

PL / CO	500	550	600	610	630	650	670	700	750	800	850	900	950	1000	1050	1100	1150
E	550	600	650	660	680	700	720	750	800	850	900	950	1000	1050	1100	1150	1200
TIEMPO / TIME	2,8 s.								3,4 s.			3,7 s.			3,9 s.		
PESO / WEIGHT	35	39	41	41	42	43	44	46	48	50	52	54	56	58	60	62	64

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## 1.- GENERALITIES

### 1.1. INTRODUCTION.

As a solution to the requirements of disposing of a comfortable access and security in the present lifts, Puertas Fermator has been manufacturing a wide range of automatic cabin and landing door which allow an easy solution for all, and for each of the existing installations or those to be installed.

As a solution to the requirements of installing doors of access in some cabins that because of lateral space matters or for dimensions of the opening, does not allow the collocation of sliding doors, Puertas Fermator proposes the installation of a folding door reference CA.PL.4, which is the object of the study of this document.

### 1.2. DRAWING SET AND DESCRIPTION OF FUNCTION.

The door which is detailed in the present study corresponds to a cabin door of central opening 4 panels, that when it opens it folds two by two in the lateral threshold of the cabin access or clear opening.

Basically the folding door is composed of an operator group situated in the superior part, the panels set situated under the operator which receives the movement of open/closed and of two aluminium treads that guide the panels by the central part superior and inferior.

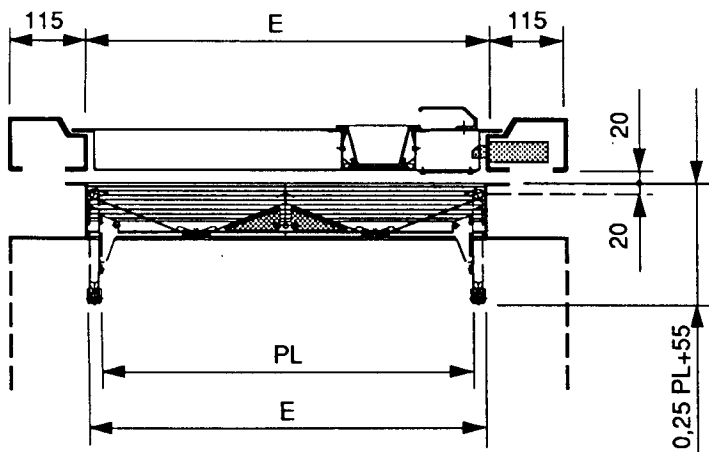
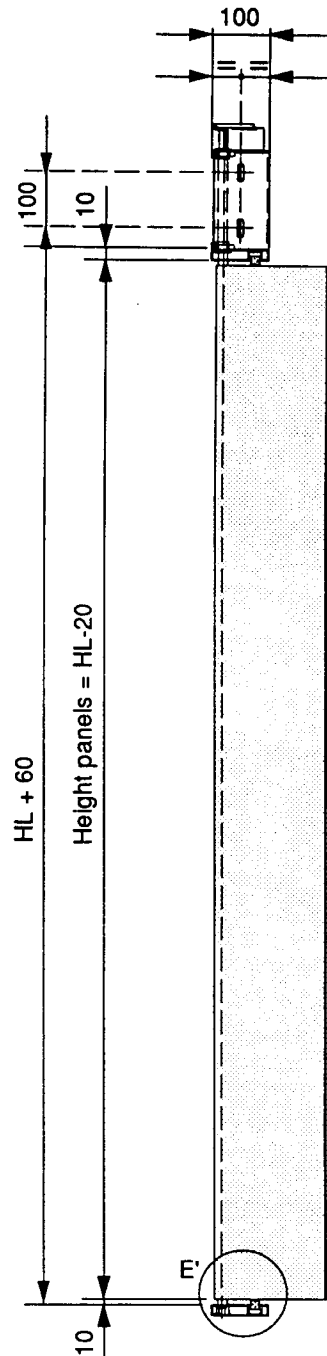
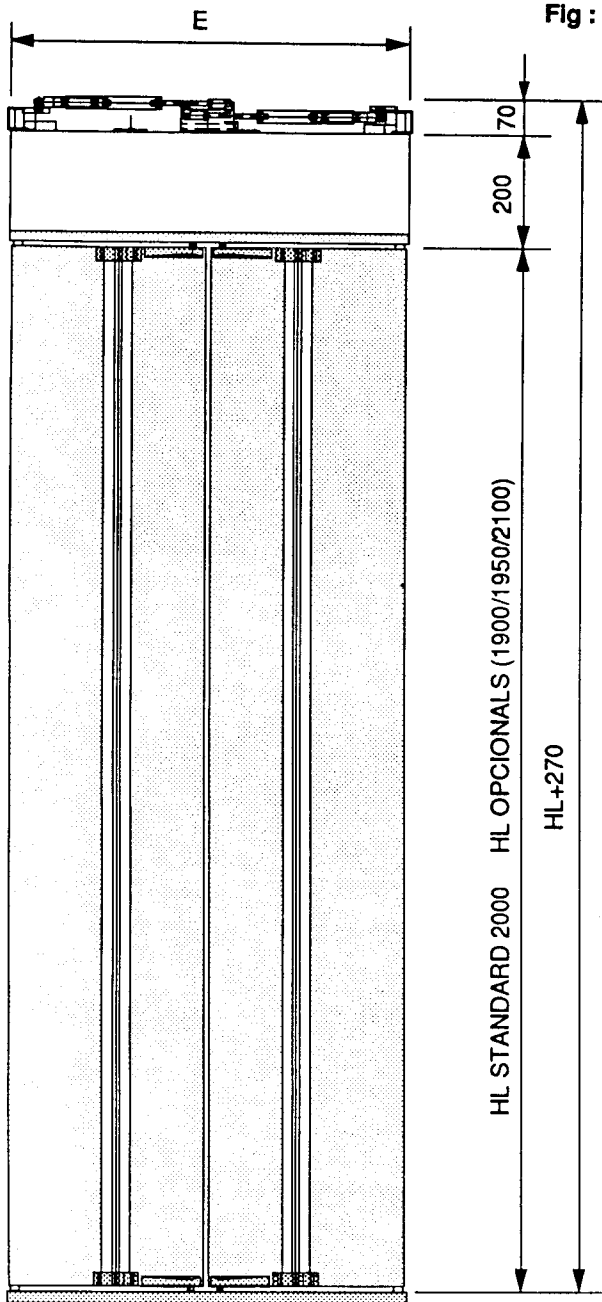
The general dimensions of the folding door are detailed in figure no.1. From its study we can deduce that the door adjust in width to the measurement of the clear opening of the cabin which from now on it will be denominated "E", and once the door is installed the access to the cabin is reduced to 25 mm each side that represents 50 mm less. The resulting measurement coincides with the clear access of the cabin, denominated Clear Opening "PL" that corresponds with the opening according to the following equatin  $PL = E - 50$  or  $E = PL + 50$ .

The transmission of movement over the panels is by means of the operator, it is the motor situated in this which impulses the trapecial belt so it transmits in the direction and the necessary dragging at four reduction pulleys situated over the two central shafts, and joined by cogged belts.

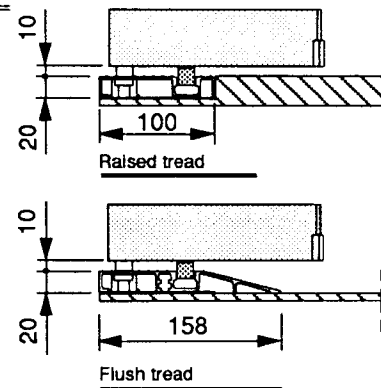
The central shaft of the operator effects a rotation of 180° that proportioning a movement of the arm and joined to the dragging shaft is sufficient for producing a rotation of 55°. The dragging shafts work together with the two dragging panels and transmit this rotation of 55° which is sufficient for the door to open or close completely.

The panels are guided in the superior central and inferior part by four guides that slide lineal and transversely to the opening through canals incorporated in the tread. (see figure no.2).

Fig : 1



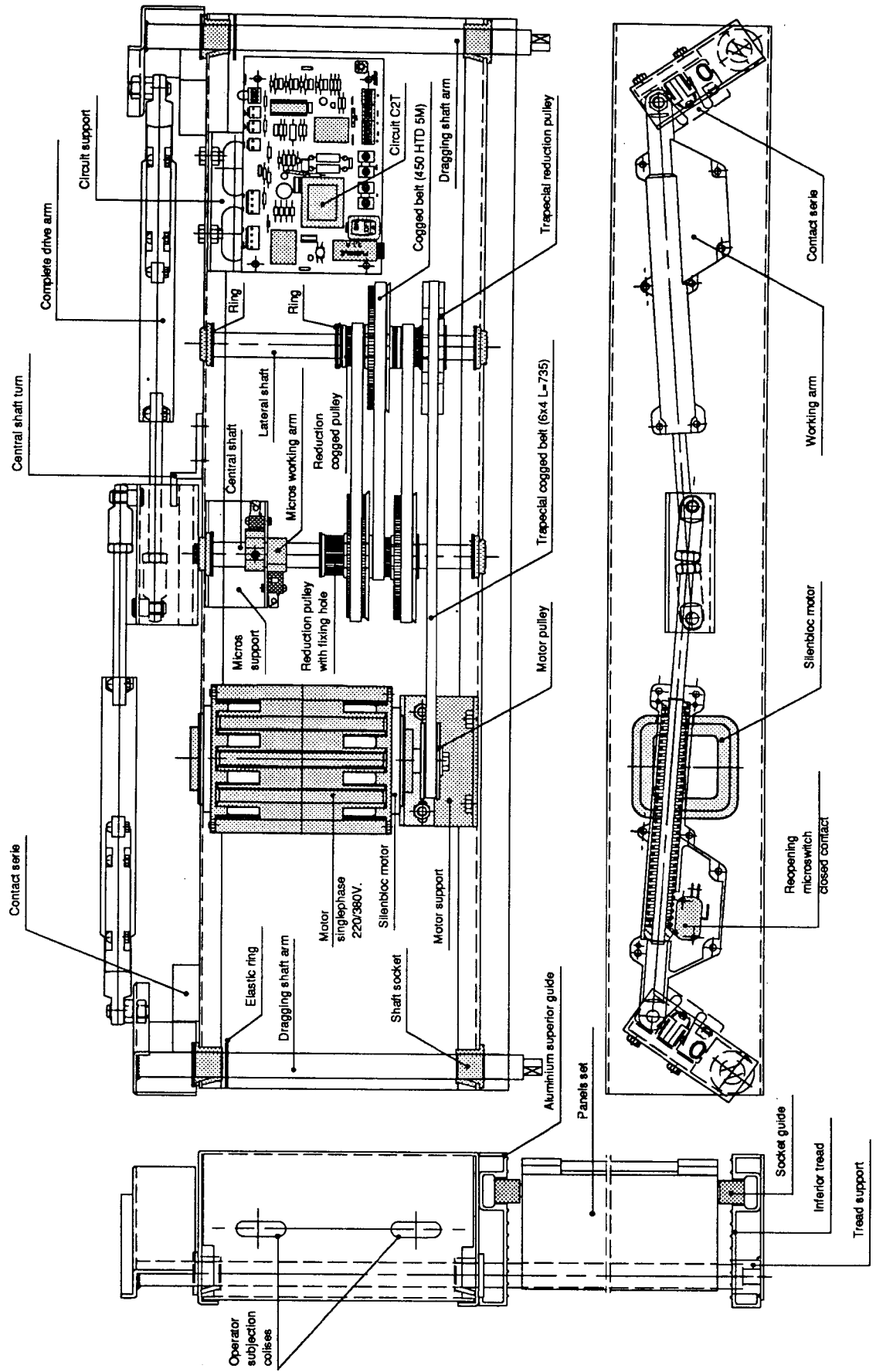
DETAIL E'



E	550	600	650	660	680	700	720	750	800	850	900	950	1000	1050	1100	1150	1200
PL	500	550	600	650	660	680	700	720	750	800	850	900	950	1000	1050	1100	1150
Time Man.										3,4 seg.			3,7 seg.			3,9 seg	
Inox.weight	35	37	40	41	42	43	44	45	48	51	54	58	61	65	69	72	76

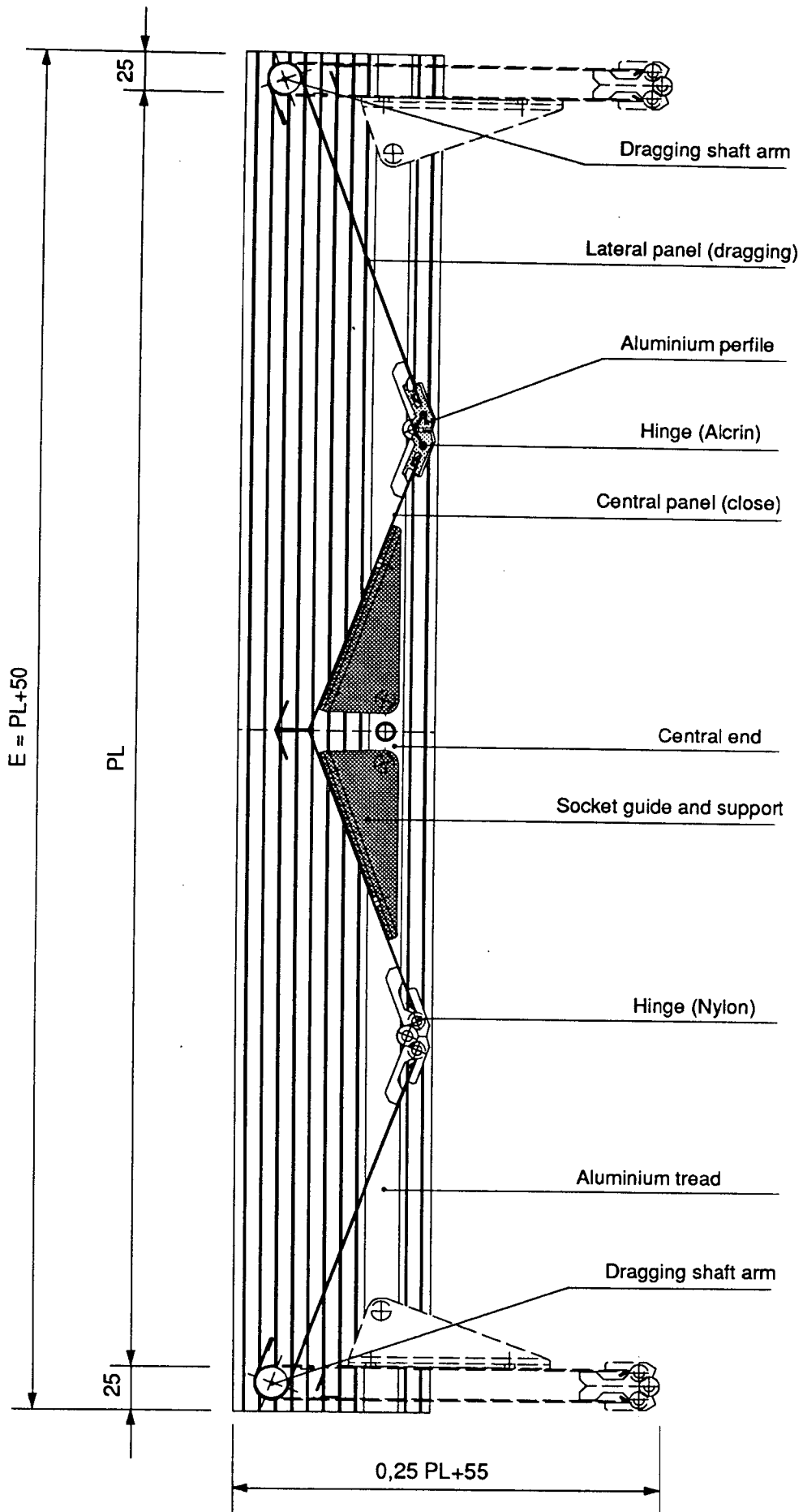
**GENERAL OPERATOR DESCRIPTION**

Fig. 2



**PANEL AND TREAD**

Fig : 3



**2.- PRESENTATION ON DELIVERY.**

The folding door CA.PL.4 is sent unmounted and packed in two boxes which contain the following:

A) Carboard box of 800x300x100 mm :

- Operator of the folding door assembled, including the motor and the superior guide.
- Inferior aluminium tread.
- Superior toe guard and base.
- Plastic bag with various guides and screws..
- Optional: Retractable cam for the locks of the j2 semiautomatic doors.

B) Carboard box of 2000x260x100 mm :

- Set of assembled panels.
- Hinges and perfile of joining rubber already on panels.

**3.- ASSEMBLY OF FOLDING DOOR.****3.1.-PLACING OPERATOR OF THE DOOR IN THE CABIN.**

The metallic base of the operator is prepared vertically, on both lateral sides, with two holes of 10 x 32 mm and separated at 100 mm, these holes are centred in height and width on each side.

To collocate the operator to the opening of the cabin this must be situated in the centre and at the correct height from the ground (see figure no.31) . Drill two holes of 10,25 mm on both laterals and fix the operator to the jamb with 4 screws of M10 x 25. If the drilling has been realized in the centre this permits a vertical regulation of  $\pm 10$  mm from the operator.

Once the operator is installed, it is important to check that it stays horizontal to the cabin floor. An operator collocated crooked may produce a bad functioning in the door.

It is important to check that the two lateral arms set free the jambs of the cabin from the superior part of the operator. If not, they should be cut so that they remain 5 mm from the superior base of the operator (Fermator doors produce higher operators in order to avoid this happening - consult us if necessary).

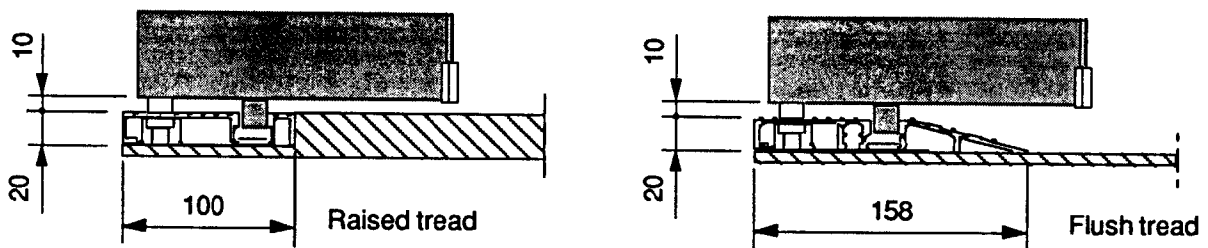
Also it is advisable to install the toe guard which serves as a superior cover of the operator, until it is put into service, as it must move repeatedly over the operator before it can be verified that the installation of the door is finished.

**3.2.- COLLOCATION OF THE TREAD.**

In order to fix the aluminium tread to the cabin floor, we must assure vertical alignment with the operator, for this, it is advisable to take as a vertical reference, the jambs of the openings or if not , use a plumb (see figure no.3.2.)

As the total length of the tread corresponds to the width of the opening of the cabin less 2 mm., the placing of the tread in the centre does not allow any error. The only thing to be taken into consideration is that the tread is perfectly in line with the operator.

The tread, whether flush or raised, has a metallic support that acts an inferior base for the aluminium tread. The fixing of the support and tread to the cabin floor is done with 3 screws M6 x 40 only 3 holes should be made in the floor with a drill of 6.5 mm.



The treads have 4 openings in the guide zone to allow cleaning or emptying of any dirt and it is recommended that at the same time of drilling the cabin floor, another 4 holes, large enough should be made to allow the dirt to fall through.

**3.3.- ASSEMBLY OF THE PANELS.**

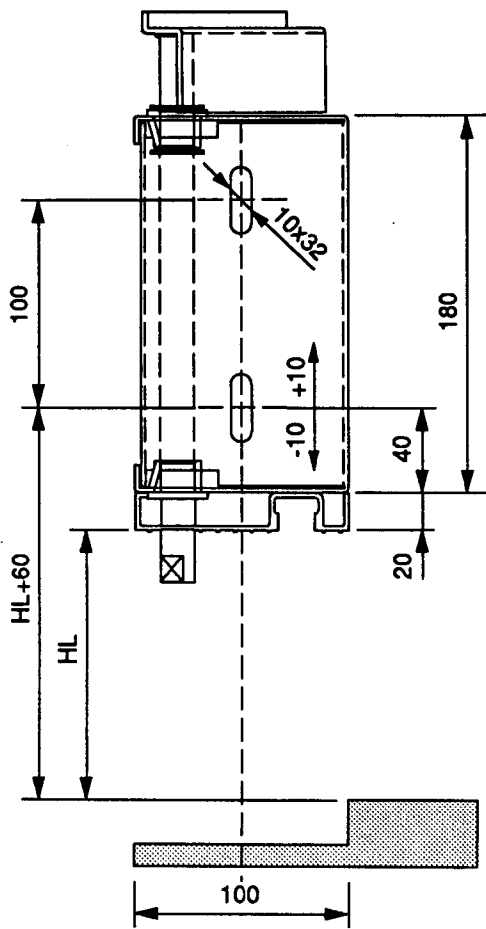
The four panels that form the set are sent assembled two by two (dragging panel and closing panel). It is only necessary to place the supports and socket guides of the panels, which are sent in a plastic bag, in the superior and inferior in each of the two sets.

For the collocation of the panels, itt is recommended to proceed as follows:

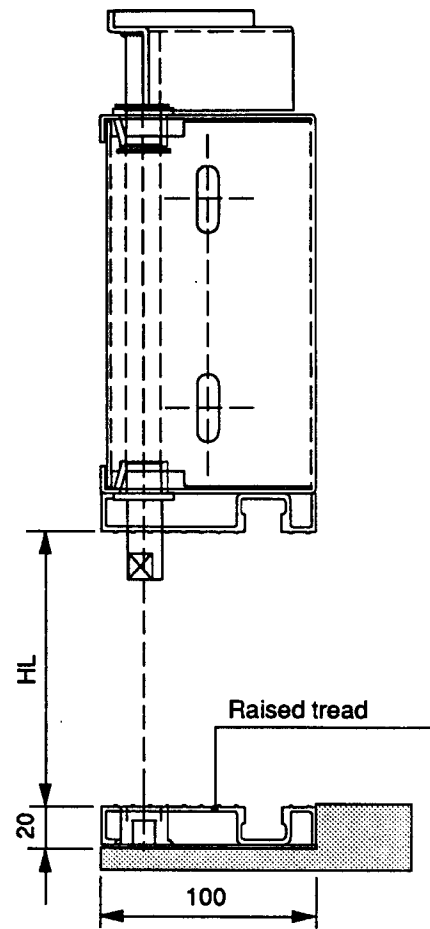
a) In the first place, work over the operator, which means, according to the set of panels to be installed, we must take out the two plastic rings that hold the dragging shaft to the operator and move it up 20 mm. This gives sufficient space so that the inferior part of the lateral shaft of the operator remains hidden within the operator and can entrar into the set of panels (see figure 4).



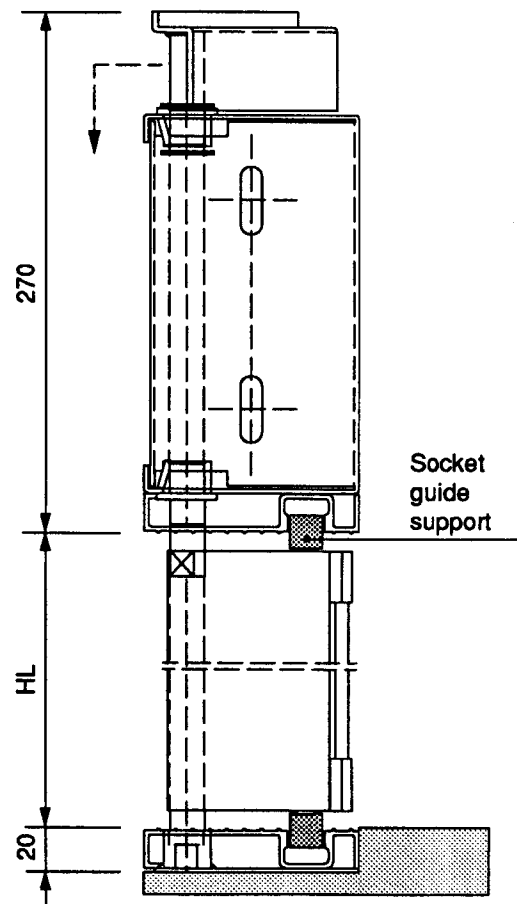
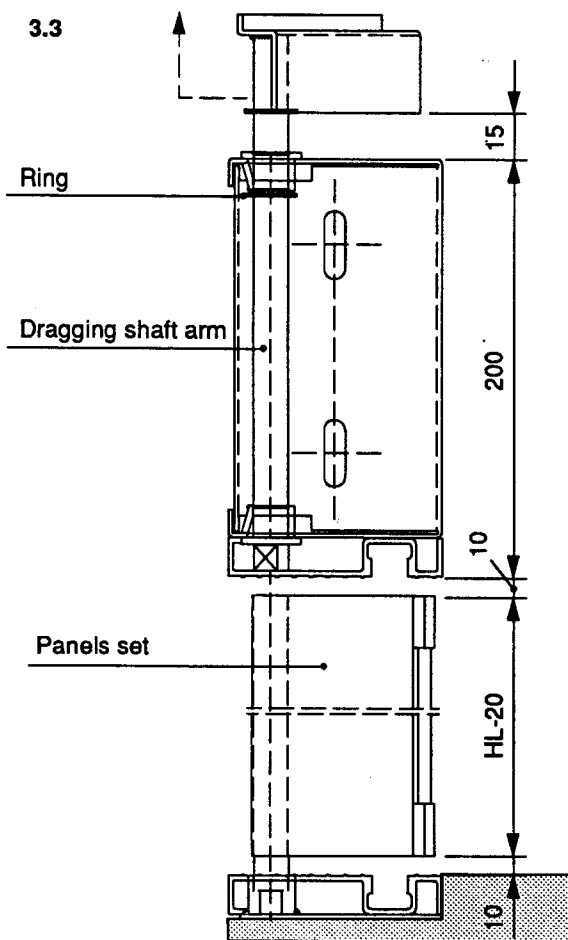
3.1



3.2



3.3



b) Collocate the vertical shaft of the panels set by its inferior part in the inside of the socket guide autolubricated of bronze of the tread. Raise the panels until the vertical shaft in its superior part reaches the position of the lateral dragging shaft of the operator.

c) Lower the dragging shaft operator until it is completely inside the shaft of the panels, being careful that the millings coincide. The millings of the two shafts are the ones that situate the panels correctly in relation to the movement that the operator transmits to them. Replace the two rings that hold the lateral shaft to the door operator.

d) Assure that the support and socket guide of the panels move correctly by the superior and inferior aluminium guides.

The correct position of the panels is that in the distance between superior and inferior treads there is 10 mm. In case of not obtaining this measurement by more or less, the error can be corrected lowering or highering the operator of the folding door in the cabin.

#### **4.-ADJUSTMENT OF CABIN OPERATOR.**

To adjust the folding door before it is put into service, it is necessary to do some adjustments over the operator. Is advisable to do this with electrical supply already resolved.

##### **4.1.- ADJUST CLOSING OF PANELS.**

Two problems may arise on closing the door of a folding door, that they remain half open or do not close completely, or that they bang one against each other in the middle point of closing. The solution to this problem is to advance or delay one or the two panels.

A) The doors remain open, that is one or the two panels together do not arrive to the central end of the treads. To correct this fault it is necessary to work over one or the two working arms of the operator. Close more the panels means to turn more the dragging shaft towards the central shaft of the operator, or what it is the same, reduce the length of the working arm (see figure no.5)

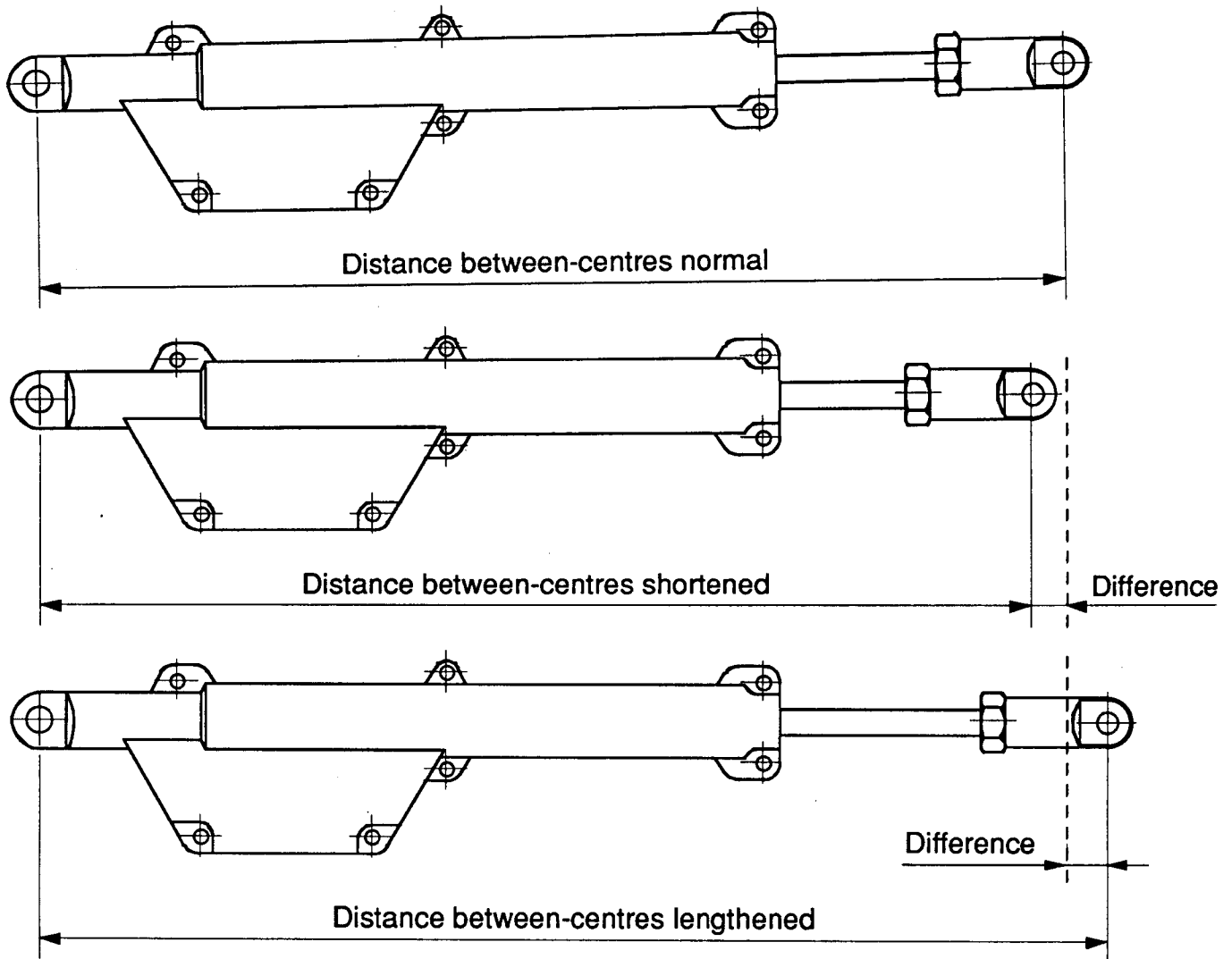
The working arm has in its extrem from threaded stick M8 and a plastic thread terminal. To reduce its length, take out the elastic ring that hold the arm to the central operator shaft, free the arm, unblock the nut that fixes the terminal and screw the last one until having the distance between centre required. Block again the terminal and fix it in inverse process to the central shaft.

If the modification of the working arms are correct, the panels should close completely.

## PUERTAS FERMATOR

B) The doors remain closed, the band excessively on closing. The problem now is completely the opposite to before mentioned and the solution is to increase the length of the working arms.

Proceed the same way as the pont before mentioned and extend the arms to the required measurement.

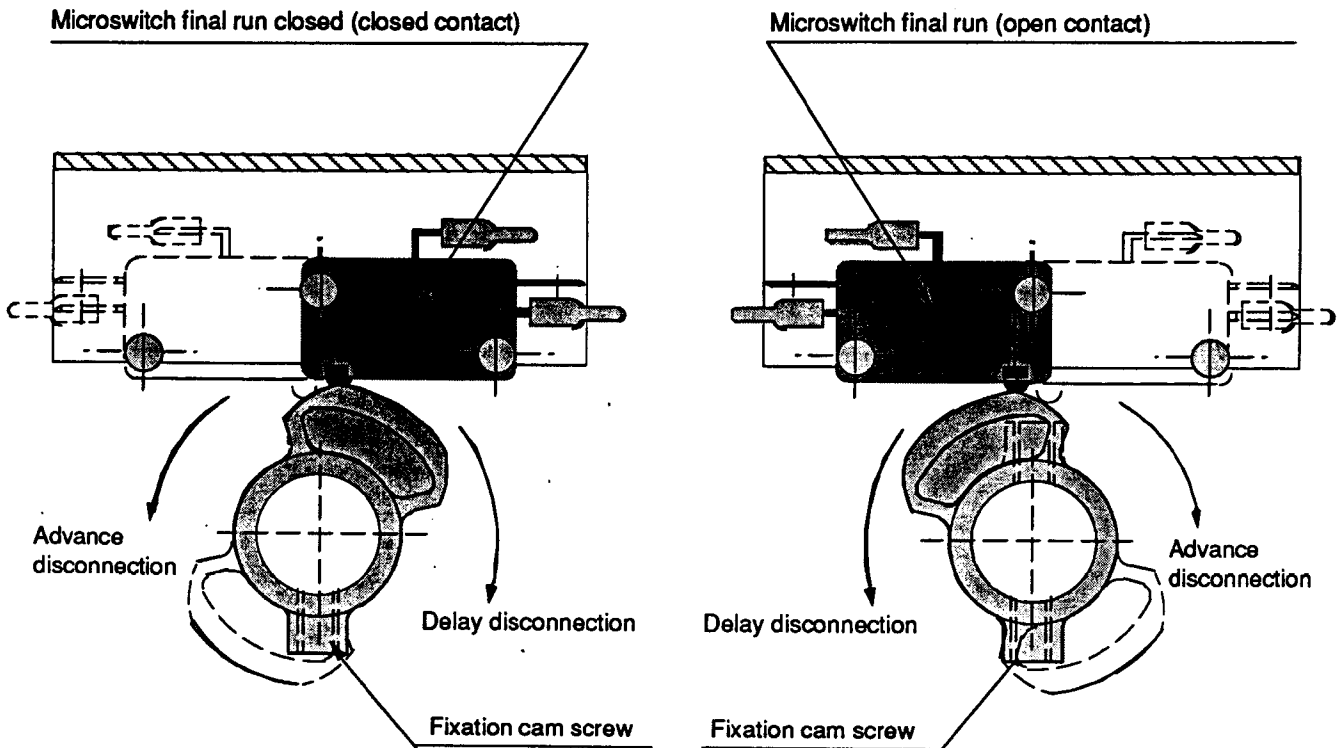


### 4.2. ADJUST CONTACTS AT END OF RUN.

Situated over a fixe metallic base to the operator, has been collocated two microswitches that work as contacts of end of run fo open or close. These microswitches work usually with the closed contacts or in continuity allowings the current to the motor, and only is interrupted when thepanels reach extrem positions of open or close.

The microswitches are activated by two cams in the central shaft, the regulation of these is realized by means of an allen scw, advancing or delaying as required.

The regulation of the closing and opening cam have an independent adjustment one from the other. (see figure no. 6).



#### 4.3.-CLOSING SECURITY DEVICE AND REOPENING.

The security device that acts as a stop and reopening of the door when this finds an obstacle, has been placed in the inside of the working arm operator.

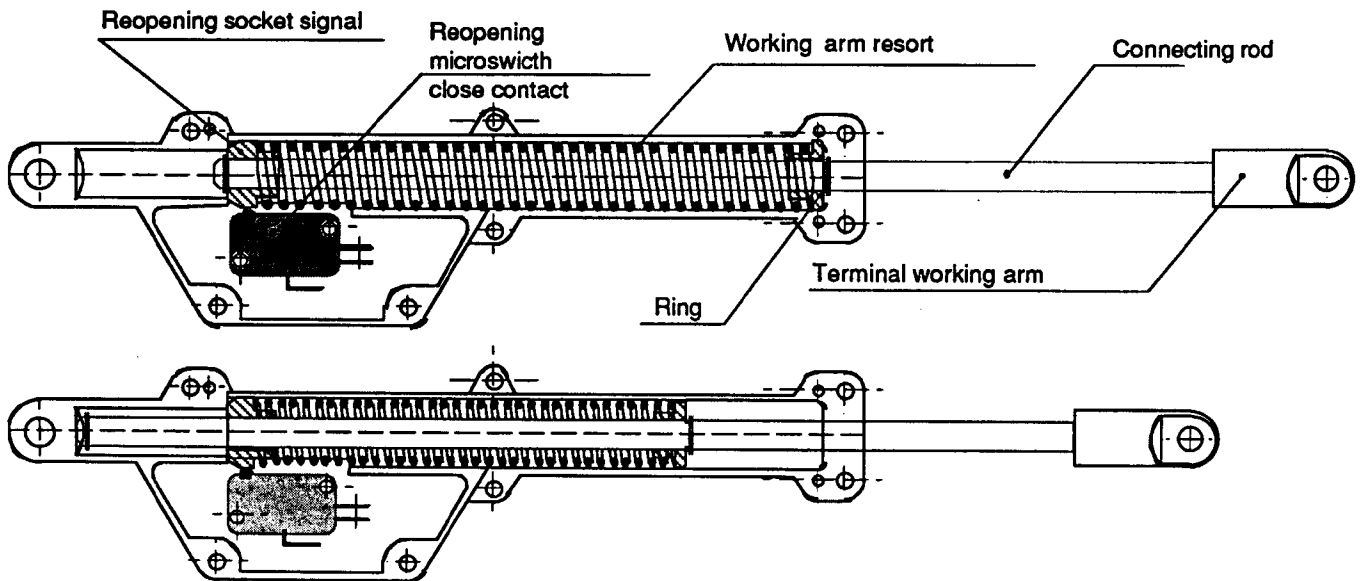
As the operator transmits the movements of rotation from the central shaft to the dragging panels through the two working arms, any blockage of any of the two doors on closing provokes the release of the security device on closing one of the two arms that initiates the reopening manoeuvre.

The function of this security in closing the folding door is detailed as follows: The working arm is joined to the central shaft of the operator by a metallic stick with a plastic terminal and in its rear part at the dragging shaft by a cover drive arm in plastic.

The metallic stick has in its rear part a spring and two sockets joined to it by two metallic rings, all this set is in the inside of the cilinder formed by two parts of the plastic cover drive arm. Inside the cover drive arm is fixed in a position predetermined an electrical microswitch in such a way that when it reaches with the rear socket of the stick is activated (closed contact).

When blocking the door, the distance required between-centres of the working arm tends to increase, which determines that the spring to the stick when supported by its anterior part over the neck of the cover drive arm presses it. Pressing the spring permits that the stick moves inside the cilinder of the cover, drive arm, which equally happens with the rear socket which at the same time frees the bubble of the microswitch and logically this changes its electrical state from closed to open or without continuity.

The change of electric state of the microswitch is used as a signal of inversion of the motor rotation, and consequently initiates the reopening of the door. (see figure no.7).

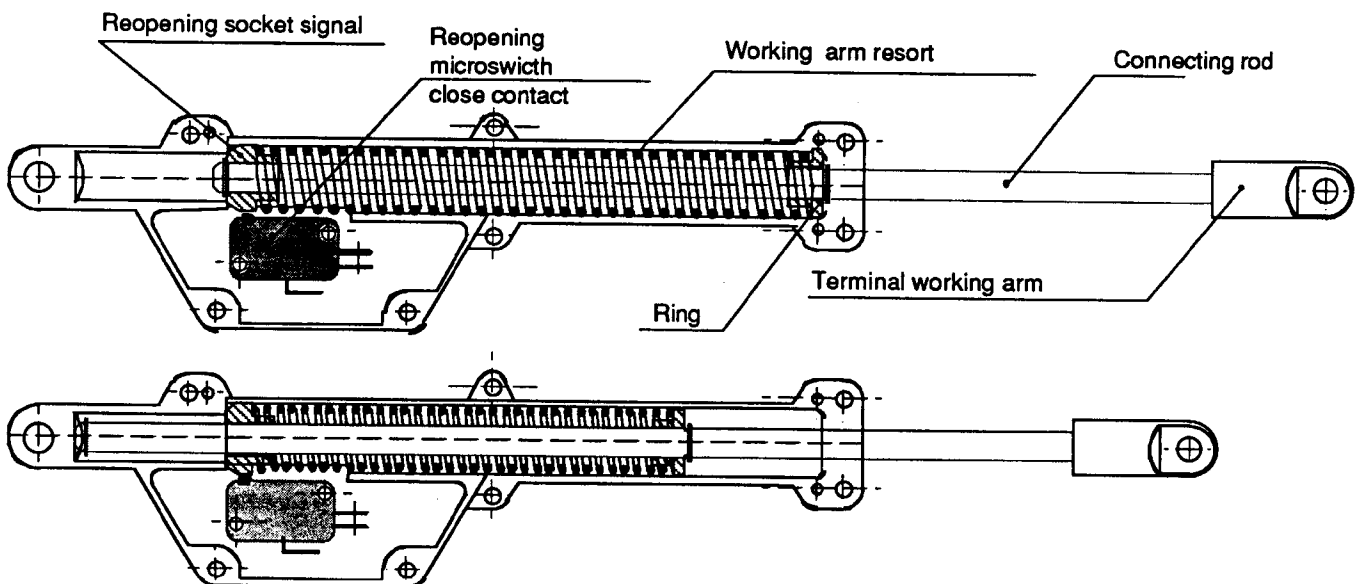


This same device functions in a similar manner when the doors block on opening, (see figure no.9) although as can be appreciated does not produce any effect on the electrical state of the microswitch.

The door can retain itself a big part of the opening run until the spring of the working arm is totally compressed. If it liberates, the recovery action of the spring it forces the door to open completely.

The blocking effort required for the exitation of the security device of one of the two arms, is prefixed and can not be regulated. The importance of this is understood within the typified values in the current standards regarding the security in the access to cabins.

In case that the mentioned force is superior or inferior to the required, Puertas Fermator disposes of other springs of the same dimensions but consist of different recuperations.

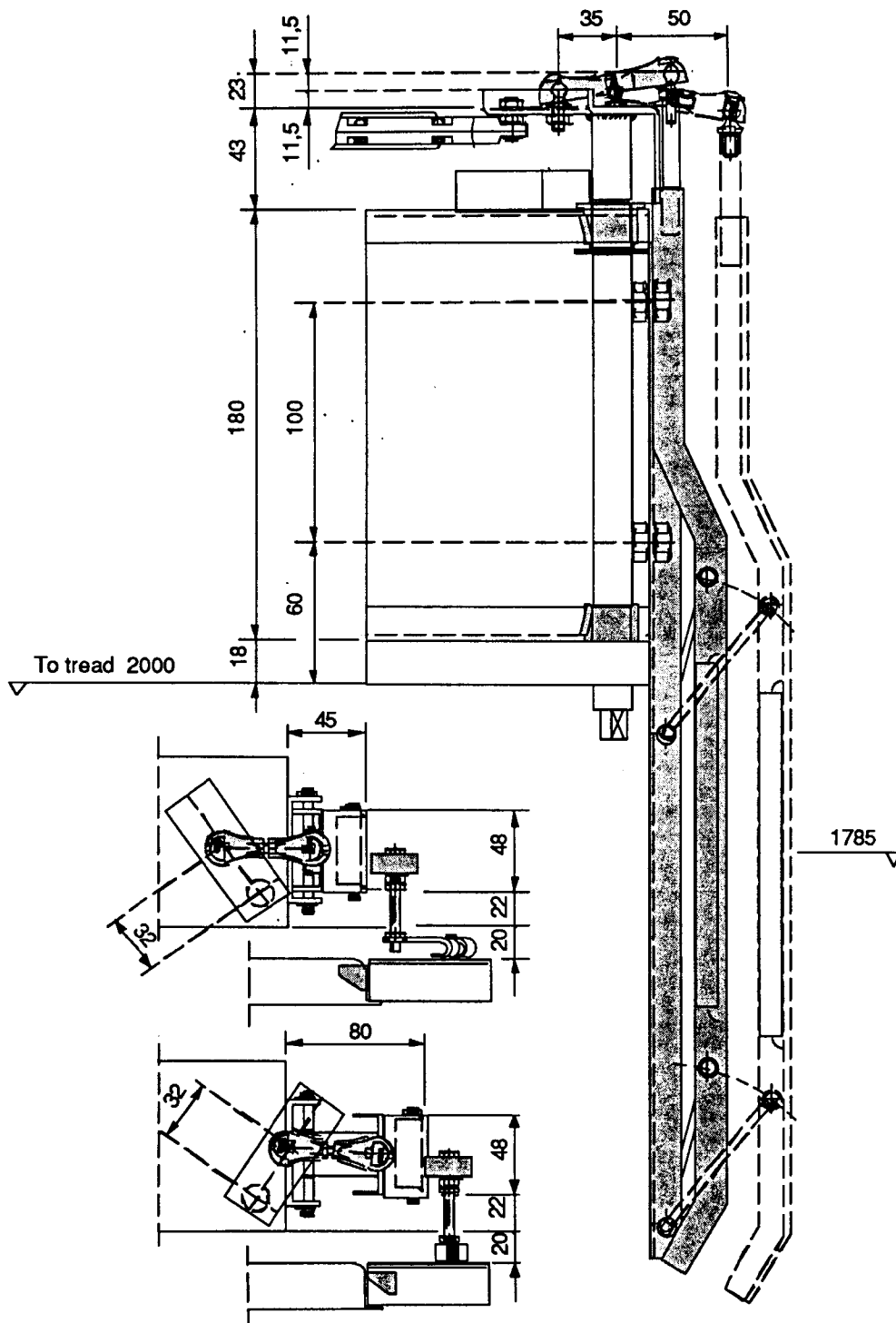


**5.- ASSEMBLY OF RETRACTABLE CAM.**

The collocation of the retractable cam regarding to the operator is detailed in figure no.10. The cam fits on the laterals of the operator, taking advantage of the two screws that fixes it to the jambs of the opening (see figure no.10).

The situation of the cam is regulated lengthways but does not allow an adjustment in height, this regulation is sufficient to activate all kind of locks.

The retractable cam has no side when assembling, therefore it can be installed on the right or left of the operator without any additional problem.



## **6.- INCIDENTES AND THEIR REPAIR.**

In this section is treated those situations that although not being usual may happen during the function of the door and the means of repairing.

In case of not being accompanied by the explanation of the following points with a representative drawing, refer to figure no.2.

### **6.1.- REPLACING MOTOR.**

In case of breakdown of the threephase motor it is advisable to disassemble the operator in order to make the necessary investigations and test.

In order to dismantle the motor, loosen the two screws M6 that fix it by the inferior part to the operator, so that the sheet that fixes it to the motor is dismantled, then take the trapezial cogged belt out, of the pulley of the motor. For dismantling the rubber silenblocks that hold the motor in the operator, loosen the two screws M5 that join them.

For the assembling of the motor proceed in the inverse way to the described, paying special attention that the trapezial cogged belt remains sufficiently tight.

### **6.2.- PLACING THE TRAPEICIAL BELT.**

In case of breaking or wearing of the trapezial belt, of that which transmits toe rotation over the motor to the first reduction pulley, proceed as follows:

The trapezial belt is assembled in such a way that the two central and lateral shafts of the operator are situated in the inside, so it is not possible to change them without working over these two shafts.

For liberating the belft from one of the shafts, supposing that it is the central shaft of the operator, the two elastic rings that fixe it to the operator should be taken out. Pass, in this moment, the belt under the central shaft. Proceed in the same way with the central auxiliar shaft.

It is advisable not to effectuate this procedure with the two shafts at the same time, the reason is that it is very difficult to collocate both shafts in their place again becassue of the tension that the cogged belts make.

Once the worn or broken trapezial cogged belt is liberated, a new one has to be placed, for this, we will effect the operation of liberation of shafts described before, assuring that once the shaft in question has passed in the inside of the belt,

it is well placed in the operator and that the elastic rings have been collocated correctly in the shaft.

Finally, for collocating the trapezoidal cogged belt in the inside of the reduction pulley, it is advisable to loosen the screws that hold the motor to the operator, because in the correct position of the motor, the belt is pretightened and it is impossible its collocation.

### **6.3.- CHANGING COGGED BELTS.**

The three cogged belts transmit the rotation movement from the first reduction pulley to the central shaft of the motor and join the four reduction pulleys.

Of all these the last belt transmits the highest par and lowest speed, so probably has more possibilities of breaking. Equally it seems to have the worse accesibility, that is why we will base this section in the changing of this belt.

The belt referred to has the central and lateral shaft of the operator inside, so it obliges or liberate both successively to situate the belt outside according to the explanation of pont 6.2. of the present study.

The only new point to consider is that the cogged belt has to liberate, at the same time, the first reduction pulley that is situated in the trapezoidal belt of the motor, so it is advisable to derail the trapezoidal belt of the pulley before placing the new belt.

Once completed the above points are the following movements are logical:

- a) Pass the 2nd belt to the position of the last one.
- b) Pass the 1st belt to the position of the 2nd.
- c) Place the new belt in the position that the first belt had.

Put into position again the shaft that was loose, and automatically all the cogged belts will remain tightened. Place the trapezoidal belt over the first reduction pulley as described in the anterior section.

### **6.4.- CHANGING ONE REDUCTION PULLEY.**

The reduction pulleys can be found two by two over the central and lateral shafts of the operator, three of them rotate freely over these shafts and the fourth is fixed to the central shaft of the operator by means of a connecting rod. This last one receives the rotation movement of the other three and as it is fixed over the central shaft, transmits a rotation of approx.  $180^\circ$

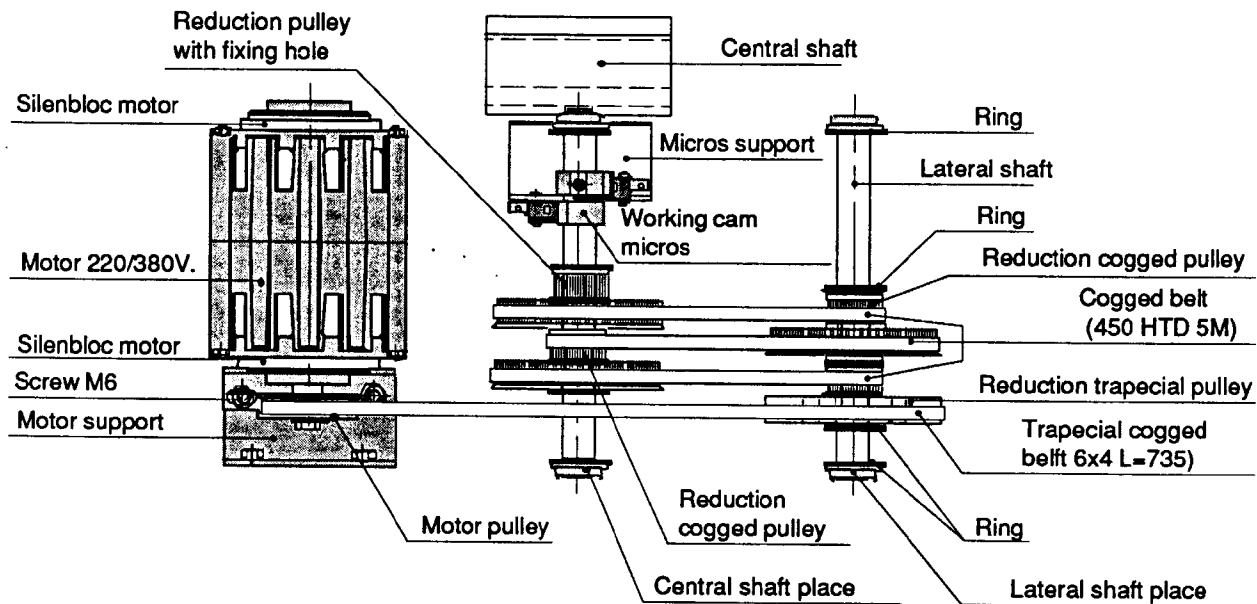
If is necessary to change any of the pulleys, this should be done over the shaft that holds it, that is, liberate the shaft from the elastic rings that hold it to the operator and lift it in a way that it can free pulley by its inferior part.



Before removing any pulley dismount the two rings that fix the two pulleys to the shaft, derail all the belts above the pulleys of the above mentioned shaft, and then slide downwards one or the two pulleys that need to be changed maintain the separation between both, once the changed maintain the separation between both, once the chage is made.

Reinstall the cogged and trapecial belts in the pulleys and fix them to the shaft with the two elastic rings previously unmounted. Place the shaft over its bese and fix it with the two remaining rings.

The last reduction pulley has a milling to put a pulley with fixing hole which joins it to the shaft. This pulley con not be substituted for any of the other three pulleys. Equally, the pulley that receives the movement of the motor rotation in the first instance, is externally different to the others as it has a uncogged trapecial groove suitable for the belt of the motor, this pulley can only be substituted for one of its same configuration.



**6.5.- SUBSTITUTION OF A MOVING ARM.**

When it is necessary to replace one of the two moving arms of the operator, simply take off the two elastic rings that fix it to the central and dragging shafts, disconnect the electric cable of the arm of connection or if this does not exist, from the circuit. In some cases the fastening clamps of the cable that hold it to the operator should be loosened.

The most usual way is to change completely the moving arm, when requesting this spare part, indicate the clear opening of the operator. In the event of requiring performance "in situ", some possible incidences as detailed as follows may be solved.

### **6.5.1.- CHANGING MICROSWITCH OF REOPENING.**

When the cause that provokes bad functioning of the security device is found in the microswitch of the moving arm, and needs to be replaced for another identical one, it is advisable to proceed as follows:

Once the moving arm is loose (it is not necessary to disconnect it electrically) open the plastic drive arm cover by means of unscrewing the seven screws M4 that join the two parts. In the inside the electric microswitch of reopening is situated in a predetermined position by two pivots injected into the drive arm cover.

Take out the defective microswitch and put a new one in the same position with terminals connected correctly. It is important that the new electric contact presents the same electric state as before, normally it is closed contact when it has the bubble pressed.

Join the two parts of the drive arm cover and fix the 7 screws M4. Check with a tester that the electric contact changes its state when calling the arm manually, before mounting it over the operator. Lastly, fix the arm to the two shafts of the operator and collocate the two elastic rings.

### **6.5.2.- MODIFICATION OF THE REOPENING FORCE.**

As shown in other sections of this study, the modification of the force for closing, depends exclusively on the force developed by the spring of the moving arm of the operator.

To modify this it is essential to change for one identical. However, this change is not very usual as all the arms are adequate in type and clear opening for the doors to which they are destined. Nevertheless, this is the correct way to proceed.

Once the moving arm is dismantled and opened the connecting rod remains completely accessible part of the rod and situated between two plastic socket guides which are blocked over this by two elastic rings.

To free the spring it is necessary to take out the rear ring carefully, as the spring may fall out, dismount the plastic socket and then change the spring.

To assemble proceed viceversa, that is, press the new spring so that the socket guide fits, and the plastic ring in its place, place the connecting rod over the drive arm cover and assemble all the set.

### **6.5.3.- CHANGING THE DRIVE ARM COVER.**

The dismantling and possible changing of the plastic drive arm cover is simple, according as described in previous sections. Any drive arm cover can be changed for other regardless of the length of the drive arm.

**6.6.- CHANGING SET OF PANELS.**

When the imperfections caused by using badly the folding door result in the need to change a complete or half set of panels, it is advisable to proceed as follows:

- a) Dismantle the supports and socket guides of the central parts of the damaged panels, this simple operation may be done with a hexagonal spanner no.10.
- b) Take off the two elastic rings of the dragging shaft and raise it until the milling of the shaft is in line with the inferior part of the operator.
- c) Lift the panel set until it frees the inferior of the tread and take it out to allow the collocation of the new set.
- d) Place the panel set according as shown in leaflet no.3.3.

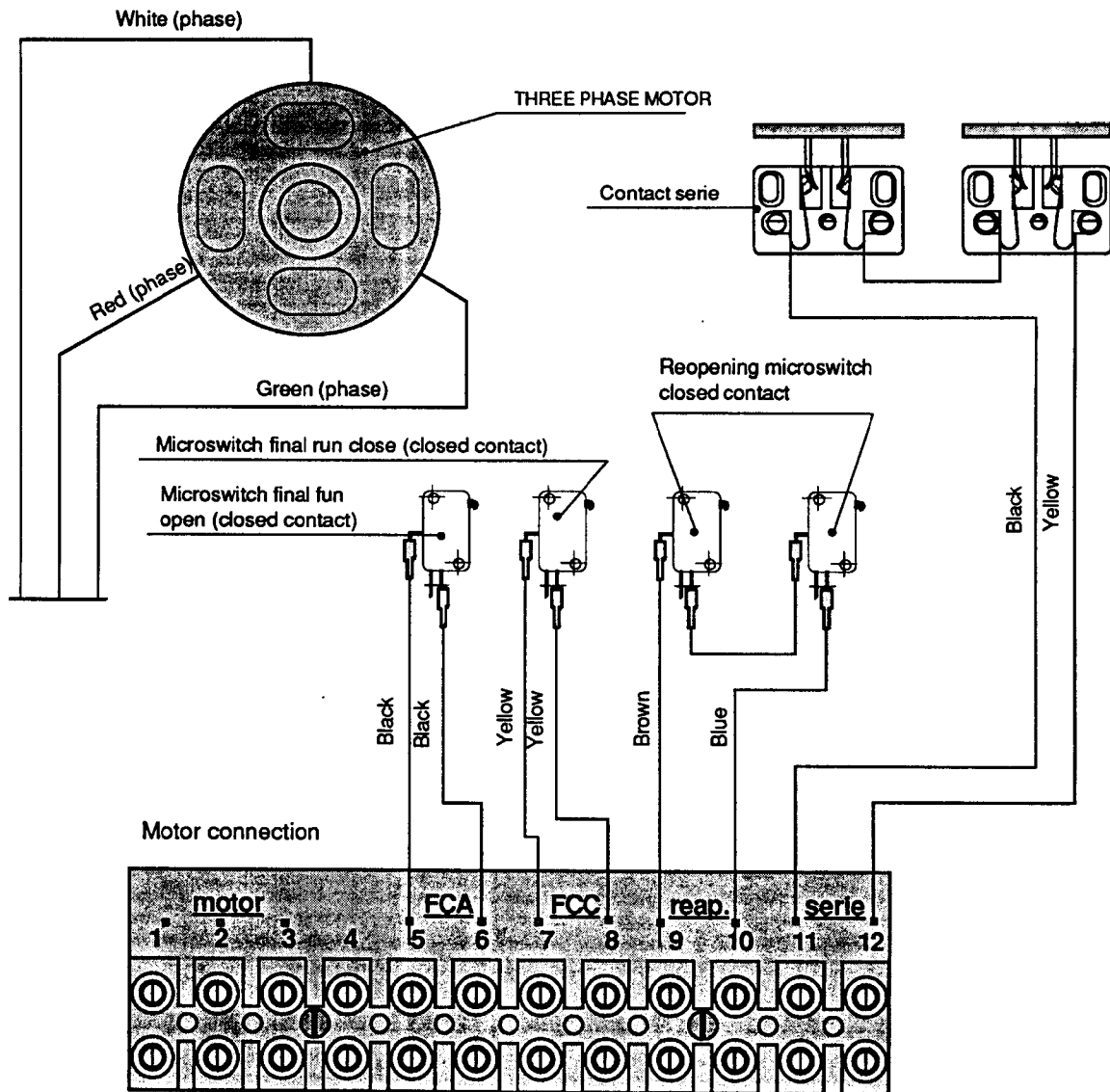
The sets of panels are supplied with the hinges and aluminium profiles already assembled and because of this it is not recommended to try to assemble them "in situ" as it is practically impossible to do so if not available industrial resources similar to those used in the manufacturing.

It is important to know, the height of the panels and clear opening of the door before changing any panels as there are panels with heights and widths of many dimensions, and also some special ones

**7.- DIAGRAM OF ELECTRIC WIRING.**

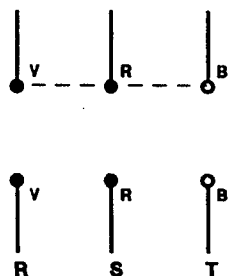
**7.1.- WIRING OF OPERATOR.**

The wiring of the operator can be seen in this diagram. The connection is 220V and 38V as can be seen at end of page.

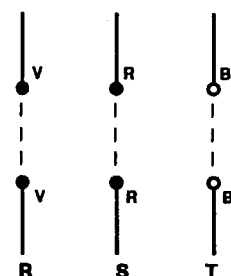


MOTOR CONNECTION

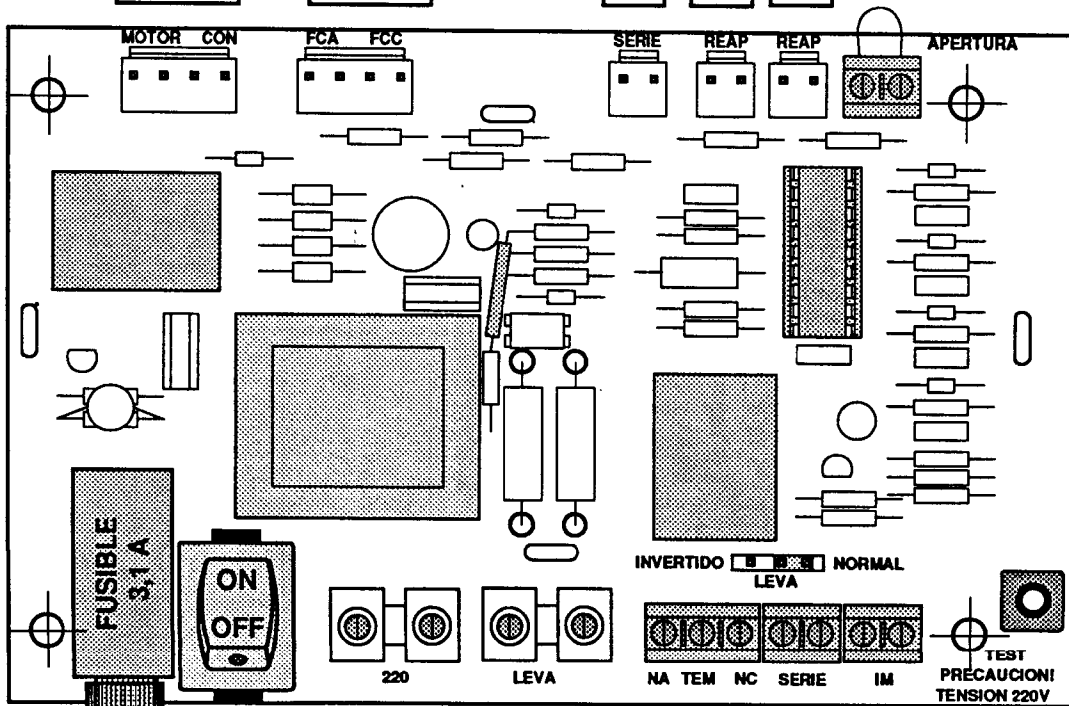
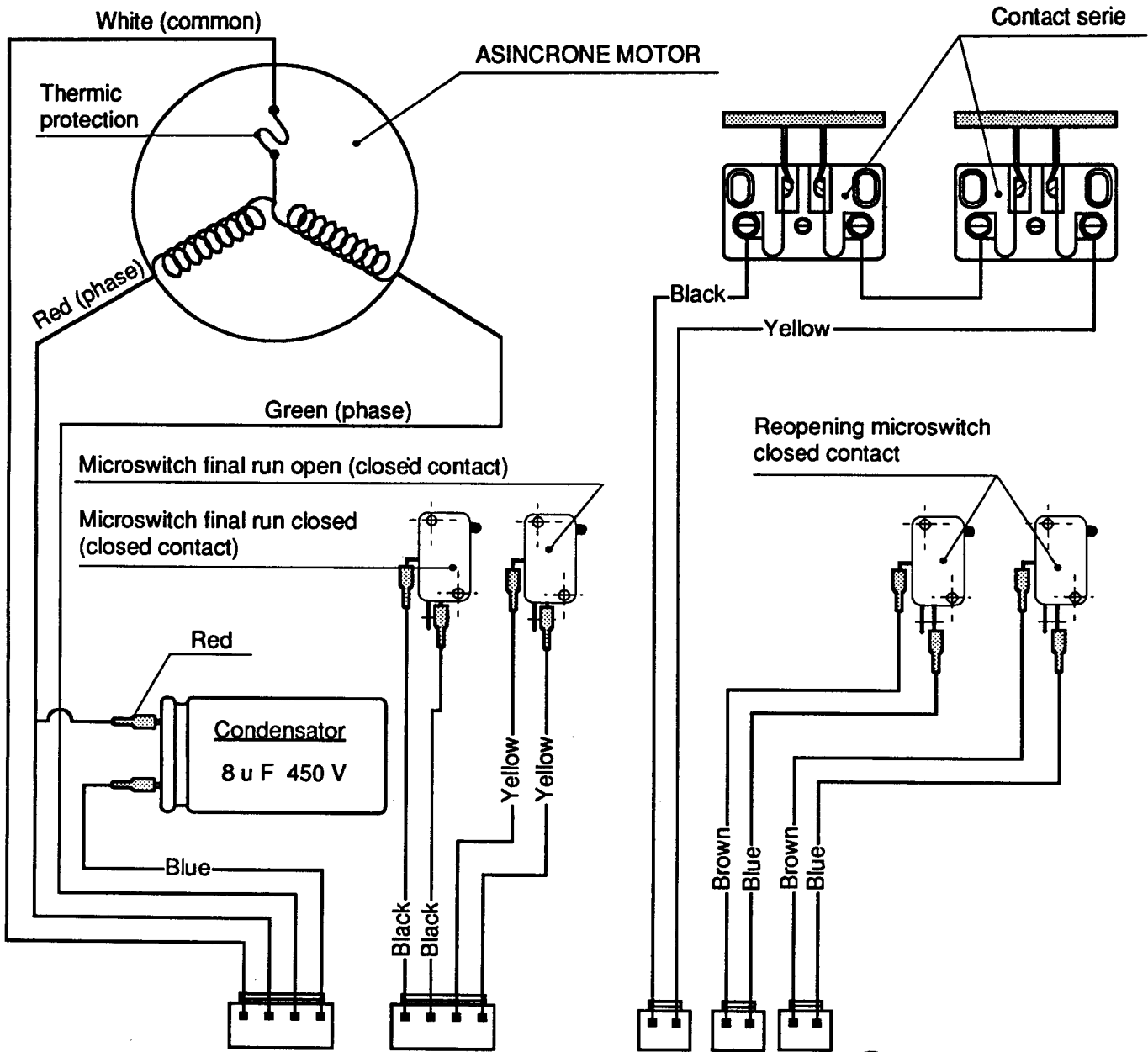
Connection at 380 V III



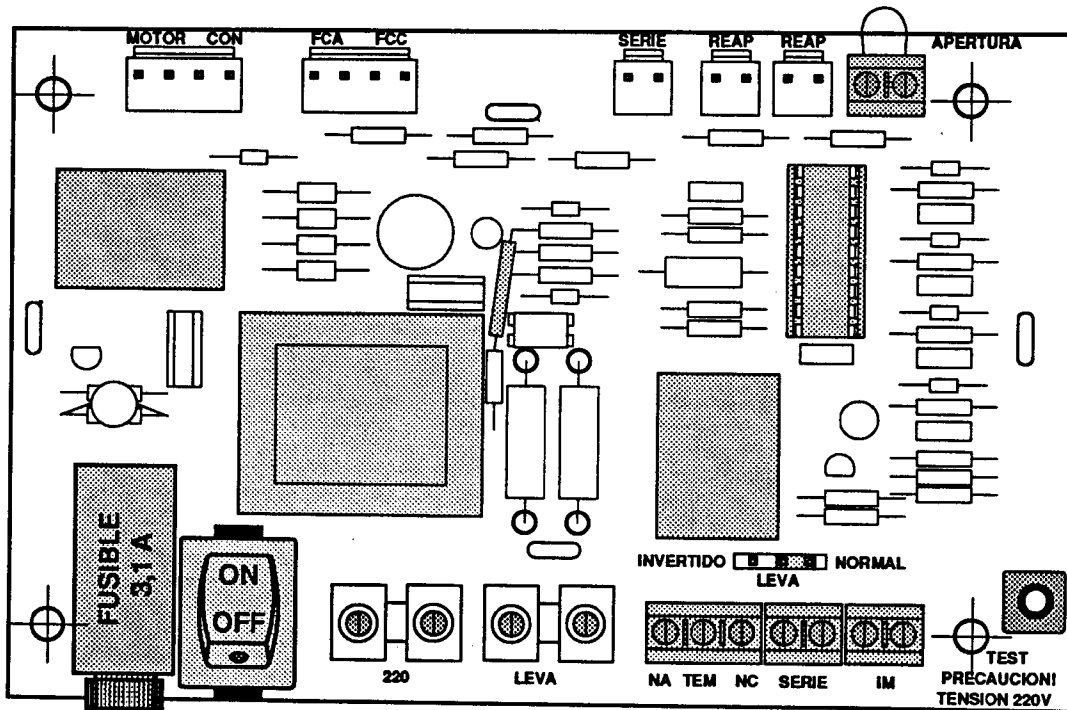
Connection at 220 V III



V: (Green)  
R: (Red)  
B: (White)



**Printed circuit C2-T**



**EXTERNAL CONNECTION :**

- **220 AC:** Connect 220 volts. single phase alterne current.
- **CAM:** Supply in parallel with the existing retractable cam, or, with the signal for opening or closing of door. This supply is valid for any tensions between 24 and 240 volts, whether the current is alterne or continuous.
- **NA-NC :**It is a contact switched and temporized to the excitation of the cam. This contact remains 6 seconds after the cam signal.
- **SERIE :** Should be connected with the demoninated serie of exterior locks.
- **I.M. :**By passing, the door does not open connecting it to a magnetic, is used to avoid that the door opens between floors.
- **LOGIC INVERSOR:** Permits to have the door in open or close position, by passing it respectively the indicated positions as normal or inverted.
- **TEST:** Switch that permits make a complete manoeuvre of open/close doors.
- **OPENING :** To connect the switch for opening the interior door of the cabin or the signal of the photocell. Only functions while the door is closing.
- **MICROPROCESSOR:** Incorporates the function Soft-Start which activate the motor from tension CERO into MAXIMUM in a progressive way of 0.5 seconds avoiding any possible brusqueness. Assure that the switching is done with the triacs deactivated, avoiding any extra tension or spark in the microswitches end of run, connected to the circuit (during the switching there only circulates an intensity of 1mA through the contacts of the microswitches). Controls up to 5 consecutive reopenings, passing this amount provokes the inhibition of the door during the following 25 seconds.

**7.2.-REGULATION OF THE CONTACTS OF SERIE.**

The signal of presence of panels on the closing of the door is given by two electrical contacts connected in serie and from now on we will denominate them as series switch.

Each series switch from two parts the first which is over the superior lateral of the operator and is adjustable, and the second that serves as electrical contact joined to the dragging shafts of the operator.

In order to advance or delay the signal of presence of panels according as necessary, simply move the first series switch so that it is nearer or further to the fixed contact in the dragging arm when it is closed. Doing so, the series switch advances or delays the signal depending on the rotations made by the dragging arm.

The regulation of the two series switches is independent one from the other.

Note: It is not convenient to advance much the serie switch, as it may complete the electric serie without the door having closed completely, and there is a danger that the lift moves with the doors half-open.

**8.- POSSIBLE BREAKDOWNS AND THEIR ELIMINATIONS.**

<u>BREAKDOWN</u>	<u>CAUSE OF BREAKDOWN</u>	<u>ELIMINATION</u>
Operator does not open nor close remains immobile.	- Power does not reach motor	- Check tension in terminal
Power in motor but does not open nor close.	- Trapecial belt broken	-Replace belt and adjust tension
	- Cogged belt broken	- Replace cogged belt
	- Motor pulley loose	- Tighten pulley
	- Reduction pulley with fixing hole turns freely	- Change the pulley and check milling of hole.
Operator function and panels do not move	- The dragging shafts do not move the panels	- Check position of the shaft on the panel

BREAKDOWN	CAUSE OF BREAKDOWN	ELIMINATION
	- The shaft does not interlock with the panel	- Lower the operator until the shaft enter completely into the shaft of the dragging panel
	- Panels blocked	- Unblock panels and inspect the tracks of the tread
	- Trapecial belt very tight	- Check correctly situation of the socket guides.
		- Loosen the screws of the motor until the belt is correctly tightened
Door opens but does not close	- Contact of reopening active (open)	- Adjust the microswitch of the reopening.
	- Contact of reopening different to indicated	- Change the connection of the ends of contact (third string)
	- Drive arm is blocked	- Dismount the arm and check the internal disposition of the elements
	- Cam signal does not enter	- Check the signal of entry parallel to the existing cam
	- Motor does not disconnect	- Adjust the cam that activates the microswitch end of closing
Motor of the operator does not disconnect	- Microswitches end of run badly adjusted	- Adjust the cams that activate the micros
The reopening functions continually	- Obstacle in the threshold of the cabin door	- Remove the obstacle or clean the inferior tread.
	- Spring of the reopening loose	- Change spring
	-Panels jammed during the closing run	- Clean and oil the guides of the two treads of AI.



<b>BREAKDOWN</b>	<b>CAUSE OF BREAKDOWN</b>	<b>ELIMINATION</b>
Door operator makes noise	- Needs grease or oil in sockets of central and drive shaft	- Grease (never with spray)
	- The motor touches the metallic part of operator	- Centre the rubbers that hold the motor
Electric signal of panel presence fails	One of the two contacts does not give continuity	- Adjust the contact of the operator contacts
Panels do not close or open completely	- Badly adjusted the regulation of arm drive	- Adjust the arm as shown in section 4.1.
	-The central shaft does not rotate at 180°	- Delay the cams that activate the micros of final run

NOTE: In this section has been described some incidences that although not usual, may happen during the installation or later, and because of this, it would be advisable to check the above points before using the installation.

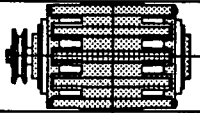
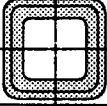

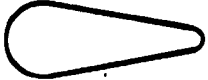

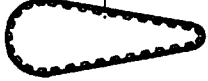




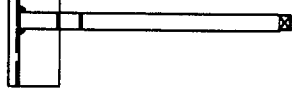


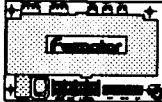

**9.- TOOLS NECESSARY.**

- Spaners for hexagonal screws: 6-7 / 8-9 / 10-11 (x2) / 12-13 (x2) / 16-17.
- Tubular spanners: 10-11 / 12-13 / 16-17.
- Spanners for allen screws : 3 / 4 / 5 / 6.
- Screwdrivers: 1 star, 2 flat, 1 regleta.
- Pliers (pointed) for interior and exterior elastic rings.
- Electric drill with drills: 4,25 / 6,25 / 8,25/ 10,25.
- Radial (sometimes) with cutting disc
- Nylon hammer.
- Level of water drops.

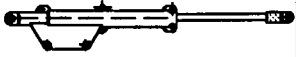

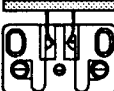
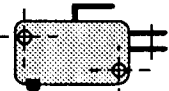
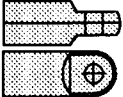

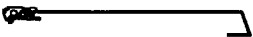
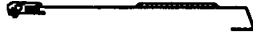

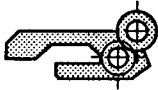





**10.- SPARE PARTS AND ACCESSORIES.**

IMPORTANT: On request of any of the parts always indicate the TYPE and CLEAR OPENING of the folding door. On the next page there is a list of most normal accessories and parts more liable to be used as spare parts.,

# Listado de elementos Puertas plegables

REFERENCIA	DENOMINACION	FIGURA
50.10-01	Motor Ø90.	
50.10-02	Silenbloc motor.	
50.10-13	Motor pulley Ø30 - 45.	
50.20-11	Trapezial cogged belt (6x4 L=735)	
50.20-12	Reduction pulley with trapezial groove	
50.20-03	Cogged belt (450 HTD 5M)	
50.20-04	Reduction cogged pulley	
50.20-05	Reduction pulley with fixing holes	
50.20-06	Central shaft	
50.20-07	Lateral shaft	
50.30-01	Dragging shaft arm	
50.30-10	Working cam micros	
50.30-11	Micros support	
50.40-02	Printed circuit C2T.	
50.40-03	Reopening wiring	

# Listado de elementos Puertas plegables

REFERENCIA	DENOMINACION	FIGURA
50.50-00	Working arm set	
50.50-01	Working cover drive arm	
50.50-25	Serie switch	
50.50-02	Reopening microswitch and final run	
50.50-03	Terminal drive arm	
50.60-01	Dragging lateral panel	
50.60-02	Central panel without glass	
50.60-03	Central panel with glass	
50.60-04	Hinge (Alcrin)	
50.60-05	Hinge (nylón)	
50.60-11	Support and socket guide	
50.60-12	Central stopper	
50.70-01	Superior and inferior aluminium guide	
50.70-02	Flush tread	
50.70-03	Tread support	
50.80-00	Retractable cam	