

**EQUIPAMENTO AUTOMÁTICO DE LAVAGEM
IMPIANTI AUTOMATICI DI LAVAGGIO
AUTOMATIC WASHING EQUIPMENT
EQUIPO AUTOMATICO DE LAVADO**



**INSTALAÇÃO – USO – MANUTENÇÃO
INSTALAZIONE – USO – MANUTENZIONE
INSTALLATION – USE – MAINTENANCE
INTALACION – UTILIZACION – MANTENIMIENTO**

EDITION – APRIL 2003



INDEX

1. GENERAL WARNING	04
2. APPLICATION	05
2.1 Figures of the Equipment Composition	06
2.1.1 Internal Optional	06
2.1.2 External Optional	07
3. IDENTIFICATION PLATE	09
4. SAFETY DEVICES	10
5. TRANSPORTATION	11
6. CHARACTERISTICS OF WASHING AREA	13
6.1 Minimum Dimensions for the Area	13
6.2 Feeding	14
6.3 Installation: Dimensions and Weights	16
6.4 Noise	17
6.5 Pollution of Draining Water	18
7. UNPACKING	18
8. INSTALLATION	19
9. EQUIPMENT DESCRIPTION	20
9.1 General Characteristics	20
9.2 Fittings and Optional	21
10. COMMAND AND OPERATION DEVICES	23
10.1 Keyboard	23
10.2 Brushes Mapping in Relation to the Keyboard	25
10.3 Emergency Stop Keys	25
11. WASHING PROGRAMS	26
11.1 Washing Cycles	27
12. TIME AND CONSUMPTION	27
13. WARNING AND INSTRUCTIONS TO THE OPERATOR	28
13.1 Daily Operations	28
13.2 Recharge of Chemical Products	29
13.3 Setting the Products Distribution Capacity	29
13.4 Preliminary Controls for Each Washing	31
13.4.1 Verifications	31
13.4.2 Recommendation About the Indicated Items	31
13.5 The Washing Process	32
13.6 Start of the Washing Cycle	32
13.7 Emergency Stop	33

13.8	Turning Off the Machine at the End of the Day	33
14.	ORDINARY MAINTENANCE	34
14.1	Weekly	34
14.2	Monthly	35
14.3	Semestral	35
14.4	Lubricants	35
15.	DAMAGES	36
15.1	Re-establishment of the Protection Circuit Breaker	37
16.	INOPERÂNCÊ	37
17.	DISASSEMBLING THE INSTALLATION	38
18.	INSTALLATION, FIRST FUNCTIONING AND SETTING	40
18.1	Installation	40
18.2	Grounding	45
18.2.1	Instructions for the Ground Circuit Connection	45
18.2.2	Especifications of the Materials to be Used	46
18.3	Adjusting	47
18.3.1	Procedures for Adjusting the Pneumatic System	47
18.3.2	Electric Verifications	49
19.	FUNCTIONING	50
19.1	Description of Washing Cycles	50
20.	EXTRAORDINARY MAINTENANCE	53
20.1	Equipment Check-up	53
20.2	Possible Defects	54
21.	ADVISABLE SPARE PARTS	60
22.	LIST OF ATTACHED DOCUMENTS	63

PART A

INSTRUCTIONS TO THE CUSTOMER

1. GENERAL WARNING

- This manual is an integrating part of the machine which was delivered to you and so, it must be carefully kept for further reference.
- Read carefully all warnings in this manual for they guarantee a safe installation, use and maintenance.
- Installation must be performed by a qualified professional according to the existing rules and to the manufacturer instructions. Wrong or badly executed installation may put security under risk.
- Electrical installation must be performed according to all existing security rules and, particularly it must have a grounding circuit.
- Equipment adjustments are executed by specialized technicians during the assembly and installation and therefore there is no need for any regulation. In case of damage or malfunction you must call the manufacturer Technical Assistance and require the replacement of the original parts. The non observation of this rule may jeopardize all installation security.
- To periodically control, at least once a month, the functionality of all safety devices.
- During the work time there must be a person that knows the machine quite well and that, in case of any problems, is able to adopt the corrective actions to avoid danger.
- Before performing any cleaning or maintenance on the equipment be sure to disconnect the electric power by turning off the main switch of the machine and to interrupt the water and air supply. Be sure that during interference the switch is kept off.
- No modification at all may be done in the machine without previous written authorization from the manufacturer.

CECCATO DMR cannot be considered responsible by eventual damages to people, animals or any thing arising out of the non observation of the points above described.

- In case of any fault check the correct electric, water and air feeding. All service executed by the Technical Assistance due to excess or lack in the feeding system will be charged, even if the machine is under the warranty validity time.
- Wherever necessary your attention will be called to important points through the following indications.

**NOTE :**

Supply other information of interest

**WARNING !**

Caution to avoid operations that may cause damage or to the installation

**ATTENTION !**

Warning for dangerous operation that may cause hazard

2. APPLICATION

This machine is designed for vehicle washing, particularly buses with dimensions not higher than the following:

EQUIPMENT	LFO 535 LFO 735	LFO 541 LFO 741
MAXIMUM VEHICLE WIDTH (mm)	2700	2700
MAXIMUM VEHICLE HEIGHT (mm)	3500	4100

It must be observed that the free distance from the floor in any vehicle must be equal or higher than 30 cm. The front area of the vehicle must have at least 6 square meters.

No other use has to be considered.

This machine was designed and constructed to be used with chemical products for fast-washing systems supplied, or advised by CECCATO.

The use of other detergents or chemical substances may interfere in the machine operation as well as in the safety of the staff involved in such work.

2.1 Figures of the Equipment Composition

The complete washing installation for the LFO models may be composed by several figures according to the optional applied.

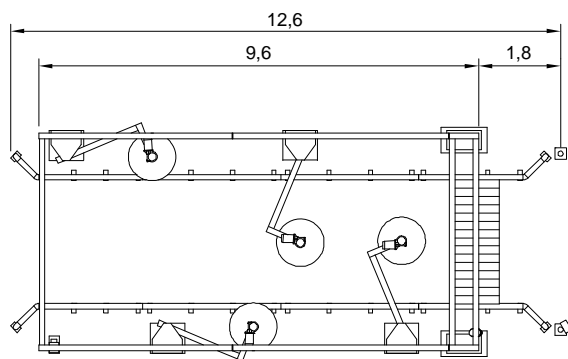
These optional may vary depending on the so called internal optional which apply to the washing equipment itself and, by the external optional which are composed by extra components installed together with the washing equipment.

2.1.1 Internal Optional

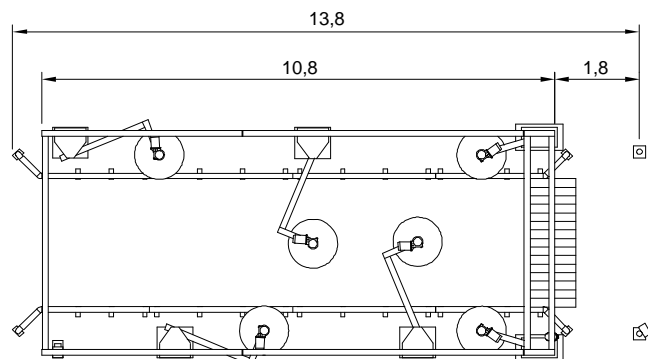
These optional are the following:

Maximum Height for Washing: Two options: 3,50m and 4,10m.

Number of Brushes: Two options: five brushes and seven brushes. In this item we can check that the equipment length dimension is different for 5 or 7 brushes, as follows:



EQUIPMENT LFO 5 BRUSHES



EQUIPMENT LFO 7 BRUSHES

Structure Finishing: Two options: only zinc plated or zinc plated with painting. The options for colors are: White (RAL 9010), Black (RAL 9005), Blue (RAL 5002), Yellow (RAL 1018), Red (RAL 3002).

Voltage and Frequency:

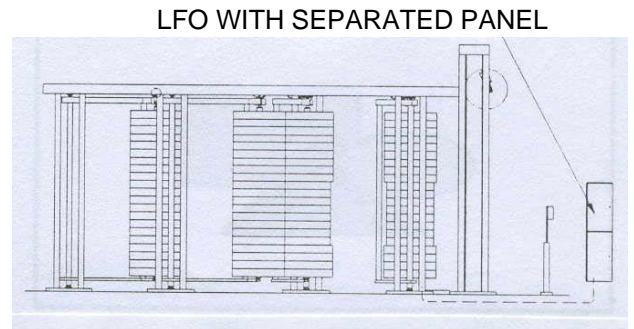
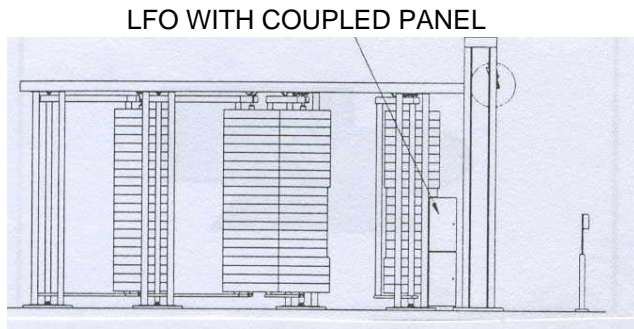
230V - 50HZ	220V - 50HZ or 60HZ
400V - 50HZ	380V - 50HZ or 60HZ
	440V - 50HZ or 60HZ

Actuation: This optional define the type of actuators that control the equipment performance, with two options: Photocells or Limit Switch.

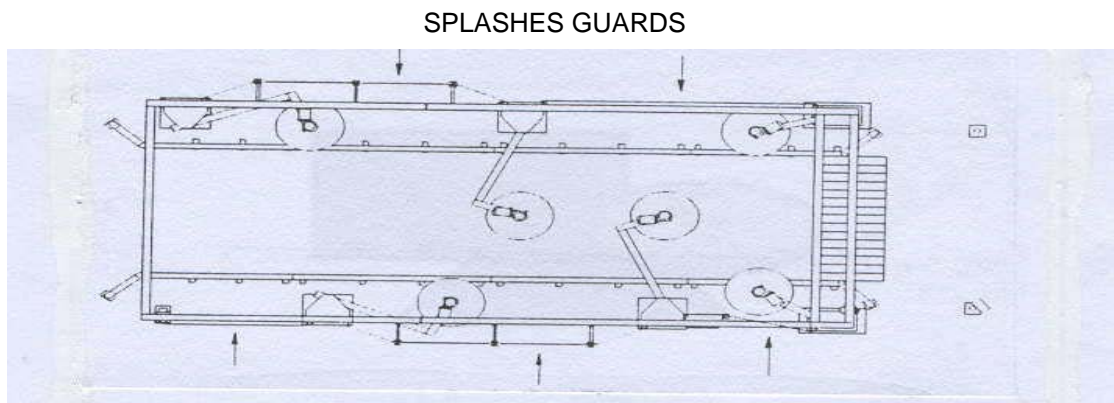
Wheel Guide: The wheel guide is a safety item with two options: Leaden or Screwed to the floor.

Traffic Light: Because of the external optional, the traffic light may be installed with a post attached to the equipment. This option will be mandatory only if there is pre-washing.

Electric Panel: The electric panel that commands the washing equipment can be supplied in two options: Coupled with the equipment which is the regular option or separated from the equipment.



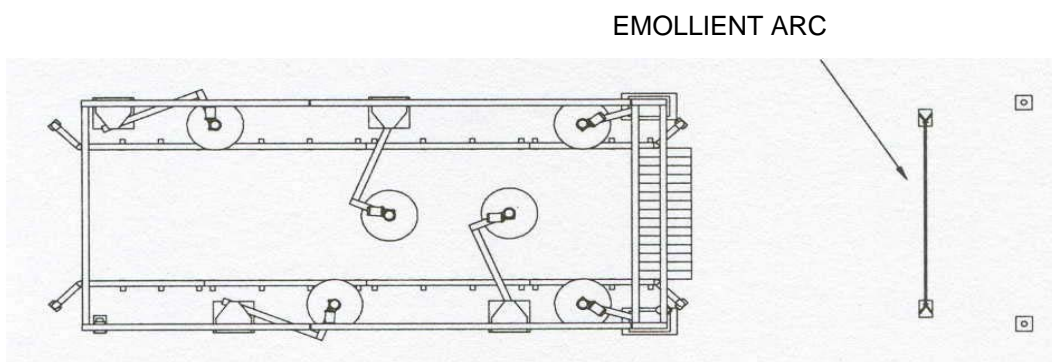
Protection: Against Splashes: Protection in canvas placed as an optional on the equipment to retain the water dispersion out of the washing track and, as a safety device due to the brushes movement. This device is obligatory in narrow areas and in countries of the European Community (EC).



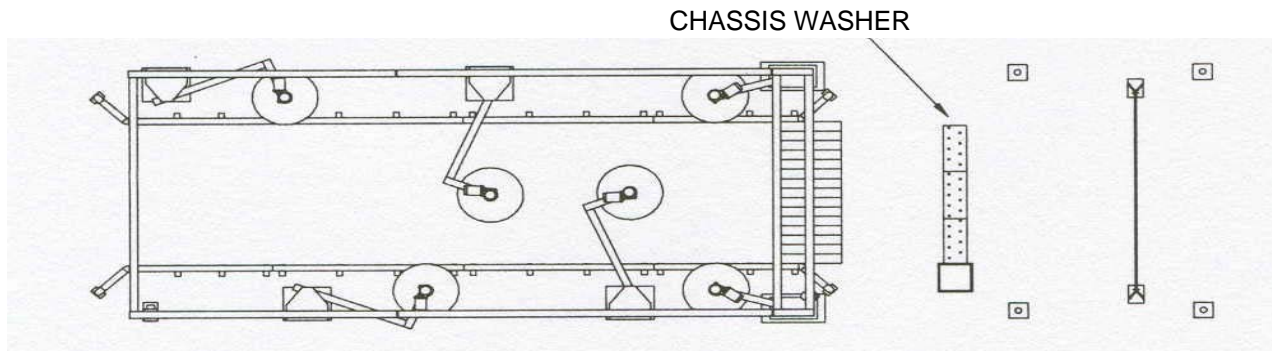
2.1.2 External Optional

These optional are composed by devices intended to work together the washing equipment, performing a cleaning pre-work or final finishing in the washing carried out by the LFO equipment. These optional are:

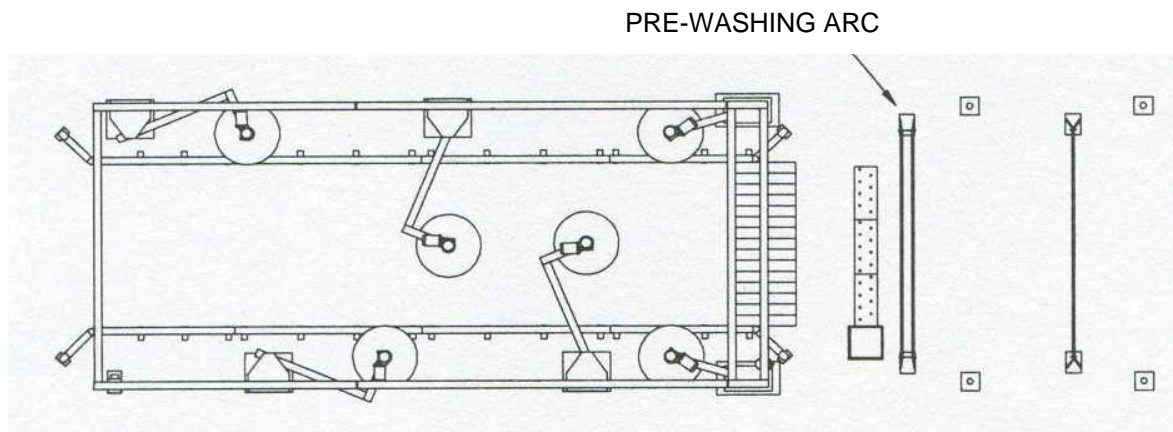
Emollient Arc: Are shaped structure with nozzles and a self device to apply the chemical product which "soften" the dirties on the vehicle body in order to improve the LFO washing equipment performance. This arc must be used before the pre-washing arc so the product can be rinsed off before the washing.



Chassis Washer: Device assembled on the floor in order to spray water under medium pressure directly under the chassis, so removing the thicker dirties stuck to this surface.

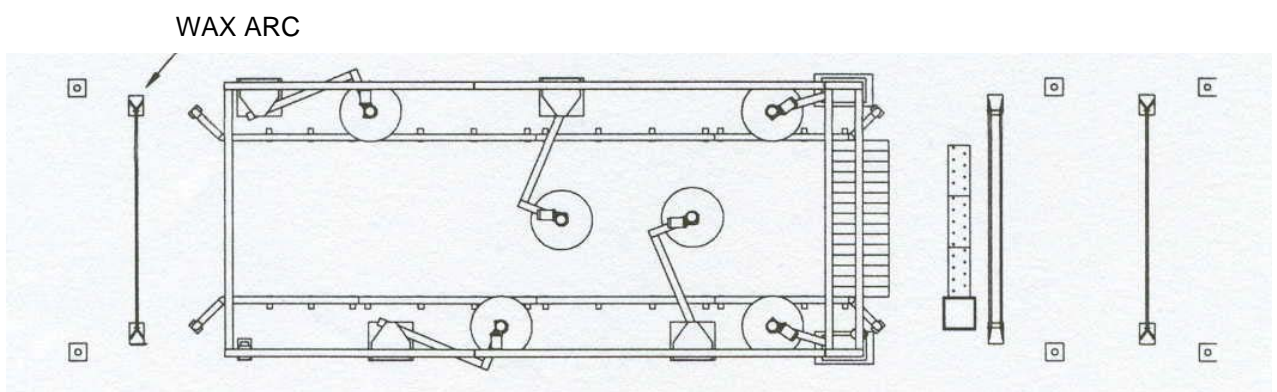


Pre-Washing Arc Under Medium Pressure: Arc shaped structure to spray water over the vehicle body: The aim of this arc is to remove dirties or emollient off the vehicle body before it enters the LFO equipment.

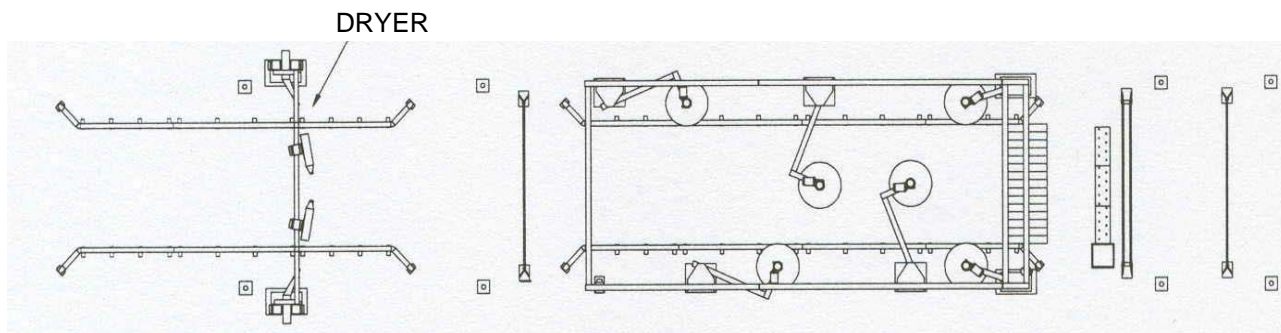


	<p>NOTA:</p> <p>This arc must be used whenever the Emollient Arc is utilized.</p>
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Wax Arc: Arc shaped structure assembled right after the LFO washing machine equipment exit which aim is to apply a wax protecting film over the vehicle body. This is particularly recommended when the optional dryer is used.

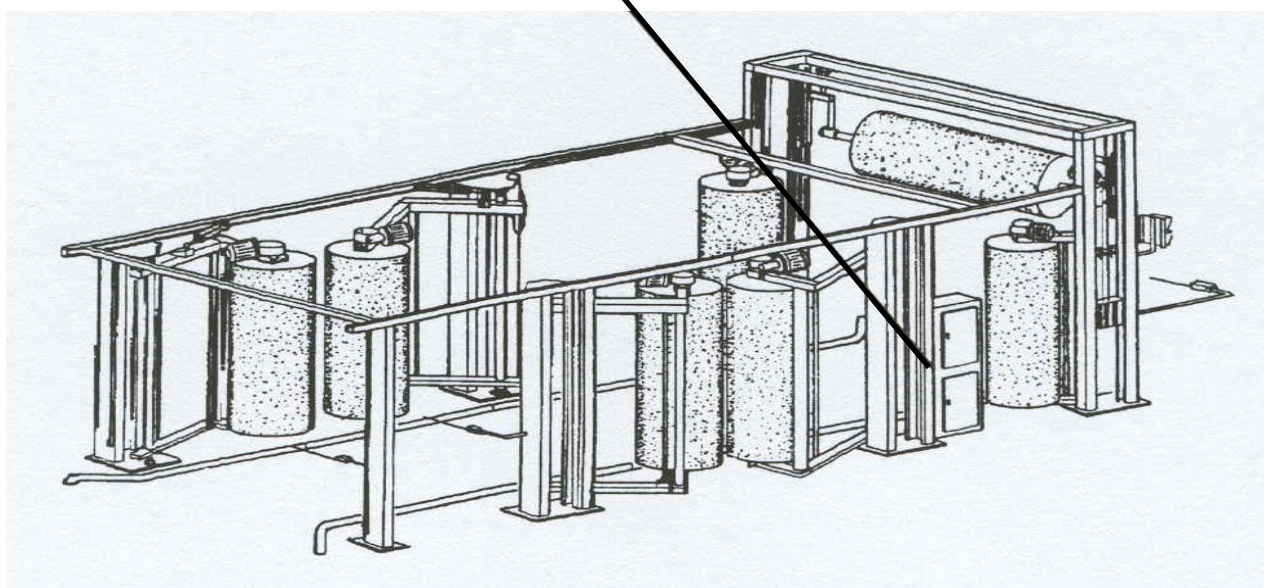


Dryer: This is an aside equipment assembled after the LFO equipment and, after the Wax Arc in order to remove the humidity excess off the vehicle body. It is highly recommended together the Wax Arc so a better equipment performance can be reached.



3. IDENTIFICATION PLATE

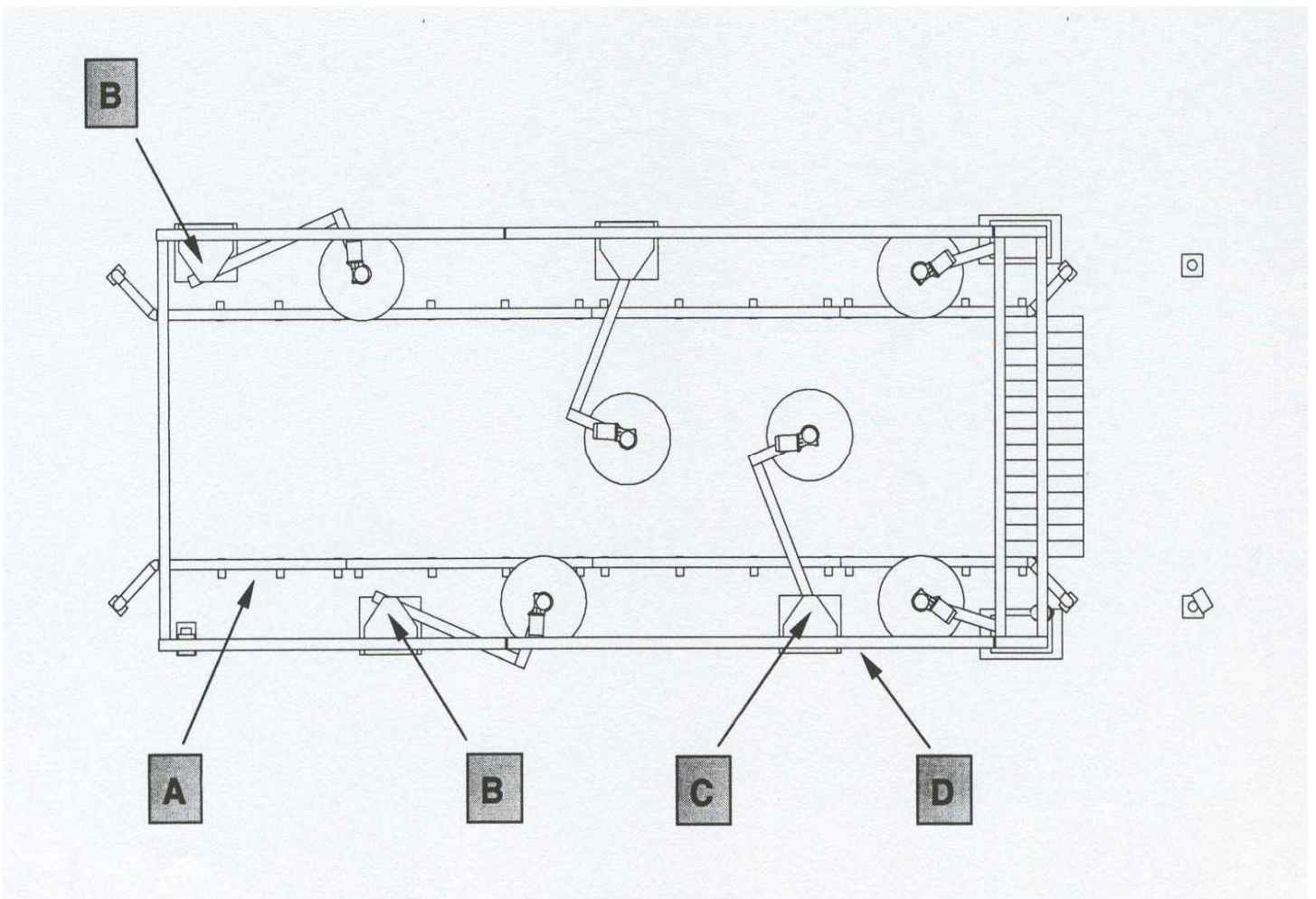
CECCATO DMR SEBASTIANA G. DE CAMPOS, 1100 CAMPOS ELISIOS - LIMEIRA - SP BRASIL			
TYPE			
MOD.	YEAR		
REGIS.			
MOTOR MAX. POWER	KW		A
INSTALLED POWER	KW		
PHASE 3	V	HZ	



4. SAFETY DEVICES

Removing or modifying one or more of the following devices may compromise the installation safety:

- A) Wheels Guide
- B) Limit Switch for Improper Vehicle Entrance
- C) Sound Alarm
- D) Counter-Weight Guard
- E) Brushes Pneumatic Guard (Relief Valve)
- F) Splashes Guard

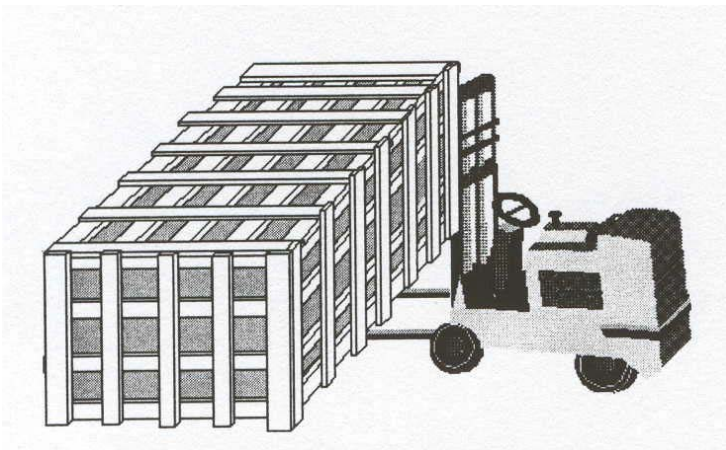


5. TRANSPORTATION

The equipment transportation is a very delicate phase for irreparable damages may happen if certain rules are not observed. Obviously the farther the equipment will be transported, the more care must be taken.

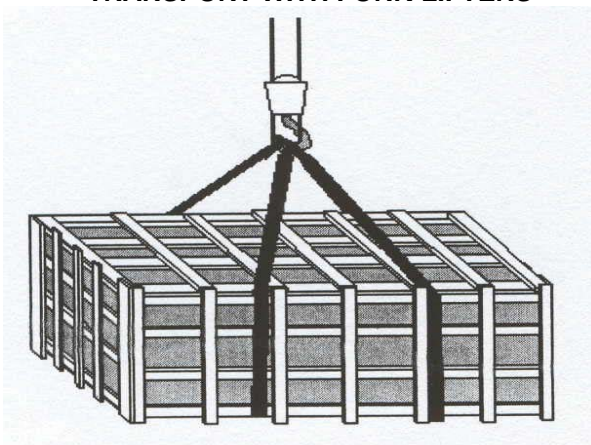
Loading and unloading the machine must be done carefully using appropriate ways and watching the existing predisposition in the machine. It is not advisable to transport the machine on long distance trips.

- a) All loose parts must be fixed.
- b) The horizontal brush and counter-weight must be fixed in a way that the swinging caused by the transport does not damage them.
- c) The vertical brushes must be disassembled to avoid any pressure on the bearings.
- d) Ropes must not be help to points where they can cause damages or ruptures due to their pressure.
- e) Take all necessary means in a way that the transporting vehicle body and the painting do not suffer any damage caused by frictioning.



To move the equipment when in crates use a hoist with a minimum capacity of 3500 Kg.

TRANSPORT WITH FORK-LIFTERS



Use currents with a minimum capacity of 5000 Kg or a belt with a minimum capacity of 3500 Kg.

Minimum Length = 8m
Tapes ISO 4878

TRANSPORT WITH HOIST

CRATES DIMENSIONS FOR LFO MODELS.

MODELS		LFO 535		LFO 541		LFO 735		LFO 741	
Crate Number		1	2	1	2	1	2	1	2
Net Weight	kg	1.500	2.302	1.700	2.352	1.500	2.402	1.700	2.452
Gross Weight	kg	2.080	3.072	2.310	3.152	2.080	3.172	2.310	3.252
Length	m	6.00	4.70	6.00	4.70	6.00	4.70	6.00	4.70
Width	m	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35
Height	m	1.30	1.60	1.30	1.60	1.30	1.60	1.30	1.60
Cubic Content	m ³	18.33	17.67	18.33	17.67	18.33	17.67	18.33	17.67

CRATE DIMENSION FOR THE DRYER (OPTIONAL)

DRYER 35

Net Weight (kg)	Gross Weight (kg)	Length (m)	Width (m)	Height (m)	Cubic Content (m ³)
860	1320	5.10	1.30	1.00	6.63

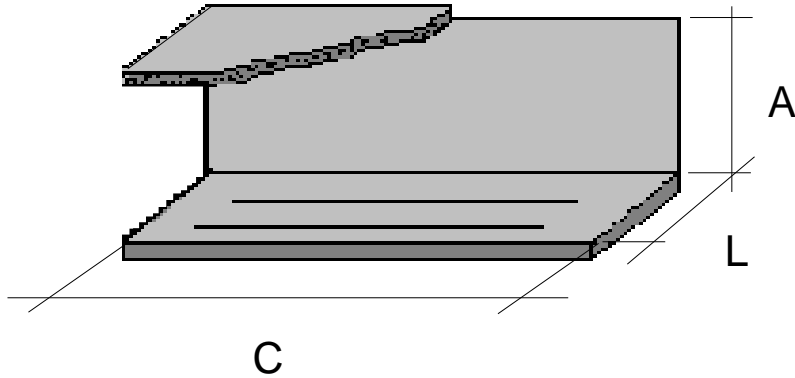
DRYER 41

Net Weight (kg)	Gross Weight (kg)	Length (m)	Width (m)	Height (m)	Cubic Content (m ³)
890	1350	5.10	1.30	1.00	6.63

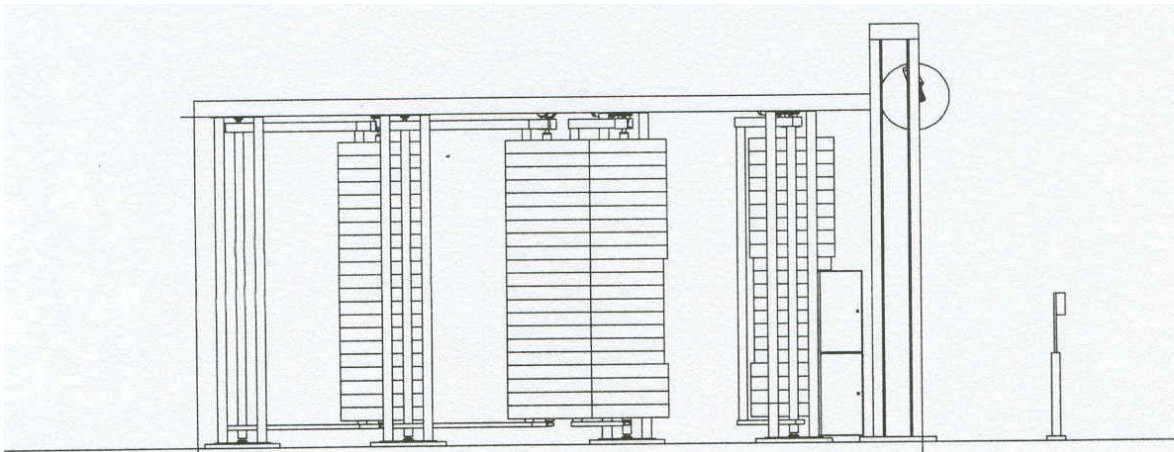
6. CHARACTERISTICS OF WASHING AREA

In order to dispose the installation in the washing area, watch the foundation drawing plants according to the equipment models which may be found in the list attached to this manual.

6.1 Minimum Dimensions for the Area



DIMENSIONS	C (mm)	L (mm)	A (mm)
LFO 735	14.500	5.900	5.250
LFO 741	14.500	5.900	5.900
LFO 535	13.000	5.900	5.250
LFO 541	13.000	5.900	5.900
DRYER 35	9.000	7.150	4.950
DRYER 41	9.000	7.150	5.000
ARCS 35	6.000	5.000	4.400
ARCS 41	6.000	5.000	5.000



MINIMUM PLAN = 15.000

MINIMUM PLAN = 15.000





ATTENTION !

For the minimum specified dimensions the equipment must be equipped with safety system for narrow areas.

6.2 Feeding

Water Inlet Connection	2 x 1"
Water Pressure	2,5 / 3,5 bar
Compressed Air Inlet	R 1/4"
Air Pressure	6 bar

	<p>NOTE :</p> <p>The pipe diameter for water supply may vary according to the distance from the pump. See installation plants.</p>
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	<p>ATTENTION !</p> <p>Any interference in the electrical installation, even a small one, must be performed by qualified staff.</p>
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Feeding Tensions and Frequencies - 230V +/- 10% - 50Hz
400V +/- 10% - 50Hz
220V +/- 10% - 50HZ / 60HZ
380V +/- 10% - 50HZ / 60HZ
440V +/- 10% - 50HZ / 60HZ

Cables for the equipment electric feeding according to the table below:

TABLE 1 - ELECTRICAL CABLES FOR LFO EQUIPMENT						
VOLTAGE (V)	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	GENERALE SWITCH
220/230	UP TO 74M 25mm ²	UP TO 105M 35mm ²				NH 100A
380/400/440	UP TO 88M 10mm ²	UP TO 140M 16mm ²				NH 63A

TABLE 2 - ELECTRICAL CABLES FOR LFO EQUIPMENT WATER PUMP						
VOLTAGE (V)	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	GENERALE SWITCH
220/230	UP TO 50M 4mm ²	UP TO 75M 6mm ²	UP TO 125M 10mm ²			
380/400/440	UP TO 60M 1.5mm ²	UP TO 100M 2.5mm ²				

TABLE 3 - ELECTRICAL CABLES FOR THE CHASSIS WASHING EQUIPMENT						
VOLTAGE	SECTION	SECTION	SECTION	SECTION	SECTION	GENERALE

(V)	DISTANCE	DISTANCE	DISTANCE	DISTANCE	DISTANCE	SWITCH
220/230	UP TO 32M 6mm ²	UP TO 54M 10mm ²	UP TO 86M 16mm ²			NH 40A
380/400/440	UP TO 39M 2,5mm ²	UP TO 63M 4mm ²	UP TO 95M 6mm ²			NH 25A

TABLE 4 - ELECTRICAL CABLES FOR THE WAX ARC OR EMOLLIENT

VOLTAGE (V)	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	GENERALE SWITCH
220/230	UP TO 40M 6mm ²	UP TO 70M 10mm ²	UP TO 110M 16mm ²			NH 40A
380/400/440	UP TO 50M 2,5mm ²	UP TO 80M 4mm ²	UP TO 130M 6mm ²			NH 25A

TABLE 5 - ELECTRICAL CABLES FOR CHASSIS WASHING, PRE-WASHING, WAX AND EMOLLIENT

VOLTAGE (V)	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	GENERALE SWITCH
220/230	UP TO 40M 10mm ²	UP TO 75M 16mm ²	UP TO 100M 25mm ²			NH 63A
380/400/440	UP TO 53M 4mm ²	UP TO 80M 6mm ²	UP TO 120M 10mm ²			NH 40A

TABLE 6 - ELECTRICAL CABLES FOR THE DRYER

VOLTAGE (V)	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	SECTION DISTANCE	GENERALE SWITCH
220/230	UP TO 87M 50mm ²	UP TO 120M 70mm ²				NH 160A
380/400	UP TO 60M 16mm ²	UP TO 100M 25mm ²				NH 80A

INSTALLED POWERS

EQUIPMENT	LFO 535	LFO 735	LFO 541	LFO 741
INSTALLED POWER (KW)	12	15	12	15

EQUIPMENT (OPTIONAL)	DRYER	EMOLLIENT ARC	WAX ARC
INSTALLED POWER (KW)	22	2.2	2.2

EQUIPMENT (OPTIONAL)	CHASSIS WASHER	MEDIUM PRESSURE ARC
INSTALLED POWER (KW)	3.7	3.7

6.3 Dimensions and Weights

EQUIPMENT	LFO 535	LFO 735	LFO 541	LFO 741
WIDTH (mm)	5.250	5.250	5.250	5.250
LENGTH (mm)	12.000	13.000	12.000	13.000
HEIGHT (mm)	5.050	5.050	5.700	5.700
WEIGHT (kg)	3.800	3.900	4.050	4.150

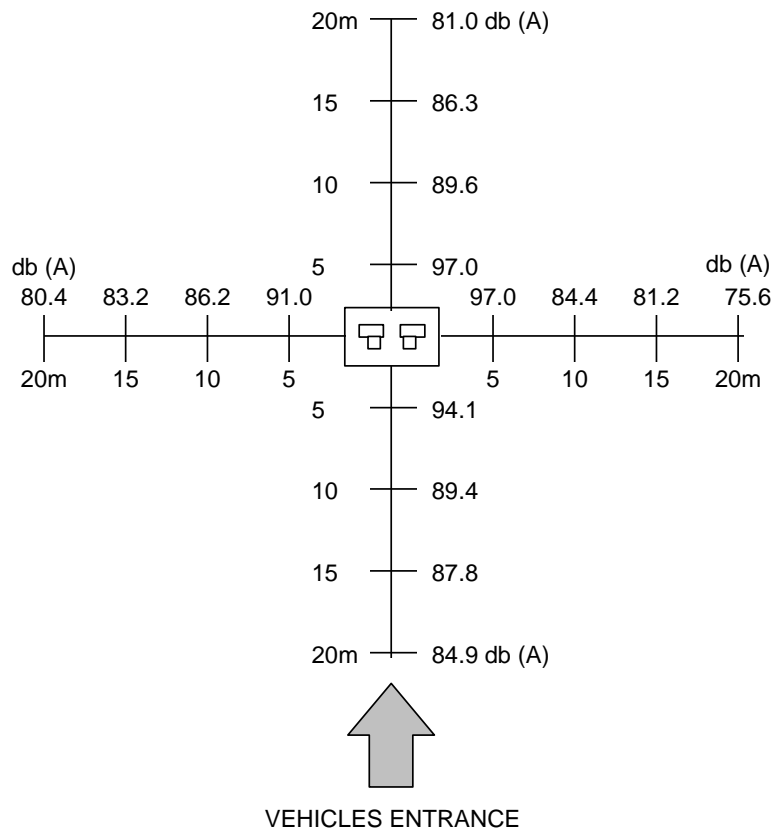
EQUIPMENT (OPTIONAL)	DRYER 35	DRYER 41	WAX ARC
WIDTH (mm)	6.500	6.500	4.300
LENGTH (mm)	1.500	1.500	450
HEIGHT (mm)	4.700	5.400	4.000
WEIGHT (kg)	860	890	120

EQUIPMENT (OPTIONAL)	CHASSIS WASHER	EMOLLIENT ARC	MEDIUM PRESSURE ARC
WIDTH (mm)	2.650	4.300	4.300
LENGTH (mm)	370	450	450
HEIGHT (mm)	---	4.000	4.000
WEIGHT (kg)	150	120	205

6.4 Noise

Level of noise generated by the optional Dryer, evaluated under the following conditions:

- Relief of the sound level pressure in free field on a reflector plan.
- Measurements accomplished at 5, 10, 15 and 20 meters far from the starting axis.



NOTE :

Values may vary due to the background noise and the installation environment. The data presented are orienting include a background noise of 73db (A).

6.5 Pollution of Draining Water

Pollution of draining water is due to the chemical products used in the washing process (wax, shampoo, etc) and also by some products derived from the vehicles (earth, oil, dust, etc.)

Below, just as a matter of information we have the indexes that characterize the pollution regularly found in the discharge of industrial vehicles washers.

PH	5 - 10	
Sediment Solids	10	p.p.m.
COD	700	mg/l
Mineral Oils	100	mg/l
Tensoactives MBAS	30	mg/l

The characteristics may vary a lot according to the quality of the products used and the amount of dirt from the vehicles washed.

To hold the pollution index it is advisable to use CECCATO products and a limited use of doses.



NOTE :

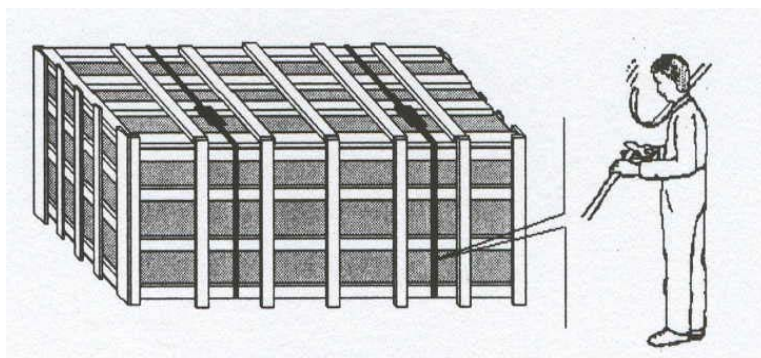
For the washer water discharge it must be observed the local legislation relating to drainage, always treating the effluent accordingly.

7. UNPACKING

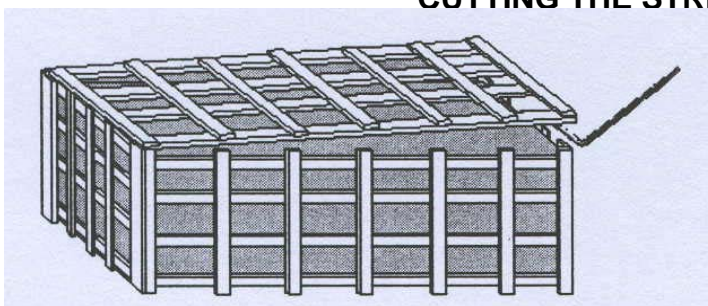


ATTENTION !

Cutting the metallic strips is a dangerous operation so, all necessary care must be taken and safety equipment must be utilized. Do not cutting edges in the environment.

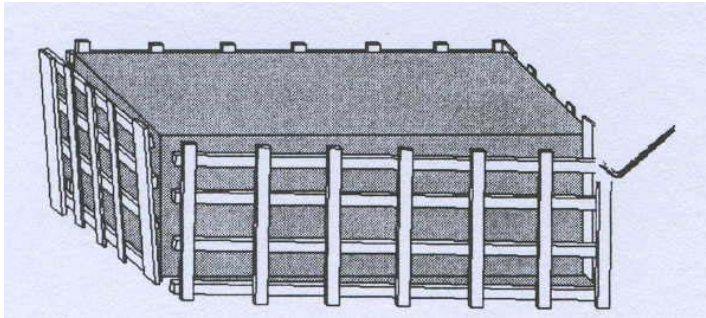


CUTTING THE STRIPS



Start unpacking by removing the nails from the upper part of the box.

UNPACKING



Continue by removing the nails from edges.

UNPACKING



NOTE :

- All material used in the packing is compatible with the environment.
- They may be preserved without any harm or be burned out in a specific burner for this type of material.
- Plastic material may be utilized again.
- It is advisable that all parts made of cardboard be placed in a determined place to be collected for recycling.

8. INSTALLATION



ATTENTION !

The installation and the first work must be only by trained professional staff.
See part B item 18 - Installation, first work and setting.

9. EQUIPMENT DESCRIPTION

9.1 General Characteristics

STRUCTURE

- Completely treated with hot zinc.
- Entrance of cables and feeding hoses is located under the electrical panel column.
- It is fixed counter-bases leaden to the floor.

WHEELS GUIDE

- Allows a correct placing of the vehicle, improving the washing, protecting the equipment and the vehicle against accidents that may be caused by misconduction inside the equipment.

TRAFFIC LIGHT

- With two lights automatically commanded by the actuators.
- Plastic lenses in two colors, green and red, assembled on metallic chassis.

HORIZONTAL BRUSH

- Pendulum system based on the tilting of the lateral suspension arms.
- Up and down movement through pneumatic cylinder.
- Brush rotation through reducer motor, worm and bronze crown.
- Motor with degree of protection IPW55 isolation B.
- Leaning pressure on the vehicle determined by a counter-weight.

VERTICAL BRUSHES

- Rotation through reducer motor, worm and bronze crown indirectly linked to the brushes tubes by plastic couplings.
- Opening and closing movement through pneumatic cylinders.
- Leaning pressure on the vehicle determined by pneumatic counter-pressure.

BRISTLES

- Brushes composed by individual modules with several sizes according to their positioning.
- Easily replaceable modules fixed by locking screws.

ELECTRICAL INSTALLATION



ATTENTION !

Do not handle by mistake or disconnect the ground current switch.
(Life Saver).

- Electrical installation must be executed according to the existing legislation.
- Every electric motor is protected with an appropriate shield against short circuits and overload.
- Motors with tension unified in the European models.

HIDRO PNEUMATIC INSTALLATION

- Differentiated water supply for the rear part (washing) and front part (rinsing).
- Pneumatic circuit with pressure switch.
- Possibility of connecting a flow switch to the hydraulic circuit.
- Discharge of water condensed in the entrance of the air filter.
- Pumps automatic actuation according to the vehicle passage (Saver).

DOSING SYSTEM OF CHEMICAL PRODUCTS

- With venturi and regulator valve for controlling the water/shampoo mixture.
- Optional with dosing pump.
- Water distribution and regulated products, reducing expenses to a minimum.

WINTER WATER DRAINING

- Taps are foreseen to the handy wintry discharge (anti-freezing).

9.2 Fittings and Optional

EMOLLIENT ARC

- Composed by an arc with galvanized tubes in which nozzles are positioned and directed to the vehicle.
- Consists of a vehicle pre-washing with special chemical products and consequent rinsing with water under medium pressure before the washing with brushes.
- The emollient injection is made through a dosing pump and because of this it must be used concentrated without preparing mixtures in an external reservoir.

MEDIUM PRESSURE ARC

- Composed by an arc with galvanized tubes in which nozzles are positioned and directed to the vehicle.
- Consists of removing chemical products excess applied before the washing.
- Improves washing performance in equipment with such optional.

CHASSIS WASHER

- Composed by two transversal tubes assembled on a lowering part of the floor, in which are placed nozzles directed to the vehicle chassis.
- Water feeding for the chassis washer is done by a proper medium pressure pump.

AUXILIARY VERTICAL BRUSHES

- Rotation through a reducer motor with worm and bronze crown indirectly connected to the brushes tubes by plastic coupling.
- Opening and closing movement through pneumatic cylinder.
- Rotation direction opposite to the vehicle passage, counter-rotation, which allows washing all corners not reached by the regular brushes in favorable rotation.

WAX ARC

- Composed by an arc with galvanized tubes in which nozzles are placed and directed to the vehicle.
- Increase protection for the vehicle body against the action of atmospheric agents.
- Injection through a dosing pump.
- Improve drying efficiency in equipment with this optional.

DRYER

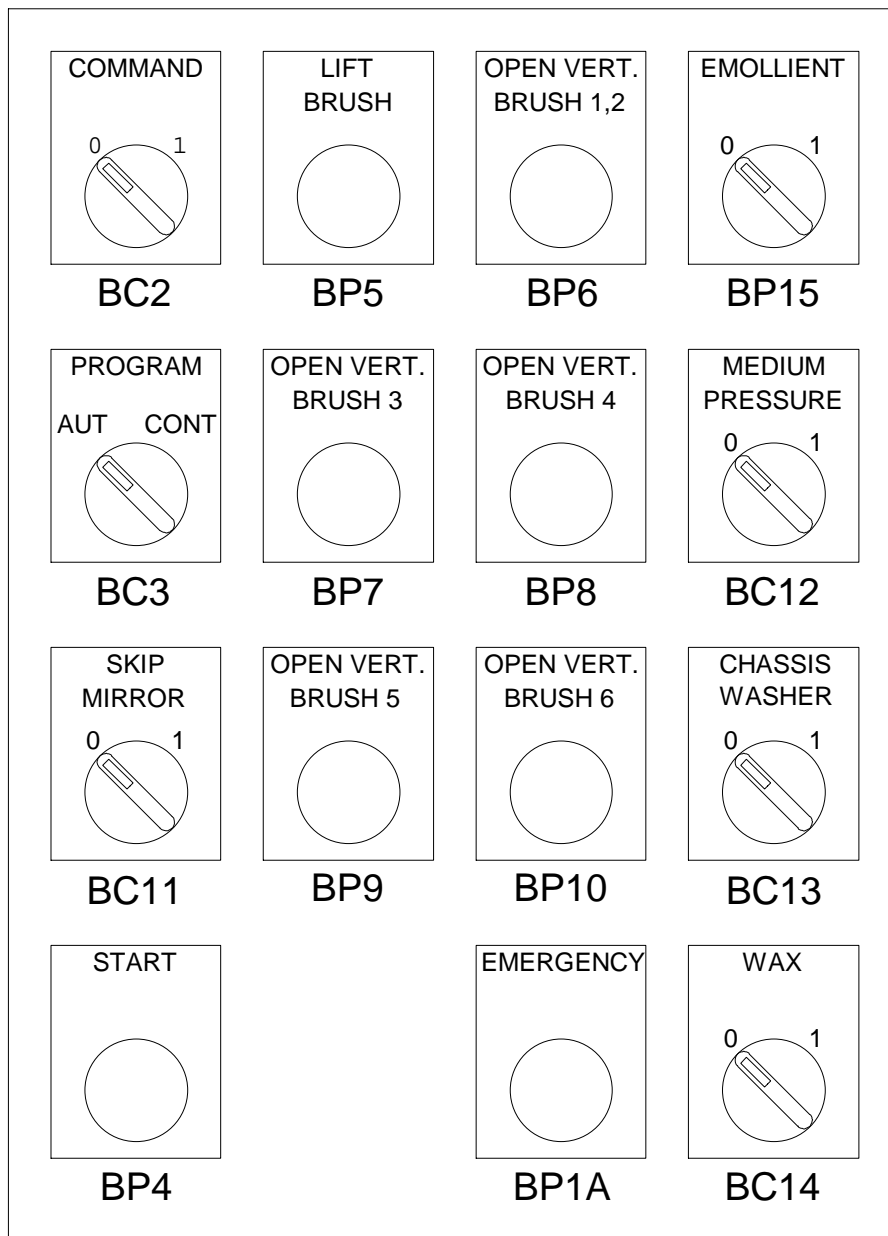
- Six fans assembled on a tubular structure with hot zinc treatment. They apply air streams against the vehicle surface during its passage through the portico.

10. COMMAND AND OPERATION DEVICES

The equipment is connected to a command that provides the operator to act over the equipment allowing him to correct eventual facts and abnormalities during the washing. This device is called keyboard and its characteristics are supplied below.

10.1 Keyboard

In this device there is a panel on which is assembled a set of keys whose functions are the following:



BP1A - *Emergency Key*, must be pressed in any case where there are irregularities of operation in the equipment or in the washing process. This key immediately interrupts all movements and makes all brushes open.

BC2 - *General Key*, must be actuated by placing it on the position 1 every time you are going to use the equipment.

BC3 - *Selecting Program Key*, must be actuated by placing it on the desired position, automatic or continuous.

AUTOMATIC PROGRAM - The equipment gets ready to receive the vehicle at any time. In this option the actuation will be always done by the first actuator placed in the equipment entrance, turning off after the vehicle exit.

CONTINUOUS PROGRAM - In this program the equipment must be handy actuated through the key START (BP4) before receiving the vehicle. In this option the equipment keeps ON even after the vehicle exit, awaiting the coming vehicle and, turning off only by the Emergency Key (BP1) or the General Key (BC2).

BP4 - *Start Key*, must be actuated to start the equipment only when the Selecting Program Key (BC3) is on the continuous option.

BP5 - *Lift Brush Key*, must be actuated in all cases where there is a need to lift the horizontal brush in order to skip any obstacle, or to totally above.

BP6 - *Open Brushes Key*, must be actuated in all cases where there is a need to push away brushes 1 and 2 (counter-rotation) from the vehicle to skip any obstacle or fitting.

BP7 / BP8 / BP9 / BP10 - *Open Brushes Key*, must be actuated in all cases where there is a need to push away brushes 3,4,5 and 6 from the vehicle to skip any obstacle or fitting.



NOTE :

Each key actuates its corresponding brush, as described on the plate.

BC11 - *Selector Key for Skip Mirror Program*, must be actuated on position 1 every time that this program is going to be used to make the vertical brushes 3 and 4 skip the side mirrors.

BC12 - *Selecting Key for the Medium Pressure Program*, must be actuated placing it on position 1 every time that the medium pressure arc is going to be used in the pre-washing.

BC13 - *Selecting Key for the Chassis Washer Program*, must be actuated placing it on position 1 every time that chassis washer is going to be used in the pre-washing.

BC14 - *Selecting Key for the Wax Program*, must be actuated placing it on position 1 every time that this product is going to be used in the washing process.

BC15 - *Selecting Key for the Emollient*, must be actuated placing it on position 1 every time that this product is going to be used in the pre-washing.

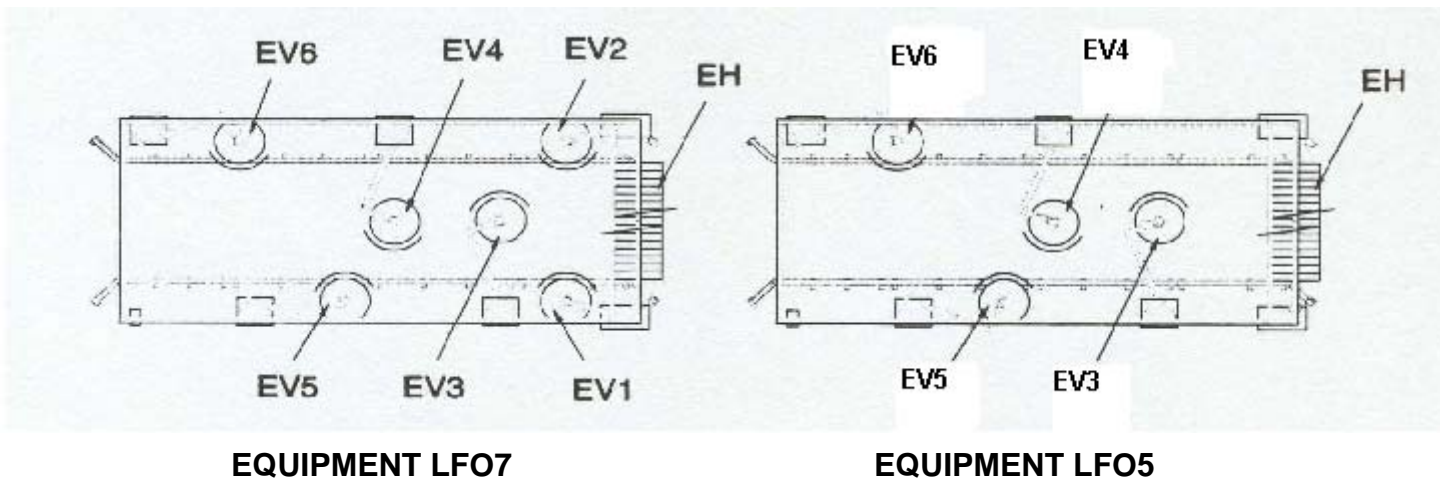


WARNING !

Only people trained by CECCATO must operate this equipment.

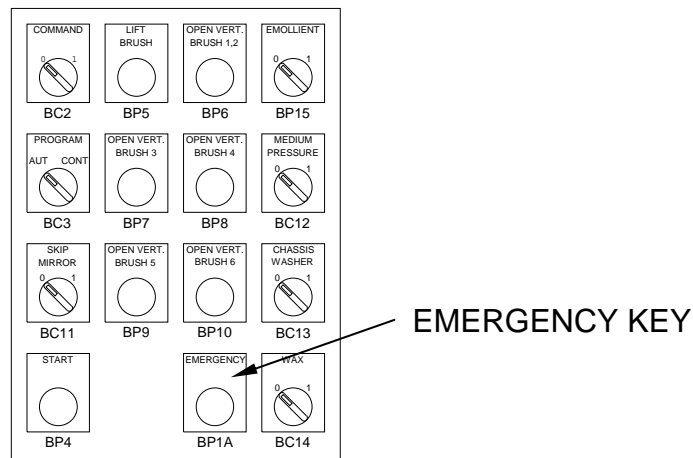
Customer has to define how many people and who must take part in the training operation executed by the assembler technician after the complete assembly and test of the equipment. It is entire responsibility of the customer any disturbance originated by the lack of attention to this note.

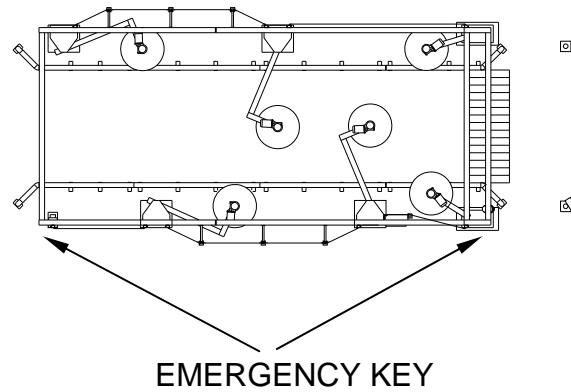
10.2 Brushes Mapping in Relation to the Keyboard




10.3 Emergency Stop Keys

Three keys are foreseen as to allow the equipment emergency stop. One is assembled in the low right corner of the keyboard and the other two are assembled on the equipment. In this case one is in the equipment entrance and the other in exit, as shown in the figures below:





11. WASHING PROGRAMS

	<p>NOTE :</p> <p>Before proceeding the vehicle washing, see item 13 - Instructions and Warnings to the Operator.</p>
---	---

In the LFO washing equipment it is considered two ways of executing the washing process, taking into consideration the number of vehicles to be washed.

If the washing operation is not frequent, which means, there is a gap of time between one vehicle and the other, the equipment may be programmed to work on automatic basis. In this case the equipment turns on automatically as the vehicle comes closer and turns off as soon as the vehicle leaves the equipment.

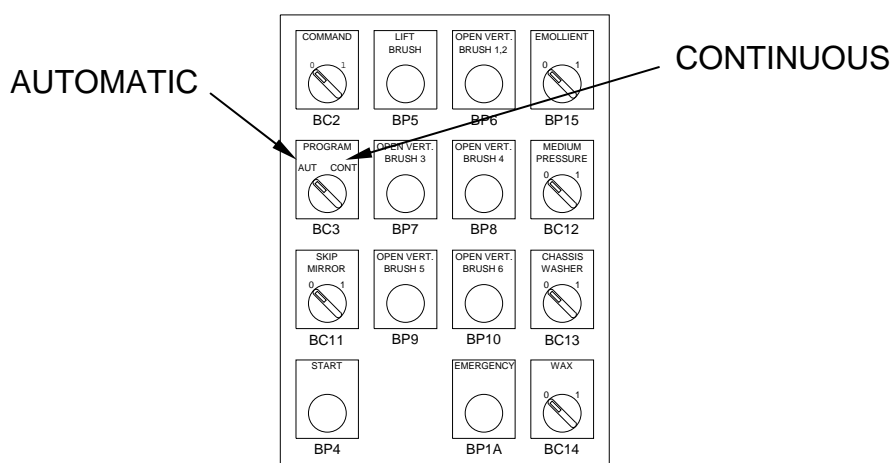
If, on the other hand, there is a line of vehicles to be washed the equipment must be programmed to work on continuous basis. In this case the equipment is kept on all the time, allowing the consecutive inlet of vehicles just respecting the interval indicated by the traffic light. One vehicle can only enter when the traffic light turns to green.

Working on continuous basis becomes necessary to avoid a great number of motors starting in a short space of time. This way of operating provides a great reduction in the consumption of electric power as well as a longer life for the motors and components.

11.1 Washing Cycles

AUTOMATIC PROGRAM - The equipment gets ready to receive the vehicle at any time. In this option the start will always be by the first actuator (antenna or fotocell) of the equipment, turning off after the vehicle leaves it. To predispose the equipment in such way, the key in the keyboard must be set to AUTO.

CONTINUOUS PROGRAM - For this program the equipment must be turned on by hand through the starting key (BP4) before receiving the vehicle, the program key must be set to the position CONT. In this option the equipment is kept on even after the vehicle exit, awaiting for the next one. In this program the equipment is turned off through the general key (BC2) or, eventually by the emergency key (BP1).



12. TIME AND CONSUMPTION

		LFO 535 / 541	LFO 735 / 741
FEEDING TENSION	V	230 / 400	230 / 400
COMMAND TENSION	V	24	24
INSTALLED POWER	KW	12	15
ENERGY CONSUMPTION/VEHICLE	KW/H	0,20	0,3 / 0,6
DILUTED DETERGENT CONSUMPTION/VEHICLE	ML	300 / 500	300 / 500
WATER CONSUMPTION/VEHICLE	L	350 / 500	350 / 500
WASHING TIME	MIN	1/2	1/2
WORKING PRESSURE/COMPRESSED AIR	PSI	70 / 80	70 / 80
NUMBER OF WATER PUMPS	UN	02	02
WATER PUMP POWER	CV	3	3
FLOW RATE/WATER PUMP	L/H	7200	7200
WATER PUMP PRESSURE	BAR	4,3	4,3

OBTAINMENT OF TABLE DATA:

- Data were obtained considering a 14m long vehicle.
- Chemical products used are those supplied by CECCATO.
- Electric energy consumption comprises, besides the equipment, two water pumps of 2,2KW each, which feed the equipment.
- The consumption of optional indicated in separate as follows, must be taken into consideration.

		EMOLLIENT ARC	CHASSIS WASHER	PRE-WASHING ARC
FEEDING TENSION	V	230 / 400	230 / 400	230 / 400
COMMAND TENSION	V	24	24	24
INSTALLED POWER	KW	2,2	3,7	3,7
ENERGY CONSUMPTION/VEHICLE	KW/H	0,04	0,06	0,06
CHEMICAL PRODUCT CONSUMPTION/VEH	ML	300 a 500	---	300 a 500
WATER CONSUMPTION/VEHICLE	L	120	230	230
WASHING TIME/VEHICLE	MIN	1 a 2	1 a 2	1 a 2
WORK PRESSURE/COMPRESSED AIR	PSI	70 a 80	---	70 a 80
WATER PUMP POWER	CV	3,0	5,0	5,0
FLOW RATE/WATER PUMP	L/H	7200	14000	14000
WATER PUMP PRESSURE	MCA	43	40	40

		WAX ARC	DRYER	
			OPENED	CLOSED
FEEDING TENSION	V	230 / 400	230 / 400	230 / 400
COMMAND TENSION	V	24	24	24
INSTALLED POWER	KW	2,2	14,7	22,0
ENERGY CONSUMPTION/VEHICLE	KW/H	0,04	0,24	0,36
CHEMICAL PRODUCT CONSUMPTION/VEHICLE	ML	300 a 500	-----	-----
WATER CONSUMPTION/VEHICLE	L	120	-----	-----
WASHING TIME/VEHICLE	MIN	1 a 2	1 a 2	1 a 2
WORK PRESSURE/COMPRESSED AIR	PSI	70 a 80	-----	-----
WATER PUMP POWER	CV	3,0	-----	-----
FLOW RATE/WATER PUMP	L/H	7200	-----	-----
WATER PUMP PRESSURE	MCA	43	-----	-----

13. WARNINGS AND INSTRUCTIONS TO THE OPERATOR

13.1 Daily Operations

- a) Before starting operation, clean the installation and floor. No strange object is supposed to stay on the floor for not to damage the equipment or the vehicles.
- b) Check if there is nothing strange in the brushes. Check if the parts of the bristles are properly fixed to the hold brushes tube.
- c) Check the level of chemical products in the reservoirs, fill them up if necessary. Consult the paragraph "Recharge of Chemical Products".
- d) Daily clean the actuation photocells (emitter and receiver) in the equipment that owns this system.
- e) Check the functioning of the emergency stop key.
- f) Check the presence of electric energy, water and air.
- g) Drain the condensing water from the compressor.
- h) Check if the machine is in regular position to start (mobile equipment).
- i) Check the condition of the actuating antenna in the equipment that owns this system.
- j) Control the oil level in the pneumatic system. Consult paragraph 14.1 Ordinary Maintenance.

13.2 Recharge of Chemical Products



NOTE :

In order to obtain good results in the washing and utilize CECCATO chemical products.

The quality of the chemical product is not responsible only for the final quality of the washing but has also a great influence over the duration of the dosing system and all parts in contact with the products. Products of low quality may damage the pumps and of the valves responsible for the aspiration and distribution of the product.

The check of chemical products must be always done before starting the operation. For machines equipped with dose pumps the products must be used as supplied (pure); for machines with venturi type injector it is necessary to dilute the products according to the recommendation in the technical cards placed in the products containers.

- Substitute the product if it is not going to be completely used or if no recharge is done after a month, since the product, mainly the wax loses its characteristics when in contact with atmospheric agents.
- Clean the aspiration filters every time that the product is completely substituted.
- Effectuate the recharge before draining completely the reservoir. In equipment with dosing pump functioning under dry condition may cause, along the time, a deterioration of the pump membrane.

13.3 Setting the Products Distribution Capacity

The setting of the products distribution is performed in function of the product injection device located in the equipment.

A) For basic equipment with shampoo injection through venturi this setting must be done as follows:

Start putting the equipment to work and regulate by the regulating tap placed above the solenoid valve (VS1) for a diluted shampoo consumption of about 400 ml/min. After, regulate with the vehicle being washed observing results (or drying if this optional is available) by regulating the tap as wished.

B) For the equipment with shampoo injection through dosing pump or that has this component in any of its optional, proceed in the following way:



WARNING !

The dosing pump set up must be always done with the pump on.

- ⇒ Check if there is chemical product in the reservoir.
- ⇒ Put the dosing pump to work.

- ⇒ While the pump is working, change the capacity by using the regulation key of the dosing pump.
- ⇒ Adjust the product injection capacity slowly, gradually altering the regulation key position, always observing the washing results (or drying if this optional is available) at every alteration. Check the efficiency or excess of product.


Possible regulations for the dosing pumps:

Pump Graduation	Pump Flow
100%	100ml
90%	90ml
80%	80ml
70%	70ml
60%	60ml

Pump Graduation	Pump Flow
50%	50ml
40%	40ml
30%	30ml
20%	20ml
10%	10ml

Recommended regulations for dosing pumps:

Regular Shampoo	30 to 40%
Emollient	60 to 80%
Wax	15 to 25%

	<p>IMPORTANT :</p> <p>Do not dilute the chemical products. Use only recommended products.</p>
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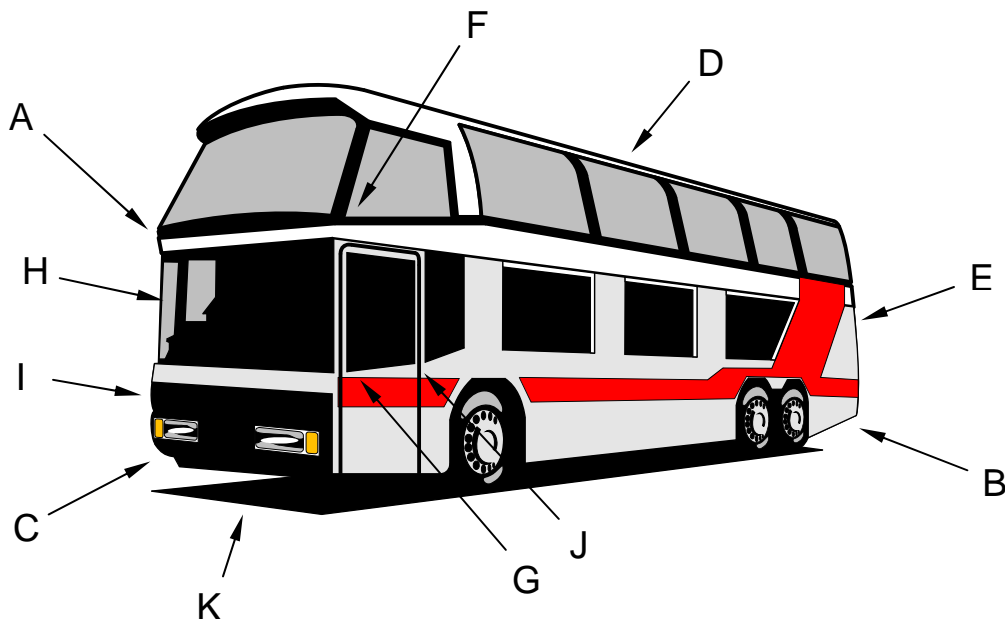
13.4 Preliminary Controls for Each Washing



WARNING !

Vehicle dimensions cannot be higher than those described in paragraph 2 Application

13.4.1 Verifications



The operator must make sure that the vehicle does not have any defects or characteristics that may damage the machine or even the vehicles during the washing. In particular:

- A. Salience in the vehicle body that may compress the brushes in any part
- B. Trailer hooks
- C. Very low spoilers
- D. Baggage racks with sharp angles
- E. Ski rack
- F. Antennas
- G. External mirrors or very prominent extra lights
- H. Windshield wipers in bad conditions
- I. Metallic adorns incorrectly applied on the vehicle body
- J. Loose or salient knobs
- K. Vehicle or any other structures dimensions beyond those specified in paragraph 2 - Application

13.4.2 Recommendation About the Indicated items

ITEMS **A** and **D** - Check whether the brushes movement can overcome these obstacles.

ITEM **B** - Pay very much attention to and eventually protect them.

ITEM **C** - If the free distance from the floor is less than 200mm they must be removed.

ITEM **E** - Usually the ski rack must be removed, what is rapidly done.

ITEM **F** - Radio antennas must be lowered or fixed with adhesive tape to the vehicle body. TV antennas must be removed.

ITEM **G** - Must be withdraw or removed.

ITEM **H** - Windshield wipers may be fixed with the suckers or adhesive tape; attention to very curved wipers, unique wipers, very big or very light ones that may be grabbed by the brushes. For this the operator will learn how to see these hazard factors and to avoid them. In all cases the wipers cannot lift and so, if necessary they must be fixed with suckers or adhesive tape.

ITEMS **I** and **J** - Wherever necessary fix with adhesive tape.

ITEM **K** - Vehicles that have exposed details on the structure cannot surpass the height and length allowed dimensions. Attempts in this way damage the vehicle or the equipment.

Besides all these items, verify if all windows are closed; check that all doors, inclusive the baggage compartment one, are closed up.

13.5 The Washing Process

Equipment LFO is a drive-thru tunnel type equipment in which the washing is performed as the vehicle goes along inside the machine. Due to this the washing final quality is directly linked to the manner the maneuverer passes through the equipment.

That is why it is so important that the driver receives a very good training and be conscientious about the important role he assumes during the washing process.

The driver must move the vehicle forward in constant speed during the whole washing period avoiding impacts on the brushes jolts in the vehicle.

In order to obtain an excellent washing quality it is necessary that the speed of 1km/h be respected (about 16 meters/minute) up to the total closing of the brushes.

Maximum attention must be paid when the vehicle interrupts the second actuator (antenna or photocell - descend of the horizontal brush), in this moment the vehicle cannot stop by any means before the horizontal brush stays on the vehicle top.

13.6 Start of the Washing Cycle


a) Turn on the general three-phase switch in the general power cabinet and the disconnecting switch located at the door of the equipment electric panel.

b) Turn the equipment on through the general key (BC2) placing it in the position ON. In this moment the red traffic light will light up; close the vertical brushes 3 and 4.


After closing the vertical brush 4, the traffic light changes from red to green, authorizing the vehicle entrance.

c) Before the first vehicle gets in it is necessary that the desired program be selected which is, continuous or automatic, actuating the program key, pointing it to the program whised. See programs description in paragraph 11.1.

d) When finishing to use the equipment, turn off the general key (BC2) for in this way the brushes will be totally open, allowing the vehicles passage if necessary. Turn off the connecting switch at the door of the electric panel and the three-phase switch in the general power cabinet.

	<p>ATTENTION !</p> <p>Before starting the washing proceed with all verifications pointed in item 13.4</p>
---	--

13.7 Emergency Stop

	<p>ATTENTION !</p> <p>If during the washing any irregularity happens, the operator may stop the machine by pressing the red key for emergency stop. See its locations in paragraph 10.3.</p>
---	---


To reactivate the machine after an emergency stop:

- Verify and solve the cause;
- Loose the mechanical blocking of the emergency key by turning it to anti-clockwise direction.

13.8 Turning Off the Machine at the End of the Day

- Turn off the general key (BC2) in the keyboard and take out the key.
- Turn off the connecting switch at the door of the electric panel in the washing equipment.
- Turn off the general three-phase switch (in the European case a diferential-magnothermal switch in the power cabinet which feeds the washing equipment. In installations executed by the customer, in European equipment, they must have this device in accordance to the European security laws).
- Interrupt the water feeding in the tubes that connect the washing installation.
- Do not interrupt the air feeding.

14. ORDINARY MAINTENANCE


	<p>ATTENTION !</p> <p>Before any maintenance operation it is necessary to interrupt electric, water and air feeding and, to empty the hydraulic and pneumatic circuit through their respective taps.</p>
---	---

The periodic maintenance operations were divided into two distinct groups:

REGULAR MAINTENANCE, that refers to lubrication, simple cleaning operation and interference that the customer may do without knowing installation.

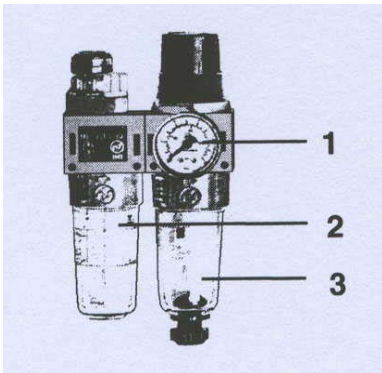
EXTRAORDINARY MAINTENANCE, which refers to more complex operations that are performed by CECCATO Technical Assistance.

In the present chapter it will be described only the regular maintenance.

	<p>NOTE :</p> <p>For extraordinary maintenance consult paragraph 20 - Extraordinary Maintenance.</p>
--	---

14.1 Weekly

- a) Clean and grease the steel cables and the guides of the horizontal brush.
- b) Clean all nozzles.
- c) Check the presence and integrity of the limit switch actuators, if existing.
- d) Check and eventually complete the oil level of the lubricator in the air treatment groups (2).
For this purpose use a type of oil indicated in paragraph 14.4 Lubricants.



AIR TREATMENT GROUPS



ATTENTION !

Before unscrewing the little cup (2) make sure that the air line entirely discharged: manometer, placed in the group must indicate "0" (zero).

14.2 Monthly

- Check whether there is any oil loss in the brushes rotation reducer boxes.
- Clean up the aspiration filters in the chemical products pumps when existing.
- Clean, with compressed air stream, the air treatment filter. In order to reach the filter unscrew the regulator little cup (3).



ATTENTION !

Before unscrewing the little cup (3) be sure that the air line is completely discharged: manometer placed in the group must be showing "0" (zero).

14.3 Semestral


- Check the brushes wear by measuring and comparing them with the original size; change or move the plates if there is a wear equal to or higher than 30% of the original size.
- Check the rubber of the brushes shock-absorbers devices.
- When existing, disassemble and clean the aspiration valves of the products pumps. The same operation must be done with the aspiration filter valve and the injection valve of the water collector.
- Check the wear on the horizontal brush steel cables and, call Technical Assistance if there is need to replace them.

14.4 Lubricants

- Grease the horizontal brush guide: use universal grease.
- Lubricate the air line: use oil for mist or micromist lubrication of pneumatic equipment, recommended according to the following table.
- Lubricate mechanical elements subjected to small and medium weight intensity, with lubricants recommended according to the following table:


LUBRICANTS	LUBREFIL	BEARINGS, GUIDES	REDUCERS
PETROBRÁS	IMBRAX HR 32 EP	IMBRAX GMA 2	LUBRAX ECF 220 PS
IPIRANGA ATLANTIC	IPITUR AW 32 IDEAL AW 32	IPIFLEX 2 LITHOLINE MP 2	IPIRANGA SP 220
SHELL	TELLUS C10 TELLUS C32	RETIMAX A	OMALA 220 MACOMA R 220
ESSO	TURBINE OIL 32	MP GREASE H	SPARTAN EP 220
TEXACO	RANDO OIL HD 32	MARFAK MP 2	MEROPA 220
VALVOLINE	ETC-15 ETC-32	LITIO EP2	ENGRENAGEM EP 220
CASTROL	HISPIN AWS 32	CASTROLEASE MP	ILO SP 220
NOMENCLATURA ISO	VG 32	THE LÍTIO BASE	VG 220

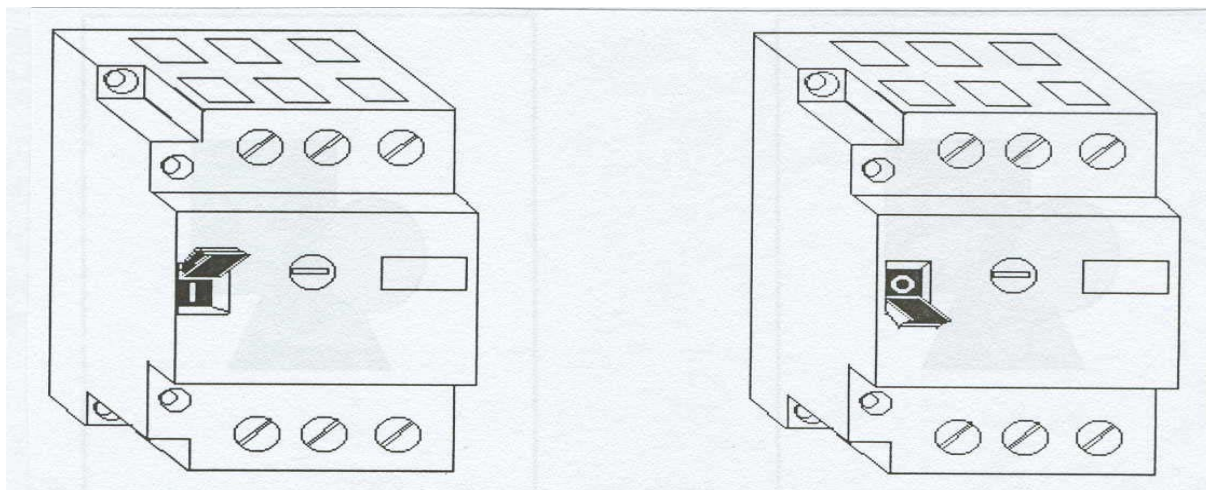
15. DAMAGES

	<p>ATTENTION !</p> <ul style="list-style-type: none"> - Repairs or maintenance must be executed with the machine completely stopped. - Make sure that the general switch with door blocking does not be actuated by non qualified or trained staff. - If after following the given instructions, the damage continues, call the Technical Assistance. - Place full identification in the electrical feeding switches starting that the machine is under.
---	---

15.1 Re-establishment of the Protection Circuit Breaker

The automatic and magnothermal circuit breakers are located in the general electric board of the installation.

	<p>ATTENTION !</p> <ul style="list-style-type: none">- Before accessing the electric board take away the tension from the diferencial-magnothermal circuit breaker placed in the beginning of the electric line that feeds the washing machine (electric installation executed by the customer must have this device in accordance to the European Electric Security.- Make sure that the diferencial-magnothermal circuit breaker is not touched by any other person during work time.- Identufy that the equipment is under maintenance in the electric feeding circuit feeding circuit breakers.
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CIRCUIT BREAKER ON

CIRCUIT BREAKER OFF

16. INOPERANCE

When the washing installation stays stopped for a long time:

- a) Fill up the chemical products reservoirs with water and perform some complete washing cycles; after that, perform some cycles with the chemical products reservoirs completely empty. In this way it is executed the washing and emptying of the pumps system and chemical products distribution.
- b) Empty all water conductor tubes by opening the taps for wintry discharge (if existing). As an alternative, actuate the automatic wintry draining, if the installation has it.
- c) Turn off the electrical feeding. Turn off the water and compressed air connections. Make sure that during this period the electric energy is not turned on by non-authorized people.
- d) Grease the components (bearings, cylinders, etc) using hydrorepellent product.

e) Protect bristles against direct sunshine and rain by covering them with transparent material.

f) Fix the vertical brushes in open position for not to block the passage.

To turn on the equipment again call the Technical Assistance.

17. DISASSEMBLING THE INSTALLATION

It is necessary to make the division in homogeneous parts, according to its composition and they must be deposited in appropriate places, according to the local existing legislation regarding rubbish disposition.

PARTE B




This part of the manual is reserved to the qualified professional staff authorized by
CECCATO DMR




NOTE :


Every intervention performed by the authorized professional in operations to: turn on the machine, control and maintenance, must be recorded in the cards "**Notes for Technical Assistance Calls**" enclosed in this manual.


18. INSTALLATION, FIRST FUNCTIONING AND SETTING

	<p>ATTENTION !</p> <ul style="list-style-type: none">• The operations described in this chapter must be accomplished by qualified or authorized staff.• The electric feeding installation and the grounding must be executed to the existing security legislation.
---	--

18.1 Installation

	<p>ATTENTION !</p> <p>The assembly operation requires a lot of care on handling the parts. Use adequate safety material, isolate the area and do not allow the entrance of non-qualified people.</p>
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	<p>WARNING !</p> <p>These suggestions were considered with the hoist having free access by every sides.</p>
---	--

	<p>NOTE :</p> <ul style="list-style-type: none">• Before starting the operations to assemble the equipment make sure that all work involving the track preparation was executed with full accomplishment with the foundation plants delivered by CECCATO. (see attached material)• As reference to the positioning (left or right) consider the entrance of the equipment.• Consult the chapter for spare parts to visualize the components shapes.
---	--

a) Assembly of Front Columns and the Horizontal Brush Beams

- Place the front columns laying on the ground in their respective positions, which means, counter-weight column on the left side in relation to the vehicle entrance and the pneumatic cylinder column on the right side.
- With the parts still on the ground assemble the upper rear beams that link the two columns.

**NOTE :**

The front beam of the horizontal brush has two pulleys which should be turned downwards after being assembled.

- Place the columns near to their respective fixation counter-bases, taking care to put a wedge under them for a better. The “U” shaped guides of the horizontal brush cars should be turned to the center of the track.
- We recommend not to tighten completely the flanges bolts in order to facilitate the further alignment of the machine.
- After doing this it is possible to also the water piping wherever possible, according to the columns and beams assembling position.

**NOTE :**

Right after, put the steel cable very well fixed in order to lift the complex.

**ATTENTION !**

This steel cable shall have a minimum resistance of 2000 Kgf. Protection gloves should also be worn in order to avoid personal accidents.

**WARNING !**

After placing the steel cable, lift the whole complex and put it on its bases and, slightly tighten the fixation nuts. After fixing the columns, lift the counter weight with a hoist and with a good quality rope keep it tied in its upper position (leaning against the conic rubber stoppers) after this, put the four counter-weight nylon guides in their respective positions.


b) Assembling the Vertical Brushes Columns**WARNING !**

In the upper part of the vertical brushes columns the stringers fixation flanges are chamfered in two corners. These chamfers shall be turned to the center of the machine.

- Place the columns close to their respective counter-bases putting a wedge under them for better handling.

Assembling of the first vertical brush holder column on the left side (usually containing the electric panel).

- Firmly tie with a steel cable on the upper part of the column in order to lift it with a hoist.
- The electric panel door shall be turned to the external side of the machine.

	WARNING !
After making sure that the steel cable is very well fixed, carefully lift the column and place it on its respective base. Slightly tighten the fixation nuts in order to facilitate a firther alignment.	

Assembling of first column (vertical brush holder the right side)

- This column is usually identified by a box containing pneumatic components.
- Follow the same procedures described in item (2.a) to lift and fix column, taking the same previous precautions.

Assembling of second column (vertical brush holder on the left side)

- This column is identified by a 35mm hole at a height of 2m (for equipment with photocells this hole is only as reference).
- To lift and fix this column it is necessary to follow the same procedures and care described in item (2.a).


Assembling the second column (vertical brush holder on the right side)

- It is possible to identify this column by the three existing clamps in its side.
- When fixing this column it is necessary to obey the same rules indicated in item (2.a).

Assembling of third column for sustaining the stringer (on the left side)

- This column may be identified for being the only one constructed in a unique double outline being that the side with three clamps must be turned to the equipment exit.
- Follow the same steps and care of item (2.a) to place and this column.

c) Assembling the longitudinal beams

	NOTE :
In the lower part of the beams there are fixation flanges chamfered in two corners. These chamfers must be turned to the center of the machine.	

**WARNING !**

In order to lift the beams it is necessary to use a steel cable with a minimum resistance of 2000 Kgf.
Safety gloves must also be worn to prevent personal accidents.

Assembling the front longitudinal beam (left side)

- Tie the beam with the steel cable and carefully lift it with the hoist, leaning the beam against the electric panel column.
- Place the screws of the easel side and after, the screws of the electric panel column. Do not tighten them completely.

Assembling the front longitudinal beam (right side)

- Tie the beam with the steel cable to the hoist and carefully lift it. Place the screws at the side of the easel and after, the screws on the vertical brush column.

Assembling the rear longitudinal beam (left side)

- Tie the beam with the steel cable and lift it with the hoist, placing before the bolts that link the two beams (front and rear) and after, the screws on the column.

Assembling the rear longitudinal beam (right side)

- Follow the same procedures related in item (3.c), taking all needed care.

d) Assembling the arms with vertical brushes**NOTE :**

In all brushes arms there are two bearings which must have their lubricating nozzles turned to the center of the machine.

- The arms of brushes EV3, EV4, EV5, and EV6 must be assembled (in "L") while still on the floor, leaving a guide wire on the upper part for the passage of the motors feeding cables.

**ATTENTION !**

To place the brushes arms it is necessary to use the hoist with a steel cable (minimum resistance of 2000 Kgf) lifting them slowly and carefully. Fix the upper and lower bearings. Perform these operations wearing safety gloves.


- On assembling the arms it is advisable to follow this order:

- Fix arm EV1
- Fix arm EV2
- Assemble and fix arm EV3
- Assemble and fix arm EV4
- Assemble and fix arm EV5
- Assemble and fix arm EV6

e) Place the Central Transversal Beam with the Side Open, for the Passage of Electric Cables and Hidro-Pneumatic Piping, Turned to the Front of the Equipment.


f) Place the Rear Transversal Beam with the Opening for the Passage of Hydraulic Piping Turned to the Front of the Equipment.

g) Tighten All Bolts (counter-bases, columns and beams) Always Controlling the Equipment Alignment and Leveling.

	<p>NOTE :</p> <p>In order to tighten the flanges to the beams it is advisable to use a hatchet wrench with extension.</p>
---	--

h) Rubber Stopprers and Cylinders

- Put rubber stoppers in the counter-rotation vertical brushes (EV1 and EV2).
 - Put limit rubber stoppers and supports for the fixation of pneumatic cylinders.
 - Put pneumatic cylinders.
- The cylinders for the counter-rotation brushes have a path measurement of 250mm.
 - The cylinders of brushes EV3, EV4, EV5 and EV6 have a path measurement of 500mm.

	<p>NOTE :</p> <ul style="list-style-type: none"> • The rod trunnion of the cylinder must be fixed to the arms of the brushes. • The fixation supports of the pneumatic cylinders in the arms of EV5 and EV6 are the biggest ones.
---	--

i) Passage of the Pneumatic Hoses

- To facilitate the passage of the hoses select them according to the fine connection point and the distribution point.

j) Installation of Hydraulic Piping

- Assemble the machine front arc on the floor (with the lateral nozzles tuned to the center of the machine), and lift it carefully fixing to the plastic clamps.

- Place the water pipes on the arms, with the nozzles directed to the brushes.

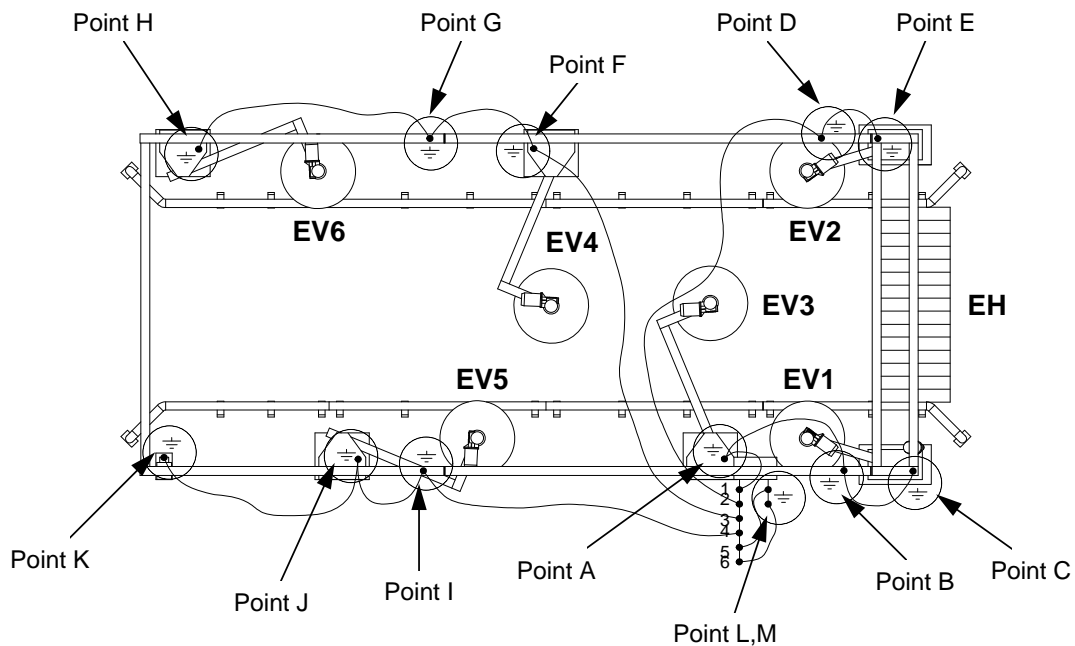
- Place the water distribution pipes in the machine structure and connect the hoses.

18.2 Grounding

As the LFO model equipment was projected according to the CE safety rules, it is necessary to link all its structure to the GROUND CIRCUIT to assure the safety of the people that either operate it or work around it.

Because of that, before starting it up, carefully follow the instructions and drawings show it below for the GROUND CIRCUIT connection.

Remember that the safety of these people depends on the accuracy of your work.



18.2.1 Instructions for the Gound Circuit Connection

- 1) Inside the electrical panel, at the copper bar, there are six terminal ZB6K (green and yellow), that must be connected to the several points on the equipment structure, named A,B,C,D,E,F,G,I,J,K,L E M.
- 2) Start up the circuit through any one of the ZB6K terminal (green and yellow), located inside the electrical panel.
- 3) From the first chosen terminal, connect it with the points A,B,C in a sequential way.
- 4) Connect the second terminal with the points D and E in a sequential way.
- 5) Connect the third terminal with the points F,G and H in a sequential way.
- 6) Connect the fourth terminal with the points I,J and K in a sequential way.
- 7) Connect the fifth terminal with the point L.


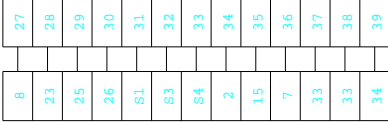
8) Connect the sixth terminal with the point M.

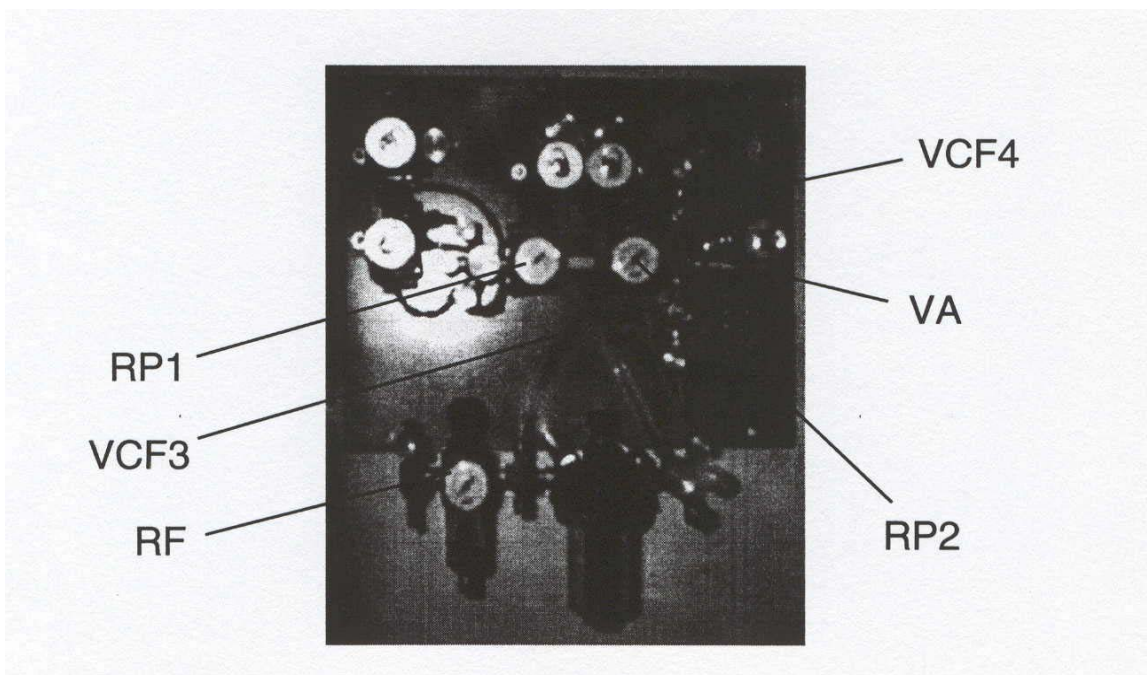
18.2.2 Especifications of the Materials to be Used

- 1) Cables for the connection of the points described above must be flexivel, single, 750V, 70 °C, Class 4 according to NBR 6880 or the local rules, formed by 123 x 0,25mm diameter, PVC, with the 6mm² section.
- 2) Each end of the cable use terminal ring type, pre isolated, yellow for 6mm² cable.
- 3) Use one cable for each terminal. Never put two or more cables in the same terminal.
- 4) The terminals must be fixes at the equipment structure, according to the drawing, with round had screw 6,3 x 10mm. (DIN 7971 STANDARD)
- 5) The terminals must have a perfect contact with the equipment structure. It mustn't any kind of isolation (dust, paint, grease, oil, etc.).
- 6) All the points mentioned above refer to the LFO 7 model, therefore for too models some of these points won't exist. In this cable follow the above instructions, going to the point following the one that doesn't exist.

18.3 Adjusting

18.3.1 Procedures for Adjusting the Pneumatic System

	<p>NOTE :</p> <ul style="list-style-type: none"> • Always consult the equipment pneumatic scheme. • For a numerical identification of the electric terminals in the terminal ruler in the electric panel check the following figure: <div style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="border: none;">ORDER NUMBER</td> <td style="border: none;">→</td> <td style="border: none;">↙</td> <td style="border: none;">↘</td> </tr> <tr> <td style="border: none;">TERMINAL NUMBER</td> <td style="border: none;">→</td> <td style="border: none;">↙</td> <td style="border: none;">↘</td> </tr> </table>  </div>	ORDER NUMBER	→	↙	↘	TERMINAL NUMBER	→	↙	↘
ORDER NUMBER	→	↙	↘						
TERMINAL NUMBER	→	↙	↘						



a) Pressure Adjustment

- Adjust the pressure at the refill (RF), to 70 ~ 80 PSI
- Adjust the pressure at the regulator 1 (RP1), to 40 PSI
- Adjust the pressure at the regulator 2 (RP2), to 12 ~ 15 PSI
- Adjust the relief valve (VA), for discharge at 15 PSI

b) Regulating the Sound Alarm

Make a bridge from the terminal 1, order 1, to the terminal 62 of order 76 (consult the electric scheme).

After that adjust the alarm sound intensity level through the T2 regulator and/or in the proper alarm.

**NOTE :**

The bridge must be executed at the moment and only for the alarm regulation.

c) Adjusting the Displacement Speed of the Horizontal Brush

Make a bridge from the terminal 1, in order 1, to the terminal 68, order 82.

After this the brush shall go down.

Watch the speed that the brush moves. If necessary adjust the flow control valve 1 (VCF1) assembled in the lower part of the pneumatic cylinder that actuates this brush.

After doing this adjustment go on with the regulation by pressing several times the horizontal brush lift key (BP5) in the keyboard, watching the brush moves. To adjust this speed act over the regulator (T3) assembled on valve VS16.

**NOTE :**

The bridge must only be executed at the moment and just for horizontal brush adjustment.

d) Adjusting the Vertical Brushes 1 and 2 (LFO 7 brush equipment).

Make a bridge from terminal 1, in order 1, to terminal 63 of order 77.

When the bridge is executed, the vertical brushes 1 and 2 (EV1 and EV2) shall close. Actuate the open brush key 1 and 2 (BP6) to open these. Watch these brushes movement.

If key open with violence or even do not open, actuate the regulator (T4) assembled on valve (VS17) to adjust the opening speed of these brushes.

**NOTE :**

The bridge must only be executed at moment and just for regulating any vertical brush.

e) Adjusting Vertical Brushes 3 or 4 (EV3 or Ev4)

With the bridge indicated in item (d) done, actuate the open brush 3 key (BP7) or 4 (BP8) and watch the movements.

If any of the two open with violence or even if they do not open, the adjusting shall be done in any of the control valves assembled at the exit of the pressure regulator 2 (RP2).

The flow control valve (VCF2) according to figure on page 47 controls the vertical brush 4 (right).

The flow control valve (VCF3) according to figure on page 47 controls the vertical brush 3 (left).


f) Adjusting the Vertical Brushes 5 or 6 (EV5 or EV6)

Make a bridge from terminal 1 in order 1 to terminal 33 of order 79.

When the bridge is executed, the brushes close: actuate the open vertical brush 5 key (BP9) or the open vertical brush 6 (BP10) and watch their movements.

If any of the two open with violence or even do not open, the adjusting must be done in the correspondent regulator to the brush.

The vertical brush 6 (EV6) is controlled by the regulator T6 assembled at the exit of valve (VS23).

	<p>NOTE :</p> <p>The bridge must only be executed at the moment and just for regulating any of the brushes.</p>
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18.3.2 Electrical Cheching

Put tension in the panel:


- Check if local electric power tension is compatible with the one specified to the equipment.
- Connect energy to the panel.
- Check tension in the three phases (according to local tension).
- Set the three-phase circuit breakers checking the regulation of these circuit breakers (according to table in the electric scheme).
- Check trnsformer connection of the comand panel.
- Adjust the time relays according to table in the electric scheme.
- Check the directions of brushes rotations as indicated in the electric scheme.
- In case of need to invert any rotation direction use the terminal in the electric table and not the motors terminal.
- Check the rotation direction of water pumps.

After executing all settings and checking supply the chemical products reservoirs of the equipment.

19. FUNCTIONING

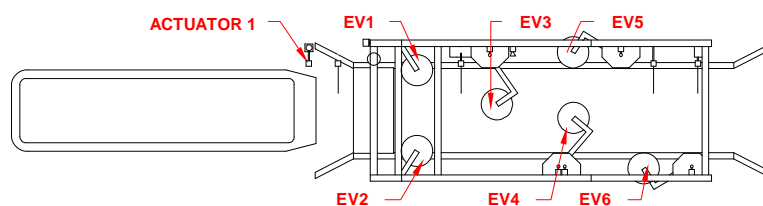
- Machine at ease (off).
- Horizontal brush lifted and all vertical brushes open (if there is compressed air in the feeding net).
- When turning on the commutation (BC2) and commuting the program selector key BC3 to any position (Automatic or Continuous), the following will happen:
 - Light up the red traffic light.
 - Close vertical brush 3 (turn on VS18).
 - Close vertical brush 4 (turn on VS19).
- After closing vertical brush 4, the traffic light commutes from red to green leaving the equipment ready to operate (stand by).

19.1 Description of Washing Cycles

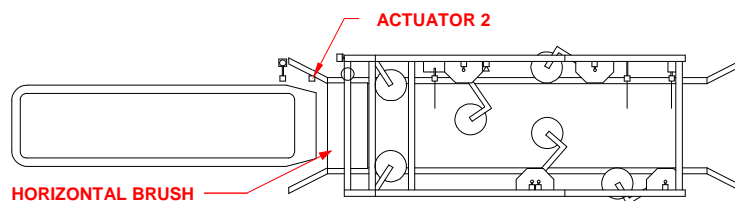
	NOTE :
The right and left sides are considered on visualizing the vehicle from the maneuverer position or, the same as seeing it from the rear part.	

The brushes and actuators numbering refers to the 7 brush equipment, for the 5 brush equipment disconsider the indications and occurrences for the counter-rotation brushes.

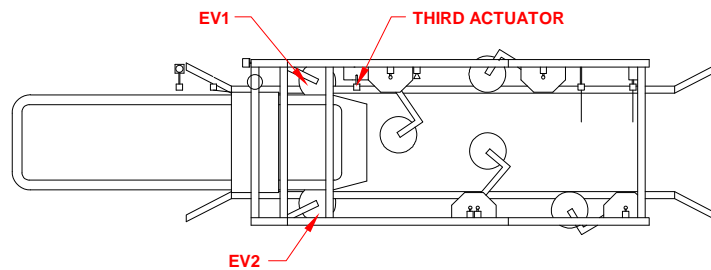
When the vehicle enters the equipment it will cut the first actuator, turning on the washing water pump (BAL) and the detergent solenoid valve (VS4), in this very moment starts a sequence of time counting to turn on at every two seconds, in the following order, these components: Horizontal Brush (E.H.), Vertical Brushes 1 and 2 (E.V.1 and 2), Vertical Brushes 3 and 4 (E.V.3 and 4), Vertical Brushes 5 and 6 (E.V.5 and 6).



As the vehicle goes forward, it will cut the second actuator making the horizontal brush to come down, which will perform the washing of the bus top.

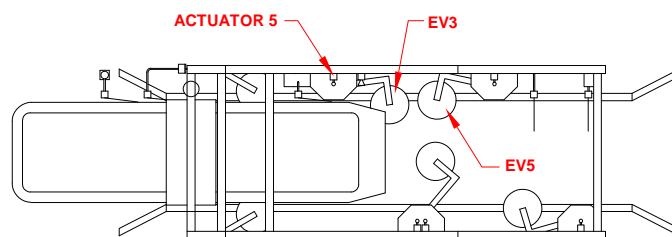


When the vehicle cuts the third actuator (LFO 7 brush equipment) the counter-rotation vertical brushes (EV1 and 2) will be closed after the side mirrors pass by them.



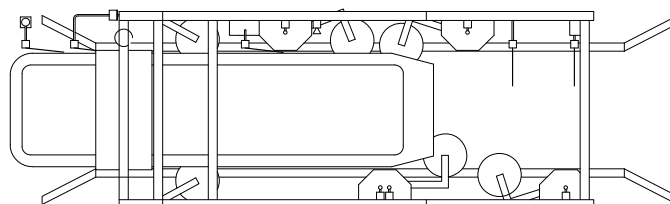
On continuing to advance, the vehicle meets the vertical brush 3 (EV3) which starts washing its right windshield. With the vehicle continuous advance this brush will be opening till reaching the right side of the vehicle, promoting the washing of these areas and always keeping the contact with these surfaces.

When vertical brush (EV3) opens, the actuator 5 which is located in the upper part of the column is activated, starting the rinsing water pump (BAE).

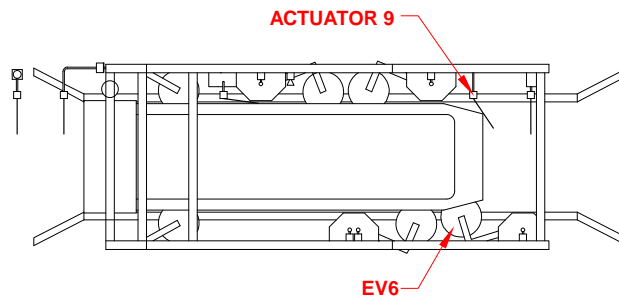


This same sequence will repeat with vertical brush 4 (EV4) which will perform the vehicle left side washing.

When the vertical brush opens it actuates the actuator 6 releasing the vertical brush 5 for washing the side and the rear and will also actuate the safety system (sound alarm) through the actuator 7 and an immediate opening of vertical brush 5 if there is a vehicle ahead, in the final phase of washing.



When the vertical brush 4 (EV4) opens, the actuators 6 and 7 are deactivated, commuting the traffic light from green to red through the actuator 7. When the actuator 6 is deactivated, the vertical brush 5 (EV5) is freed to close.



In the moment that the vertical brush 3 (EV3) gets away from the vehicle and closes, it activates the actuator 5 again, turning off the washing water pump (BAL).

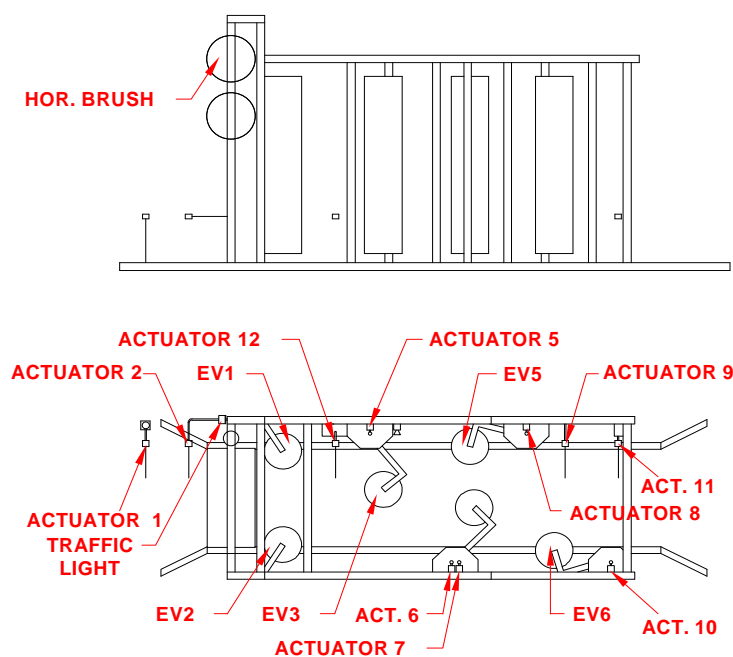
When the vertical brush 4 (EV4) gets away from the vehicle and closes, the actuator 7 will “program” the vertical brush 6 (EV6) to close and will change the traffic light from red into green.

When the vehicle cuts the actuator 9, the vertical brush 6 (EV6) will be closed in the right side of the vehicle. When the vehicle cuts the actuator 11, this will keep the equipment working. If the optional Wax Arc is installed, it will be turned off in this moment.

With the vehicle continuous progress, it will pass the actuator 11, disactivating it. At this point two conditions happen:

First: If there is another vehicle being washed inside the equipment, right after this first one, the optional Wax Arc, if installed, will be turned off. The vertical brush 6 will be opened, getting back to its original position.

Second: If there is no other vehicle being washed inside the equipment, this will be deactivated when the actuator 11 is also deactivated.



20. EXTRAORDINARY MAINTENANCE

20.1 Equipment Check-Up

MECHANIC AND PNEUMATIC

- 01 Check the rubber stoppers
- 02 Check the tight in the counter-bases
- 03 Check the vertical brushes reducers
- 04 Do a general tight in the structural screws of the equipment
- 05 Equipment general lubrication
- 06 Verify valves and pneumatic components (hoses, etc.)
- 07 Drain refill and complete the oil the lubricator
- 08 Check shampoo and wax valves (dryer)
- 09 Check the functioning of all mobile parts of the equipment
- 10 Check the dryer and wax regulation (if existing)
- 11 Check the functioning of the chassis washer (if existing)
- 12 Check all pneumatic cylinders (leaks, rods, etc,)
- 13 Check steel cables, counter-weight guides, pulleys and the horizontal brush swinging

ELECTRIC

- 01 General tight in the electric panel
- 02 Test voltage and amperage of all motors
- 03 Check coils of solenoid valves
- 04 Check keyboards and connecting cables in general
- 05 Check photocells alignment
- 06 Check water pumps
- 07 Check traffic light functioning
- 08 Check fuses, circuit breakers, thermal relays, time relays, contactors, cells, sensors and limit switch

20.2 Possible Defects

MACHINE DOES NOT START

PROBABLE CAUSE	CORRECTIVE ACTION
01. There is no electric feeding.	01. Check if energy is getting to the electric panel of the equipment.
02. Connection cables are loose.	02. Check if they are not damaged. Firmly tighten the cables.
03. ON / OFF key is in the OFF position.	03. Change the key to position ON.
04. EMERGENCY key is with key the contact open.	04. Disactivate the EMERGENCY or change the key contact. (whatever necessary)
05. Internal contact of the START key doesm not work. (in the case of continuous program)	05. Change the key.

THERE IS NO UP AND DOWN MOVEMENT IN THE HORIZONTAL BRUSH

PROBABLE CAUSE	CORRECTIVE ACTION
01. Counter-weight and horizontal brush guides without lubrication, or counter-weight guides are tight.	01. Lubricate the guides with grease or regulate the counter-weight guides.
02. Lack of oil in the pneumatic cylinder. (except for ISO cylinder)	02. Complete the level of oil in the pneumatic lubricator as indicated, or regulate the oil flow.
03. Photocell FE2 or Limit Switch FC2 are not actuating.	03. Replace the photocell. As to the Limit Switch check if the contact is closed, replacing it if necessary.

BRUSH DOES NOT ROTATE OR MACHINE DOES NOT WORK

PROBABLE CAUSE	CORRECTIVE ACTION
01. Thermal relay or protection circuit normal.	01. Motor amperage above normal. Open motor to check if the bearing is locked, check if general feeding voltage is not low. Reactivate the relay or circuit breaker by pressing the reactivating key.
02. Machine circuit breaker, inside the machine, is burned.	02. Change circuit breaker. If this cause repeats, seek a different cause.
03. Motor feeding cable is interrupted.	03. Change the cable.

TRAFFIC LIGHT DOES NOT WORK

PROBABLE CAUSE	CORRECTIVE ACTION
01. Lamp with bad contact.	01. Fit the lamp. (screw it better)
02. Lamp burned.	02. Change the lamp.
03. Diode or capacitor with defect.	03. Replace the diode or the capacitor.

SPURT WATER PUMP WITHOUT PRESSURE

PROBLABE CAUSE	CORRECTIVE ACTION
01. Pump rotating in contrary direction.	01. Invert the pump rotation.
02. Retention valve or botton valve dirty.	02. Clean the valve.
03. Pump with dirty disc.	03. Disassemble and clean disc.

MACHINE WITH ABNORMAL NOISE

PROBABLE CAUSE	CORRECTIVE ACTION
01. Oil level of reducers is bellow normal. (level must be in the middle of the crow)	01. Complete the oil level.
02. Motor bearing damaged.	02. Open the motor, uncoupling it from the reducer and change the bearing.
03. Reducer bearing damaged.	03. Open the reducer and change the bearing.
04. Motor of fan scraping on the cover.	04. Smooth out the cover.

MACHINE STARTS BUT THERE IS NO WATER OUTLET

PROBABLE CAUSE	CORRECTIVE ACTION
01. Pump protection circuit breaker is damaged.	01. Change circuit breaker.
02. Circuit breaker is disactivated.	02. Activate circuit breaker.
03. Botton valve is clogged.	03. Unclog valve.
04. Feeding cable that comes from the panel to the water pump contactor is interrupted.	04. Change cable.

MOTOR MAKES NOISE BUT DOES NOT ROTATE

PROBABLE CAUSE	CORRECTIVE ACTION
01. Burned fuse in the macjine or in the general feeding board.	01. Change fuse.
02. Circuit breaker damaged.	02. Replace circuit breaker.

BRUSH DOES NOT OPEN OR DOES NOT GO UP THROUGH THE KEY

PROBABLE CAUSE	CORRECTIVE ACTION
01. Compressor is off.	01. Turn on compressor.
02. General feeding valve is closed.	02. Open valve.
03. Pressure is out of specification. (below normal)	03. Put pressure in the specified level.
04. Lubricator cup is without oil.	04. Complete oil level as indicated.
05. Feeding cable that comes from the electric panel to the key is interrupted.	05. Change cable.
06. OPEN BRUSH contact key or LIFT BRUSH key is not working.	06. Change the contact.

THERE IS NO CHEMICAL PRODUCT APPLICATION

PROBABLE CAUSE	CORRECTIVE ACTION
01. Reservoir is without chemical product.	01. Fill up the reservoir.
02. Botton filter is clogged.	02. Clean filter.
03. Venturi does not pull product.	03. Clean venturi and nozzles.
04. Water with little pressure.	04. Check water pump and foot valve.
05. Dosing pump with problem.	05. Check solenoid valve of feeding pump. Check pump retention valve. Check time relay for the pump.

PUMP SPURTS WATER WITHOUT PRESSURE

PROBABLE CAUSE	CORRECTIVE ACTION
01. Pump rotating in contrary direction.	01. Invert pump rotation.
02. Retention valve or bottom valve dirty.	02. Clean valve.
03. Pump with dirty disc.	03. Disassemble and clean disc.

PUMP SPURTS WATER NORMALLY BUT NOT PULL DETERGENT

PROBABLE CAUSE	CORRECTIVE ACTION
01. Burned valve.	01. Replace coil.
02. tap closed.	02. Regulate opening.
03. Nylon tube folded.	03. Unfold.

PUMP SPURTS WATER NORMALLY, DOES NOT PULL DETERGENT AND RETURNS WATER TO THE DETERGENT RESERVOIR

PROBABLE CAUSE	CORRECTIVE ACTION
01. Clogged nozzles.	01. Clean nozzles.
02. Venturi damaged.	02. Replace.
03. Venturi clogged.	03. Clean venturi.

ENERGIZE THE VALVE THAT LOWERS THE BRUSH BUT IT DOES NOT GO DOW

PROBABLE CAUSE	CORRECTIVE ACTION
01. Flow control valve closed.	01. Regulate opening.
02. Weight excess on the counter-weight.	02. Regulate counter-weight.
03. Solenoid valve with defect.	03. Replace.

PUMP DOES NOT PULL WATER

PROBABLE CAUSE	CORRECTIVE ACTION
01. There is no water in the box.	01. Fill up the box.
02. Retention or botton valve damaged.	02. Fix or replace.
03. Air in the pump.	03. Prime it.

AFTER BEING TURNED OFF, THE MACHINE DOES NOT CLOSE THE VERTICAL BRUSHES

PROBABLE CAUSE	CORRECTIVE ACTION
01. One of the valves with solenoid burned.	01. Replace.

21. ADVISED CHANGE OF PARTS

The following list is conceived using the criteria:

- 1) Equipment with electric tension 380V - 50HZ
- 2) Quantity "A" - few equipment, advised for a group of up to five equipment.
- 3) Quantity "B" - many equipment, advised fir a group of five or more equipment.
- 4) for equipment assembled abroad it is advisable to apply the quantity pointed out in column "B".
- 5) Quantity GR = quantity in the group. Quantity TT = total quantity applied in the equipment.
- 6) the set refers to the manual in the spare part.

Quantities related to the LFO 7 brush equipment.

Moto Reducer of Horizontal Brush

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
03	91071721	01	07	--	01	Three-phase motor 2CV B5 C90 4P IPW55 220/380V - 50HZ
04	91070208	01	07	02	05	Cable Press 9 to 12
12	09822522	01	07	01	03	Endless axis D24mm (1-3163)
25	09822521	01	07	01	03	Crown for reducer (1-3151)
37	05800000	01	07	02	08	Retaining kit and rings for reducer
38	00822511	01	01	--	01	Reducer set 2CV (0-3288)

Moto Reducer of Vertical Brushes and Auxiliaries

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
01	91071721	01	--	--	--	Three-phase motor 2CV B5 C90 4P IPW55 220/380V - 50HZ
08	91070208	01	--	--	--	Cable Press 9 to 12
09	09822522	01	--	--	--	Endless axis D24mm (1-3163)
26	09822521	01	--	--	--	Crown for the reducer (1-3151)
35	05800000	01	--	--	--	Retaining kit and rings for reducer
36	00822515	01	06	--	02	Set of reducer 2CV (0-3288)

Pneumatic Cylinder Horizontal Brush

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
17		01	01	--	01	ISO cylinder

Pneumatic Cylinder Vertical Brushes

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
16		04	04	--	02	ISO cylinder 63 x 500

Pneumatic Cylinder Auxiliary Brushes

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
16		02	02	--	02	ISO cylinder 63 x 125/220

Horizontal Brush Handle

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
01	09824802	02	04	02	06	Conic rubber stopper (0-0186)
08	16021220	04	04	02	06	Horizontal brush pulley guide (0-0975)
16	09824806	04	04	02	06	Cylindrical rubber stopper (0-0710)
18	16021213	02	02	--	04	Two-chamel pulley (0-3355)
24	00820587	01	01	--	01	Horizontal brush hold tube (0-4534)
28	91090636	01	01	01	03	Sabó retainer BR 1081 D 42 x D 72 x 12
39	16021212	01	01	--	02	One-chamel pulley (0-3235)
43	91023001	01	01	--	02	Horizontal brush shock absorber

Horizontal Brush Elevation System

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
01	09821220	04	04	01	05	Two-chamel pulley (0-3352)
02	09821219	03	03	01	03	One-chamel pulley (0-0539)
03	16022408	04	04	04	12	Counter weight guide element
06	09822442	02	02	--	02	Smaller plate for counter weight regulation (0-2953)
07	09822443	02	02	--	02	Medium plate for counter weight regulation (0-2951)
08	09822444	02	02	--	02	Larger plate for counter weight regulation (0-2952)
16	11022305	02	02	--	02	Spring for rubber stopper
17	09824802	02	04	--	--	Rubber conic stopper (0-1660)

Vertical Brushes Arm

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
04	15022101	01	06	01	06	Rubber protector (0-2107)
15	09824803	04	20	02	10	rectangular rubber stopper (0-3439)
32		01	06	--	02	Lattice
40	16029901	01	01	--	02	Limit switch actuator

Auxiliary Brushes Arm

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
04	15022101	01	06	--	--	Rubber protector (0-2107)
19	09824803	02	20	--	--	Rectangular rubber stopper (0-3439)
26		01	06	--	--	Lattice

Assembling of Auxiliary and Vertical Brushes

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
03	09829503	02	12	02	10	Vertical brushes couplinh (0-2171)
04	91090303	01	06	01	05	Elastic sleeve for coupling (0-2170)
12	91090637	01	06	--	05	Sabó retainer BRG 00161 D 48 x D 72,25 x 10
14	15022109	01	06	--	03	Vertical brushes protection disc (0-3358)
17	91090647	01	06	--	05	Sabó retainer BR 01954 D 35 x D 80 x 12
21	00820586	01	06	--	01	Vertical brush holder tube LFO 735 (0-6865)
21	00820589	01	06	--	01	Vertical brush holder tube LFO 741 (0-6866)

Hydraulic System

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
07	09824310	01	01	--	01	Venturi

Cabinet for Electric and Pneumatic Components

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
08	91025504	02	02	01	04	Fast clamp for door
09	91026206	04	04	--	04	Hinge for door

Actuation Antennas

ITEM	CODE	QTY GR	QTY TT	QTY A	QTY B	DESCRIPTION
13	91071906	01	01	--	02	Red lens for traffic light
14	91071907	01	01	--	02	Green lens for traffic light
20	91014450	05	05	02	10	Actuating rod for limit switch

22. LIST OF ATTACHED DOCUMENTS

1) Foundation Plants (see description ahead)	
General Lay-out	1-9391
LFO 5 Equipment	1-9273; 1-9274
LFO 7 Equipment	1-9353; 1-9354
Optional:	
Chemical product applier arc	1-9381
Medium pressure arc	1-9382
Chassis washer	1-9379; 1-9380
Wax / dryer arc	1-9385
Dryer	1-7588
2) Dimensional drawings	
LFO 5 Equipment	1-9278
LFO 7 Equipment	1-9280
Optional:	
Arcs	1-9384
Dryer	1-9383
3) Electric / Pneumatic schemes	
LFO 5 and 7	1-9259; 1-9260; 1-9261
Optional:	
Emollient arc, chassis washer, medium pressure arc	1-9262; 1-9263
Wax arc	1-8920
Dryer	1-9281; 1-9282
4) CECCATO DMR chemical products cards for washing	
5) Cards for "TECHNICAL ASSISTANCE NOTES"	
6) WARRANTY CONDITIONS	
7) "EC" declaration	
8) Declaration in accordance "73/23"	

FOUNDATION PLANTS DESCRIPTION

The next attached documents refer to the bases to install the several models LFO equipment and their optional.

All optional were draw separately in order to facilitate their location and application.

Drawing 1-9391, general LFO lay-out with optional, show the installation of a LFO equipment with all its optional. Observe that the distances among the several bases are the minimum ones recommended; longer distances among the bases may improve some optional performance since they allow a longer action of the chemical products on the vehicle surface.

In this table there are two tables for electric cables that indicate the redommended electric cables to feed installations with two distinct groups of optional.

In drawing 1-9391 it is shown in a simplified way the connection of a LFO equipment and, the connections of several optional are omitted. Consult the foundation plants drawings related to the optional to be installed in order to check the necessary connections.

All optional dedicated to the pre-washing are connect to an optional command panel supplied by CECCATO and must be installed in a client's "pumps hose".

These optional, when capable, start working automatically by the vehicle passage. Observe that the bases for the actuators are necessary when the optional is the first by which the vehicle passes before getting to the LFO equipment. In drawing 1-9391, notes 3 and 4 exemplify it, the actuators bases for chassis washer and medium pressure arc would not be necessary for such installation, all pre-washing optional would be actuated by the actuator assembled together the emollient arc.

The optional for finishing have a different performance being that the optional wax arc is commanded by the LFO equipment and the optional dryer has a functioning totally disengaged from the installation.

See in drawing 1-9391 the application table for the several drawings placed in this attached document.