

BL 229

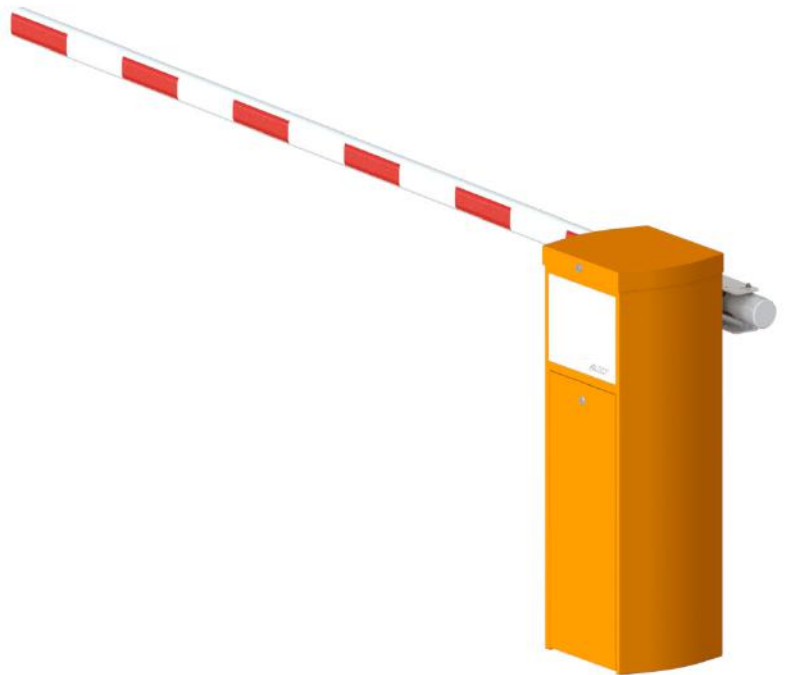
Automatic rising barrier

TECHNICAL MANUAL

Rev.D • Update 06/2022



BL 229



BL 229 TOLL

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1. SAFETY WARNINGS



Read this document carefully and completely before using the barrier and keep it in a safe place for future reference. Failure to comply with the instructions in this document may cause damage to the barrier and serious personal injury.

This equipment is 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 responsible for damage caused by improper use of the equipment.

Putting up a vehicle barrier or an access control obstacle exposes you to liabilities in terms of people's safety:

- Pedestrian, cyclist and motorcyclist should not access the passage where the barrier is. However, if pedestrians must use this passage, it is mandatory to effectively signal their movement (sound and/or light signal, markings on the ground, and so on).
- Any work on the equipment must be done by qualified personnel. Any work on this product that is unauthorised or carried out by an unqualified technician will automatically entail the annulment of the warranty.



ASSEMBLE THE ARM AND ITS ACCESSORIES BEFORE PERFORMING ANY ELECTRICAL TESTS ⇒ CHAP. 4.4, PAGE 17



NEVER OPERATE THE BARRIER, EVEN MANUALLY, IF THE LIMIT CAM AND THE END STOP UNITS ARE NOT INSTALLED PROPERLY. (⇒ REP. K & L, FIG. 14, PAGE 14).



**ATTENTION!
LIFT THE ARM BEFORE PERFORMING ANY WORK INSIDE THE HOUSING TO RELEASE THE TENSION IN THE BALANCING SPRINGS AND PREVENT UNDESIRED MOVEMENTS OF THE DRIVING MECHANISM!**



**ATTENTION!
DO NOT WORK ON THE BARRIER OR STAND NEAR IT DURING A THUNDERSTORM, ESPECIALLY WHEN THE BARRIER IS IN THE OPEN POSITION (ARM UP), RISK OF ELECTRIC SHOCK!**

- The access keys to the gate operator must only be used by staff that are aware of the electrical and mechanical risks in the event of negligent manipulation. All personnel need to lock the mechanism's access hatch after the intervention.
- Cut off the power supply on the circuit breaker (⇒ Rep. 23, Fig. 1, page 6) before any manipulation inside the housing.
- Any internal element that could be live or in movement must be handled with care.
- The equipment has been configured in "minimal risk" mode for its users. Any alteration of the settings must be carried out by qualified personnel and shall in no way invoke any liability for Automatic Systems.
- The barrier must be completely visible by the user before being activated.
- Detection loop installations must be validated by qualified personnel that have determined the optimal configuration (adapted to vehicle type and passageway).



ATTENTION! THE RISK OF INJURY EXISTS FOR PEOPLE WHEN USING STANDARD DETECTION LOOPS; THEY CAN INCORRECTLY DETECT TRUCKS AND (MOTOR)BIKES AND CLOSE THE GATE ON THEM!

- Do not add unapproved accessories (contact between different metals can cause a battery effect that decreases the equipment's corrosion resistance).

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



This symbol is used to highlight **information** 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.



ATTENTION! This symbol is used to indicate a **risk of injury or property damage**.



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



This symbol is used to highlight a **risk of cutting yourself**.



This symbol is used to identify the **ground connection point**.



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



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



This symbol indicates that the equipment **must be disposed of in accordance with the applicable North American Directives**.

2. PRESENTATION

There are currently two BL 229 models:

The first model, which we will call '**BL 229**':

- for a wide range of applications;
- equipped with a round arm for free passage from 10' [3.05m] to 19'8" [6m];
- with opening and closing speeds between 1,2 and 4 seconds depending on the arm length:

The second model is called '**BL 229 Toll**':

- designed for motorway tolls;
- meeting the many requirements in terms of performance, reliability, robustness, adaptability and low maintenance;
- equipped with an oval arm for free passage from 10' [3.05m] to 13'1" [4m];
- with opening and closing speeds adjustable between 0.6 and 1.7 seconds.

BL229 toll model is equipped with an analog sensor. The analog sensor detects the extreme positions (open/close), but also allows the exact position of the arm to be known at all times for better control of the movement. For example, the barrier can increase the torque of the motor to compensate for windy conditions.

3. DESCRIPTION

3.1. COMPONENT LOCATION

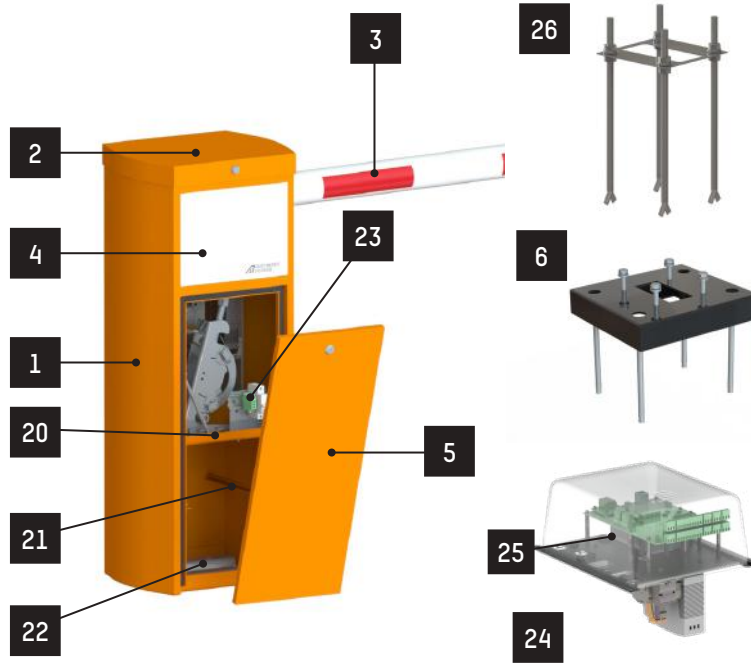


Fig. 1 - Component location - General

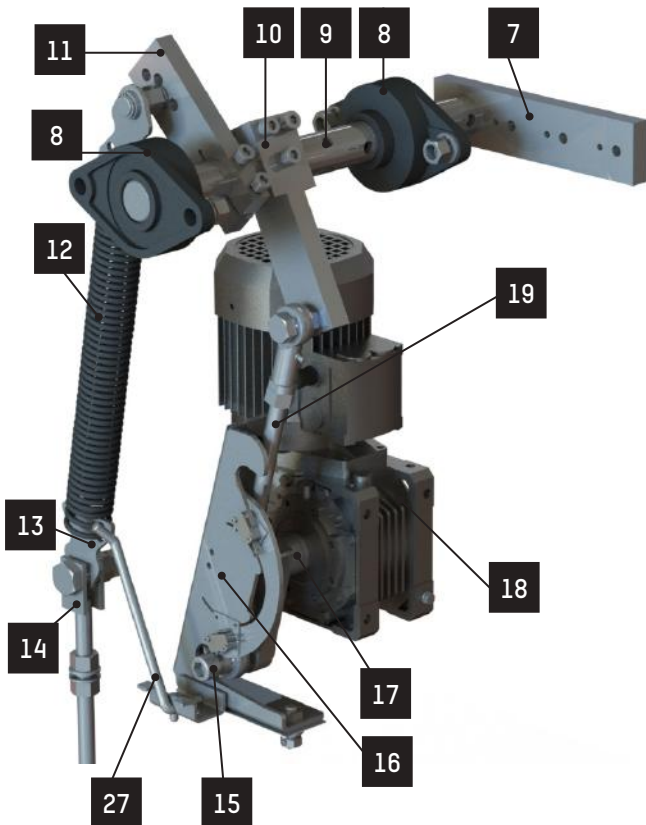


Fig. 2 - Component location - Mechanism

REP.	DESCRIPTION
1	Housing
2	Lockable cover
3	Arm
4	Front panel
5	Lockable door
6	Raised base (optional)
7	Arm fastening clamp
8	Bearing
9	Arm shaft
10	Connecting rod lever
11	Spring lever
12	Balance spring
13	Spring anchor plate
14	Spring stretcher
15	Limit switch
16	End stop unit
17	Crankshaft
18	Gear motor
19	Connecting rod
20	Mechanism bracket
21	Control board bracket
22	Fastening clamps
23	Circuit breaker
24	Control board
25	Frequency converter
26	Fixing frame
27	Unlocking lever

3.2. OPERATION PRINCIPLE



The references in this chapter refer to the illustrations on page 7.

The opening of the arm (3) is controlled by the user (via a key switch, a push-button, a radio transmitter), by detections loops buried beneath the roadway, or by an external unit.

Closing is controlled in the same way, the unit can be configured to automatically close after a specific length of time.



A STOP COMMAND IMMEDIATELY STOPS THE MOTOR, BUT NOT THE ARM MOVEMENT: THE ARM COULD LOWER PROGRESSIVELY DUE TO ITS WEIGHT AND ANGULAR POSITION.

THE "ANALOG POSITION SENSOR" LETS YOU ADJUST THE POSITION OF THE ARM WHEN STOPPING TO COMPENSATE FOR THIS PHENOMENON.

The movement created by the gear motor (18) is transmitted to the arm by a crankshaft-connecting rod device (17+ 19).

One or two balancing springs (12) assist the motor during the opening and the closing of the barrier.

The speed of the arm's movement, controlled by the frequency converter (25), is adjustable during opening and at closing. The movements are configured in the factory to offer progressive accelerations and controlled decelerations at the end of the movement.

Safety

The barrier will put itself out of service when its movements are not completed within the assigned time or when it does not manage to close after several attempts.

Presence sensors can optionally be added to open, stop immediately, reopen or close the arm if a user is detected in the vicinity of the equipment.

In the open and closed positions, the alignment of the connecting rod and crankshaft (19 and 17) lock the arm's movement ("mechanical locking").

The barrier is factory-configured to remain locked in the event of power failure, the arm then being raised by means of the lever (27). However, this parameter can be modified so that the arm automatically rises in the event of a power failure. In this case, it will rise to its balanced position with the balancing spring(s). The opening resulting angle will be close to 45°.



You must manually complete the opening of the barrier.

The breakaway device, which comes as standard with toll model and is available as an option for the BL 229 Standard, allows the arm to pivot (the arm comes out of its fastening jaw) when an impact occurs. The breakaway device reduces damage to the barrier and the vehicle hitting it.



Fig. 3 - Breakaway device

3.3. CONTROL BOARD

The control board (24) co-ordinates the activity of the barrier: movement management, options, inputs and outputs, etc. This information can however be repatriated and processed by an external terminal (not supplied by AS). The board records and displays the history of the last operations carried out as well as any possible defects preventing the barrier's movement.



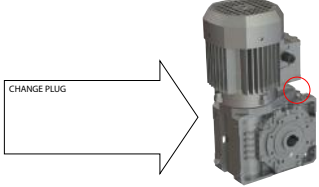
See dedicated handbook.

3.4. LOCATION OF LABELS AND DOCUMENTS



Fig. 4 - Location of identification labels

REP.	REPRESENTATION	DESCRIPTION	LOCATION
1		<p>Plastic pouch, glued, containing the following documents:</p> <ul style="list-style-type: none"> • Technical manual • Electrical diagram • Implementation drawing • Option documents 	Inside of the door.

REP.	REPRESENTATION	DESCRIPTION	LOCATION
2		Label with QR Code giving access to the technical documentation of the product digitally (web).	On the top plate of the housing (inside the gate).
3		Product identification label.	On the top plate of the housing (inside the gate).
4		The gear box vented plug and the label for changing the transport plug of the gear motor.	In a bag attached to the arm fastening clamp.

4. INSTALLATION

On receipt, check the state of the material. Immediately notify your insurance company or your distributor if any damage occurred during transport. If necessary, proceed with the repairs.



ATTENTION! SAFETY INSTRUCTIONS!

1. The installation personnel must follow all local regulations and standards applicable to the gate installation site.
2. When installing the gate, all operations must be done by qualified personnel. All the safety instructions indicated in this section and in Chap. 1, page 3 must be followed.
3. The gate must be installed with permanent wiring as required by local codes.
4. To reduce the risk of injuries, the grounding connection must be done in accordance to the local codes.
5. To reduce the risk of entrapment, the gate must be installed in a location with sufficient clearance between the gate and adjacent structures when opening and closing. (24 inches [0,6m] minimum)
6. Controls intended for user activation must be located at least 79 inches [2 m] away from any moving part of the gate and where the user is prevented from reaching over, under, around, or through the gate to operate the controls. Outdoor or easily accessible controls shall have a security feature (key lock) to prevent unauthorized use.

4.1. PREPARING THE BASE PLATE

The barrier cannot be installed directly on the ground, you can choose between:

- A concrete base plate, by means of the fixing frame provided when requested (detailed procedure hereafter);
- Or on a raised base (provided as an option);

For the positioning of the base plate, please refer to the Installation Drawings (⇒ NAM-BL229-IN-01-EN), which takes precedence over any other information.

Insert the four fixing bolts (27), each provided with a nut (31) and a flat washer (32), in the holes of the fixing frame (33).

The thread must be directed upwards as illustrated. Install a flat washer (34), a lock washer (35) and tighten nut (36) on each thread and by letting the thread exceed the frame (33) by the height defined in the Implementation Drawings. Use adhesive tape to protect the threads from concrete splashes.

Fit the PVC tubes and install the power cable (to the general power board), the command cable (to the access control system) and the detection cable (to the loops and/or possible cells), leaving a tail of approximately 39 inches [1 m].

The cabling must be carried out in accordance with local standards where the installation is located.

Build a concrete base (37) and place the base plate in it. The frame (33) must be flush mounted with the platform and perfectly horizontal.

When the concrete has set, remove the adhesive tape from the threads and remove the nuts (36), the lock washer (35) and the flat washers (34), which will be used for anchoring the barrier.

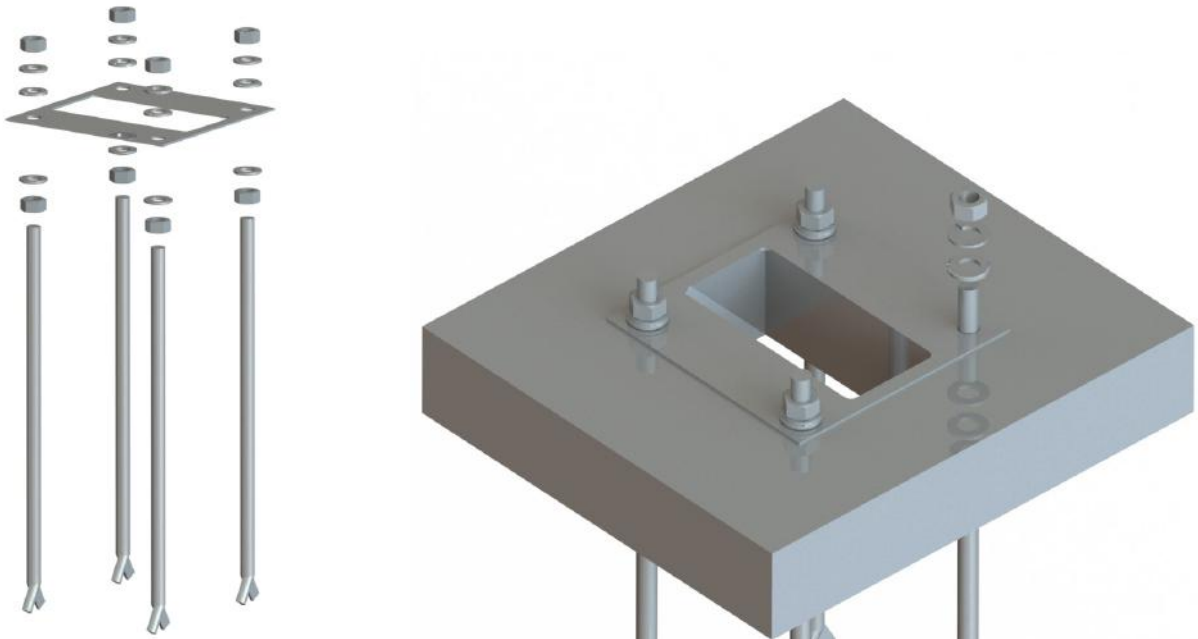


Fig. 5 - Preparing the base plate

4.2. PLACING THE EQUIPMENT

- Bring the equipment on site by means of an appropriated handling device (hand truck or equivalent).
- Remove the cardboard packaging.
- Unlock and remove the side door (5). The keys are attached on the arm's fixing clamp (7).
- Unlock and to remove the cover (2).
- Remove the wooden slats attached to the bottom of the housing.

FASTENING TO CONCRETE BASE	FASTENING TO RAISED BASE (OPTION)
<p>To avoid damaging the fixing bolts, place the barrier carefully on its base according to the chosen command solution (position of the arm in relation to the door and the road: ⇒ page 14).</p>	<p>Drill 4 holes $\varnothing 1/2'' \times 7.5''$ in depth, clean them with air and anchor the raised base to the floor with the expandable screws (40). Tighten to 254lb-in [40 Nm].</p>
<p>Insert the two fixing clamps (23) into the housing onto the fixing bolts (27).</p>	<p>WARNING: the provided expandable screws are intended to be fixed in concrete (class C20/25 to C50/60). Adapt anchors to the type of concrete used on site if needed.</p>
<p>Secure the housing to the base plate by tightening the clamps (23) on the fixing bolts by means of the flat washers (34), lock washer (35) and nuts (36) supplied.</p>	<p>Place the barrier on the raised base and secure it by tightening the clamps (23) on the base (38) using the screws (42), washers (41) and lock washers (43) supplied.</p>
<p>Fig. 6 - Fixing on a concrete base</p>	<p>Fig. 7 - Fixing on a raised base</p>

REP.	DESIGNATION
37	Concrete base
38	Base of the housing
39	Raised base

- If needed, add adjustment shims under the housing to obtain the correct levelling of the barrier.



Only tighten the nuts (36) after the arm (⇒ Chap. 4.4, page 17) and the optional tip support are installed. (⇒ Chap. 4.5, page 21)



ATTENTION! THE FOLLOWING PROCEDURE MUST BE PERFORMED PRIOR TO OPERATING YOUR GATE. FAILURE TO DO SO WILL VOID THE MANUFACTURER'S WARRANTY AND RESULT IN PERMANENT DAMAGE TO YOUR EQUIPMENT.

- This equipment's gearbox has been sealed with a plug for transportation purposes. The plug must be replaced with the vented plug located in the plastic bag fixed on the arm fastening clamp (Ref. 7, Fig. 2, page 6).

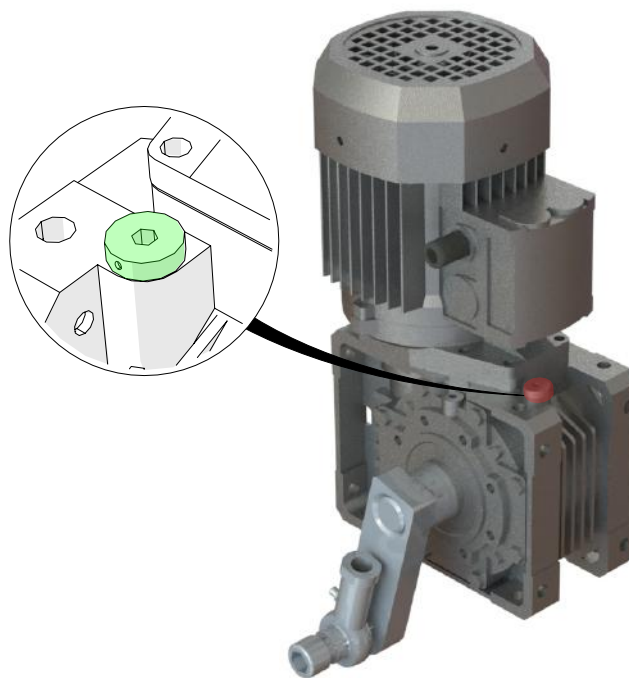


Fig. 8 - Plug to change on the gearbox



ONCE THE VENTED PLUG HAS BEEN INSTALLED, THE BARRIER MUST REMAIN IN AN UPRIGHT POSITION FOR TRANSPORT OR HANDLING PURPOSES. FAILURE TO DO SO WILL CAUSE OIL IN THE GEARBOX TO LEAK WHICH MAY CAUSE PREMATURE WEAR OF THE GEARBOX.

4.3. CONVERSION FROM ONE SOLUTION TO ANOTHER

The barrier can be configured in 4 different ways, according to the position of the arm with regard to the door and the road.

To change from one configuration (solution) to another, the mechanism must be adapted: the arm is either on the door side (solution 2+3) or opposite to the door side (solution 1+4), and the motor turns in one direction (solution 1+2) or the other one (solution 3+4).

The gear motor, the crankshaft and the connecting rod (18, 17 and 19) (shaded here below) remain fixed. On the other hand, the end stop unit (16) used for solutions 1 and 2 is different from that of solutions 3 and 4. Similarly, the front panel (4), will have to be replaced by a new one in most of cases.

All the other parts are interchangeable from one solution to another.

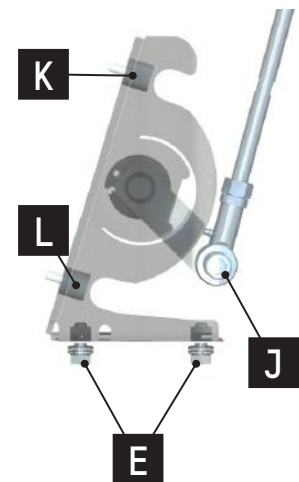
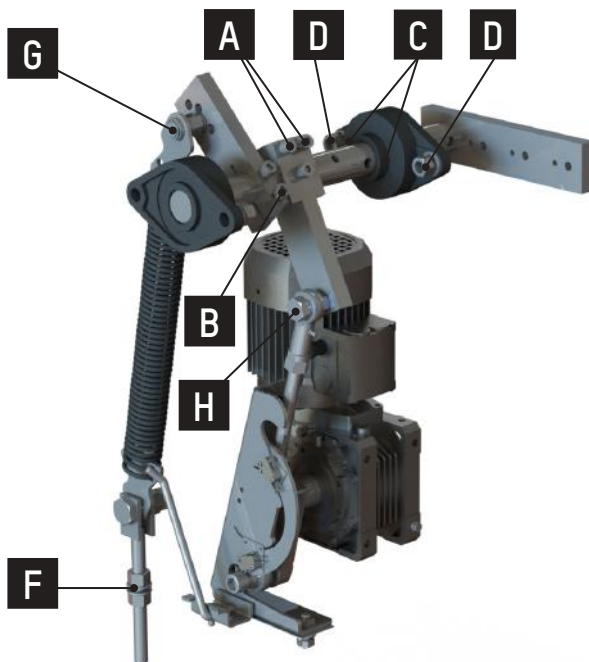
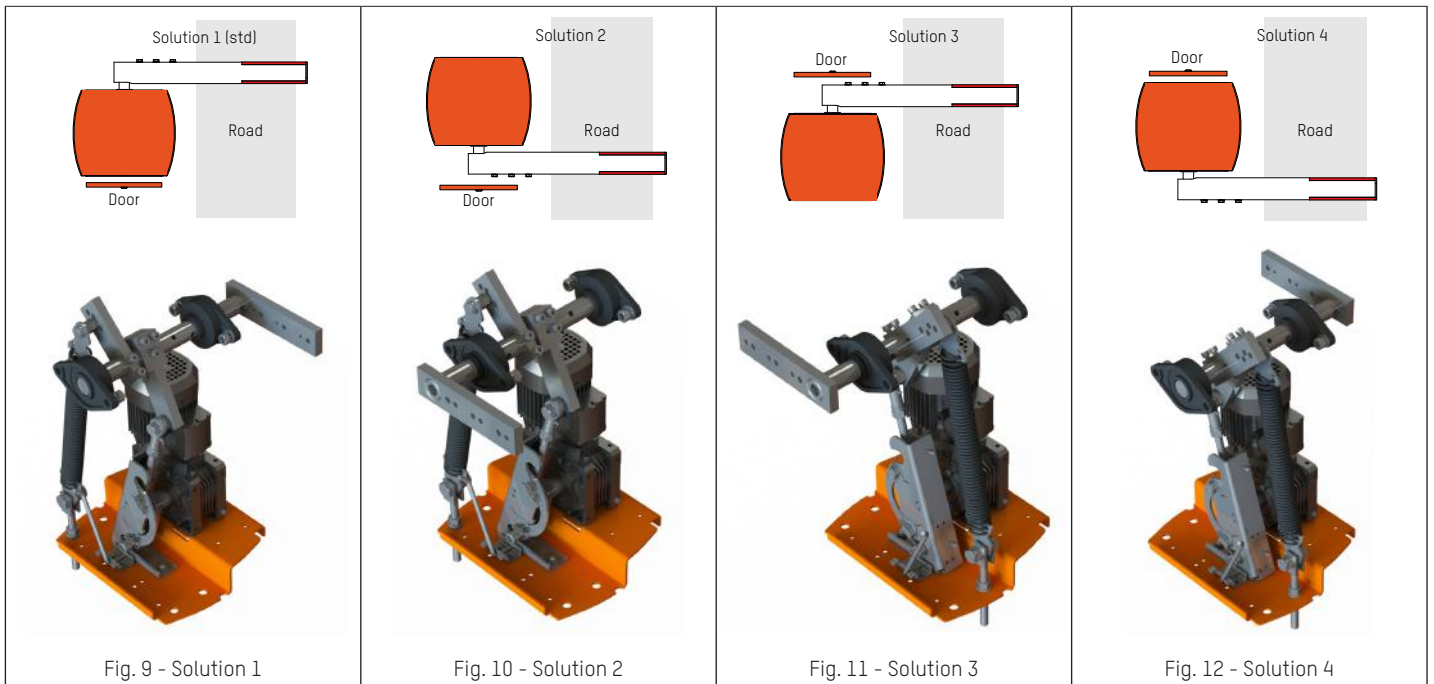


Table of operations to be carried out, marked ●, to move from one solution to another:


1 ↔ 2	1 ↔ 3	1 ↔ 4	2 ↔ 3	2 ↔ 4	3 ↔ 4	
●	●	●	●	●	●	Turn (OFF) the power supply using the main circuit breaker (23).
●	●	●	●	●	●	Set the arm upright and remove it by unscrewing the three screws and flat washers. (In reverse order of Chap. 4.4, page 17)
●	●	●	●	●	●	 TAKE NOTE OF THE POSITION OF THE SPRING (G) ON THE SPRING LEVER (11) AS WELL AS DIMENSION OF X (⇒ FIG. 26, PAGE 26) BEFORE PROCEEDING TO THE NEXT STEP.
●	●	●	●	●	●	Unscrew the connecting rod lever (screws A) and the spring lever (screws B).
●	●	●	●	●	●	Unscrew the compression screws (C) from the bearings on the arm shaft.
●	●	●	●	●	●	Withdraw the arm shaft (9).
●	●			●	●	Remove the panel (4) of the arm side (pierced) and apply a new one (full).
	●	●	●	●		Remove the stop assembly (screws E).
	●	●	●	●		Reverse the position of the circuit breaker assembly (23).



Fig. 15 - Assembly solution 1/2



Fig. 16 - Assembly solution 3/4

	●	●	●	●		Reverse the position of the unlocking lever (27).
						<u>Assembly the new stop:</u> Unscrew the 2 bumpers (K and L) to attach them on the new end stop unit. If the limit switches are installed, follow the steps in (⇒ Chap. 5.6, page 29). If the analog sensor is installed, follow the steps in (⇒ Chap. 5.7, page 30). Fix the new ends stop unit with the screws (E). Add shims (provided) if necessary, so that the cam (J) is correctly positioned in the notches of the end stop unit.
	●	●	●	●		Take care to loosen the spring to the maximum and to unscrew it from its support (Nuts F) and from its lever (pivot G).
	●	●	●	●		Unscrew the connecting rod from its lever (Screws H).

1 ↔ 2	1 ↔ 3	1 ↔ 4	2 ↔ 3	2 ↔ 4	3 ↔ 4	
●	●	●	●	●	●	<p>Insert the shaft into the bearings by passing it through the two correctly positioned levers: they must be directed respectively towards the connecting rod and the spring, the holes on the arm shaft must be located on the top (see illustrations of the various solutions on previous page).</p> <p>Check the alignment of the arm shaft in relation to the bearings (⇒ Chap. 5.1, page 23).</p>
	●	●	●	●		Attach the connecting rod to its lever (Screws H).
	●	●	●	●		<p>Attach the spring to the support (Nuts F), on the closed side of the end stop unit.</p> <p>Attach the spring to its lever (Pivot G).</p>
●	●	●	●	●	●	Tighten the shaft in the bearings by means of the compression screws.
●	●	●	●	●	●	Tighten the two levers after having checked their alignment on the shaft (⇒ Chap. 5.1, page 23).
●	●	●	●	●	●	Remount the arm (⇒ Chap. 4.4, page 17)
●	●	●	●	●	●	Adjust the tension of the spring (⇒ Chap. 5.2, page 24)
	●	●	●	●		Invert 2 of the 3 phases of the motor (U, V, W, ⇒ electrical drawings).
●	●	●	●	●	●	Turn ON the power supply using the main circuit breaker (Rep. 23 , Fig. 1, page 6).

4.4. INSTALLATION OF THE ARM

4.4.1. INSTALLATION OF A ROUND ARM



BL 229: standard equipment.

BL 229 Toll: unavailable.

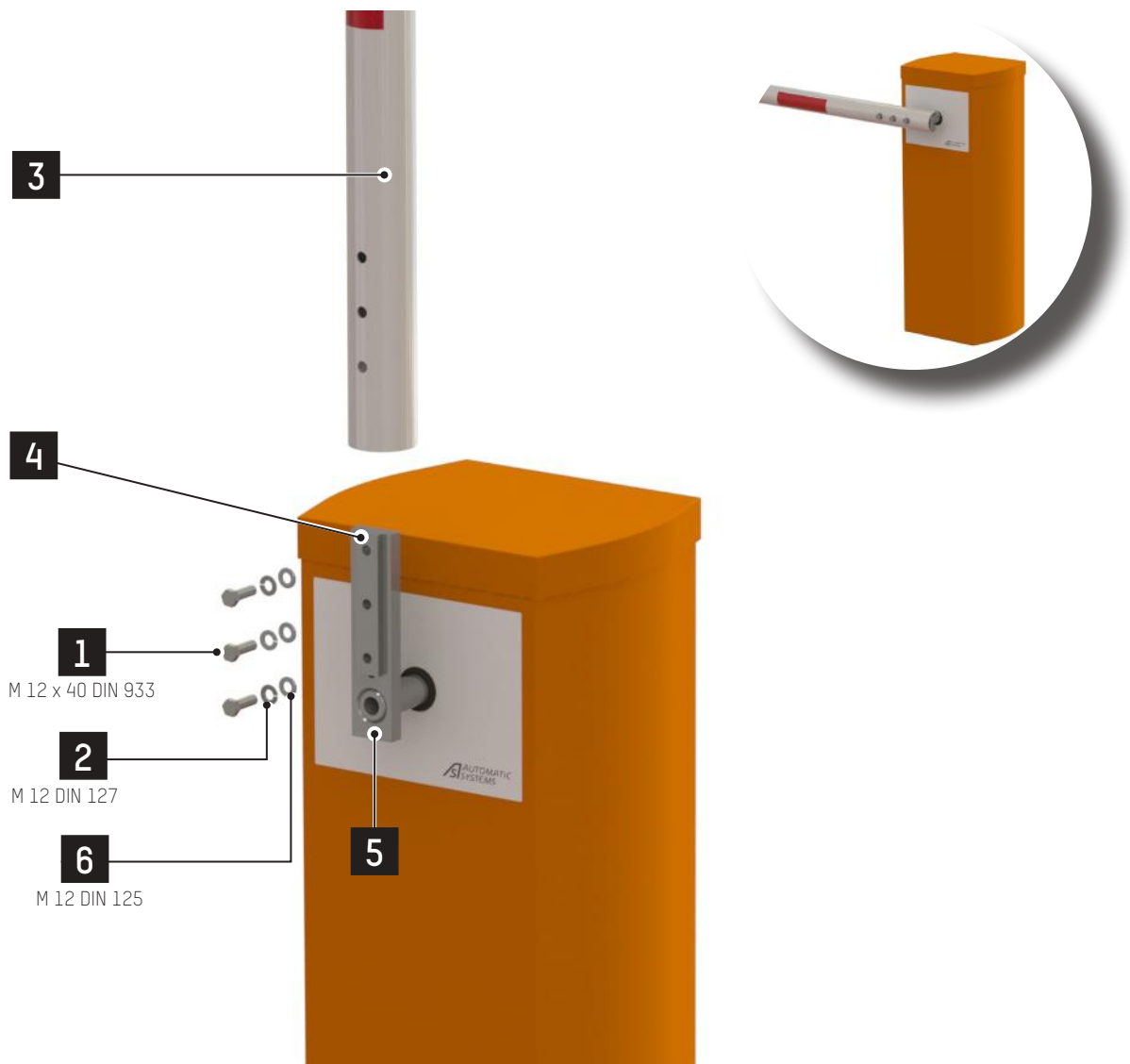


Fig. 17 - Installation of a round arm

- Remove the three screws (1), the lock washer (2) and the flat washers (6) of the clamp (5).
- Position the arm (3) on the clamp, taking care that the spacer (4) is in place, and put back the flat washers (6), the lock washer (2) and the screws (1) as illustrated above.
- Check the proper alignment of the arm in relation to the clamp and tighten the screws (1) firmly.
- Bring the arm to its horizontal position and check its alignment so it is horizontal in relation to the roadway.
- If necessary, correct the position of the mechanism and definitively tighten the nuts (Rep. 36, Fig. 6, page 12) of the fixing clamps.

4.4.2. INSTALLATION OF A ROUND ARM WITH BREAKAWAY DEVICE


BL 229: available in option.

BL 229 Toll: unavailable.

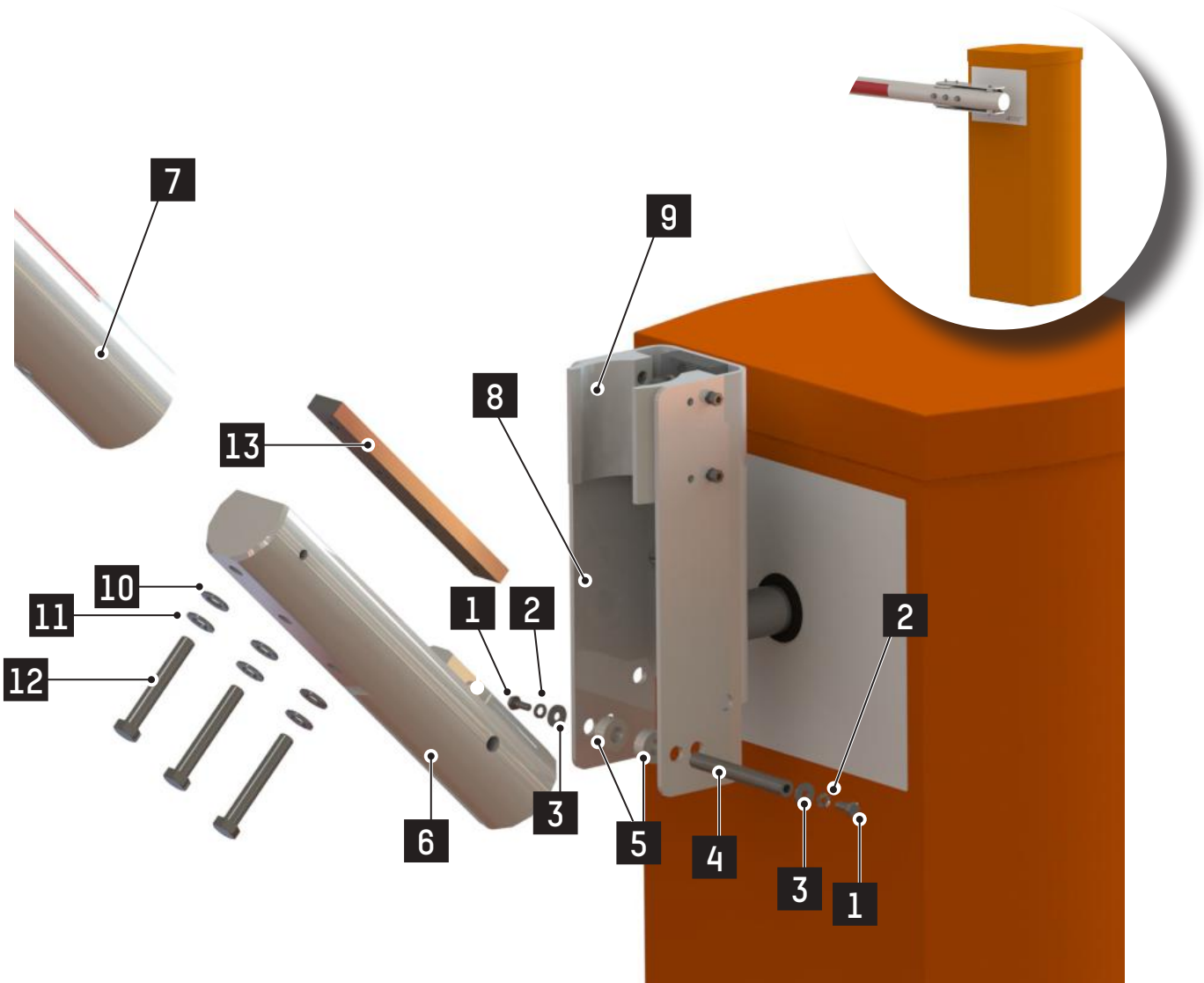


Fig. 18 - Installation of a round arm with breakaway device

- Jaw (8) in vertical position, remove screws (1) and the lock washers (2), the flat washers (3) the rod threaded at its ends (4) and the spacers (5) of the jaw.
- Insert the internal reinforcement (6) inside the jaw (8), aligning the through holes. Then, place the two spacers (5) at both ends of the through hole and insert the threaded rod at its ends (4);
- Replace the previously removed flat washer, lock washer and screws on the threaded rod at its ends and tighten firmly.
- Position the threaded plate (13) on the internal reinforcement (6) taking care of aligning the 3 holes.
- Position the internal reinforcement in an angled position to insert the arm (7) on it.
- Align the 3 holes of the arm (7) with the 3 holes of the internal reinforcement (6) and the threaded plate (13). Install the flat washer (10), the lock washer (11), the screws (12) and tighten firmly
- Bring the arm in the jaw to a vertical position. Press the arm strongly so that it clips correctly between the synthetic blocks (9).
- Bring the arm to its horizontal position and check its alignment so it is horizontal in relation to the roadway.
- If necessary, correct the position of the mechanism and definitively tighten the nuts (Rep. 36, Fig. 6, page 12) of the fixing clamps.

4.4.3. INSTALLATION OF AN OVAL ARM WITH BREAKAWAY DEVICE



BL 229 Toll: standard equipment.

BL 229: available in option.

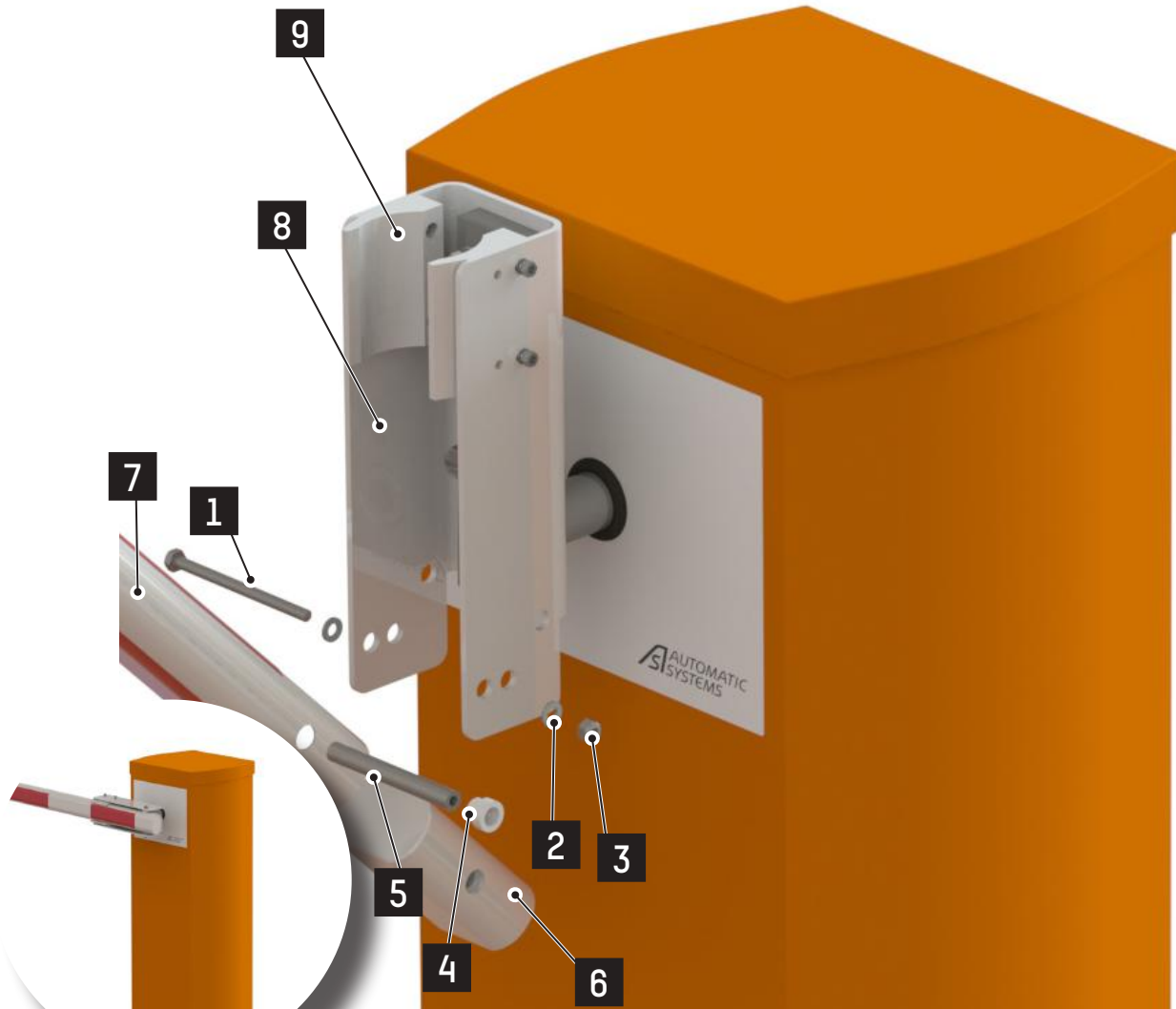


Fig. 19 - Installation of an oval arm with breakaway device

- Jaw (8) in vertical position, remove the screw (1), the washer (2), the nut (3), the spacers (4) and the sleeve (5) of the jaw.
- Insert the internal reinforcement (6) inside the aluminium arm (7), aligning the through hole. Then place the sleeve (5), the two spacers (4) at both ends of the through hole.
- Position the arm in an angled position to insert the screw (1) through the jaw (8) and the arm (7).
- Replace the previously removed flat washer (2) and nut (3) on the screw (1) and tighten firmly.
- Bring the arm in the jaw to a vertical position. Press the arm strongly so that it clips correctly between the synthetic blocks (9).
- Bring the arm to its horizontal position and check its alignment so it is horizontal in relation to the roadway.
- If necessary, correct the position of the mechanism and definitively tighten the nuts (Rep. 36, Fig. 6, page 12) of the fixing clamps.

4.4.4. INSTALLATION OF A PROTECTA® ARM WITH BREAKAWAY DEVICE



BL 229: available in option.

BL 229 Toll: available in option.

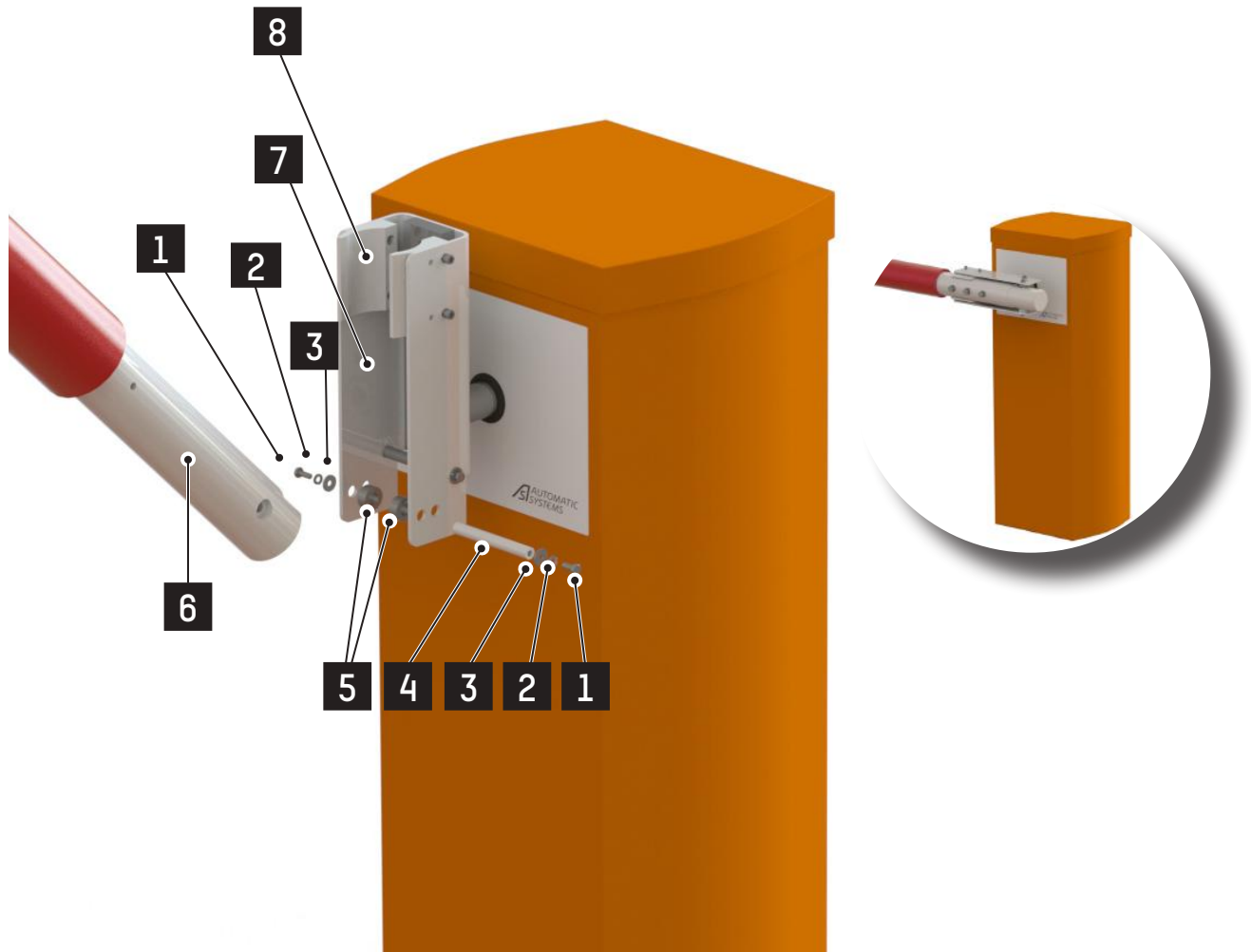


Fig. 20 - Installation of a Protecta® arm with breakaway device

- Jaw (7) in vertical position, remove screw (1), lock washer (2), flat washer (3), the rod threaded at its ends (4) and the spacers (5) of the jaw.
- Place the two spacers (5) at both ends of the through hole.
- Position the arm in an angled position to insert the threaded rod at its ends (4) through the jaw (7) and the arm (6).
- Replace the previously removed flat washers, lock washers and screws on the rod threaded at its ends and tighten firmly.
- Bring the arm in the jaw to a vertical position. Press the arm strongly so that it clips correctly between the synthetic blocks (8).
- Bring the arm to its horizontal position and check its alignment so it is horizontal in relation to the roadway.
- If necessary, correct the position of the mechanism and definitively tighten the nuts (Rep. 36, Fig. 6, page 12) of the fixing clamps.

4.5. INSTALLATION OF THE TIP SUPPORT



BL 229: available in option.

BL 229 Toll: unavailable.

The tip support is automatically provided with any barrier that is longer than 16'5" [5m] and is optionally available for shorter arms.

The tip support's role is to maintain the end of the arm in its horizontal position and to ensure its rigidity.

The tip support must be anchored to a concrete base, according to the instructions of drawing NAM-BL229-IN-04-BI.

The height of the tip support will need to be adjusted once the arm has been levelled (⇒ Chap. 5.5, page 27):

- Install and tighten screws (1) and their associated washers and nuts.
- Move the upper tip support post (2) in the necessary direction so that the end of the arm comes to rest when in the closed position $\pm 1-3/16"$ [3 cm] above the tip support. Mark the 4 holes position indicated by the 4 arrows shown below of the upper tip support post (2) on the lower tip support post (3). Remove the upper tip support post (2). Drill and tap the lower tip support post (3) for M6 screws.
- Insert the upper tip support post (2) back in the lower tip support post (3) taking care to align the holes of item (2) with the drilled and tapped holes on item (3) made during the previous step. Install and tighten screws (4) to set the tip support to the desired height.
- Align the arm in the tip support by making, if necessary, the barrier swivel on its base.
- Tighten the nuts (Rep. 36, Chap. 4.2, page 12) to ensure the final fastening of the barrier.

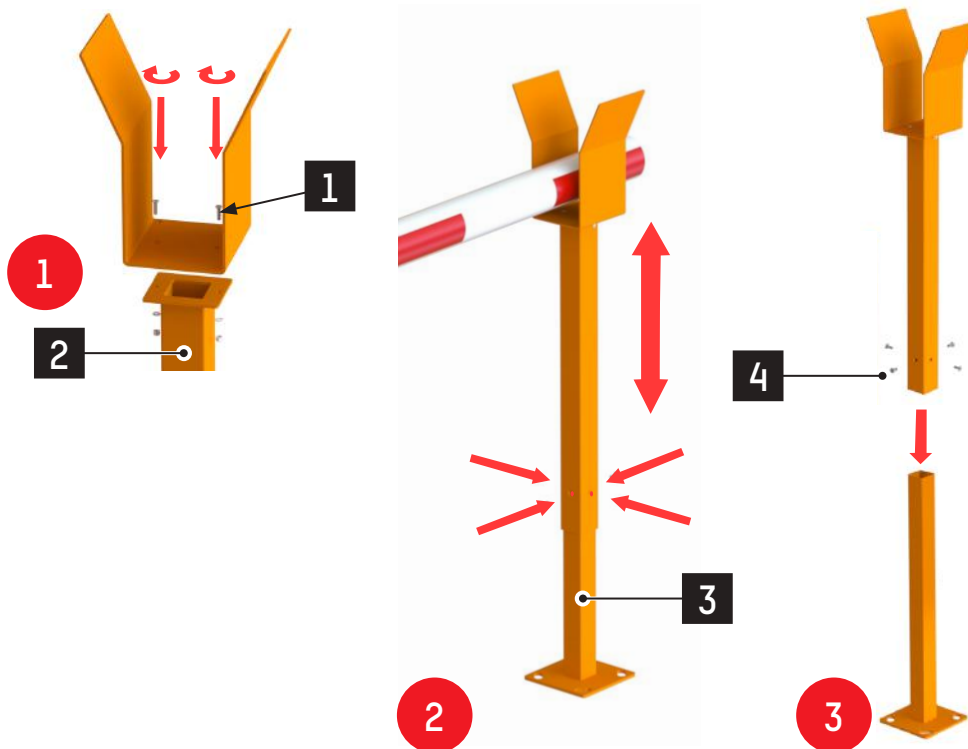


Fig. 21 - Installation of the adjustable tip support

4.6. ELECTRICAL CONNECTIONS



DO NOT CONNECT TO A FLOATING NETWORK OR TO HIGH IMPEDANCE EARTHED INDUSTRIAL DISTRIBUTION NETWORK.



HIGH LEAKAGE CURRENT.

**IMPERATIVELY CONNECT TO THE GROUND WITH A 14 AWG CABLE MINIMUM BEFORE CONNECTING THE MAINS.
DO NOT CONNECT MORE THAN 1 GATE TO THE SAME DIFFERENTIAL BREAKER.**

Please refer to the electrical diagram inside the barrier, which takes precedence over any other information.

Connect any options as indicated on the electrical diagram.

Connect the power supply to the circuit breaker (⇒ Rep.23, Chap. 3.1, page 6).



**THE MAIN CABLE CANNOT BE ATTACHED TO OTHER CABLES COMING OUT OF THE HOUSING!
INSTEAD, IT MUST BE KEPT AS FAR AWAY FROM THEM AS POSSIBLE.**

Connect the ground wires to their terminals:

- Cable (1) between the housing and the cover
(Check this connection each time before you close the cover);
- Cable (2) between the housing and the door
(Check this connection each time before you close the cover);

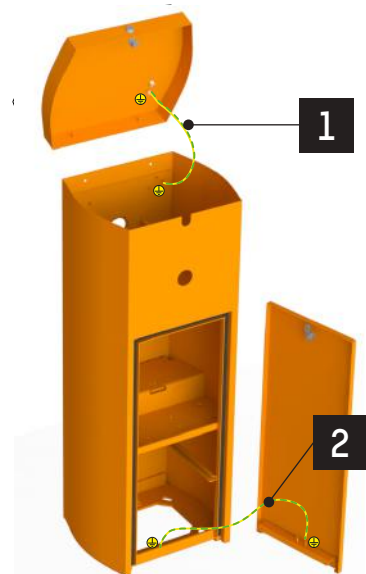


Fig. 22 - Ground connections

5. ADJUSTMENTS

5.1. POSITIONING THE LEVERS ON THE ARM SHAFT

The connecting rod and spring levers (⇒ Rep.10 and 11, Chap. 3.1, page 6) must be positioned on the arm shaft (⇒ Rep.9, Chap. 3.1, page 6) according to the chosen solution.

1. Screw the rod lever onto the shaft, by passing the screws through the holes in the rod and shaft corresponding to the considered solution (⇒ Fig. 23 and Fig. 24).
2. Align the spring lever hole with the hole on the shaft corresponding to the considered solution (⇒ Fig. 24): figures indicated on the illustration (1 to 4) indicate which reference hole to use according to the considered solution (1 to 4). With correct positioning, the rod lever and spring lever make a 20 degree angle as shown (⇒ Fig. 23).



The screws of the rod lever must be tightened with a torque of 531 lb-in [60 Nm], the one of the spring lever with a torque of 708 lb-in [80 Nm].

Similarly, the arm shaft must be positioned in relation to the bearings so that the circular reference mark on the arm shaft (D) is level with the side of the bearing (⇒ Fig. 23).

The bearing's compression screws (C, ⇒ Fig. 13, page 14) are then positioned in front of the groove marked in the arm shaft for this purpose

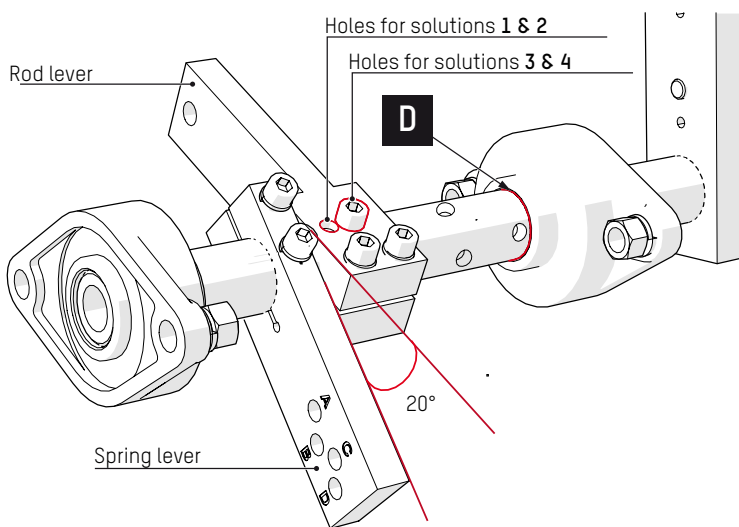


Fig. 23 - Arm shaft (Solution 4)

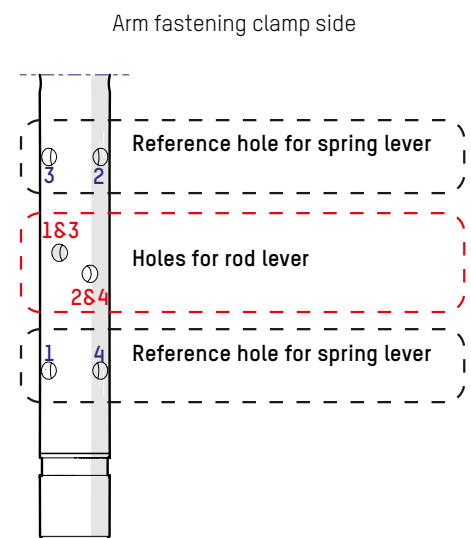


Fig. 24 - Rod and spring levers marks on the shaft, according to the considered solution

5.2. BALANCING OF THE ARM BY MEANS OF THE SPRING

The tension of the spring must be adjusted in such a way as to ensure minimal effort for the motor both at the opening and the closing of the barrier:

1. Withdraw screw (1) and disconnect the connecting rod from its lever.
2. Raise the arm slightly and release it: it must remain balanced.
Repeat the operation at various different angles.
3. If the arm drops, the tension of the spring must be increased:
 - Loosen locknut (2).
 - Tighten nut (4) slightly against support (3) to increase the spring's tension.
Repeat until stage 2 is correct.
 - Tighten nut (2) to lock nut (4).
 - If it is insufficient, position the spring on the next mark (5) further from the arm shaft (e.g. B ⇒ C).
 - If that is still insufficient, use two springs and repeat the above adjustments.
4. If the arm goes up, the tension of the spring must be decreased:
 - Loosen locknut (2).
 - Loosen nut (4) slightly to slacken the spring.
Repeat until stage 2 is correct.
 - Tighten nut (2) to block nut (4).
 - If it is not sufficient, position the spring on the previous reference mark (5) closer from the arm shaft (e.g. B ⇒ A).
 - If that is still insufficient, remove one spring (if there were two of them) and repeat the above adjustments.

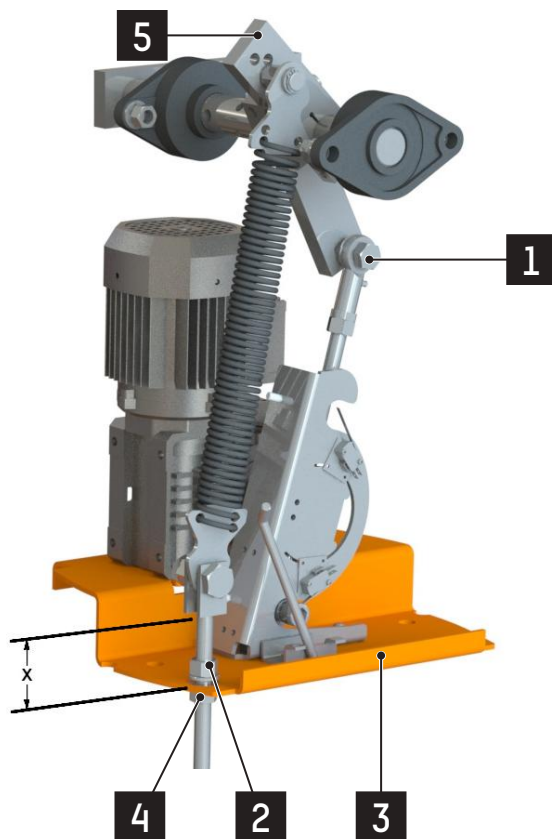


Fig. 26 - Balancing spring(s) settings

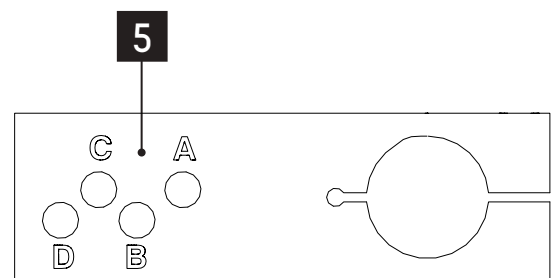


Fig. 25 - Detail of fixing points on the spring jaw

The following table shows the spring adjustments for the various arm lengths.

5.3. BALANCING TABLE FOR BL 229 (FOR INFORMATION ONLY)

ARM LENGTH (M)	ARM TYPE	OPTION	Ø OF SPRING WIRE	NB OF SPRINGS	POSITION OF SPRINGS ON LEVER (1)	X (2)	
3,0			5,5	1	C	50	
3,5			7	1	A	60	
4,0			7	1	B	38	
4,5			Round Ø 81	7	1	C	40
5,0			7	2	A/A	60	
5,5			7	2	A/A	35	
6,0			7	2	B/B	34	
3,0	Round Ø 81	1 arm light kit	5,5	1	C	42	
3,5			7	1	A	47	
4,0			7	1	B	38	
4,5			7	1	D	28	
5,0			7	2	A/A	57	
5,5			7	2	B/B	44	
6,0			7	2	B/B	30	
3,0	Round Ø 81	2 arm light kits	5,5	1	C	40	
3,5			7	1	A	47	
4,0			7	1	C	50	
4,5			7	1	D	28	
5,0			7	2	A/A	55	
5,5			7	2	B/B	42	
6,0			7	2	B/B	28	
3,0	Round Ø 81	Safety edge	7	1	A	63	
3,5			7	1	B	40	
4,0			7	1	C	44	
4,5			7	2	A/A	57	
5,0			7	2	B/B	47	
5,5			7	2	C/C	50	
6,0			7	2	C/C	35	
3,0	Round Ø 81	Safety edge + 1 arm light kit	7	1	A	54	
3,5			7	1	B	48	
4,0			7	1	C	48	
4,5			7	2	A/A	55	
5,0			7	2	B/B	35	
3,0	Round Ø 81	Safety edge + 2 arm light kits	7	1	A	54	
3,5			7	1	B	40	
4,0			7	1	C	35	
4,5			7	2	A/A	55	
5,0			7	2	B/B	45	

5.4. BALANCING TABLE FOR BL 229 TOLL (FOR INFORMATION ONLY)

ARM LENGTH (M)	ARM TYPE	OPTION	Ø OF SPRING WIRE	NB OF SPRINGS	POSITION OF SPRINGS ON LEVER (1)	X (2)
3,0	Oval arm		5,5	1	B	45
3,0	Protecta® arm		5,5	1	B	43

(1) Spring position on lever: mark: **(5)** ⇒ Fig. 25, page 24.

(2) **X** = Distance of fixing plate / support (mm): ⇒ Fig. 26, page 24



For arms longer than 13' [4 m] or for configurations with options, it can be useful to increase the torque on the frequency converter (refer to the handbook of the AS1620 control unit).

5.5. LEVELLING OF THE ARM

1. First check the position of the levers on the arm shaft (⇒ Fig. 23, page 23).
2. Close the barrier so the arm is in its horizontal position.
3. On the connecting rod (⇒ Rep. **19**, Chap. 3.1, page 6), loosen nuts (**1**) and (**2**).



One nut has a left-hand thread and the other one a right-hand thread.

4. Turn the connecting rod (**20**) in the clockwise direction to make the arm rise and anti-clockwise to lower it. Check to ensure the arm is perfectly horizontal by means of a spirit level.
5. Tighten the nuts (**1**) and (**2**).

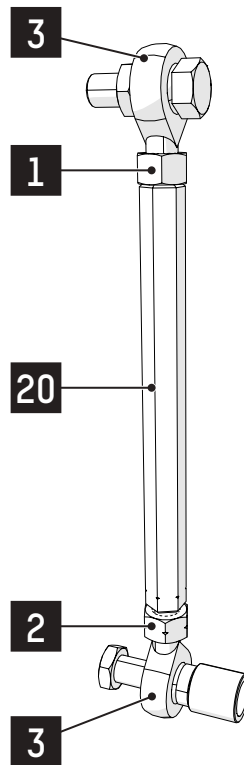


Fig. 27 - Connecting rod assembly

5.6. LIMIT SWITCH SETTINGS

The limit switches are usually installed in the factory according to the customer requested solution and will not require any adjustment. The limit switch comes standard with the standard BL229 with arm length between 10' [3.05 m] and 16'5" [5 m]. Standard BL229 with longer than 16'5" [5 m] arms and BL229 Toll model come with the analog sensor by default (⇒Chap. 5.7, page 30).

However, if the solution is changed in the field, make sure your limit switches are mounted appropriately for the new solution.

The illustrations below show the correct limit switch position according to the end of the stopper.

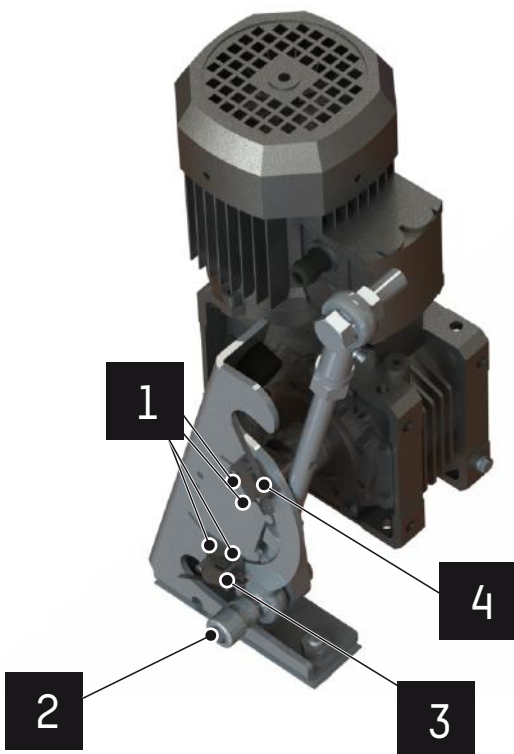


Fig. 28 - Limit switch assembly

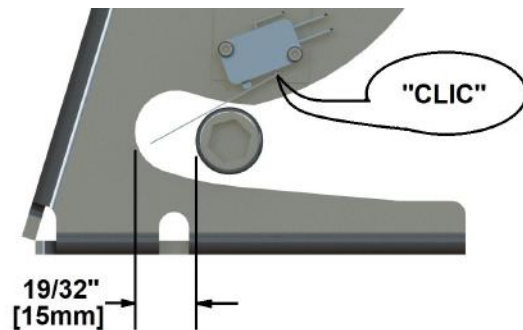


Fig. 29 - Limit switch positioning detail.

Should you need to replace the limit switch in the field proceed as described below.

Please, refer to the illustrations above.

1. Open the door and turn **OFF** the main breaker;
2. Loosen the 4 mounting screws (1) of the limit switch (3) and (4).
3. Install limit switch on the new ends stop unit (if the new solution configuration needs an ends stop unit model replacement) taking care to secured them in a way that the limit switch is engaged when the cam (2) is located at 19/32" [15 mm] from the ends of the ends stop unit (⇒ Fig. 29, page 29).

5.7. ANALOG SENSOR SETTINGS

The analog sensor and cam are usually installed in the factory according to the customer requested solution and will not require any adjustment. The analog sensor comes standard with the BL229 Toll and with standard BL229 with arm of 18' [5.5m] or longer.

However, if the solution is changed in the field, make sure your cam is mounted appropriately for the new solution.

The illustration below shows the front view of the motor when the access panel is open. It shows the correct cam position according to the possible solutions (⇒ Ch. 4.3, page 14)

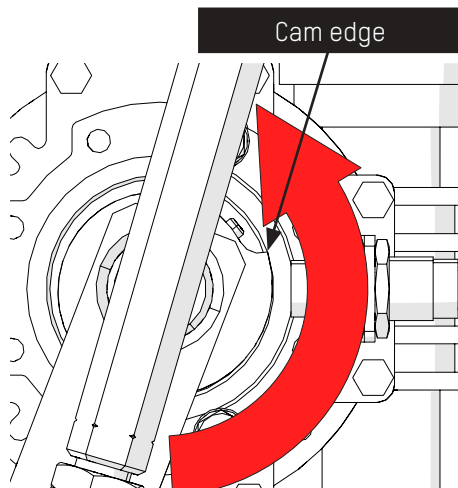


Fig. 30 - Analog sensor - Solution 1 & 2

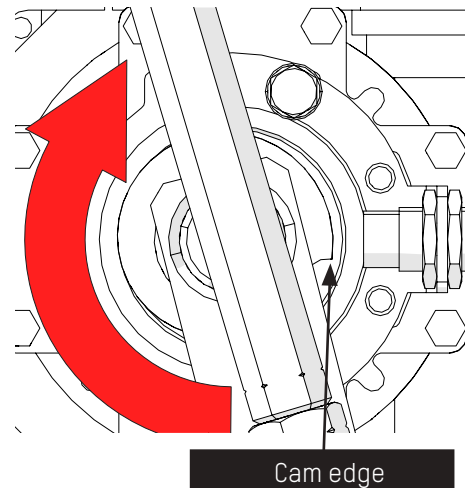


Fig. 31 - Analog sensor - Solution 3 & 4

Should you need to change the analog sensor and cam position in the field proceed as described below.

Please, refer to the illustrations above and on the next page.

1. Open the door and turn **OFF** the main breaker;
2. Unlock the mechanism with the release lever and place the gate arm in open position (⇒ Fig. 32, page 30);
3. Loosen the two mounting screws of the spiral cam (⇒ Fig. 33, page 30);
4. Flip the spiral cam and replace it correctly (the cam edge must be close to the analog sensor when the arm is in closed position) onto the gear shaft, tighten the two mounting screws;
5. Proceed with the analog sensor calibration procedure (⇒ Ch. 5.8, page 31).



Fig. 32 - Gate mechanism in open position

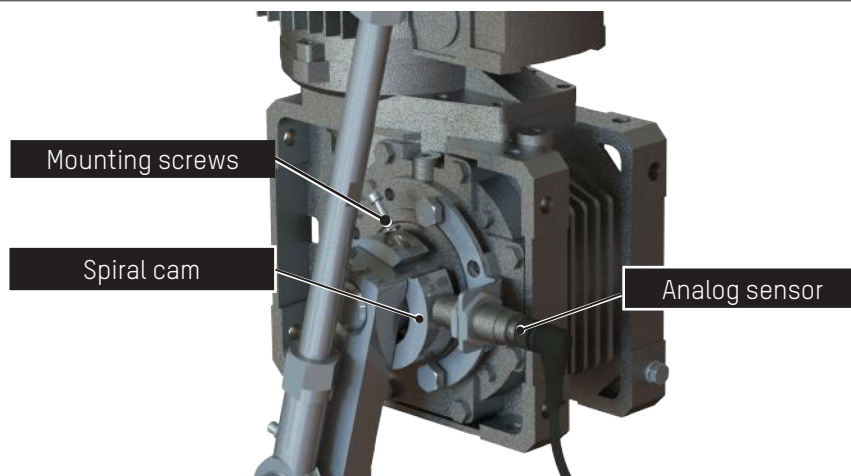


Fig. 33 - Detail of mounting screws fixing the spiral cam

5.8. CALIBRATION OF THE ANALOG SENSOR



THE GATE WILL NOW MOVE TO DETERMINE THE UP AND DOWN POSITION!

1. Place the gate arm in the closed position;
2. Disconnect the RJ45 connector of the frequency converter to prevent gate arm from moving.
3. Adjust the analog sensor, it is located at 1/8" [3 mm] from the cam (or until the value shows 2000 (± 100) on the web interface when the barrier is connected with the Ethernet port or mini USB port).
4. Plug the RJ45 connector of the frequency driver back into the control logic.
5. Perform the analog sensor calibration procedure described below using the maintenance interface or using the integrated HMI interface.



For more information on the following steps, please refer to the technical manual of the AS1620 control logic.

5.8.1. USING THE MAINTENANCE INTERFACE

- a. Go to the page **Individual Tests** and select the menu **Calibration**.
 - b. Perform the **End stop position** test.
 - c. The interface will confirm the success of the calibration if the gate arm is in the open position once the test is completed.
- If calibration fails, return to step 3. The analog sensor is not correctly positioned.

5.8.2. USING THE INTEGRATED HMI INTERFACE

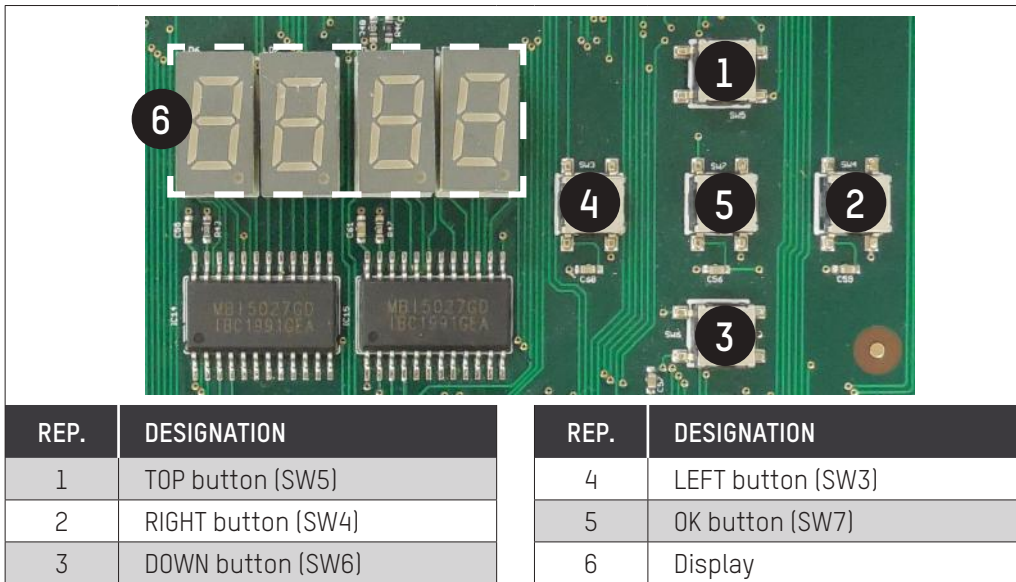


Fig. 34 - Integrated Human-Machine Interface

Proceed to the calibration of the analog sensor:

- a. Press and hold the 'OK' (5) button for 2 seconds ⇒ **SET**
- b. Press the up ▲ (1) and down ▼ (3) buttons until to find the menu: **INSE**
- c. Press the up ▲ (1) and down ▼ (3) buttons until to find the menu: **POS**
- d. Press the right button ► (2) to display **POS** and again the right button ► two (2) seconds to display **YES**
- e. Press and hold the right button ► for three (3) seconds to start the calibration.
- f. Check the test result on the display.
- g. Press and hold the 'OK' (5) button for 2 seconds to leave the mode or wait 1 minute.

If calibration fails, return to step 3. The analog sensor is not correctly positioned.

5.9. CONFIGURING THE FREQUENCY CONVERTER

The factory settings allow the frequency drive and gear motor to be protected against all malfunctions. These values should therefore not be changed under any circumstances.



ANY CHANGES TO THESE PARAMETERS WITHOUT HAVING THE EXPRESS PERMISSION OF AUTOMATIC SYSTEMS WILL VOID THE PRODUCT WARRANTY

The frequency converter is a **Schneider Altivar ATV12** connected in Modbus.

Configuration is performed via Modbus. The only parameters to be entered manually are the Modbus address (add = 1) and the baud rate (tbr = 38400), which can be accessed via the configuration menu:

```

COnF  ⇒  Frl    ⇒  Mdb
COnF  ⇒  FULL  ⇒  CON      ⇒  Add = 1
                               ⇒  tbr = 38400
    
```

Turn the power OFF then ON to activate the modifications.

5.9.1. MAIN ERROR MESSAGES

In case of failure, the frequency converter can indicate the origin of the fault via codes.

The most common are described below.



AFTER A POWER FAILURE, THE CODE DISAPPEARS AND IS NO LONGER READABLE ONCE THE GATE HAS RESTARTED. THEREFORE, IT IS IMPERATIVE TO NOTE THESE ADDRESSES BEFORE RESETTING THE BARRIER!

CODE	DESCRIPTION
OHF	Overheating of the frequency converter.
OLF	Overloading of the gear motor.
ObF	Excessive braking.
SLF1	Modbus communication fail: check that the cable connecting the control logic and the frequency driver is connected properly.
OPF1	Loss one phase at the frequency converter output.

6. USE

6.1. COMMISSIONING

Before commissioning, review the procedures described in chapters 4. Installation, 5. Adjustments, 6. Use and 6.3. Maintenance.



The following list can be used as a checklist for commissioning the barrier.

- Anchor the gate to the base in accordance with the recommendations of the (⇒ Ch. 4. Installation, page 10).
- Attach the arm (⇒ Ch. 4.4. Installation of the arm, page 17).
- Check the proper positioning of the arm in its open position (vertical) and closed position (horizontal). Refer to the corresponding adjustment if necessary (⇒ Ch. 5.5. Levelling of the arm, page 27).
- Adjust the balance of the arm (⇒ Ch. 5.2. Balancing of the arm by means of the spring, page 24).
- Connect the inputs and outputs on the control logic.
- Connect the power cables on the terminal blocks.
- Power up the unit, by means of the main switch (Rep. **23**, page 6), and wait for the control logic to complete its initialisation (about 5 seconds).
- The integrated HMI displays the message **boot**.
- After a few seconds, the message **run** appears and the equipment is ready to use.



Refer to the control unit handbook for the meaning of the various messages displayed on the HMI.

- Proceed to the calibration (only if there is an analog) (⇒ Ch. 5.8. Calibration of the analog sensor, page 31).



THE GATE WILL NOW MOVE TO DETERMINE THE UP AND DOWN POSITION!

- Check the correct configuration of the gate. If needed, adjust the parameters via the maintenance interface.
- Check the proper working of options and safety measures.
- Carry out some electrical opening and closing tests by using the integrated HMI (▲:open command, ▼:down command) or by means of the command mode that is at your disposal (push-button box, transmitter/receiver, etc.)

6.2. MANUAL OPENING IN THE EVENT OF POWER FAILURE

6.2.1. PROCEDURE FOR SOLUTION 1 OR 2

The BL229 barriers are available in 4 solutions depending on the position of the arm and the door in relation to the road (⇒ Chap. 4.3, page 14).

This procedure describes the steps for manual opening in solution 1 or 2:

- Using the key provided, open the access door.
- Switch off the power at the main circuit breaker. Depending on the options selected, the mechanism may unlock itself, in which case the arm will make a partial or total opening movement.
- If this is not the case in the installed barrier version, a release lever is provided to allow manual opening.

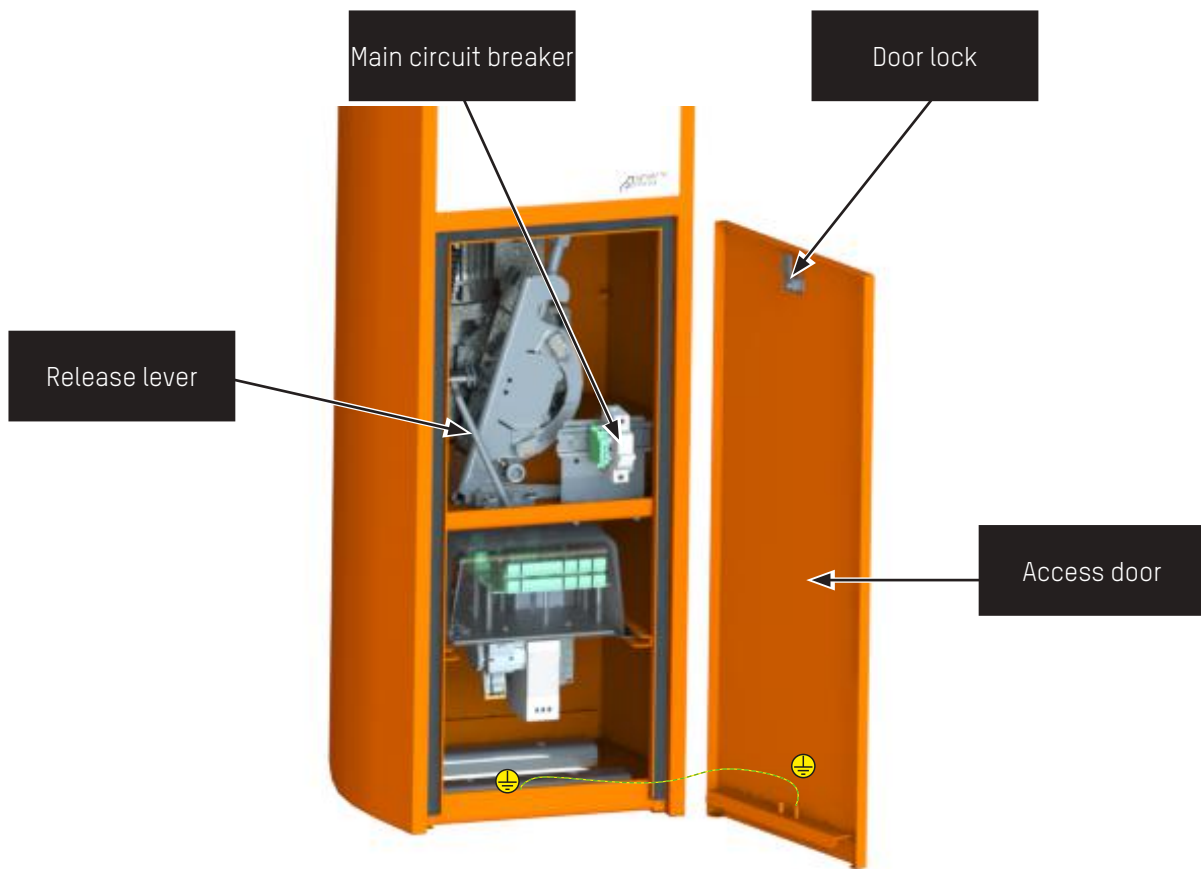


Fig. 35 - Attaching the ground cable

- Rotate the lever clockwise with your left hand (a few degrees are sufficient to leave the alignment position of the crank system).
- The balancing spring then acts on the main axis of the arm, triggering an opening movement. If necessary, use your right hand to assist the movement and bring the arm upright.
- Re-engage the circuit breaker to allow the barrier to restart automatically after the 120 Vac power supply is restored.
- Lock the access door.

6.2.2. PROCEDURE FOR A SOLUTION 3 OR 4

The procedure is almost identical for a solution 3 or 4.

However, in this case the stop is reversed and the lever movement is therefore counter-clockwise. It is therefore more convenient to make this movement with your right hand and to accompany the movement of the arm with your left hand.



Fig. 36 - Solution 1

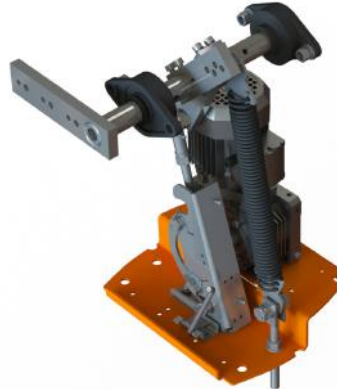


Fig. 37 - Solution 3

6.3. MAINTENANCE



MAINTENANCE OPERATIONS MUST BE CARRIED OUT IN COMPLIANCE WITH THE SAFETY WARNINGS STATED IN CHAPTER 1.

Refer to preventive maintenance manual NAM-BL229-PM-EN.

6.4. TROUBLESHOOTING

If the barrier does not work correctly, check the following points:

- Check the displayed messages on the HMI of the control unit.
- Review the procedures described in Chapters 4. Installation, 5. Adjustments et 6.3. Maintenance.
- Check that the circuit breaker (⇒ Rep. 23, Fig. 1, page 6) is properly engaged and that the voltage corresponds to the voltage required in the technical datasheet.
- Check if the motor is working.
- Check if the frequency converter (⇒ Rep. 25, Fig. 1, page 6) is in fault: the red LED on the side of the converter blinks. In this case, contact an Automatic Systems representative.
- Check the connection of the commands according to the electrical diagram provided with the equipment.
- Check that all the electric wires are correctly tightened, and tighten them if necessary.
- Carry out an electrical opening/closing test by means of the integrated HMI (▲:open command, ▼:down command).



After the equipment has been switched off for a long time, it will be necessary to carry out several opening/closing cycles to raise the temperature of the gear motor in order to allow correct unlocking of the gearmotor and correct balancing of the arm.

6.5. PROLONGED STOPPAGE / DESTRUCTION

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

- To place the barrier in a dry place that is protected from heat and bad weather.
- To leave the barrier turned on. With the motor remaining permanently powered, a certain temperature is maintained in the housing. This eliminates problems of condensation and, at low temperature, prevents the gear motor's oil from solidifying, which would cause the performances of the barrier to fail during the first operations following to a long period of disuse.



When you decommission the equipment, empty the oil from the gear motor (⇒ Rep. **18**, page 6) and scrap the various components of the machine by the appropriate means (metal parts, electronic components, etc) according to your local legislation.

7. DIMENSIONS

7.1. DIMENSIONS OF BL 229

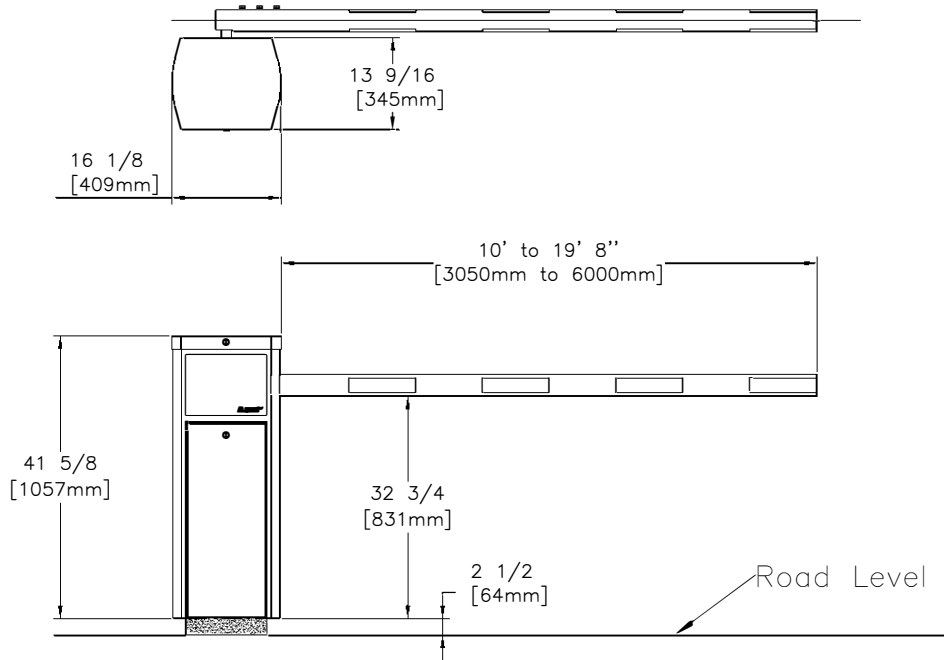


Fig. 38 - Dimensions of BL 229 with round arm

7.2. DIMENSIONS OF BL 229 TOLL

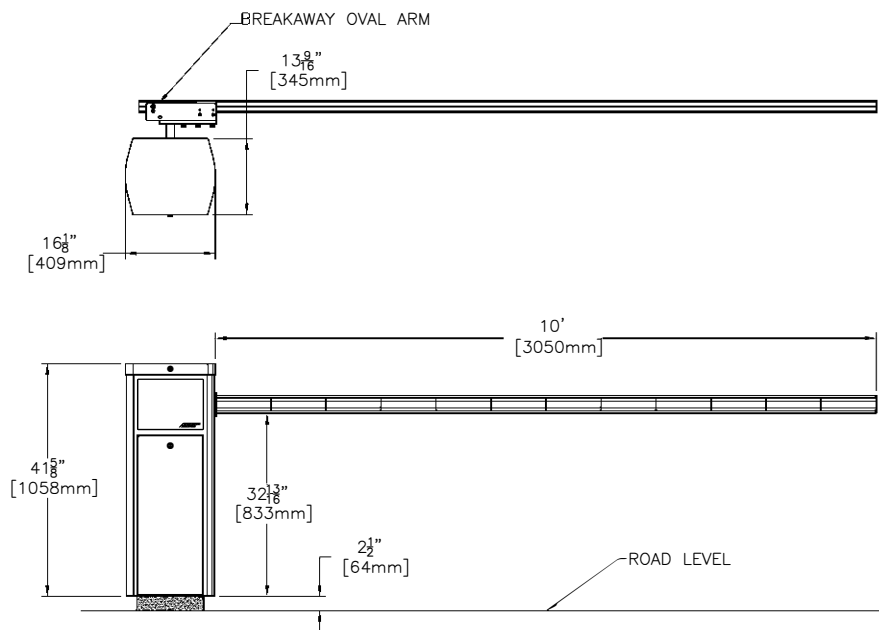


Fig. 39 - Dimensions of BL 229 Toll

7.3. DIMENSIONS OF BL 229 WITH ARTICULATED ARM (OPTION)

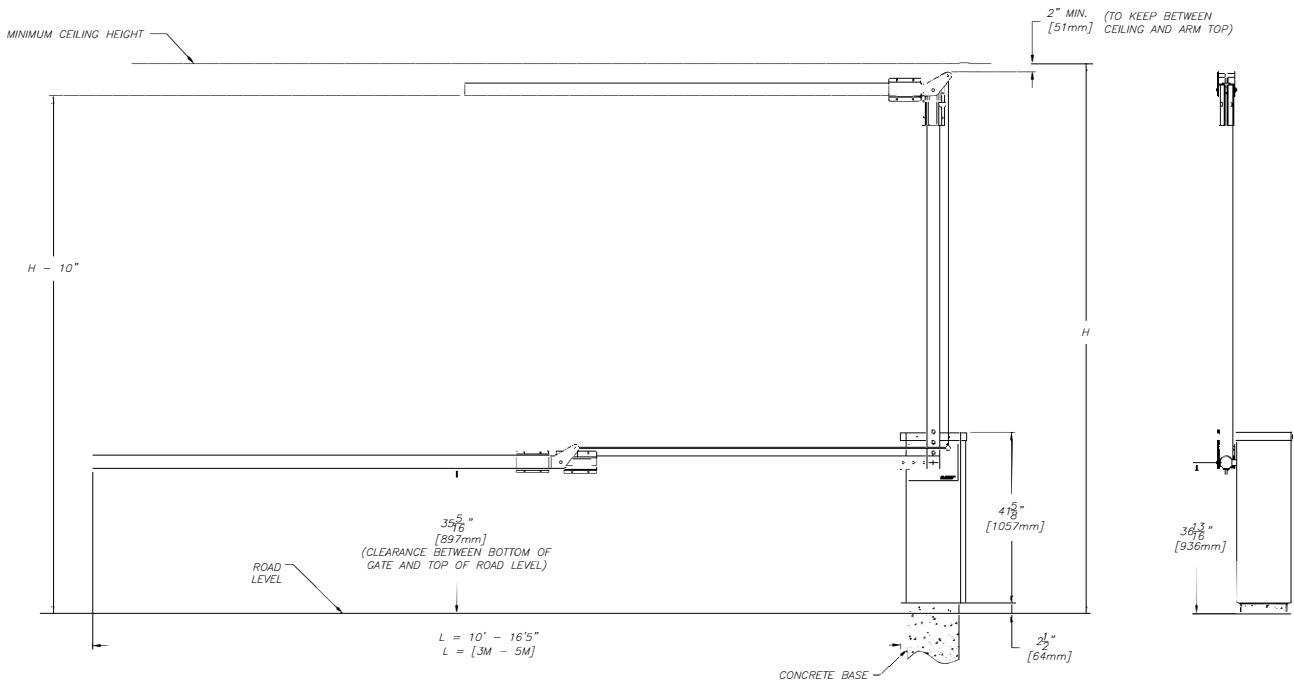


Fig. 40 - Dimensions of BL 229 with articulated arm.

8. APPENDIX

- Electrical drawings : can be found in the document pocket (⇒ Chap. 3.5, page 8).
- Implementation drawings: NAM-BL229-IN-01-EN and NAM-BL229-IN-02-EN.
- Preventive maintenance guide: NAM-BL229-PM-EN.
- AS1620 Control Unit handbook.

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