AUTOMATIC SYSTEMS

BL 227

Electric rising barriers

TECHNICAL MANUAL

(Translated from the original French version)

Rev. 04 • Update 08/2020

TABLE OF CONTENTS

1. SAFETY WARNINGS

- This manual must be made available to any person working on the equipment: installers, maintenance technicians, end users, etc.
- This equipment has been designed to control and manage vehicle access and cannot be applied to any other use without risk to users or to the integrity of the equipment.
- ***Automatic** Systems* cannot be held liable for damage resulting from improper use of the equipment.
- The contractor shall comply with local regulations when installing the equipment.
- The end of the arm must always be at least 0.5 m from any object.
- Pedestrian traffic must be prohibited within the area of operation of the barrier, unless its movement is effectively announced *(sound and/or light signal, markings on the ground, etc.)*.
  In the countries of the European Union, the EC Machines Directive stipulates that a sticker prohibiting pedestrian access must be placed on either side of the equipment *(less than 1 metre upstream and downstream of the barrier's arm in horizontal position)*:

The installation of detection loops *(optional)* must be validated by qualified personnel who will determine the loop arrangement best suited to the type of vehicle and passage configuration.

THERE IS A RISK OF INJURY IF STANDARD DETECTION LOOPS ARE USED, AS THESE MAY INCORRECTLY DETECT TRUCKS, BICYCLES OR MOTORCYCLES AND CLOSE THE OBSTACLE ON THESE VEHICLES!

For details, refer to the manuals on loops, available on:
http://partnerweb.automatic-systems.com.

- Any work on the equipment must be performed by qualified personnel. Any unauthorized work or work performed by an unqualified technician on this product shall automatically void the manufacturer's warranty.
- The access keys to the mechanism must be used by personnel who are aware of the electrical and mechanical risks they incur in the event of negligent handling. These personnel are required to lock the mechanism's access hatch after the intervention.
- Assemble the arm and its accessories before performing any electrical tests *(⇨ Chap. 7.1, page 12)*.
- **Lift the arm before performing any work inside** the housing to release the tension of the balancing springs and prevent undesired movements of the drive mechanism *(⇨ Chap. 10.5, page 25)*.
- **As soon as the access door to the mechanism is open, cut power via the circuit breaker *(⇨ Chap. 10.4, page 24)*.**
- **Never operate the barrier, even manually, without the adjustable stops *(⇨ Marker 8, Chap. 5.1, page 8)*.**
- Any internal component that may be live or that could move should be handled with caution.
- Do not add non-approved accessories *(contact between different metals causes a battery effect that decreases the equipment's corrosion resistance)*.
- The equipment is configured to in "minimal risk" mode for users. Parameters should only be changed by qualified personnel with full knowledge of the consequences, and any changes to these parameters shall in no way entail any liability on the part of ***Automatic** Systems*.

- The obstacle must be completely visible to the potential user/operator before being put into operation.
- After a collision, even if there is no visible damage, the equipment must be carefully checked by a qualified technician.

SOME BOOMS ARE DESIGNED WITH A FRACTURE INITIATION THUS ENABLING BARRIER DAMAGE LIMITATION. FOR ANY REUSE OF DAMAGED BOOM, PLEASE CONTACT OUR CUSTOMER SERVICE!

AUTOMATIC SYSTEMS DISCLAIMS ALL LIABILITY FOR THE REUSE OF A DAMAGED BOOM.

2. GENERAL SYMBOLS

The following symbols are used in this manual or as labels on the equipment:

This symbol is used to highlight **a tip** that may help you to better understand the product.

This symbol is used to highlight an **important instruction for the correct use and/or maintenance of the product.**

This symbol is used to highlight a **risk of electric shock or electrocution**.

This symbol is used to identify the ground connection point.
(Either in the form of an affixed label or directly engraved on a mechanical part)

This symbol is used to indicate the **tool** to be used for the relevant operation.

This symbol indicates that the equipment **conforms to European standards and directives**.

This symbol indicates that the equipment must be disposed of in accordance with the applicable European Directives *(DEEE 2012/19/EU)*.

3. OPERATING PRINCIPLE

Items referred to in this section can be seen on the images *(⇨ Chap. 5. Location of components, page 8)*.

Arm opening (**13**) is controlled by a keyswitch, a push-button, a radio transmitter, a command sent over the network connection, detection loops buried in the roadway, or an external control device *(tollbooth, card reader, management centre, etc.)*.

Closing is controlled in the same way, or automatically via a timer.

The processing of these commands may be made contingent on external information to be received by the barrier. For example, closing is not allowed if a vehicle is detected in the obstacle's path *(information received from a detector)*, or opening is not allowed if the parking lot is full *(information received via another device)*.

The movement initiated by the **gear motor** (**4**) is directly transmitted to the arm by the **main shaft Ø75** (**5**).

The speed of the arm, controlled by the variable frequency drive (**72**), is adjustable for both opening and closing movements. Movements are factory-configured to provide fast acceleration and slow deceleration at the end of the movement.

The **control logic** (**3**) coordinates the barrier's activity: management of movements and options, input and output information processing, etc. This information can be downloaded and processed by an external terminal *(not provided by **Automatic** Systems)*.

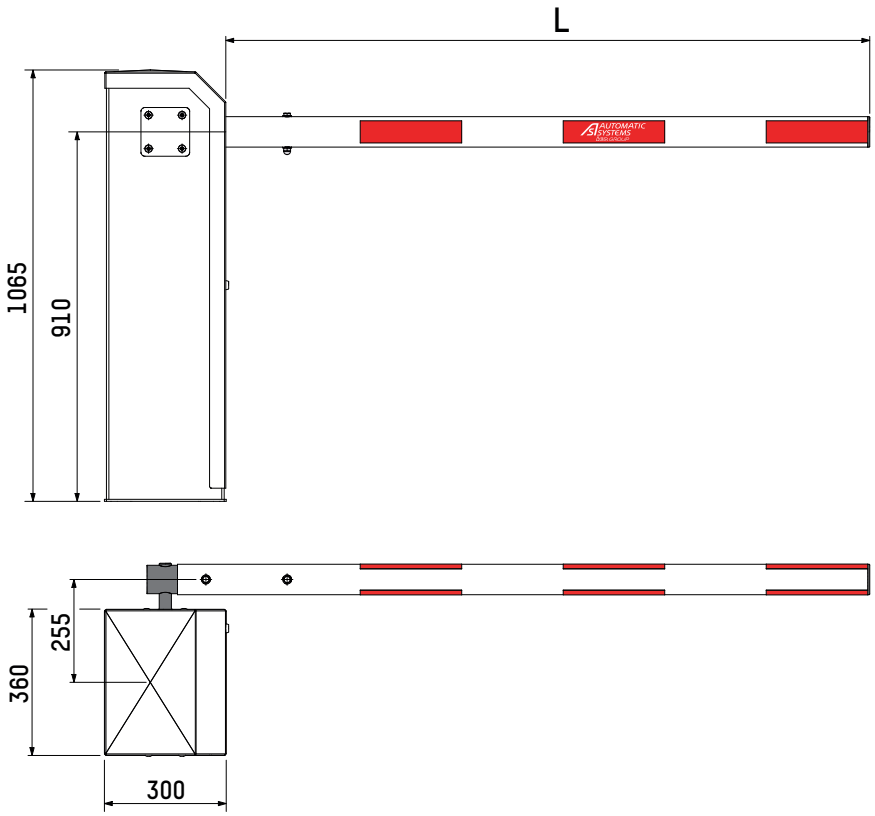
A compensating spring (**9**) acts as a counterweight. It helps the motor during opening and closing based on accessories and lengths *(models without automatic raising of the arm in case of power failure)*.

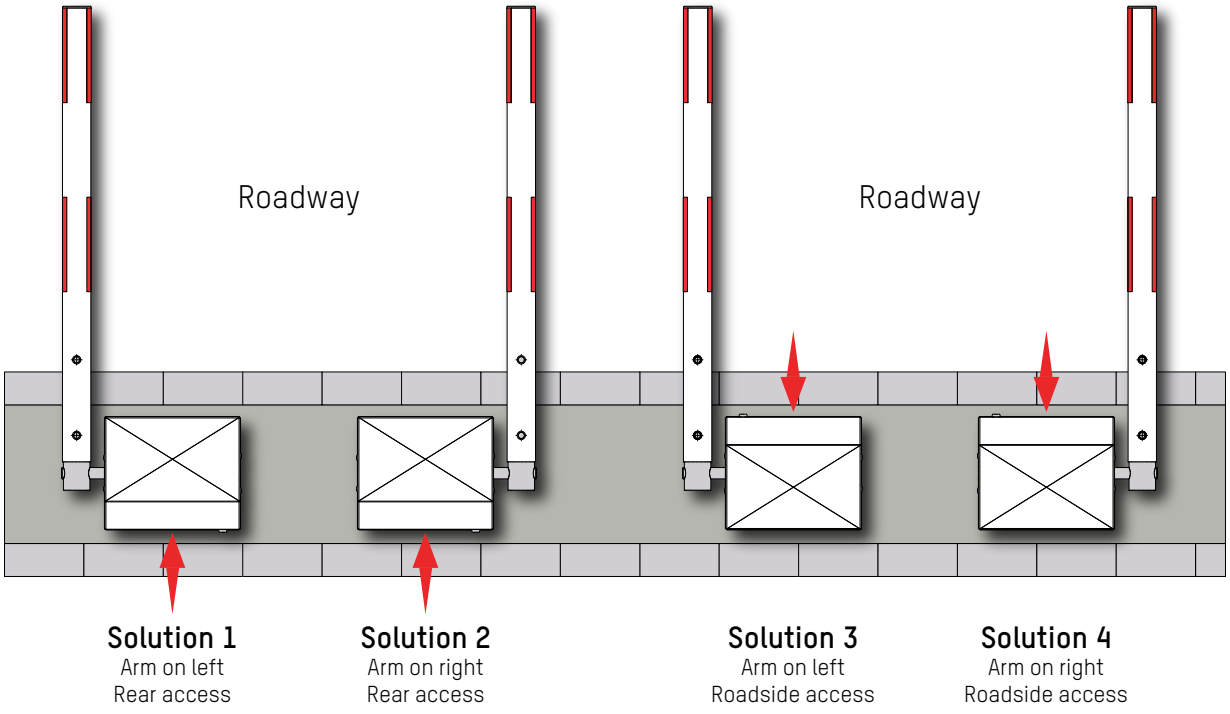
For barrier models with automatic raising of the arm in case of power failure, the spring tension is increased to ensure that it can raise the arm by itself in the event of a power failure.

Maintaining the arm in its two extreme positions *(open and closed)* as well as after a Stop command is achieved by means of an electromagnetic brake: Normally Closed Brake *(= closed when idle, i.e. not powered on)*, energized during arm movement to release the arm.

For models with AVR *(with automatic raising) (optional)*, the electromagnetic brake is of the NO type *(= open when idle, i.e. not powered on)*, energized in the two end positions *(open / closed)* to ensure locking of the arm.

4. FOOTPRINT / SOLUTIONS





Solution 1
Arm on left
Rear access

Solution 2
Arm on right
Rear access

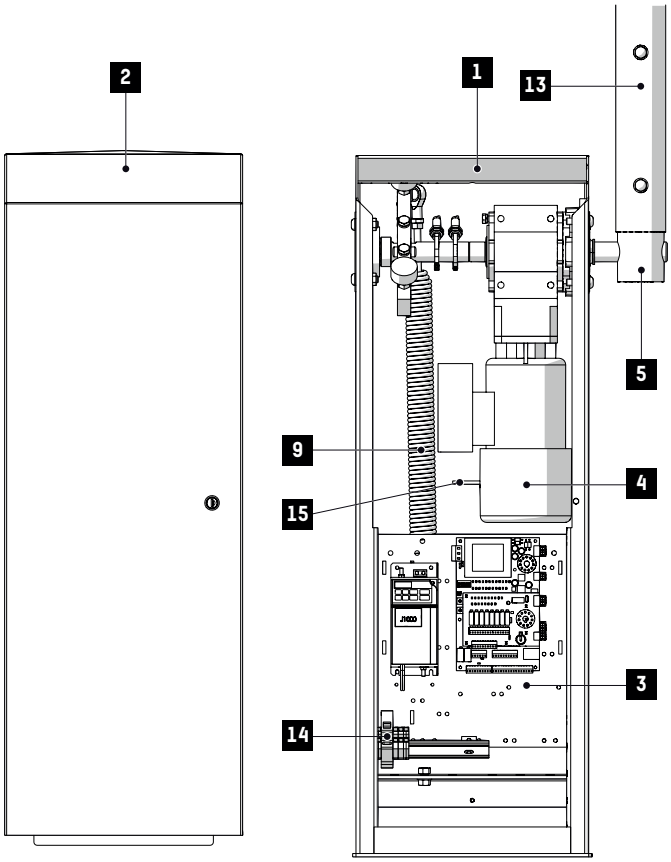
Solution 3
Arm on left
Roadside access

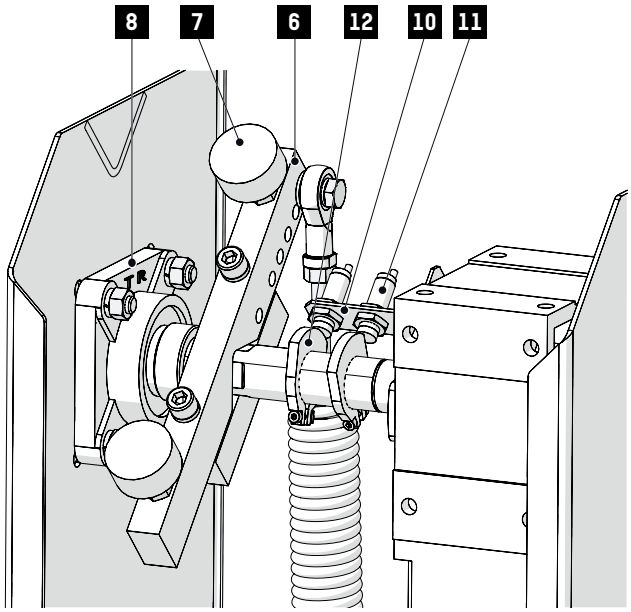
Solution 4
Arm on right
Roadside access

Switching from one solution to another does not require additional parts.

5. LOCATION OF COMPONENTS

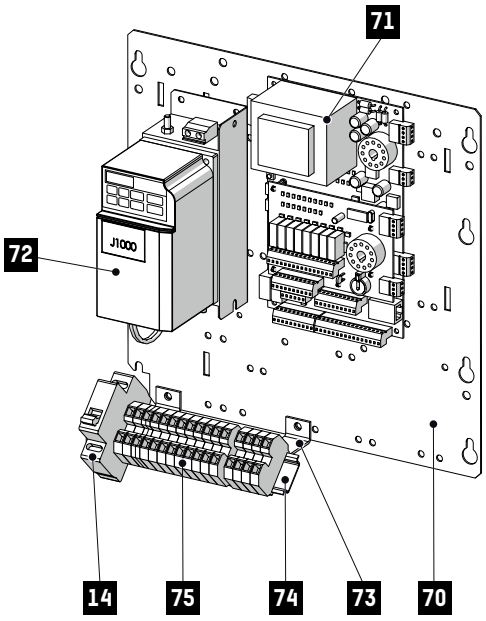
5.1. PARTS LIST





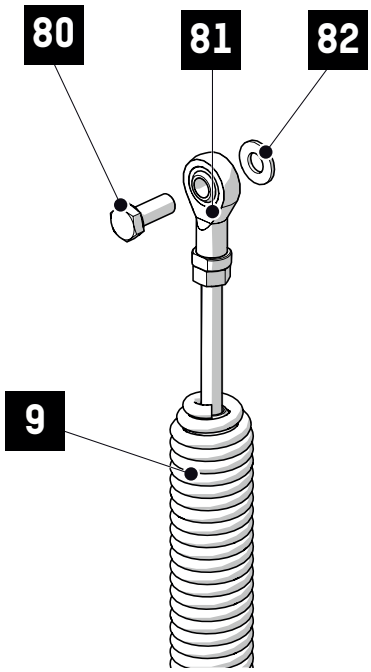
Marker	Description	Marker	Description
1	Frame assembly	8	Bearing Ø30
2	Top cover	9	Spring assembly
3	Control board assembly	10	Detector bracket
4	Gear motor A102 SR	11	Inductive position sensor
	Gear motor A102 AVR *(optional)*	12	Detection cam
5	Main shaft Ø75	13	Arm Ø75
6	Stop hub	14	Main circuit breaker
7	Adjustable stop	15	Brake release lever

5.2. CONTROL BOARD



Marker	Description
70	PCB steel plate
71	Electronics board
72	Frequency converter *(+ filter)*
73	Terminal bracket
74	DIN rail
75	Terminal block

5.3. COMPENSATION ASSEMBLY



Marker	Description
9	Spring assembly (1)
80	Screw H M10x25 Zn (2)
81	Hinge/spring
82	Washer M 10 Zn

(1) Includes spring and pre-assembled hinge
(2) Installed with high strength thread lock

6. INSTALLATION

6.1. EQUIPMENT STORAGE BEFORE INSTALLATION

Before installation, protect equipment from impact and store it in its original packaging in a dry area protected from dust, heat and the weather.

Storage between -30 and +80°C.

6.2. EQUIPMENT INSTALLATION

The barrier must be fastened to the ground, on a concrete base (**Fig. b**). The top of this base must be perfectly horizontal, and placed high enough to prevent any depression effect.

It is possible to embed the optional seal bracket, CHA0209, in this base (**Fig. a**). In this case, allow an excess threading length of 40mm for each bolt.

6.2.1. SEAL BRACKET CHA0209 (OPTIONAL)

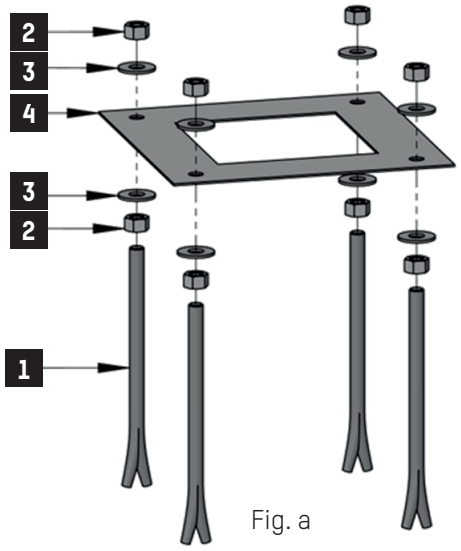


Fig. a

Rep.	Description
1	Anchoring bolt M14
2	Hexagon nut M14
3	Wide flat washer Ø14
4	Seal bracket

6.2.2. SEAL BRACKET ASSEMBLY

Insert the four anchoring bolts (**1**), each with a nut (**2**) and a flat washer (**3**), into the holes of the seal bracket (**4**). The thread must be oriented upward as shown on **Fig. a**.

Attach the anchoring bolts to the seal bracket using the flat washers (**3**) and nuts (**2**), ensuring the anchoring bolts' threads protrude at least 40 mm. Fasten the nuts. Use adhesive tape on the threads protruding from the seal bracket to protect them from concrete splatter.

1. Install 2 sleeves with minimum 40 mm diameter to run the power and control cables (**Fig. b**).
   Install the required number of sleeves with 20 mm diameter to run the detection loop, blocking photocell and electrical tip support cables *(optional)*.
   Cables must protrude 1 metre from the concrete base.
2. Make a concrete base in which the seal bracket will be centred as defined on **Fig. b**. The seal bracket must be flush with the surface of the concrete base and perfectly horizontal (**Fig. b**).
3. When the concrete has set, remove the adhesive tape from the threads, and remove the nuts and the flat washers in the upper part of the seal bracket. Install the sole plate on the concrete base using the previously removed washers and nuts.

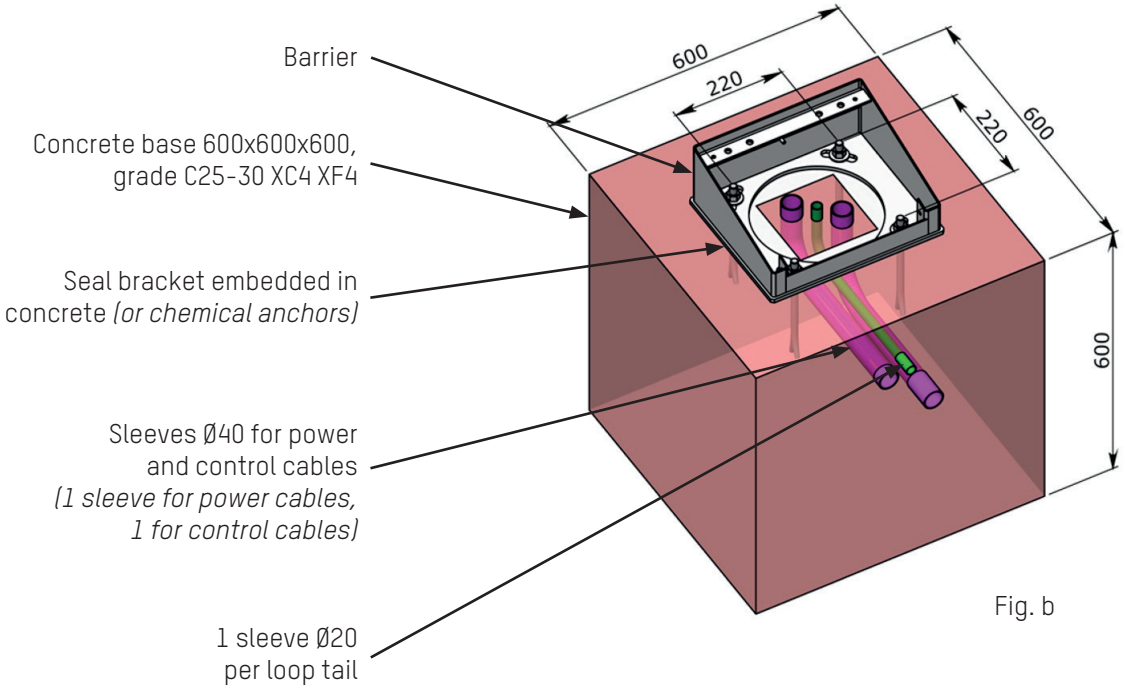


Fig. b

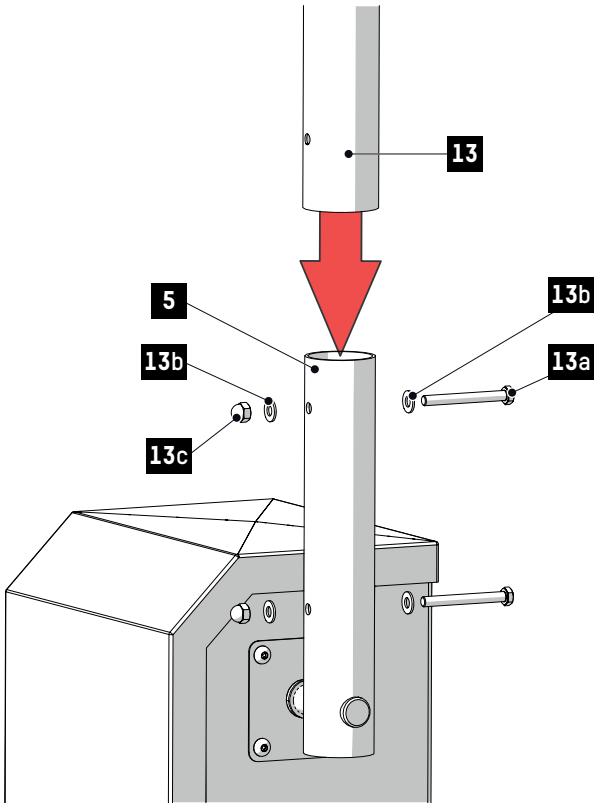
If no seal bracket is available, it is possible to fix the barrier to the ground using 4 chemical anchors M12 minimum. A rubber sole *(peplic joint)* can be added between the concrete base and the barrier frame.

7. FIRST COMMISSIONING

7.1. ROUND ARM Ø75 ASSEMBLY / DISASSEMBLY

- All screws should be greased before assembly.
- Nominal tightening torques are given in the legend in the figure.
- The barrier must be open *(⇨ Chap. 10.5, page 25)* before proceeding with arm assembly or disassembly.

1. Fit arm Ø75 (**13**) on the tube at the outlet of the main shaft Ø75 (**5**), and fasten with the stainless steel screws H M10x90 (**13a**), the stainless steel washers M10 (**13b**) and the stainless steel cap nuts M10 (**13c**).
2. Adjust the vertical and horizontal positions of the arm *(⇨ Chap. 7.2, page 13)*.
3. Adjust spring compensation *(⇨ Chap. 7.3, page 16)*.



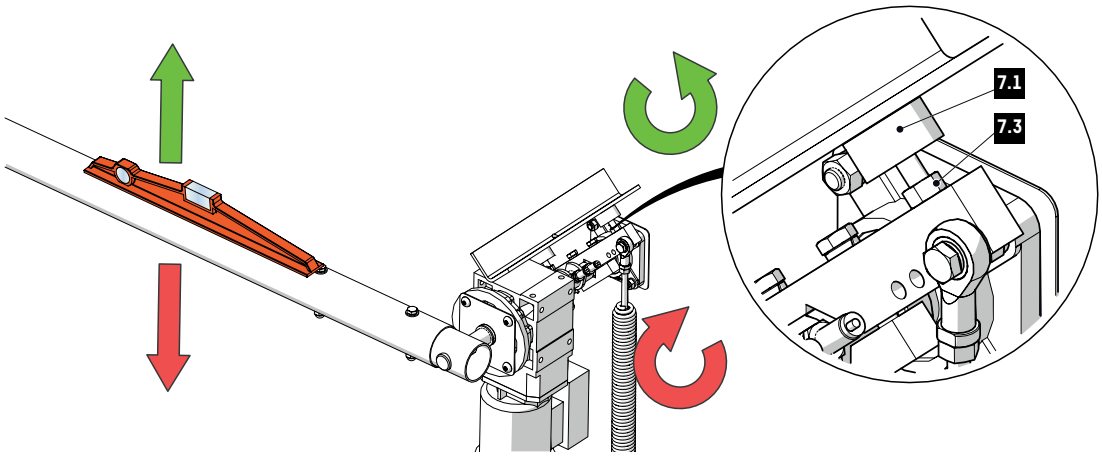
To disassemble the arm, unscrew the stainless steel screws H M10x90 (**13a**) and remove the stainless steel washers M10 (**13b**) and stainless steel cap nuts M10 (**13c**).

Then slide the arm Ø75 (**13**) on the tube at the outlet of the main shaft Ø75 (**5**) upward so as to remove it.

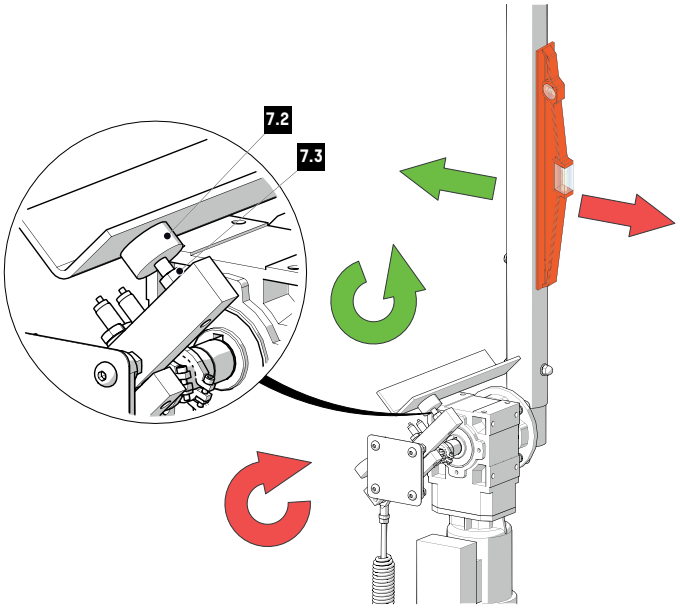
7.2. HORIZONTAL / VERTICAL ADJUSTMENT

7.2.1. BARRIER MODEL SR

- Turn off the barrier's power supply *(⇨ Chap. 10.4, page 24)*.
- Loosen the locknut (**7.3**).
- Screw or unscrew the lower stop (**7.1**) until the optimal horizontal position is obtained.



- Tighten the locknut again (**7.3**).
- Operate the manual brake release lever located on the motor *(⇨ Marker **15**, Chap. 5.1, page 8)*.
- Raise the arm into vertical position.
- Release the brake release lever.
- Loosen the locknut (**7.3**).
- Screw or unscrew the upper stop (**7.2**) until the optimal vertical position is obtained.



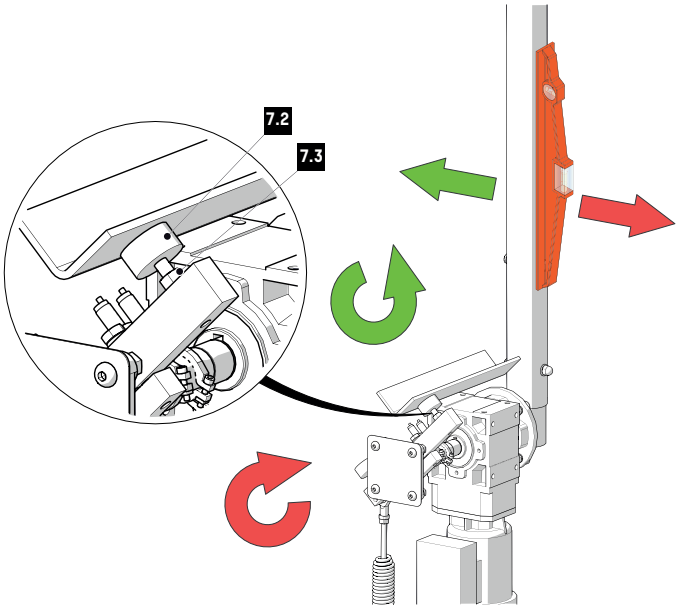
- Tighten the locknut again (**7.3**).
- Switch on the circuit breaker.

7.2.2. BARRIER MODEL AVR

- Turn off the barrier's power supply *(⇨ Chap. 10.4, page 24)*.

> *THANKS TO THE SPRING(S), THE ARM IS RAISED AUTOMATICALLY.*

- Loosen the locknut (**7.3**).
- Screw or unscrew the upper stop (**7.2**) until the optimal vertical position is obtained.



- Tighten the locknut again (**7.3**).
- Note down the position of the upper location of the spring on the hub (**6**) ⇨ **Fig. 1**.

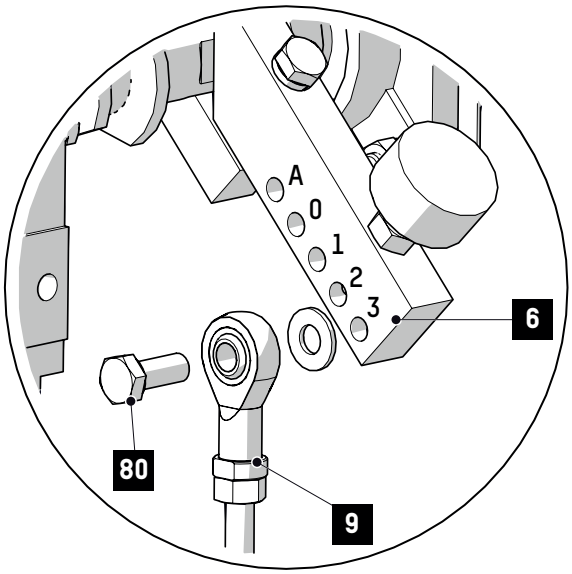


Fig.1

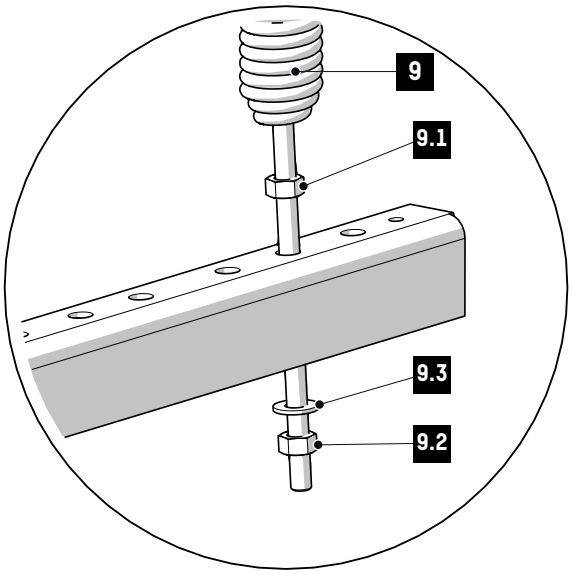


Fig. 2

- Loosen the locknut (**9.1**) and completely release the spring tension by loosening the nut (**9.2**) ⇨ ***Fig. 2***.

- Maintain the arm in vertical position and release the spring from the upper location on the hub by unscrewing the screw (**80**) ⇨ **Fig. 3**.

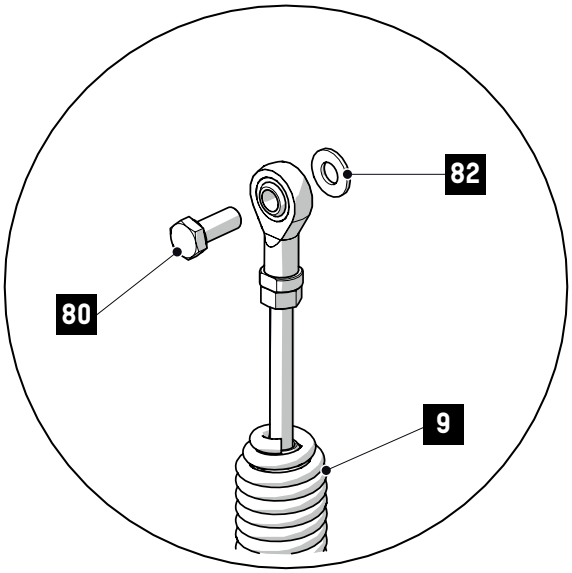
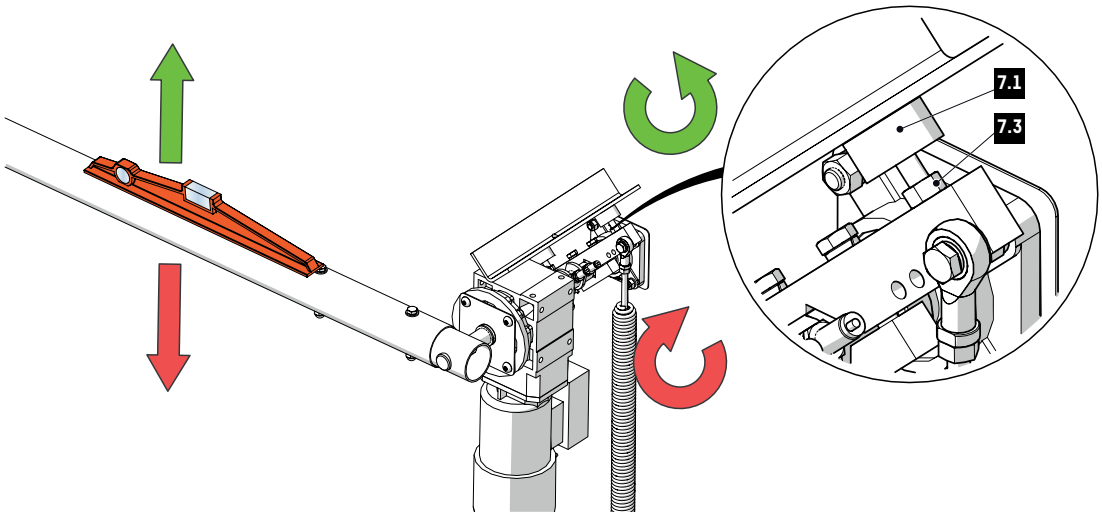


Fig. 3

- Lower the arm into horizontal position.
- Loosen the locknut (**7.3**).
- Screw or unscrew the lower stop (**7.1**) until the optimal horizontal position is obtained.



- Tighten the locknut again (**7.3**).
- Raise the spring and adjust its tension *(⇨ Chap. 7.3, page 16)*.
- Switch on the circuit breaker.

7.3. CHECKING / ADJUSTING THE COMPENSATION

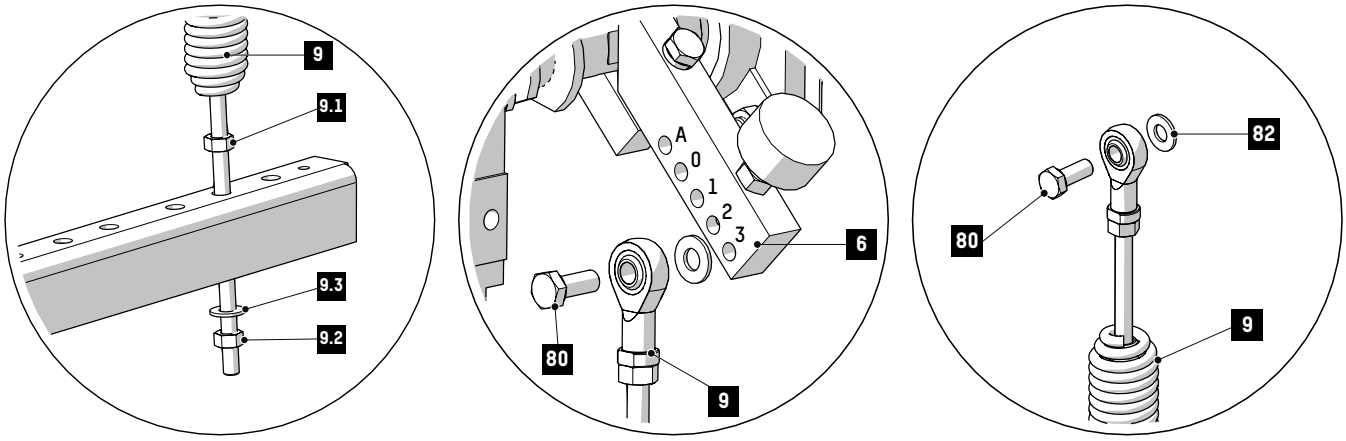
For operation **with automatic raising** *(optional)* of the arm in case of power failure, the spring tension should be adjusted so that the arm is raised slowly and completely until it reaches its vertical position. The contact between the upper stop *(⇨ Marker **7.2**, Chap. 7.2, page 13)* and the frame should not be too violent to avoid rapid deterioration.
If this is not the case, adjust the spring tension *(see below)*.

For operation **without automatic raising** of the arm in case of power failure *(SR models)*, the spring tension should be adjusted so that a minimal effort is required from the motor both for opening and closing the barrier:

- Enable the motor brake release lever *(⇨ Marker **15**, Chap. 5, page 8)*.
- Keeping the brake enabled, manually raise and then release the arm: it should remain in balance when positioned at 45°, and remain on its stops in the high and low positions.
  If this is not the case, adjust the spring tension *(see next page)*.
- Release the brake release lever.

Spring tension adjustment:

- Unscrew the nut (**9.1**).
- Tighten or loosen the nut (**9.2**) to tense or untighten the spring (**9**).



- If this adjustment proves insufficient, change the fixing hole of the spring (**9**) on the hub (**6**):
  a. Bring the arm to its vertical position.
  b. Turn off the equipment's power supply *(⇨ Chap. 10.4, page 24)*.
  c. Decrease the spring tension (**9**) by loosening the nut a few turns (**9.2**).
  d. Unscrew the screw (**80**) and change the position of the spring's on the hub (**6**) according to the table of the main spring adjustments *(⇨ Chap. 10.7, page 26)*.
- Adjust spring tension.
- Tighten the nuts and locknuts (**9.2 & 9.1**) and the fastening screw of the spring (**80**) on the hub (**6**).

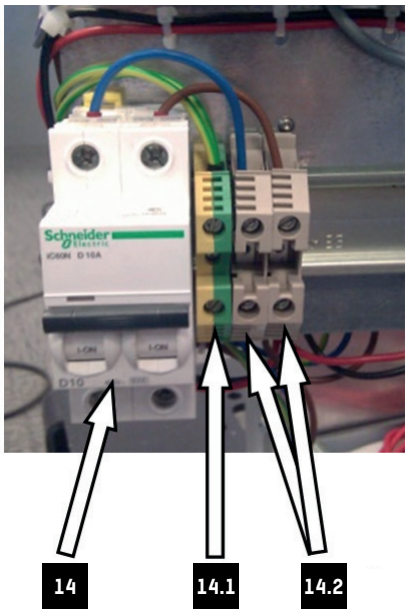
7.4. ELECTRICAL CONNECTIONS

*THE ARM **MUST** BE ASSEMBLED BEFORE PROCEEDING WITH ANY TESTS.*

DO NOT CONNECT TO A FLOATING NETWORK OR TO A HIGH IMPEDANCE EARTHED INDUSTRIAL DISTRIBUTION NETWORK (HIGH LEAKAGE CURRENTS).

WORK MUST BE DONE IN ACCORDANCE WITH THE SAFETY WARNINGS (⇨ CHAP. 1. SAFETY WARNINGS, PAGE 3).

Connections must be done **in accordance with the wiring diagrams** included **inside the equipment**, as these represent the primary reference instructions *(this section is for information purposes only)*.

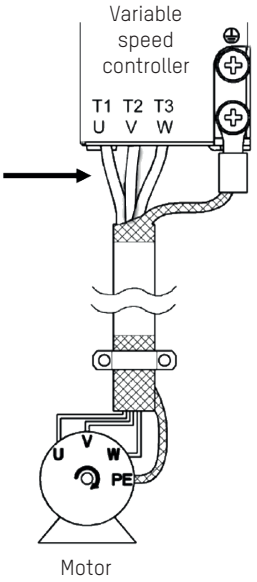


RAISE THE ARM (⇨ CHAP. 10.5, PAGE 25)) BEFORE MAKING ANY ELECTRICAL CONNECTIONS!

- Remove the top cover *(⇨ Chap. 10.3, page 24)*.
- Switch the circuit breaker OFF *(⇨ Chap. 10.4, page 24)*.
- Connect the power supply cables to the terminal blocks (**14.2**), ensuring that the power supply's characteristics meet the required specifications *(⇨ Chap. 9, page 20)*.
- The terminal block (**14.1**) must be grounded via a cable with a cross section of at least 1 mm² or more depending on the applicable legislation. *(High leakage current: above 3.5 mA, but below 5% of the rated current)*.
- The following must be provided at the feeder head:
  - A 10 A/30 mA super-immune selective differential circuit breaker *(for 1 barrier maximum)*
  - A 10 A/300 mA differential circuit breaker *(for 5 barriers maximum)*
- Connect the various control elements and options in accordance with the diagrams supplied, leaving a space of 15 cm with the power cable reaching the terminal blocks (**14.2**).

7.5. POWERING UP

1. Set the circuit breaker (**14**) to ON ⇨ the barrier's control program, stored in the control board PLA1300, takes about 10 seconds to start up and become operational.
   Start-up progress is displayed on the HMI LEDs. They light up for 5 seconds to indicate that the program is installed and effective. After these 5 seconds, only the OK LED is lit *(or blinks)*, according to the barrier's operating mode.
   By default, the barrier is in automatic mode and the *(green)* OK LED is steadily lit.
   During the start-up phase, the arm does not move. When this phase is completed, it is positioned as defined in the maintenance interface *(see appropriate manual)*.
2. Once the software is operational, the HMI of the PLA1300 board can be used to issue open/close commands via the push-button. *(Refer to the Logic manual)*
   If the movement is made in the opposite direction, swap the connection of 2 phase cables between the motor and the variable speed controller after having shut off the power supply *(= swap the T1/U and T3/W cables in the figure below)*:



8. MAINTENANCE

All maintenance or servicing must be performed with the power switched off and in accordance with the safety warnings *(⇨ Chap. 1. Safety warnings, page 3)*.

Every year (*)

- Ensure internal screws and bolts are properly tightened *(torque)*: bearings, gear motor, hub, sensors, spring assembly, arm attachment, base attachment, etc.
- Clean the body and the arm with a soft cloth impregnated with a non-aggressive detergent.
- For very sunny countries, it is advisable to treat the exterior of the body with a glossing product.
- Shut off the electrical power supply and check the behaviour of the arm:
  - For models with automatic raising, the arm should rise completely but without violently hitting the end stop.
  - For models without automatic raising, the arm should be able to rise manually with more or less effort..
- Blow out the electronic board + frequency converter assembly so as to remove any deposits of exhaust particles.

Every 2 years (*)

- Ensure screws and bolts are properly tightened *(torque)*: bearings, gear motor, hub, sensors, spring assembly, arm attachment, base attachment, etc.
- Check the state of the electrical connections.
- Check the sole plate for absence of leaks.
- Check the inside of the barrier for cleanliness.

(*) To be adapted according to equipment operating conditions, especially when the equipment is located in an oxidizing climate *(e.g., near the ocean)*.

9. TECHNICAL CHARACTERISTICS

Electrical power supply:	Single-phase 230 V~ (± 10%) + ground – 50 Hz
Useful power consumption:	450 W while moving *(44W at rest)*
Motor:	Three-phase 230 V/250 W
Free passage [L]:	2 to 6 m, in increments of 0.5 m
Operating time:	Adjustable between 1.5 and 3.5 seconds *(Capacity for controlling congested periods: 8 to 15 vehicles/minute)*
Operating temperature:	Between -25 et +60°C
Average relative humidity:	95%, without condensation
IP:	IP44
Sound level:	< 70db
Weight:	Net weight *(excluding arm)*: 80 kg Arm: 15 kg max.
MCBF :	5.000.000 mean cycles between failures, with recommended maintenance
CE	Complies with European standards

10. MAINTENANCE AND TROUBLESHOOTING

PRIOR TO ANY WORK ON THE INSIDE OF THE HOUSING, THE ARM MUST BE IN THE HIGH (OPEN) POSITION (⇨ CHAP. 10.5, PAGE 25), IN ORDER TO REDUCE THE STRETCHING OF THE SPRING AND TO PREVENT UNWANTED MOVEMENTS OF THE DRIVE MECHANISM, WHICH MAY CAUSE SEVERE INJURIES.

10.1. PROBLEMS AND REMEDIES

Check power supply voltages of the board's fuse.
PLA1300 board: OK LED should be steadily steadily litVariable frequency drive: the green square FREQ should be steadily lit and the green RUN LED should blink.

SYMPTOM(S)	PROBABLE CAUSE(S)	CHECK(S) OR APPROPRIATE SOLUTION(S)
The barrier remains open.	An opening command is sent continuously.	Ensure the opening command is a pulse and not a continuous command.
	The *(optional)* switch is in "forced opening".	Check condition of the *(optional)* switch.
	The swing-off sensor does not signal "presence of arm"	Swing-off of the arm is not properly adjusted. The sensor is maladjusted. Check via a shunt on the electronic board to simulate the sensor *(refer to the electronic diagram)*.
	No signal received from the high position sensor. Barrier in calibration with variable frequency drive blocked.	Sensor out of service or maladjusted. Note: - Barrier low ⇨ High sensor OFF / Low sensor ON - Barrier high ⇨ High sensor ON / Low sensor OFF - Barrier in mid-position ⇨ High and Low sensors ON.
	Electronic board is faulty.	Check if the OK LED of the PLA1300 is steadily lit. Check the external commands via shunts at the board terminal block.
	Variable frequency drive is faulty.	See chapter on error codes of the frequency converter *(⇨ Chap. 10.2.1, page 23)*.
	The *(optional)* loop detector remains active.	Check the detector's sensitivity and reset the loop detector to zero. If the sensitivity setting is too high, it can cause the barrier to be locked open.
		Check whether the LEDs on the detector are signalling a detector or loop failure.
	The *(optional)* cell is signalling a presence.	Check photocell alignment.
		Ensure photocells are not dirty.
The barrier remains closed.	No opening command is received.	Check if the barrier operates by simulating an opening command.
	The *(optional)* switch is in "forced closing".	Check condition of the (optional) switch.
	Variable frequency drive is faulty.	See chapter on error codes of the frequency converter *(⇨ Chap. 10.2.1, page 23)*.
	No signal received from the Low position sensor. Barrier in calibration with variable frequency drive blocked.	Sensor out of service or maladjusted. Recall: - Barrier low ⇨ High sensor OFF / Low sensor ON - Barrier high ⇨ High sensor ON / Low sensor OFF - Barrier in mid-position ⇨ High and Low sensors ON.
	Control logic is faulty.	Check if the OK LED of the PLA1300 is steadily lit. Check the external commands via shunts at the board terminal block.

Check power supply voltages of the board's fuse. PLA1300 board: OK LED should be steadily steadily litVariable frequency drive: the green square FREQ should be steadily lit and the green RUN LED should blink.		
SYMPTOM(S)	**PROBABLE CAUSE(S)**	**CHECK(S) OR APPROPRIATE SOLUTION(S)**
The barrier takes a long time to close after a vehicle has passed.	The closing after passage timer is set for too long.	See page General configuration of the maintenance interface *(see appropriate manual).*
	The opening command is given again during the passage.	Set a lower pulse time for the barrier opening command.
The barrier opens for no apparent reason.	The opening loop *(optional)* is too sensitive.	Adjust the sensitivity and/or frequency of the opening detector. A sensitivity setting that is too high or an improper frequency may cause unwanted openings.
	The access control system sends unwanted commands.	Check the LEDs of the inputs on the PLA1300 board. Check the access control system.
The arm is incorrectly positioned on the *(optional)* tip support.	The arm strikes the tip support with too much force.	Adjust the lower stop *(⇨ Chap. 7.2, page 13)*
	The arm stops before it reaches the tip support.	Adjust the position sensors. *(⇨ Chap. 10.8.3, page 29)*
The arm bounces in the high and/or low position.	The adjustable stops inside the barrier are too tight.	Adjust the stops *(⇨ Chap. 7.2, page 13)* Reinitialize the barrier via the page Maintenance interface motor tests *(see appropriate manual).*
The power disconnects when the barrier is turned on.	An incorrect differential circuit breaker is being used.	Use a differential circuit breaker as recommended in Chap. 7.4, page 17

10.2. ADJUSTING THE VARIABLE FREQUENCY DRIVE

The factory settings protect the variable frequency drive and the gear motor from all malfunctions. The settings of the variable frequency driver should therefore never be modified.

ANY MODIFICATION OF THESE PARAMETERS WITHOUT PRIOR EXPRESS PERMISSION FROM AUTOMATIC SYSTEMS IS YOUR FULL RESPONSIBILITY AND WILL AUTOMATICALLY VOID THE PRODUCT WARRANTY.

During normal operation, the DRV LED is lit. The variable frequency drive then displays the operating frequency of the motor.

10.2.1. MAIN ERROR MESSAGES

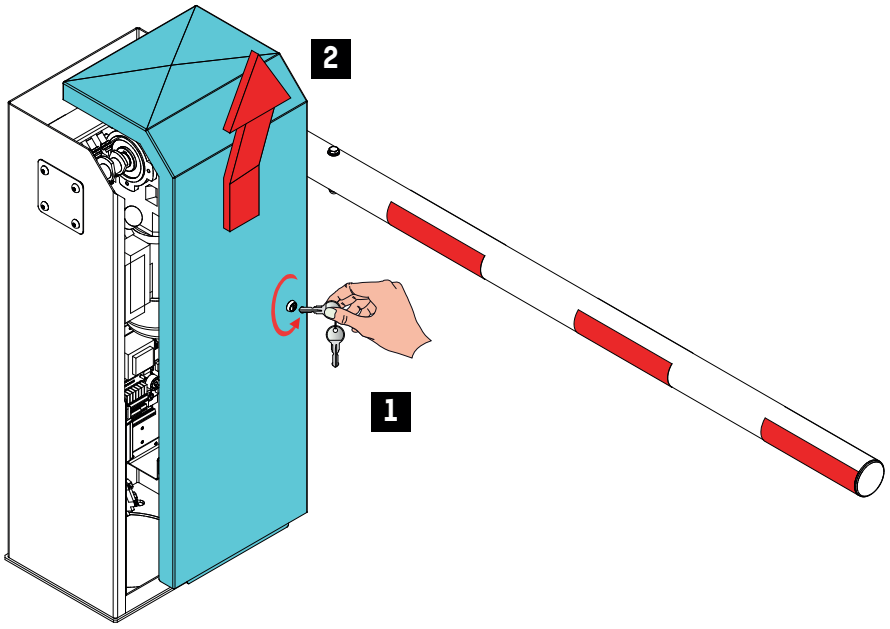
In the event of a fault, in addition to the blinking of the ALM LED, the VFD can indicate the origin of the fault via codes. The most common faults are described below.

AFTER SWITCHING OFF THE POWER SUPPLY, THIS CODE DISAPPEARS AND WILL NO LONGER BE VISIBLE WHEN IT IS SWITCHED ON AGAIN. IT IS THEREFORE IMPERATIVE TO RECORD THIS CODE BEFORE REINITIALIZING THE BARRIER.

CODES	DESCRIPTION	
Uu1	Insufficient supply voltage of the VFD (Uu 2), of faulty motor phase (Uu 2)	
Uu2		
Ou	Voltage of the SC bus has exceeded its max. limit	
oH (blinking)	VFD temperature rise	
oL1	Motor overload	Check the balancing of the arm and perform operational tests to check if the VFD does not make any noise. The barrier may have been vandalised during closing or opening.
oL2	Variable frequency drive overload	
Bb (blinking)	Check the wiring of the variable frequency drive at the inputs	
oC	Short circuit or insulation fault at the VFD output *(check motor windings and insulation)*.	
GF	Ground problem	

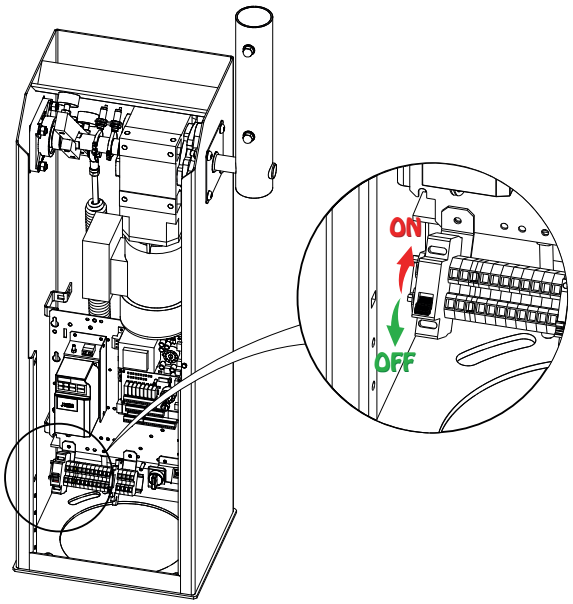
10.3. OPENING THE TOP COVER

1. Turn the lock 90° anticlockwise.
2. Lift the cover and pull it toward you.



10.4. SWITCHING EQUIPMENT OFF

1. Open the door *(⇨ Chap. 10.3. Opening the Top Cover, page 24)*.
2. Lower the circuit breaker (**14**) to deactivate the barrier.



10.5. MANUAL RAISING OF ARM

The procedure to be followed for manually raising the arm differs according to the configuration, as shown in the following table:

BARRIER CONFIGURATIONS	PROCEDURE
With automatic raising of the arm in the event of a power cut. *(optional)*	Shut off the power supply *(⇨ Chap. 10.4, page 24)* ⇨ the spring *(⇨ Marker **9**, Chap. 5.1, page 8)* automatically raises the arm.
Without automatic raising of the arm in the event of a power cut.	Shut off the power supply *(⇨ Chap. 10.4, page 24)*. Operate the manual brake release lever located on the motor *(⇨ Marker **15**, Chap. 5.1, page 8)*. Manually raise the arm *(with sufficient force to overcome the resistance of the brake)*. Release the brake release lever.

10.6. REPLACING THE SPRING ASSEMBLY

Ratchet and 16-mm ratchet extension.

- Open the door *(⇨ Chap. 10.3. Opening the Top Cover, page 24)*.
- Shut off the power supply *(⇨ Chap. 10.4. Switching equipment Off, page 24)*.
- Raise the arm slightly past 90° and tighten the upper stop so that the arm does not fall back down.
- Note down the position of the upper location of the spring (**9**) on the hub (**6**) ⇨ **Fig. 1**.

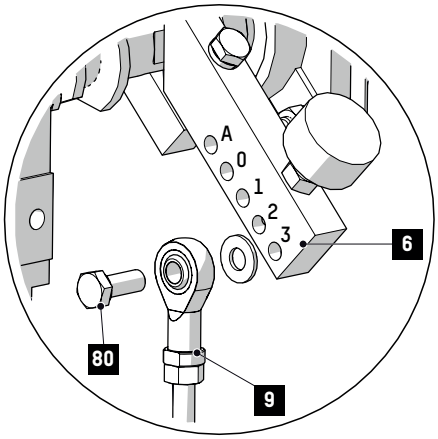


Fig. 1

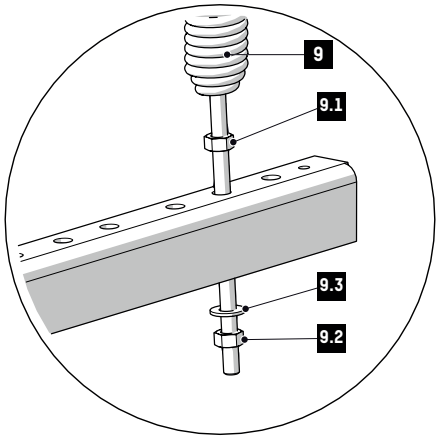


Fig. 2

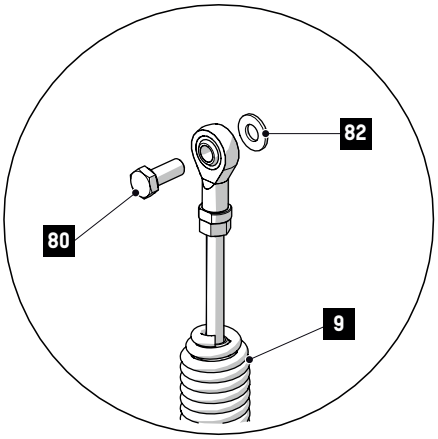
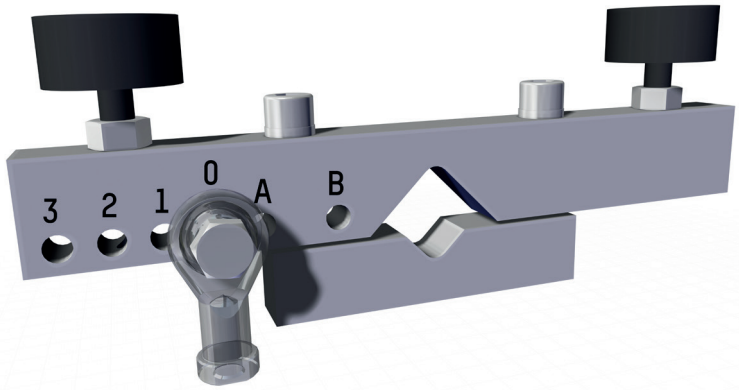


Fig. 3

- Loosen the locknut (**9.1**) and completely release the spring tension by loosening the nut (**9.2**) ⇨ **Fig. 2**.
- Unscrew the screw (**80**) for retaining the spring assembly on the hub and remove the faulty assembly ⇨ **Fig. 3**.
- Replace the spring assembly (**9**) and put the washers (**82 & 83**) and the fastening screw (**80**) back into position. Screw down everything.
- Adjust the vertical position of the arm *(⇨ Chap. 7.2. Horizontal / vertical adjustment, page 13)*.
- Adjust the spring tension *(⇨ Chap. 7.3. Checking / Adjusting the Compensation, page 16)*.

10.7. TABLE OF MAIN SPRING ADJUSTMENTS

10.7.1. POSITION OF THE SPRING(S) ON THE STOP HUB



	SR MODEL Without thread		AVR MODEL Without thread		SR MODEL With low thread		AVR MODEL With low thread	
Useful length of the arm (in metres)	Nbr of spring(s)	Position(s) on the axle	Nbr of spring(s)	Position(s) on the axle	Nbr of spring(s)	Position(s) on the axle	Nbr of spring(s)	Position(s) on the axle
2	-	-	1	0	-	-	1	1
2,5	-	-	1	1	-	-	1	1
3	-	-	1	1	1	1	1	2
3,5	-	-	1	2	1	2	1	2
4	1	1	1	2	1	3	2	2+2
4,5	1	2	2	1+2	1	3	2	2+3
5	2	0+1	2	2+2	2	2+2	2	2+3
5,5	2	1+1	2	2+3	Not available			
6	2	2+3	2	3+3				

10.7.2. READING THE TABLE

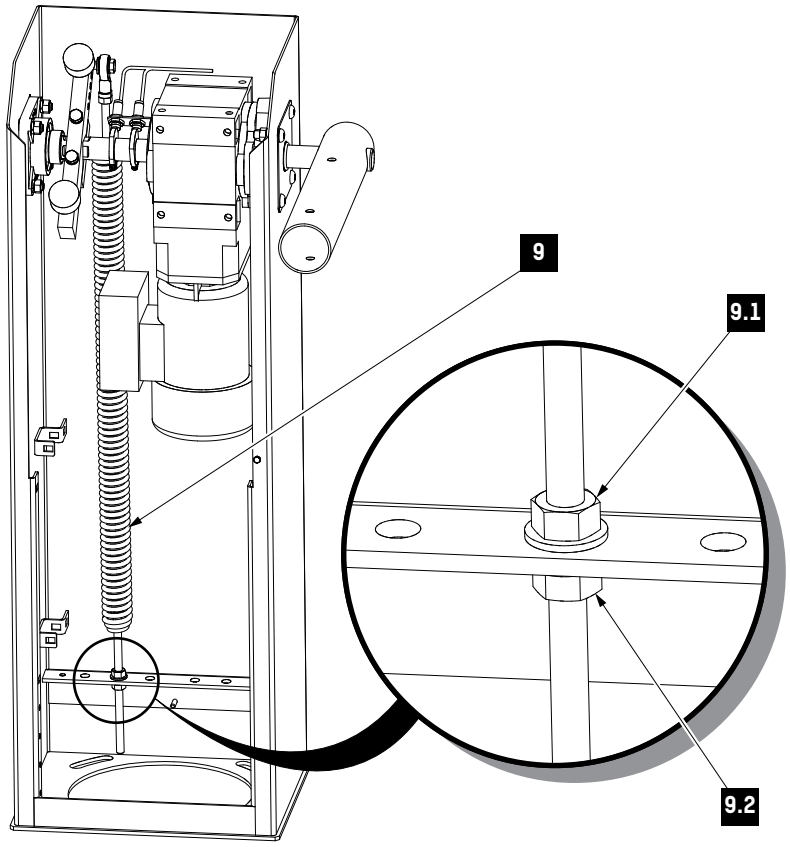
The yellow boxes indicate the position of the spring on the hub. If only one number appears, only one spring is needed; if two numbers are indicated, two springs must be mounted.

The spring is considered correctly tensioned if it can no longer vibrate with the arm in the high position.
For the high and low threads, contact our Customer Service.
For models equipped with an electromagnet roller, over-dimension the setting to the higher size.

10.7.3. CHECKING THE PROPER BALANCING OF THE ARM

- On SR model barriers *(without automatic raising)*, the arm positioned at 45% with the brake disengaged should be lowered slowly.
- On AVR model barriers *(with automatic raising)*, when the arm is in horizontal position, it should be raised gently in the event of a power failure.

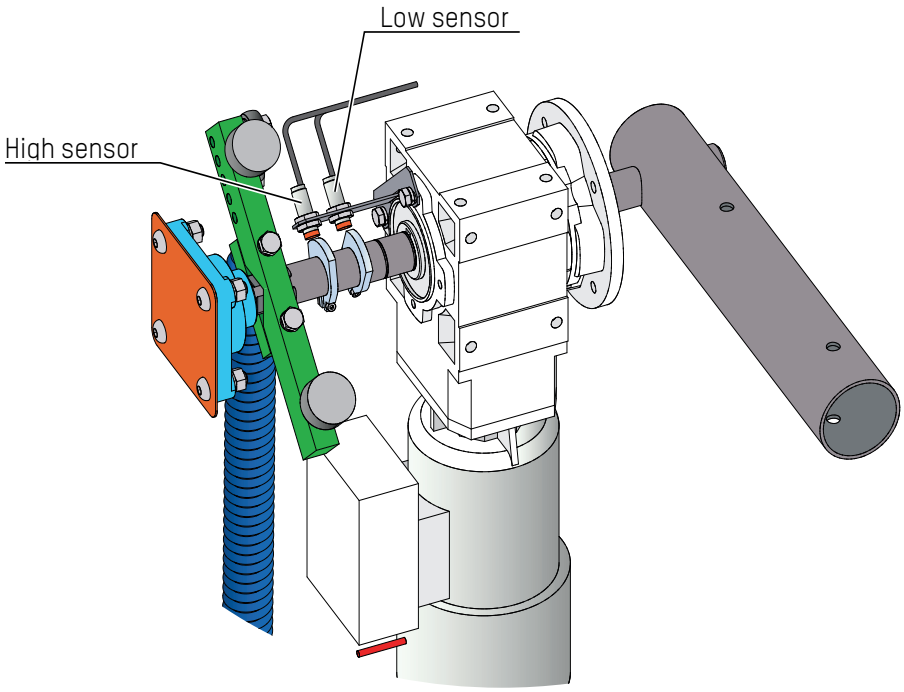
In addition to the high location of the spring on the hub, a fine adjustment can be performed by tightening or loosening the nuts H M10 at the bottom of the spring *(see picture below)*.



- First proceed with the loosening of the locknut (**9.1**).
- Then proceed with the fine adjustment of the spring tension by tightening *(pressing)* or loosening *(releasing)* the nut (**9.2**).
- Check the proper balancing of the arm in accordance with the instructions given at the start of this chapter.
- Tighten and block the locknut (**9.1**).

10.8. REPLACING THE POSITION SENSOR

10.8.1. LOCATION OF THE POSITION SENSORS



By convention, when the user is located in front of the barrier, the inductive sensor located to his left controls the high position.

10.8.2. OPERATION OF THE POSITION SENSORS

- Opening or closing sequence: motor start at high speed after an acceleration ramp.
- Passage of the trough of the cam in front of the sensor: activation of low speed and start of the end-of-movement timer.
- Stopping of movement by mechanical contact of the adjustable stop on the frame.
- Disconnection of the motor's electrical power supply upon expiry of the end-of-movement timer.

The inductive sensors are intended to command the VFD to switch to low speed while at the same time initiating a timer that will shut off the motor's electrical power supply.

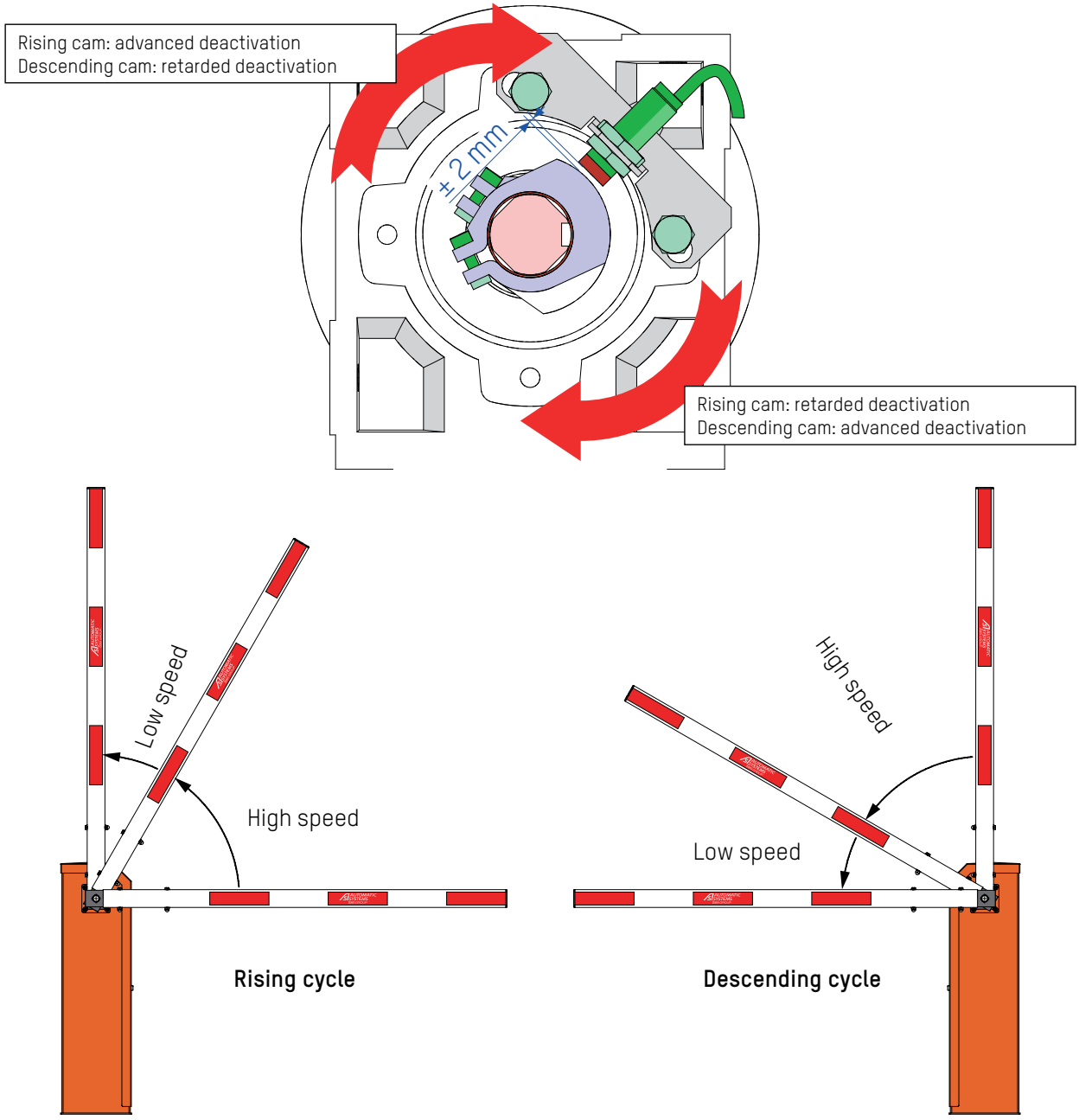
NEVER OPERATE THE BARRIER, MANUALLY OR ELECTRICALLY, WITHOUT THE ADJUSTABLE STOPS.

10.8.3. THE SENSORS

Fine adjustment of the horizontal and vertical positions of the arm requires only an adjustment of the adjustable stops *(⇨ Marker 7, Chap. 5.1, page 8)*. If the barrier is out of adjustment following a problem, if there is rebounding or if the operating speed has been modified, the setting of the detection cams should be altered. For this, proceed as follows:

Loosen the locking screw of the relevant cam and slightly rotate the cam. The low speed should be activated as late as possible and be virtually invisible to the eye, so as to keep the operating time as short as possible.

Adjusting the low speed deactivation during rising or descending, according to the selected cam.



10.8.4. REMPLACEMENT D'UN CAPTEUR INDUCTIF DE POSITION

All maintenance and servicing work must be carried out with the power switched off and in accordance with the safety instructions *(⇨ Chap. 1. Safety warnings, page 3)*.

Two 17 mm open-ended wrenches – flat screwdriver – cutting pliers – Rilsan collars

- Remove the top cover *(⇨ Chap. 10.3, page 24)* and shut off the electrical power supply *(⇨ Chap. 10.4, page 24)*.
- Loosen and remove the 2 retaining nuts M12 of the faulty inductive sensor.
- Disconnect the sensor wires from the relevant terminal blocks on the electronic board.
- Replace the sensor and reconnect the wires.
- Ensure that the distance between the sensor's detection head and the boss of the cam is between 2 and 3 mm.
- Check the barrier's setting during operation and, if necessary, adjust the cam position *(⇨ Chap. 10.8.3, page 29)*.

10.9. REPLACING THE GEAR MOTOR

All maintenance and servicing work must be carried out with the power switched off and in accordance with the safety instructions *(⇨ Chap. 1. Safety warnings, page 3)*.

10 mm and 17 mm tubular wrenches – 13 mm, 16 mm & 17 mm open-ended wrenches - 3 mm, 4 mm & 6 mm Allen wrenches – flat and cross-headed screwdriver – flat file – mallet – bronze drift Ø25 – sandpaper – cutting pliers – drift punch – circlip pliers

- Remove the top cover *(⇨ Chap. 10.3, page 24)* and shut off the electrical power supply *(⇨ Chap. 10.4, page 24)*
- Remove the arm *(barrier in vertical position)*
- IF OPTIONAL AVR OR ARM ≥ 4 METERS : detach the spring from the upper hub (locate the position of the spring shaft on the hub)
- Loosen the 2 screws H M10 to remove the hub
- Disassemble the electronic board + frequency converter sub-assembly
- Loosen the eccentric ring of the bearing using the 4 mm Allen wrench and rotate it by a quarter turn to unlock it
- Detach the sensor support bracket from the gear motor by removing the 2 screws H M8
- Rub the shaft with sandpaper so as to remove the protective varnish
- Open the circlip and the detection cams *(locate their positions)* and slide them onto the shaft
- File off the marking of the bearing ring locking screw
- Remove the external bearing protection plate by removing the 4 screws CBLH M10
- Take out the shaft by tapping on the bearing side with the bronze drift
- Open the motor terminal box, locate and disconnect the wires and then take out the cables
- Place a support under the gear motor to lift it prior to loosening it
- Loosen the 4 fastening nuts M10 of the flange
- Remove the assembly and proceed with the assembly of the new gear motor
- Reinstall in reverse order and check the proper functioning of the barrier

10.10. INVERTING THE SIDES FOR MOUNTING THE ARM

10 mm and 17 mm tubular wrenches – 13 mm, 16 mm & 17 mm open-ended wrenches - 3 mm, 4 mm & 6 mm Allen wrenches – flat cross-headed screwdriver – flat file – mallet – bronze drift Ø25 – sandpaper – cutting pliers – drift punch – circlip pliers

- Proceed with the removal of the gear motor assembly *(see above)*.
- Remove the assembly and proceed with its reassembly on the other side of the frame.
- Reinstall in reverse order.
- Modify the position of the inductive position sensors.
- Invert 2 motor phases.
- Adjust the position cams *(⇨ Chap. 10.8.3, page 29)*.

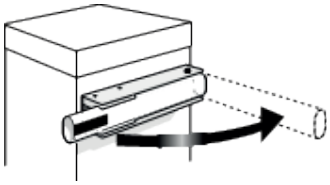
11. PROLONGED SHUTDOWN / DESTRUCTION

If the barrier is not to be used for a long period, it is recommended:

- To store the barrier in a dry place away from heat and protected against the weather.
- To leave the power on. If the motor remains permanently powered, a certain temperature is maintained in the body. This eliminates problems of condensation and, at low temperature, prevents the gear motor oil from solidifying, which would have the effect of not reproducing the performance of the barrier during the first switching operations following a long period of inactivity.

When the equipment is taken out of service, drain the oil from the gear motor and scrap the various components of the machine through the appropriate channel *(metal parts, electronic components, etc.)* according to the legislation in force in the country concerned.

12. TERMINOLOGY

Dégondage	When the arm comes out of its jaw, in the case of vehicle impact: 
HMI	*(Human Machine Interface)* Switches and LEDs located on the PLA1401 motherboard that interface with the unit.
Arm	Obstacle to prevent passage that moves up *(barrier open)* or down *(barrier closed)*.
Direction A	By convention, the direction A is the passage from free area to controlled area.
Direction B	By convention, the direction B is the passage from controlled area to free area.
VF	Variable Frequency Driver.
N/A	Not Applicable.

13. EC DECLARATION OF CONFORMITY

AUTOMATIC SYSTEMS

CE

EC declaration of conformity

bsi. ISO 9001 Quality Managment

bsi. ISO 14001 Environmental Management

We, undersigned,

AUTOMATIC SYSTEMS SAS
22 rue du 8 mai 1945
95340 PERSAN
FRANCE

Herewith declare that the following machine

Electrical rising barrier

BL 227

is in accordance with the conditions of the following Directives, standards and other specifications:

- Machinery Directive 2006/42/CE.
- Low-voltage Directive 2014/35/UE.
- Electromagnetic compatibility Directive 2014/30/UE.
- RoHs Directive 2011/65/EU.
- EN 12100:2010: Safety of machinery – General principles for design - Risk assessment and risk reduction (ISO 12100:2010).
- IEC 60204-1 / A1 : 2016: Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
- EN 61000-6-3 / A1 : 2011: Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments.
- IEC 61000-6-2 : 2016: Electromagnetic compatibility (EMC). Generic standards. Immunity standard for industrial environments.

Made in PERSAN,
Date: 2020.08.26
Name: Roland Monet
Function: Operations Director France

14. ANNEXES

- Wiring diagram(s): the wiring diagram(s) to be used as reference is(are) the diagram(s) delivered with the equipment. It(they) are included in the equipment.
- Technical manual for accessories and options.
- Control logic manual available on request.

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