1. General warnings

1.1 - Safety warnings

⚠ WARNING!
This manual contains important instructions and warnings for personal safety.

An incorrect installation can cause serious injury. Before starting work it is necessary to carefully read all the parts of the manual. If in doubt, suspend the installation and request clarification from the King-Gates Support Service.

⚠ WARNING!
According to the most recent European legislation, the construction of a door or an automatic gate must comply with the provisions of Directive 98/37/EC (Machinery Directive) and in particular, the EN 1244, EN 12453, EN 12635 and EN 13241-1 5 standards which allow stating the alleged compliance of the automation.

In consideration of this, all product installation, connection, testing and maintenance operations must only be carried out by qualified and competent technicians!

⚠ WARNING!
Important instructions: keep this manual for the possible future maintenance and disposal of the product.

1.2 - Installation warnings

• Before starting the installation, check whether this product is suitable for automating your gate or door (see chapter 3 and the "Technical characteristics of the product"). If it is not suitable, DO NOT proceed with installation.

• Install a disconnecting device in the system power supply network with a contact opening distance that allows complete disconnection in the conditions stated by overvoltage category III.

• **All installation and maintenance operations must be carried out with the automation disconnected from the power supply.** If the disconnecting device from the power supply is not visible from the place where the automatism is positioned, before starting work it is necessary to attach on the disconnecting device a sign with the inscription "WARNING! MAINTENANCE IN PROGRESS ".

• During installation, handle the automatism with care, avoiding crushes, shocks, falls or contact with liquids of any kind. Do not place the product near heat sources or expose it to open flames. All these actions can damage it and cause malfunctions or dangerous situations. If this happens, immediately suspend the installation and contact King-Gates Customer Service.

• Do not make changes to any part of the product. Unauthorized tampering can only cause malfunctions. The manufacturer declines all liability for any damages deriving from arbitrary changes to the product.

• If the gate or the door to be automated is equipped with a pedestrian door, the system must be set up with a control system that inhibits the operation of the motor when the pedestrian door is open.

• Check that there are no points of entrapment with fixed parts when the gate leaf is in the maximum opening position; protect these parts as required.

• The wall control panel must be positioned in view of the automation, away from its moving parts, at a minimum height of 1.5m from the ground and not accessible to the public.

• The packaging material of the product must be disposed of in full compliance with local regulations.

1.3 - Use warnings

• The product should not be used by people (including children) with physical, sensory or mental disabilities, or lacking the necessary experience or knowledge, unless they are supervised by someone responsible for their safety, or have been fully trained on its use.

• Children playing nearby the automation system should be kept under constant supervision to prevent them from tampering with it.

• Do not let children play with the fixed controls. Keep remote control devices away from the reach of children.

• When cleaning the surface of the product only use a soft damp cloth. Only use water, without detergents or solvents.

2. Product description

EN

This product is to be used to automate hinged gates or doors, for both residential and industrial use.

⚠ WARNING!

Any other use other than that described and in environmental conditions other than those listed in this manual is to be considered improper and prohibited!

The product is an electromechanical gear motor, equipped with a 24 V direct current motor powered by the internal control unit and a gearbox with an articulated arm.

In the event of a power failure (black-out), it is possible to move the leaves of the gate by hand by manually unlocking the gear motor.

Fig. 1 shows all the components present in the pack (according to the chosen model):

[a] - electromechanical gear motor

[b] - arm connecting to the motor

[c] - arm connecting to the leaf

[d] - leaf support bracket

[e] - motor unlocking key

[f] - wall support bracket to secure the motor

[g] - metal hardware (screws, washers, etc.)

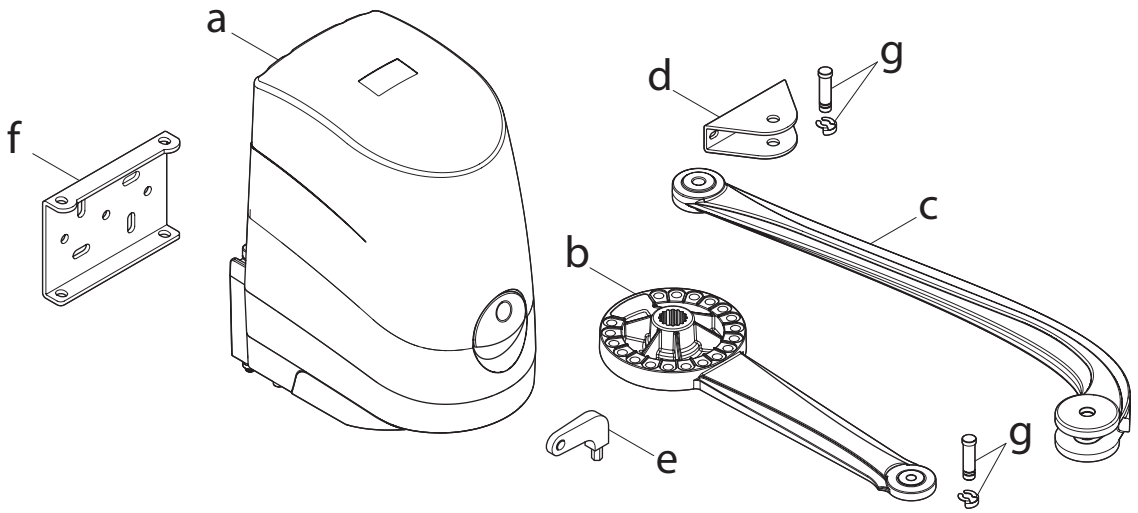


Fig. 1

3. Installation

⚠ Warning! - The installation of **MODUS** must be carried out by qualified personnel, in compliance with current regulations, standards and laws, and following these instructions.

3.1 - Preliminary checks

Before installation, always check that there are no broken product components, that the model selected is appropriate for the intended use and that the installation environment is suitable for the product.

⚠ IMPORTANT – The gear motor cannot automate a manual gate that does not have an efficient and safe mechanical structure.

It cannot correct defects due to bad installation or poor maintenance of the gate.

3.2 - Suitability of the gate and installation environment

• Check that the mechanical structure of the gate is suitable for the installation of an automation system and in compliance with current local regulations (if necessary, check the data found on the label of the gate).

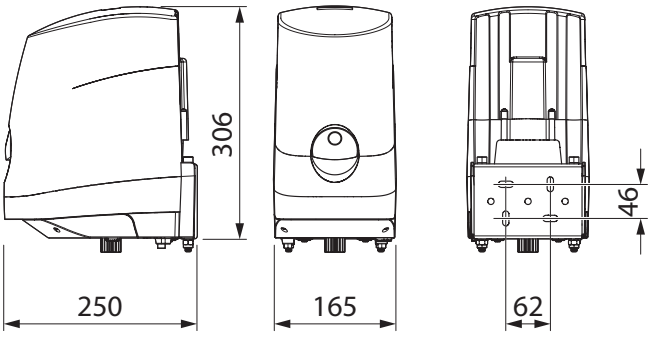
• Manually close and open the gate leaf, to make sure that there is an appropriate level of constant friction during the whole opening or closing movement (no points requiring increased effort).

• Check that when moved to any position between fully open and fully closed, the gate leaf keeps its balance, without movements.

• Make sure that around the gear motor there is enough room to easily and safely release the gate leaves by hands.

• Make sure that the product is installed on a solid surface, so that it can be securely fastened.

• Make sure that the installation position is compatible with the overall size of the product.



The correct opening movement of the gate and the force that the motor exerts to execute it, depend on the position in which the motor and arm brackets are fixed. Therefore, before proceeding with the installation you must check **charts 1 and 2** and **figure 3** to define the maximum opening angle of the leaf, the limits of the leaf and the position of the fixing brackets.

3.3 - Use limitations

Before installing the product, check that the size and the weight of the gate leaf are within the limits stated in **chart 1.**

kg - Maximum gate leaf weight

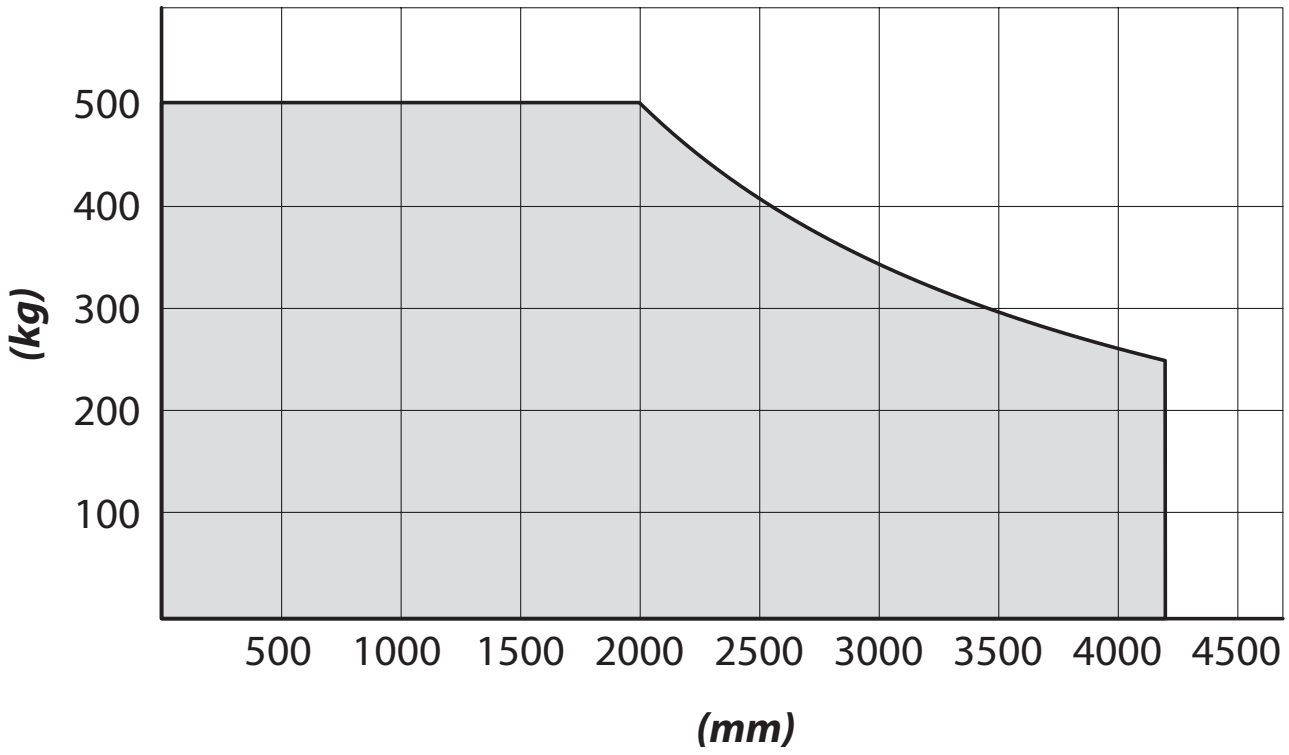
mm - maximum gate leaf length

⚠ WARNING!

- The single leaf must not exceed 4.2m in length.

EN

Chart 1 - Use limitations



3.4 - Installation preparation works

Fig.2 shows an example of an automation system using King-Gates components. These components are positioned following a typical and standard setup.

With reference to **Fig.2**, establish the approximate position where each component will be installed and then arrange any conduits for the electrical wiring.

Useful components for a complete system:

1 - MODUS MASTER gear motor
2 - Pair of photocells
3 - Pair of stops (open position)
4 - Photocell columns
5 - Flashing warning device with built-in antenna
6 - Key selector or digital keypad
7 - Vertical solenoid latch
8 - MODUS SLAVE gear motor

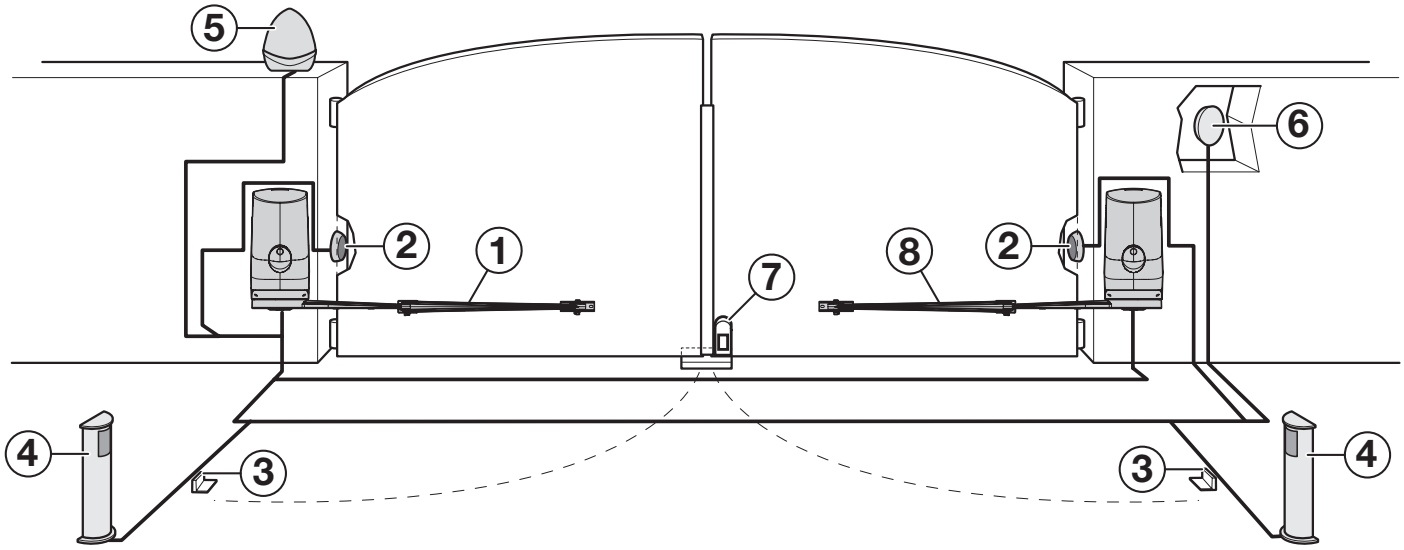


Fig. 2

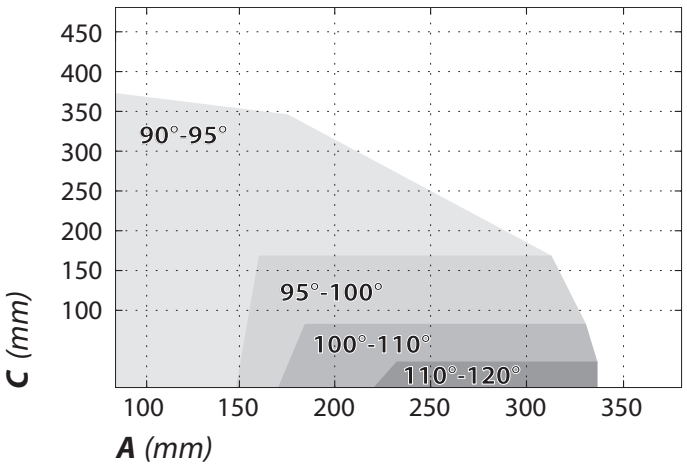
EN

3.5 - Installation of the fixing brackets and the gear motor

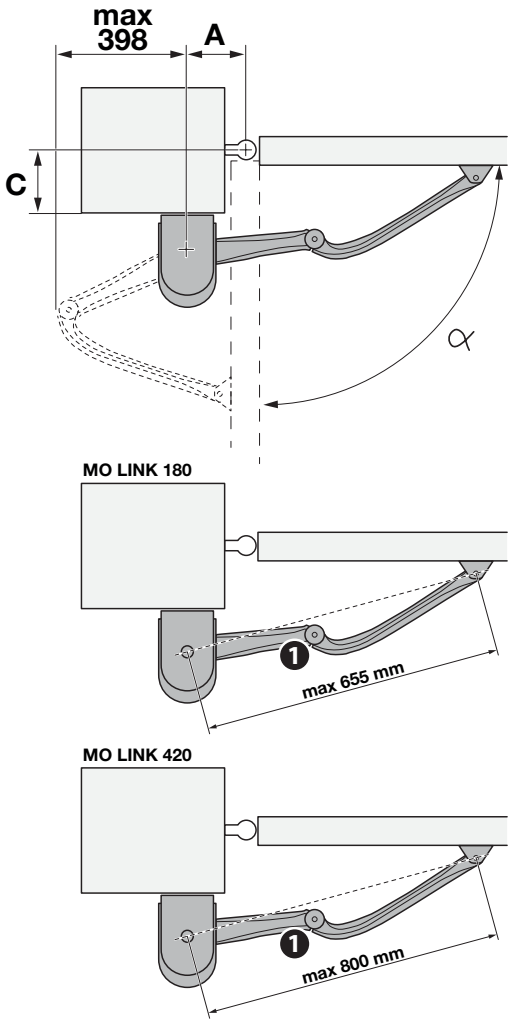
3.5.1 – Installation of the rear fixing bracket

Calculate the rear bracket position using **chart 2**.

Chart 2 (mandatory measurements)



This chart is used to define **distances A** and **C** and the **leaf maximum opening angle**.



Installation examples

MO LINK 180

A	C	α
140	30	90
250	30	120
140	80	90
190	80	100
140	130	90
170	130	100
140	160	90
160	160	95
140	200	90
160	200	95

MO LINK 420

A	C	α
140	30	90
250	30	110
140	80	90
185	80	100
140	130	90
170	130	95
140	160	90
160	160	95
140	200	90
150	200	90
140	240	90
150	240	90
140	280	90
170	280	90
140	320	90
170	320	90

Fig. 3

01. Measure value "**C**", then trace a straight horizontal line in **chart 1** against the obtained valued. Select a point in the line, taking into account the desired opening angle, suitable for the column. Trace a vertical line starting from the point identified and obtain value **A**.

Before proceeding with the installation, make sure that value **A** allows to fix the rear bracket, otherwise select another point on the chart. Finally, to fix the bracket on the leaf, refer to the maximum dimensions of the arm in **figure 3**. Failure to comply with the bracket installation distances may lead to automation operation faults, such as:

- Cyclical movements and accelerations at some positions of the stroke.
- Increased motor noise.
- Limited opening, or no opening at all (in case of counter-lever fixed motor).

⚠ **WARNING! – Before fixing the rear bracket, make sure that the front bracket will be fixed to a solid position of the gate leaf; the front bracket will have to be secured at a different height than the rear bracket (Fig. 4).**

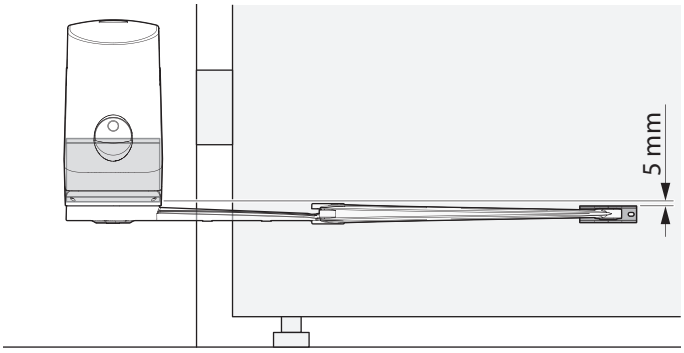


Fig. 4

02. At this point, mark on the leaf and on the wall the holes of the brackets which will then be used to fix the two brackets.

03. Fix the rear bracket of the motor to the wall complying with the dimensions seen previously **(fig. 5).**

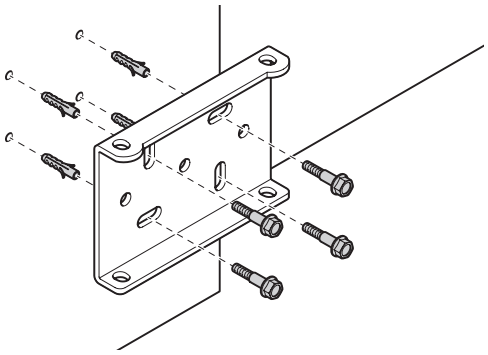


Fig. 5

3.5.2 – Securing the gear motor to the fixing brackets

• Secure the gear motor to the rear bracket:

01. Secure the gear motor to the bracket as shown in **Fig. 7** using the screws, washers and nuts supplied;

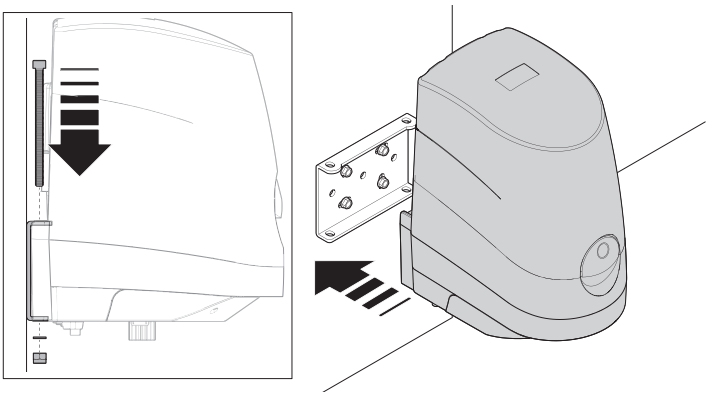


Fig. 7

02. Fully tighten the nuts to the screws.

• Install the arms onto the motor:

01. Secure the arm onto the gear motor using the screw;

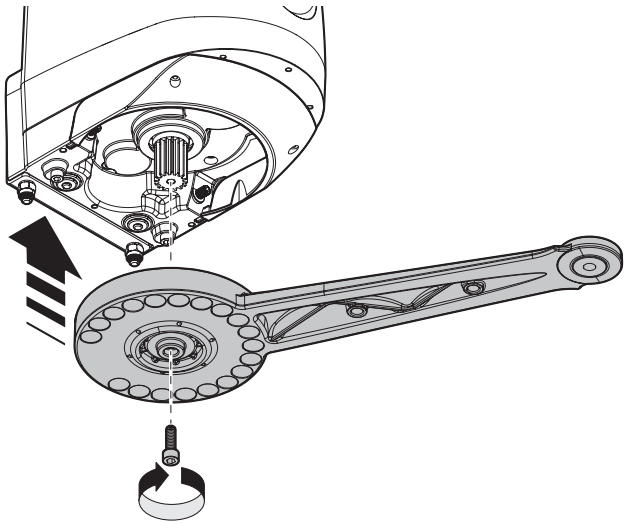


Fig. 8

02. Fix the two arms to each other using the pin and the seger **Fig. 9**;

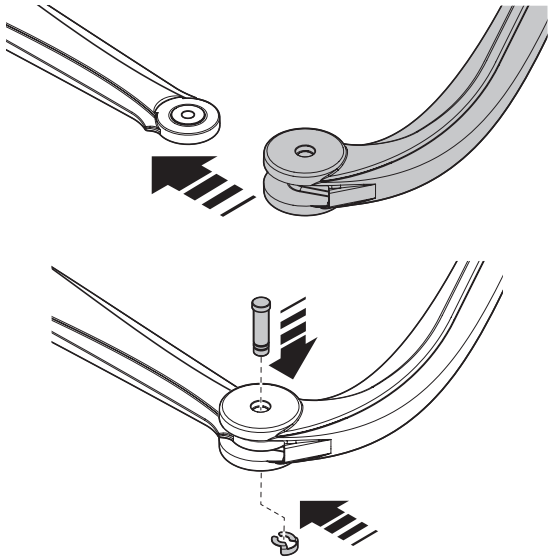


Fig. 9

• Secure the gear motor to the front bracket:

01. Secure the gear motor arm to the bracket as shown in **Fig. 10** using the pin and seger supplied;

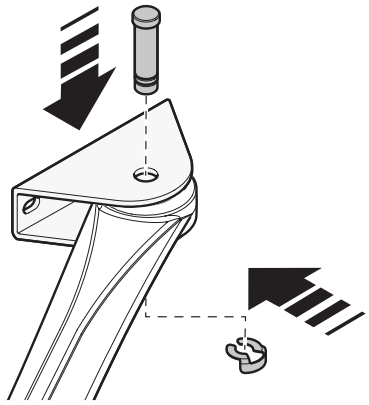


Fig. 10

02. Tighten the seger fully onto the pin seat;

3.5.3 – Installation of the front fixing bracket

01. The front bracket must be secured to gate leaf;

02. Define the front bracket position height in accordance with **Fig. 4**;

03. Fix the bracket to the solid section of the gate leaf **Fig.11**.

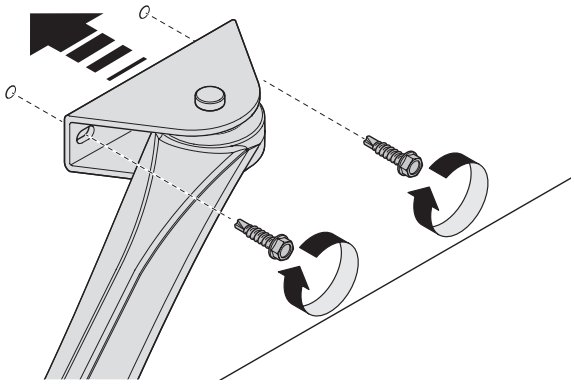


Fig. 11

3.5.4 – Installation and adjustment of the motor limit switches

Adjust the gear motor **opening** and **closing** limit switches:

01. Release the gear motor as shown in **Fig. 12**;

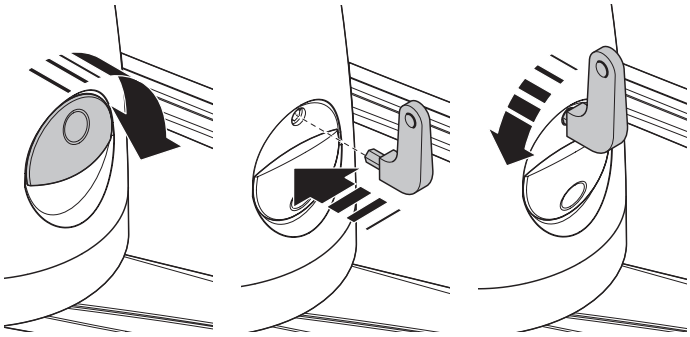


Fig. 12

EN

02. Remove the 2 screws underneath the motor and remove the cover as shown in **Fig. 13**;

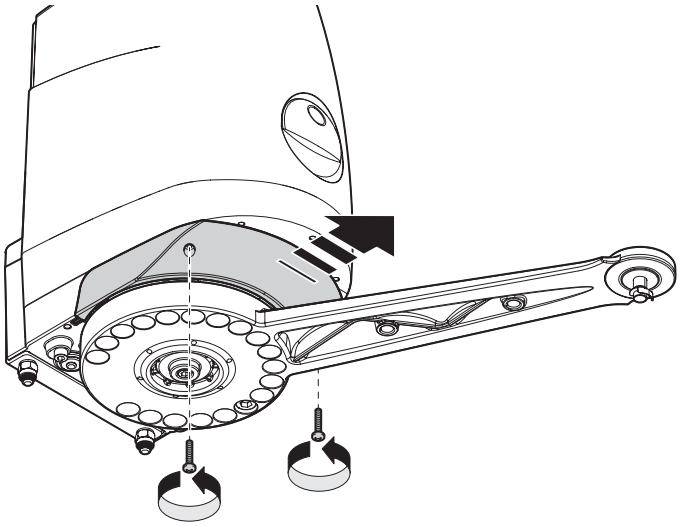


Fig. 13

03. Unscrew the screw in the motor arm and remove it as shown in **Fig. 14**;

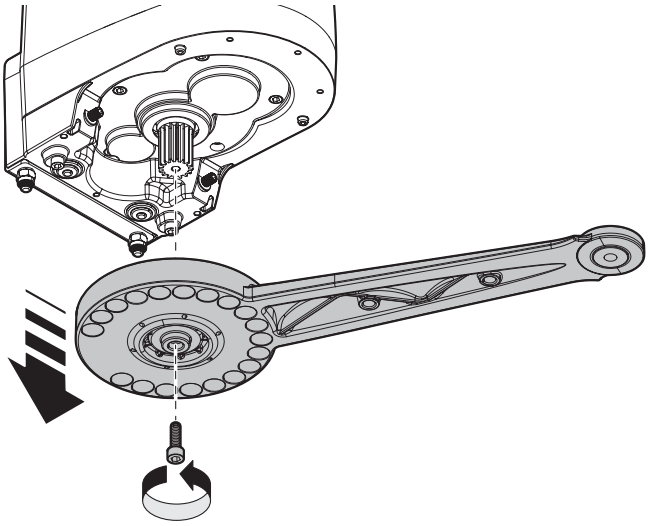


Fig. 14

04. Fix the limit switches on the motor arm **Fig. 15**; these must also be installed in the presence of mechanical stops on the ground.

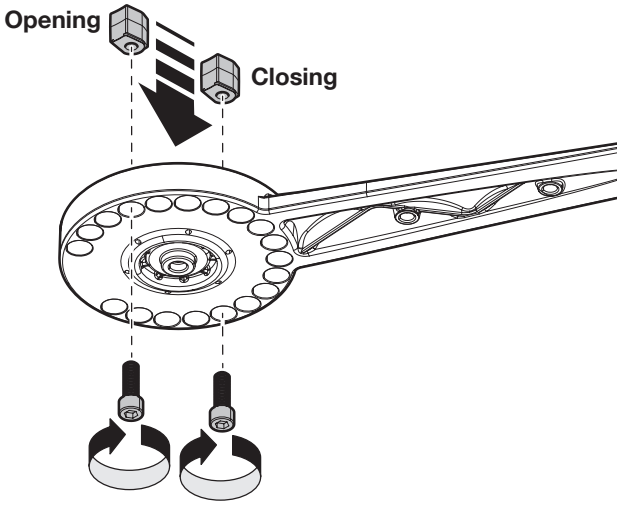


Fig. 15

05. At this point re-install the arm onto the motor **Fig. 16**;

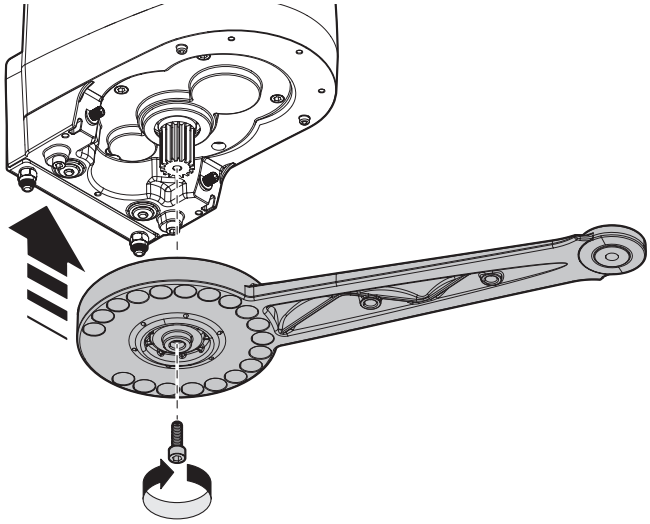


Fig.16

06. Manually verify that, when opening and closing, the gate leaf stops at the desired points**Fig. 17**;

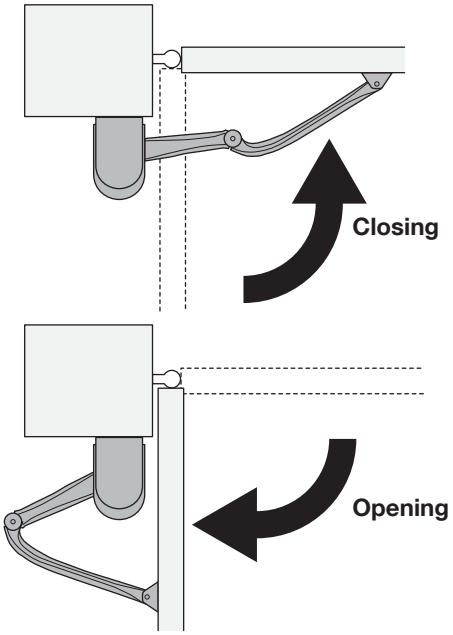


Fig.17

07. By screwing or unscrewing the two screws **(A)** on the motor, the two limit switches can be adjusted; then, using the two screws **(B)** block the two adjusting screws**(A) Fig. 18**;

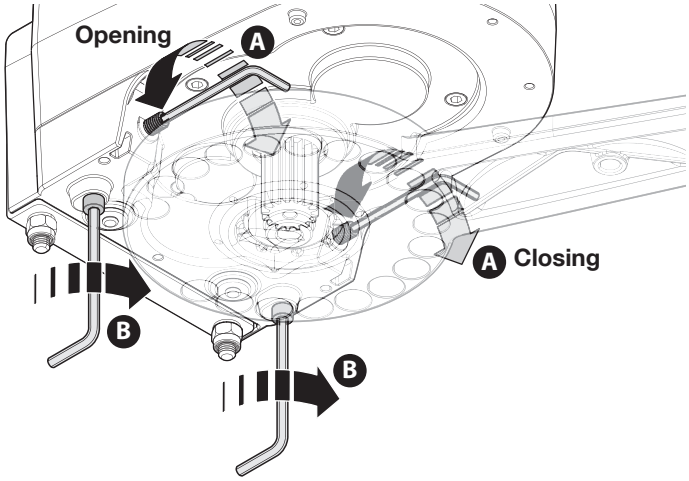


Fig. 18

08. Replace the cover and tighten the two screws **Fig. 19**;

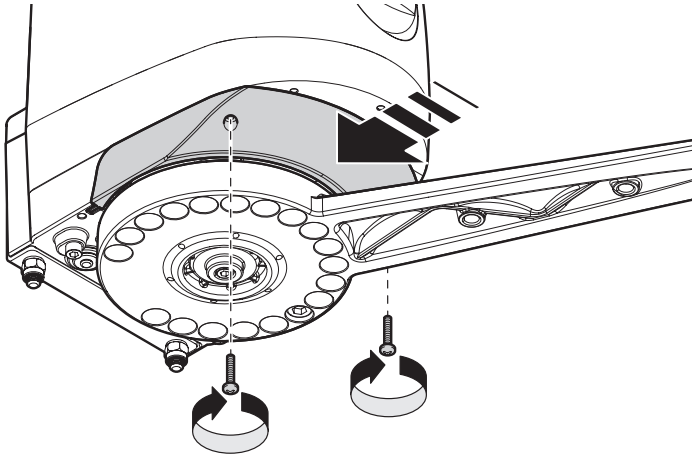


Fig. 19

09. Finally, secure the gear motor by turning the release key;

10. For the assembly of the second motor, carry out the same operations proceeding in reverse order for the adjustment of the limit switches;

11. After installing and adjusting the motors, position the leaves halfway along their stroke so that, after making the electrical connections, they can learn the opening and closing procedures correctly **Fig. 20**.

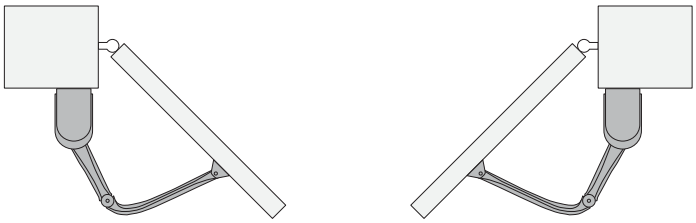


Fig.20

4. Electrical connections

EN

⚠ WARNING!

- An incorrect connection can cause faults or dangerous situations; therefore, scrupulously comply with the indicated connections.

- Perform the connection operations with the power supply disconnected.

To connect the gear motor proceed as follows:

01. Remove the gear motor cover as shown in **Fig. 21**;

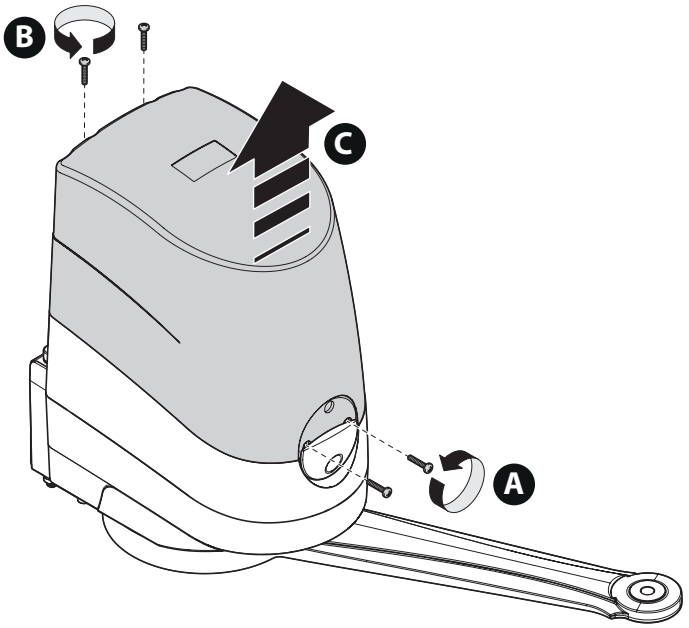


Fig. 21

02. Loosen the cable gland of the gear motor and insert the connection cables **Fig. 22**;

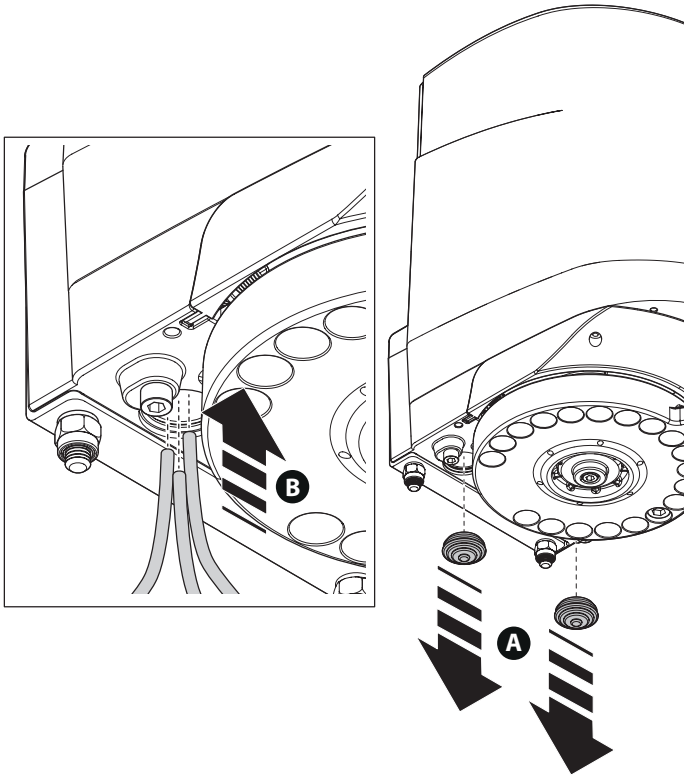


Fig. 22

03. Bring the cables to the top of the motor near the control unit **Fig. 23**;

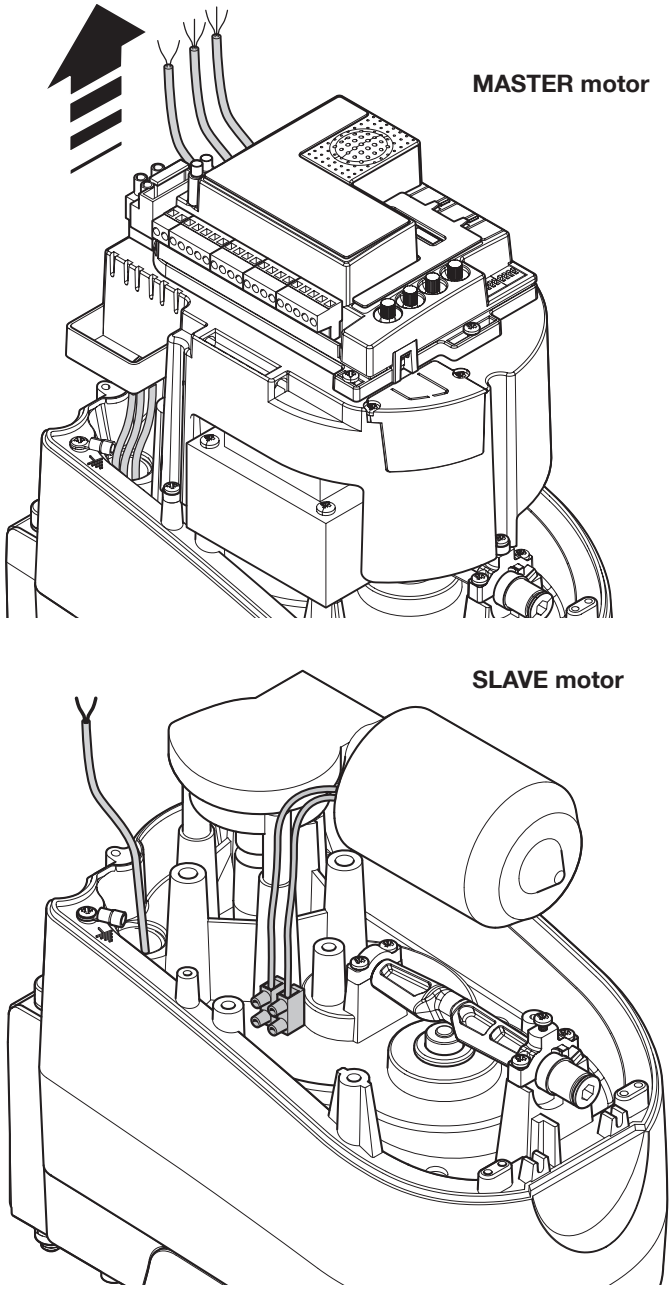


Fig. 23

04. For how to connect the two motors, refer to the manual of the "**Control unit**" supplied with the rest of the documentation;

05. After making all the electrical connections, replace the cover on the gear motor.

To check the connections, the direction of rotation of the motor, the displacement of the movement of the leaves and the adjustment of the limit switch, refer to the instruction manual of the "**Control unit**".

5. Testing the automation

In order to guarantee maximum safety, this is the most important phase in the realization of the automation. The test can also be used as a periodic check of the devices that make up the automatism.

The testing of the entire system must be performed by expert and qualified personnel who must take responsibility for the required tests, according to the present risk and verify compliance with the provisions of laws, regulations and standards, and in particular with all the requirements of the EN12445 standard which sets out the test methods to verify gate automatisms.

Testing

Every individual component of the automatism, for example safety edges, photocells, emergency stop, etc. requires a specific testing phase; for these devices, the procedures indicated in the respective instruction manuals must be carried out. To test the gear motor, carry out the following operations:

01. Check that all the provisions of this manual and in particular chapter 1 have been strictly adhered to;

02. Release the gear motor as shown in **Fig. 8**;

03. Verify that it is possible to manually move the opening and closing leaf with a force not exceeding 390 N (about 40kg);

04. Lock the gear motor and connect the power supply;

05. Using the control or stop devices provided (key selector, control buttons or radio transmitters), carry out tests to open, close and stop the gate and verify that its behaviour corresponds to what was expected;

06. Check one by one that all the safety devices present in the system (photocells, safety edges, emergency stop, etc.) work correctly; and that the gate's behaviour corresponds to what is expected;

07. Order a closing manoeuvre and check the force of the impact of the leaf against the stop of the mechanical limit switch. If necessary, try to relieve the pressure by finding an adjustment that gives better results;

08. If the dangerous situations caused by the movement of the leaf have been safeguarded by limiting the impact force, this force must be measured according to the provisions of the EN 12445 standard;

Note – The gear motor has no torque adjustment devices, therefore, this adjustment is entrusted to the control unit.

Commissioning

Commissioning can only take place after all the testing phases of the gear motor and the other devices have been successfully completed. For commissioning, refer to the instruction manual of the control unit.

⚠ **IMPORTANT** – Partial or "temporary" commissioning is prohibited.

6. Maintenance

Regular maintenance is required to maintain a constant level of safety and to guarantee the maximum life of the entire automation.

Maintenance must be carried out in full compliance with the safety requirements of this manual and in accordance with the applicable laws and regulations. For the gear motor, scheduled maintenance is required within a maximum of 6 months.

Maintenance operations:

01. Disconnect all power sources.

02. Check the state of deterioration of all the materials that make up the automation with particular attention to the erosion or oxidation of the structural parts; replace the parts that do not give sufficient guarantees.

03. Check that screw connections are tightened properly.

04. Check the moving parts for wear and replace worn parts as required.

05. Reconnect the power supply sources and carry out all the tests and checks provided for in chapter 5.

For other devices in the system, refer to their instruction manuals.

7. Disposal

This product is an integral part of the automation, and therefore must be disposed of together with it.

As for the installation operations, even at the end of the product life, dismantling operations must be carried out by qualified personnel.

This product consists of various types of materials: some can be recycled, others must be disposed of. Ask about the recycling or disposal systems required by the regulations in force in your area, for this category of product.

⚠ **Warning!** - some parts of the product may contain polluting or dangerous substances which, if dispersed in the environment, might cause harmful effects on both the environment and human health.

As indicated by the side symbol, it is forbidden to dispose of this product with household waste. Have it disposed of separately, according to the methods set out by the regulations in force in your country, or return the product to the seller when buying a new equivalent product.

⚠ **Warning!** - local regulations may provide for heavy penalties for the illegal disposal of this product.

8. Technical characteristics of the product

⚠ WARNINGS:

- All the technical characteristics shown refer to an ambient temperature of 20°C (± 5°C).
- King-Gates reserves the right to make changes to the product at any time it deems necessary, while still retaining the same functionality and intended use.

	Modus 280	Modus XL
Type	Electromechanical gear motor for hinged gates or doors	
Power supply	230Vac 50Hz	230Vac 50Hz
Motor power supply	24 Vdc	24 Vdc
Maximum absorbed power	280 W	350 W
Current absorbed	1.25 A	1.87 A
Maximum speed	1.5 rpm	1.5 rpm
Operating temperature	-20 /+55°C	-20 /+55°C
Work cycle	80%	80%
Dimensions	165x250x306 mm	165x250x306 mm
Leaf maximum dimensions/weight	2.8m / 300kg	4.2m / 500kg

9. Product durability

Durability is the average economic life of the product. The durability value is strongly influenced by the severity index of the manoeuvres performed by the automatism: that is the sum of all the factors contributing to the wear of the product (**see Table 1**).

To establish the probable durability of your automation, proceed as follows:

01. Calculate the severity index by summing up the percentage values of the items in **Table 1**;

02. In **chart 3** from the value just found, draw a vertical line to cross the curve; from this point draw a horizontal line to cross the "manoeuvring cycles" line. The determined value is the estimated durability of your product.

The durability estimate is based on the design calculations and the results of tests carried out on prototypes. In fact, being an estimate, it does not represent any guarantee on the actual duration of the product.

TABLE 1

		Severity index
Leaf weight [Kg]	> 200 kg	0%
	> 300 kg	5%
	> 400 kg	10%
	500 kg	20%
Leaf length [m]	2 - 3 m	0%
	3 - 4 m	10%
	4 - 4.2 m	20%
Ambient temperature above 40°C or below 0°C or humidity over 80%		20%
Solid door		15%
Installation in a windy area		15%

EN

CE DECLARATION OF CONFORMITY
and declaration of incorporation as "partly completed machine"

Declaration according to Directives: 2004/108 / EC (EMC); 2006/42 / EC (MD) Annex II, Part B

Note: the content of this declaration corresponds to that indicated in the official document filed at the headquarters of King Gates S.r.l. and, in particular, to the latest version of the same, available before printing this manual. The text has here been re-edited for editorial purposes. The complete document of the EU declaration of conformity is available at the following link: **www.king-gates.com/download/**.

Declaration number: MODUS **Revision:** 0 **Language:** EN

Manufacturer's name:	KING GATES S.R.L.
Address:	Via A. Malignani,42 - 33077 Sacile (PN) Italy
Product type:	Electromechanical gear motor with built-in board (MA versions) Electromechanical gear motor (SL versions)
Model / Type:	MODUS 280 MA; MODUS 420 MA; MODUS XL MA MODUS 280 SL; MODUS 420 SL; MODUS XL SL
Accessories:	please see catalogue

The undersigned Giorgio Zanutto as Managing Director declares under his own responsibility that the above-mentioned product complies with the provisions imposed by the following directives:

- Directive 2014/53/UE (RED)
  MODUS 280 MA, MODUS 420 MA, MODUS XL MA models
  - Health protection (art. 3(1)(a)): **EN 62479:2010**
  - Electrical safety (art. 3(1)(a)): **EN 60950-1:2006 + A11:2009 + A12:2011 + A1:2010 + A2:2013**
  - Electro-magnetic compatibility (art. 3(1)(b)): **EN 301 489-1 V2.2.0:2017, EN 301 489-3 V2.1.1:2017**
  - Radio spectrum (art. 3(2)): **EN 300 220-2 V3.1.1:2017**

Furthermore, the product is compliant with the following directive according to the requirements for "partly completed machines" (Annex II, part 1, section B):

Directive 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006 on machinery and amending Directive 95/16/EC (recast).

- It is hereby declared that the relevant technical documentation has been compiled in accordance with Annex VII B of Directive 2006/42/EC and that the following essential requirements have been met:

1.1.1- 1.1.2- 1.1.3- 1.2.1-1.2.6- 1.5.1-1.5.2- 1.5.5- 1.5.6- 1.5.7- 1.5.8- 1.5.10- 1.5.11

- The manufacturer undertakes to forward to the national authorities, in response to a justified request, the relevant information on the "partly completed machine", without prejudice to its intellectual property rights.
- If the "partly completed machine" is commissioned in a European country with an official language other than the one used in this declaration, the importer is obliged to accompany this declaration with the related translation.
- Please note that the "partly completed machine" must not be put into service until the final machine in which it is incorporated is in turn declared compliant, where appropriate, with the provisions of Directive 2006/42/EC.

Furthermore, the product complies with the following standards:

EN 60335-1:2012+A11:2014, EN 62233:2008 , EN 60335-2-103:2015 for models MODUS 280 MA, MODUS 420 MA, MODUS XL MA.

EN 61000-6-2:2005, EN 61000-6-3:2007 + A1:2011 for models MODUS 280 MA, MODUS 420 MA, MODUS XL MA, MODUS 280 SL, MODUS 420 SL, MODUS XL SL.

Place and date: Sacile 11/10/2018

Giorgio Zanutto
(Managing Director)