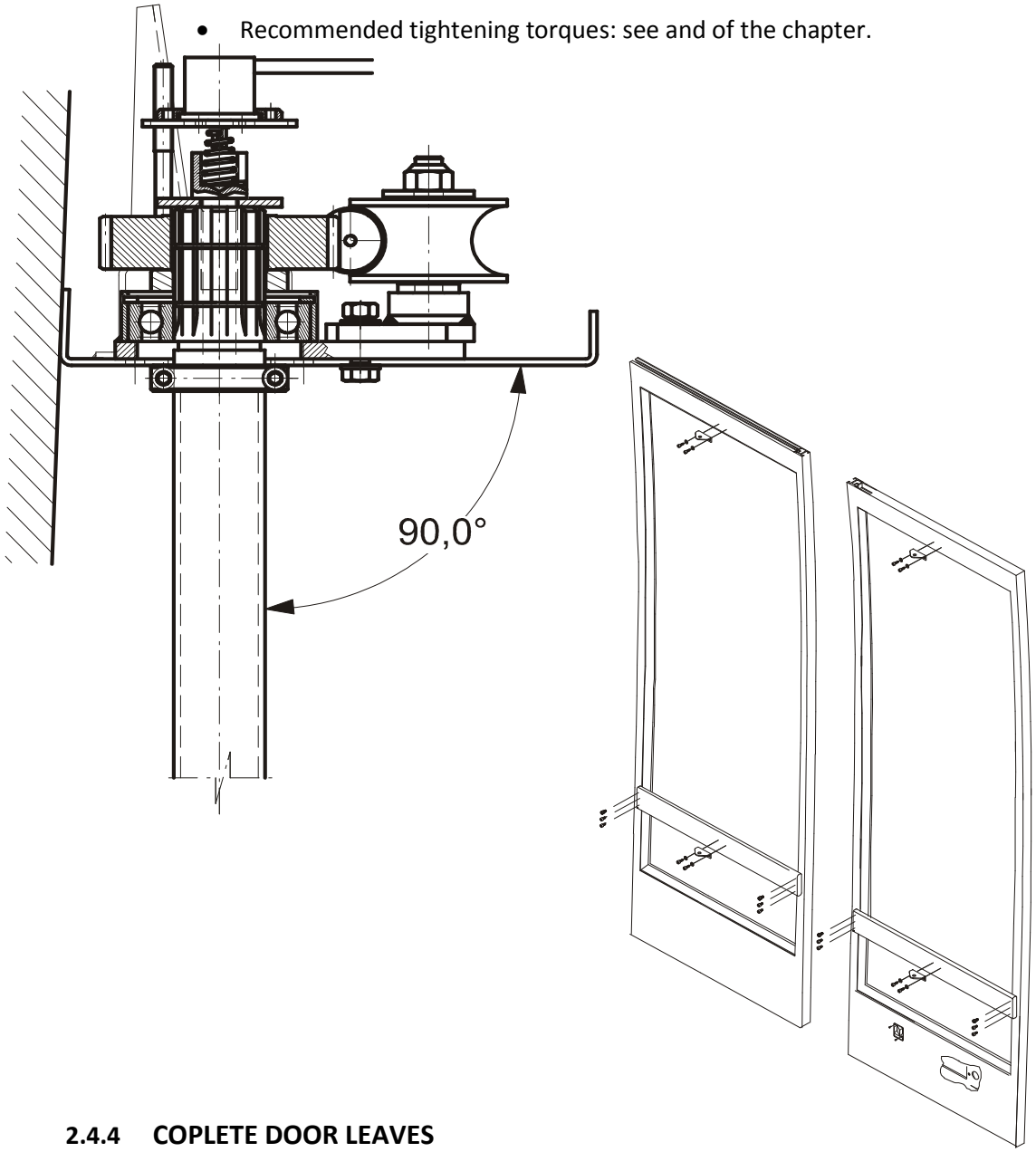






- Mount the hinge joints to the arms. Check the turning radius that forms theentry of the bar and that the hinge joints are centred.

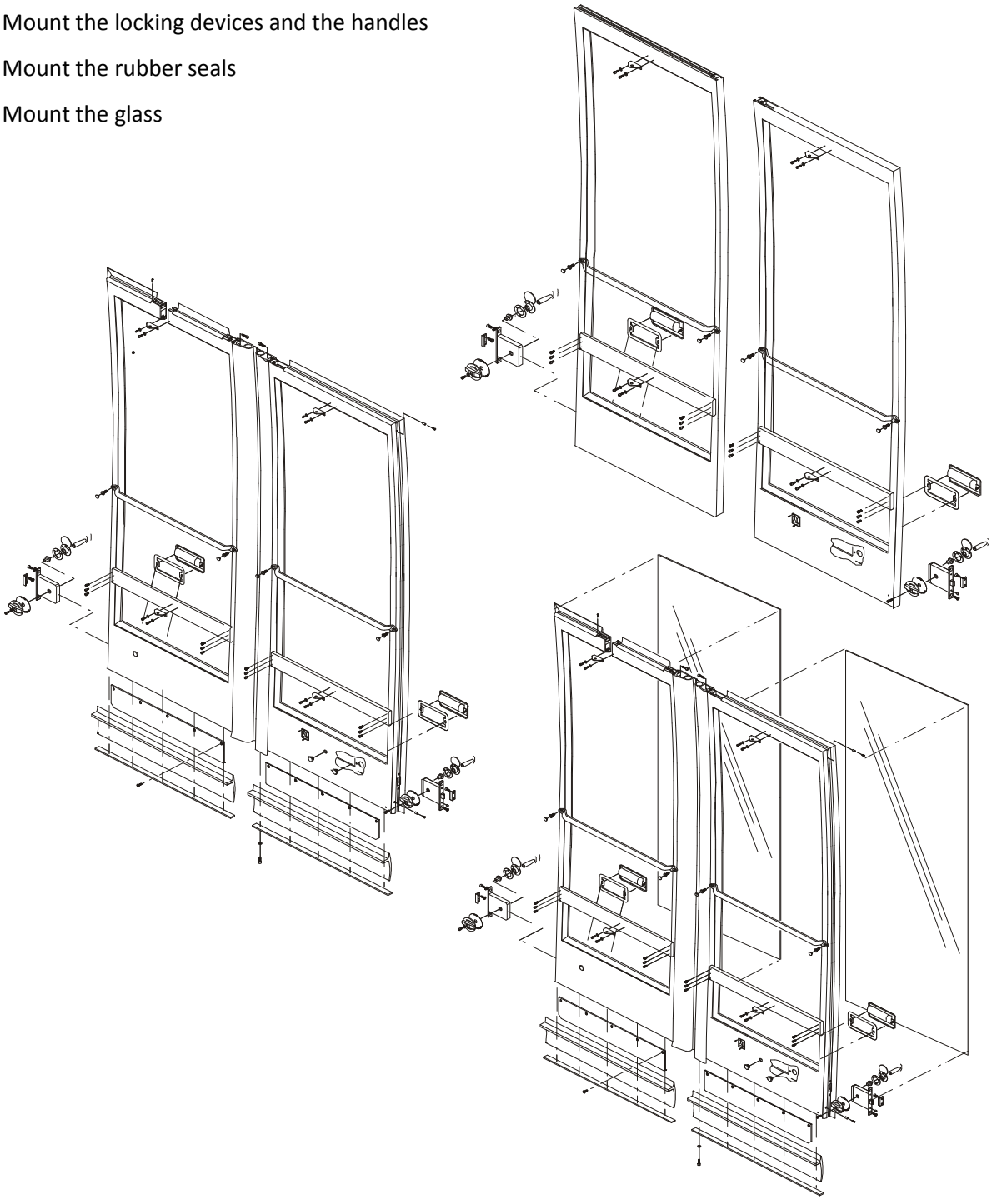
- Checking: verify that the plate and the rod form a 90 degree angle. Use a square, turn the rod manually and check that it slightly tilts. Verify the distance between the centre of the bar and the centre of the hinge joints.
- Recommended tightening torques: see and of the chapter.



2.4.4 COPLETE DOOR LEAVES

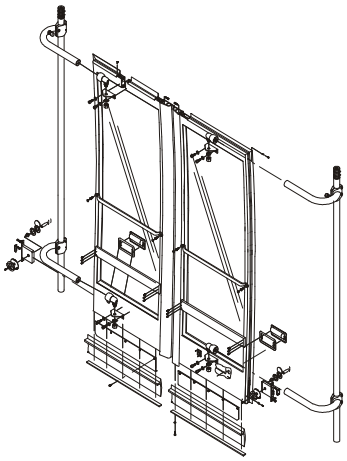
- Screw the supports of the hinge joints to the screwed dril holes mechanised from origin.

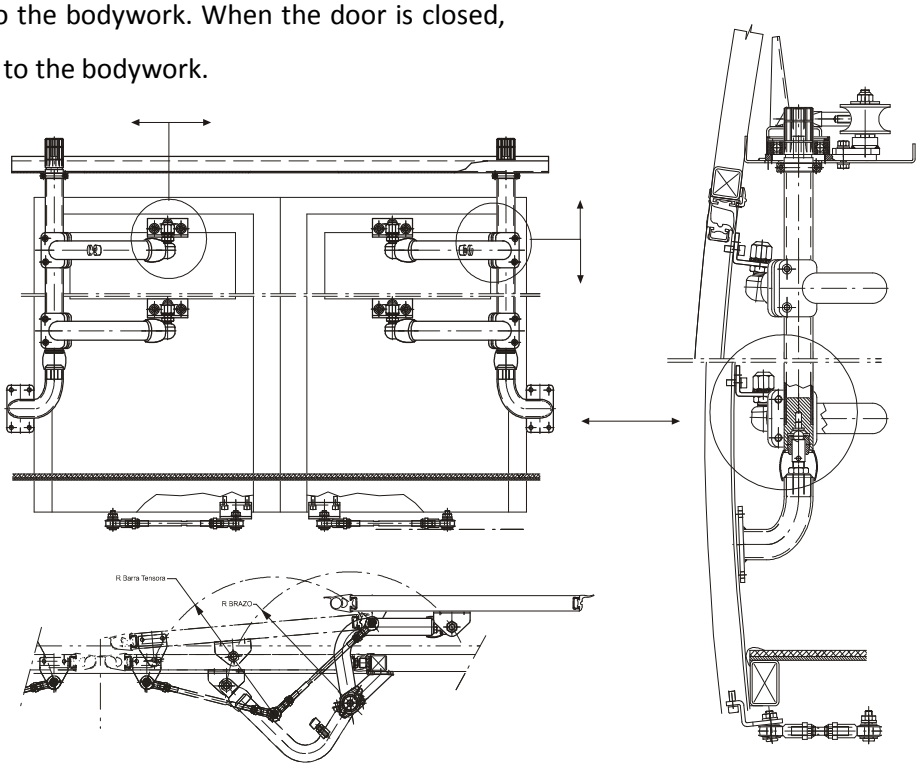
- Mount the locking devices and the handles
- Mount the rubber seals
- Mount the glass



2.4.5 MOUNTING THE LEAVES ON TO THE VEHICLE

- Mount the leaves on the vehicle screwing the ball joint to their supports
- Lateral adjust is made by modifying the ball joint supports position
- Front adjust is made by modifying the low arm position. Using the lower arm, the connection between the door and the cylinder doesn´t change
- Height adjust is made by modifying the height of the arms on the bar
- The tightening bar is screwed on the door using a support fixed on the door. It is screwed to the chassis by another support made by the coach builder
- Tightening bar check. When the door is completely opened, it has to be parallel to the bodywork. When the door is closed, it has to be alligned to the bodywork.





2.4.6 RECOMMENDED TIGHTENING TORQUES

Screw	Tightening (Nm)	Door clamps
d.4,2 plate	4,5 Nm	door sealing rubber fixing
M3	1 Nm	outer lock hubcap
M5	5 Nm	outer door handle, inner red door handle
M6	8 Nm	rod stop bushing, lock, lower sealing rubber
M8	20 Nm	lower rod support, handles
M10	40 Nm	bar / arm clamps, ball joint supports, BT ball joints / BT ball joint supports / tie rods
M14	80 Nm	ltightening bar ball joint / tube
M16	125 Nm	support / arm ball joints, upper fixing screw / lower turning axle bar

2.5 ANOMALIES

2.5.1 DOORS DO NOT WORK

Cause

- Pressure lack in the circuit (Doors can be moved manually)

Solution

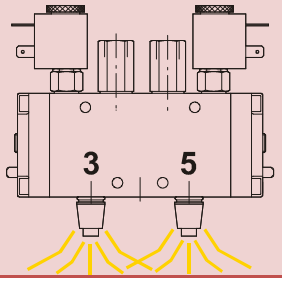
- Check that the pressure reaches the auxiliar air tank. Start the vehicle until the service pressure is reached.
- Check that the door is not set to emergency, activate emergency reset switch.

Cause

- Electric failure. (Doors keep opened or closed, with pressure).

Solution

- Check connections. (Always while pushing to open or close, the valve coils must have leakage).



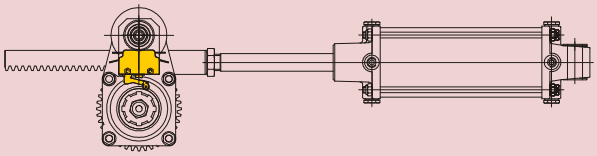
Pressing vias 3 or 5

Cause

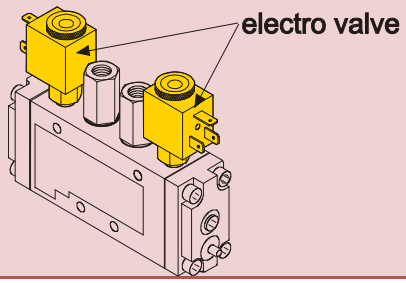
- **Failure of the door's limit switch.**

Solution

- **Check the position or replace the micro switch.**



- **Check the door fuses. If everything is in order, and the valves do not excite, the whole circuit has to be inspected by an electric workshop, to verify that all the limit switch (of the doors, etc) are in order.**

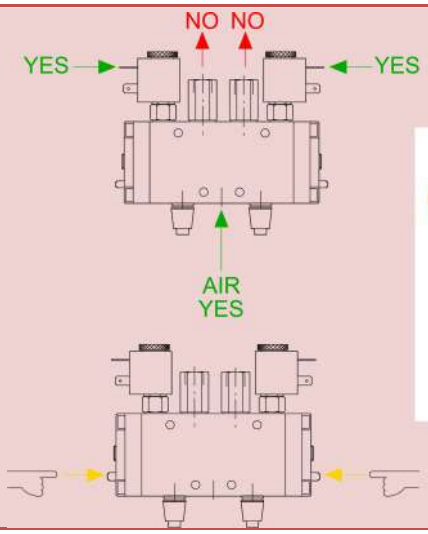


Cause

- **Electrovalves do not work.**

Solution

- **If the air and current arrive to the electrovalve, and it does not work, it can be obstructed by impurities. Clean the general filter, add oil with molybdenum bisulphide and actuate the valve several times by means of the manual switch. The valve will clean it self in most cases.**

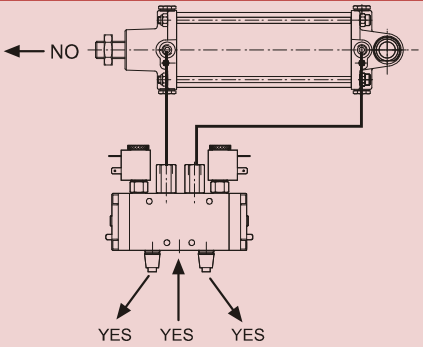


Cause

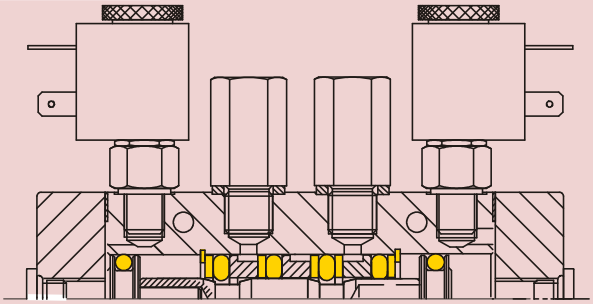
- **Electrovalves do not work.**

Solution

- **Before dismounting, check if the cylinder piston is not passed. The piston rubber can be damaged. If so, dismount and change the piston fittings of the cylinder.**



- **The piston or the sealing joint can be scratched. If so, dismount the valve and change the rings taking care to dismount them as shown in the instructions of the spare rings box. NOTE: Never dismount a valve, before verify the previous points.**



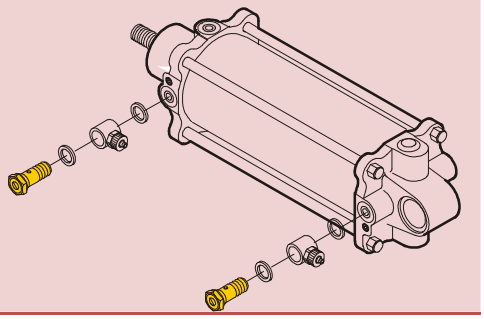
2.5.2 DOORS GO TOO FAST OR TOO SLOW

Cause

- **Bad adjustment**

Solution

- **Adjust the regulators or replace the regulation screw in the head of the connection screws or in the electrovalve's exhausts.**



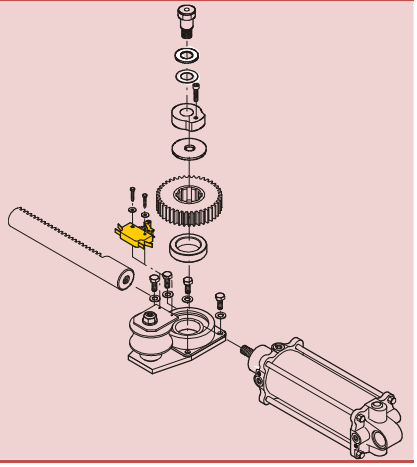
2.5.3 DOORS OPEN BY THEMSELVES

Cause

- **Bad adjustments of the limit switch of the sensitivity manual adjuster.**

Solution

- **Set the limit switch in a way that it breaks the electric circuit just when the door is completely closed.**

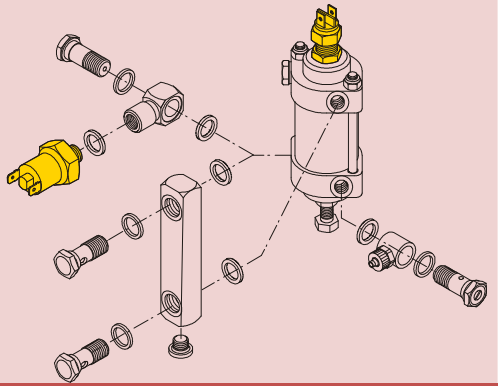


Cause

- **Short circuit in the safety pressure detector.**

Solution

- **Replace pressure detector.**



Cause

- **Leakages in the emergency push-buttons.**

Solution

- **Check the water tightness of the connections, or a possible breaking of the tube.**

2.5.4 THE CLOSED DOORS OPEN SOME CENTIMETRES WHEN RNNING

Cause

- **Bad cylinder set-up.**

Solution

- **Set up the cylinder so that stroke overrun is the same when opening or when closing. Change driving rod position if necessary.**

Important: die safety reasons, doors must remain completely closed along the operation.

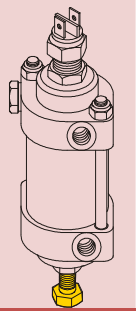
2.5.5 ON THE CLOSING PROCESS, DOOR REVERTS THE MOVEMENT RETURNING TO THE OPEN POSITION. (DOOR WITH SENSITIVITY SYSTEM)

Cause

- **Sensitivity regulator too opened.**

Solution

- **Smoothly fasten regulation screw until the door is completely closed.**



Cause

- **Bus is reclined in an abnormal position.**

Solution

- **Keep "CLOSE" push button firmly pressed until door completes closing travel.**

Cause

- **Friction due to external causes.**

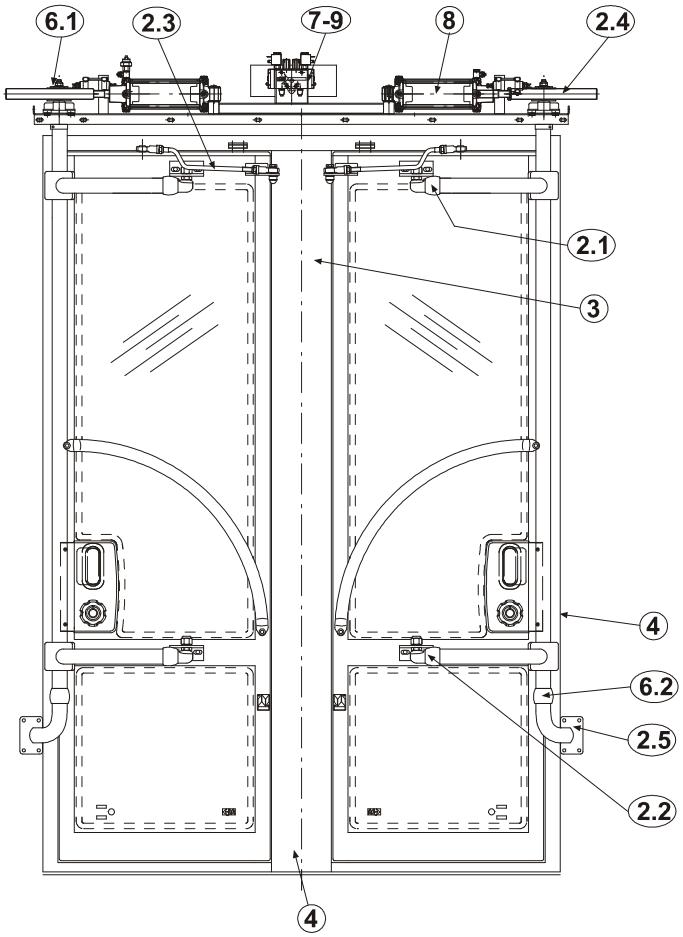
Solution

- **With air pressure disconnected, check that leaf run is smooth.**

2.6 MAINTENANCE

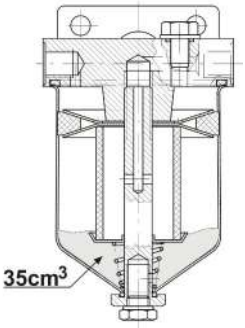
Basic instructions to upkeep doors . Periodic maintenance every 6 months or every 50.000 Km.

Note: The numbering belongs to the drawings that to continuation are detailed.



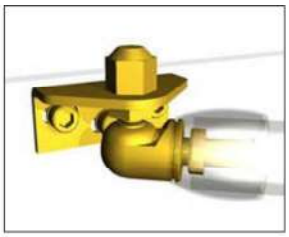
2.6.1 EMPTY FILTER AND ADD OIL

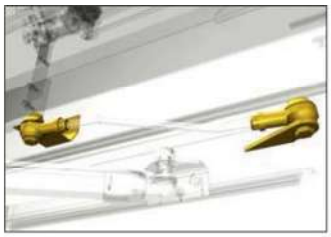
- Empty filter oil by means of a jack screw.
- Remove the plug and add half the oil bottle(35 cm^3 approximately).
- It is high indicated to use Masats original pneumatic oil. .

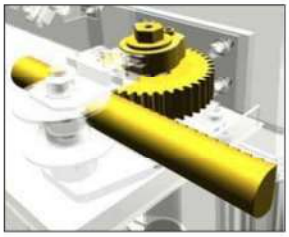


2.6.2 HOWEVER, A BLED OF SAE 10 PLUS 5% OF BISULPHIDE CAN ALSO BE APPLIED

1 

2 

3 

4 

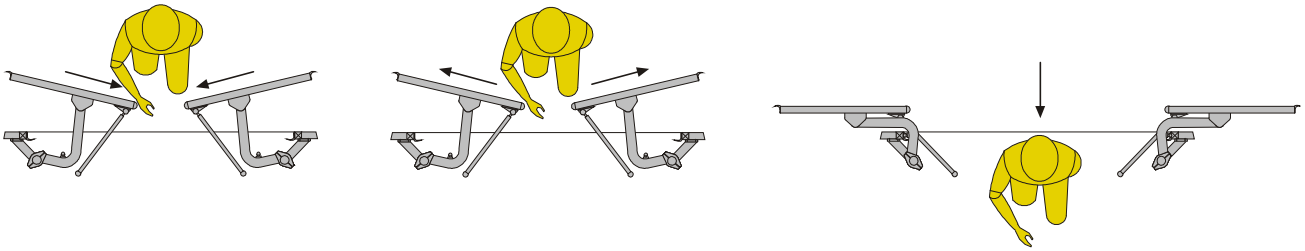
5 

2.6.3 TORQUES CHECKING

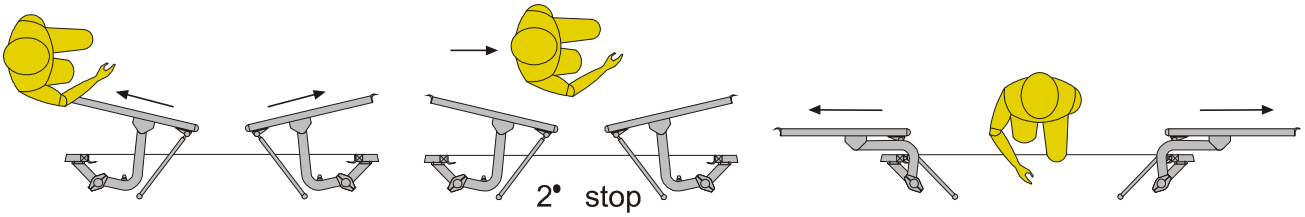
Check of all torques by following the standard torques table item 2 – 1 – 6

2.6.4 CHECK THE SENSIBILITY SYSTEM

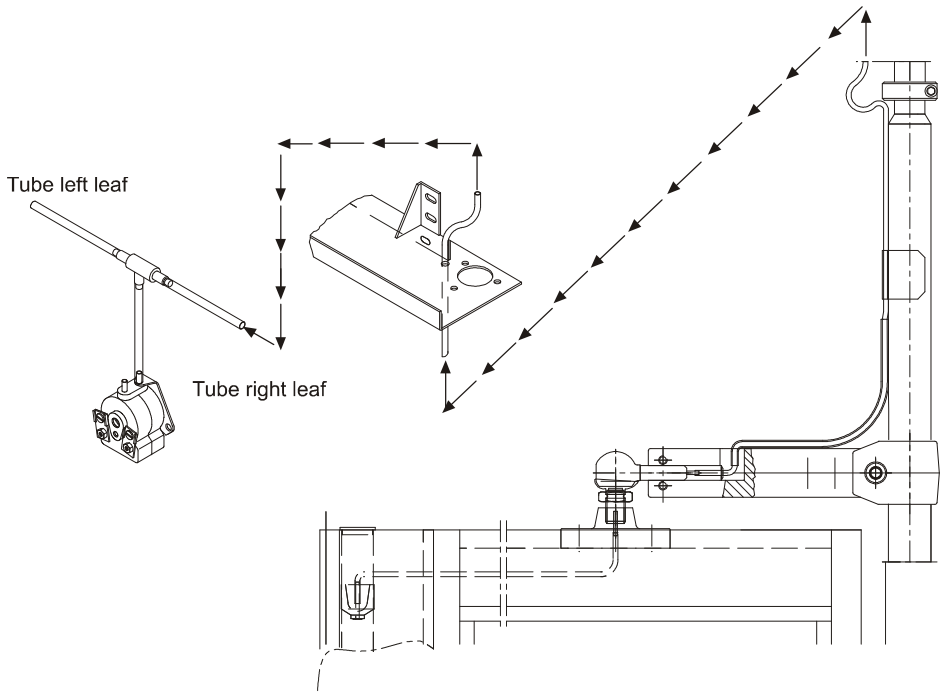
2.6.4.1 CLOSE TO SENSITIVITY



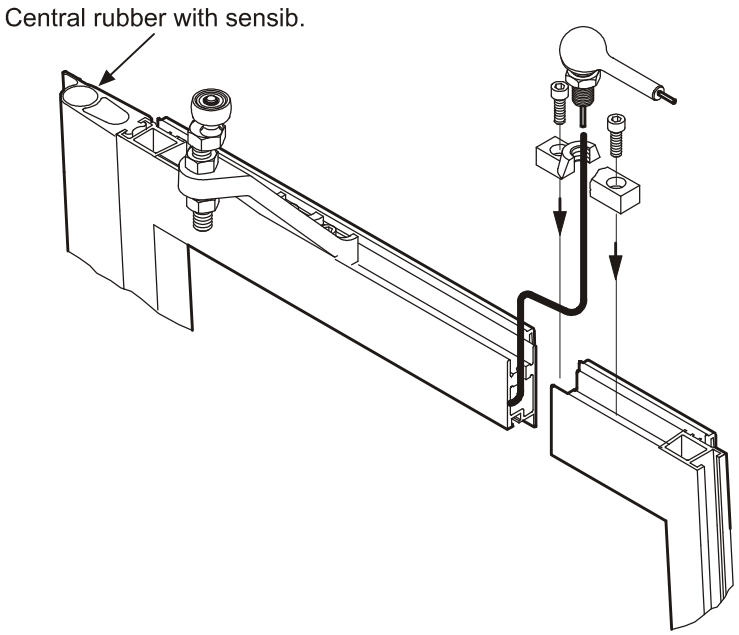
2.6.4.2 OPEN TO SENSITIVITY



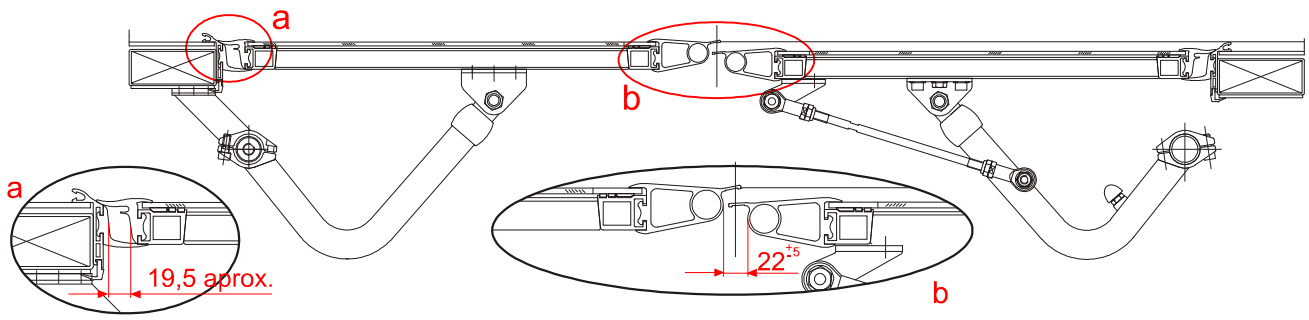
2.6.4.3 TO VERIFY ALL THE ROUTE OF THE TUBE OF SENSIBILITY SENSOR



2.6.4.4 CHECK THE CENTRE RUBBER SENSITIVE CHANNEL WORK



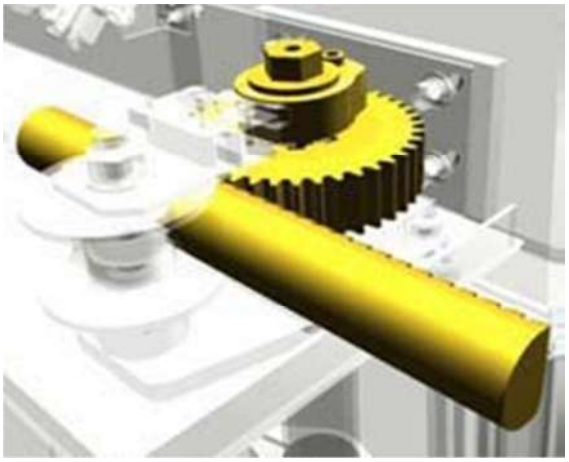
2.6.5 CHECK RUBBERS CLEARANCES



2.6.6 GREASE THE TURNING SHAFT

The outer opening equipment has two bearing points. The lower one does not need to be greased, since the turning system is made of self-greasing plastic. The upper shaft is fixed by a self-greasing bearing. The upper pinion and rack axle need to be periodically greased, by following the standard period of 6 months of operation.

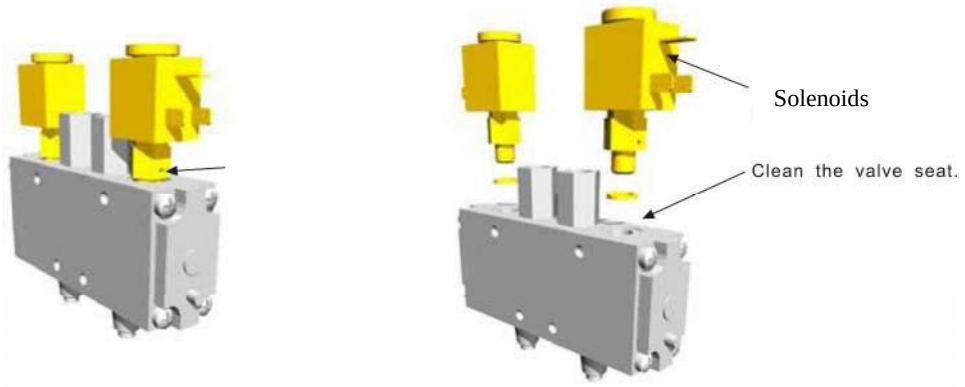
2.6.7 UPPER TURNING SUPPORT



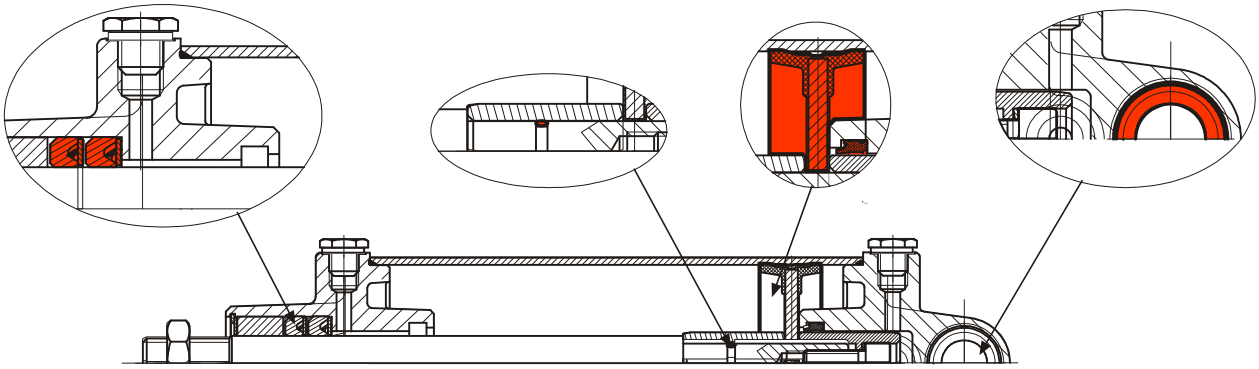
2.6.8 LOWER TURNING SUPPORT

2.6.9 ELESTROVALVES CLEANING

In case any solenoid has been damaged by some external agent, it has to be replaced. It is highly recommended the companies with a significative number of vehicles to have some spare solenoids in stock



2.6.10 ACTUATORS



Replace the cylinder consumable parts by using a cylinder repairing kit if necessary.

3 DRIVER DOOR HINGE

3.1 PRING FORCE ADJUSTMENT

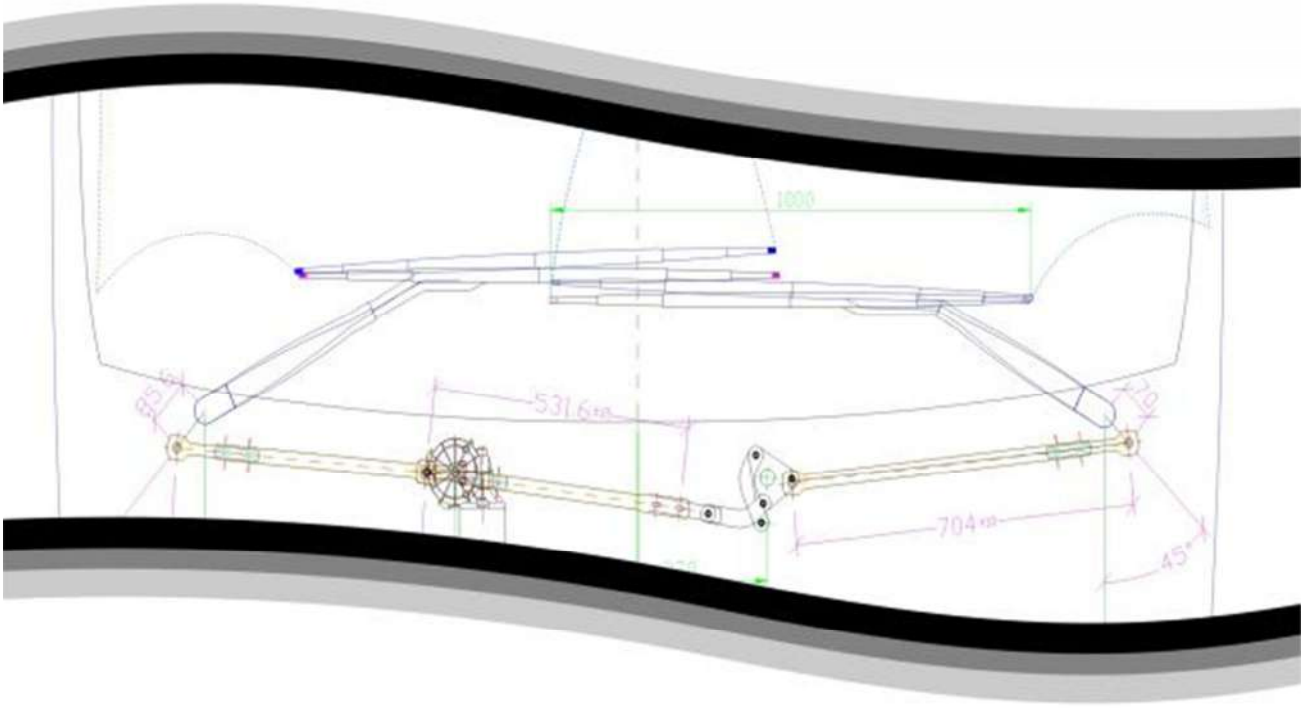
The hinge spring must be adjusted as long as some complains about door rattling opening during the bus operation appear. Excessive force on hinge reduces the time life or generates eventual breaks.

Release the pressure over the hinge pin by slightelly turning the top bolt to the left.

Remove the pin and tight bolt to left in ¼ of turn.

Hold the alley tool and put the pin back.

4 WIPER SYSTEM MAINTENANCE



4.1 WIPER SYSTEM MAINTENANCE

The following maintenance Schedule was designed for normal conditions of applications, minding places with regular occurrence of rain in 5 to 6 months of the year.

	Action	Frequency
1	Check the wiped area and cleaning efficiency. Replace the wiper blades in case inefficient cleanness.	Every 90 days
2	Correct position of wiper arms. Must be parallel to the ground.	Every 90 days
3	Check fixing bolts of arms, rods, eliminate the clearances by applying the torques: Rod 60 Nm, arms 45 Nm.	Every 90 days
4	Wiper Motor: Check the fixing bolts. Eliminate the clearances by applying the torques: M10 - 40Nm, motor rod 16mm = 25 Nm. Attetion: The task must be accomplished only when clearance and other problem are found when applying the tasks #1, 2 or 3.	Every 90 days
5	Clean and grease the joints and mobile elements (a grease with lithium must be applied), test the assembly for final prove.	Every year or when task #4 is accomplished.
6	Windscreen Washing System: Check the working. Special attention must be given to the detergent type. Domestic detergent must not be used due its chemical components damage the washer piping. The correct product is available in specialized automotive products shops.	Every Year

5 CLIMATE SYSTEM

5.1 ECOMASTER CLIMA – DESCRIPTION OF OPERATION

In Air Conditioning Operation, it is possible to vary:

The temperature set for operation

- Speed of the air in the Evaporators
- Grilles for internal/external air
- Switch on de-humidification
- Block compressor inlet. (ECO)

Any variation in the speed, position of the grilles, De-humidification or Compressor blocking places the air conditioning system in semi-automatic mode and it can be switched to fully automatic mode by pressing the AUTO button.

5.1.1 CHANGING THE SET TEMPERATURE

The Temperature can be set between 17ºC and 27ºC (63-82ºF) using the and keys.

When the temperature level is set below 17ºC (63ºF), the system engages forced chill mode (LO) and activates its maximum cooling power. (the screen displays LO)

When the temperature is set above 27ºC (82ºF), the system engages forced heat mode (HI) and activates its maximum heating power (the screen displays HI).

5.1.2 VARYING THE SPEED OF THE EVAPORATOR VENTILATORS

The speed of the evaporators can be varied from levels 1 to 3. When the speed is altered, the system goes into manual mode and the led located next to key  will be switched off.

If the key  is pressed, the system automatically recovers the corresponding speed and the led will shine again to indicate manual operation.

To alter the speed, press key  . Pressing it once will display the current speed on the screen; if it is pressed again, the value of the speed will be increased in a closed loop (from 3 it will change to 1).

Note:

If the bus is not equipped with roof-mounted heaters and the interior temperature is less than 12ºC, speed 0 may be selected while the system is warming up If speed 0 is selected manually as in the preceding example then, once the interior temperature increases to 12.5ºC, the system will automatically take on the corresponding speed and will set itself to Automatic.

5.1.3 CHANGING THE GRILLE POSITION

The position of the grilles can be changed from external air to internal air. When the position is changed, the system switches to manual mode.

If the key  is pressed, the system automatically recovers the corresponding position.

To alter the grilles, press key  . Pressing it once will indicate the current position; pressing it again will change the position.

If the Ecomaster Clima is operating in air-conditioning mode and the interior temperature is 2ºC higher than that selected (Set), the grilles will switch to Automatic mode and will close.

5.1.4 ACTIVATION OF ECO

If the 

key is pressed, the letters ECO will appear on screen and the compressor will be disconnected. The system switches into Semi-automatic mode.

Pressing the 

key will have no effect if the system is not working in De-humidification mode.

If the 
or 

key is pressed, the ECO option will be switched off.

5.1.5 ACTIVATION OF THE HUMIDIFICATION (REHEAT)

If the  key is pressed, De-humidification will be activated. This will remain in operation for 15 minutes or until the 
or 
key is pressed again.

“Reheat” cannot be activated if there are no heaters installed on the roof unit.

Selecting the de-humidification option cancels out the ECO option.

5.1.6 CHECK TEMPERATURES

The internal and external temperatures can be checked by pressing the 
key. The interior temperature is displayed first, then the exterior temperature when the key is pressed again, and so on in a loop.

5.1.7 VARIATION OF CONTRAST AND BRIGHTNESS

The values for the Contrast and Brightness can be varied and the new values will be remembered the next time the air-conditioning unit is switched on.

For this purpose, it is necessary to use the following key combination in which the first key pressed must be held down while the second key is pressed several times in succession to raise or lower the parameter in question.

 Greater brightness

 Less brightness

 Greater contrast

 Less contrast

 Factory settings for brightness and contrast

5.2 AUTO- CHECING – ERROR CODES

When the system receives the signal from the battery disconnector (+30), it first checks the outlets to check what charges are applied and to make sure there is no short-circuit.

It also checks the status of the probes.

If any anomaly is detected, it will indicate the error(s) on the Display using the following codes:

CODE	ERROR
INT. PROBE	Internal Probe Shorted or Open
ICE PROBE	Ice Probe Shorted or Open
DUCT. PROBE	Ducting Probe Shorted or Open
EXT. PROBE	External Conduit Probe Shorted or Open
MAIN PUMP	Main Outlet Pump Shorted
ReCirc PUMP	Recirculation Pump Shorted
COMP	Compressor Outlet Shorted
ROOF VALVE	Roof Valve Outlet Shorted
FLOOR VALVE	Floor Valve Outlet Shorted
STEP1	Heater Outlet Shorted Speed 1
STEP2	Heater Outlet Shorted Speed 2
AIR	Recirculation Grilles Outlet Shorted
RIGHT VENT	Right Adjustable Evaporator Ventilator Outlet Shorted
LEFT VENT	Left Adjustable Evaporator Ventilator Outlet Shorted
Adj. Cond.	Adjustable Condenser Ventilator Outlet Shorted
VENT1	Evaporator Ventilator Outlet Shorted Speed 1
VENT2	Evaporator Ventilator Outlet Shorted Speed 2
VENT3	Evaporator Ventilator Outlet Shorted Speed 3
DEMIST AIR	Demister Recirculation Outlet Shorted
HEATER1	Underfloor Heater Outlet Shorted Speed 1
HEATER2	Underfloor Heater Outlet Shorted Speed 2
POT.	Error in the automatic setting of the potentiometer.

From software version 1.0:

The following error codes are added:

VT MOT	No return or the motorized roof valve is not connected.
VS MOT	No return or the motorized floor valve is not connected.

If any of the above errors appears, the Ecomaster Clima will start to operate in accordance with the default operating programme. It is possible that the vehicle's interior temperature may not be regulated correctly under these conditions so it is recommended that the system should be reviewed by technical service personnel.

Error detected by control once the initial system checking is performed may be consulted by entering Viewing or Diagnosis modes and then simultaneously pressing the (6) and (4) keys.

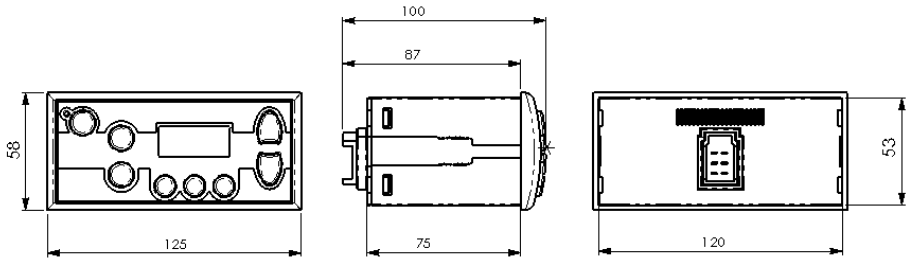
5.3 UNIT INSTALATION AND CONNECTION

5.3.1 UNIT INSTALLATION

The Ecomaster Clima unit comprises two elements: the display module and the CPU.

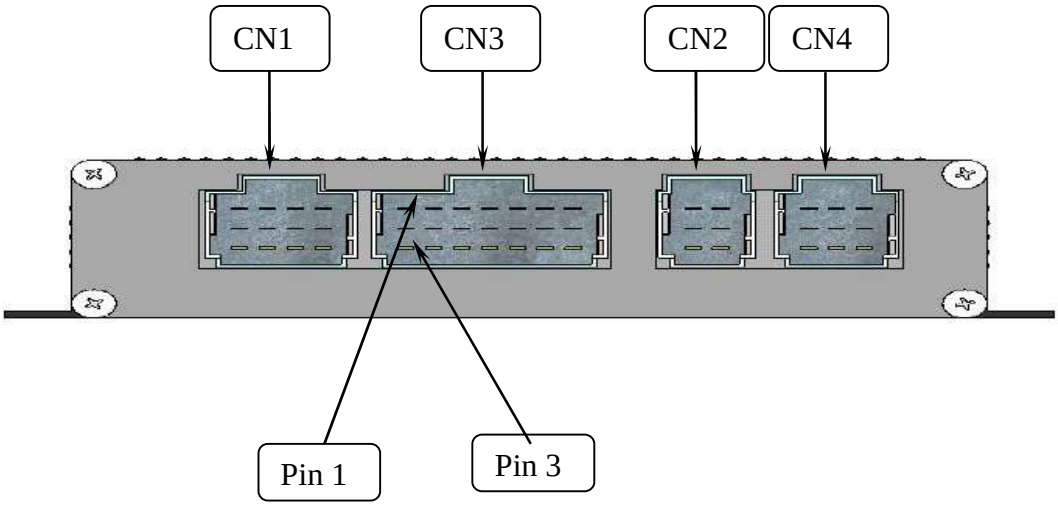
To install the display module on the dashboard, it is necessary to prepare a 120.5 x 53.5 mm hole.

The measurements are shown as follows:



For the installation of the CPU, the arrangement of the fixing holes must be taken into account, as shown in the figure.

5.3.2 CPU ELECTRIC CONNECTIONS



The references of the electric installation connectors for the CPU are as follows:

Connector	Pin no.	Ref. Hispacold	Ref. AMP.
CN1	12	3200818	1-967622-1
CN2	6	3200800	1-965640-1
CN3	21	3200820	1-967625-1
CN4	9	3200817	1-967621-1

The clamp terminals for these connectors have reference AMP 927777-3 or 927768-3 (Ref. Hispacold 3270776) according to whether they are supplied in a strip or individually.

All of the inlets and outlets allow shorting to the Positive power pin (+32V Maximum) and the power ground pin, except the temperature sensor inlets.

All of the inlets withstand a minimum of 2K5V Electrostatic Discharge (ESD)

CN1 of the CPU. Power supply connection: 12 pins.

Pin	Name	Characteristic	V	In
1	+MCS	Supply (Vdc1)	16-32V DC	1A
2	GND	Supply Ground	0V	1A
3	SAL9	Main Pump	Vdc1	0.5A
4	+30	Supply (Vdc2)	16-32V	6A
5	+30	Supply (Vdc2)	16-32V	6A
6	+30	Supply (Vdc2)	16-32V	6A
7	+30	Supply (Vdc2)	16-32V	6A
8	+30	Supply (Vdc2)	16-32V	6A
9	IN5	Alternator Signal	Vdc1	Active H
10	CAN1L	Comu. Hispacold	5V	100mA
11	CAN1H	Comu. Hispacold	5V	100mA
12	RS-	RS485- Communication	5V	100mA

Where: V Minimun-Maximun Voltgage.

In Nominal Intensity admitted.

CN2 of the CPU. Screen Connection and Reprogramming. 6 pins

Pin	Name	Characteristic	V	Rated I
1	DAT	Data	8.5V	200mA
2	PROG2	Reset	5V	2mA
3	VP	Power supply	8.5V	200mA
4	PROG1	Reprogramming	5V	2mA
5	GND	Communication GND	0V	200mA
6	RS+	RS485+ Communication	5V	100mA

Where: **V** Voltage

In Nominal Intensity.

CN3 of the CPU. Inlet-Outlet Connections. 21 pins.

Pin	Name	Characteristic	V	In	I p	D.Charge
1	TR1+	Flaps +	+30	1 A	2 A	50 mA
2	V1-	Roof valve -	+30	1 A	2 A	50 mA
3	V1+	Roof valve +	+30	1 A	2 A	50 mA
4	SAL1	Compressor	+30	8A	70 A	1.5A
5	V2+	Floor valve +	+30	1 A	2 A	50 mA
6	V2-	Floor valve -	+30	1 A	2 A	50 mA
7	SAL8	Heater V2	+30	10A	70 A	1.5A
8	SAL2	Evap Fan 1	+30	1 A	8 A	------
9	TR1-	Flaps -	+30	1 A	2 A	50 mA
10	SAL6	Recir. Pump	+30	2,5 A	40 A	0.5A
11	SAL5	Cond. Speed	+30	1 A	8 A	------
12	SAL3	Evap. 2	+30	1 A	8 A	------
13	SAL7	Heater V1	+30	5A	40 A	0.5ª
14	SAL4	Evap. 3	+30	1 A	8 A	------
15	PWM1	Right Evap. Var. Speed	-----	0.1 A	3 A	1V
16	PWM2	Left Evap. Var. Speed	-----	0.1 A	3 A	1V
17	PWM3	Condens. Var. Speed.	-----	0.1 A	3 A	1V
18	IN1	High Pressure Switch	-----	Active H	-----	------
19	IN2	Low Pressure Switch	-----	Active H	-----	------
20	IN3	Door closing	-----	Active L	-----	------
21	IN4	Door open.	-----	Active L	-----	------

Where: **V** Voltage connected to the output.

In Nominal intensity admitted at the output.

Ip Maximum peak intensity during start-up (250ms) at the output.

D charge Minimum consumption in Amperes for the system to detect that there is a device connected to that output.

NOTE: In the event of the device to be connected to a specific output exceeding the maximum consumption permitted at that output indicated by In, it will be necessary to install an intermediate relay between the CPU and the device; if this is not done, irreversible damage may be caused to the electronics.

CN4 of the CPU. Probe Connection. 9 pins.

Pin	Name	Function
1	INT	Interior Temp. Signal
3	CHN	Channel Temp. Signal
3	CHN_INT_GND	Channel and Interior Ground
4	ICE	Ice Signal
5	EXT	Exterior Temp. Signal
6	ICE_EXT_GND	Exterior and Ice Ground
7	RV1	Roof Valve Return
8	RV2	Under floor Valve Return
9	AUTO POT	Connected to GND =Auto Pot

5.3.3 ELECTRICAL CONNECTION OF THE DISPLAY

Rear view of the Display.

On the rear of the unit, there is a connector from the AMP Junior Power Timer family with 6 pins. The connector to use in the electric installation is ref. AMP 1-965640-1 (Ref. Hispacold 3200800). The housing terminals have reference AMP 927777-3 or 927768-3 (Ref. Hispacold 3270776).

CN1 of the Display. Connection to the CPU. 6 pins

Pin	Name	Characteristic	V	In
1	**IN1**	Inlet 1	Vdc1	0.5A
2	SAL3	Flap closure (with Demister)	Vdc1	Active H
3	VP	Power supply	8.5V	200mA
4	DAT	Data	8.5V	200mA
5	GND	Communication GND	0V	200mA
6	**IN2**	Inlet 2	Vdc1	Active H

5.3.4 ELECTRIC CONNECTIONS OF THE COMPONENTS

5.3.4.1 RENEWAL FLAPS

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN3	1	TR1+	Flaps +	+30	1 A	2 A	50 mA
CN3	9	TR1-	Flaps -	+30	1 A	2 A	50 mA

The recirculation flaps are activated by an electric motor. That electric motor may be connected to the electronics in two different ways:

- Directly to positions 1 and 9 on connector CN3 which are outputs with polarity inversion. In this case, the electronics cease to provide voltage to the outputs 12 seconds after having moved the flaps to their closed or open position to avoid the motor heating up.
- Through an inverter relay located in the relay box of the electric installation that performs polarity inversion functions. This relay must be excited from pin 1 of CN3. In this case, the motor will always be powered.

5.3.4.2 ROOF VALVE

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN3	2	V1-	Roof Valve -	+30	1 A	2 A	50 mA
CN3	3	V1+	Roof Valve +	+30	1 A	2 A	50 mA
CN4	7	RV1	Roof Valve Return	Vcc1			

The Ecomaster Clima is prepared to work with several types of water valves. According to the valve chosen. It must be connected as follows.

- Valve ON/OFF N.O. (Normally open): CN3 Pos.3
- Valve ON/OFF N.C. (Normally open): CN3 Pos.2
- Motorized valve with position return: CN3 Pos. 2,3 and CN4 Pos.7. The ends of the potentiometer will also be fed through GND and +30.

5.3.4.3 FLOOR VALVE

1	Pin	Name	Characteristic	V	In	I p	D.Charge
CN3	5	V2+	Floor Valve +	+30	1 A	2 A	50 mA
CN3	6	V2-	Floor Valve -	+30	1 A	2 A	50 mA
CN4	8	RV2	Floor Valve Return	Vcc1			

Follows the same criteria as for the roof valve.

From software version 1.0:

Important note: Where the floor convectors are connected through a motorized valve, this may be left closed when the Ecomaster Clima is turned off, preventing the pre-heater from pumping water through the convector circuit.

The necessary installation must be made to ensure that the valve is open when the pre-heater is operating with the Ecomaster Clima turned off.

5.3.4.4 COMPRESSOR

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN3	4	SAL1	Compressor	+30	8 A	70 A	1,5A
CN3	18	IN1	Pressure Switch High	-----	Active H	-----	------
CN3	19	IN2	Pressure Switch Low	-----	Active H	-----	------

The compressor connection is made directly to Pos.4 of CN1.

The presostat return may be connected in two different ways:

- Independent return for High and Low pressure: The High return will be connected to pos.18 of CN3 and the Low to pos.19 of CN3. The error message and activation of the system will be different according to the pressure switch cut-off.

Sole return for High and Low: will be connected to pos.19 of CN3. In this case, the error message will be HP-LP.

5.3.4.5 ADDOTIONAL PASSENGER HEATER

This heater is normally installed in the steps of the rear door of the vehicle, to support the heating in places with extreme temperatures in winter.

It has two ventilation speeds, the lowest (V1) is used to regulate the interior temperature of the vehicle during the winter and the highest speed (V2) is activated when the door is opened, to form a curtain of air that prevents cold air entering from outside.

Connection of both speeds may be performed directly to the electronics without the need for a relay, as long as the motor does not exceed the maximum consumption for these outputs of 10 and 5 Amperes for V2 and V1 respectively.

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN3	7	SAL8	V2 Heater	+30	10A	70 A	1,5A
CN3	13	SAL7	V1 Heater.	+30	5 A	40 A	0,5A

5.3.4.6 SPEED OF THE EVAPORATOR FANS

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN3	8	SAL2	Evap. Fan Speed 1	+30	1 A	8 A	------
CN3	12	SAL3	Evap. Fan Speed 2	+30	1 A	8 A	------
CN3	14	SAL4	Evap. Fan Speed 3	+30	1 A	8 A	------
CN3	15	PWM1	Evap. Right Var. Speed	-----	0.1 A	3 A	1V
CN3	16	PWM2	Evap. Left Var. Speed	-----	0.1 A	3 A	1V

There are three speeds for the evaporator fans.

These three speeds may be achieved by connection, through relays, of the fans to positions 8,12 and 14 of CN3, or by a PWM control for motors without brushes, which is independent for the right and left side of the vehicle and will be performed by connecting the electronics of the brushless motor to positions 15 and 16 of CN3.

5.3.4.7 SPEED OF THE CONDENSER FANS

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN3	11	SAL5	Cond. Speed	+30	1 A	8 A	------
CN3	17	PWM3	Var. Speed	-----	0.1 A	3 A	1V

The condenser fans may be connected, through a really, to position 11 of the CN3, so we will have a sole speed.

There is another possibility if brushless motors are used, which is to connect their electronics directly to pos.17 of CN3. In that case, the condenser fans may operate at three different speeds, controlled at all times by the Ecomaster Clima, depending on the exterior temperature.

5.3.4.8 MAIN WATER AND RECIRCULATION PUMP

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN1	3	SAL9	Main Pump	Vcc1	0.5A		
CN3	10	SAL6	Recir. Pump	+30	2.5 A	40 A	0.5ª

The main pump of the heating circuit may be activated from pos.3 of CN1. If this pump is in the pre heater, that exit will be connected to the input of the pre heater that activates the pump, and never directly to the pump connector, as the output of the Ecomaster Clima may work with maximum loads of 0.5 amperes.

If a pre heater is not installed, the main pump may be connected through a relay.

The recirculation pump which is normally used in equipment that has heating installed in the floor, is connected to pos. 10 of CN3, as long as its maximum consumption does not exceed 2.5 amperes. If not, it will be connected through a relay.

5.3.4.9 DOOR CLOSED AND DOOR OPEN

To facilitate closing of the vehicle door when the air conditioning is working, the Ecomaster Clima has the possibility of closing the renewal flaps when the door closing mechanism is activated. This means there will be no pressure inside the vehicle and the doors will close without problems.

On the other hand, in cold countries, an additional passenger heater may be installed, that has a second speed that is automatically activated when the rear door is opened and it is cold outside, thus avoiding the heat escaping from inside the vehicle.

To make these options available, the inputs must be connected for Close Door (Pos.20 of CN3) and Open Door (Pos.21 of CN3).

Of these inputs, ground GND (mass) must be connected when the push-button to close the door is activated and during the time the door is open.

Connector	Pin	Name	Characteristic	V	In	I p	D. Charge
CN3	20	IN3	Close door	-----	Active L	-----	------
CN3	21	IN4	Open door.	-----	Active L	-----	------

5.3.4.10 TEMPERATURE SENSORS

For correct operation, the Ecomaster Clima needs 4 temperature sensors:

- Interior temperature sensor: Placed in the evaporator intake. This is the reference for the desired temperature in the passenger zone.
- Channel temperature sensor: Located inside the air distribution duct of the passenger compartment. This ensures the temperature stability of the air driven through the nozzles

Interior, channel and ice temperature sensor	Exterior temperature sensor
	

- during regulation of the heating. It will be placed 1.5 meters from the outlet of the last fan on the evaporator.
- Ice Sensor: Placed between the evaporator coil and fans. Warns of the possibility of ice forming in the evaporator.
- Exterior temperature sensor: Located outside the vehicle.

Connector	Pin	Name	Function
CN4	1	INT	Interior Temp. Signal
CN4	3	CHN	Conduct Temp. Signal
CN4	3	CHN_INT_GND	GND Conductor and Interior
CN4	4	ICE	Ice Signal
CN4	5	EXT	Exterior Temp. Signal
CN4	6	ICE_EXT_GND	GND Exterior and Ice

In the installation, one must bear in mind that, for greater precision, two cables must be led to the connector CN4 for each temperature sensor.

5.4 SWITCHING ON

The CPU has 2 power inlets: +MCS (Central Safety Control or direct battery) and +30. The first of these, +MCS, powers the control and the second, +30, powers the charges.

5.5 SWITCHING ON AND AUTOMATICALLY

When the CPU has voltage at the input +MCS (CN1 Pos. 1) the Ecomaster Clima is in what is called OFF Status. The screen remains blank and displays the message OFF. The keyboard is off and is illuminated, along with the screen, for 15 seconds if any key is pressed.

If we enter diagnostic mode under these conditions, the keyboard and the screen will stay lit up.

When voltage is also received on +30 (CN1 Pos. 4,5,6,7 and 8) control performs an Auto Check and shows the outputs with an error for a few seconds, if any, and the screen then displays the message SYSTEM STANDBY. The screen and keyboard will be lit up.

Finally, the Ecomaster Clima starts up automatically (AUTO Status) when the vehicle motor and charge alternator starts up (there is voltage above 16 V in CN1 Pos. 9), as long as this has not been manually switched off beforehand. The screen displays the last temperature selected.

The air conditioner will stop running automatically when the alternator signal ceases, that is, when the vehicle motor stops.

5.6 SWITCHING ON AND OFF MANUALLY

The System may be stopped by pressing key (1) for 3 seconds. In this case, it will go to Status OFF and the screen will display the message SYSTEM OFF. It will remain in that state until the key (1) is pressed again, or the voltage +MCS is switched off and on again.

5.7 ANOMALIES WHEN SWITCHING ON

There are a number of reasons why the system may not start up and these are indicated on the Display:

BATTERY LOW	**The power at input +MCS (CN1 Pos.1) is under 22V.**
+30 MISSING	There is alternator signal (CN1 Pos.9) but not +30 (CN1 Pos. 4,5,6,7,8), or the input of +30 is below 22V.
SELECT POT	The System has just been connected to +MCS, and the POT has never been programmed.

5.8 SETTING UP THE AIR-CONDITIONING SYSTEM: POT

The Ecomaster Clima unit is capable of working with various air-conditioning systems depending on the heating elements installed in the vehicle: Roof-mounted heating units, floor-mounted convectors and under-floor heaters. The indication of the type of heating installed in the vehicle is effected through an internal variable called POT.

The ECOMASTER CLIMA contemplates the following values for POT:

POT 1: Serially-installed Roof and Floor heating circuits (Convectors). Floor valve with recirculation pump

POT 2: Only Floor circuit (Convectors). Floor valve and recirculation pump

POT 3: Parallel-installed Roof and Floor heating circuits (Convectors). Roof valve, Floor valve with or without recirculation pump

POT 4: Only roof-mounted heating circuit. Roof Valve

POT 5: Only floor-mounted heating circuit (Underfloor Heaters). With and Without Roof Valve.

5.8.1 AUTOMATIC POT

The ECOMASTER CLIMA is capable of automatically detecting the first 4 heating arrangements listed in the preceding paragraph, for which purpose we have to connect the AutoPot entry (CN4 of the CPU, pin 9) to the GND (CN1 of the CPU, pin 2).

To ensure correct detection, the valves and recirculation pump must be directly connected to the CPU, that is to say, without intermediate relays.

POT	Roof Valve	Floor Valve	Recirculation Pump
1 (FLOOR AND ROOF SERIAL)	NO	YES	YES
2 (ONLY FLOOR)	NO	YES	NO
3 (FLOOR AND ROOF PARALLEL)	YES	YES	INDISTINCT
4 (ONLY ROOF)	YES	NO	INDISTINCT

If none of these arrangements is in force, the system will assume POT=2 (ONLY FLOOR).

When the Ecomaster Clima performs the first Auto Checking, it memorises the components detected and takes that of those components, according to the preceding table, as the POT.

If new charges are detected the next time an Auto Check is carried out, a new POT value will be taken corresponding to the entire amount of the charges detected as per the table above.

If fewer charges are detected, a POT error will be indicated during the Auto Check. (The Error screen will show which heating elements are missing.) This error will be corrected by properly connecting the charges or by removing and restoring the +MCS.

The system always works with the POT value corresponding to the charges that have been detected in the most recent check.

5.8.2 MANUAL POT

If we do not want the system to detect automatically the type of heating installed or if the type of heating installed does not correspond to any of those indicated in the table above, it will be sufficient not to bridge pins 6 and 9 of CN4 on the CPU.

In this case, we will have to indicate to the control unit what type of heating is installed by selecting the appropriate POT variable on the POT Selection screen in the Diagnostic Menu.

The first time the System is powered up, it indicates SELEC POT on the screen and we will have to programme the POT value so that the system can work.

To do so, we enter diagnostic mode by simultaneously pressing the keys (8) + (7) + (5). Remember this must be done in status OFF (air conditioner off). Once in Diagnostic mode, within the Input-Output menu, go to the POT screen to select the appropriate value by pressing and holding the key (6) while increasing the POT value with the keys (8) and (7).

NOTE: Once the POT has been selected, if the air conditioner loses battery voltage, it will not be necessary to input it again, as it is stored in the memory. This must be borne in mind if an Ecomaster Clima CPU is moved from one vehicle to another with different heating configurations. If this is the case, in order for the system to work correctly, the POT must be input manually again for the new installation.

5.8.3 DIAGNOSIS AND DISPLAY

The diagnosis and display menus have been designed to allow installation personnel and technical staff to verify the operation of the components in the passenger air conditioning system following installation of the control unit or during maintenance and repair operations.

The difference between the two menus lies in the fact that the Diagnostic Menu allows each of control unit outlets to be activated independently so that the operation of the different components can be verified separately.

The Display Menu is used to see the status of each of the elements controlled by the Ecomaster Clima, while it is operating in air-conditioning mode, without any interruption in the regulation of the temperature and without any possibility of acting on any of the components (by switching them on or off).

5.8.3.1 DIAGNOSTIC MENU

To enter the Diagnostic Menu, we must first switch off the Ecomaster Clima by pressing the (1) key for 3 seconds. (The screen will display the messages SYSTEM STANDBY or SYSTEM OFF) and we will later simultaneously press the keys (8) + (7) + (5).

There are 5 screens inside the Diagnostic Menu:

Screen	Access Key
Inlets – Outlets.	(3)
Extended temperatures.	(5)
Time counters.	(4)
Errors.	+ (4+6)
Internal variables.	+ + (8+7+6)

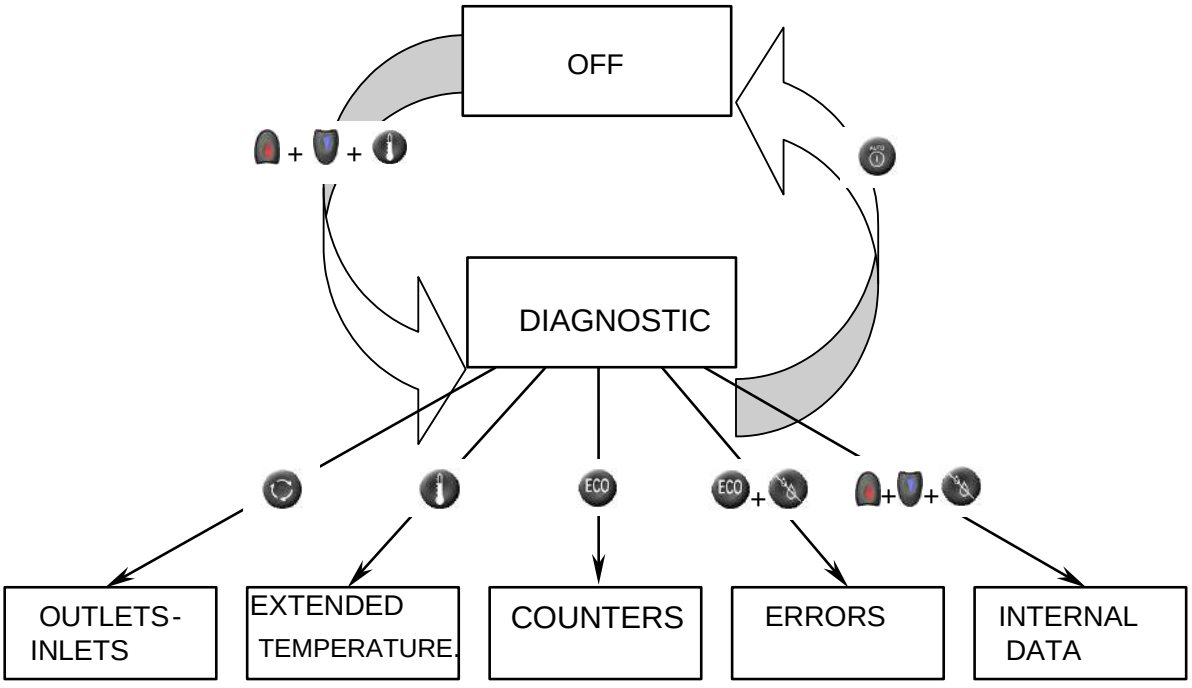
On entering the Diagnostic routine, the first screen encountered is that of INLETS-OUTLETS.

To change from one screen to another, we will use the keys indicated in the preceding table.

To move within the screens of the Diagnostic Menu, we will use the (7) and (8) keys.

In order to change the ON/OFF status of any of the outlets selected, the (2)key should be pressed.

To exit the Diagnostic Menu (from any of its screens), pressing the (1)key will take us back to OFF status in which the Ecomaster Clima remains inactive.


OFF
DIAGNOSTIC
ECO
ECO
OUTLETS-
INLETS
EXTENDED
TEMPERATURE.
COUNTERS
ERRORS
INTERNAL
DATA

5.8.3.2 INLETS-OUTLETS

Once in the Diagnostic Menu, select the desired outlet to be enabled or disabled by moving with the (7) and (8) keys, and then press the (2) key to turn this on or off.

In diagnostic mode, it is possible to enable or disable the outlets through the keypad, apart from consulting other variables.

Keep in mind that the outlets for evaporator and condenser blowers could be PWM or relay outputs. In case PWM output is connected to the blowers, the outlets to be tested are RB EVAP and LBEVAP for evaporator and CONB for condenser. In case of relay outputs, the outlets to be tested will be EVAP1, EVAP2 and EVAP3 for evaporator and CND for condenser.

INLETS/OUTLETS	MESSAGE	POSSIBLE VALUES	ERROR INDICATORS
EVAPORATOR VENTILATORS SPEED 1	EVAP.1	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing
EVAPORATOR VENTILATORS SPEED 2	EVAP. 2	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing
EVAPORATOR VENTILATORS SPEED 3	EVAP. 3	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing
RIGHT ADJUSTABLE EVAPORATOR VENTILATORS	RB EVAP.	0,1,2,3	SHORTED There is a short circuit NO CONEC Not connected ?+30 +30 is missing
LEFT ADJUSTABLE EVAPORATOR VENTILATORS	LB EVAP.	0,1,2,3	SHORTED There is a short circuit NO CONEC Not connected ?+30 +30 is missing
CONDENSER VENTILATORS	CND	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing
ADJUSTABLE CONDENSER VENTILATORS	CNDB.	0,1,2,3	SHORTED There is a short circuit NO CONEC Not connected ?+30 +30 is missing
COMPRESSOR	COMP	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected.

ROOF VALVE	RV VAL	CLOSED (V1+=24 V, V1-=0 V) OPEN (V1+=0 V, V1-=24 V)	SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected.
FLOOR VALVE or HEATER SPEED 1	FV VAL. C1 HEATER	CLOSED (V2+=24 V, V2-=0 V) OPEN (V2+=0 V, V2-=24 V) ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected. SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected.
RECIRCULATION PUMP or HEATER SPEED 2	FP PUMP C2 HEATER	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected.
MAIN PUMP	MP PUMP	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing
RECIRCULATION FLAPS	RC FLAP	RECIR (TR+=24 V, TR-=0 V) FRESH (TR+=0 V, TR-=24 V)	SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected.
DEMISTER FLAP CLOSURE	DEMIST AIR RC DFR	RECIR (24 V) FRESH (0 V)	SHORTED There is a short circuit

			?+30 +30 is missing
STEP HEATER SPEED 1	SI HEATER	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected.
STEP HEATER SPEED 2	S2 HEATER	ON (24V) OFF(0V)	SHORTED There is a short circuit ?+30 +30 is missing If an N appears, this means it has not been detected.
GAS CHARGE	GAS CHARGE	ON OFF	
HP PRESSURE GAUGE INLET	HP	24V 0V	
LP PRESSURE GAUGE INLET	LP	24V 0V	
DOOR OPEN	DO DOOR	OPEN (24V) CLOSED (0V)	
DOOR CLOSURE	DC DOOR.	ON (24V) OFF(0V)	
AIR-CONDITION ARRANGEMENT	POT.	0,1,2,3,4,5	
ALTERNATOR INLET	ALTERNAT	YES (>22V) NO (<22V)	
POWER SUPPLY +30	+30	YES (>22V) NO (<22V)	
BATTERY POWER	BATTERY	REAL VALUE IN VOLTS	
TEMPERATURE SCALE	º CENT º FARH		
HARDWARE-SOFTWARE VERSION	SOFT XX.X HARD YY.Y		
LANGUAGE SELECTION	ENGLISH ESPAÑOL		

Some of the outlets are detected automatically and an N will appear if these are not detected.

5.8.4 EXTENDED TEMPERATURES

On the extended temperatures screen it is possible to see the temperature values on all of the sensors in the Ecomaster Clima and the return values from the roof heating and floor heating valves if these are remotely operated.

INLET	MESSAGE	VALUES
Interior Temperature	INT	XX.X ºC SHORTED There is a short circuit NO CONEC Not connected
Exterior Temperature	EXT	XX.X ºC SHORTED There is a short circuit NO CONEC Not connected
Channel Temperature	CHN	XX.X ºC SHORTED There is a short circuit NO CONEC Not connected
Ice Temperature	ICE	XX.X ºC SHORTED There is a short circuit NO CONEC Not connected
Roof Valve Return	RV RET	Return Voltage
Floor Valve Return	FV RET	Return Voltage

5.8.5 TIMES COUNTERS

There are 11 counters.

We can press the  (8) and  (7) keys to move up or down through the list of counters.

COUNTER	MESSAGE	VALUES
Compressor	COMP	CMP
Evaporator Ventilator Speed 1	VENT1	EVAP. 1
Evaporator Ventilator Speed 2	VENT2	EVAP. 2
Evaporator Ventilator Speed 3	VENT3	EVAP. 3
Condenser Ventilator	VENTC	CND
Step Heater Speed 1	STEP1	S1 HEATE
Step Heater Speed 2	STEP2	S2 HEATE

Main Pump	MAIN PUMP	MP PUMP
Recirculation Pump or Heater Speed 1	Re Circ PUMP HEATER1	FP PUMP C1 HEATE
Floor Valve or Heater Speed 2	FLOOR VALVE HEATER2	FV VAL C2 HEATE
Roof Valve	ROOF VALVE	RV

We can delete a counter by moving the cursor over it and keeping the  (2) key pressed until it is deleted.

5.8.5.1 ERRORS

The Errors screen shows those inlets or outlets that have an error with the same messages as on the INLETS – OUTLETS screen.

If there are no errors, it will display the NO ERRORS message.

In the case of a POT error, it will indicate what elements were present before and are now not detected. The indication given will be as per the following codes.

RV => Roof Valve
FV => Floor Valve
FP => Recirculation Pump

5.8.5.2 INTERNAL DATA

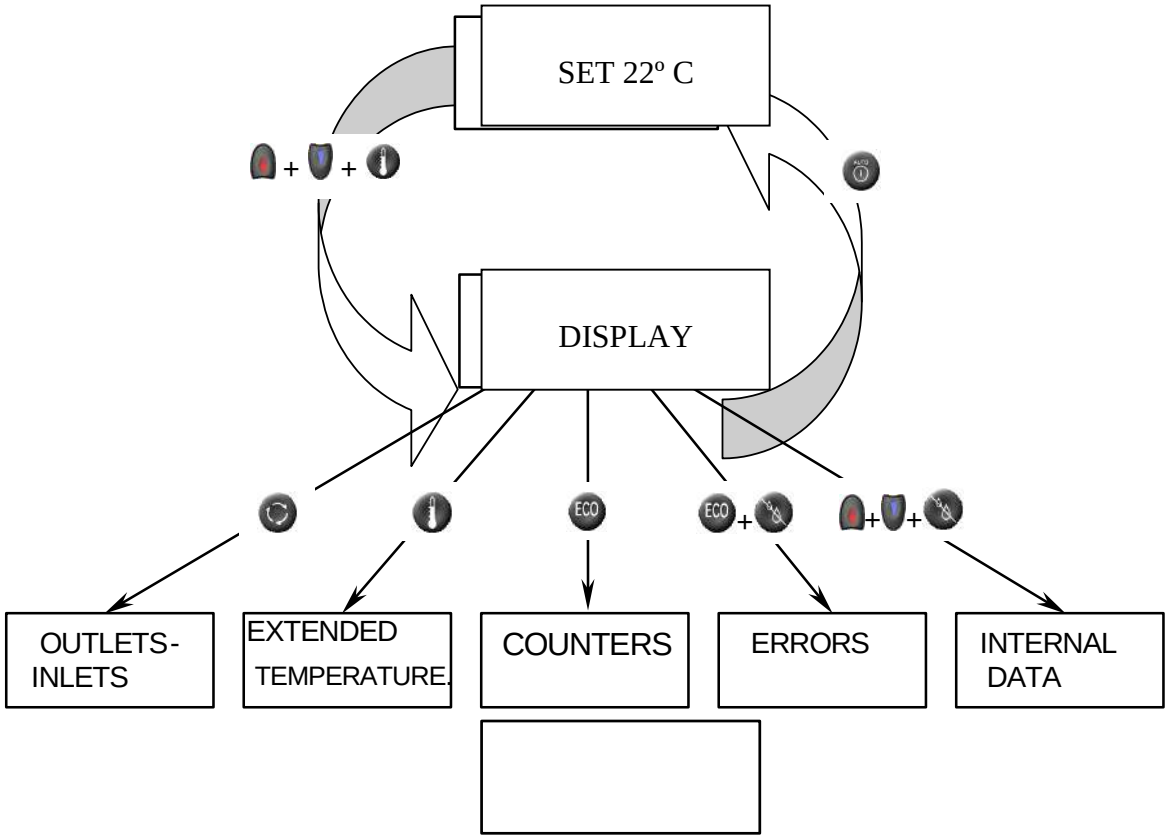
DATA	MESSAGE	VALUE
PWM1 Return Outlet	DATA1	XX.XXX voltage with millivolts
PWM2 Return Outlet	DATA2	XX.XXX voltage with millivolts
PWM3 Return Outlet	DATA3	XX.XXX voltage with millivolts
Internal Variable	DATA4	CAL,VEN_AC,AC, VEN_INI,VEN_CAL, CALD,ACD
Internal variable	DATA5	XX.X
Voltage	DATA6	XX, voltage with tenths of a volt
Internal variable	DATA7	XXX.X
Internal variable	DATA8	XXX.X

We can press the (8) and (7) keys to move up or down through this list.

5.8.6 DISPLAY MENU

The display function helps to see, during operation, the same screens as in diagnostic mode but without the possibility of changing the state of any of the outlets.

To enter the Display Menu, we will press the (8) and (7) keys on the SET screen.



5.9 SPECIAL FUNCTIONS

5.9.1 REHEAT

Reheating is the process of dehumidifying the air in the passenger compartment. It is activated via the keypad and lasts for 15 minutes. This is indicated on the display with the REHEAT message.

This can be implemented if the air conditioning under way is not the default mode (due to a probe error) or if the type of heating available is different from types POT 2 and POT 5, that is to say, if roof heating is installed.

To activate Reheating, the system switches on the compressor and roof heating simultaneously.

The recirculation flaps remain open. If the Evaporator Speed is less than 2, the control unit sets Speed 2.

Ice detection is disactivated and if disconnection of the compressor is detected by the low presostat, that error is not shown on the screen.

5.9.2 LOW BATTERY

Detection of the battery voltage is performed at the input of +MCS (CN1 Pos. 1).

When the voltage is lower than 22 V, the air conditioner goes to OFF Status and the screen shows the message BATTERY LOW.

5.9.3 DETECTION OFFICE IN THE EVAPORATORS

Whenever the Ice Sensor measures 2ºC or less for one minute, the StopIce function is activated and this will stop the compressor.

StopIce will disappear when the Ice Sens or marks Set -5ºC or more.

The ICE message (StopIce) can be viewed in extended temperature mode. (Display of temperatures from Display)

StopIce is disabled if REHEAT is on.

5.9.4 HIGHERROR (HP), LOWERROR (LP), STOPLOW

The low and high pressure switches returns from the compressor are in series. First comes the High pressure and then the Low pressure. In this way, if the compressor is turned on and there is no High pressure return, there will not be any return from the Low pressure either and the error will show High. If there is no Low pressure return but High is present, then the error is due to Low pressure.

It is possible to connect both of them or either one. If only of them is connected, it must be connected to the LOW pressure inlet.

ErrorHigh

If disconnection of the high pressure switches is detected for 15 seconds, ErrorHigh (HP) is activated. No message appears on the screen.

The error is disactivated when the high pressure switches is reconnected and the compressor need not be on.

When the high error is detected, the control increases the speed of the condensor motors, as long as they are not working at maximum speed. This only happens if the condenser motors have speed regulation electronics by PWM.

ErrorLow

If 3 brief disconnections of the low pressure switches are detected within a one minute period, ErrorLow (LP) will be activated and the compressor will stop for three minutes.

If disconnection of the low pressure switches lasts more than 30 seconds, the ErrorLow (LP) will also be activated, but in that case, it will not cancel the compressor output.

As we may see, detection of an ErrorLow (LP) does not always disactivate the compressor output, although the screen does show the message LOW-PRESS.

If there is a sole return to the two pressure switches connected to the LOW intake, the message will be shown on the screen in the event of disconnection of either of the pressure switches being HP-LP.

5.9.4.1 DOOR CLOSURE

When door closing is detected (0V in CN1 pos.20) the recirculation flaps close, preventing entrance of exterior air and enabling the coach doors to close.

If the signal lasts more than 25 seconds, it is taken as erroneous and the recirculation flaps cease to be forced into their recirculation position.

5.9.4.2 ECO

The Eco option prevents the compressor from being turned on even if this is requested by the System.

It is enabled by pressing the 

(4) key. It is disabled by pressing the 

(4) key again or the 

(1) key.

If Dehumidification is activated, the ECO option cannot be turned on.

When the Eco mode is activated, the word ECO will be shown on the screen.

5.9.5 FLAP INVERTER RELAY OR MOTORIZED FLAPS

If the flaps are activated by an electric motor, it must be connected to the outlets TR+ and TR- (CN3 pos. 1 and 9) and it will thus be detected by the control unit which will cut off the voltage 15 seconds after the flaps are in position so as to protect them from overheating.

If no drive unit is detected, the control unit does not cut off the voltage after the 15 seconds are up, thus allowing the use of the inverter relay.

5.9.6 ACTION IN THE CASE OF A SHORT CIRCUIT IN THE OUTLETS

ON/OFF outlets

The Outlets SAL1 to SAL9 are ON/OFF outlets

If one of these outlets is directly set to positive, the System will detect a short-circuit in this outlet. It will disable the outlet for 5 seconds, and then it will try to connect it again.

Outlets +/- (Motors)

The paired outlets TR1+ and TR1-, V1+ and V1-, V2+ and V2- are referred to like this.

If one of these outlets is connected to positive, the System will detect a short-circuit in this outlet when an attempt is made to set it to negative or vice versa. It will switch the outlet to OFF for 5 seconds, and then it will try to activate it again.

PWM Outlets

This is the naming of the outputs PWM1, PWM2, PWM3.

If one of these outlets is connected to positive, the System will detect a short-circuit. It will disable the outlet for 5 seconds and then it will try to connect it again.

5.10 CHECKING TEMPERATURE SENSOR

All the Ecomaster Clima temperature sensors are of type PTC1000.

To check they are working, use the attached table that shows the relation between temperature and resistance that must be measured across the sensor terminals.

Temperature ºC	Resistance Ohms
-30	624.00
-20	684.00
-10	747.00
0	815.00
10	886.00
20	961.00
30	1040.00
40	1122.00
50	1209.00
60	1299.00
70	1392.00
80	1490.00

For values not shown on the table, interpolate between the nearest figures. The measurement range of the sensors is–30ºC to +80ºC.

5.11 TECHNICAL CHARACTERISTICS

5.11.1 CPU CHARACTERISTICS

Characteristic	VALUE
Power supply	Vdc=16-32Vdc
Consumption	25A Protection with a 30 A fuse
Mounting	Surface
Working range	-40ºC to 85ºC
Storage	-40ºC to 85ºC
Temp. Probes	PTC (1000 Ohms 25ºC)
Temp. Probe Range	-30ºC to 95ºC
Temp. Precision	±1ºC
Temp. Resolution	0.1ºC

Digital inlets	4 active at a voltage of 0V, Maximum Vdc Voltage 2 active at Vdc Voltage, Maximum Vdc Voltage
Digital outlets	4 x 1A Outlets 3 x 1A outlets for motors (+-/-+) 5 x 0.5A, 2.5A, 8A, 10A outlets
PWM Outlets	4 PWM 0.1A outlets.
Connections	4 *Junior Power Timer* connectors, with 6, 9, 12 and 21 pins
Communication	Programming and Follow-up: 2-wire RS485 up to 1000 meters Display and Follow-up: 3-wire Loop up to 10 meters Other Communications: CAN 2.0B
Interface	8-key silicone keypad.

5.11.2 DISPLAY CHARACTERISTICS

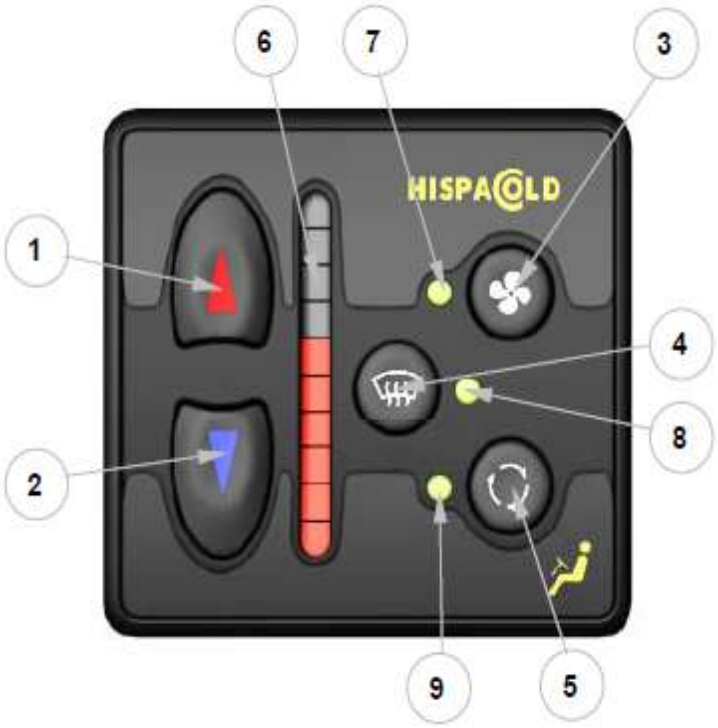
Characteristic	**Value**
Power supply	Vdc= 8 – 10 Vdc
Consumption	350mA
Mounting	Inserted into an opening
Working range	-40ºC to 85ºC
Storage	-40ºC to 85ºC
Display	LCD display with 2 lines of 8 characters, Yellow-Green with backlighting Transflective. Viewing angle 12. Temperature range 0-50ºC
Digital inlets	2 active at Vdc Voltage, Maximum Vdc Voltage
Digital outlets	1 x 0.5A Outlet
Communication	CPU Connection 3-wire Loop up to 10 meters
Interface	5.11.2.1.1.1.1.1 8-key silicone keypad. **Double UP-DOWN** **AUTO-ON** **RECIRCULATION** **VENTILATOR SPEED** **TEMPERATURE** **REHEAT** **ECO** LEDs: 1: **Auto**

5.12 ECOMASTER BASIC D

5.12.1 DESCRIPTION OF OPERATION

Ecomaster Basic D is a heating control for the driver that allows, through its keypad, the handling of the following elements:

- Air propulsion temperature (through the water valve).
- Ventilation speed.
- Grilles for internal/external air.
- Grilles for feet/windscreen.



The control consists of 5 keys for the selection of the different functions, a bar of leds for the indication of the temperature level required and three leds or light indicators to signal the activation of the different elements.

By pressing key  (1) the selected temperature for the propulsion air increases. Each keystroke increases this temperature.

By pressing key  (2) the selected temperature for the propulsion air decreases. Each keystroke decreases this temperature.

The key  (3) is used to vary the speed of the air propelled by the anti-condensation fans. There are two air speeds that are indicated by the colour of led No. 7.

The state of the fans varies according to the key pressed  (3): stopped (led off), minimum speed (led shows green), maximum speed (led shows red) and so on.

The key  (4) is optional and it is not present in all the items in the Ecomaster Basic D family. It is used in order to place the anti-condensation grilles so that air propulsion goes to the feet or to the windscreen. If led No. 8 is off, this means that the air is directed to the windscreen, if it is showing red it means that the air goes to the feet.

In order to handle the grille selecting the inlet of the outside fresh air, key  (5) must be pressed. If led No. 9 is showing green, the grille will be placed so that the inlet of external air is allowed. On the contrary, if led No. 9 is red, the air will be re-circulating from inside the vehicle.

The Ecomaster Basic D control will automatically close the air grilles leaving them in re-circulation position (led No. 9 showing red) in case the temperature control for passengers requires the activation of air conditioning. Nevertheless, the driver can open the grilles again by hand and leave them in renewal position (led No. 9 showing green) by pressing key  (5).

The control turns off each time the electricity supply is interrupted, through the general switch disconnection, and the activation of any outlet is impossible. As soon as it is powered on, it will turn on in the same conditions when it was turned off, that is to say, it remembers the previous state of all of the outlets.

5.12.2 ERROR DETECTION AND WARNING

The Ecomaster Basic D control panel includes a sophisticated system for error detection and warning.

Each time the control is powered on, it carries out an automatic check of all the outlets.

If any problem is detected with the power supply during the following 12 seconds, it will show the detected error through the flashing of one of the leds in the led bar No. 6. (See error table)

After any error warning, the control panel will activate those outlets which were free of errors.

In addition to error warning during the initial starting process, it is possible to check the detected errors by pressing the keys  (1) and  (2) simultaneously.

There is another form of failure warning through the flashing of leds 7, 8 and 9 in the following way:

If there is a short circuit in the outlet for minimum speed, maximum speed will begin functioning and led No. 7 will flash green.

If there is a short circuit in the outlet for maximum speed, minimum speed will begin functioning and led No. 7 will flash red.

If there is a short circuit in the feet-windscreen grilles outlet, led No. 8 will flash.

If there is a short circuit in the outlet of external/internal air grilles, led No. 9 will flash.

A table with error codes for each of the outlets is shown below:

The column marked LED shows the led from the led bar No. 6 to be illuminated in order to show the corresponding error. Led No. 1 corresponds to the lower led of the led bar.

LED	ERROR
1	Indicates that valve calibration is under way.
2	Outlet of short-circuited grounded pump.
3	Minimum speed outlet of fans connected due to failure to positive power supply.
4	Minimum speed outlet of fans short-circuited to ground.
5	Maximum speed outlet of fans connected, due to failure, to positive power supply.
6	Maximum speed outlet of fans short-circuited to ground.
7	PWM outlet connected, due to failure, to positive power supply.
8	PWM outlet short-circuited to ground or without connection. (This error is shown after the initial check).
9	Error in the outlet of the re-circulation grille.
10	Error in the outlet of the feet-windscreen grille.
11	Error in the outlet of the water valve.
12	Error in return to position of valve (emergency mode).
13	Internal error.

Error table.

5.13 FAMILY RANGE

The Ecomaster Basic D family comprises two models whose main difference is that one of them has an additional push-button that allows action on the grilles directing air to the feet or the windscreen.

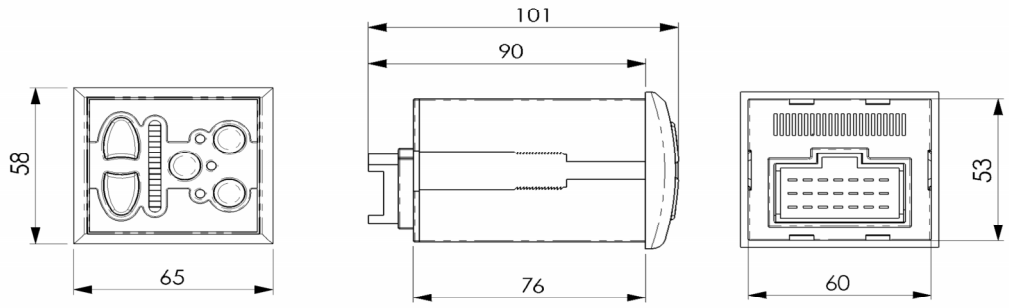
Items in the Ecomaster Basic D family:

Reference	Water Valve		Renewal grille		Windscreen grille	
	24V	12V	24V	12V	24V	12V
3200700	•		•		•	
3200736	•		•			
3200737		•		•		•
3200738		•		•		

5.14 UNIT INSTALLATION

For the installation of the unit, it is necessary to prepare a 60.5 x 53.5 mm hole.

The measurements are shown as follows:



On the rear of the unit there is an AMP Timer Power Junior connector with 21 pins, ref. AMP 966140-6. The connector to be used in the electrical installation is that with ref. AMP-1-0967625-1. The receptacle terminals have ref. AMP 927775-3.

5.15 ELECTRICAL WIRING

The connection to each of the pins of the rear connector of the unit is described below:

Pins numbering is according to figure 5.1.

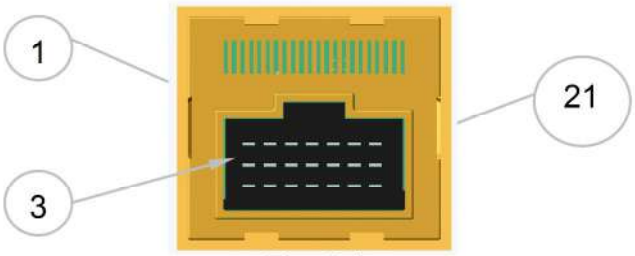


Fig. 5.1

Pin	Name	Description	V	I Nom	I Max	L Max
1	+30	Positive Power Supply (Vdc)	16-32 V	7 A	25 A	-
2	+30	Positive Power Supply (Vdc)	16-32 V	7 A	25 A	-
3	+30	Positive Power Supply (Vdc)	16-32 V	7 A	25 A	-
4	V2	V2 fans	0-Vdc	15 A	80 A	5 mH
5	+30	Positive Power Supply (Vdc)	16-32 V	7 A	25 A	-
6	GND	Power supply ground (GND)	0V	5 A	5 A	-
7	V1	V1 fans	0-Vdc	10 A	40 A	5 mH
8	RVAL+	Return Valve Pos. Power Supply.	12V	5mA	5mA	-
9	RVAL+	Return Valve Position	Vdc	-	-	-
10	PUMP	Pump	0-Vdc	3.5 A	40 A	10 mH
11	RVAL-	Ground Return Valve Pos. (GND)	0V	5 A	5 A	-
12	FLPIN	Grilles closing (with AA)	Vdc	-	-	-
13	PWM	Fans with speed regulation through PWM	0-Vdc	100 mA	3 A	-
14	FLP2-	Windscreen grille – 12V/-24V	0-Vdc	1 A	2 A	-
15	FLP2+	Windscreen grille +12V/+24V	0-Vdc	1 A	2 A	-
16	FLP1-	Re-circulation grille –12V/-24V	0-Vdc	1 A	2 A	-
17	FLP1+	Re-circulation grille +12V/+24V	0-Vdc	1 A	2 A	-
18	VAL+12 VAL+12NC	Motorized valve +12V Positive valve ON/OFF Norm. Closed 12V	0-12 V	1 A	2 A	-
19	VAL+24 VAL+24NC	Motorized valve +24V Positive valve ON/OFF Norm. Closed 24V	0-Vdc	1 A	2 A	-
20	VAL-24 VAL+24NO	Motorized valve -24V Positive valve ON/OFF Norm. Open 24V	0-Vdc	1 A	2 A	-
21	VAL-12 VAL+12NO	Motorized valve -12V Positive valve ON/OFF Norm. Open 12V	0-12 V	1 A	2 A	-

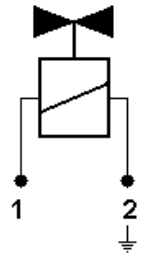
Notes:

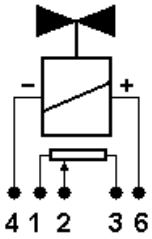
- Providing the rated intensity allowed is not exceeded for each of the outlets, the installation of relays will not be necessary.
- I Max is the maximum intensity admitted in that outlet during a period of less than 250 ms. (Starting peaks)
- L Max is the maximum inductance admissible for normal intensity.
- The unit must be protected with a 25A fuse in case of using an outlet directly to engines with brushes and a 10A fuse for engines with a speed control through PWM.
- When any of the terminals from No. 6 to 11 (GND) is already connected to ground, the introduction of a voltage different to 0V DC in any of the other GND will destroy the control.
- If the speed control for fan engines is through PWM, the use of pins 1 and 2 for power supply is enough. If the control is through direct activation it is necessary to connect pins 1, 2, 3 and 5 for power supply.
- Depending on the reference, grilles and valve control will be 12V or 24V. In the case of the valve, only the corresponding outlets will be operative (pins 18 and 21 for 12 V, and pins 19 and 20 for 24V).

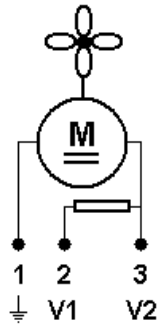
5.16 CONNECTION OF THE ELEMENTS TO BE MONITORED

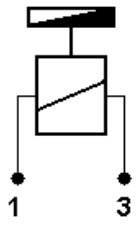
As a summary, the possible wiring diagrams for each of the elements are shown below:

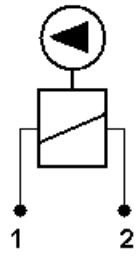
Element	Valve type	Connection	Comments
Solenoid valve ON/OFF	Normally open (NO) 12Vdc	Connect 1 to pin Nº 21 Connect 2 to GND	The valve works in 8-second cycles and from these it will be opened 0.5 seconds for each led illuminated on led bar No. 6. The remaining time up to 8 seconds, it will be
	Normally closed (NC) 12 Vdc	Connect 1 to pin Nº 18 Connect 2 to GND	
	Normally open (NO) 24 Vdc	Connect 1 to pin Nº 20 Connect 2 to GND	
	Normally closed (NC) 24	Connect 1 to pin Nº 19	

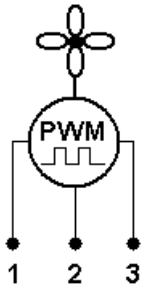
	Vdc	Connect 2 to GND	closed.

Element	Valve type	Connection	Comments
Motorized valve 	12V	Connect 4 to pin Nº 21 Connect 6 to pin No. 18 Connect 1 to pin No. 8 Connect 2 to pin No. 9 Connect 3 to GND	The valve moves only each time the number of illuminated leds on led bar No. 6 is changed. Once the position is reached, it will remain still and without voltage.
	24V	Connect 4 to pin No. 20 Connect 6 to pin No. 19 Connect 1 to pin No. 8 Connect 2 to pin No. 9 Connect 3 to GND	

Fan 	Two speeds with direct power supply (without relay)	Connect 1 to GND Connect 2 to pin No. 7 Connect 3 to pin No. 4	While there is voltage in the corresponding terminal to V2, there is also voltage in V1.

Element	Grille type	Connection	Comments
Grille engine 	Feet-Windscreen 12 or 24 Vdc	Connect 1 to pin No. 14 Connect 3 to pin No. 15	The engine moves until it reaches limit position. 6 sec. After that, it stops having voltage in its terminals.
	External air. 12 or 24 Vdc	Connect 1 to pin No. 16 Connect 3 to pin No. 17	

Element	Type	Connection	Comments
Water pump.  		Connect 1 to GND Connect 2 to pin No. 10	It is automatically connected when selecting 3 or more illuminated leds from the led bar No. 6.

Element	Fan type	Connection	Comments
Fan  	Two speeds with regulation through PWM.	Connect 1 to GND Connect 2 to pin No. 13 Connect 3 to 24 Vdc.	

5.17 CHECKING OF OPERATION

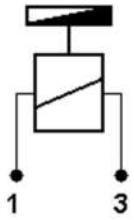
In order to check the correct operation of the outlets it is possible to carry out the diagnosis manually as stated in the chapter concerning error detection and warning.

In case you want to check if there is voltage at any of the outlets, the following must be taken into account:

- The use of a lamp is not suitable for checking outlets from No. 13 to 21 as it may activate the internal detection of short circuit if the consumption of the lamp is higher than the maximum intensity admissible in the corresponding outlet.
- In the case of grille engine outlets, voltage is present in the outlet up to 6 seconds after the movement has been completed, this is done as a protective measure for the mechanical elements of the engine. Due to this, once these 6 seconds have passed, it will not be

possible to read any voltage in the corresponding pin, although this does not mean that there is any problem.

- The grille engines and the motorized valve change spin direction when the electronics change the polarity of the outlets connected to them, that is to say, in order for them to turn in one direction pin 1 is put to 24V and pin 3 to 0V, and in order for them to turn in the other direction, this is inverted by applying 0V to pin 1 and 24V to pin 3.



- Due to this fact, it is not possible to detect the short circuit to ground of the pin set to 0V, nor the accidental connection to positive of the pin which in that moment is at 24V. For this reason, the detection and warning of short circuits of grille engines is only carried out when the engine is turning in either direction.
- For the motorized valve, the control will only provide outlet and can therefore be detected during movement. Once the corresponding position of the user's selection has been reached, the outlet will be turned off until a new position change is required.

The control identifies a valve as motorized when it can read the return of the motor potentiometer at pin No. 9. If no voltage is detected at this pin, it is assumed that the connected valve is of the ON/OFF type. The effect on the valve is that it will alternately turn in one direction and the other.

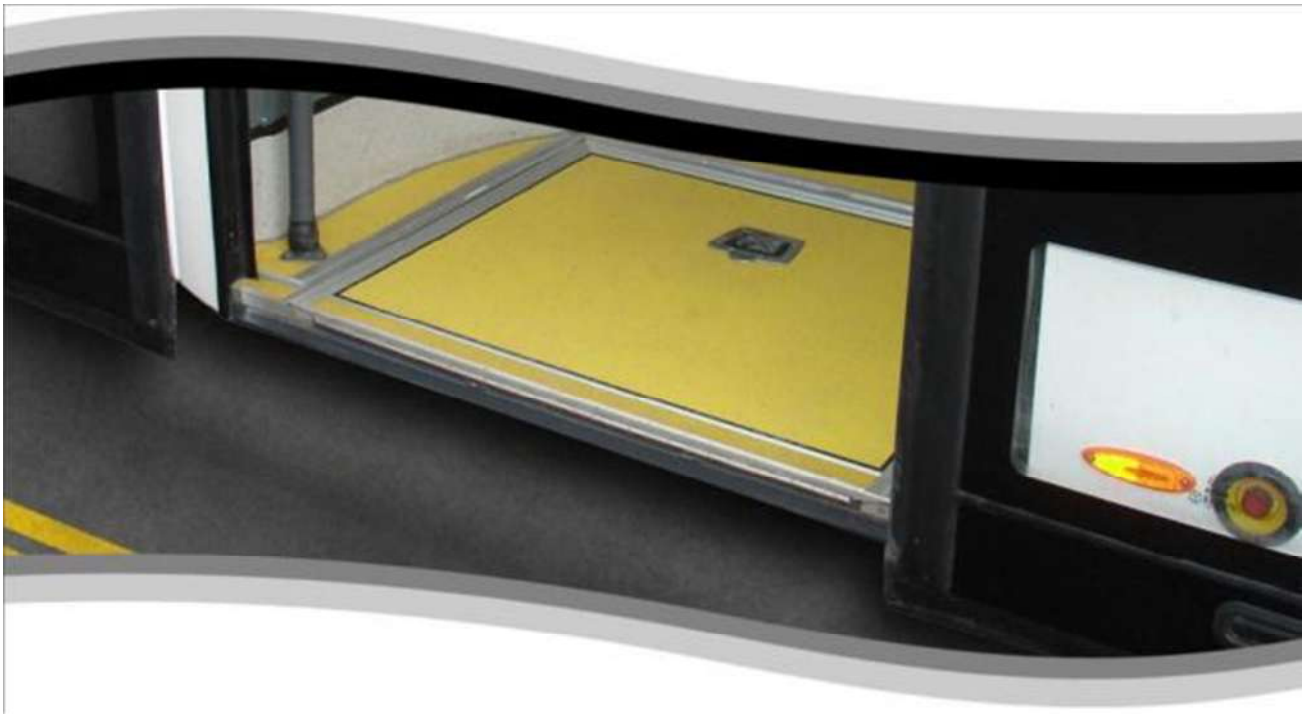
In the case of a short circuit in outlet 13 of speed regulation (PWM), a speed change will not be possible. If the short circuit is to ground, fan engines will remain stopped, led No. 7 reporting fan speeds will not change colour and will not flash. If the accidental connection of outlet 13 is to positive, the fans will remain working at maximum speed without being able to change and led 7 will not flash.

If error No. 13 on overheating is detected, the control will cancel the corresponding outlet to the water pump if it is active and the speed outlet selected in that moment (except if engines with PWM speed control are used). The led indicator of the selected speed will flash in order to warn of an error.

5.18 TECHNICAL CHARACTERISTICS

Power supply	24 VDC (16-32V DC) 4 power supply inlets
Maximum consumption	25 A for engines with direct activation 10 A for engines controlled through PWM
Digital inlets	1 active at 12/24V
Analogue inlets	1 position return of motorized valve
Outlets	1 ON/OFF 3.5A outlet (pump) 1 ON/OFF 10A outlet (V1 fans) 1 ON/OFF 15A outlet (V2 fans) 3 +-/-+ 1A outlets (re-circulation grille, windscreen grille and valve). 1 PWM 100 mA outlet (PWM fans). 1 12-V outlet for the power supply of valve return.
Indicator leds	1 bar with 16 red leds indicating heat quantity 1 green/red led indicating air speed 1 green/red led indicating the position of re-circulation grilles 1 red led indicating the position of the feet/windscreen grilles
Keyboard	5 or 4 illuminated silicone keys
Working range	-20 ºC to 85 ºC
Storage	-20 ºC to 85 ºC
Connections	1 AMP connector, Junior Power Timer series, with 21 pins (references: Control 966140-6, Installation 1-0967625-1 Receptacle terminal 927775-3)

6 MANUAL RAMP



6.1 TECHNICAL FEATURES

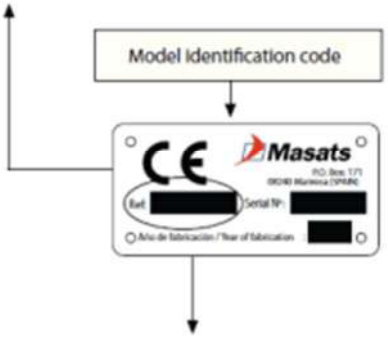
Ramp for city buses	
Driving:	Manual
Weight:	30Kg
Static load:	375 Kg. Maximum load capacity
Supply voltage:	24V. DC by inside/outside ramp sensor
Safety:	Handhold lock/unlock
Install:	Integration into the floor of the vehicle

6.1.1 INSTALLATION

All the ramp elements will be integrated into the floor of the vehicle once installed within the defined dimensions so that no part will remain outside. For better control of the ramp and for ease of operation, the handhold has a key locking mechanism. Said locking prevents use of the handhold, thus preventing third parties from activating the ramp.

6.1.2 SENSOR

The ramp incorporates a sensor on the fixed platform which fully controls the ramp position. The sensor is powered by the car battery. To ensure its proper functioning the voltage should be 24V.



6.1.3 IDENTIFICATION CODE

There is a CE normative identification plate on the inside mobile platform where the code “Ref.” is the model. Available in case of spare parts.

6.2 INTRODUCTION

This manual contains information for safe use of the RM2 access ramp for persons with reduced mobility.

This manual should be read and understood to know the HAZARDS, SAFETY ELEMENTS, instructions for use… before using the ramp.

Safe operation of the ramp is paramount. It is the operator's responsibility to understand and operate the ramp in a correct and safe manner.

The best way to become familiar with its operation is to practise as operator and as user. In this way one learns what it is like to use the ramp.

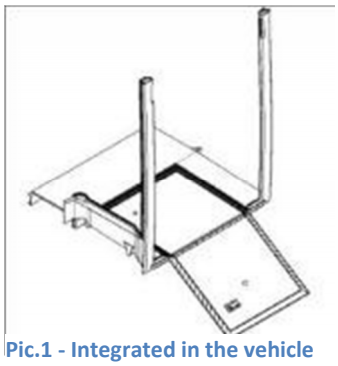
In addition, this manual contains the instructions and conditions necessary to install the RM2 ramp. Please follow these instructions carefully and if you have any query you can call MASATS S.A. technical service. Follow all the steps described from start to finish and do not modify or dismantle any part of the ramp.

1. Read and understand the instructions described in this manual.
2. Do not allow persons that have not received adequate training or that have not read this manual to install the ramp.
3. Ensure that the vehicle battery is disconnected when connecting to the power supply.

6.2.1 DESCRIPTION OF THE SYSTEM

The RM2 ramp is a mechanical system that is activated manually. In this model, there are the products with references 32829xxx. The system comprises 5 functional parts which in tandem are the main assembly units.

- Fixed platform
- Mobile platform
- Inside/ outside ramp sensor
- Handhold
- Finishing strips



Pic.1 - Integrated in the vehicle

All the ramp elements will be integrated into the floor of the vehicle once installed within the dimensions defined in the technical specifications, so that no part will remain outside the device itself. (Pic.1) The ramp sensor is powered by the car battery and to ensure its proper functioning, the voltage should be 24V.

6.2.2 FUNCTIONAL GROUPS

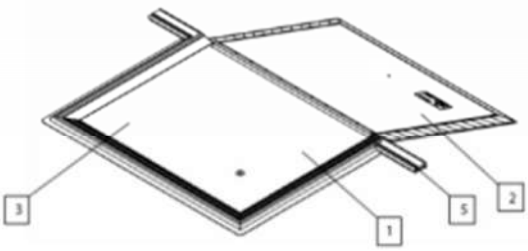
1. Fixed platform: Part of the ramp always located in the vehicle interior. Used to fix the device to the vehicle whilst also ensuring good integration of ramp with ground when opened out.

2. Mobile platform: Only mobile part of the ramp. A hinge fitting allows the mobile platform to pivot and open out through the door. This manual operation is performed by hand.

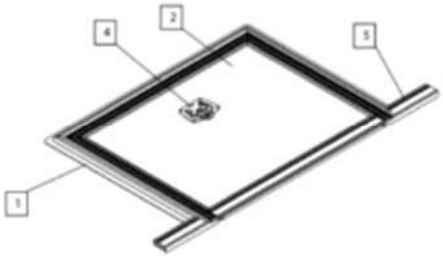
3. Inside/ outside ramp sensor: Electro-mechanical unit which fully controls the ramp position.

4. Handhold: Fixed to the mobile platform, this handle facilitates effortless and ergonomic operation of the ramp.

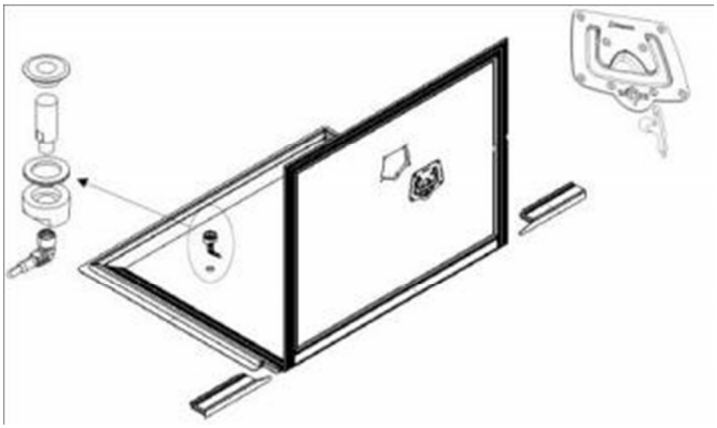
5. Finishing strips: These ensure optimum signage in the access area whilst also lending aesthetic appeal to the device.



Ramp opened out



Ramp folded away



Functional groups

6.2.3 ASSOCIATED SENSOR SYSTEM

An inductive type sensor in the device's fixed platform is used to control the ramp position, indicating the status of the ramp at all times (open or closed).

This sensor detects the proximity of the mobile platform to the fixed platform giving a signal at approx. 10 mm. or less distance. Operation N.O

6.2.4 ASSEMBLY AND INSTALLATION

Before proceeding with assembly and installation of the RM2 ramp, it is important to read and understand this manual to know the HAZARDS, SAFETY ELEMENTS, instructions for use, controls and all the information included.

In like manner, when handling equipment, the minimum safety requirements should be met in accordance with the minimum workplace health and safety regulations and the appropriate safety equipment (safety boots and gloves) and tools should be used.

Follow these instructions carefully and if in doubt call MASATS S.A. technical service. Follow all the steps described from start to finish and do not modify or dismantle any part of the ramp.

Improper assembly and installation of the system can cause operating problems and even hazards and injury to users, operators and third parties.

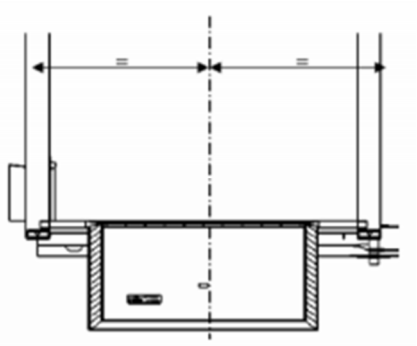
6.2.5 ASSEMBLY AND INSTALLATION REQUIREMENTS

Before commencing assembly and installation of the RM2 ramp, please check that the following requirements are met:

- The minimum dimensions of the vehicles structure where the ramp will be located are in the section 2.1, vehicle compartement width x vehicle compartement length.
- The useful width of the access in which the ramp is to be situated should be more than 1000mm.
- The ramp should be positioned so that there is no obstacle to the platform opening out.
- Ensure that the vehicle floor (timber) is not thicker than that of the device. (20 mm)
- The vinyl flooring (PVC floor) to be used should be no thicker than 2 mm.
- The structure which will hold the ramp should allow the fixed platform to be anchored and fixed along the perimeter of the base plate.
- Said structure must enable the most level placement possible of the device. Ensure there are no protruding elements that might interfere with level placement of the ramp.
- The ramp should be situated so that, respecting the dimensions of the preceding points, there is not obstacle impeding the proper functioning of the ramp.
- It is recommended that assembly and fixing of the ramp be commenced before installing the floor.
- The vehicle's power supply should be prepared to power the sensor correctly at 24 VC and for receipt of the output signal of said sensor.

At this point, position the device in the ideal/ desired location and check that it is working properly. Also check the sensor position to ensure that it does not interfere with the chassis. If any problem is identified at this stage please contact MASATS S.A technical support service.

6.2.6 ASSEMBLY

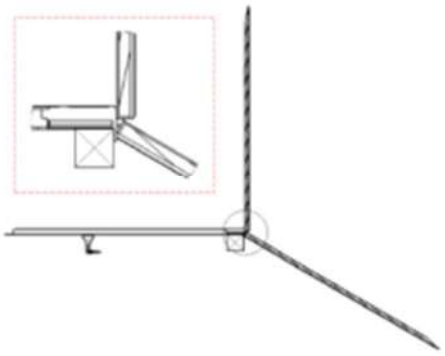


Before assembling the ramp, ensure that the vehicle is on as flat as surface as possible, disconnect the car battery and engage the handbrake.

Having followed all of the above instructions, proceed as follows to ensure correct assembly:

1. Define the ideal position: for correct assembly without any incident we recommend that:

- the ramp be centred with the access to minimise any possible errors concerning the useful width of the access.



- The front edge of the base plate of the fixed platform should be flush with the vehicle step, ensuring optimum opening angle and finish of the ramp.

2. Place the ramp in its ideal/ desire position. Fix it provisionally and check that it is working properly. Also check the sensor position to ensure that it does not interfere with the chassis.

3. Make any necessary adjustments to its position.

4. Fix the ramp to the structure (in closed position). It is recommended that rivets be use (stainless steel is preferable), which should be drilled into the plate and the structure. Where possible, use polyurethane based adhesive to avoid direct contact between the plate and the chassis.

5. At this point install the sensor set in the relevant opening which is located on the fixed platform. Lock underneath with the nut at a tightening torque of approx. 100 N.m. Do not connect cable at this stage.

6. Proceed with installation of the floor surface and vinyl floor covering. Also position the finishing strips on the step, cutting them at the desired length in accordance with the door width.

7. To install the handhold, make a precise cut in the vinyl flooring on the mobile platform. Provide access once again to the platform and the tapped holes (x4).

8. Fix the handhold using 4 M5 screws at a tightening torque of approx. 8 N.m.

6.2.7 INSTALLATION

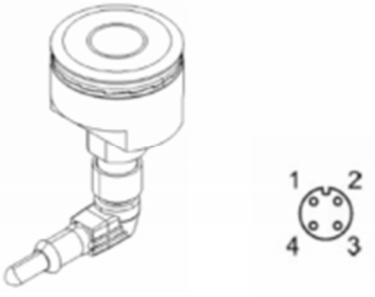
Once perfectly assembled, proceed with installation of the RM2 ramp.

To do this, connect the sensor in accordance with the following instructions:

1. Connect the sensor to the M12 connector supplied. Screw in tightly until the union between the two slides.

2. Collect up the protruding section of piped cable (5 metres), map and fix the path to the junction box. Play particular attention when doing this, as, if the cable is connected incorrectly it could lead to wearing of same.

3. Connect the cable according to the diagram below.



- Brown positive at 24 VC
- Black sensor signal
- Blue negative
- White Not applicable

Once the power and signal cables have been connected as indicated in the circuit diagram, the device is considered installed and ready for use.

6.3 CORRECT USE OF THE RAMP

The RM2 ramp is a platform designed for persons with reduced mobility to access the bus through the same access door as other passengers.

The maximum load capacity is 350 kg.

Masats S.A accepts no responsibility for use of the ramp for any other purpose.

6.3.1 RAMP OPERATOR

The platform should be operated by a trained person.

The vehicle driver should be trained on how to use same, operating it in accordance with the instructions in this manual and should personally supervise use of the platform.

The driver of the vehicle in which the platform is installed is responsible for its proper use and is the only person that should operate it.

When the ramp is needed, the driver should stop the vehicle in an area that allows the platform to be used safely and with minimum lateral or front surface unevenness.

6.3.2 INSTRUCTIONS BEFORE USE

Once the vehicle is positioned properly for use of the platform, the below steps should be followed strictly to operate the RM2 ramp:

1. Stop the vehicle.
2. Engage the handbrake.
3. Notify passengers that you intend to use the ramp and request that the access area in question be kept clear.
4. Open the access doors.
5. Go to the access door where the device is located.

6.3.3 CHECKS BEFORE USE

Once at the access door, the driver should ensure that the location is suitable for use of the ramp checking the following parameters:

1. Ensure that the device can reach the ground from the vehicle.
2. Make sure that there is nothing obstructing the ground on which the ramp platform will rest.
3. Check that the doors are fully open.
4. Check that there is nothing blocking the exit of the platform.

5. Check that there is no obstacle on the vehicle floor.

6. Clear the ramp operation and movement area.

7. Inform the user on the procedure for accessing the vehicle.

Once all the requirements have been met the driver can now open out the ramp.

From this time and until completion of the operation, the driver should remain beside the access door paying particular attention to safety and the "environmental" conditions in accordance with the abovementioned points.

Incorrect use of the ramp can result in personal injury.

6.3.4 CHECKS DURING USE

As well as remaining beside the access door, paying particular attention to safety and "environmental" conditions, it is important to bear in mind a series of aspects during operation:

1. Follow the instructions for use carefully and use this manual to resolve any issue that may arise.

2. Do not allow any person-user or operator-or part of their body, to be situated below or to interact with the movement of the ramp, or to be located in a position where he/she/it may become trapped between the platform and the ground when operating the ramp.

3. Listen for any unusual sounds during operation.

4. Watch out for any inappropriate movements/ deformations of the device.

5. Observe all the instructions and hazards on the ramp.

6. Most importantly, use common sense when operating the ramp.

7. If any anomaly is detected at this point that affects the operation of the ramp, do not use it until a qualified technician has repaired the device.

6.4 OPERATION

The RM2 ramp is a simple mechanism that operates logically. In any case, the different functions or associated modes are defined below.

6.4.1 OPENING AND CLOSING THE RAMP

To open the ramp properly from its closed position:

1. Go to the outside of the vehicle, standing suficiently close to the ramp to avoid having to force it upwards.

2. Bend slightly towards it and grip the handhold.

3. Pull gently from its rest position up to a 90º angle approximately.

4. At this point, without letting go of the handhold, use the other hand to help support the ramp at the side.

5. Let go of the handhold and gently rest the ramp on the ground whilst moving to one side keeping clear of its movement range.

The steps should be carried out in reverse to close the ramp. Pay particular attention to correct positioning of your body to avoid yanking or sudden movements.

The weight of the platform always tends to follow the position of the operator. Thus, it is important to open and close the ramp gently taking care not to trap feet or hands.

6.5 RAMP OPERATING POSITIONS

For good use and operation of the ramp, two optimum operating positions are defined:

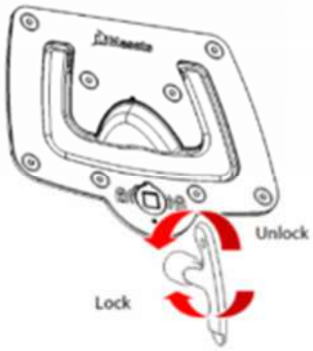
CLOSED: When not in use. The mobile platform rests on the fixed and is 100% level with the vehicle floor.

Any element that gets trapped between the 2 platforms will result in unevenness at the rest position and may cause vehicle users to trip over.

In any case, any significant unevenness should be detected by the ramp signal outside.

OPEN: Once the operator has operated the ramp correctly, it is considered to be in open position. For this the ramp should rest flat and not be at a slope of any more than 12 %, which would make it unsuitable for use.

6.5.1 SAFETY: HANDHOLD LOCK/UNLOCK



For better control of the ramp and for ease of operation, the handhold has a key locking mechanism.

Said locking prevents use of the handhold, thus preventing third parties from activating the ramp.

As a safety measure, it is recommended that the handhold be locked after each time the ramp is used. This means that it will have to be unlocked each time it is used.

6.5.2 SAFETY: OUTSIDE/INSIDE RAMP SIGNAL

A sensor for controlling the ramp is located on the fixed platform of the device. This indicates the ramp status at all times (open or closed).

This signal minimises possible damage to the ramp should one forget that it is open when closing the door or moving the vehicle.

6.5.3 MISUSE OF THE DEVICE

Any action that is a risk to the integrity of the device and to nearby persons is considered misuse:

- The ramp must not be launched from a height, it must be supported and rest gently on the ground.
- The ramp should be properly supported by the ground. Any imbalance can result in deformations of the ramp and is potentially dangerous for the user.
- In a closed position the ramp there should be no obstruction between the 2 platforms. If this should occur, the ramp will remain semi-open and may cause passengers to trip over it. It could also become deformed if stepped on continuously under said conditions.

6.6 MAINTENANCE

To guarantee proper operation of the system and to guarantee a long useful life of the platform it is paramount that the entire system be kept in good condition.

6.6.1 BASIC PREVENTIVE MAINTENANCE

To keep the system in good condition, it is recommended that basic system maintenance be carried out each month.

- It is recommended that the system be kept clean and in good condition. It is thus highly recommended that the surface of the fixed and mobile platforms and hinge be kept clean

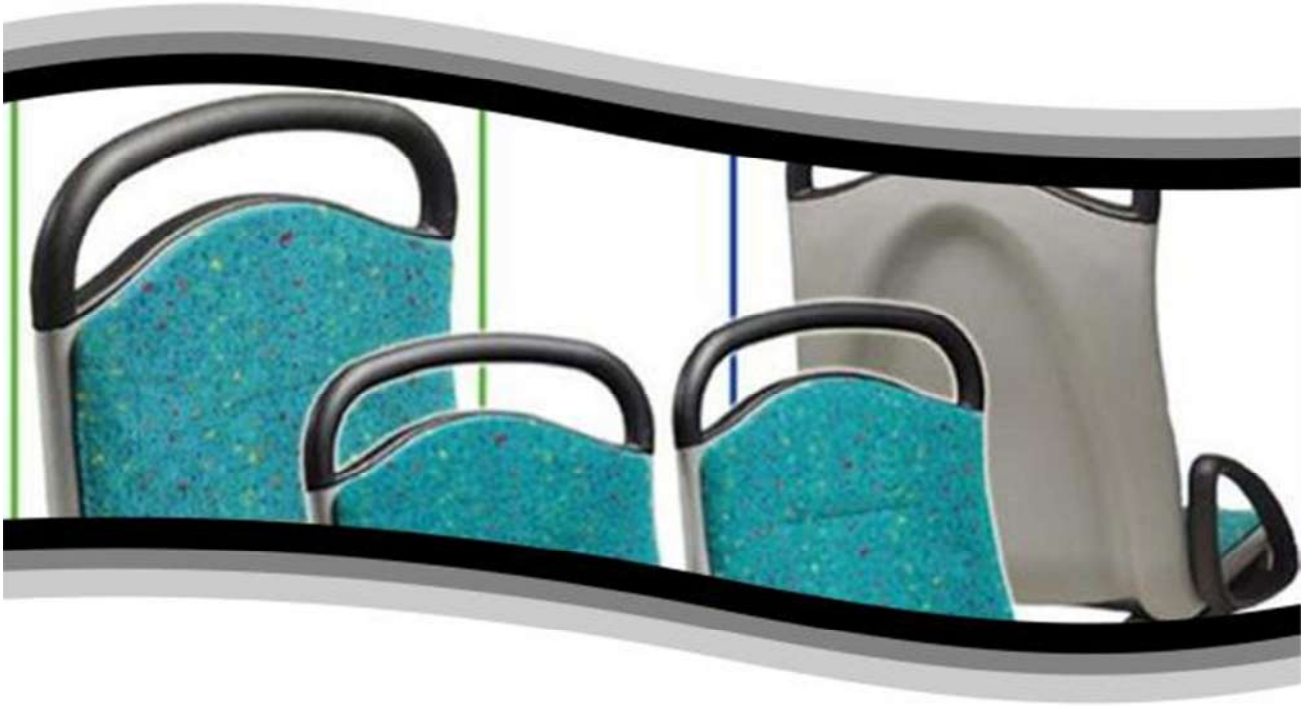
Accumulation of dust, dirt, sediment, sand, mud and any other residue can cause malfunctioning of the system and reduce the useful life of same.

- It is recommended that during cleaning, a visual inspection of the different parts of the platform be carried out paying particular attention to the mobile parts.

6.6.2 COMPLETE PREVENTIVE MAINTENANCE

Where timely maintenance is carried out under normal operating and soiling conditions, no other more extensive preventive action need be taken.

7 GAMA CICLO - MANUAL DESCRIPTION



This manual was designed to facilitate the maintenance procedures to the customers and service staff. It contents the maintenance information of ESTEBAN CICLO seats.

To facilitate the maintenance procedures it is highly recommended that technicians have free access to this manual and study in details all the procedures before start the jobs. It is also important use this manual to clarify eventual doubts.

The manual is designed in a modular structure contenting the following sections:

1. Introduction
2. Description
3. Getting started and Preventive Maintenance
4. Troubleshooting
5. Repairing Module
6. Cleanness Manual

7.1 INTRODUCTION

This is the current section.

7.1.1 DESCRIPTION

This section brings information about the variants of CICLO seats and describes the main seat's components.

7.1.2 GETTING STARTED AND PREVENTIVE MAINTENANCE

- Getting Started: It indicates all tasks after the repairing procedures as procedures to check the seat after the first assembling.
- Preventive Maintenance: It indicates the parts and mechanisms that demands regular maintenance, inspections and timeframe for the maintenance tasks. The information is presented in a 2 inputs table: Vertical – all the components with the operation to be completed; Horizontal – all the tasks to

be completed. The information is organized in a way that is possible to make sure that all points were checked by following the table routine.

7.1.3 TROUBLESHOOTING

This section includes a table to find out reasons for faults.

7.1.4 REPAIRING MODULE

This section describes the operations of assembling and disassembling of the seat and its mechanisms.

7.1.4.1 REPAIRING MODULE HEAD

Every Repairing module has a head o top of the sheet, describing the following data:

- Application: It informs the model of seat where the instruction can be applied.
- Estimated Time: it informs the average labor time to complete the task, minutes based.
- Tools: Brings the list of tools necessary to accomplish the task.
- Sundries and Consumables: It specifies all the Sundries and Consumables necessary to complete the tasks such as grease, adhesive, rivets, etc.
    - Spare Parts: It includes the necessary spare parts to conclude the task, organized with all the catalogue references.

7.1.4.2 IMPORTANT INDICATIONS

The important indications a present as follow, inside of color boxes to highlight inside of text.

It might be necessary to loosen the bolts that of plastic structure and seat platform union in order to facilitate the job

7.1.5 CLEANNESS MANUAL

It indicates the cleanness procedures and correct product to carry out services as stains removal, fabric cleaning, plastic cleaning and painting protection.

7.2 GENERAL DESCRIPTION

The seat is designed to propitiate comfort to passengers and an anti-vandalism features to the operators. Based in a anti-vandalism structure combined with a ergonomic seat integrating the bars support, CICLO seat optimizes the space designated to passengers.

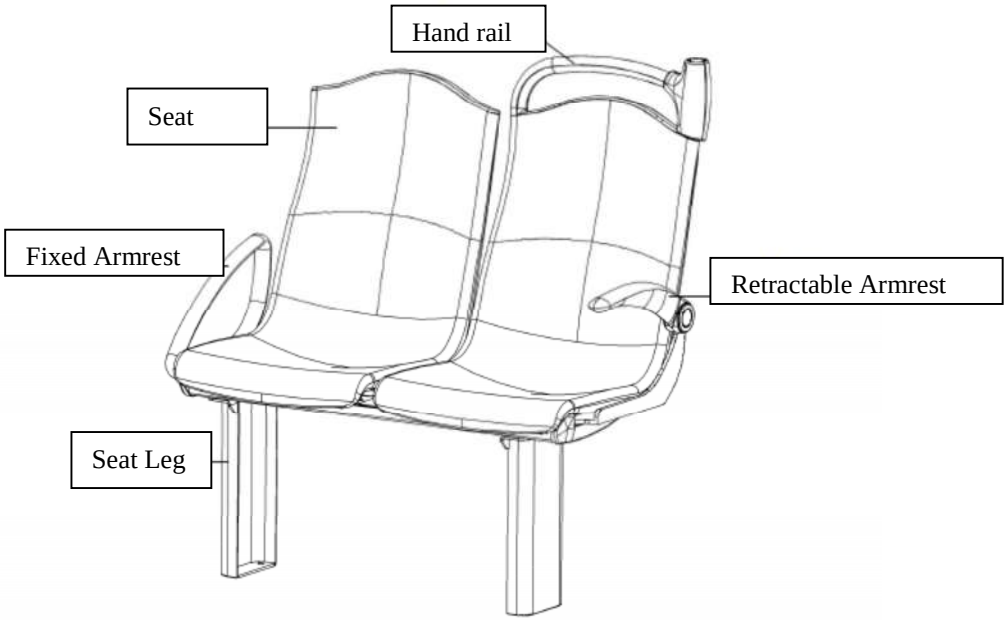
The new and innovators materials applied on its construction have outcome a low weight, versatile and high anti-vandalism resistance.

7.2.1 TECHNICAL DATA

- Made in recyclable materials and homologated fulfilling the directive ECE 95/28, ensuring safety to passengers and environment friendly.
- Homologated fulfilling the Directive UIC 564-2
- 23 kg, Double upholstered with high resistance and quality fabric, anchored through leg and side wall fixing system.

7.2.2 COMPONENTS

The seat is composed by the following elements: seat platform, leg, seat plastic structure and arm rest.



7.2.2.1 PLATFORM

It is a metallic structure welded and black powder coated.

7.2.2.2 LEG

Metallic piece fixed in the platform through bolts. Black powder coated.

7.2.2.3 PLASTIC STRUCTURE

Composed by blew plastic piece in addition to a anti-vandalism structure ergonomic designed.

The seat cushion and backrest are polyurethane foam made, recovered with high quality fabric.

The fabric is fixed on the seat cushion and backrest through brackets located on posterior side of the seat.

7.2.2.4 FIXED ARMREST

It is structured in Polyamide with metallic inserts with high resistance to side stresses. It is fixed to the platform through bolts.

7.2.2.5 RETRACTABLE ARMREST (OPTIONAL)

If necessary the seats are equipped with retractable armrest. The main function is facilitate the access of Disable persons to the seat. Seats designated to disable person usually must have such solution. This armrest is assembled over a metallic bracket which is fixed to the platform.

7.3 GETTING STARTED

Before get started, the seat must be checked minding its functionalities and visual conditions.

The checks are visual for external components and manual working to elements belonging to mechanisms. The complete check list is indicated on table called “Preventive Maintenance”, chapter 6.3.1.

7.3.1 PREVENTIVE MAINTENANCE

	Frequency						
Maintenance tasks	**Regular Maintenance**					**Checks**	
	Every Week	**Every 6 months**	**Every Year**	**Every 2 years**	**Every 3 years**	**Week checks**	**6 months check**
Upholstery							
Vacuum Cleaning to absorb the fine dust	**X**						
Wet cleaning (wow and natural fabrics upholsteries) – See upholstery maintenance and cleaning.		**X**					**X**
Dry Clean through appropriate product (synthetic fabrics, polyester, etc). – See upholstery maintenance and cleaning.		**X**					**X**
Check upholsteries conditions, searching for scratches, holes or discoloration.							**X**

Search for stains and flattening of pelage.							X
Check the needle work do not present loosened wires and fringes.							X
Verify that fabric do not present wrinkles or bags.							X
Verify that the pelage sense is uniform.							X
Seat							
Check if there are noise due vibration.							X
Verify that seats cushion and backrest are fixed.							X
Re-tight the fixing bolts of seat against the platform.					X		
Foams							
Verify that foams do not present flattening and deforming.							X
Anchorage							
Re-tight the backrest fixing points.					X		

7.4 TROUBLESHOOTING

Problem Description	Inspection	Cause	Solution	Attention
Noise on seat structure	Seat fixing not strong enough	Loosened screws	Tight Screws	
	Loosened armrest	Loosened screws	Tight Screws	
	Loosened side cover	Loosened screws	Tight Screws	
	Loosened seat leg	Loosened screws	Tight Screws	
	Loosened backrest	Loosened screws	Tight Screws	
Noise on fixing points	A noise is noticeable when backrest is stressed.	Loosened fixing screws	Tight Screws	
	A very noticeable vibration is detected when backrest is solicited by its back.	Backrest structure is deformed and needs to be replaced.	Replace backrest structure.	Check if the fixing screw touch the side wall rail.
Upholsteries fabric discoloration	When press the fabric with finger and displace in the opposite sense of flattening a color	Dirty fabric	Clean fabric	Refer to specialized process for this cleanness.

	difference is noticeable.			
	The most protected zones of fabric have more true colors than that one subjected to passengers use.	Dirty fabric	Clean fabric	Refer to specialized process for this cleanness.
	The fabric color changes depending on vision angle	Flattening by incorrect maintenance	Change maintenance procedures	Check the maintenance procedures chapter

7.5 REPARING PROCEDURES

GAMA CICLO

INSTRODUCTION

The instructions for seat maintenance are separated as repairing modules. The first part includes the complete seat, the subsequent parts comprehend the variations of each particular model and seats options.

The modules structure is organized in complementary way. So every advanced module depends on the prior ones, i.e when the interior part disassembling is shown, user must consider the external part disassembling instruction before.

Every module describes, in detail, the disassembling system of an element.

The assembling and disassembling procedures are opposites, so the manual does not describes both unless a special care is demanded.

The pictures of these manual always represents an off side double seat set. The pictures corresponding to side pieces details represents the off side window or off side aisle seat. The repairing of any other case will be done in an analogue way.

Transport and storing of the seat must be done with the legs supporting the whole set, never with the upside down being supported seat upholstery or plastic structure. It is indicated to pack the seat accordingly to avoid eventual damages caused by small shocks or vibration.

When any repairing is carried out, it is convenient use only original spare parts as indicated in spare parts catalogue. Any other aftermarket solution would cause mal function or premature failure of other components. In addition to the risks of failure, once confirmed, Irizar reserves to the right of decline of all warranty conditions, annulling the product warranty.

BOLTS TORQUE

The bolted unions must be tighten following the toques on the next table since there are no special remarks to the referred mechanism.

This specifications is applied to hexagonal or cylindrical head bolts and steel nut with friction factor from 0,12 to 0,14.

The torque is specified combing the metric labeling, wires pitching and quality of each bolt.

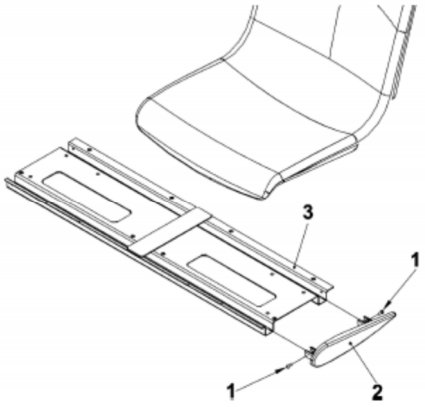
Diameter	Thread Pitch	Quality	
		Torque (Nm)	
		5.6	8.8
M4	0,7	1,5 +/- 0,3	2,9 +/- 0,5
M5	0,8	3,0 +/- 0,5	6,0 +/- 0,9
M6	1	5,0 +/- 0,7	10 +/- 1,5
M8	1,25	12,5 +/- 2	25 +/- 3,8
M10	1,5	24,5 +/- 4	49 +/- 7,4
SAE 7/16”	20 wires/inch		35 +/- 5,3

The bolt quality is indicated on its head. In case of doubt when a bolt replacement is demanded, always use a 8.8 bolt.

Bolts Fixing Joints on Seat	Diameter	Quality	Attention
Seat against the platform.	M8	8.8	20 +/- 3 Nm
Seat leg against platform.	M8	8.8	Previous table
Backrest Support against supports.	M8	8.8	Previous table

For unions bolt/ Plastic, Bolt/ Aluminum, Bolt/ plate, greased unions and any other not specified in this manual, the seat manufacturer will indicate.

80.01.01			STRUCTURE SIDE COVER
Model:	Ciclo CicloMuki	**Estimated time:**	3,25 min.
Tools:	Screw driver Hammer	**Sundries, consumables:**	N/A
Spare parts:	LS cover (Ref. 008040405) RS cover (Ref. 008040406) LS cover with armrest (Ref. 008040407) RS cover with armrest (Ref. 008040408)		



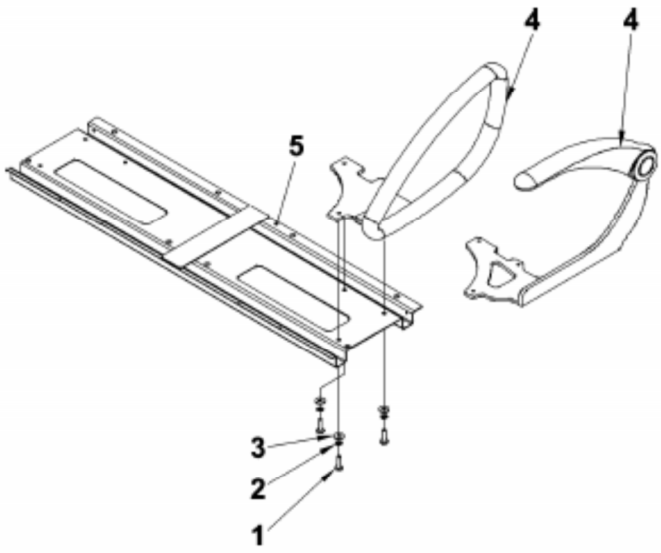
DISASSEMBLING

1. Loose the bolts (1) that fix the side cover (2) to the seat PLATFORM (3).
2. Take the side cover (2) off, extracting from its housings in the seat PLATFORM (3).

ASSEMBLING

1. Place the side cover (2) on seat PLATFORM (3) and hit with hammer.
2. Fix the side cover (2) through the bolts (1).

80.01.03			AISLE ARM REST
Model:	Ciclo Ciclo Muki	**Estimated time:**	4,30 min
Tools:	Wrench 12-13 Screw Driver	**Sundries and consumables:**	N/A
Spare parts:	LS Armrest (Ref. 008040409) RS Armrest (Ref. 008040410) LS Retractable Armrest (Ref. 008002201) RS Retractable Armrest (Ref. 008002202) Hexagonal bolts M6x20 (Ref. 000601609) Pressure washer M6 (Ref. 000625001) Washer 6,4x18 (Ref. 000622101)		



DISASSEMBLING

It might be necessary to loosen the bolts that of plastic structure and seat platform union in order to facilitate the job

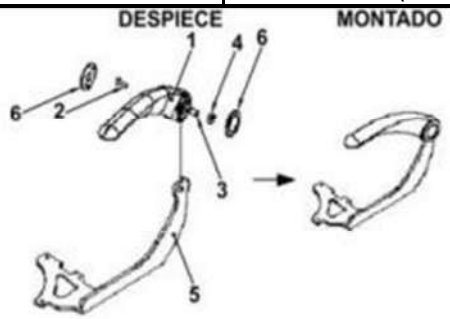
1. Loosen the side cover, see module 80.01.01
2. Loosen the 3 hexagonal bolts (1), pressure washers (2) y washers (3) that fix the armrest (4) and platform (5).
3. Take the armrest off (4).

ASSEBLING

Revert the above instructions.

Re-tight the seat platform and Plastic structure union after finish

80.01.05	ARMREST TURNING MECHANISM		
Model:	Ciclo Ciclo Muki	**Estimated time:**	15 min
Tools:	Screw Drive Hammer Wrench 16-17	**Sundries and consumables:**	N/A
Spare Parts:	Arm Assy (Ref. 007502202) Countersunk head hexagonal bolt M8x30 (Ref. 000607117) Turning Bushing (Ref. 007508102) Turning Nut (Ref. 002508214) LS Retractable support set (Ref. 008001501-G06) RS Retractable support set (Ref. 008001502-G06) Armrest cover (Ref. 007540410)		



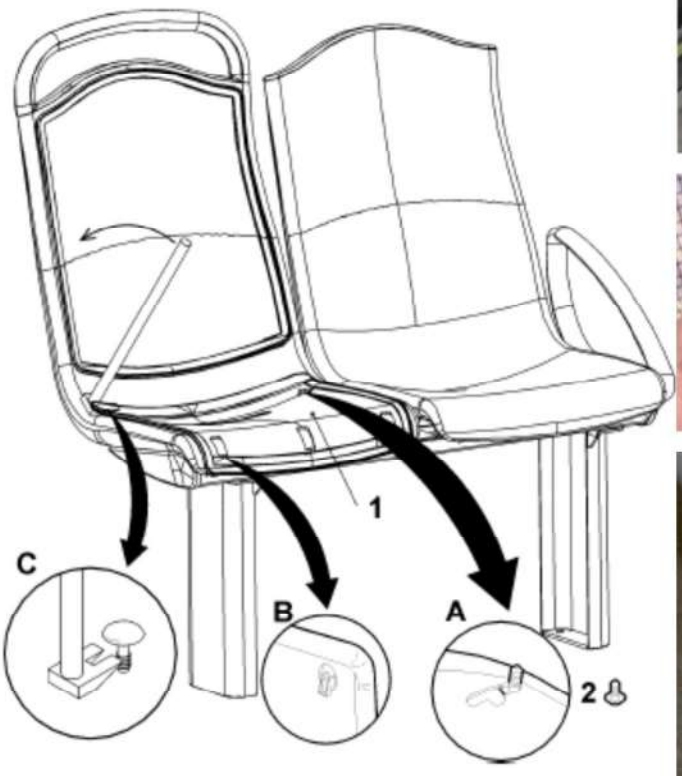
DISASSEMBLING

1. Disassemble the arm, see module 80.01.03.
2. Take the 2 caps offs (6), loosen and take the bolt off (2) and nut (4).
3. Take the bushing off (3) from the armrest body (1).
4. Take the armrest off (1) from the support (5).

ASSEMBLING

Revert the above instructions.

80.02.01	UPHOLSTERED SEAT CUSHION		
Model:	Ciclo Ciclo Muki	**Estimated time:**	4,10 min
Tools:	Crowbar / Screwdriver / Hammer	**Consumables and sundries:**	N/A
Spare Parts	Fixing Clip US 700 (Ref. 000698420) CICLO: Seat cushion (Ref. 008004401) MUKI: Seat cushion (Ref. 008004402)		



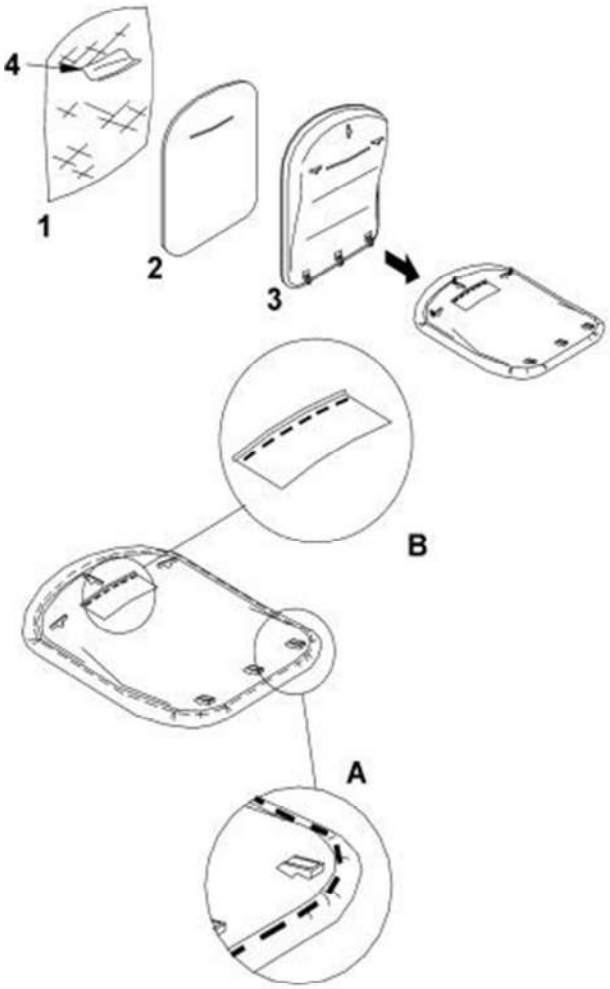
DISASSEMBLING

1. Insert the crowbar in the junction of seat cushion (1) and the plastic structure, the crowbar detail must fit to the clip (2), see detail C. A special care is demanded to avoid damages on plastic structure.
2. Force the crowbar in the sense of the arrow to unclip the clip and loosen the seat cushion (1) on both clips (2).
3. Extract the 2 clips (2) from the cushion (1) and discard.
4. Take the 3 remaining inserts from seat cushion plate slots (1) see detail B.

ASSEMBLING

1. Insert new clips (2) to the cushion plate (1). Insert the clips in too the extreme of the slots, detail A.
2. Attach the seat cushion plate (1) to the seat following the procedure: the 3 inserts in slots of plastic structure (detail B), and the clips (2) in the holes.
3. Hit with a hammer to fix the cushion (1). Review to ensure a good fixing.

80.02.02			CUSHION COVER
Model:	Ciclo Ciclo Muki	**Estimated time:**	12,60 min
Tool:	Pneumatic stapler	**Sundries and Consumables:**	Staple BEA 80/6 (Ref. 000662003)
Spare Parts:	CICLO: Cover (Ref. 0080034XX) Considering the body number 15mm foam (Ref. 008010401) Cushion Base (Ref. 008040402) MUKI: Cover (Ref. 0080034XX) Considering the body number 15mm foam (Ref. 008010402) Cushion Base (Ref. 008040423)		



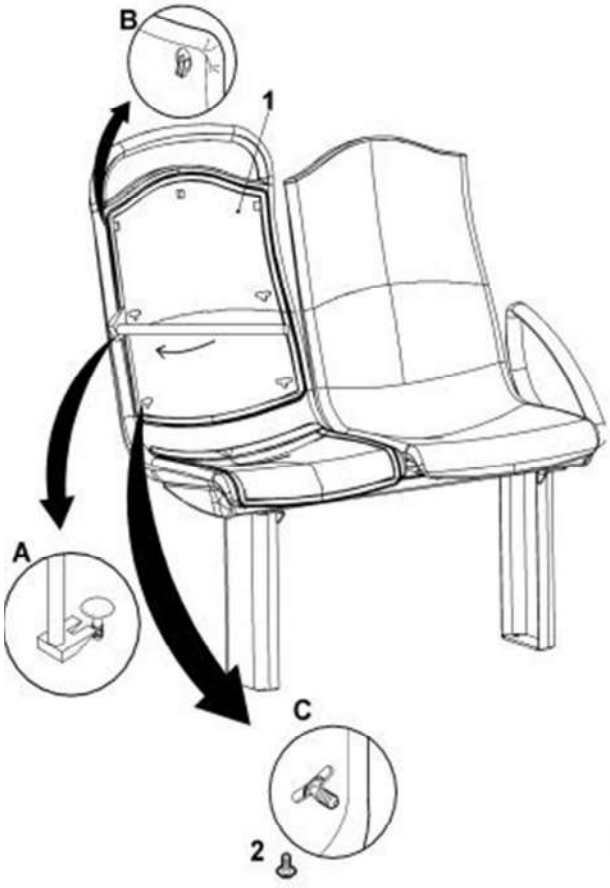
DISASSEMBLING

1. Loosen the seat cushion, see module 80.02.01.
2. Take staples off (3), detail A.
3. Unbound and take the staples off from the stretch net (4) in the seat cushion (3), see detail B.
4. Separate the cover (1) from the foam (2).

ASSEMBLING

Revert the above instruction.

80.03.01			COVERED BACKREST
Model:	Ciclo Ciclo Muki	**Estimated time:**	3,90 min
Tools:	Crowbar / screwdriver / hammer	**Sundries and consumables:**	N/A
Spare Parts:	Fixing clip US 700 (Ref. 000698420) CICLO: Backrest cushion (Ref. 008004301) MUKI: Backrest cushion (Ref. 008004302)		



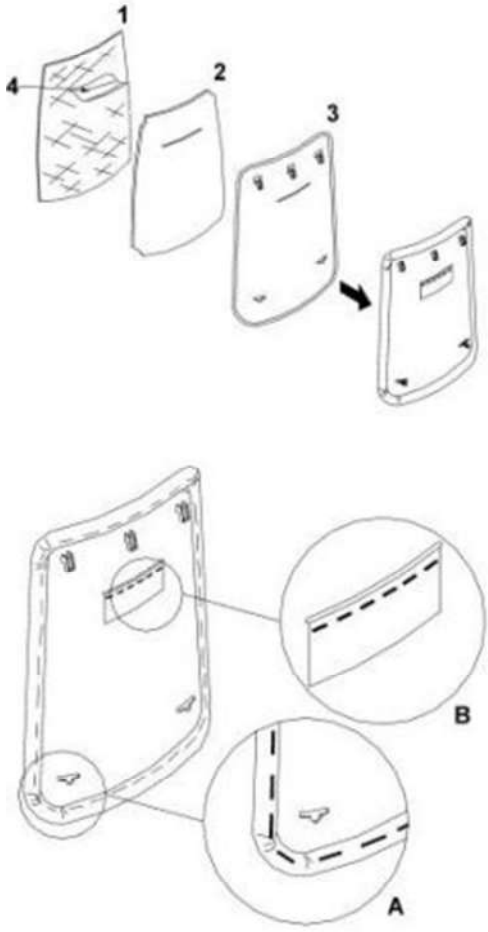
DISASSEMBLING

1. Insert the crowbar in the junction of backrest cushion (1) and the plastic structure, the crowbar detail must fit to the clip (2), see detail C. A special care is demanded to avoid damages on plastic structure.
2. Force the crowbar in the sense of the arrow to unclip the clip and loosen the backrest cushion (1) on both clips (2).
3. Extract the 2 clips (2) from the cushion (1) and discard.
4. Take the 3 remaining inserts from seat cushion plate slots (1) see detail B.

ASSEMBLING

1. Insert 4 new clips (2) to the cushion plate (1). Insert the clips in too the extreme of the slots, detail A.
2. Attach the backrest cushion plate (1) to the seat following the procedure: the 3 inserts in slots of plastic structure (detail B), and the clips (2) in the holes.
3. Hit with a hammer to fix the cushion (1). Review to ensure a good fixing.

80.03.02			BACKREST COVER
Application:	Ciclo Ciclo Muki	**Estimated Time:**	12,40 min.
Tools:	Pneumatic Stapler	**Sundries and Consumables:**	Staple BEA 80/6 (Ref. 000662003)
Spare Parts:	CICLO: Cover (Ref. 0080033XX) Correspondent to the body number 15mm foam (Ref. 008010301) Backrest plate (Ref. 008040401) MUKI: Cover (Ref. 0080033XX) correspondent to the body number 15mm foam (Ref. 008010302) Backrest Plate (Ref. 008040424)		



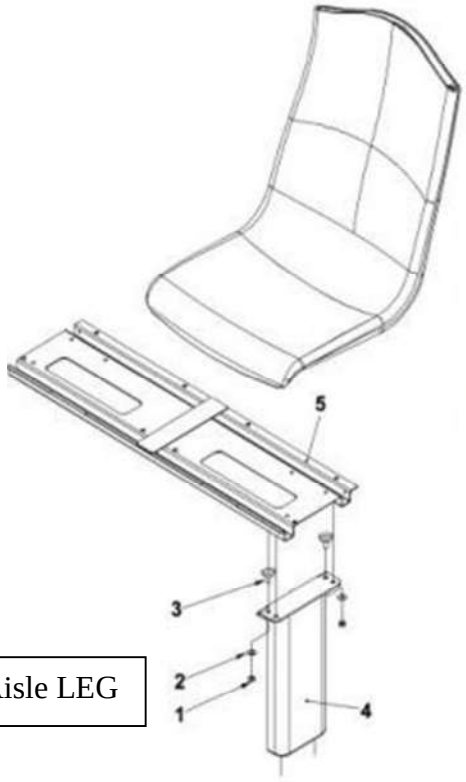
DISASSEMBLING

1. Loosen the backrest cushion, see module 80.03.01.
2. Take staples off (3), detail A.
3. Unbound and take the staples off from the stretch net (4) in the backrest cushion (3), see detail B.
4. Separate the cover (1) from the foam (2).

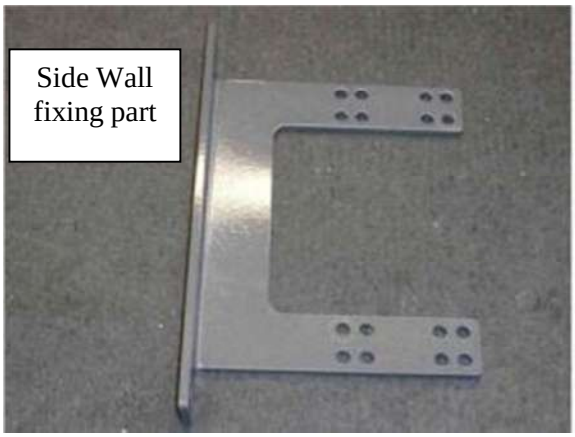
ASSEMBLING

Revert the above instructions.

80.05.01	AISLE SEAT LEG / SIDE WALL FIXING RAIL		
Application:	Ciclo Ciclo Muki	**Estimated Time:**	8,00 min.
Tools:	Screwdriver Wrench 12-13 Hammer Measure tape	**Sundries and Consumables:**	N/A
Spare Parts:	Seat leg (Ref. 0080017XX) depending on body number Seat platform fixing bolts (Ref. 005208201) Washer 8mm (Ref. 000621101) Parlock nut M8 (Ref. 000632103)		



Aisle LEG



DISASSEMBLING

Seat Leg

1. Loosen the hexagonal nut M8 (1) and washers (2) that fix the Leg (4) to the platform (5).
2. Take the leg off (4), extract the platform (5) and the 2 fixing bolts (3).

Side Wall

1. Loosen the 4 bolts (1), washer (2) and hexagonal nuts (3) that fix to the platform (5).
2. Take the fixing part from the wall.

ASSEMBLING

Seat Leg

1. Fix the seat leg to the platform (5) using the correspondent holes (3).
2. Fix, not tightening, the leg to the platform with the washers (2) and hexagonal Nuts M8 (1).
3. Using the measure tape and rubber hammer, adjust the leg position (4) in the desired position.
4. Tight the bolts using the wrench and applying the correct torque.

Side Wall Fixing Part

1. Insert 2 fixing bolts (3) in the platform (5)
2. Fix, not tightening, the platform using 2 washers (2) and hexagonal nuts M8 (1)
3. Using the measure tape and hammer, adjust to the suitable position (4).
4. Tight the bolts applying the correct torques.

80.05.02	HAND RAIL FIXING FLANGE		
Application:	Ciclo Ciclo Muki	**Estimated Time:**	3,70 min.
Tools:	Torx	**Sundries and Consumables:**	N/A
Spare Parts:	LS flange Ø33 mm (Ref. 008006001) RS flange Ø33 mm (Ref. 008006002) LS flange Ø35 mm (Ref. 008006003) RS flange Ø35 mm (Ref. 008006004)		

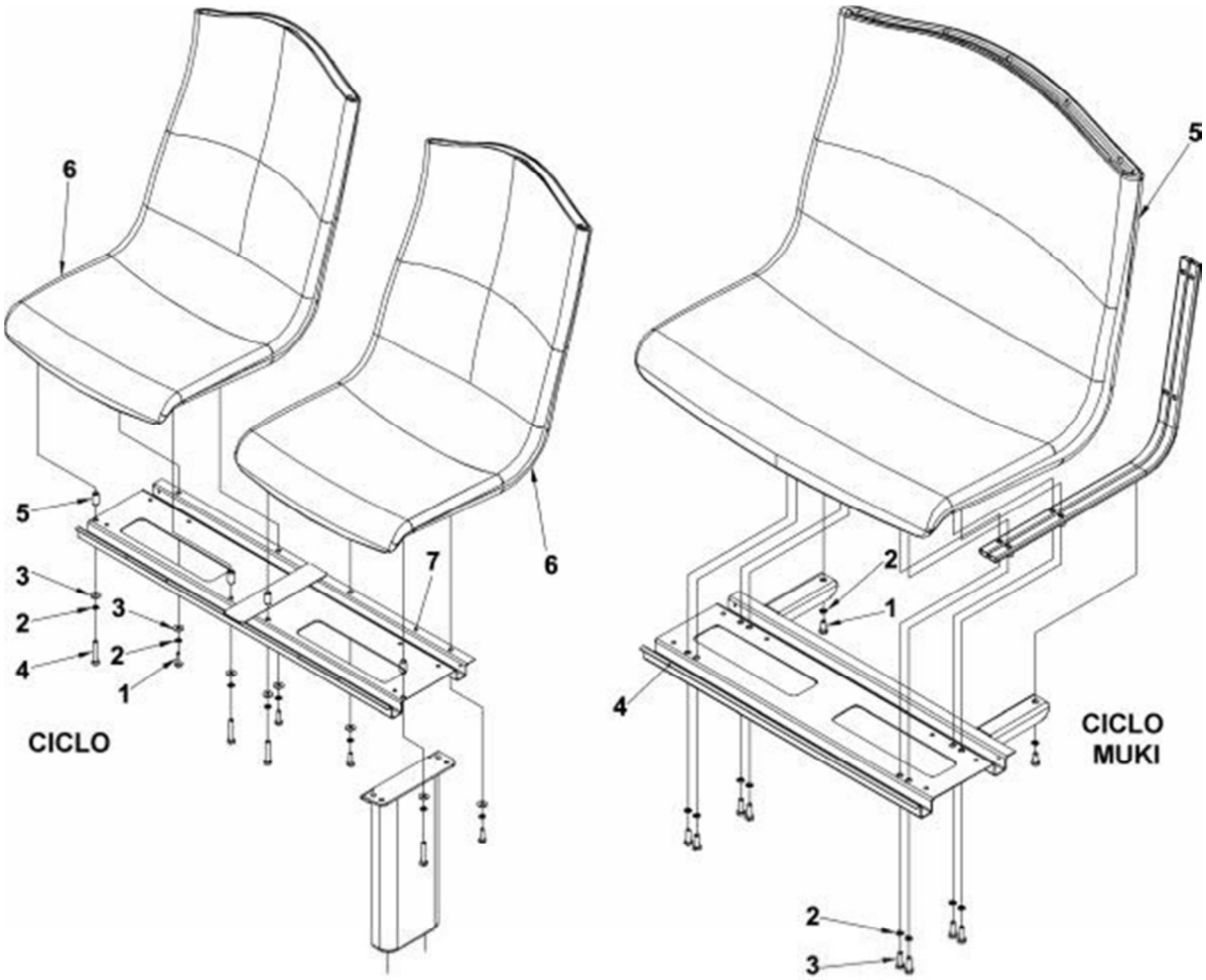
DISASSEMBLING

1. Loosen the 3 bolts (2) washers and pressure washers (3).
2. Take off the semi-flanges (1.)
3. Extract pin (4) from the bar.

ASSEMBLING

Revert the above instructions.

80.08.01			PLASTIC STRUCTURE
Application:	Ciclo Ciclo Muki	**Estimated Time:**	11,00 min.
Tools:	Screwdriver Llave Tubo 12-13	**Sundries and Consumables:**	Ninguno
Spare Parts:	CICLO: Double coated platform set (Ref. 008001101-N50) Gray Plastic Structure+black handrail (Ref. 008043427-G02) Light Gray Plastic Structure+black handrail (Ref. 008043429-G02) Light Gray Plastic Structure+Yellow handrail (Ref. 008043438-G02) Light Gray Plastic Structure+Yellow handrail Cover(Ref. 008043440-G02) Yellow Plastic Structure+Black handrail (Ref. 008043427-A03) Yellow Plastic Structure+Black handrail cover(Ref. 008043429-A03) Red Plastic Structure+Black handrail (Ref. 008043427-R06) Red Plastic Structure+Black handrail cover (Ref. 008043429-R06) MUKI: Platform Set (Ref. 008001105-N50) Gray Plastic Structure+black handrail (Ref. 008043449-G02) Red Plastic Structure+Black handrail (Ref. 008043449-R06) Yellow Plastic Structure+Black handrail (Ref. 008043449-A03) Light Gray Plastic Structure+Yellow handrail (Ref. 008043451-G02)		


6
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CICLO
MUKI
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3

DISASSEMBLING

Ciclo

1. Loosen the four hexagonal headed bolts M8x15 (1), pressure washers (2) and washer (3), fixing the plastic structure backwards (6) to the platform (7).
2. Loosen the four hexagonal headed bolts M8x40 (4), pressure washers (2), washers (3) and bushings (5), that is fixing the plastic structure (6) to the platform (7) by front section.
3. Take the seat off.

Ciclo Muki

1. Loosen the four hexagonal headed bolts M8x15 (1), pressure washers (2) and washer (3), fixing the plastic structure backwars (4) to the platform (5).
2. Loosen the eight hexagonal headed bolts M8x30 (3), pressure washers (2), that are fixing the plastic structure (4) to the platform (5) by front section.
3. Take the seat off.

ASSEMBLING

Revert the above instruction for assembling.

7.6 MOQUETTES (FABRIC) MAINTENANCE AND CONSERVATION

7.6.1 REGULAR CLEANNESS

A weekly vacuum cleaning will enlarge the fabric statutory life.

When vacuum cleaning, do not create excessive friction fabric by the nozzle, always apply the nozzle in go and back movements, in a regular and soft movements.

7.6.2 DEEP REGULAR CLEANNESS

It is recommended every 6 months and depending on accumulated dust. The following process are recommended:

- Wow Fabric and blends: humid cleaning by “spray – extraction” process. Preferentially accomplished by a specialist using the most indicated method for each case (wow fabrics shampoo or similar products).
- Synthetic Fabrics (acrylic, polyester, etc.) – Dry clean using the right product. Preferentially accomplished by a specialist using the most indicated method for each case.
- As alternative for natural and synthetic fabrics, it is indicated use “dry foam” cleaning processes. Again accomplished by a specialist using the most indicated method for each case.
    - When steam cleaning is used, a special care must be paid in order to avoid stains, generated by water condensation from the steam machine. Again, a specialist must be consulted.

7.6.3 STAINS TREATING

The most important is actuate as fast as possible, preferentially, before the stain get dried, otherwise the removal of stain will very difficult or not effective.

If the stain is liquid of greasy, it is necessary absorb using a clean fabric or a foam. In case of solid of semi-solid stains, the excess must be removed with a spatula.

If the stain got dried, brush slightly to eliminate residual materials and immediately absorb with a humid fabric or sponge.

In case the action must occur to stain interior in order to reduce its size.

Below, there is a list of most common stains types and its specifics treatments:

Oil. Cover the stain area with powder or paste talc. Leave for some hours and than brush. If stain got dried, use a stain remover.

Tar or Pitch. Treat with benzol or stain remover thinner.

Pen Ink. Treat locally with Alcohol.

Shoes Bitumen. Dissolve with Ethanol, press with a clean fabric and clear with neutral soap.

Coffee / Cocoa. Treat with benzene of stain remover thinner.

Gum. Treat with acetone and wash afterwards removing the residues.

Grease. Treat with alcohol or similar. If persists, stain remover thinner.

Adhesives. Once dried, impossible to remove. If possible, treat immediately with acetone.

Lipstick. Treat locally with alcohol.

Perfume / Make up. Treat locally with hot glycerin, rinse with water and neutral detergent.

Paint. Clean immediately with a cotton fabric soaked in solvent. If oil based paint, use an oil with turpentine; If synthetic based paint, treat with suitable solvent, apply the powder talc and brush after dried.

Gum. Treat with alcohol and remove the residues.

Chocolate. Treat using warm water and soap or neutral shampoo, rinsing afterwards.

Nail Polish. Use acetone, wash and rinse.

Fruits.Wash with blend of neutral detergent and water. If persists, dry foam.

Milk. With detergent or neutral shampoo for upholsteries.

Ice Cream. Wash with warm water and stains remover thinner.

Rust. Treat with specific remover anti-oxide or lemon juice alternatively.

Urine. Treat with neutral detergent for upholsteries. If persist, consult a specialist.

Resin. Remove the residues and treat with solvent (Turpentine oil) and wash.

Blood. Wash with warm water and neutral detergent. If it is dried, wash many times.

Sweat. Brush with vinegar or alcohol diluted.

Tea. Same as coffee and cocoa.

Ink. Soaked with alcohol and wash with neutral detergent.

White Wine. Rinse with cold water and wash subsequently.

Red Wine. Wash immediately and than treat locally with lemon juice.

Vomit. Wash detergent or upholsteries shampoo and rinse.

7.7 PLASTICS PARTS CLEANING

On plastic structure the first cleanness must be done with a sponge soaked in soaped water. Once dried, spray an alkaline detergent with high pH, suitable for plastic surfaces, strongly rubbing with dried fabric. In rough surfaces, it is necessary to brush to remove the adhered dirt.

7.8 PAINT PROTECTION

When cleaning the vehicle interior, use only water or neutral products dissolved in water. Avoid to use abrasives, strong acids or strong bases as bleach or hydrochloric acid. Do not use organic solvents.

7.9 URBAN 90 PASSENGERS SEAT

7.9.1 PRESENTATION

This manual was designed to facilitate the maintenance procedures to the customers and service staff. It contents the maintenance information of ESTEBAN seats.

To facilitate the maintenance procedures it is highly recommended that technicians have free access to this manual and study in detail all the procedures before start the jobs. It is also important use this manual to clarify eventual doubts.

The manual is designed in a modular structure contenting the following sections:

- General Information
- Trouble shooting
- Repairing Modules
- Unions Torques
- Getting Started
- Maintenance Timeframe
- Maintenance Instructions
- Standard Labor Time table.

General Information

Description of all seat's components.

Troubleshooting

This section includes a table to find out reasons for faults.

Repairing Modules

This section describes the operations of assembling and disassembling of the seat and its mechanisms.

Unions Torques

This section brings the toques to be applied in the junction of different bolted elements of the seat.

Getting Started

It indicates all tasks after the repairing procedures as procedures to check the seat after the first assembling.

Maintenance Timeframe

It indicates the parts and mechanisms that demands regular maintenance, inspections and timeframe for the maintenance tasks. The information is presented in a 2 inputs table: Vertical – all the components with the operation to be completed; Horizontal – all the tasks to be completed. The information is organized in a way that is possible to make sure that all points were checked by following the table routine.

Maintenance Instructions

This section brings all the indications to perform a good maintenance such as: cleanness procedures and correct product to carry out services as stains removal, fabric cleaning, plastic cleaning and painting protection;

Standard Labor Time Table

Informs the average time to complete all the maintenance tasks, base in minutes.

7.9.2 GENERAL INFORMATION

Main Features

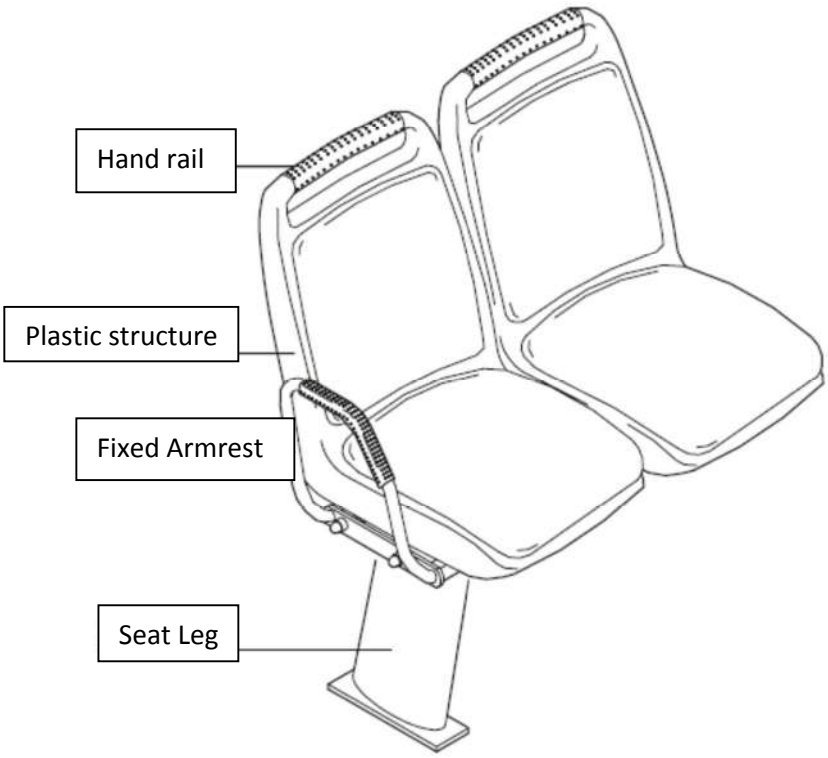
TYPE: Seats passengers

MODEL: URBAN 90

MATERIALS:

- structure: structural steel
- Paint : powder coat
- Filling elements: Polyurethane Foam.
- Fabrics: Wow, synthetic or acrylic.

COMPONENTS



7.9.3 COMPONENT DESCRIPTION

The seat is composed by following elements: platform, leg, seat and armrest.

Platform

It is a metallic structure welded and black powder coated.

Seat Leg

Metallic piece fixed in the platform through bolts. Black powder coated.

Plastic Structure

Composed by blew plastic piece in addition to a anti-vandalism structure ergonomic designed.

The seat cushion and backrest are polyurethane foam made, recovered with high quality fabric.

The fabric is fixed on the seat cushion and backrest through brackets located on posterior side of the seat.

Armrest

It is structured in Polyamide with metallic inserts with high resistance to side stresses. It is fixed to the platform through bolts.

7.9.4 TROUBLESHOOTING

Problem Description	Inspection	Cause	Solution	Attention
Noise on seat structure	Seat fixing not strong enough	Loosened screws	Tight Screws	
	Loosened armrest	Loosened screws	Tight Screws	
	Loosened side cover	Loosened screws	Tight Screws	
	Loosened seat leg	Loosened screws	Tight Screws	
	Loosened backrest	Loosened screws	Tight Screws	
Noise on fixing points	A noise is noticeable when backrest is stressed.	Loosened fixing screws	Tight Screws	
	A very noticeable vibration is detected when backrest is solicited by its back.	Backrest structure is deformed and needs to be replaced.	Replace backrest structure.	Check if the fixing screw touch the side wall rail.
Upholsteries fabric discoloration	When press the fabric with finger and displace in the opposite sense of flattening a color difference is noticeable.	Dirty fabric	Clean fabric	Refer to specialized process for this cleanness.
	The most protected zones of fabric have more true colors than that one subjected to passengers use.	Dirty fabric	Clean fabric	Refer to specialized process for this cleanness.
	The fabric color changes depending on vision angle	Flattening by incorrect maintenance	Change maintenance procedures	Check the maintenance procedures chapter

7.9.5 REPAIRING MODULES

The instructions for seat maintenance are separated as repairing modules. The first part includes the complete seat, the subsequent parts comprehend the variations of each particular model and seats options.

The modules structure is organized in complementary way. So every advanced module depends on the prior ones, i.e when the interior part disassembling is shown, user must consider the external part disassembling instruction before.

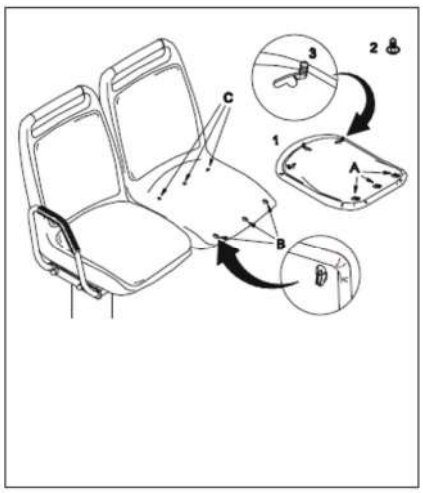
Every module describes, in detail, the disassembling system of an element.

The assembling and disassembling procedures are opposites, so the manual does not describes both unless a special care is demanded.

The pictures of these manual always represents an off side double seat set. The pictures corresponding to side pieces details represents the off side window or off side aisle seat. The repairing of any other case will be done in an analogue way.

Transport and storing of the seat must be done with the legs supporting the whole set, never with the upside down being supported seat upholstery or plastic structure. It is indicated to pack the seat accordingly to avoid eventual damages caused by small shocks or vibration.

When any repairing is carried out, it is convenient use only original spare parts as indicated in spare parts catalogue. Any other aftermarket solution would cause mal function or premature failure of other components. In addition to the risks of failure, once confirmed, Irizar reserves to the right of decline of all warranty conditions, annulling the product warranty.



Covered Seat Cushion

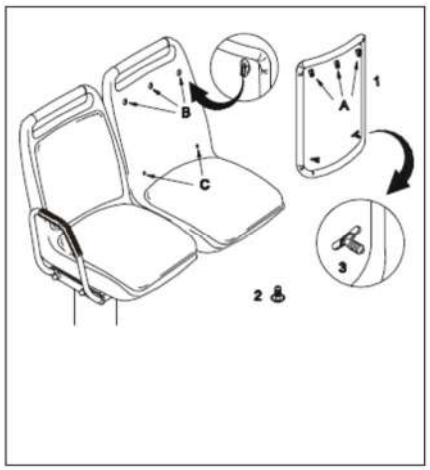
Disassembling:

1. Remove the seat cushion as using the crowbar as defined in the item 4.4.
2. Take the cushion plate out of fixing point "A" in the slots "B" of the plastic structure.

Assembling:

1. Insert 3 new clips (2) to the cushion plate (1). Insert the clips in to the extreme of the slots, detail 3.
2. Attach the backrest cushion plate (1) to the seat following the procedure: the 3 inserts in slots of plastic structure (detail B), and the clips (2) in the holes (C).
3. Hit with a hammer to fix the cushion (1). Review to ensure a good fixing.

Attention: to replace the cushion, check module 4.14.



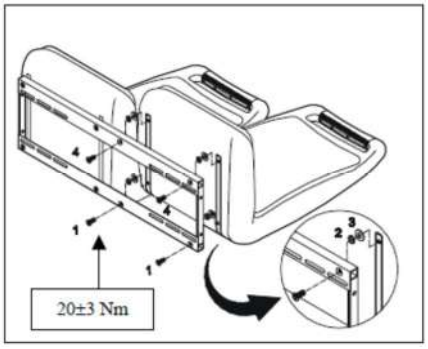
Covered Backrest

Disassembling:

1. Remove the seat backrest as using the crowbar as defined in the item 4.4.
2. Take the backrest plate out of fixing point "A" in the slots "B" of the plastic structure.

Assembling:

1. Insert 2 new clips (2) to the backrest plate (1). Insert the clips in to the extreme of the slots, detail 3.
2. Attach the backrest cushion plate (1) to the seat following the procedure: the inserts “A” in slots of plastic structure (detail B), and the clips (2) in the holes (C).
3. Hit with a hammer to fix the cushion (1). Review to ensure a good fixing.



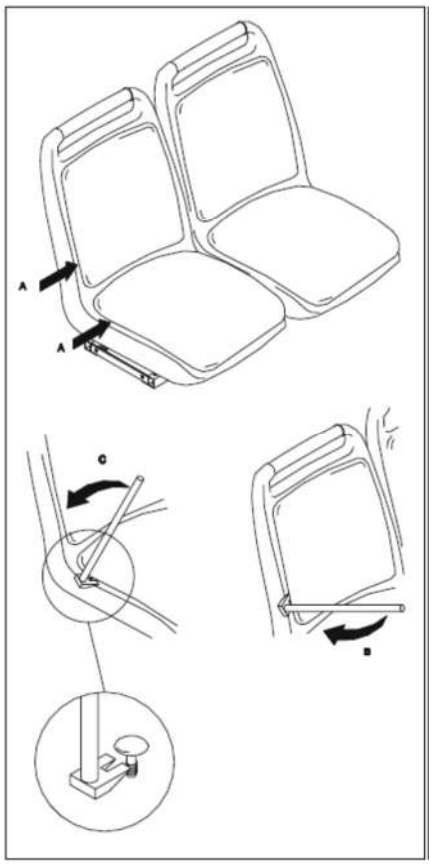
Seat Plastic Structure

Disassembling:

1. Loosen the seat cushion (see module 4.01).
2. Loosen the backrest (see module 4.02).
3. Loosen the handrail cover (see module 4.11).
4. Loosen the 4 bolts 8x55 (1) 4 washers Ø 8 (3) and 4 pressure washer (2), that fix the seat backwards to the platform.
5. Repeat the operation above to remove the seat frontward from the platform
6. Take the seat off.

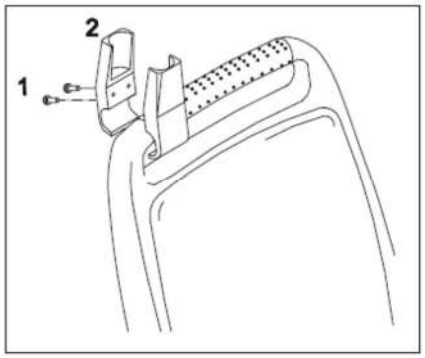
Assembling:

1. Revert the above process.



Using the Crowbar to take the seat and backrest cushion off.

1. Insert the crowbar in the junction of backrest and seat cushion (A) and the plastic structure, the crowbar detail must fit to the clip, see detail. A special care is demanded to avoid damages on plastic structure.
2. Force the crowbar in the sense of the arrow (C and B) to unclip the clip and loosen the backrest or seat cushion clips.
3. Repea the operation for both sides for seat and backrest cushions
4. Take the cushions off.



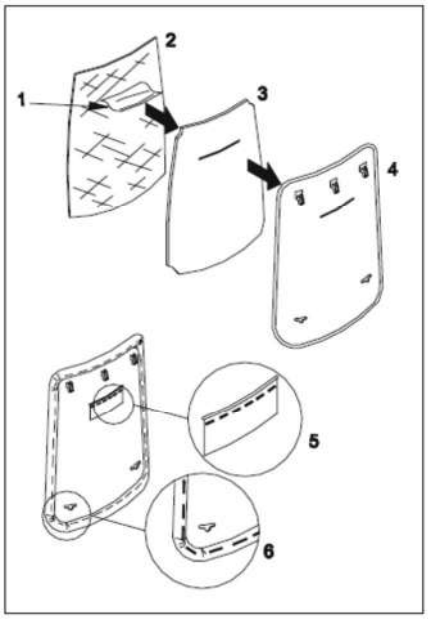
Hand Rail Fixing Flange

Disassembling:

1. Loosen the bolts (2).

Assembling:

1. Revert the above process.



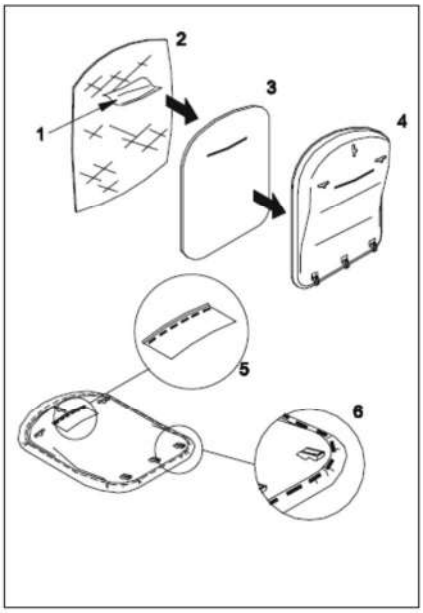
Backrest Cover

Disassembling:

1. Loosen the backrest cushion (see 4.02).
2. Take staples off, detail 6.
3. Unbound and take the staples off from the stretch net (5) in the backrest cushion (3), see detail 5.
4. Separate the cover (2) from the foam (3).

Assembling:

1. Revert the above instructions.



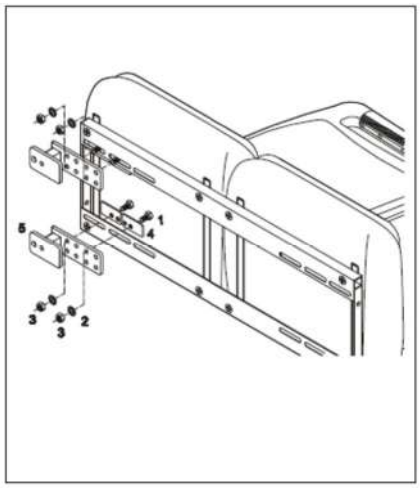
Seat Cushion Cover

Disassembling:

1. Loosen the seat cushion, see module 4.01.
2. Take staples off (3), detail 6.
3. Unbound and take the staples off from the stretch net (1) in the seat cushion (5), see detail B.
4. Separate the cover (2) from the foam (3).

Assembling:

1. Revert the above instructions.



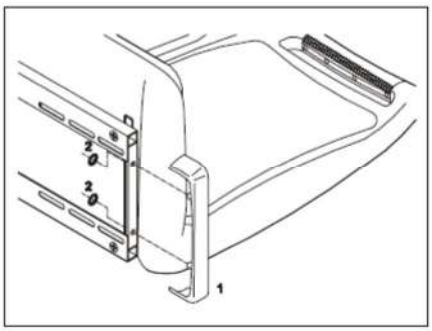
Side Wall fixing System

Disassembling:

1. Check the fixing system type and the bolts position.
2. Loosen the 4 hexagonal bolts M8x25 (1), take the pressure washers off Ø 8 (2) and the 4 nuts M8x25 (3). Take the bracket off.
3. Repeat the prior steps to the second bracket.

Assembling:

1. Place 4 hexagonal M8x25 in the suitable holes with 4 reinforcement plate (4).
2. Insert the brackets (5) in the platform using four pressure washers and M8 Nuts. Slightly tight the nuts.
3. Using a measure tape, check the seat position and if necessary adjust te positioning using a rubber hammer.
4. Apply the correct torque.



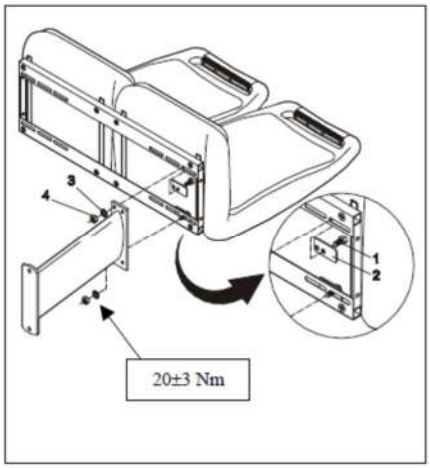
Platform Side Cover

Disassembling:

1. Take the cover off (1) extracting the fast coupling washers (2).

Assembling:

1. Place the new side cover and fix using new fast coupling washers.



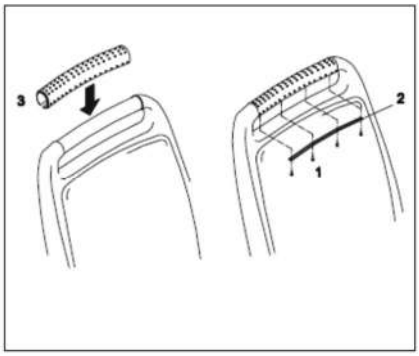
Seat Leg

Disassembling:

1. Check the current arrangement of the screws that tie the leg and unscrew them.
2. Remove old leg.

Assembling:

1. Fix the seat leg to the platform using the correspondent holes (2).
2. Fix, not tightening, the leg to the platform with the washers (2) and hexagonal Nuts M8 .
3. Using the measure tape and rubber hammer, adjust the leg position in the desired position.
4. Tight the bolts using the wrench and applying the correct torque.



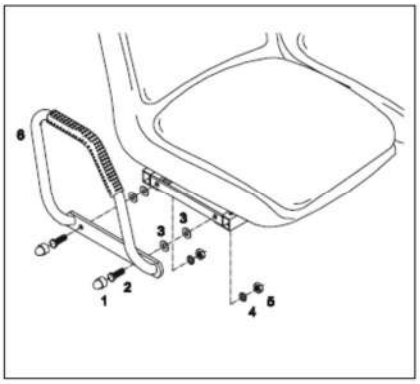
Seat Handrail gripping cover.

Disassembling:

1. Remove the four bolts (1) and the retaining profile (2) that fixes the cover (3).
2. take the gripping cover off.

Assembling:

1. Revert the above instructions.



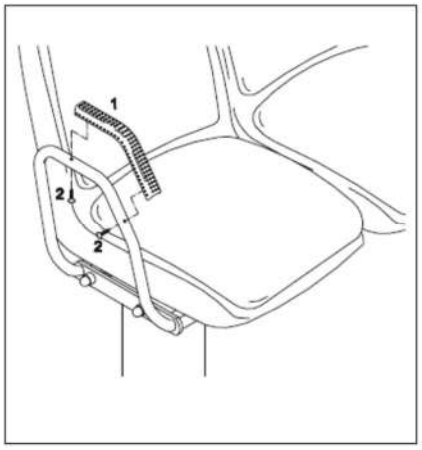
Aisle Armrest

Disassembling:

1. Take the screw caps off (1).
2. Loosen the hexagonal head bolts (2), with the correspondent washer and nut.

Assembling:

1. Introduce the bolts (2) in the arm holes adding the washers (3).
2. Place the armrest in the seat placing the spring washer in the inner side (4) fixing with 2 nuts.
3. Tight the bolts.



Armrest gripping cover

Disassembling:

1. Loose the bolts (2).

Assembling:

1. Tight the bolts.

BOLTS TORQUE

The bolted unions must be tighten following the toques on the next table since there are no special remarks to the referred mechanism.

This specifications is applied to hexagonal or cylindrical head bolts and steel nut with friction factor from 0,12 to 0,14.

The torque is specified combing the metric labeling, wires pitching and quality of each bolt.

Diameter	Thread Pitch	Quality	
		Torque (Nm)	
		5.6	8.8
M4	0,7	1,5 +/- 0,3	2,9 +/- 0,5
M5	0,8	3,0 +/- 0,5	6,0 +/- 0,9
M6	1	5,0 +/- 0,7	10 +/- 1,5
M8	1,25	12,5 +/- 2	25 +/- 3,8
M10	1,5	24,5 +/- 4	49 +/- 7,4
SAE 7/16”	20 wires/inch		35 +/- 5,3

The bolt quality is indicated on its head. In case of doubt when a bolt replacement is demanded, always use a 8.8 bolt.

Bolts Fixing Joints on Seat	Diameter	Quality	Attention
Seat against the platform.	M8	8.8	20 +/- 3 Nm
Seat leg against platform.	M8	8.8	Previous table
Backrest Support against supports.	M8	8.8	Previous table

For unions bolt/ Plastic, Bolt/ Aluminum, Bolt/ plate, greased unions and any other not specified in this manual, the seat manufacturer will indicate.

7.9.6 PUTTING INTO SERVICE

Before get started, the seat must be checked minding its functionalities and visual conditions.

The checks are visual for external components and manual working to elements belonging to mechanisms. The complete check list is indicated on table called “Preventive Maintenance”.

Maintenance Timeframe

	Frequency						
Maintenance tasks	**Regular Maintenance**					**Checks**	
	Every Week	**Every 6 months**	**Every Year**	**Every 2 years**	**Every 3 years**	**Week checks**	**6 months check**
Upholstery							
Vacuum Cleaning to absorb the fine dust	**X**						
Wet cleaning (wow and natural fabrics upholsteries) – See upholstery maintenance and cleaning.		**X**					**X**
Dry Clean through appropriate product (synthetic fabrics, polyester, etc). – See upholstery maintenance and cleaning.		**X**					**X**
Check upholsteries conditions, searching for scratches, holes or discoloration.							**X**
Search for stains and flattening of pelage.							**X**
Check the needle work do not present loosened wires and fringes.							**X**
Verify that fabric do not present wrinkles or bags.							**X**
Verify that the pelage sense is uniform.							**X**
Seat							
Check if there are noise due vibration.							**X**
Verify that seats cushion and backrest are fixed.							**X**
Re-tight the fixing bolts of seat against the platform.					**X**		
Foams							
Verify that foams do not present flattening and deforming.							**X**
Anchorage							
Re-tight the backrest fixing points.					**X**		

Maintenance Instructions

Moquettes (Fabric) Maintenance and Conservation

Regular Cleanness

A weekly vacuum cleaning will enlarge the fabric statutory life.

When vacuum cleaning, do not create excessive friction fabric by the nozzle, always apply the nozzle in go and back movements, in a regular and soft movements.

Deep Regular Cleanness

It is recommended every 6 months and depending on accumulated dust. The following process are recommended:

- Wow Fabric and blends: humid cleaning by “spray – extraction” process. Preferentially accomplished by a specialist using the most indicated method for each case (wow fabrics shampoo or similar products).
- Synthetic Fabrics (acrylic, polyester, etc.) – Dry clean using the right product. Preferentially accomplished by a specialist using the most indicated method for each case.
- As alternative for natural and synthetic fabrics, it is indicated use “dry foam” cleaning processes. Again accomplished by a specialist using the most indicated method for each case.
    - When steam cleaning is used, a special care must be paid in order to avoid stains, generated by water condensation from the steam machine. Again, a specialist must be consulted.

Stains Treating

The most important is actuate as fast as possible, preferentially, before the stain get dried, otherwise the removal of stain will very difficult or not effective.

If the stain is liquid of greasy, it is necessary absorb using a clean fabric or a foam. In case of solid of semi-solid stains, the excess must be removed with a spatula.

If the stain got dried, brush slightly to eliminate residual materials and immediately absorb with a humid fabric or sponge.

In case the action must occur to stain interior in order to reduce its size.

Below, there is a list of most common stains types and its specifics treatments:

Oil. Cover the stain area with powder or paste talc. Leave for some hours and than brush. If stain got dried, use a stain remover.

Tar or Pitch. Treat with benzol or stain remover thinner.

Pen Ink. Treat locally with Alcohol.

Shoes Bitumen. Dissolve with Ethanol, press with a clean fabric and clear with neutral soap.

Coffee / Cocoa. Treat with benzene of stain remover thinner.

Gum. Treat with acetone and wash afterwards removing the residues.

Grease. Treat with alcohol or similar. If persists, stain remover thinner.

Adhesives. Once dried, impossible to remove. If possible, treat immediately with acetone.

Lipstick. Treat locally with alcohol.

Perfume / Make up. Treat locally with hot glycerin, rinse with water and neutral detergent.

Paint. Clean immediately with a cotton fabric soaked in solvent. If oil based paint, use an oil with turpentine; If synthetic based paint, treat with suitable solvent, apply the powder talc and brush after dried.

Gum. Treat with alcohol and remove the residues.

Chocolate. Treat using warm water and soap or neutral shampoo, rinsing afterwards.

Nail Polish. Use acetone, wash and rinse.

Fruits.Wash with blend of neutral detergent and water. If persists, dry foam.

Milk. With detergent or neutral shampoo for upholsteries.

Ice Cream. Wash with warm water and stains remover thinner.

Rust. Treat with specific remover anti-oxide or lemon juice alternatively.

Urine. Treat with neutral detergent for upholsteries. If persist, consult a specialist.

Resin. Remove the residues and treat with solvent (Turpentine oil) and wash.

Blood. Wash with warm water and neutral detergent. If it is dried, wash many times.

Sweat. Brush with vinegar or alcohol diluted.

Tea. Same as coffee and cocoa.

Ink. Soaked with alcohol and wash with neutral detergent.

White Wine. Rinse with cold water and wash subsequently.

Red Wine. Wash immediately and than treat locally with lemon juice.

Vomit. Wash detergent or upholsteries shampoo and rinse.

Plastic Parts Cleaning

On plastic structure the first cleanness must be done with a sponge soaked in soaped water. Once dried, spray an alkaline detergent with high pH, suitable for plastic surfaces, strongly rubbing with dried fabric. In rough surfaces, it is necessary to brush to remove the adhered dirt.

Paint Protection

When cleaning the vehicle interior, use only water or neutral products dissolved in water. Avoid to use abrasives, strong acids or strong bases as bleach or hydrochloric acid. Do not use organic solvents.

Standard Labor Time Table

#		MODULE	OPERATION	TIME (MINUTES)
1		4.01	Replace seat cushion	4,10
2		4.02	Replace backrest cushion	3,90
3	*	4.03	Replace seat plastic structure	11,00
4		4.04	Replace backrest cushion cover	12,40
5		4.05	Replace seat cushion cover	12,60
6		4.06	Replace side wall fixing bracket	8,00
7		4.07	Replace platform side cover	3,25
8		4.08	Replace seat leg	8,00
9		4.09	Replace seat handrail gripping cover	5,10
10		4.10	Replace aisle armrest	4,30
11		4.11	Replace armrest gripping cover	3,30
12		4.12	Replace seat handrail flange	3,70

MAINTENANCE PLAN

Guidelines for Maintenance Plan Application

1 - The first line of the table indicates the time frame for the works to be carried out. The criterion is to assume whatever comes first, i.e. even if a vehicle is not doing 5.000km per week, the work needs to be performed in a weekly basis.

2 – Blue lines organizes as family the main mechanisms of the vehicles such as Doors, Air conditioning system, etc. Some families demand to be organized in Sub-groups, which are highlighted in yellow.

3 – The white cells that show numbers on its correspondent timeframe (column) and task to be carried out (line), indicate that task must be performed and number value indicates, roughly, the labor time.

	Maintenance Tasks	Weekly or 5.000 km	Monthly or 15.000 Km	Every 3 months or 40.000 Km	Every 6 months or 75.000 km	Yearly or 150.000 Km	Every 2 years or 300.000 Km	Every 3 years or 450.000Km	Part #
1	**Climatization Family**								
1.1	**Compressor Group**								
1.1.1	V belts tension			0,1					
1.1.2	V belts Replacement					0,5			Depends on Chassis type
1.1.3	Compressor Oil Revision					0,1			
1.1.4	Clutch pulley bearings replacement					1			AH3450040
1.1.5	Cranckshaft seal and drier filter replacements. Expasion valves filters cleaning.							4	593125 (Drier Filter) 599479 (Cranckshaft seal)
1.1.6	V belts tensioning system. Airbag checking.			0,1					

1.1.7	Electrical installation revision at compressor zone (diode, pressure					**0,5**			
1.1.8	Compressor fixing base Silent Block revision					**0,1**			
1.1.9	Compressor, clutch pulley and pressure switces revision. Hidraulic circuit revision, gas filtering, leakages proves and gas					**0,75**			
1.1.10	Run the diagnosis system to test all electric / electronics devices.					**0,1**			
1.2	**Condensers Group**								
1.2.1	Condensers motors and fans assy revision.					**0,2**			
1.2.1	Extraction, revision and washing of condensers coils					**6**			
1.3	**Evaporators Group**								
1.3.1	Evaporators Motors Revision					**0,2**			
1.3.2	Evaporators water trays drains revision					**0,2**			
1.3.3	Air return Filters cleaning and revision	**0,3**	**0,3**						
1.3.4	Air return Filters Replacement			**0,5**					**593122**
1.3.5	Air recycling flaps revision					**0,1**			
1.3.6	Extraction, revision and washing of evaporators coils					**6**			
1.4	**Heating System Group**								

1.4.1	heating system components revision. Floor and roof valves.					**0,1**			
1.4.2	Main water pump revision					**0,1**			
1.4.3	Main water pump reparing kit replacement							**0,6**	**8009510 Booster pump Reparing kit)**
1.4.4	Pre heater working revision					**0,1**			
1,4,5	Revision Wispers, convectors and fans of Artic heating devices (Opcional)					**0,2**			
1.5	**Demister Group**								
1.5.1	Air filter revision		**0,1**						
1.5.2	Air filter replacement					**0,1**			**592793**
1.5.3	Fan Motors revision					**0,4**			
1.5.4	Air recycling flaps motor revision					**0,1**			
1.5.5	Air flow trap revision					**0,1**			
1.5.6	Water tray drain revision					**0,1**			
1.5.7	Demister water valve revision			**0,1**					
1.5.8	Run the diagnosis system to test all electric / electronics devices.					**0,1**			
2	**Doors Family**								
2.1	Check door operation		**0,5**						
2.2	Door adjustment				**1,5**				
2.2	Sensibility system revision (pneumatics, electrics)		**0,25**						
2.3	Door emergency operation revision		**0,25**						
2.4	Cleaning of electro valves and pilots					**1**			

2.5	Check the electro neumatic system - leaks, connections					**0,5**			
2.6	Door mechanims torques check					**0,4**			
2.7	Grease the doors Mechanism						**0,1**		
3	**Manual Luggage Bin Doors**								
3.1	Clean and grease the wheels arch covers lock			**0,3**					
3.2	Clean and grease the hinged luggage bins			**0,5**					
3.3	grase luggage bins door pneumatic locks and pistons			**0,2**					
3.4	Revision and greasing of front bonnet and bumper opening system			**0,2**					
4	**Wipers System**		**0,1**	**0,1**		**0,7**	**0**	**0**	
4.1	wiped area and wiper blades revision			**0,1**					
4.2	Ensure wiper arm positioning, which must be parallel to the floor.		**0,1**						
4.3	System and torque check for wiper arms and rods					**0,2**			
4.4	System and torque check for wiper motor					**0,2**			
4.5	Cleaning and greasing of joints and mobile elements					**0,3**			
5	**Body electrical instalation**								
5.1	external and internal lighting revision					**0,3**			
5.2	Installation revision: electrical box, batteries box, destination equipment, lighting, CCTV.					**0,5**			

5.3	Revision of electrical devices compartment sealing system					**0,2**			
5.4	Check the electrical instalation of the destination displays system			**0,5**					
5.5	Check the stop calling warning for passenger and disable persons			**0,3**					
6	**Seats**		**0**	**0**		**0,5**	**0**	**0**	
6.1	Revision of arms fold down system					**0,5**			
6.2	Check seat belts operation					**0,1**			
6.3	Check that there are no noises and vibrations			**0,2**					
6.4	Check that the seat backs and the cushions are well positiones and tied up.			**0,2**					
6.5	Check-torques of the union between the seat base and the cushion					**1**			
6.6	Check seat upholtey situation			**1**					
6.7	Check torques of seat clamping to the floor.								
7	**Audio-Video**								
7.1	Cleaning of cd loader reading head (laser)						**0,5**		
7.2	Revise electrical system						**0,5**		
7.3	Check the driver´s microphone					**0,1**			
7.4	Check the speakers					**0,2**			
8	**Rearview Mirror**								

8.1	Revision of Mechanism working and electrical instalation (motor and demisting system)					**0,1**			
8.2	Revision of Mirrors and arms fixing sytem.					**0,2**			
9	**Painting**								
9.1	Revision of underneath rubbering protection					**0,5**			
9.2	Revision of external painting coat				**1**				
9.3	Revise the coating of the structural members				**1**				
10	**Disable people Access (Ramp)**								
10.1	Check and grease the moving components					**0,5**			
10.2	Revision of electrical installation with special attention to the open ramp signal sensor.		**0,1**						
11	**Underneath**								
11.1	Check the lower exterior part, including the structural members and the floor plywood				**0,5**				
			4	**13**		**42**	**3**	**1**	
	TOTAL LABOR (h)		**5,7**	**17,4**	**4**	**67,15**	**4,1**	**5,6**	
	MATERIALS								
	Compressor belts						**X**		
	Drier Filter							**X**	
	Air recicling filters			**X**					

ATTENTION:
1 - All tasks to be performed by trained staff
2 - This plan is subjected to modifications accondingly to the buses operation / Application
3 - Labor costs or Spareparts replacements on maintenance plan are not included in the warranty policy
4 - Labor time defined is based on Irizar staff experience and may vary accondingly to customer or agent staff experience.

Elaborated and revised by: Hector Holabe / Daniel Scarpino de Castro
Approved by: Hector Olabe
Application: Irizar Iria City BUS, built on Scania and Volvo Chassis, Rear Engine designed.
Distribution: Customers and Service Agents

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