

# AUTOMATION SYSTEMS

## ACTUATOR FOR SWING GATES

Installation manual for the installer

**DTM 300 / 400 / 600**

version 2.3



**AUTOMATION MUST BE IMPLEMENTED IN ACCORDANCE WITH EUROPEAN STANDARDS:**

**EN 12100** (Safety of machinery. Electrical equipment of machines. General requirements)

**EN 12445** (Gates. Safety in use of power operated doors. Test methods)

**EN 12453** (Gates. Safety in use of power operated doors. Requirements)

- The installer should provide the device with a residual current circuit breaker ensuring that the devices are disconnected from the power supply (EN 60335-1).
- Automatic swing gates should comply with the standards as well as with any applicable local regulations.
- The electrical installation to which the automation is connected must comply with the applicable standards and be properly made.



Failure to observe and follow the instructions marked with these symbols may result in an accident resulting in personal injury or property damage. Please read these warnings carefully. The gate drive ensures correct and safe operation only if the installation and use complies with the following safety rules. DTM System is not responsible for accidents resulting from improper use or unprofessional installation of devices.



When installing or repairing an automatic gate, be careful and do not wear jewelry, watches or loose clothing.

Electrical cables should be laid in accordance with local regulations regarding construction and electrical installations. Electric cables may only be connected to a properly grounded network by an authorized electrical specialist.

Remove any locks installed on the gate to avoid damaging it.

After installation, it is necessary to check that the mechanism is correctly adjusted and that the drive, security system and emergency unlocking function properly.

The gate drive cannot be started or continue to operate if there is a gate in the gate and it is not closed properly.

Any movement of the gate towards the wall should be blocked or limited (e.g. by installing limiters). This will eliminate the possibility of crushing when opening the gate.

The gate should always move freely. A gate that jams or jams should be repaired immediately. Do not attempt to repair the gate yourself. A specialist should be engaged for this purpose.

Keep additional equipment out of the reach of children. Do not allow children to operate the control buttons or remote control. It should be remembered that an automatic gate is a device in which the risk of serious injury cannot be completely eliminated in the event of remote operation, unsupervised by an adult. Control devices should allow for visual verification of the gate itself and its immediate surroundings.

When performing maintenance work such as cleaning, lubrication, etc., the gate automation must be disconnected from the mains. In the gate's electrical installation, a device should be provided to disconnect all phases using a switch (distance between contacts min. 3 mm) or separate fuses.

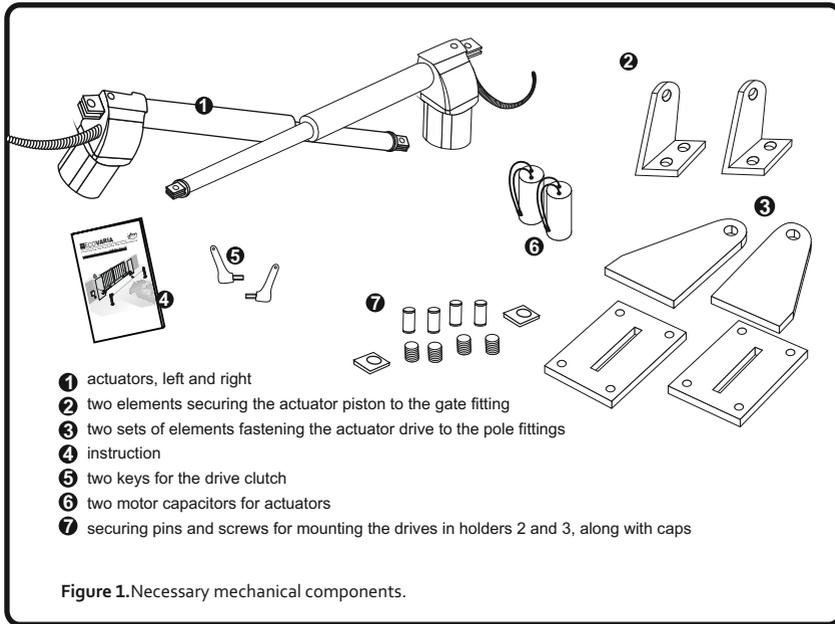
Please make sure that those who install, maintain or operate the gate automation follow these instructions. Keep these instructions where you can quickly refer to them when needed.

Protection systems against crushing or injury (e.g. photocell systems) must operate correctly after the drive is installed and connected to the network.

## 1. Introduction

### 1.1. Basic information

Electromechanical actuators are designed to control swing gates. The assembled and launched system can be operated very conveniently using radio transmitters. **Please check whether you have all the elements from Figure 1 and then read the entire manual.**



### 1.2. Technical data of selected elements of the set DTM300/DTM400/DTM600

|                                  |                                |
|----------------------------------|--------------------------------|
| - housing material:              | aluminum with plastic elements |
| - mains power supply (motor)     | 230V AC, 50Hz                  |
| - current consumption            | 1.2A                           |
| - power consumption              | 350W                           |
| - capacitor                      | 8-10 $\mu$ F, 400V             |
| - maximum gate width             | 3/4/5 m                        |
| - maximum gate weight            | 250kg                          |
| - protection class               | IP-43                          |
| - thermal protection:            | 150°C                          |
| - arm stroke:                    | 300/400/600mm                  |
| - leaf movement speed:           | 18mm/s                         |
| - pulling force:                 | 2200 N                         |
| - engine speed:                  | 1400 rpm                       |
| - continuous operation           | 4 min                          |
| - work intensity                 | 35%/h (21 cycles/h)            |
| - temperature range              | -20°C to +60°C                 |
| - actuator weight                | 6.5 kg                         |
| - spacing of pin sockets min-max | 640-1040/740-1140/940-1540mm   |

## 2. MECHANICAL ASSEMBLY

### 2.1. Preparation of the workplace

In order to properly install the actuators, the workplace must be properly prepared. It is necessary to examine the gate system in terms of the requirements presented below:

- **The drive mechanism requires space on the sides for arms and assembly.** Please make sure this place is available. If there is no space, provide it!
- **Gates subject to heavy loads (wind) must be secured using an additional electric lock.**
- **Check whether the gate opens and closes freely.**

#### Gate parameters affecting the operation of the system:

- **Gate size:** The size of the gate is a very important factor. Wind can cause braking of the gate or certain stresses, significantly increasing the amount of force required to move it.
- **Gate weight:** The weight of the gate is an approximate parameter. However, the maximum permitted weight of the gate should not be exceeded. The actual weight carried by the drive is influenced by: the type of gate, wind, and the space around the gate.
- **Temperature influence:** Low external temperatures may make starting difficult or impossible (changes in the ground, etc.), while high temperatures may cause sticking of elements that are too tightly fitted due to the thermal expansion of the metal.
- **Service frequency / switch-on time:** The drives have a maximum switch-on time of approximately 35% (21 cycles) per hour.

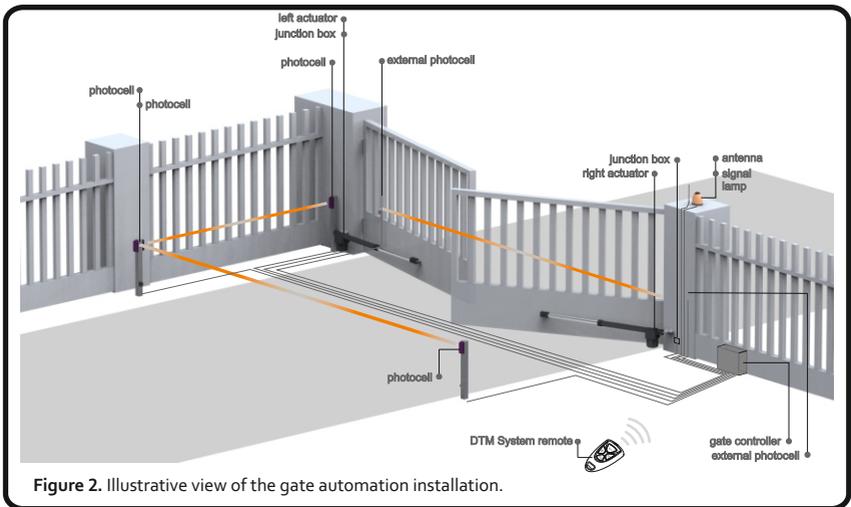


Figure 2. Illustrative view of the gate automation installation.

#### ATTENTION!

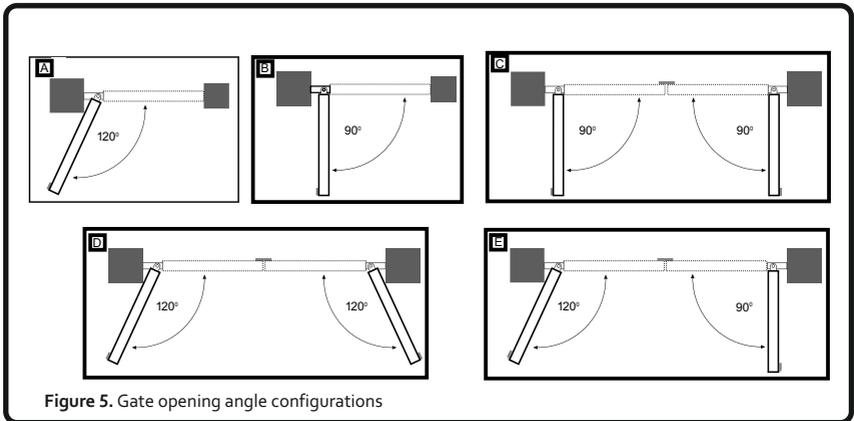
The actuator cannot operate so that the piston extends or retracts completely. A correctly set actuator moves up to 95% of the extension when the gate is closed and up to 5% when the gate is open. Failure to follow this recommendation will damage the actuator and void the warranty!



When the bracket is not stable enough, it must be strengthened. If we have a wooden gate, the gate fittings must be screwed through. It is then advisable to use a board from the outside so that the fastening cannot loosen over time. Thin wooden gates must be additionally reinforced to withstand the stresses that occur.

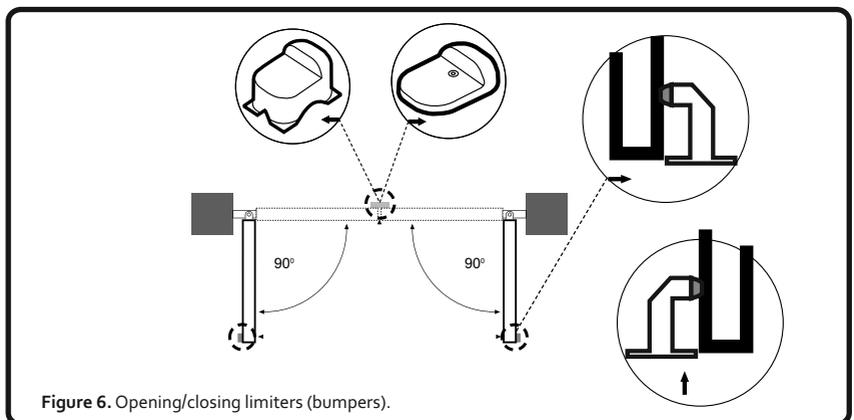
### 2.3. Selecting the gate opening angle

Allowed angles range from 90 degrees to 120 degrees (see Figure 5). An opening angle exceeding 120 degrees is possible but not recommended! If the gate has a leaf, we must remember about the appropriate sequence of opening and closing the leaves. Figure 7 will be helpful in selecting the appropriate mounting dimensions for the actuators, which shows the mounting dimensions A and B and the corresponding opening angles.

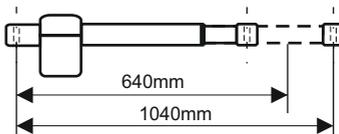


### 2.4. Limiters

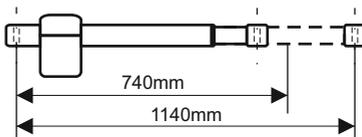
**A swing gate requires a stop in the OPEN and CLOSE direction. The limiters protect the drive, gate and fittings against wear.** Operating the gate without permanently attached limiters leads to its incorrect operation. It is often dangerous, it leads to premature wear and voids the warranty!



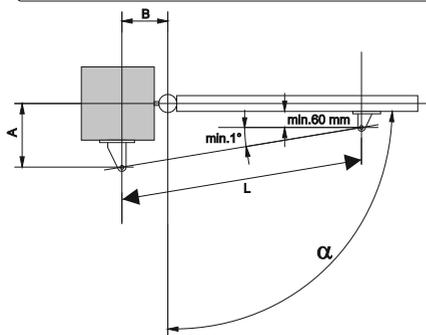
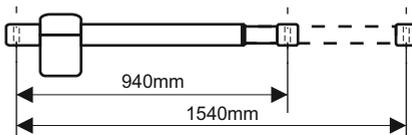
| Recommended dimensions DTM300 (mm) |     |     |     |
|------------------------------------|-----|-----|-----|
| $\alpha$                           | A   | B   | L   |
| 95°                                | 140 | 140 | 922 |
| 120°                               | 120 | 160 | 922 |



| Recommended dimensions DTM400 (mm) |     |     |      |
|------------------------------------|-----|-----|------|
| $\alpha$                           | A   | B   | L    |
| 95°                                | 145 | 145 | 1122 |
| 120°                               | 110 | 170 | 1122 |



| Recommended dimensions DTM600 (mm) |     |     |      |
|------------------------------------|-----|-----|------|
| $\alpha$                           | A   | B   | L    |
| 95°                                | 280 | 280 | 1532 |
| 120°                               | 120 | 310 | 1532 |



If it is not possible to obtain the dimensions given in the table, other dimensions can be determined - for a leaf opening of 90°  $A=B$  (difference between A and B max. 4cm) - **within the range enabling the actuator to completely open and close the gate leaf**. Incorrect selection of these dimensions may result in the **actuator's stroke not being enough to completely open and/or close the gate**.

Figure 7. Definitions of actuator dimensions.

## 2.5. Pole fitting

The appropriate position of the post fitting is decisive for the subsequent operation of the gate. The first step is to determine the distance between the motor rotation point and the gate rotation point (Figure 7), and therefore, the opening angle (see point 2.3.). These dimensions are marked as dimension A and dimension B. The influence of these dimensions on the operation

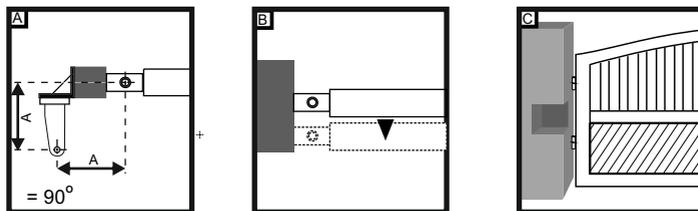


Figure 8. Methods of making pole fittings.



plug is glued into the wall in a stress-free manner, this is more suitable than the use of expansion, plastic or steel dowels. In the case of masonry columns, a relatively large steel plate must be screwed on to cover a few bricks, and then a hinge plate can be welded to it. You can also use an angle plate as a support plate, which can be screwed to the corner of the column.

### 2.6. Gate fittings

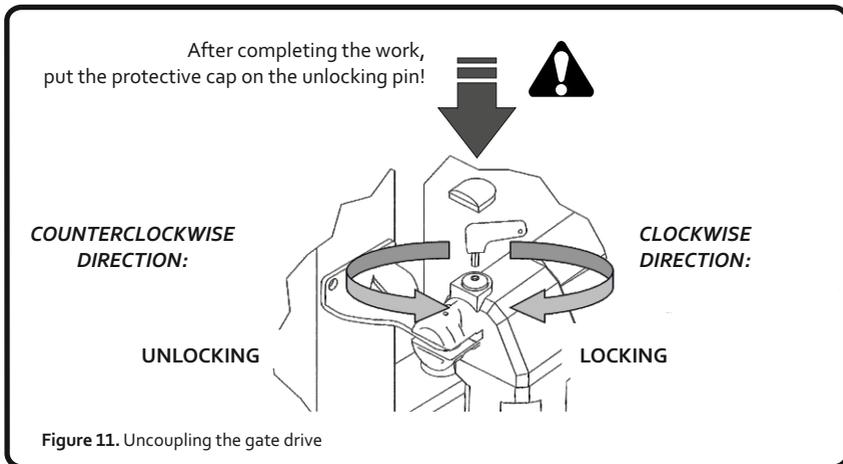
The gate fitting must be mounted horizontally in relation to the pole fitting. The distance between the fittings is determined by the mounting dimension. **When the gate is closed, the drive should extend up to 95%. When open, the drive should have a 5% extension.** Completely RETRACTING or EXTRACTING the piston during operation will damage the drive and will void the warranty! The mounting dimensions must be observed in all circumstances! (dimension A and B). In the case of steel gates, the brackets should be welded or cross-bolted. In case of cross-tightening, use large washers or a plate on the other side. However, for wooden gates, use through drilling when mounting. It is recommended to fasten the board from the outside to prevent the bracket from loosening. Thin wooden gates without a metal frame must be additionally reinforced to withstand constant stress. **Please leave enough space for the drive to rotate. Failure to meet this requirement will result in breakage of the drive mounting!**

### 2.7. Assembly of the drive arms

Unlock the drive. Slide the unlocked drive onto the gate fittings and secure it using the securing pins and screws provided. Before the first start-up, check whether there is no collision of the actuator with the gate fittings and the gate itself throughout the entire operating range of the gate. If we do not check this, the drive mounting may break! When attaching the drive to the hinge, do not use a hammer or similar tool.

### 2.8. Locking/unlocking the drive

The drive mechanism can be unlocked. The gate can then be operated manually (in the event of a power failure). **Locking/unlocking procedure :** Insert the hexagon socket wrench into the hole provided in the upper part of the housing. To unlock the drive, turn the key in the appropriate direction, as shown in Figure 11, until resistance occurs. To lock, turn the key in the opposite direction, as shown in Figure 11, until resistance occurs. After locking/unlocking the drive, cover the key area with a special cap included in the set. **After blocking the drive, before starting the actuators for the first time, move the gate manually until you hear the characteristic "click" of the clutch mechanism.** This activity significantly increases the life of the clutch components.



**THE FORCE IN THE CONTROLLER MUST BE ADJUSTED SO THAT AFTER THE GATE IS COMPLETELY CLOSED, ITS EMERGENCY UNLOCKING IS POSSIBLE!**

Operating the actuator with excessive force, in addition to increasing wear of the actuator elements, will also cause excessive stress in the gear mechanism after the gate is fully closed. This may result in a situation where it becomes impossible to disengage the clutch using the supplied key. Attempting to unblock with excessive force may result in damage to the actuator mechanism and/or the key, which is not subject to warranty repair.

### 2.9. Maintenance

The drive mechanics do not require maintenance. However, it is recommended to check at regular intervals (monthly) that the gate fittings and drive are securely attached. Loosen the drive and check whether the gate operates properly. Remember that the drive cannot eliminate problems caused by a malfunctioning gate.

### 3. Electrical installation IMPORTANT REMINDER

Electrical and drive automation installations must be performed by experienced and qualified personnel in accordance with applicable law. The devices contain dangerous voltages of 230V 50Hz, all connections should be made with the voltage turned off. The installer's task is to install the system in a safe enough way to minimize the risk associated with its use. The person who installs the device without complying with all applicable regulations is responsible for any damage that the device may cause.

#### 3.1. Preparation of electrical installation components

**WIRING-** The basic cabling configuration is consistent with Figure 14. Before purchasing the cabling, check whether you have a photocell of the type with a built-in optical indicator, then you must provide two additional wires in the cables for the photocells. The length of the wiring depends on the length of the gate, the width and height of the posts, and the space provided for the distribution boxes, so we should estimate the cable lengths ourselves. The cabling arrangement is shown in Fig. 15. Together with the actuators, approximately 80 cm of cable is delivered, which is laid in an arc to the controller or a waterproof distribution box located above the ground. The starting capacitor can be connected inside the distribution box or in the controller. You should also use protective conduits for the cables.

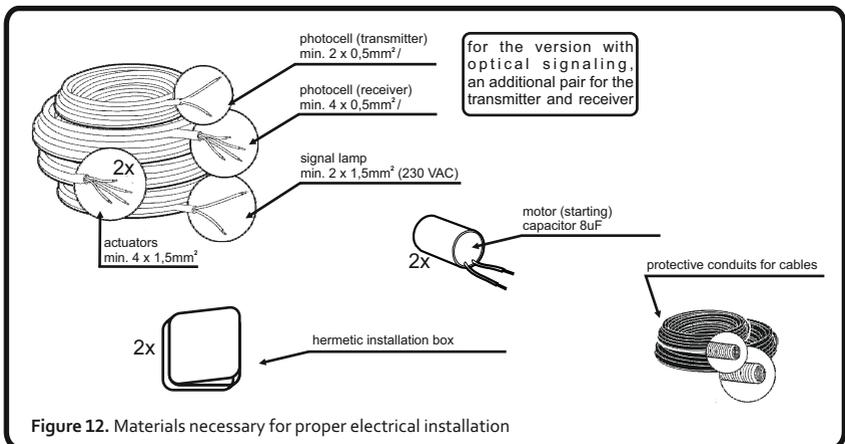


Figure 12. Materials necessary for proper electrical installation

### 3.2. Connecting devices to the controller

Connecting the devices to the controller should be the last installation activity performed in accordance with the instructions attached to the control unit. First, install the motors, lay the necessary cables and attach the safety devices. When installing the installation, use a main switch that cuts off the mains voltage. Please remember that moisture and water destroy electronic devices, so you need to protect the controller against these factors. All openings and cable entries must be sealed to maintain the desired IP protection level. **Electrical and drive automation installations must be performed by experienced and qualified personnel in accordance with applicable law.**

### 4. Acceptance tests

After installing the controller and all associated devices, especially safety ones, final tests should be performed to check the entire automation. These tests should be performed by competent personnel who are aware of the existing hazards! Final tests are the most important phase in the implementation of automation. Individual components such as the motor, photocells, etc. may require specific inspections and it is therefore recommended to follow the inspection procedures contained in the instructions for the components concerned.

Both gate leaves, both when opening and closing, should provide equal resistance to the actuators. Therefore, wings of the same dimensions and weight should be used. Moreover, the plane of the gate leaf should be located relative to the ground in such a way that there is no variation in resistance due to gravity forces when opening and closing the gate.

#### 4.1. Movement direction control

Check whether when the OPENING function is activated, the automation physically moves in the opening direction. In a situation where the movement is in the closing direction or there is no movement at all, disconnect the controller's power supply and reverse the connection of the cables of the appropriate actuator to the OPEN and CLOSE terminals. Check operation again.

#### 4.2. Making any additional controller settings

Set all desired controller operating parameters. This operation should be performed based on the instructions provided with the control panel, where you should look for information about the electrical connections and configuration of the controller itself.

#### 4.3. Security check

If photocells are installed, cause the photocells to be violated and check whether the controller responded appropriately. Proceed in the same way with the remaining safety devices, if installed.

#### 4.4. Checking the functions controlling the movement of the actuator

Check whether all devices (especially safety ones), buttons and radio transmitters control the gate movement correctly. If this is not the case, make the necessary corrections.

#### 4.5. Inspection of emergency gate opening mechanisms

Carry out a trial unlocking of the mechanism with the gate closed in order to check the forces required for this operation.





DTM System hereby declares that the controller complies with Directive 2014/53/EU, 2014/35/EU. The full text of the EU declaration of conformity is available at the following website: [www.dtm.pl](http://www.dtm.pl)

#### TERMS OF WARRANTY

DTM System delivers devices that are operational and ready for use. The introducer grants a warranty on the basis of a correctly completed warranty card and sales document. The introducer undertakes to repair the device free of charge if any defects occur during the warranty period due to the fault of the introducer. The faulty device should be delivered to the place of purchase, including a copy of the proof of purchase, a correctly completed warranty card and a short, clear description of the damage. The cost of dismantling and assembling the device is borne by the user. The warranty does not cover batteries in remote controls, any damage resulting from improper use, unauthorized adjustments, modifications and repairs, or damage resulting from lightning, overvoltage or short circuit in the power supply network. Detailed conditions for granting guarantees are regulated by relevant legal acts.



The presented symbol informs that a given electrical or electronic device must not be disposed of with household waste at the end of its service life. The device should be taken to a specialized collection point. Details of your nearest collection point can be obtained from your local authority. Additionally, you can return the product to your local distributor when purchasing another device with similar features. Appropriate disposal of the device allows you to preserve valuable natural resources and avoid negative effects on health and the environment, which may be at risk in the event of improper waste handling.



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