

GET1/AD97
GET2/AD97

D811222 23-10-02 Vers. 02

AUTOMATIC DOORS

THESE INSTRUCTIONS ARE VALID AUTOMATIC DOORS EQUIPPED WITH AD97 CONTROL PANEL (CODE D113148).
IN CASE OF MODELS EQUIPPED WITH A DIFFERENT CONTROL UNIT, REFER TO THE INSTRUCTIONS SUPPLIED WITH THE PRODUCT.



1) GENERAL INFORMATION

Motorized top rail for automatic sliding doors with single (mod. GET1) or double (mod. GET2) leaf.

Complete with control panel. Special accessories for complete installation are available on request.

For GET1 versions, please remember to indicate if the opening side is right or left (looking from the door outside to the inside).

2) TECHNICAL FEATURES

2.1) Mechanical features

GET 1 working passage space	min 700 mm max 2500 mm
GET 2 working passage space	min 800 mm max 2900 mm
Single-leaf capacity	GET1 150 kg
Double-leaf capacity	GET2 120+120 kg

2.2) Electrical features

POWER SUPPLY	230Vac (+/- 15 10%) 50-60 Hz
FUSES	see figures 25 + 32
ACCESSORIES POWER SUPPLY	12Vdc 0.7A max.
ABSORBED POWER (mains)	Automation 130VA MAX Accessories 20VA MAX
OPENING SPEED	Adjust. up to 60 cm/sec. (GET 1) Adjust. up to 120 cm/sec. (GET 2)
CLOSING SPEED	70% approx. of the opening speed
AUTOMATIC CLOSING TIME	Adjustable from 0 to 35 seconds
APPROACH SPEED	From 2.5 to 20 cm/sec (GET 1) From 2.5 to 40 cm/sec (GET 2)
WORKING TEMPERATURE	From 0°C to + 50°C (internal casing)
BRAKING ADJUSTMENT	Automatic
ANTI-SQUASH	Anti-squash safety mechanism in presence of obstacles
BACK-UP BATTERIES	(optional) 2 x 12V - 1.2Ah
TOP RAIL DIMENSIONS	See (fig. 1)

3) DESCRIPTION OF THE PARTS (fig.3)

The standard version of the GET automation is made up of:

- 1 Natural or anodised aluminium top rail.
- 2 Power supply unit complete with bipolar switch, mains fuse and anti-interference filter
- 3 Control unit with microprocessor AD97
- 4 Direct current gearmotor
- 5 Opto encoder for stroke detection and obstacle control
- 6 Driving pulley
- 7 ISORAN RPP8 15EC type toothed driving belt
- 8 2 carriages per leaf with 2 wheels on bearings, anti-derailment roller. Carriages have height and depth adjustment.
- 9 Leaf-fastening contour
- 10 Rubber doorstops.

The following optional elements can be added to complete the automation:

- 11 DAB Battery-operated anti-panic device
- 12 CEP Electromagnetic door-latch and manual release
- 13 PFE7 Function control button board
- 14 TSA Natural or anodised aluminium supporting beam
- 15 PGI Lower door-guide contour for leaves with frames
- 16 PPR Slide for lower door-guide.
- 17 RIM Narrow range infrared radar.
- 18 FAT 1 Photocell (1 amplifier + 1 transmitter + 1 receiver)
- 18 FAT 2 Photocell (1 amplifier + 2 transmitters + 2 receivers)
- 19 Closing cover
- 20 SASAM1-2 Device for break open doors

4) FASTENING TYPE AND METHOD

The GET automation can be installed in various ways. On request the TSA supporting beam with screws and fastening plates can be supplied to fasten the top rail when this cannot be attached to a wall.

Fig. 2 shows the contour of the TSA supporting beam and its dimensions. For GET 1 models, if the opening direction is not specified in the order, the door will be supplied with the usable passage space PU on the right (looking at the door from the outside).

The opening, however, can be changed from right to left, by carrying out the following straightforward operations:

- a - Loosen the belt tightening stop and the driving pulley.
- b - Remove the pulling bracket from the carriage to which it is attached and pull the belt until the pulling bracket has gone beyond the driving pulley.
- c - Re-position the pulley and the belt tightening plate. Use a lever or a large flat-bladed screwdriver to correctly re-tighten the toothed belt.

d - Fasten the pulling bracket to the carriage of the leaf.

e - Check the position of the doorstops and adjust these as required by loosening the two fastening screws and sliding the doorstops in the groove of the contour. If the end of stroke bracket on the power supply unit side is fixed onto the bracket of the unit itself, loosen the screws of the power supply unit and adjust the position of the unit as required in order to find the correct position for the end of stroke bracket.

NOTE: If the door is equipped with an electrical bolt, the transformation from right to left is more difficult due to the position of the electrical bolt. To carry out this operation, contact our after-sales service.

5) INSTALLATION METHODS

A few of the automation installation methods are explained below:

The automation can be:

- **Attached to a wall.**
- **Attached to the ceiling** (using the TSA supporting beam).
- **Encased in door-frame** (with or without the TSA supporting beam).

5.1) Wall attachment (fig. 4)

Make sure that the surface where the GET top rail is to be fastened is level. If this is not the case, use shims to level the surface. The shims should be fastened in line with the fastening holes in the top rail. This creates a solid resting base for the anchoring points and prevents the track from bending during the fastening of the screws. If more fastening holes, in addition to those already made, are required, these should be located approx. every 600-800 mm depending on the type of base present (concrete, brick, wood, iron, etc.).

5.2) Ceiling attachment (with supporting beam fig. 5)

If the GET top rail is fastened to the ceiling, then a sturdy support should also be fastened to the ceiling (fig. 5) which guarantees solid anchoring for the TSA supporting beam. To allow opening, the distance between the top rail and the ceiling should be at least 70 mm if the enclosing case supplied by the manufacturer is used.

The supporting beam is fastened to the support and the GET top rail (fig. 5) is fastened to the beam. This type of installation is particularly recommended if the leaves and the fixed part are made of frameless plate glass and therefore not load bearing.

5.3) Encased in door-frame (with or without supporting beam fig. 6)

The supporting beam is encased in a load-bearing door-frame or a flat contour with appropriate thickness for firm attachment of the GET top rail is fitted into the frame.

If the TSA supporting beam is used, the fastening of the GET top rail, using the screws and the plates supplied with the supporting beam, will be made easier. If the enclosing case supplied by the manufacturer is used, then there should be at least 70 mm of space between the GET top rail and the ceiling to allow the case to open. Fastening should be carried out using HSFHC countersunk cap screws.

6) ESTABLISHING THE FASTENING HEIGHT OF THE TOP RAIL

The value of the GET top rail fastening height HFT should be measured at the highest point of the floor (fig. 7).

This is to avoid the mobile leaf from jamming after installation has been finished. The HFT value is the result of the following calculation:

$$HFT = HGP + HA + HT$$

where:

HFT= top rail fastening height (the highest point of the contour is taken into consideration - fig. 7).

HGP= space between the floor and the mobile leaf (this varies according to the type of lower guide chosen)

HA= Height of the finished leaf

HT= GET top rail height (HT is always = 168 mm if the carriages are adjusted as shown in fig. 8).

Therefore, once the HFT fastening height of the GET top rail has been established (fig.7), the following equation allows the height of the finished leaf HA to be calculated).

$$HA = HFT - HGP - HT (168 \text{ mm})$$

After installation the leaf height can still be adjusted by means of the sliding carriages. If the carriages are kept in the position indicated in fig.8 and the formulas observed, then a height adjustment of ± 6 mm can be carried out (fig. 1).

! CAUTION - The GET top rail should be fastened in such a way as to ensure a perfectly horizontal position. This guarantees the correct functioning of the automation.

To fasten the single-leaf GET 1 top rail, the type of installation should be taken into consideration.

6.1 Attachment to a wall (above a door opening) (fig.10)

! CAUTION - To fasten the top rail, only use flat countersunk cap screws as shown in fig. 9. If this is ignored, the sliding carriages may collide.

For this type of installation, make sure that the leaf stroke "CA" is the same as the usable passage space PU with adequate overlap "S" to allow the complete closing of the leaf fig.10.

For example: GET110 allows a usable passage space PU of 1050mm. By creating an overlap S= 50 mm, the usable passage space PU will become 1000 mm. Therefore the GET top rail should be fitted so that it protrudes beyond the end of the passage space by the amount of overlap required.

6.2 Attachment between two walls (in a door opening) (fig.11)

In this type of installation, the two walls act as the end of stroke mechanisms for the leaf. If the top rail is shorter than the total passage space, bring the top rail to rest completely on the wall on the side of the usable passage space PU (fig.11).

Since there is no S overlap with the wall to obtain the complete closing of the door, the usable passage space PU is the same as the leaf stroke CA.

6.3 Fastening of GET2 top rail (with two mobile leaves) (fig. 12)

In order to position the top rail in a symmetrical position with respect to the passage space, for whichever type of installation (above a door opening, in a door opening, etc.) the half way point of the door opening and the half way point of the GET top rail should be marked. Fasten the GET top rail by making the two marks correspond (fig. 12).

7) LEAF ASSEMBLY AND ADJUSTMENT

For a proper functioning of the automation and its accessories, observe the dimension values indicated in fig. 13 for Mod. GET1-right or left- or in fig.14 for Mod. GET2.

7.1) Framed leaf

The automation is supplied with the sliding carriages already fastened to the leaf attachment contour. The leaf attachment contour has a length suited to the leaf. The automation is therefore supplied with the doorstops already adjusted.

Before removing the leaf attachment contour in order to fasten it to the leaf, the position where the carriages are fastened to the leaf attachment contour should be marked. This aids the final adjustment of the leaf end of stroke brackets.

The leaf attachment contour should be fastened to the leaf as in fig.15. Make 8mm diam. holes with countersinks in the leaf attachment contour. In correspondence with the holes in the leaf attachment contour, drill and make M8 threads in the upper rail of the leaf. Then use M8 HSFHC flat countersunk cap screws.

If the thickness of the upper rail of the framed leaf is less than 6-7 mm and the leaf is heavy, the upper rail should be reinforced on the inside with an iron plate or bar where the leaf attachment contour is screwed in several points.

7.2) Plate glass leaves (fig. 16)

The PPA clamping system can only be used for tempered plate glass leaves with a thickness of 10 or 12 mm or for coupled safety glass. It should not be used for glass panes with air space. From now on, reference will be made to as glass panes for convenience.

- The pane of glass should not be perforated.
- The PPA clamp should be fastened to the door attachment contour as shown in fig.16. The position where the carriages are fastened to the leaf attachment contour should be marked before removing this contour in order to fasten it to the PPA clamp. This aids the final adjustment of the leaf end of stroke brackets.
- Some weather strips G with appropriate thickness should be attached to both sides of the pane of glass, between the clamp and the glass pane.
- The PPA clamp should be secured by tightening the side screws (22Nm max. torque).
- The leaf is now ready to be installed.

8) LEAF INSTALLATION AND ADJUSTMENT (fig. 17)

Insert the two fastening plates P onto the leaf attachment contour, position the carriages at the points marked earlier on the leaf fastening contour and

secure the carriages.

The crossways depth adjustment is carried out by sliding the fastening screw of the carriages in the slot of the carriages themselves (fig. 17).

The height of the leaf from the floor is adjusted by loosening the screws C (fig. 18) of each carriage and using screw A. (Adjustment can be ± 6 mm).

9) FLOOR LEAF GUIDE (fig. 19)

The lower guide of the leaf is fastened to the floor in the distance of overlap S between the mobile leaf and the fixed part when the door is closed.

9.1) Framed leaf - For doors with frames, prepare the frame for insertion and fastening of the PGI contour for the sliding of the leaf. The PPR slide, already adjusted as in fig. 20, should be fastened so that the leaf is held completely vertical. The slide, after being fastened, allows a further adjustment of ± 4 mm.

9.2) Glass leaves - For the glass leaves, use the model which is most suitable for the type of bottom rail used. For the glass leaves without bottom rail, a guiding slide with appropriate thickness is supplied with the clamp Mod. PPA.

9.3) Break open doors - For installation, see the relevant instruction manual.

10) DOOR-STOP ADJUSTMENT

! CAUTION - Before supplying the automation with electricity (or connecting the battery), check the sliding of the leaves manually. If the positions of the Right and Left door-stops have to be adjusted, check the stroke of the leaf pulling carriages carefully. Collisions with the toothed pulleys may occur. It should be remembered that the position of the door-stops also determines the self-learning of the control board. Therefore the positioning and fastening of these should be checked carefully.

For doors with single or double leaf, the pulling carriages should hit the rubber tips of the respective end of stroke brackets both in closing and opening. The working stroke of the automation is determined by the position of the end of stroke brackets.

For doors with two leaves, there are a further two rubber tips which can be adjusted using the CH13 spanner at the point of contact when the door closes (fig. 21). These are used to prevent the two leaves from colliding with each other during closing. Adjust the two tips so that the leaves do not touch each other.

11) ELECTRICAL CONNECTION

Bring the power supply line to the left-hand side of the automation (looking from the inside to the outside). The power supply line should have a cross section of 3x1.5 mmq.

Fit a bipolar circuit breaker with a min. of 3mm contact opening, provided with protection against overloading and short-circuiting and capable of disconnecting the automation from the mains.

The power supply connection must be carried out as shown in fig. 25.

Secure the power supply cable with the cable clamp F.

L PHASE
N NEUTRAL
≡ EARTH

12) CONNECTION OF ACCESSORIES

I collegamenti degli accessori possono essere eseguiti con cavetti multipolari di sezione 0.5 mm². Di seguito viene riportata la lista dei vari schemi di collegamento degli accessori e lo schema generale di collegamento.

The connections of the accessories can be carried out using multipolar wires with a cross section of 0.5 mmq.

Below is the list of the various connection diagrams for the accessories and the general wiring connection diagram.

- fig.26 Electrical connection diagram for the standard GET top rail.
- fig.27 Diagram for the electrical connection of the radar and PFE7 selector to the control unit AD97.
- fig.28 Electrical connection diagram for DAB anti-panic device.
- fig.29 Manual controls electrical connection diagram.
- fig.30 Electrical connection diagram for FAT1-FAT2 photocells
- fig.31 GET electric connection general diagram.

13) FUNCTIONS

13.1) Control unit version AD97

- Self-learning of door width: when switching on, the door carries out a complete manoeuvre at approach speed in order to measure the width of

the door by means of the encoder.

- Self-learning of end of braking speed: during the self-learning stage the door measures the encoder frequency in relation to the end of braking speed.
- Self-adjustment of braking intensity: with each manoeuvre the micro-processor carries out an analysis of the braking distance required and varies braking intensity according to temperature variation, friction etc. in order to guarantee normal functioning over time, with the minimum mechanical stress and the minimum noise possible.
- Anti-squash function: if an obstacle blocks the movement of the door, slowing it down, this function inverts the movement during closing and stops the movement during opening.

The sensitivity required to activate the safety device can be adjusted by means of a trimmer which determines the variation in speed with respect to the set speed. This function is excluded during the braking and approach phase. During these phases, the anti-squash safety device operates whenever the door is pushed in the direction opposite the direction of movement. If the door is blocked but not pushed back, the door remains in the blocked position until a new command is given.

- Memorization of obstacle: if an obstacle has caused the anti-squash function to step in, during the subsequent movement the door will slow down around the point where the obstacle was detected. If the latter has been removed, the door will function again as normal.
- Manual opening: when the door is completely closed, if this is manually pushed by a few centimetres during opening, it will then open completely (obviously if the mechanical block is present, this should be released first manually).

- Buffer battery: two rechargeable batteries guarantee the functioning of the door even when there is no mains supply. The amount of time the door can function using the batteries depends on the weight of the door itself and the electronic accessories connected to it. The control unit disconnects the battery automatically when the charge level reaches the minimum threshold so as not to damage it irretrievably.
- Check of break open doors. It verifies the condition of the break open doors.

As an alternative, it can be used as emergency stop after having connected a N.C. hold-to-run push button.

13.2) Functions of selector mod. PFE7 (optional)

- Night: It inhibits all the commands including the operation of the anti-panic device.
- Opening by radar A: The door is opened by the radar which detects the passage in one direction only.
- Opening by radar A+B: The door is opened by the radars which detect the passage in both directions.
- Total or partial opening: The door remains completely opened in the case of a total opening original function or remains partially opened in the case of a winter opening original function.
- Winter opening by radar A+B : The door is partially opened by the radars which detect the passage in both directions.
- Winter opening by radar A: The door is partially opened by the radar which detects the passage in one direction only.
- Door closed: The door remains closed. However, the following functions are active:

- 1) Anti-panic: if the door is equipped with the anti-panic device mod. DAB and there is no power supply for a period long enough to discharge the battery, the door opens and remains open (if the device mod. DAB is not fitted, this function has no effect).
- 2) Self-learning: if there is no power supply, the door will carry out the self-learning as soon as the power supply returns. This function is activated when the battery of the anti-panic device mod. DAB is exhausted or when the door is not equipped with such a device.
- 3) Manual opening: when the door is closed and its leaves are manually forced and moved along their slides, the door, after a short movement, will open automatically (after having released the door -latch mod. CEP if present).

13.3) Dip-switch functions (fig. 32)

- | | | |
|------|------|---|
| DIP1 | -ON | Acoustic signal for exhausted battery on. |
| | -OFF | Acoustic signal off. |
| DIP2 | -ON | Anti-panic A: if there is no power supply the door opens and remains open (provided that the DAB batteries are fitted). |
| | -OFF | Anti-panic B: if there is no power supply the door continues to operate until the battery runs flat. |
| DIP3 | -ON | Photocell off. |
| | -OFF | Photocell on (provided that photocells are connected). |
| DIP4 | -ON | Emergency stop off. |
| | -OFF | Emergency stop on (provided that the stop push button is connected). |



DANGER - The setting of DIP3 and DIP4 to "on" can be dangerous as it inhibits the operations of the relevant safety means.

Observe the current standards regarding the number and location of the safety elements to be installed.

13.4) Trimmer functions (fig. 32)

- | | |
|------------|--|
| T1-TCA | adjusts the automatic closing time from 0 to 35 seconds (except when completely turned to clockwise direction). |
| T2-ANTISQ | adjusts anti-squash sensitivity. This is adjusted on the basis of the weight and the speed of the door in order to obtain the required sensitivity. |
| T3-WINTER | adjusts the partial opening stroke. From 0 to 75% of the door width. |
| T4-H.SPEED | adjusts the opening speed. Closing speed corresponds to 70% of opening speed. |
| T5-L.SPEED | adjusts the speed of the self-learning of the measurements and the approach speed. This adjustment must be carried out during the first manoeuvre. The ideal adjustment is obtained when the set speed is the minimum required to move the leaf. Carry out a reset at each adjustment operation by disconnecting the power supply for a few seconds and, if necessary, also the DAB device (anti-panic batteries). |

13.5) Led functions (fig. 32)

- | | |
|-------|---|
| D24 | lights up in the presence of the mains supply |
| D20 | lights up when the battery is flat and the DP1 (buzzer) is ON; the flat battery condition is recognized as such by the control system if the signalling persists for at least 1 second. |
| D3 | lights up when total opening is activated |
| D4 | lights up together when closing is activated |
| D5 | switches off when the stop command is given. |
| D6 | switches off when the photocells or safety devices step in. |
| D7,D8 | flash rapidly during door movement and indicate that the encoder is functioning correctly. |

14) AD97 TERMINAL BOARD CONNECTIONS (fig.31 ÷ 32)

- | | |
|-------|---|
| 1,2 | 26.5 Vac transformer connection |
| 3 | connection + batteries |
| 4 | connection - batteries |
| 5,6 | motor (5 brown / 6 blue) |
| 7,8 | 24Vdc release connection |
| 9,10 | 0 - 16Vac transformer connection |
| 11-12 | break open door contact connection and emergency stop (leave jumpered if not used) |
| 13 | control and safety devices common wire |
| 14 | opening control (N.O./N.C. dual contact push button) |
| 15 | PFE7 selector connection |
| 16 | n.o. closing control |
| 17 | n.c. block contact stops the door (with DIP4 OFF) |
| 18 | photocell and safety devices n.c. contact reverses the door during closing (verify setting of DIP4) |
| 19 | PFE7 selector connection |
| 20-21 | - (negative for power supply to the accessories) -12Vdc 700mA max |
| 22 | + (positive for power supply to the accessories) +12Vdc 700mA max |

15) EMERGENCY MANOEUVRE

15.1) Without blocking devices of buffer batteries (fig. 33).

The doors are opened by manually pushing the leaves in the opening direction.

15.2) With door-latch blocking device mod. CEP (fig. 34).

When the door -latch mod.CEP is fitted, it is necessary to activate the manual release control. The control knob under the top rail on one side of the door is red to allow immediate identification.

Pull the red knob downwards (1) in order to manually lift the latch, after which the leaves can be manually pushed in the opening direction.

To reset the door-latch blocking device, move the red knob upwards (2).

15.3) With break open door devices mod. SASAM1-2 (fig. 35).

In the case of break open doors, it is sufficient to push the leaves frontally after which the leaves will open like a swing door in the exit direction. When the break open doors are used, an electric contact blocks the automation until the position of leaf sliding motion is reset.

16) AUTOMATION CHECK

Before allowing the automation to be used normally, carry out the following

procedure very carefully:

- Check the correct functioning of all safety devices (photocells, anti-squash sensitive edges etc.).
- Check the both manual and radar controlled opening and closing operations.
- Check the emergency opening devices in use.
- Check all functioning logic set by the selector.

17) AUTOMATION OPERATION

The good working order of all the safety devices should be checked regularly.

CAUTION: In the event of any anomalous functioning of the safety devices, consult a specialized technician immediately.

18) CONTROL

The automation is used for the power-operated opening and closing of the door. The control can be of a number of types (manual - radar controlled - magnetic badge access control, etc.) depending on requirements and the characteristics of the installation. See the specific instructions for the various control systems.

19) MAINTENANCE

CAUTION: Disconnect the power supply when carrying out any maintenance operations.

- Periodically check the condition of the sliding parts (particularly the carriage wheels and door-guide slides).
- Keep clean the sliding area of the lower door-guide.
- Periodically check the stop efficiency in the case of obstacles not detected by the photocells.
- Clean the lenses of the photocells every so often;
- In the event of any malfunctions which cannot be resolved, disconnect the power supply and contact a specialized technician (installer).

20) NOISE

The environmental noise produced by the automation in normal operation conditions is constant and does not exceed 70 dB (A). Should the door operation be noisy, check the condition of the sliding parts.

21) DEMOLITION

The disposal of materials should be carried out in compliance with current regulations. The scrapping of the automation presents no specific hazards or risks due to the automation itself.

In order to aid recycling, the material should be separated into different types (electrical parts - copper - aluminium - plastic, etc.)

22) DISMANTLING

If the automation is dismantled in order to be re-assembled in another place, proceed as follows:

- Disconnect the power supply and the whole of the electric plant outside the top rail;
- If some of the components cannot be removed or are found to be damaged, then these should be replaced.

Fig. 1

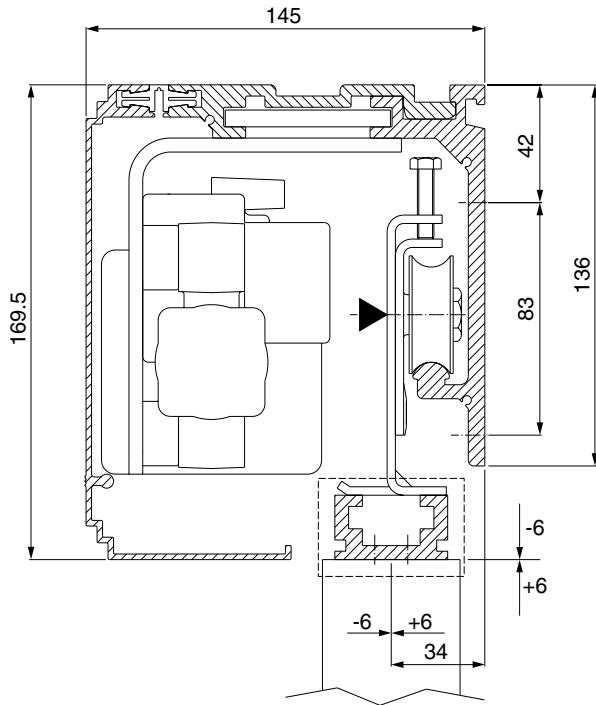


Fig. 2

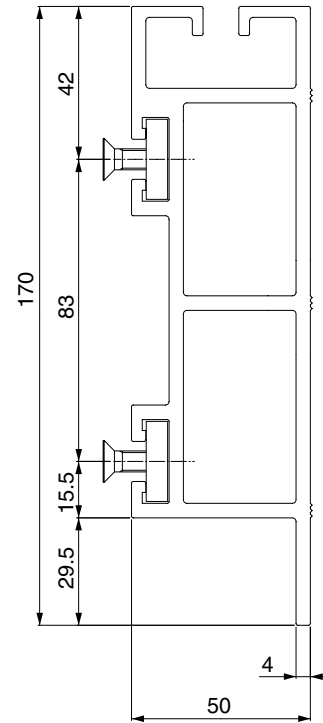


Fig. 3

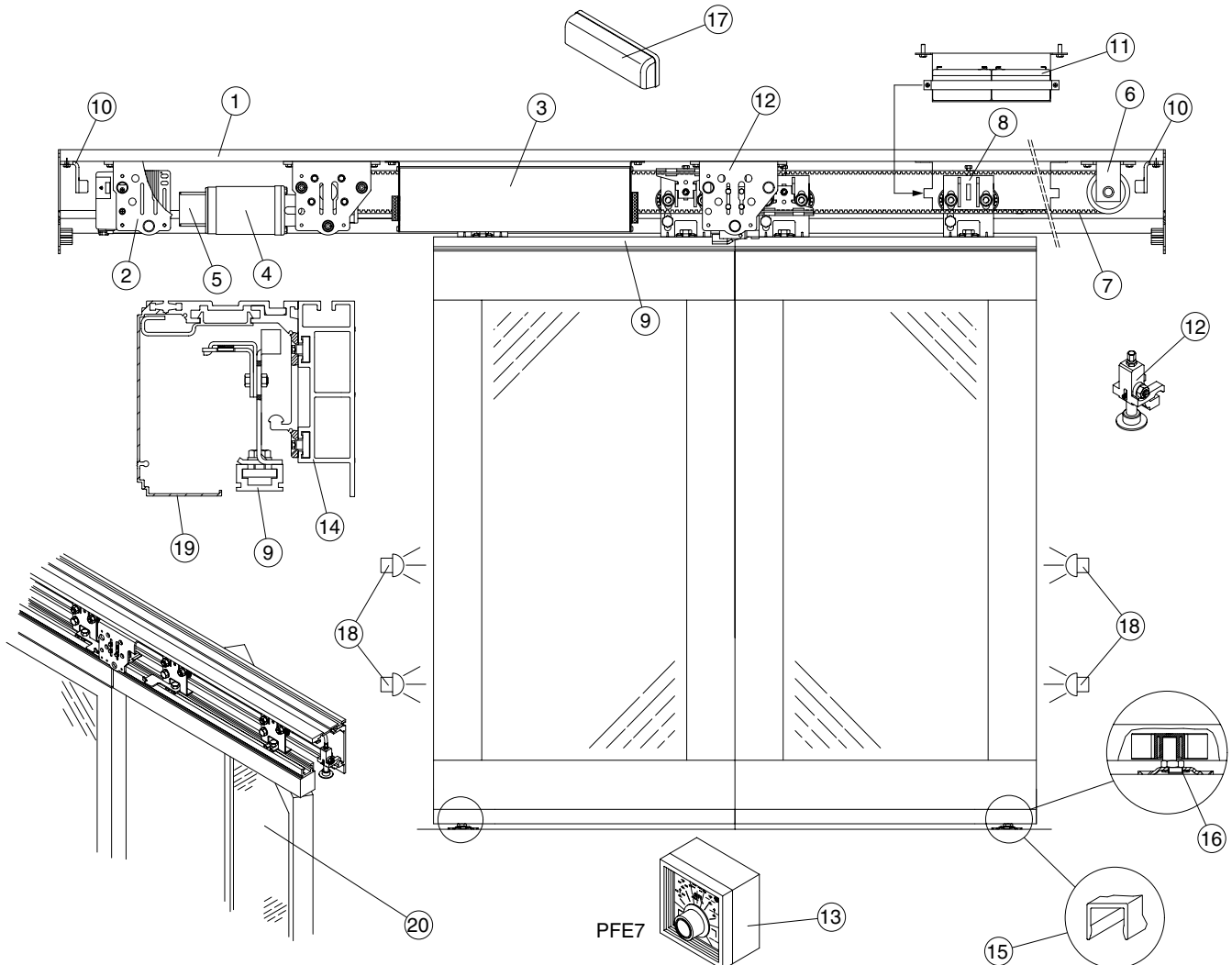


Fig. 4

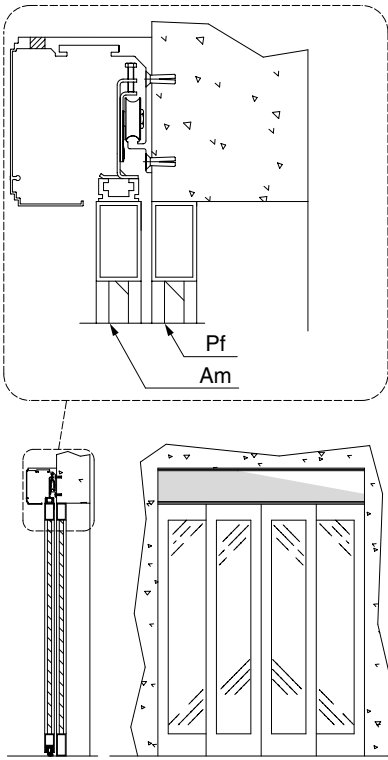


Fig. 5

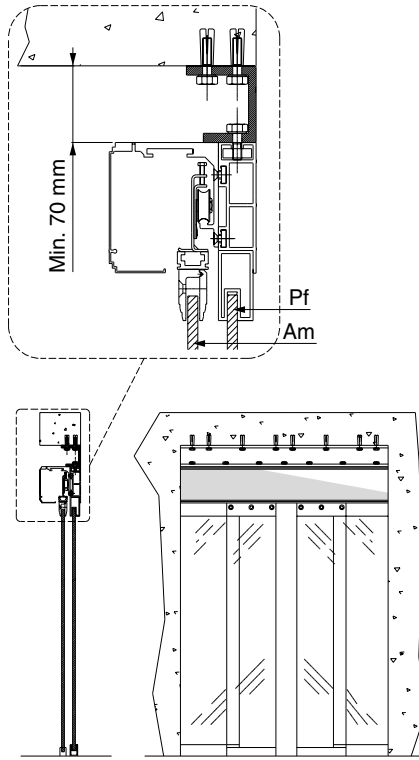


Fig. 6

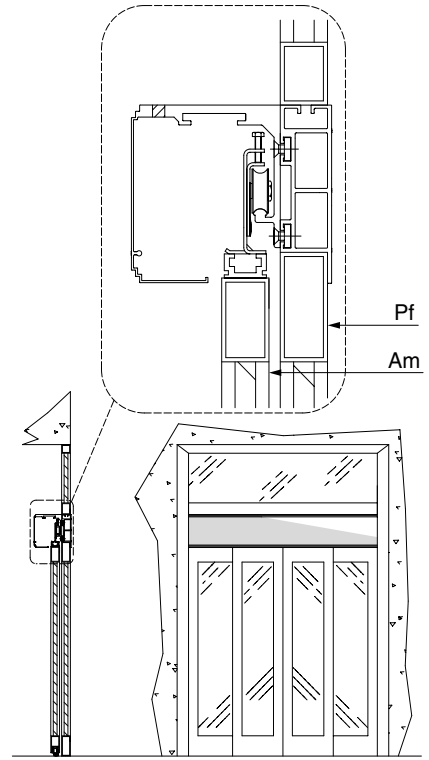


Fig. 7

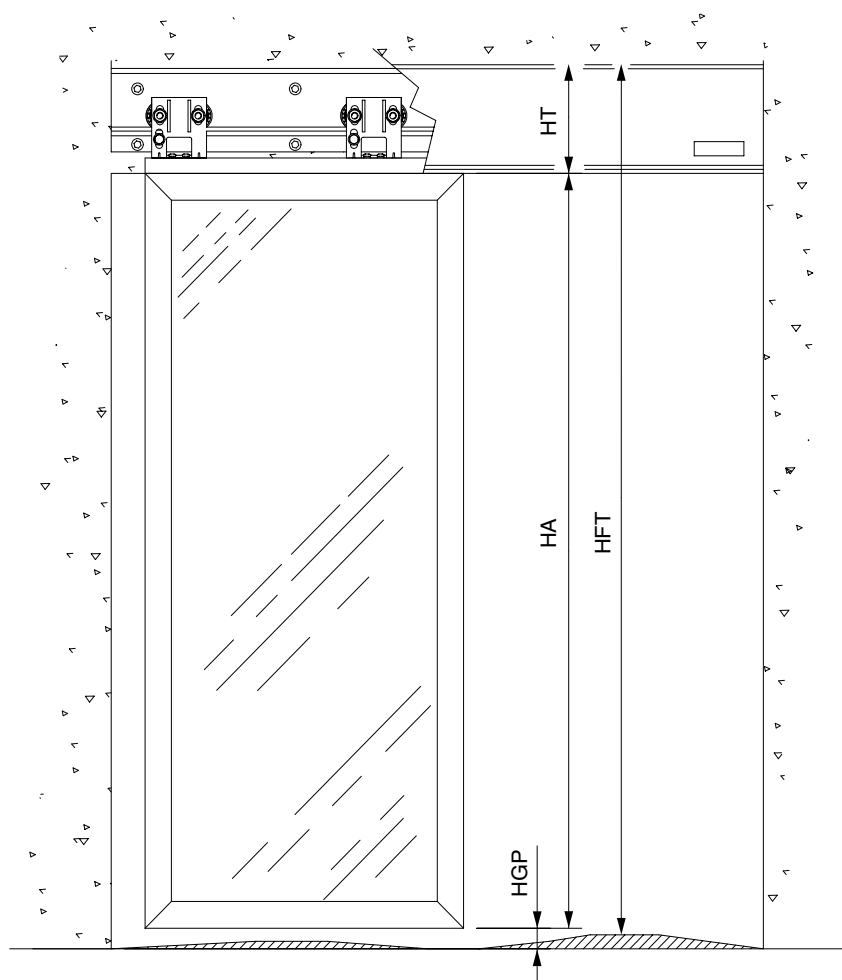
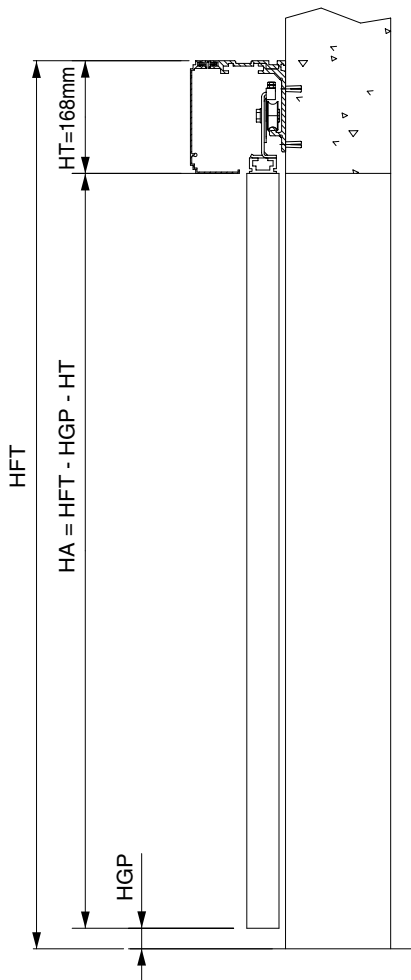


Fig. 8

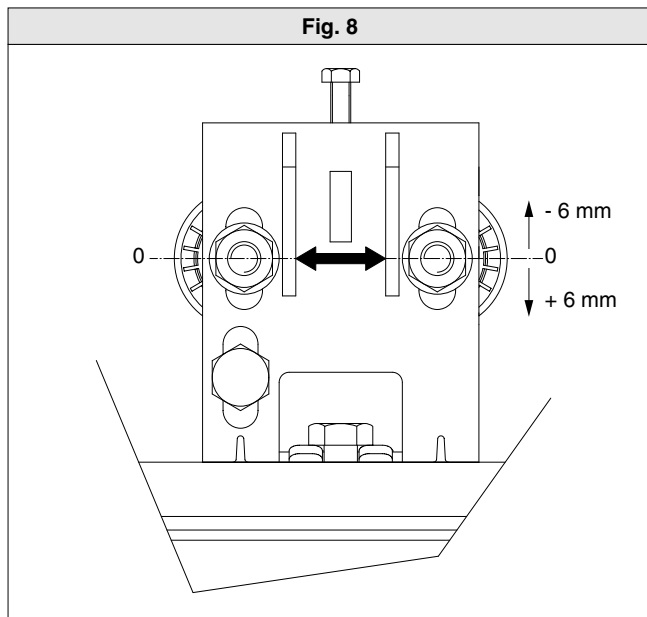


Fig. 9

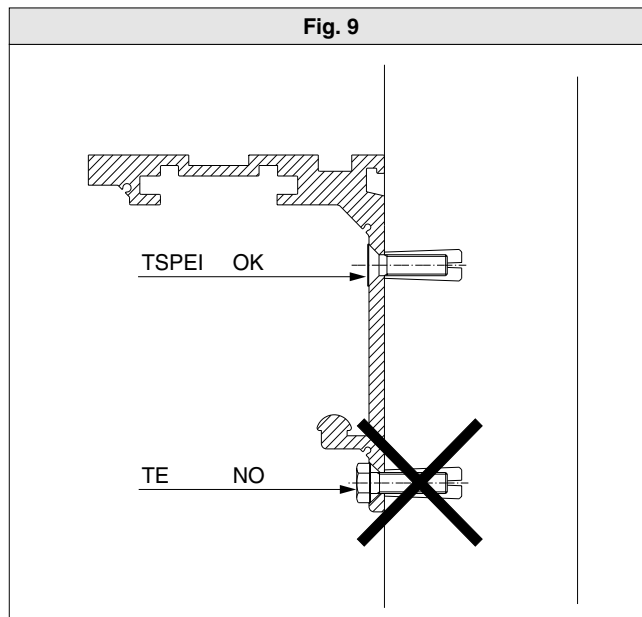


Fig. 10

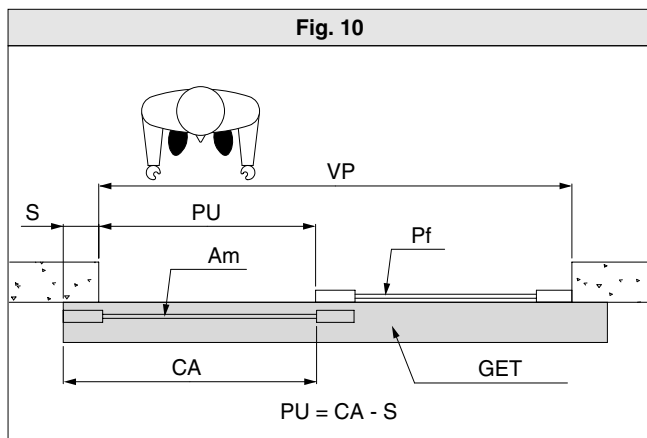


Fig. 11

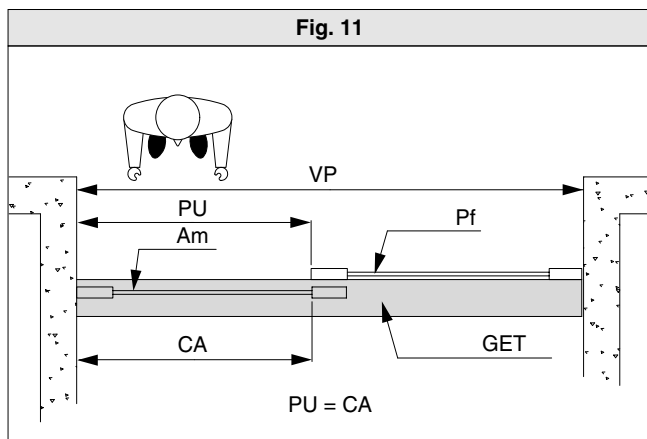
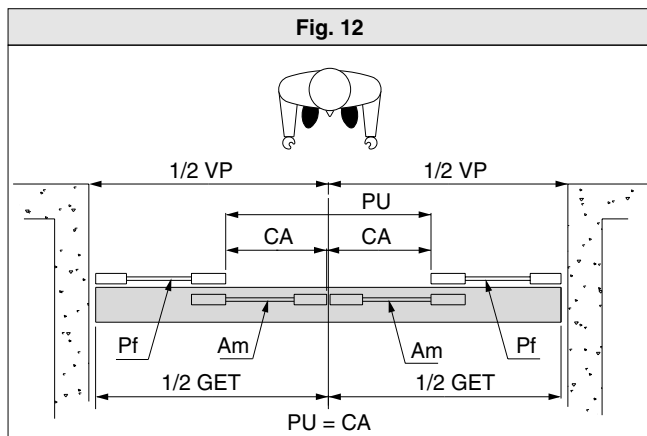


Fig. 12



Legenda

Pf = Parte fissa
= Fixed part
= Partie fixe
= Feste Seite
= Parte fija

Am = Anta mobile
= Mobile leaf
= Vantail mobile
= Beweglicher Flügel
= Hoja móvil

VP = Vano Passaggio
= Passage space
= Baie de passage
= Durchgangsbreite
= Vano pasaje

PU = Passaggio Utile
= Usable passage space
= Passage utile
= Nutzdurchgang
= Pasaje útil

S = Sormonto
= Overlap
= Superposition
= Überschneidung
= Sobreposición

CA = Corsa utile Anta
= Leaf stroke
= Course utile du vantail
= Nutzbarer Türlauf
= Carrera útil de la hoja

TSPEI = Vite Testa Piana Svasata Esagono Incassato
= Flat countersunk head screw
= Vis à tête plate évasée
= Senkschrauben benutzen
= Tornillo de cabeza avellanada hexágono encajonado

TE = Vite Testa Esagono
= Hexagonal head screw
= Vis à tête hexagonale
= Sechskantige Schraube
= Tornillo de cabeza hexágono

Fig. 13

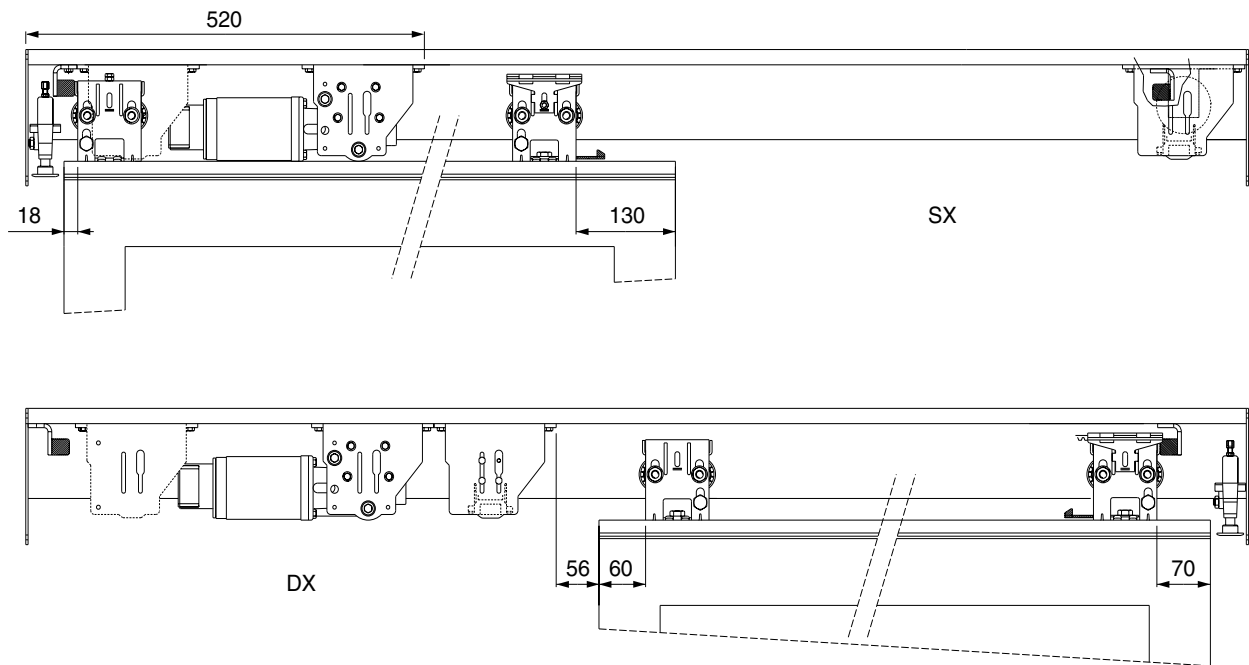


Fig. 14

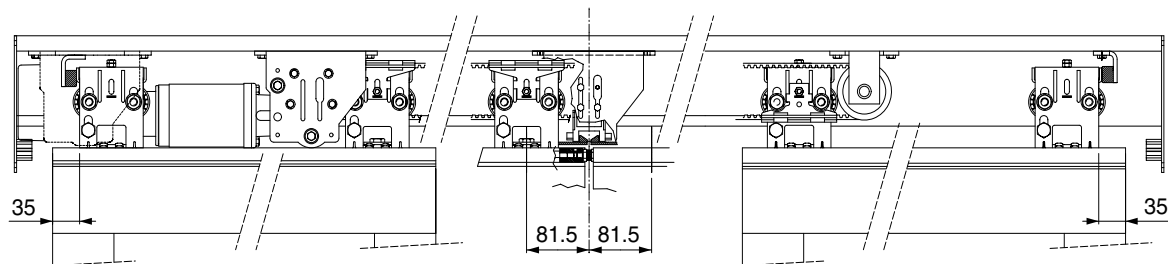


Fig. 15

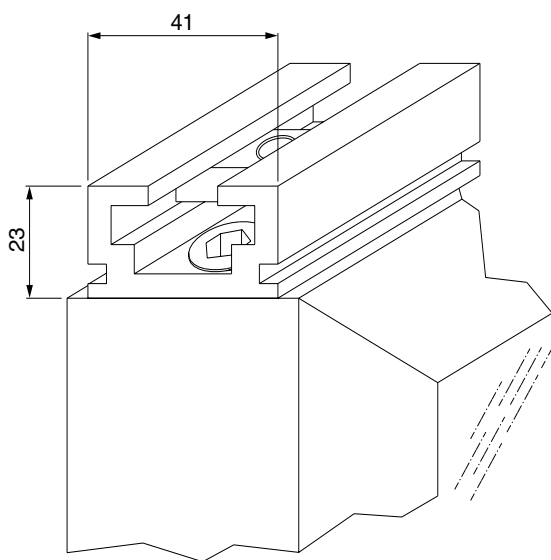


Fig. 16

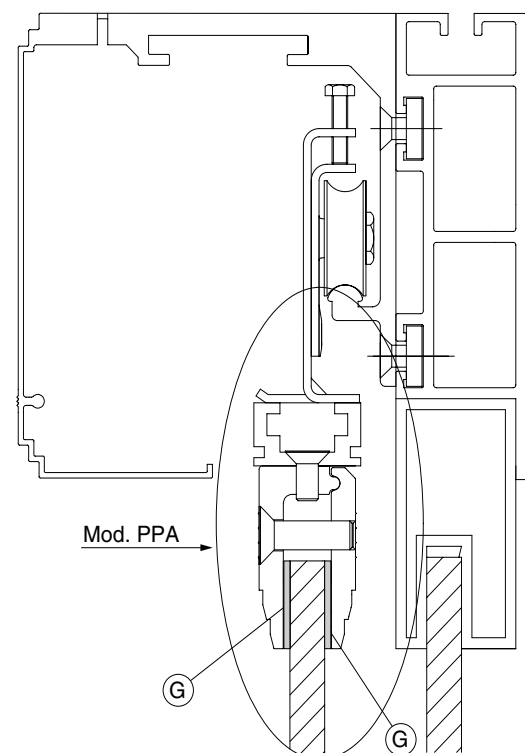


Fig. 17

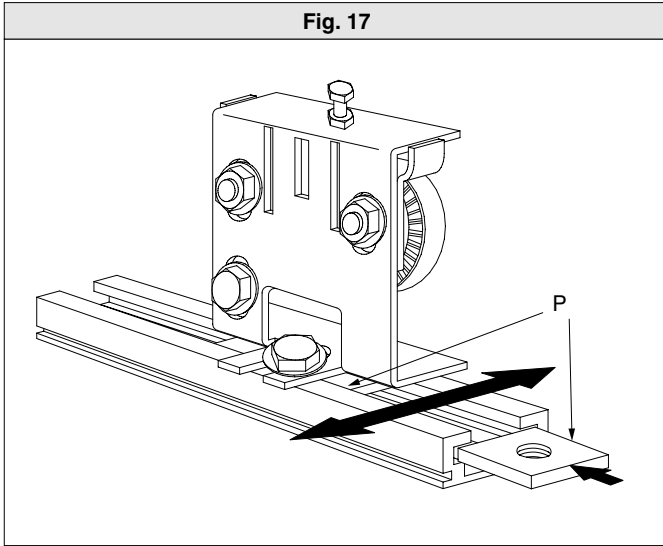


Fig. 18

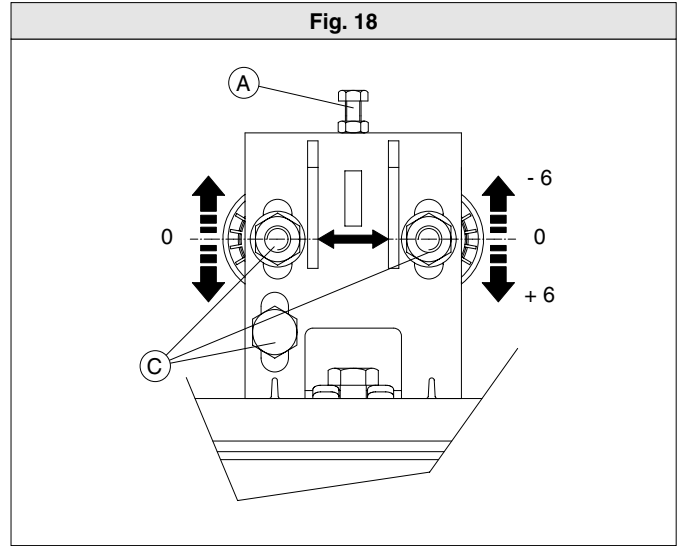


Fig. 19

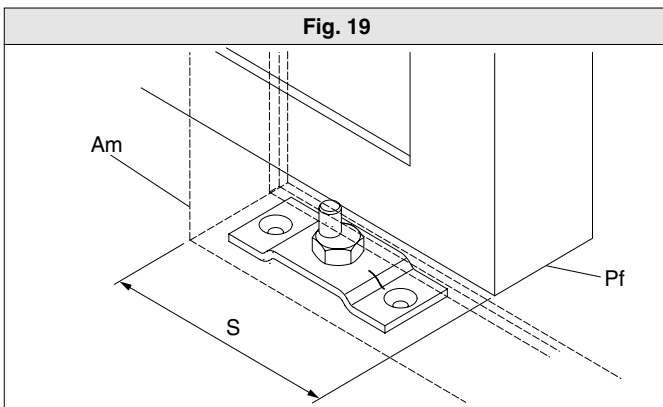


Fig. 20

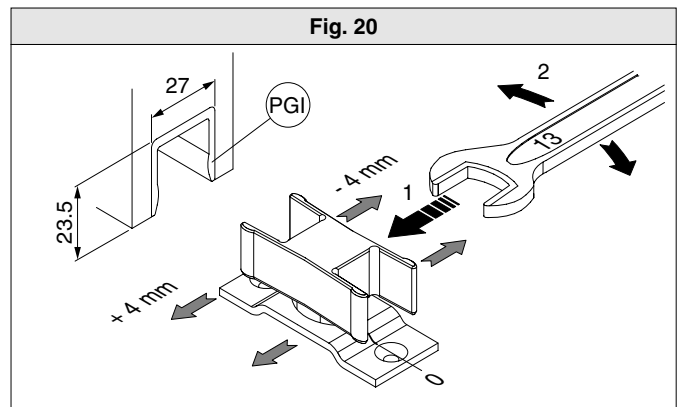


Fig. 21

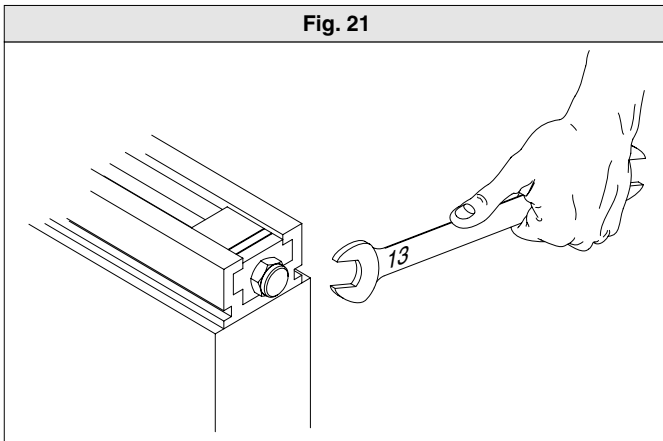


Fig. 26

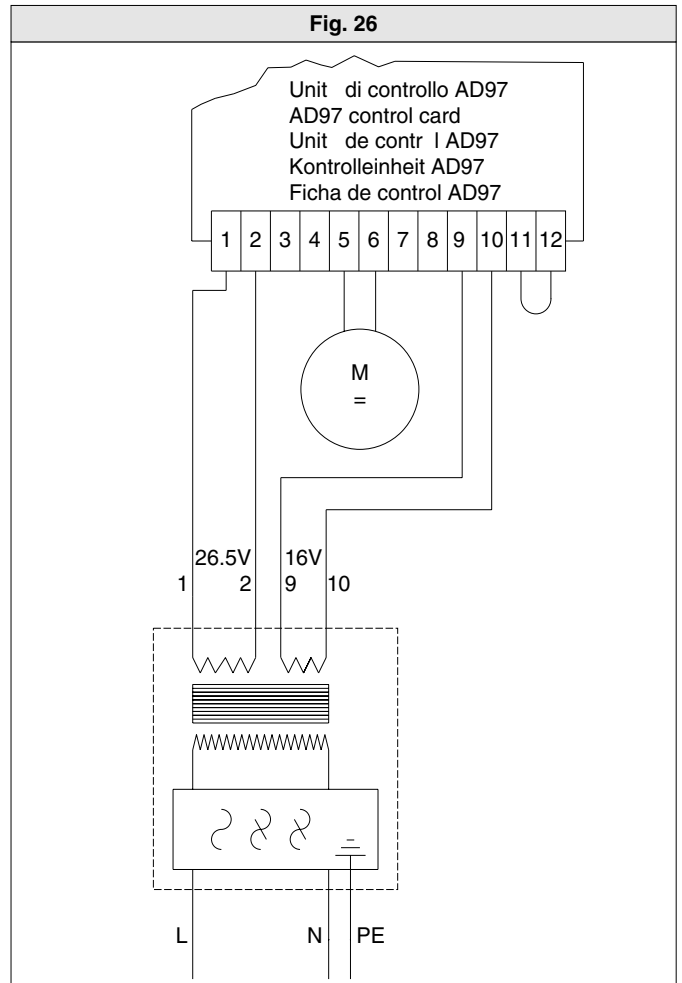


Fig. 25

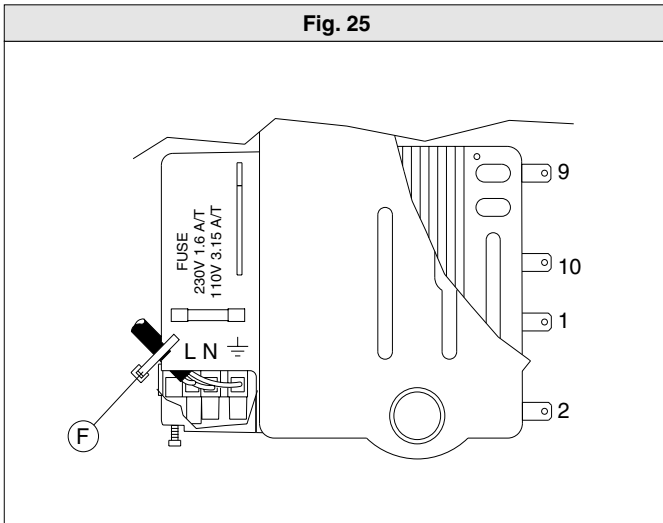


Fig. 27

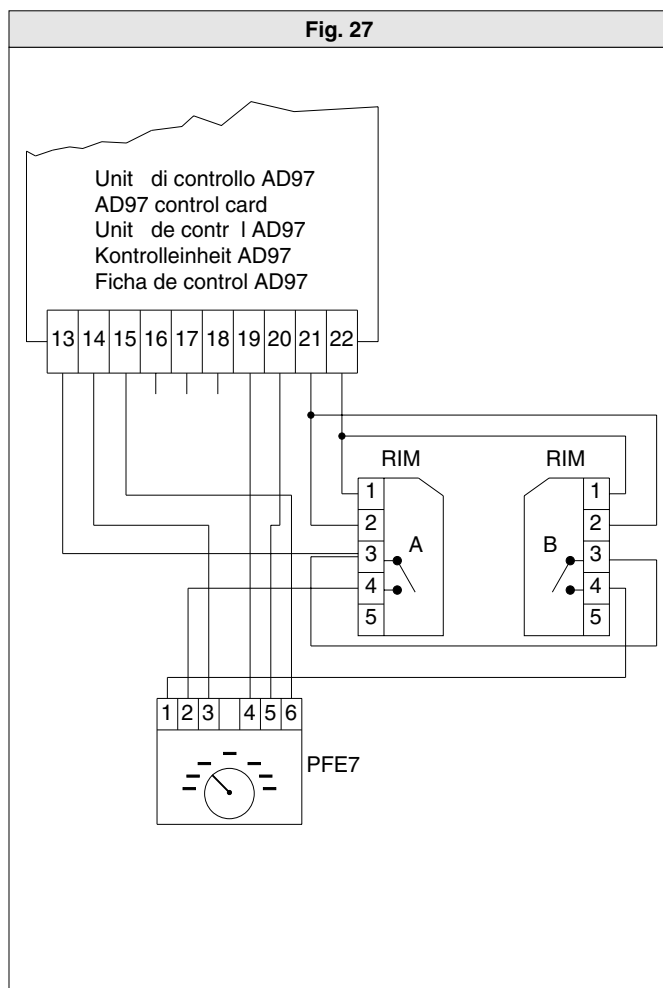


Fig. 28

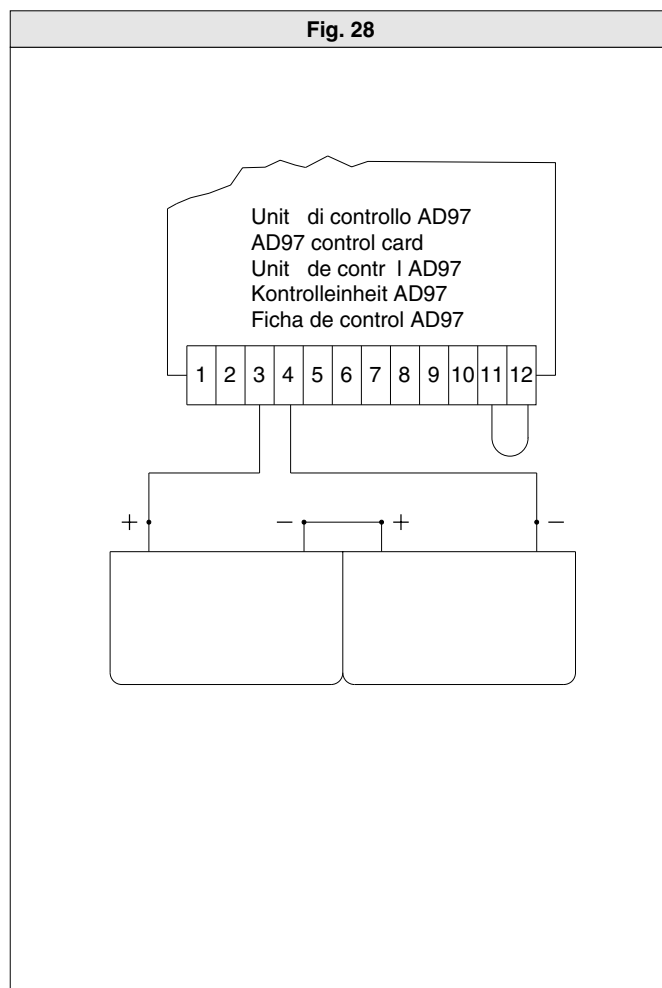


Fig. 29

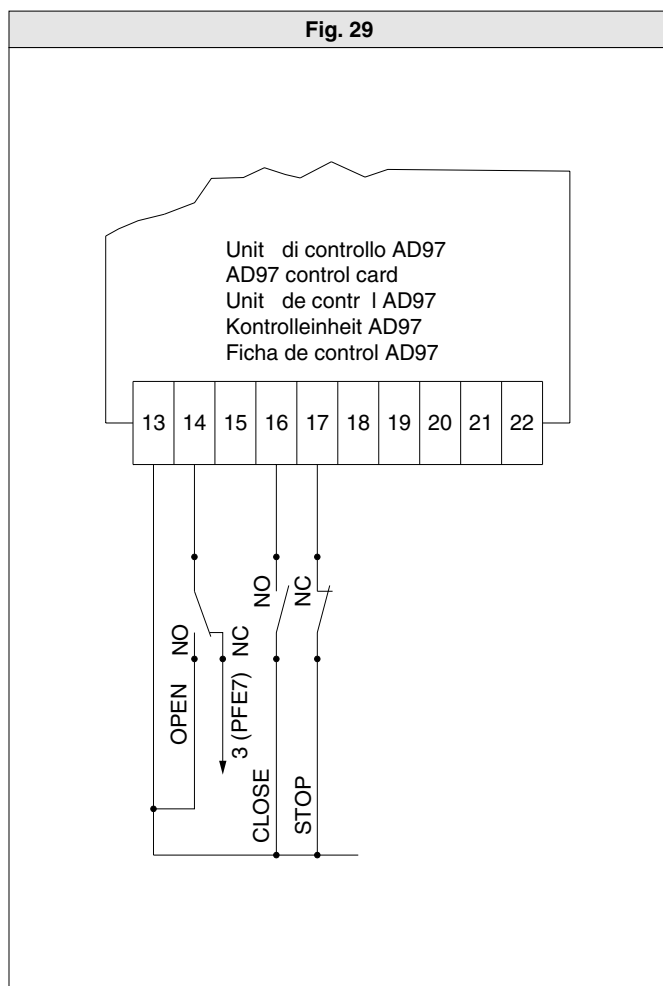


Fig. 30

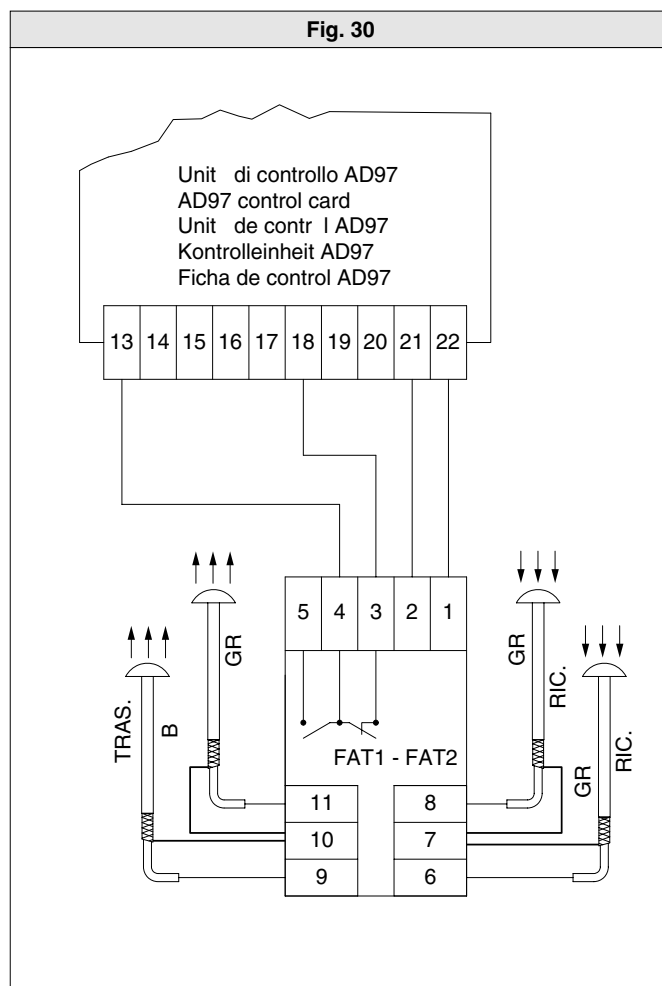


Fig. 31

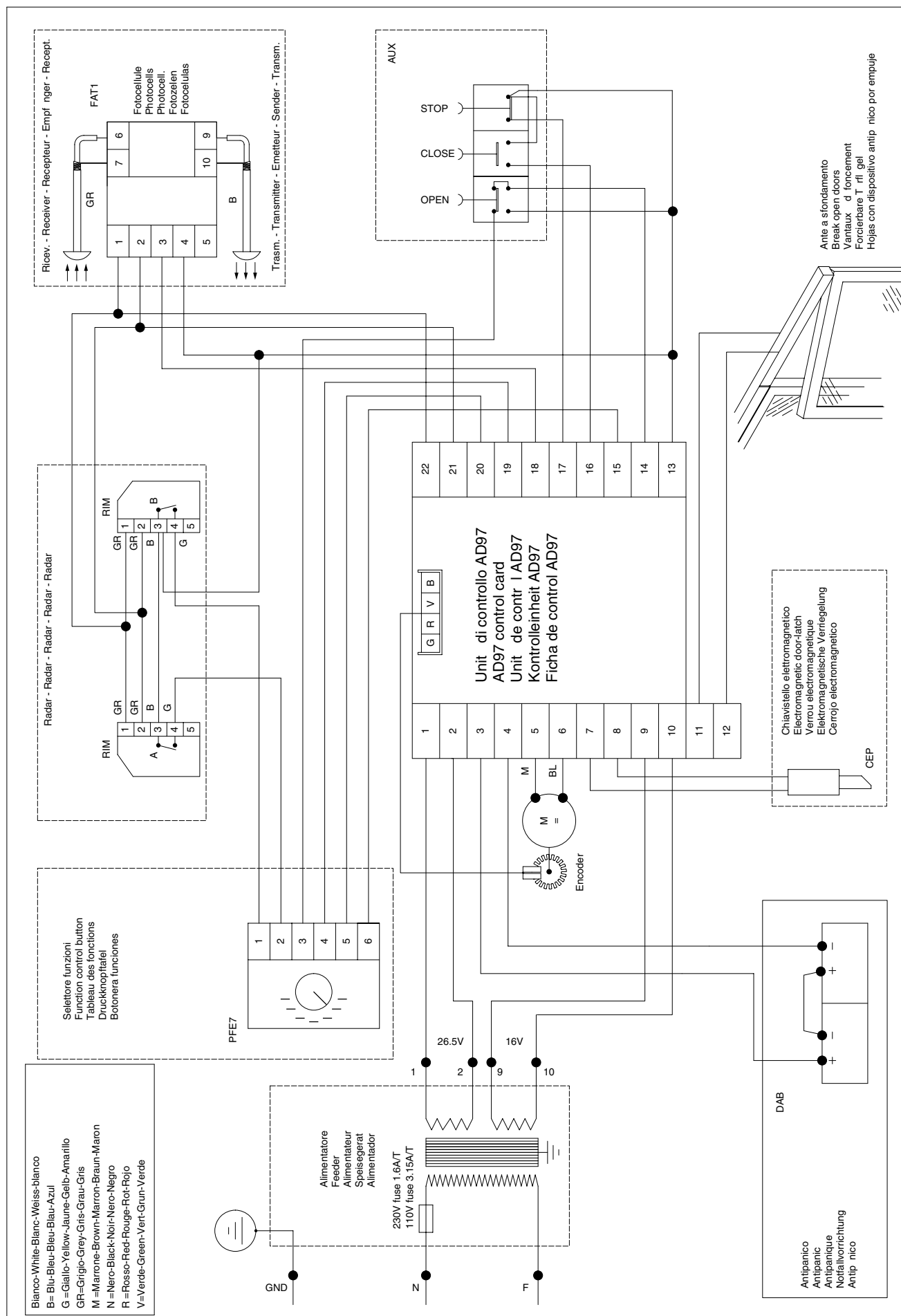


Fig. 32

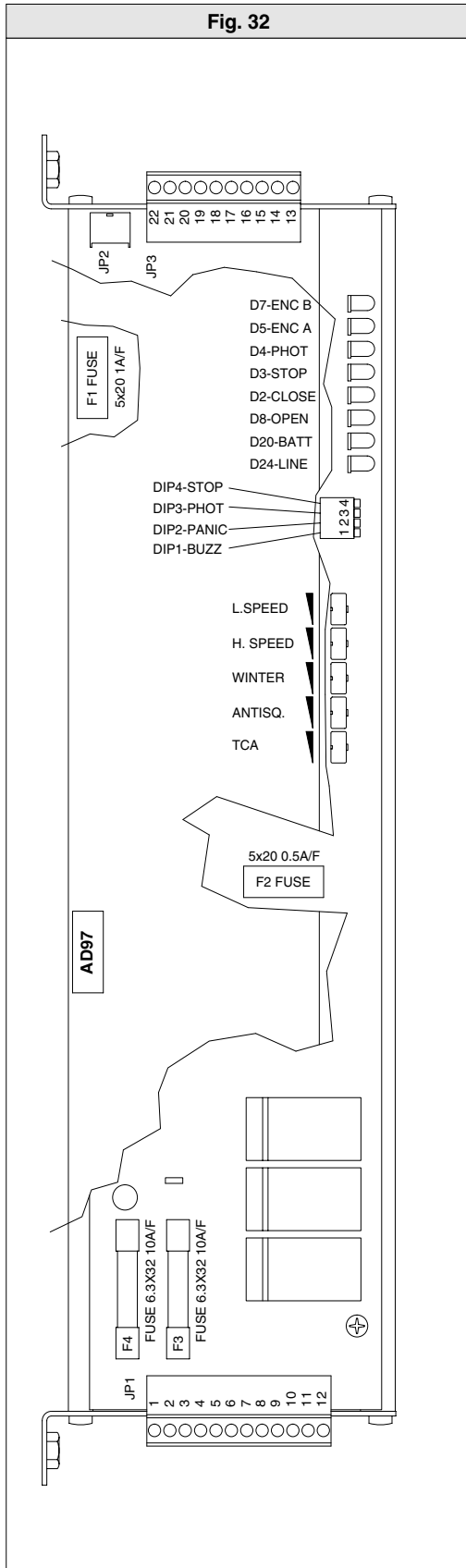


Fig. 33

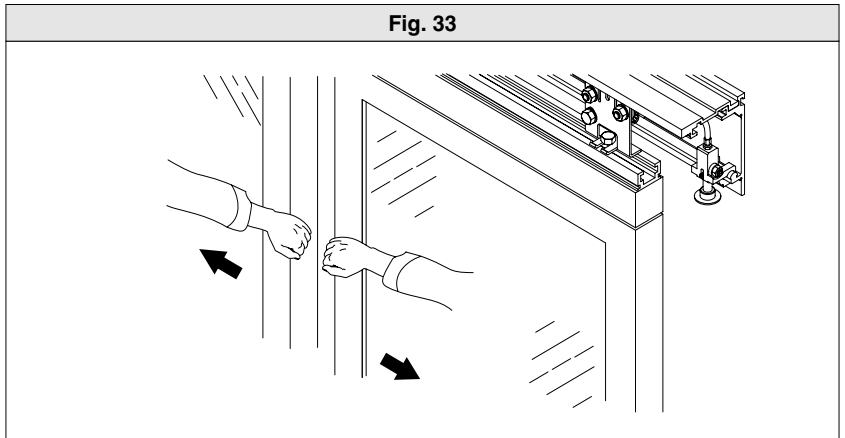


Fig. 34

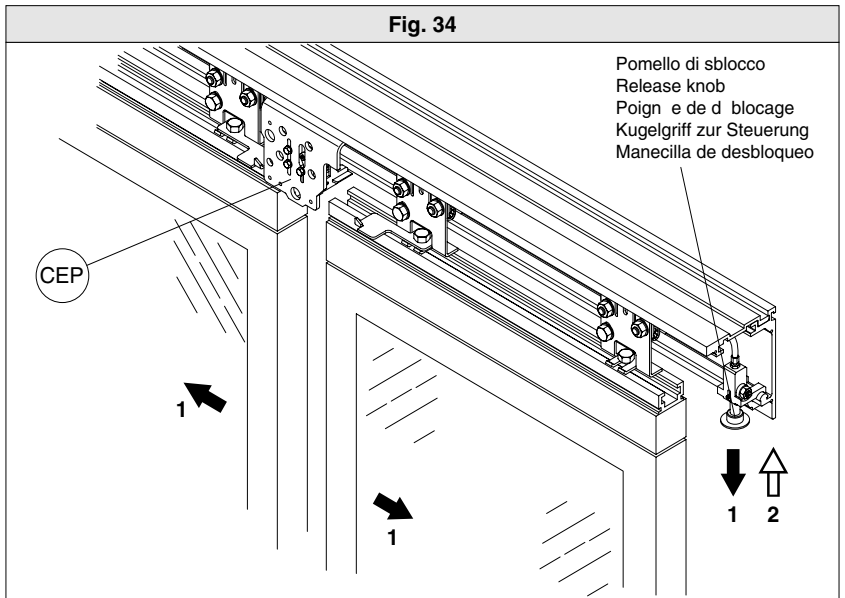


Fig. 35

