

Technical Manual

AC-21 Sliding Door Operators DICTAMAT 900-21

The DICTATOR **DICTAMAT 900-21** door operator series in combination with the SQUARE 940 control system complies with the **requirements of the EN 12453 for the "Safety in use of power operated doors"**.

All door operators are equipped with a **mechanical brake** that assures the stop of the door within the required distance even without current. An integrated thermal cutout protects the operator from too high loads.

The position control is done either with **separate limit switches** or an **encoder**, integrated in the motor, that permits a very precise positioning.

Due to the mechanical brake the motor is blocked without current. If the door has to be moved by hand in case of a power failure an additional **mechanical cranking device** can be supplied.

DICTATOR gladly will offer you a solution taking into account the requirements of your individual application. Please ask for a detailed offer and if necessary, CAD-drawings.



Selection Criteria

- For doors up to 10 m (standard)
- Pulling forces from 370 N to 2200 N
- For doors up to max. 4000 kg
- For up to 300 cycles per day (depending on the weight of the door and the speed)
- Position control: integrated encoder or separate limit switches
- Motor blocked without current
- Control system: SQUARE 940
- According to EN 12453



Summary

The new AC-21 series is a consequent application of the modular system already used with the DC-21 series. The AC-21 series offers the possibility of powered operation also of extremely large and/or heavy doors according to the requirements of the EN 12453. The modular system permits individual, customised solutions for every door. All door operators are based on similar modules and are operated with the same control system.

The values in the table below are just for orientation and a preselection. They may differ considerably depending on the type and design of the door, additional standards and legal requirements valid for the respective site. Please ask for our technical support and our customised offer.

Technical Data

Type / Motor Rating	0.18 kw	0.18 kw	0.37 kw	0.55 kw
Force of the motor	370 N	630 N	1200 N	2200 N
Opening and closing speed	separately adjustable			
max. m/sec.	0.4	0.2	0.2	0.15
Voltage	230/400 VAC			
Nominal current pf the control system	8 A	8 A	8 A	8 A
Driving torque (at the axle of the operator)	14 Nm	24 Nm	61 Nm	150 Nm
Braking moment (mechanical brake)	4 Nm	4 Nm	5 Nm	10 Nm
Duty cycle	40 % ED			
IP rating	IP 55			
Weight (without accessories)	10 kg	10 kg	21 kg	40 kg
Doors up to	600 kg	1000 kg	1500 kg	4000 kg
Travel	6 m	6 m	10 m	10 m

Options

- Position control

The standard operator is designed for separate limit switches. The control system however identifies an additional Open position (partial opening) without an extra limit switch. The control system calculates this position - if adjusted once - from the final positions and the memorised travel.

The AC-21 door operators are also furnished with an integrated encoder.

- Mechanical brake

The standard AC-21 operators are equipped with a mechanical brake making sure that even in case of a power failure the door is stopped within the required distances. In case of doors to which the EN 12453 standard does not apply, the door operators can also be furnished without the mechanical brake.

- Mechanical cranking device

All door operators with integrated mechanical brake impede moving the door without current. If the doors have to be moved manually in case of a power failure, the following options are available: additional mechanical cranking device or electromagnetic clutch.

- Accessories

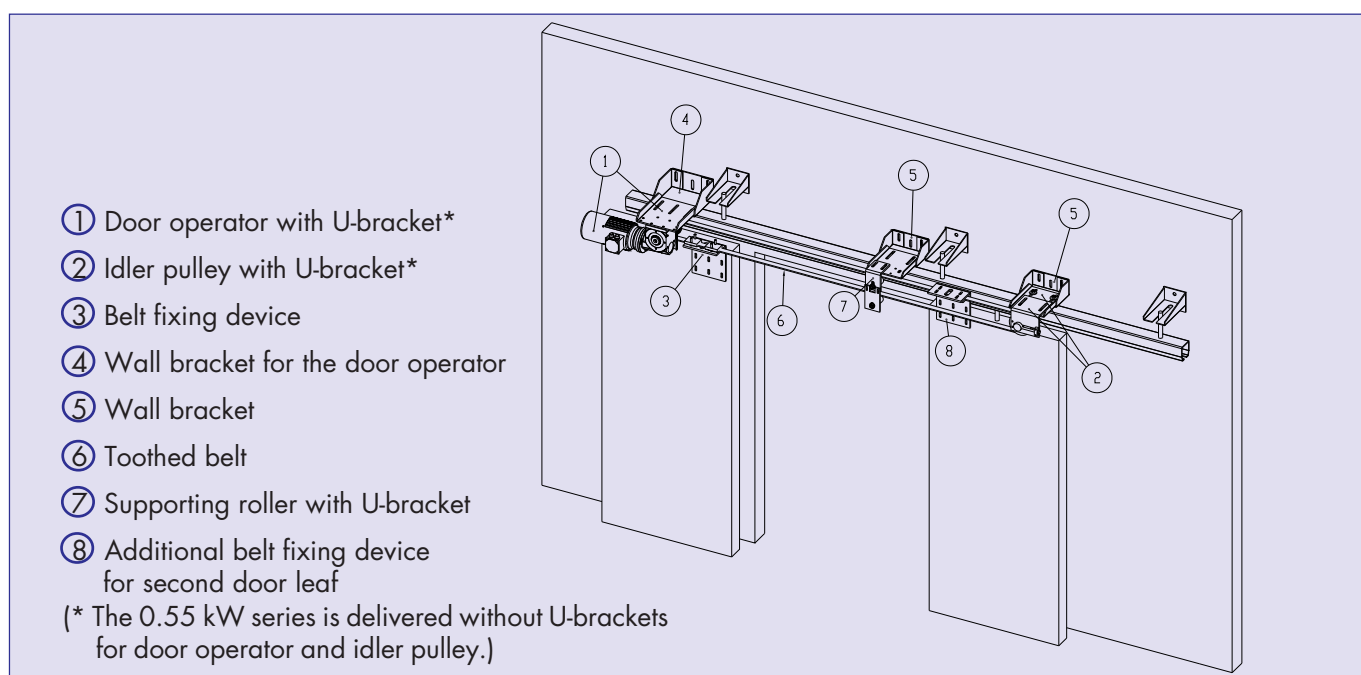
Due to the extremely high forces that occur upon the actuation of the mechanical brake extremely sturdy fixing brackets are required. As the door operator therefore normally cannot be fixed to the rail, we supply special brackets for fixing the door operator to the wall.



Components

The AC-21 door operators transmit the power to the door with the help of a revolving toothed belt. They are normally fixed to the wall, as the rails cannot take up the forces resulting from the action of the mechanical brake.

The following picture shows the components of a AC-21 door operator system for sliding doors.



Components Included DICTAMAT 900-21

- Door operator: worm gear transmission with a 230/400 VAC three-phase motor and integrated mechanical brake, integrated thermal cutout, 2 m connection cable to the control system, driving wheel for toothed belt
- U-bracket for the door operator*
- Idler pulley for toothed belt with integrated tensioning device and U-bracket*
- Belt fixing device for the door

Additional Components

- Integrated encoder
- Mechanical cranking device
- Electromagnetic clutch

Separate Accessories

- Toothed belt (type depends on the motor)
- Wall bracket for the door operator
- Wall bracket for the idler pulley
- Supporting roller with U-bracket for the toothed belt
- Wall bracket for the supporting roller
- Additional belt fixing device for sliding doors with two leaves

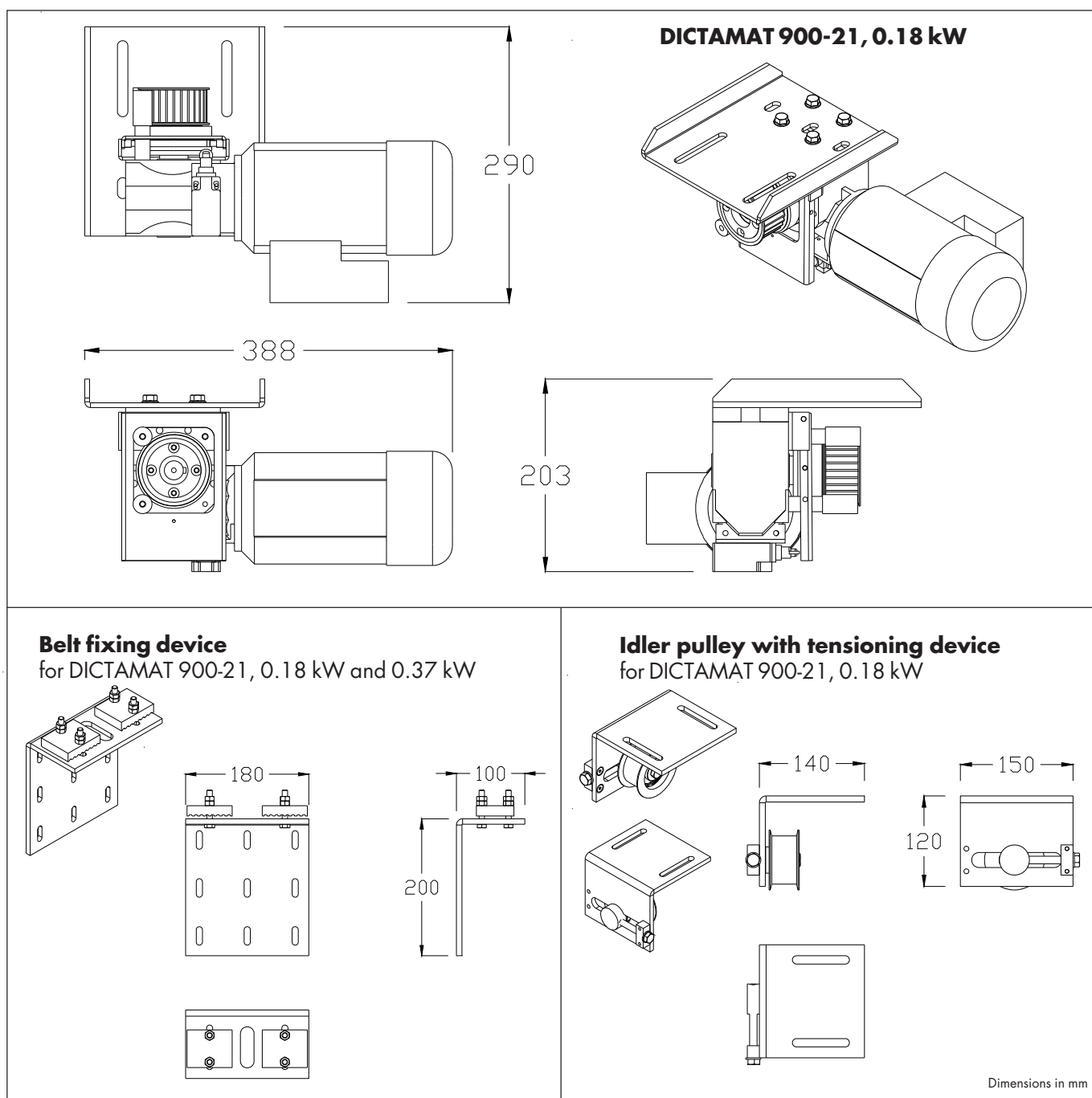


DICTAMAT 900-21, 0.18 kW

The standard components of the DICTAMAT 900-21, 0.18 kW are besides the door operator with U-bracket the idler pulley for toothed belt with integrated tensioning device as well as the belt fixing device. The 0.18 kW door operator uses the HTD 8 toothed belt. The width (either 20 or 30 mm) depends on the weight of the door and the required speed.

The 0.18 kW door operator needs an especially designed idler pulley. The belt fixing device is used both for the 0.18 and 0.37 kW door operator.

Wall brackets for the door operator and the idler pulley are to be found on page 04.017.00.





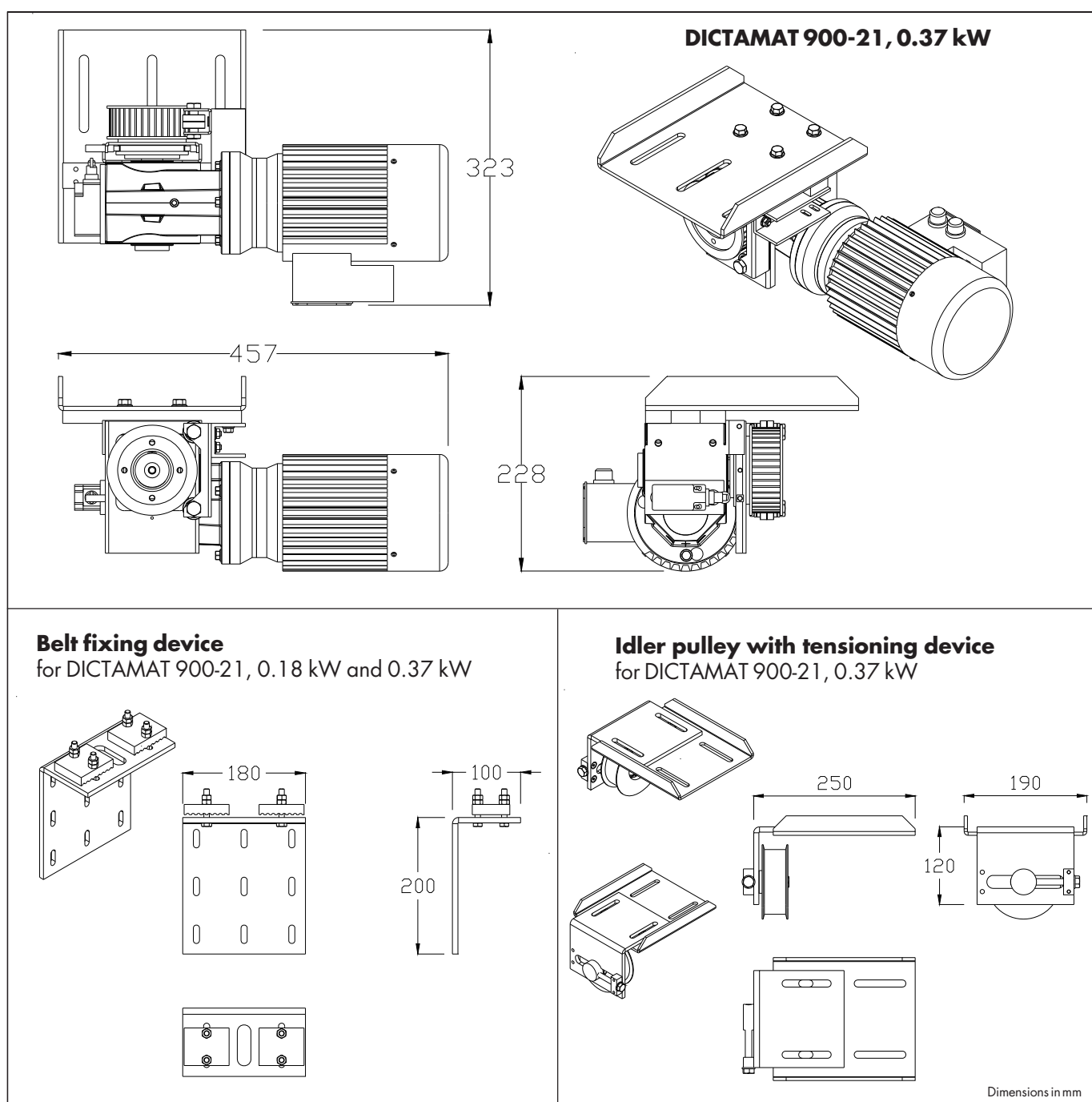
DICTAMAT 900-21, 0.37 kW

The standard components of the DICTAMAT 900-21, 0.37 kW are besides the door operator with U-bracket the idler pulley for toothed belt with integrated tensioning device and U-bracket as well as the belt fixing device.

The 0.37 kW door operator uses the 30 mm wide HTD 8 toothed belt.

The 0.37 kW door operator needs an especially for this type designed idler pulley. The belt fixing device is used both for the 0.18 and 0.37 kW door operator.

Wall brackets for the door operator and the idler pulley are to be found on page 04.017.00.



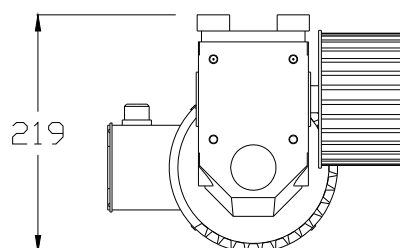
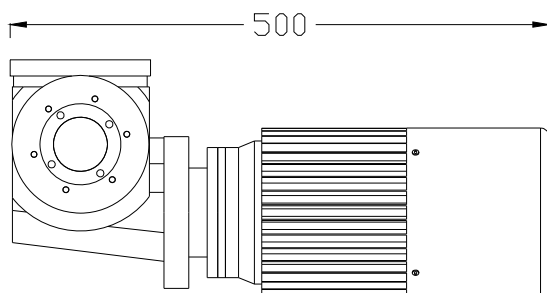
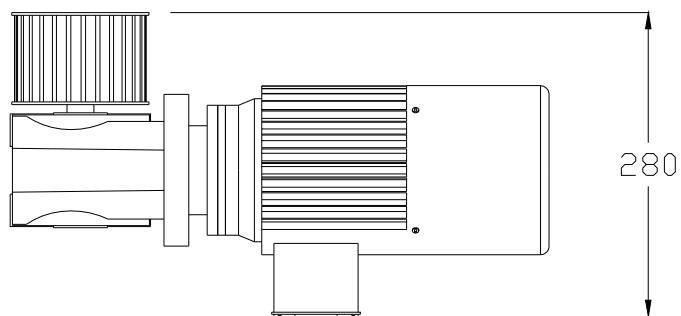
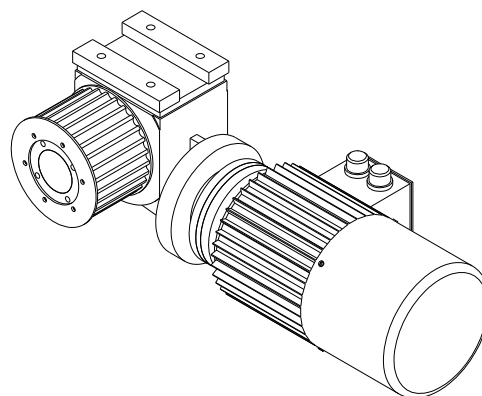


DICTAMAT 900-21, 0.55 kW

The standard components of the DICTAMAT 900-21, 0.55 kW are besides the door operator the idler pulley for toothed belt with integrated tensioning device as well as the belt fixing device. Due to the extremely high forces acting in case of the mechanical Emergency-Stop fixing brackets have to be designed individually for each application.

The 0.55 kW door operator uses a 55 mm wide toothed belt.

DICTAMAT 900-21, 0.55 kW



Dimensions in mm

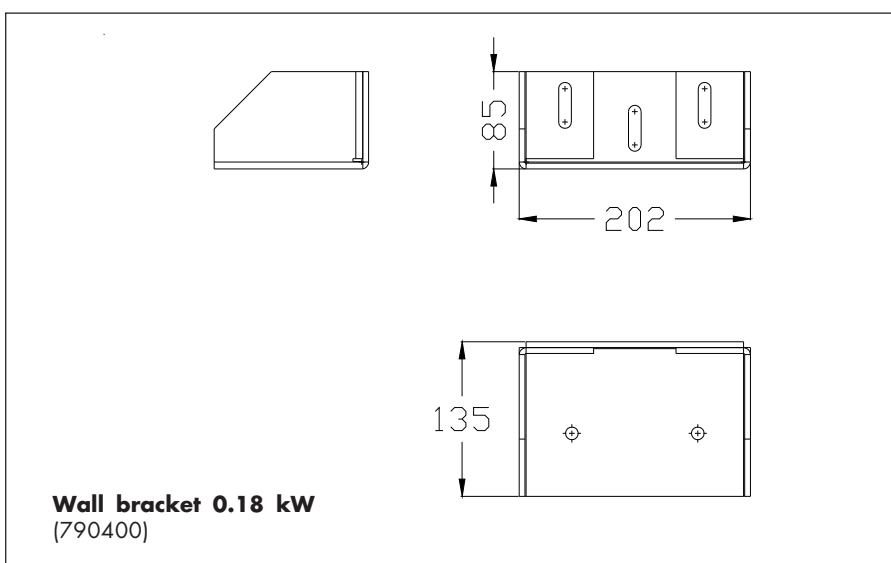
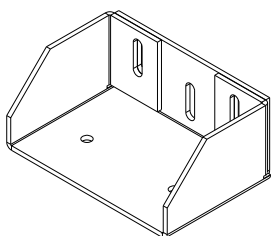


Accessories

In order to assure the necessary stability the DICTAMAT 900-21 door operators are normally fixed to the wall. There are special wall brackets available that are designed especially for the U-brackets delivered with the door drives and that withstand the high forces in case of an Emergency-Stop.

The wall must be sturdy enough to absorb the pull and shear forces. Furthermore special dowels for dynamic loads have to be used.

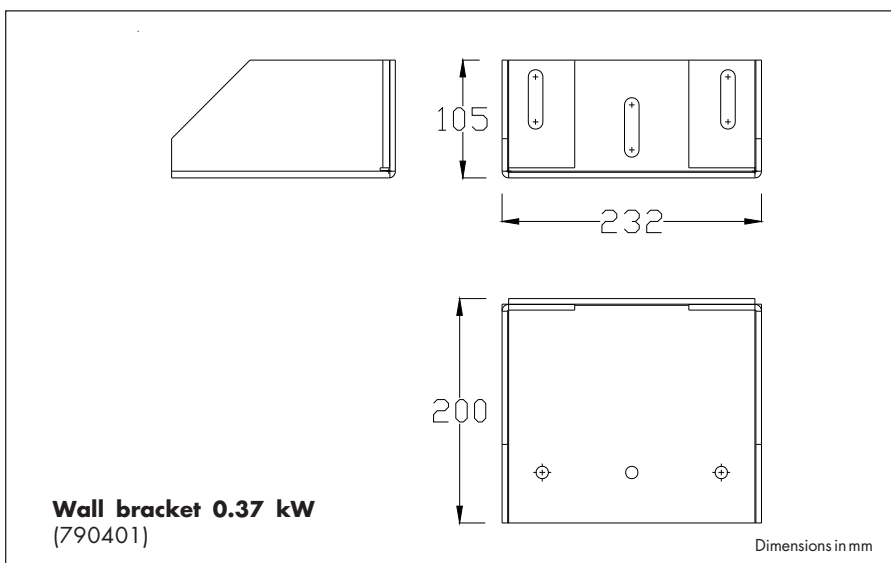
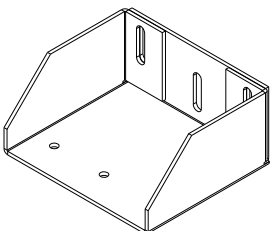
Wall Bracket 0.18 kW



Use of the wall bracket 0.18 kW:

- DICTAMAT 900-21, 0.18 kW door operator
- Idler pulley with tensioning device for DICTAMAT 900-21 0.18 kW
- Idler pulley with tensioning device for DICTAMAT 900-21 0.37 kW
- Supporting roller for DICTAMAT 900-21 0.18 and 0.37 kW

Wall Bracket 0.37 kW



Use of the wall bracket 0.37 kW:

- DICTAMAT 900-21, 0.37 kW door operator



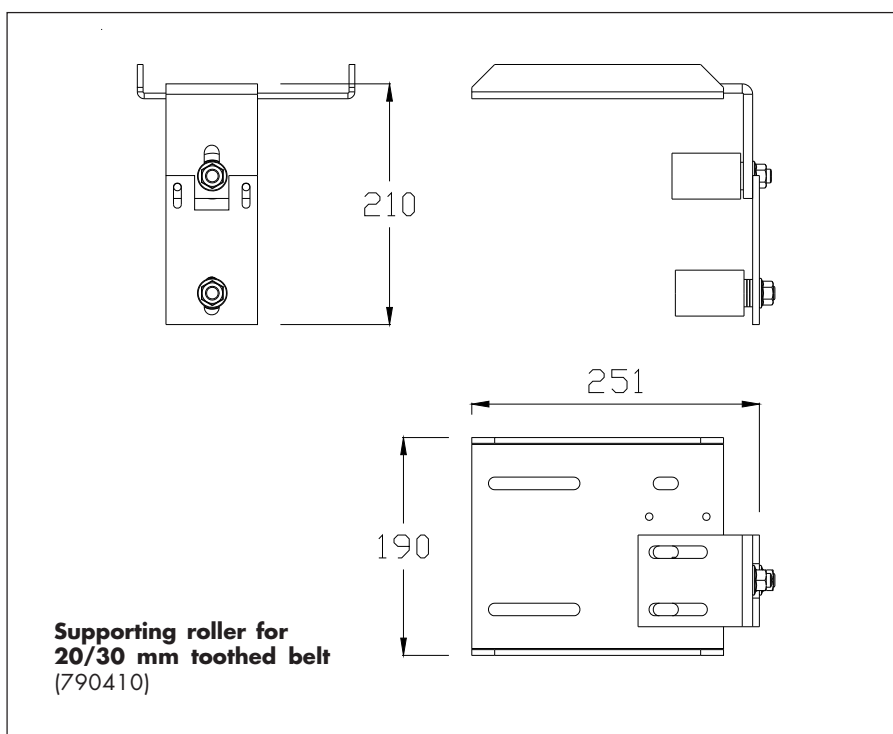
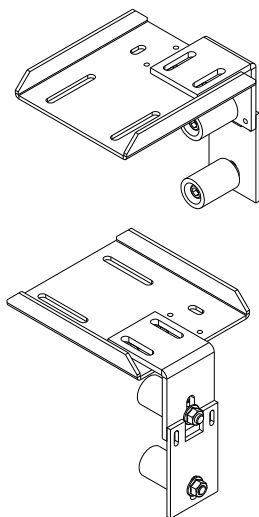
Accessories - continued

Some of the accessories can be used both for the 0.18 kW and 0.37 kW series. Among those are the supporting roller for the thoothed belt and the additional belt fixing device for doors with two leaves.

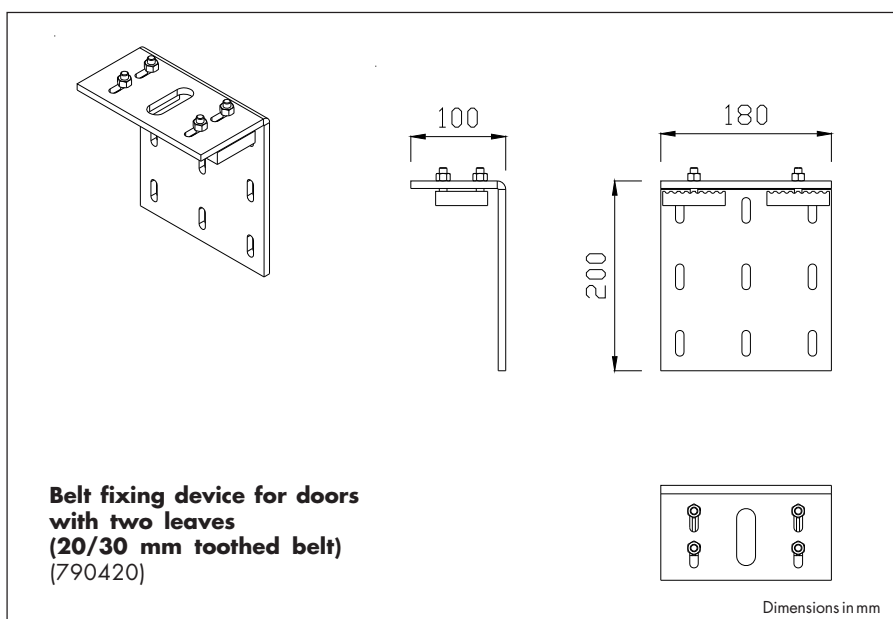
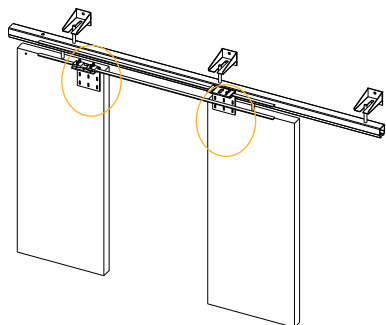
The supporting rollers prevent the sagging of the belt. They have to be used whenever the toothed belt would run unsupported for more than four meters. The rollers are generally furnished together with an U-bracket. An additional wall bracket is available (see preceding page).

In case of doors with two leaves an additional belt fixing device is required. It is always the upper part of the belt that is fixed to this device.

Supporting Roller for 20/30 mm Toothed Belt



Belt Fixing Device for Doors with Two Leaves (20/30 mm Toothed Belt)

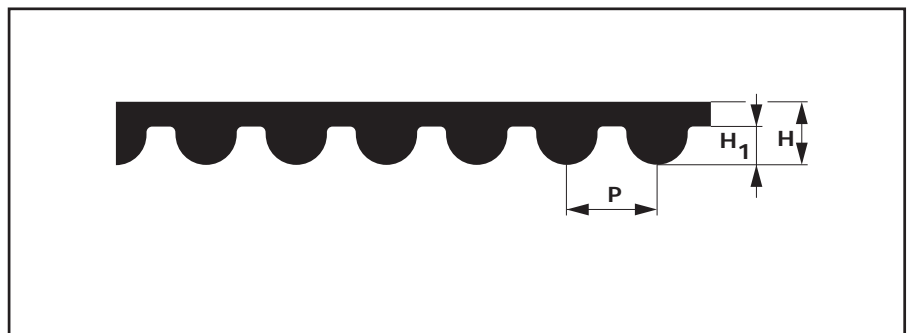




Accessories - continued

The power transmission of the AC-21 door operators is done with a toothed belt. There are different types, depending on the size of the door and the forces. The EN 12453 standard requirements result in a rather strong toothed belt for larger doors.

Toothed Belt



Technical Data

Type	HTD 8M	HTD 14M
P	8	14
H	5.6	10.6
H₁	3.4	6.1

Material	PU (polyurethane)	
Tensile material	steel cord	
Operating temperature	-30° to +80 °C	
Resistant against	UV, ozone, oil and grease	
Tension load:	- HTD 8M toothed belt, 20 mm wide	2680 N
	- HTD 8M toothed belt, 30 mm wide	4030 N
	- HTD 14M toothed belt, 55 mm wide	10930 N



Order Information

Below are listed the part numbers of the most common door operators. There is a much larger range of door operators available, e.g. with mechanical cranking device etc. Please contact us and ask for an offer for your application.

The components included in the delivery are listed on page 04.013.00. The meaning of the different letters and numbers is explained below.

Information on the SQUARE 940 control system and further components of a powered door installation as push buttons, safety equipment and limit switches are to be found later on in this chapter.

Order Information Door Operators

DICTAMAT 900-21 ZEB	0.18 - 0.4	Part no. 790000
DICTAMAT 900-21 ZLB	0.18 - 0.4	Part no. 790050
DICTAMAT 900-21 ZEB	0.18 - 0.2	Part no. 790100
DICTAMAT 900-21 ZLB	0.18 - 0.2	Part no. 790150
DICTAMAT 900-21 ZEB	0.37 - 0.2	Part no. 790200
DICTAMAT 900-21 ZLB	0.37 - 0.2	Part no. 790250
DICTAMAT 900-21 ZEB	0.55 - 0.15	Part no. 790300
DICTAMAT 900-21 ZLB	0.55 - 0.15	Part no. 790350

Order Information Accessories

Wall bracket 0.18 kW	Part no. 790400
Wall bracket 0.37 kW	Part no. 790401
Supporting roller for 20/30mm toothed belt	Part no. 790410
Belt fixing device for doors with 2 leaves (20/30 mm toothed belt)	Part no. 790420
HTD 8M toothed belt, 20 mm wide	Part no. 710490
HTD 8M toothed belt, 30 mm wide	Part no. 710491
HTD 14M toothed belt, 55 mm wide	Part no. 710485

Legend:

Z	Power transmission by toothed belt
E	Position control with separate limit switches
L	Position control with integrated encoder
B	Mechanical brake
0.18 - 0.4	Motor 0.18 kW, speed 0.4 m/s

Installation Instruction for Sliding Door Operators DICTAMAT AC 900-21

1) Security Advice

It is essential to follow the operating instructions to guarantee for a safe operation and in case of warranty claims. Defects due to not obeying the operating instructions void any warranty claims. The manufacturer and distributor assume no liability for damages and subsequent damages resulting from inappropriate operation and for any damages to property or persons due to wrong operation or not obeying the operating instructions.

This technical manual contains important advice for the service. It should be kept near the door operator.

In addition to the technical manual please pay attention to the warning and security signs on the installation.

The DICTAMAT door operator has exclusively been designed to automatically operate sliding doors/gates together with a DICTATOR control system. The manufacturer and distributor assume no liability for any applications not corresponding to the defined use.

A precondition for permanent and safe operation of the DICTAMAT door operator is regular maintenance. This has to be effected by professionals. In case the maintenance is not realized regularly or not by authorized personnel, the manufacturer or distributor is not liable for damages and their implications. We recommend you place a contract with your distribution partner.

Subsequent changes of the DICTAMAT door operator may only be effected by authorized personnel. In case it is not at once possible to remedy failures which could lead to dangerous situations, the operator of the installation has to be informed and the installation has to be put out of action. The repair has to be done as soon as possible.

The **electrical installation** has to be effected by an **authorized professional**. Please observe the regulations concerning the correct dimension of the motor feeding lines.

The door/gate has to be provided with **fixed mechanical final stopping devices**. They are needed for the teaching run if you use an incremental encoder.

2) Controls before Installation

a) Is the **door operator complete?**

- operator
- idler pulley
- belt fixing device with belt tensioner
- toothed belt/chain
- control system

b) Is the door/gate running smoothly?

Installation of the DICTAMAT AC 900-21

3) Installation Door Operator

The door operator can be mounted to the rail either in the open or closed position of the door/gate. It is fixed with the wall bracket to the wall above or beside the rail. The operator weighs up to 40 kg (depending on the version). In addition you also have to take into consideration the forces which have to be transferred to the door. It is very important a **strong enough fixing** is provided on site.

Fix the wall bracket to the wall (see drawing for drilling pattern). Fix the U-bracket to the wall bracket. Screw the door operator from below to the U-bracket. The operator can be positioned due to the oblong holes in the U-bracket. Align the operator parallel to the rail and then tighten the two attachment screws (SW17) from below until the door operator cannot move any more.

Unscrew the cover of the driving wheel and of the belt coming-off prevention device respectively.

Idler Pulley

Fix the idler pulley at the **opposite side of the rail** to the wall bracket and this to the wall. Align the idler pulley provisionally with the help of the oblong holes in the bracket and tighten the screws (SW17).

Position of Belt Fixing Device

Height: depends on whether the upper or lower belt/chain shall be fitted. Measure the distance between the lower edge of the rail and the belt/chain on the operator. This measure determines the upper edge of the belt/chain fixing device. Later the fixing device can exactly be aligned by means of the oblong holes in the mounting bracket.

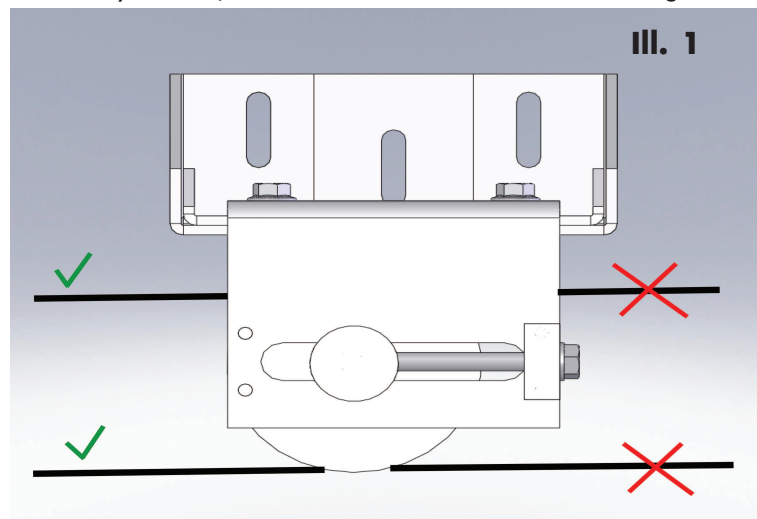
Screw the belt/chain fixing device to the door.

Then **completely open and close the door once by hand**.

Toothed Belt/Chain

Fix one end of the toothed belt/chain to one side of the clamping plate of the belt/chain fixing device.

Guide the other end of the toothed belt/chain over the idler pulley (see ill.1) and driving wheel of the DICTAMAT door operator (or the other way round) to the other side of the belt fixing device.



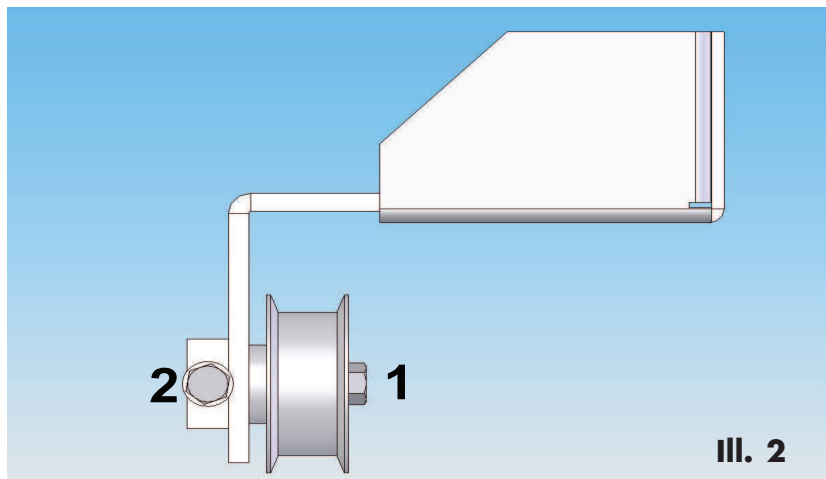
Installation of the DICTAMAT AC 900-21 , cont.**Check of Alignment**

Insert the toothed belt/chain into the other clamping plate of the belt/chain fixing device, guide the belt through the oblong hole downwards and pretension it by pulling manually. Tighten the screws of the clamping plate.

Tensioning of Belt

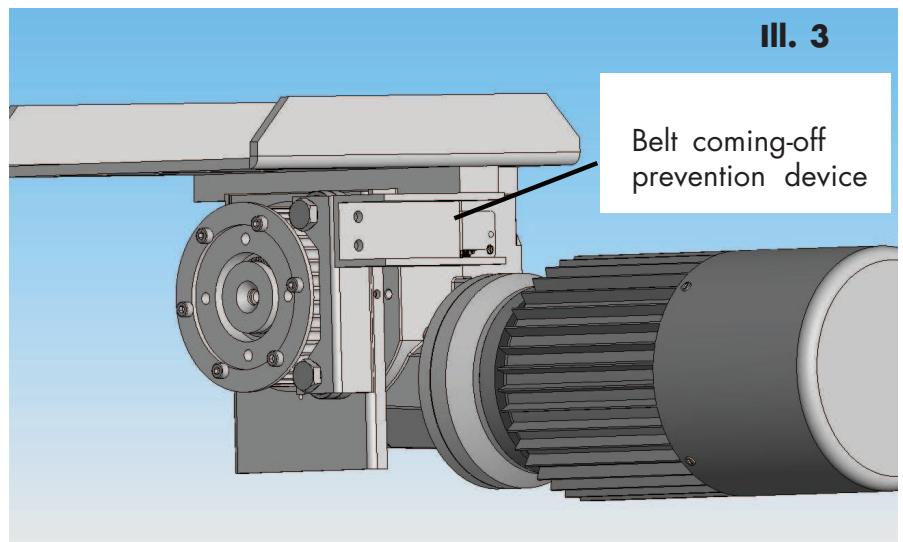
Check the exact alignment of door operator, idler pulley and belt fixing device. If they should not be aligned in one line, adjust the position and then tighten all screws hard.

Now finally tension the toothed belt/chain with the lateral screw on the idler pulley as follows (see illustration 2):



1. Loosen screw no. 1 (M10 SW17)
2. Tension the toothed belt with screw no. 2 (M10 SW17)
3. Tighten screw no. 1 (40 Nm)

Put back the cover over the driving wheel of the door operator and fix it. Please make sure the toothed belt/chain does not rub against the cover.



Installation of the DICTAMAT AC 900-21, cont.

4) Installation of the Final Switches

Separate final switches are only necessary, if you have a door operator without integrated position control (incremental encoder).

At the most you should provide 4 final switches (opener) (depending on the used control system):

- closed position
- position of crawling speed closing
- position of crawling speed opening
- open position

Connection Cables to the Control System

The DICTAMAT door operator is furnished with a 2 m connection cable to the SQUARE 940 control system.

DICTAMAT with incremental encoder:

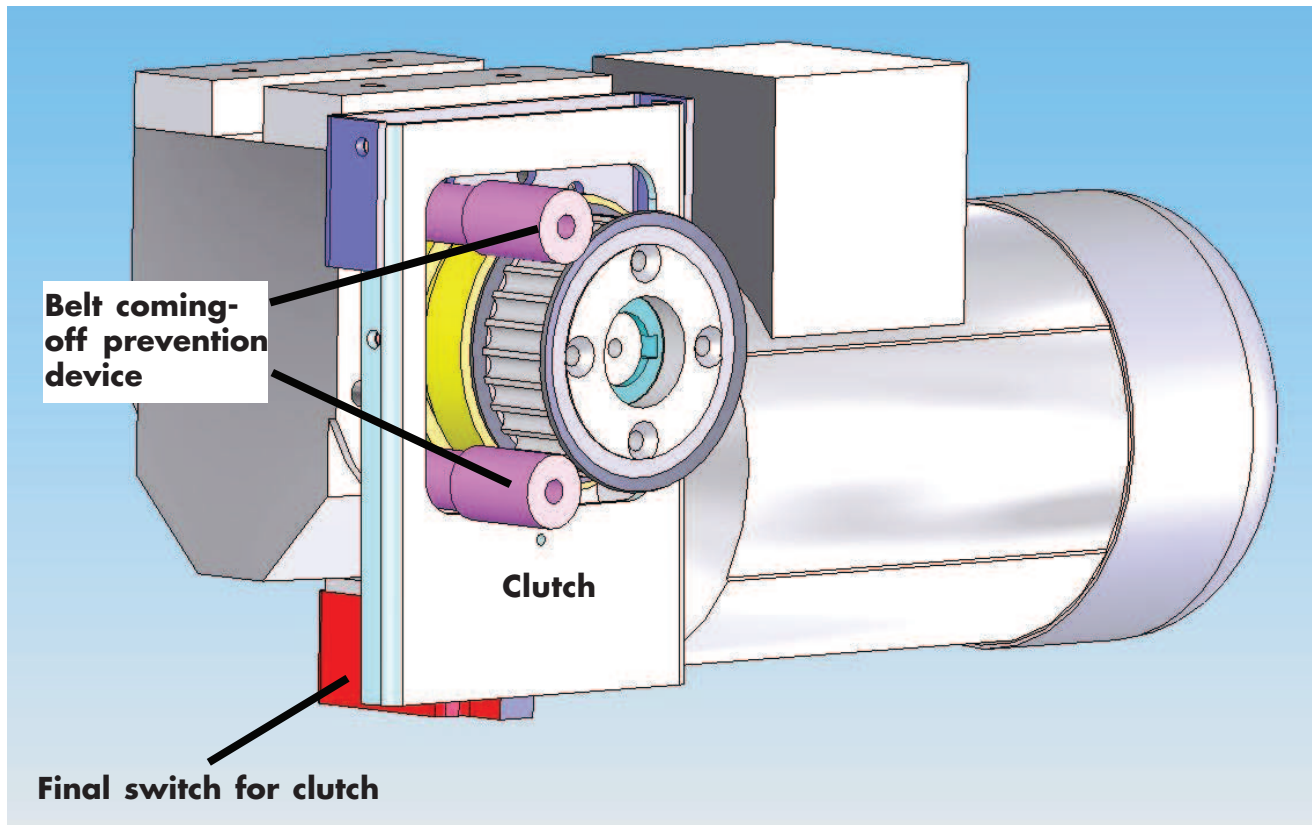
- 1 motor cable,
- 1 cable to connect the incremental encoder,
- 1 cable to the brake,
- 1 cable to the thermal contact of the motor.

DICTAMAT for final switches:

- 1 motor cable,
- 1 cable to the brake,
- 1 cable to the thermal contact of the motor.

We use screened cable to eliminate any perturbations. In case you have to lengthen the cable, please mind the advice given in the manual of the control system. The cable is provided with cable glands. It is already connected to the door operator (**only for the SQUARE 940 control system**) and just has to be connected to the control system. For the connection in the control system, please see the connection diagram in the manual of the control system (SQUARE 940).

Information on how to adjust the final positions, speed etc. you will find in the manual of the used control system.

Manual Clutch for the DICTAMAT AC 900-21

Due to the integrated brake all DICTAMAT sliding door operators are very rough-running during power failure. By means of the manual clutch the driving wheel is separated from the gearbox and then can be moved easily. This makes it possible to move the door freely.

The clutch is actuated by the included rope. The pulled rope has to be fixed so that the final switch on the door operator is actuated when the clutch is disengaged.

The final switch, once the clutch is disengaged, sets the control system on "STOP".

Connection of the clutch final switch: to the LOCK-input, see manual of the Square 940 control system.

After releasing the rope, the driving wheel moves back automatically as soon as it moves.

After the driving wheel has completely returned to its normal position, you must, to prevent personal and property damages, cut off the control system from the mains for about 10 seconds. Then let the door make a reference run, i.e. press the button OPEN till the reference point is reached.



Maintenance, Servicing

To guarantee the correct functioning of the door/gate and a long operational life of the door operator, the whole installation should be controled and serviced every month. The following controls should be effected:

- a) **Is the complete area of the door in the opening and closing direction free of obstacles?**
If necessary, apply floor markings or renew them.
- b) **Check all fixings of the door and door operator,**
including the belt fixing device and the idler pulley.
- c) **Check doors/gates for damages:**
 - bent closing edges and
 - bent frames (they may prevent the complete closing)
- d) **Check the fittings for damages:**
lock, latch, door handle(s), damper, running gear, rail etc.
- e) **Check the connection cables for damages.**
- f) **Check the drive belt for damages and wear.**
- g) **Check the tension of the belt. The belt may not skip.**
- h) **Check the final positions OPEN/CLOSE.** (Does the dorr operator switch off?)
- i) **Check the speed when opening/closing.** (Does it meet the regulations?)
(The closing edge of doors/gates moving too fast is extremely dangerous.)
- j) **Check the function of all push buttons and safety elements (light barriers etc.).**
- k) **All defective parts have immediately to be repaired or replaced.**
- l) **The results of the maintenance and checks as well as the effected repairs have to entered into the maintenance book and the operator of the installation has to be informed.**

We recommend a service at the latest after one year or 100 000 movements.