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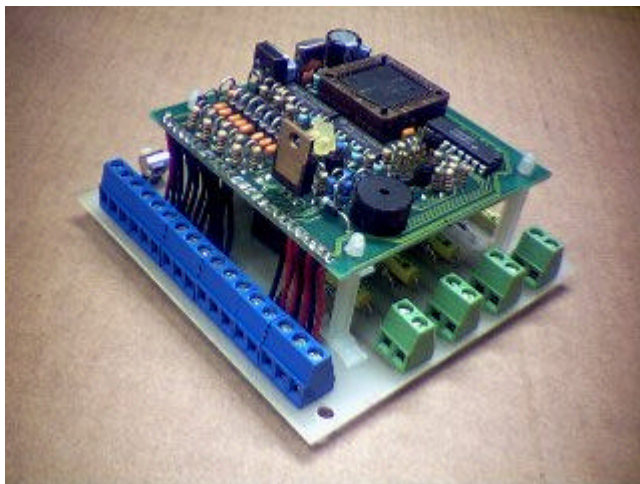
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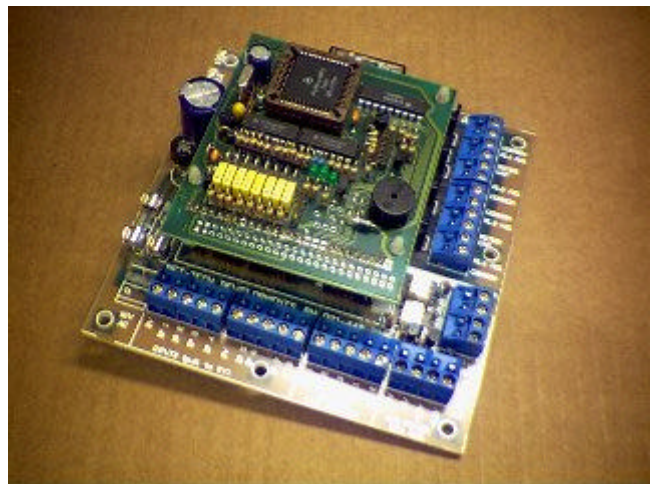
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DGC-MK2 DOOR / GATE CONTROLLER

The DGC-MK2 is a versatile automatic gate or door controller that can stand-alone or be interfaced to an access control system.



DGC-MK2 controller Version 1



DGC-MK2 controller Version 2



Typical garage internal manual control

The DGC-MK2 is a microprocessor based circuit module. It provides interfacing and logic functions to control a standard motorized gate or door. **For high-speed gates or doors, see the DGC-MK4 controller.**

As part of an access control system the DGC-MK2 will simplify programming and installation, often eliminating the need for an additional PLC or logic controller. It will look to the access control system like a simple pedestrian door.

In a domestic or stand-alone situation the DGC_MK2 can easily be interfaced to a remote control receiver, alarm panel or home automation system.

In most cases the DGC-MK2 will completely replace the relay and timer logic, and complex wiring of existing gate and door control cabinets.

The DGC-MK2 can be mounted in a cabinet with other control equipment or be mounted on its own on a wall adjacent to the gate or door being controlled.

For the purposes of these instructions, The Version 1 and Version 2 units are identical.

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FEATURES

- IDEAL FOR DOMESTIC AND COMMERCIAL GATES AND GARAGE DOORS.
- SIMPLE TO INSTALL, SETUP AND USE.
- NO PROGRAMMING EQUIPMENT REQUIRED.

- SIMPLE CONTROL INTERFACING.
- SUPPORTS MULTIPLE (parallel) CONTROL POINTS.
- MANUAL OR AUTOMATIC (timed) CLOSING.
- PEDESTRIAN FUNCTION (part open).
- FULLY PROGRAMMABLE TIME DELAYS.
- REMEMBERS TIME DELAY SETTINGS DURING POWER FAILURE.
- PROVIDES AUTOMATIC SAFETY/SECURITY LIGHTING CONTROL.
(considerable power saving possible with lighting control).

- FULL SAFETY BEAM SUPPORT LOGIC.
- MOTOR OVERLOAD MONITORING.
- ONBOARD 230V SINGLE PHASE MOTOR AND LIGHT SWITCHING.
- SUPPORTS DUAL SPEED DRIVE (with external speed controller).

- 4 CONTROL INPUTS (open, close, stop, light).
- 2 SAFETY INPUTS (safety beam, motor overload).
- 4 CONTROL OUTPUTS (open, close, brake, light).
- 3 STATUS OUTPUTS (operating, closed, alarm).
- OUTPUTS CAN DRIVE ADDITIONAL MOTOR SWITCHING RELAYS.

- EASILY MOUNTED MODULE.
- OPTIONAL WEATHERPROOF PLASTIC ENCLOSURE.
- REQUIRES SINGLE 12 Volt OR 24 Volt DC, 150 mA POWER SUPPLY.
- FULL WATCHDOG AND PROCESSOR SUPERVISION.

For more information and pricing details contact paul@pmb.co.nz

IMPORTANT NOTICE

If you are at all unsure about the installation or operation of gates, doors or the DGC_MK2 controller, seek advice.

There are two basic types of gate control:

1. Simple timed operation, no reliance on limit switches.
2. Limit switch based operation.

The simple sort (1 above) can be applied to slow moving gates or doors in some situations only. PMB does not recommend this type of control.

The second type of control relies on limit switches with secondary timing. This ensures that the gate is always cycled between two known points, closed and open. Unfortunately, this requires the limit switches to be in good working order. A failure to operate correctly will usually be the result of a failed or miss-aligned limit switch. Bigger is not always better. Larger switches tend to have silver contacts. These are not the best for low currents, gold contacts should be chosen.

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DOORS AND GATES

AN INTRODUCTION

DOORS: For this document, DOORS fill holes in building walls and are roller, tilt, sliding and anything that is not a gate. Generally mechanically more complex than gates.

GATES: For this document, GATES fill holes in fence-lines are sliding and swing units. Generally mechanically less complex than typical doors.

For simplicity, reliability and safety, PMB prefers cantilevered sliding gates.

Automating existing or installing from scratch, the problems are similar.

Cost is usually the customers biggest concern. With automatic doors and gates, you get what you pay for. A higher cost generally reflects faster and more reliable operation. Some reduce price by reducing Safety features.

Speed of operation is the most obvious characteristic, varying from around 100 mm/second (40 seconds to open a smallish 4 meter gate) to well over 1 meter/second (2 to 3 seconds for the same 4 meter gate).

NOTE: Sliding gates and doors can be very fast, roller and tilt type doors are generally slower for mechanical reasons.

Slow doors and gates are easy to control, apply power and they move, remove power and they stop where they are. Fast gates accelerate when power is applied and coast a long way when power is removed.

Fast gates must be as safe as possible for the users. A car or person being hit by a fast gate WILL be damaged. The installation company MUST do everything possible to limit their liability in the case of an accident. Accidents do happen. It is surprising how many people will speed up in an attempt to beat a closing door or gate.

Many slow doors and gates are controlled by a box full of relays and timers. The advantage is that almost any electrician can understand it. The disadvantage is higher cost and long-term relay reliability problems.

With many companies specializing in automatic doors and gates, and the requirements for interfacing to access control systems, electronic controllers are a better option.

A number of off the shelf actuator and controller packages are available. These are generally light duty rated and slow. Some are difficult to interface to other control systems.

- * The DGC controllers are not aimed at the bottom end of the market.
- * The DGC-MK2 is intended for slow to medium speed doors and gates, generally where connection to an access control system is required.
- * The DGC-MK4 is intended for high speed gates, offering full proportional speed control, battery backup, and PC programming and monitoring. Fully electronic DC motor drive (no relays).

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DGC-MK2

DOOR / GATE CONTROLLER

A CONTROLLER FOR SLOW TO MEDIUM SPEED DOORS AND GATES

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Do not disclose to third parties without written authorization of Paul Bealing (PMB).**

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INSTALLATION INSTRUCTIONS

Much of the following information is intended to improve the operation and long term reliability of this and other electronic equipment. This in turn reduces the cost to the installation company and the customer.

In some cases the condition of equipment returned under warranty will determine whether or not the warranty is valid.

HANDLING PRECAUTIONS

Considerable care must be taken when handling any Printed Circuit Board (PCB). Failures can result from Mechanical damage and/or Electrostatic damage.

MECHANICAL DAMAGE

Mechanical damage occurs when a PCB is knocked or bent.

Knocking or bumping can damage the components on the PCB, and can even damage the PCB itself. Applying pressure to a component can separate the copper tracks that the component is soldered to, from the PCB material. This often causes the track to break, resulting in unreliable operation or total equipment failure.

Bending or flexing a PCB most often happens when mounting and connecting. As the components and PCB tracks get smaller, the bending does more damage. Tracks and components can easily be loosened or broken.

ELECTROSTATIC DAMAGE

Electrostatic damage occurs when static electricity is discharged or conducted through electronic components.

The conductive parts of the PCB should not be touched directly unless at a suitably equipped anti-static workstation. Pick the PCB up, and handle it by its edges only.

Static electricity is generated by movement and surfaces rubbing together. Simply walking across a carpeted room can sometimes generate enough of a charge to give you a shock when you touch something earthed. Often the charge you carry is too small for you to detect, but when it is conducted through an electronic circuit, that circuit is often damaged or weakened.

The damage can be severe enough to be noticed immediately or more often create an unnoticed weakness that will become a major component failure in the future.

Whenever a circuit board (PCB) is not properly mounted, it must be inside a static conductive bag. Not all bags are coated on both sides; therefore the PCB should not be placed on the outside of the bag.

Before removing a PCB from its protective bag, you must be wearing a wrist strap connected to an earthing point (metal chassis) of the equipment you are working on. The equipment must also be earthed.

SIZE / COST / REPAIRABLE

Size does not reflect serviceability or price. These days with sub-miniature components and automated assembly, circuit boards are often not repaired when faulty, simply replaced. PMB will make every effort to repair where possible any item returned for service in an effort to reduce the cost to the owner.

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TECHNICAL SUPPORT

PMB Electronics will provide as much support as possible to installers and maintainers of this and other PMB Electronics supplied products.

PMB is interested in any comments or problems that arise from the installation and use of this equipment. This information can be used to improve the performance and ease of use of this equipment.

PMB Electronics can be contacted:

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INSTALLATION

MOUNTING

When supplied as a PCB only, the DGC-MK2 must be mounted into a cabinet, most likely with other control equipment. This should be done in a clean workshop.

The PCB should be mounted using nuts, bolts and spacers, or nylon PCB stand-offs. Hot melt glue and double-sided tape are not acceptable.

Enough room must be allowed to ensure that cables can easily be removed from and connected to the module without risking accidental shorts. Don't forget that the relay outputs can switch 230 Volts AC directly.

When supplied in an enclosure, this can be mounted inside another larger enclosure, or screwed directly to a wall or ceiling. If the DGC-MK2 is to be mounted outside, all mounting and cable entry points must be sealed to prevent moisture entry.

CONTROLS

The 3 main controls (open, close, stop) must be accessible for delay programming. It is recommended that 3 small push buttons be mounted inside the control cabinet. These controls can be used during installation, programming and service. Being inside the cabinet, they are not accessible to the users.

If the user is to have access to delay programming suitable controls must be available, see "PROGRAMMING THE DELAYS" later in this document.

POWER SUPPLY

The DGC-MK2 requires a 12 Volt DC or 15 to 30 Volt DC power supply. The supply does not have to be regulated but should be clean of noise spikes and voltage dips (brown-outs). In an industrial or very harsh location, mains filtering may be required.

VOLTAGE SELECT LINK

There is a link located on the bottom PC Board between the fuse and a capacitor. It should be placed onto the 2 pins closest to the fuse for a 12 Volt DC supply. The link should be placed in the 2 pins closest to the capacitor for a 15 to 30 Volt DC supply.

CONNECTION TYPES

INPUTS

The inputs are switched to 0V common to activate. This allows a number of control points to be connected in parallel with normally open inputs or series with normally closed inputs.

The safety beam input must be closed (normally closed, to 0V) for the gate/door to close (fail safe). All other inputs are normally open, closing to activate.

The inputs are pulled up to 12 Volts by internal 10K resistors. Measuring the voltage of an input that is not active will reveal 6 to 12 Volts. When the input is active, the voltage should be between 0 and 2 Volt.

inactive =	6 to 12 Volts
undefined =	2 to 3 Volts
active =	0 to 2 Volts

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If the input voltage is between 1 and 2 Volts when active or between 3 and 4.5 Volts when inactive, the DGC-MK2 may work correctly now, but could be affected by noise picked up by the input cabling.

The inputs do have noise and over-voltage protection, but it is not good practice to rely on this for long term reliability. If you have or suspect a noise problem, deal with it at the time of installation, not when the customer complains of erratic operation. This applies to any equipment installation.

OUTPUTS

There are 2 types of outputs:

1. Relays: (230V 8A)

Open = closing to drive motor.
Close = closing to drive motor.
Brake = closing to secure brake.
Light = closing to activate lighting.

2. Transistor: (open collector with series 100 OHM resistor 0.1A)

These can drive small indicators (LED) or small relays.

Operating = 12V indication or access system.
Closed Indication = 12V indication or access system.
Alarm Output = 12V indication or access system.
Open Control = additional 12V motor switching relay.
Close Control = additional 12V motor switching relay.

The 230V wiring must be physically separated from the low voltage wiring within the enclosure.

Be sure to isolate (switch off) the mains before working on the 230 Volt wiring. If live mains wiring contacts the electronics the DGC-MK2 will be destroyed.

INPUT CONNECTIONS

POWER SUPPLY

The DGC-MK2 requires 12V or 24V AC or DC at approximately 100 mA. In most situations there is no advantage in providing battery backup of the controller when the motor being controlled is driven from the mains AC supply.

OPEN CONTROL INPUT

When made active, will cause the gate/door to open. If held active the gate/door will remain open until this input is released (useful for time zone control by access control system).

CLOSE CONTROL INPUT

When made active, will cause the gate/door to close. If held active the door/gate will not be able to be opened by the open control input. Generally not used. Can be used to disable the Open control input with the gate/door closed.

The close control input is also used to cancel alarms when the gate/door is closed.

SAFETY BEAM INPUT

From one or more safety beams. When active (open circuit) will prevent the gate/door from closing, e.g. when obstructed by a vehicle or pedestrian. When closing from fully open the beam input will re-open the gate/door. When closing from the pedestrian position, the beam input will only stop the gate/door from closing until the beam is clear.

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OVERLOAD INPUT

When active, will inhibit the drive outputs. Used with an overload detection device to protect the drive motor. Generates an alarm output and constant tone from the controller Piezo buzzer.

OPEN LIMIT INPUT

When active indicates to the DGC-MK2 that the gate/door is fully open. Used to stop the drive motor when gate/door reaches the fully open position.

CLOSE LIMIT INPUT

When active indicates to the DGC-MK2 that the gate/door is fully closed. Used to stop the drive motor when the gate/door reaches fully closed position.

LIGHT CONTROL

When pulsed active (open circuit) with the lights off, will turn lights on for the programmed light time (default = 3 minutes). Pulsing this input when the lights are already on re-starts the light time period. If latched on, the lights stay on until released and the light time has expired.

This input is usually connected to one or more light switches and PIR detectors. Each time a PIR activates, the lights come on for the light time.

When dual speed is enabled, the light control input causes the DGC-MK2 to switch from high to low speed. Another limit type switch can be used. When timed speed change is used leave this input unconnected.

STOP CONTROL

When pulsed active, will clear the open and close outputs and wait for another control input operation. This input stops the gate/door when opening or closing. To prevent the gate/door timing out and closing, pulse the stop control input 3 times

OUTPUT CONNECTIONS

OPERATING OUTPUT

40V 0.1A Open collector, used to drive indicator lamps, access control equipment, audible/visual warning devices, or red and green traffic lights.

CLOSE INDICATION OUTPUT

40V 0.05A Open collector, used to drive indicator lamps or access control equipment to show gate/door closed. This output only goes active when the gate/door is closed and the brake is active. Normally connected to the reed switch input on an access controller.

ALARM OUTPUT

12V 0.1A Open collector, used to drive alarm lamps, buzzer or access control equipment to indicate that a problem exists with the gate/door or controller. Activated by motor time-out or motor overload. See "CLOSE CONTROL INPUT" above.

OPEN CONTROL OUTPUT #1

40V 0.1A Open collector, used to switch a second drive motor via a 12V/24V relay

CLOSE CONTROL OUTPUT #1

40V 0.1A Open collector, used to switch a second drive motor via a 12V/24V relay

BRAKE CONTROL OUTPUT

230V 8A relay contact, used to switch the drive motor brake. The contact is closed to release the brake.

OPEN CONTROL OUTPUT #2

230V 8A relay contact, used to switch the drive motor or contactor.

CLOSE CONTROL OUTPUT #2

230V 8A relay contact, used to switch the drive motor or contactor.

LIGHT CONTROL OUTPUT

230V 8A relay contact, used to switch garage/safety/security lighting.

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The light control output is used to switch speeds when dual speed mode is selected. Output on = full speed, output off = low speed.

USER SAFETY

It is the responsibility of the installation company to do everything possible to ensure the safety of the users and their vehicles.

Safety can be enhanced through the use of point to point beams across the door/gate opening and audible/visual warning devices.

PMB Electronics strongly recommends the use of 1 safety beam for cars only, and 2 or more safety beams where trucks are using the gate/door.

TRAFFIC LIGHTS

The operating output can be used to control red and green lights.

EXAMPLE:

When the operating output is on the red light is on. When the operating output is on and the open indication output is off, the green light is on.

It has been found that vehicles will speed up in an attempt to beat a closing door/gate, but will stop for a red light.

AUDIBLE WARNING

The operating output can also be used to drive a siren. This produces a very obvious KEEP CLEAR warning.

Although very effective, a siren will not be popular in a residential area.

OPERATION

VEHICLE USE

A pulse on the open input causes the operating output to activate. 2 seconds later, the door/gate begins to open. The operating output goes off when the door/gate is open.

2 seconds before the door/gate is due to start closing, the operating output goes active. The operating output goes off when the door/gate is closed.

If the safety beam is obstructed when the door/gate is open, it will not close until the beam is clear. If closing when the beam is obstructed, the door/gate stops and re-opens. The operating output remains active until the door/gate is closed.

PEDESTRIAN USE

The pedestrian function is intended for use with perimeter gates controlled by an access control system. It allows a gate to restrict vehicle access while allowing pedestrian access without the need for a second smaller gate.

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The DGC-MK2 does this by only opening the gate a short distance for pedestrians, and all the way for vehicles.

It is up to the access control system to decide what is a pedestrian and what is a vehicle.

A short pulse on the Open input triggers the DGC-MK2 to open the door/gate to the pedestrian position. The pulse must be shorter than the time it takes the gate to reach the programmed pedestrian position.

A long pulse on the Open input triggers the DGC-MK2 to open the door/gate to the vehicle position. The pulse must be longer than the time it takes the gate to reach the programmed pedestrian position.

If the safety beam is obstructed while closing from the pedestrian position, the door/gate stops and waits (does not re-open) before continuing to close.

By default the pedestrian function is disabled. To enable it, program a pedestrian time shorter than the full run time. To disable again, program a pedestrian time greater than the full run time.

LIGHTING CONTROL

The DGC-MK2 can control lights in a garage, carpark or driveway when the gate/door is activated or when a light switch is operated. This way safety and security lighting do not have to be left on all night.

A manual control allows the lights to be turned on before the gate/door is activated. After a programmable delay the lights go off. The default time is 3 minutes.

PIR (passive infrared) sensors and a daylight switch can be connected to the Light input to provide fully automatic lighting control.

A major feature of lighting control is the reduced power usage and savings made.

Many commercial garages are lit all day. Using PIR detectors located near entrances/exits and the DGC-MK2, lighting is only on when needed.

SAFETY BEAM

The safety beam is probably the most important part of the system. It is the only thing stopping the gate/door from closing on and damaging a vehicle or pedestrian.

When the gate/door is opening the safety beam has no effect. If the safety beam is obstructed when the door/gate is open, it will prevent it from closing. If the gate/door is closing when the safety beam is interrupted, it will stop and re-open. It will stay open for a short time after the safety beam is clear.

When closing from the pedestrian position, the gate/door stops and waits when the safety beam is obstructed. It does not re-open.

If the safety beam is obstructed while the door/gate is closed, it cannot be opened. This is to prevent the door/gate from being rigged to stay open during the next valid operation.

AUTOMATIC CLOSING

When the gate/door is opened a timer is started (if mode link set to auto-close). When the timer expires the gate/door begins to close. The default time delay is 30 seconds. This allows plenty of time for people to get ready and drive through. If the gate/gate was to start closing as they approached, the surprise could cause an accident.

30 seconds is too long in most cases. It will encourage people to follow the car in front through without letting the gate/door close.

To reduce this problem the DGC-MK2 reduces the remaining time to 3 seconds from when the safety beam is clear. 3 seconds is long enough to allow a trailer or very quick tail-gater through. The safety beam still operates.

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In effect the DGC-MK2 opens the door/gate for 3 seconds longer than needed, to a maximum of 30 seconds, excluding safety beam time.

MOTOR TIME-OUT

This is intended to protect the drive motor in the event of a mechanical problem with the gate/door.

Whenever the motor is started, an internal timer is started. The timer should not expire before the gate/door has finished its operating. If the timer expires, the motor is stopped and an alarm is generated.

When the gate/door reaches the end of its travel (limit switch) the timer is stopped. The timer has a default setting of 45 seconds.

If the gate/door takes longer than this time to open or close, the DGC-MK2 assumes that there is a problem, stops the motor and generates an alarm output. The on board Piezo buzzer generates a slow pulsed tone.

The alarm can be canceled with the close control input when the gate/door is closed.

DUAL SPEED OPERATION - FAST GATES

As the operating speed of a gate increases, it becomes much more difficult to stop it in the same position each time.

The dual speed functions allow the DGC-MK2 to work with a motor speed controller. This allows two speed operation, which with timing can effectively control a fast (> 1M/second) gate.

When dual speed is enabled the lighting control functions are disabled. The light output becomes the speed control signal to the motor speed controller. The light control input can be used as a third limit switch input to force a switch from high speed to low speed.

The gate is run at maximum speed for a programmed period of time, then switched to low speed for more accurate parking. The limit switches are still used to cut motor power and apply the brake.

Maximum and minimum full speed run times are pre-programmed. The minimum full speed run time ensures that when started, the gate is always run at full power before being switched to low speed. This ensures that it does start moving. The maximum full speed run time is used to switch the motor to low speed before it reaches the end of its travel.

THE SPEED CONTROLLER

This is an electronic PWM or variable frequency motor controller/driver. The unit used will depend on the type of motor being used. There are a number of robust off the shelf units available.

CONCLUSION

To make a fast gate reliable, speed control is essential. Doors and gates moving at up to approx. 0.5 M/sec can be "Direct On Line" relay switched. For more information concerning faster operation contact Net-Tech Developments.

FIRST TIME OPERATION

1. Before applying power, check that the limit switch and motor wiring is correct. Check that the limit switches are set to operate before the gate/door hits the end of its travel in each direction.
2. Temporarily disconnect the drive motor.
3. Apply power to the DGC-MK2. When Power is first applied, the DGC-MK2 will give 2 longer and 2 shorter beeps. It will only try to drive the motor if an open or close input is activated and the associated limit switch is not. A red indicator on the top PCB will be flashing.

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When first powered up, the brake remains released until the gate/door has been opened or closed.

4. Switch off the power and re-connect the drive motor.
5. Manually put the gate/door to about half way. This can be tricky with some garage door mechanisms. Refer to the manufacturers instructions.
6. Apply power again. If the mode is set for auto close, the gate/door may start to close after about 30 seconds, or 3 seconds after the safety beam is obstructed then cleared. If the mode is set for manual close, the gate/door will stay where it is until either the Open or Close input is activated.
7. Operate the Open input. The gate/door should start to open. If it stops part way, and a slow beeping is heard from the DGC-MK2, it has timed out. Operate the open input again. If it stops part way, but does not start beeping, the pedestrian function is active.
8. The gate/door is now open. If the mode is set for auto close, the gate/door should start to close after about 30 seconds, or 3 seconds after the safety beam is interrupted then cleared. If the mode is set for manual close, the door/gate should stay where it is until either the Open or Close input is activated.
9. The gate/door should now be operating correctly.
10. Remember to check the open and closed limit switches as per the instructions supplied with the motor drive unit.
11. Check the operation of the safety beam. Make sure that it prevents the door/gate from closing when open, and that it stops and opens the door/gate when closing.
12. Time the door/gate from when it starts moving to when it stops. Add a few seconds and program the motor time-out time. See Below.
13. Cycle the gate/door open and closed 20 to 30 times to ensure that it is operating correctly.

PROGRAMMING THE DELAYS

When delivered the DGC is programmed as follows:

Auto close time = 20 seconds
Light on time = 3 minutes
Pedestrian time = 3 minutes (effectively disabled)
Motor Time-out = 40 seconds
Max full speed = 10 seconds
Min full speed = 3 seconds (includes delay before closing)

RESTORING DEFAULTS

The default times can be restored as follows:

1. Activate the open, close and stop control inputs together.
2. Reset the DGC-MK2 by applying power or shorting the reset link.
3. Release the open, close and stop inputs.
4. 4 short, 2 long and 2 short beeps will be heard.

The defaults are reset.

PROGRAMMING

The DGC-MK2 learns by example. The faster beeping during programming indicates that the DGC-MK2 is recording a new delay time.

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When single speed is enabled, pedestrian and motor time-out can be programmed as the door/gate closes. When dual speed is enabled, maximum and minimum full speed run times can be programmed as the door/gate closes.

The stop control input activated during the faster beeping will cancel the programming process without making any changes.

To enable programming mode to be entered, the stop input must be pulsed active. You have 1 minute to enter programming mode (slow beeping). This is to prevent programming mode being entered accidentally during normal operation.

AUTO CLOSE TIME

- a. Pulse the STOP control input.
- b. Activate the OPEN control input to open the door/gate.
- c. Hold the OPEN control input active as the door/gate reaches full open.
- d. A constant beeping begins, release the OPEN control input.
- e. Pulse the OPEN control input, the beeping speeds up, recording starts.
- f. After the delay period required, pulse the OPEN control input again. the beeping stops. The new delay is stored.
- g. Pulse the CLOSE control input to close the door/gate.

NOTE: The STOP control input will cancel programming during the faster beeping.

LIGHT ON TIME

- a. Pulse the STOP control input.
- b. Activate the OPEN control input to open the door/gate.
- c. Hold the OPEN control input active as the door/gate reaches full open.
- d. A constant beeping begins, release the OPEN control input.
- e. Pulse the CLOSE control input, the beeping speeds up, recording starts.
- f. After 1/4 of the delay period required, pulse the CLOSE control input again. the beeping stops. The new delay is stored.
- g. Pulse the CLOSE control input to close the door/gate.

NOTE: The STOP control input will cancel programming during the faster beeping.

PEDESTRIAN OPEN DISTANCE

- a. Pulse the STOP control input.
- b. Activate the OPEN control input to open the door/gate.
- c. Activate the CLOSE control input to close the door/gate.
- d. Hold the CLOSE control input active as the door/gate reaches full open.
- e. A constant beeping begins, release the CLOSE control input.
- f. Pulse the OPEN control input, the beeping speeds up, recording starts.
- g. After the delay period required, pulse the OPEN control input again. the beeping stops. The new delay is stored.

NOTE: The STOP control input will cancel programming during the faster beeping.

MOTOR TIME-OUT TIME

- a. Pulse the STOP control input.
- b. Activate the OPEN control input to open the door/gate.
- c. Activate the CLOSE control input to close the door/gate.
- d. Hold the CLOSE control input active as the door/gate reaches full open.
- e. A constant beeping begins, release the CLOSE control input.
- f. Pulse the OPEN control input, the beeping speeds up, recording starts.
- g. After the delay period required, pulse the OPEN control input again. the beeping stops. The new delay is stored.

NOTE: The STOP control input will cancel programming during the faster beeping.

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MAXIMUM FULL SPEED RUN TIME

- a. Pulse the STOP control input.
- b. Activate the OPEN control input to open the door/gate.
- c. Activate the CLOSE control input to close the door/gate.
- d. Hold the CLOSE control input active as the door/gate reaches full open.
- e. A constant beeping begins, release the CLOSE control input.
- f. Pulse the OPEN control input, the beeping speeds up, recording starts.
- g. After the delay period required, pulse the OPEN control input again. The beeping stops. The new delay is stored.

NOTE: The STOP control input will cancel programming during the faster beeping.

MINIMUM FULL SPEED RUN TIME

- a. Pulse the STOP control input.
- b. Activate the OPEN control input to open the door/gate.
- c. Activate the CLOSE control input to close the door/gate.
- d. Hold the CLOSE control input active as the door/gate reaches full open.
- e. A constant beeping begins, release the CLOSE control input.
- f. Pulse the OPEN control input, the beeping speeds up, recording starts.
- g. After 4 times the delay period required, pulse the OPEN control input again. The beeping stops. The new delay is stored.

NOTE: The STOP control input will cancel programming during the faster beeping.

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MODE SELECT LINKS

Before operating the DGC-MK2 you must select the mode of operation required. See the diagram of the PCB for the location of the mode select links.

1. **PULSE OPEN AUTO CLOSE** (= link LK4 closed)

Pulsing the OPEN control input will cause the door/gate to open and remain open for a pre-programmed time then close automatically. Holding the input active will hold the door/gate open until the input is released.

2. **PULSE OPEN - PULSE CLOSE** (= link LK4 open)

Pulsing the OPEN control input will cause the door/gate to open and remain open until the close control input is pulsed.

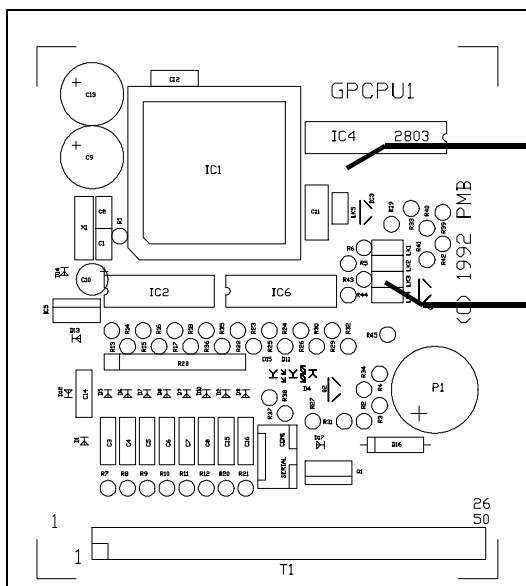
3. **SINGLE SPEED** (= link LK1 open)

Dual speed functions are disabled.

4. **DUAL SPEED** (= link LK1 closed)

Dual speed functions are enabled. The lighting control is disabled.

CPU LINK LOCATIONS



Link# function when INSERTED

LK5 = CPU RESET

LK1 = Dual speed enabled

LK2 = DRS Output Select

LK3 = Turnstile mode

LK4 = Auto close enabled

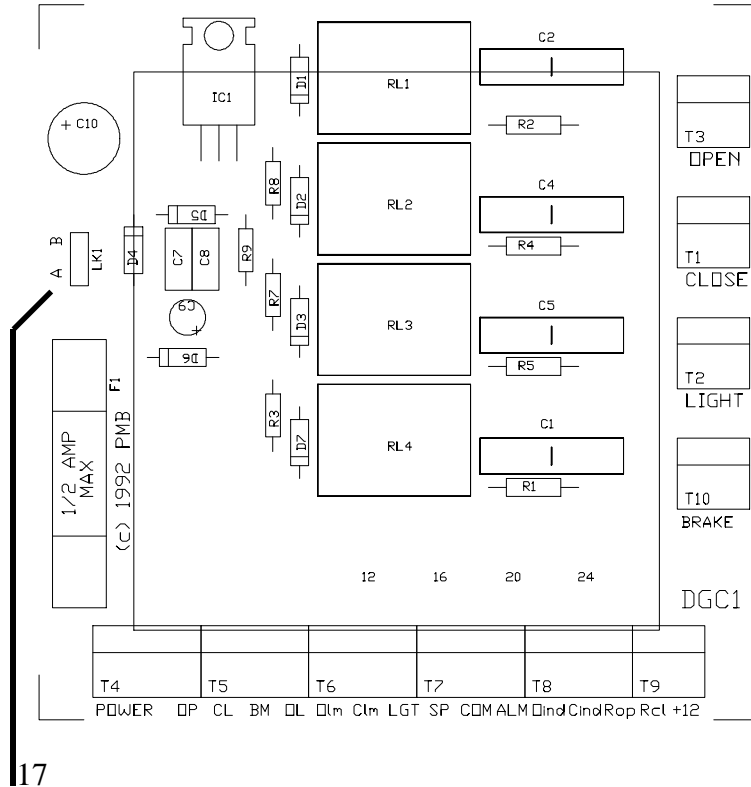
Small push on jumpers are used to short the configuration links. If a jumper is not used, leave it on 1 pin so as not to loose it. Do not solder or wrap wire onto the pins.

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TERMINATION DETAILS



RELAY OUTPUTS

OPEN = N.O. OUTPUT
CLOSE = N.O. OUTPUT
LIGHT = N.O. OUTPUT
BRAKE = N.O. OUTPUT

= FUNCTION

- 1 = +Ve Main supply
- 2 = 0V Main Supply
- 3 = Open Control Input
- 4 = Close Control Input
- 5 = Safety Beam Input
- 6 = Overload Input
- 7 = Open Limit Input
- 8 = Close Limit Input
- 9 = Light Input
- 10 = Stop Control Input
- 11 = 0V Common
- 12 = Alarm Output
- 13 = Operating Output
- 14 = Closed Output
- 15 = Aux. Open Output
- 16 = Aux. Light Output
- 17 = +12V aux out

1 ---- INPUT / OUTPUT TERMINALS ----

LINK: A = 12 Volt DC supply
B = 15 - 30 Volt DC supply

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DGC-MK2

USER INSTRUCTIONS - auto close

These instructions are general. There are many ways to install and configure the DGC-MK2 controller. Your installer will explain the details of your particular system.

WITH ACCESS CONTROL

GOING IN

You will have coded cards or tags of some sort, that will open the automatic gate or door when swiped through or presented at a reader. From here on we assume it's a card controlled door.

Depending on the type of access control system you have and how it has been programmed, the door can be always closed needing the card to open it, or left open during the day, only needing the card after hours.

If the door is closed and your card is allowed to open it, swipe the card through the reader. The lights come on and in a couple of seconds the door begins to open.

Wait until the door is fully open before driving through. A few seconds after you are clear of the door, it will begin to close.

Keep clear until the door has stopped moving.

GOING OUT

Again there are many possibilities. A card may be required, exactly as for coming in, or you may have to press a button or park your car near the door.

Keep clear until the door has stopped moving.

SIMPLE PUSH BUTTON CONTROL

There can be one or more control points; each consisting of between 1 to 4 buttons.

Pressing the button labeled OPEN will open the door as is a card had been swiped in the access control example above.

A switch or keyswitch is sometimes used to hold the door open during the day.

The control buttons are:

OPEN =	Press to open the door/gate.
CLOSE =	Press to close the door/gate.
STOP =	Press to STOP the door/gate where it is.
LIGHT =	Manually controls safety/security lighting.

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When more than 1 set of controls are installed for the one door, one can usually override the other. One set may be in the garage; another set can be in the office or house. All sets of controls work exactly the same way.

SAFETY BEAM

This is an infrared point to point beam mounted across the door opening. If a vehicle or other object is left blocking the door, assuming the object is large enough, the safety beam will stop the door from closing on it.

The safety beam also stops the door from closing if someone tries rushing through at the last moment.

If the door is already closing when the beam is interrupted, the door will stop and re-open. After a delay it will start to close again.

DO NOT assume that the safety beam will always protect you, there is only so much it can see.

AUTOMATIC CLOSE DELAY

You can change the length of time the door/gate stays open by showing the controller how long you would like.

AUTO CLOSE TIME

- a. Activate and release the STOP control.
- b. Activate the OPEN control to open the door.
- c. Hold the OPEN control active as the door reaches fully open.
- d. A constant beeping begins at the control module, release the OPEN control input.
- e. Activate and release the OPEN control again, the beeping speeds up, recording starts.
- f. After the delay period required, activate and release the OPEN control again. the beeping stops. The new delay is stored.
- g. Activate and release the CLOSE control to close the door.

NOTE: The STOP control will cancel programming at any time.

LIGHTING CONTROL

This section assumes that you have security or safety lighting controlled by the door controller.

When the door is opened, the lights come on. They go off on their own after an adjustable delay period (default time set to 3 minutes).

The light control switch works like a normal light switch, except that when turned off the lights don't go off immediately. They go off on their own after the delay period.

If the light switch is left on, the lights will stay on until it is switched off.

You can change the length of time the light stays on by showing the controller how long you would like.

LIGHT ON TIME

- a. Activate and release the STOP control.
- b. Activate the OPEN control to open the door.
- c. Hold the OPEN control active as the door reaches fully open.
- d. A constant beeping begins at the control module, release the OPEN control input.
- e. Activate and release the CLOSE control, the beeping speeds up, recording starts.
- f. After ONE QUARTER of the delay period required, activate and release the CLOSE control again. the beeping stops. The new delay is stored.
- g. Activate and release the CLOSE control to close the door.

NOTE: The STOP control will cancel programming at any time.

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FAULTS

The door controller monitors the driver motor. If the door becomes stuck the controller will stop the motor and generate an alarm. The alarm may be connected to an access control system or other monitoring equipment.

CONSTANT TONE

This indicates that the drive motor has been overloaded. The door will probably not be working correctly. If you can see the problem and are able to clear it the door can be used. To cancel the beeping noise and alarm signal, activate the close control when the door is already closed.

SLOW BEEPING

This indicates that the door has taken too long to open or close. The door will probably not be working correctly. If you can see the problem and are able to clear it the door can be used. To cancel the beeping noise and alarm signal, activate the close control when the door is already closed.

MAINTENANCE

Doors and gates, being mechanical devices, need maintenance. Your security or door installation company can recommend a minimum routine maintenance schedule.

Safety and security can be lost if automatic doors and gates are not looked after.

FEATURES

If any of the features mentioned in this instruction are not implemented on your system, contact your Security or door company, they may be simple to add or enable.

Good lighting can greatly improve security and safety. With automatic control of the lighting, power savings can be substantial enough to offset the cost of the installation.

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DGC-MK2

TECHNICAL DETAILS

The heart of the DGC-MK2 is a one time programmable (otp) Motorola MC68HC11 single chip microprocessor. This unit has a number of advanced features that are not used by the DGC, but does combine all that is required into a small reasonably priced package.

The DGC-MK2 consists of a general-purpose processor (GPCPU1 or GPCPU1A) sitting on top of a dedicated I/O board (DGC1 or DGC-MK2).

GPCPU1 features:

- * 8 Filtered & protected digital inputs
- * 3 0.2A open collector outputs
- * 3 0.05A open collector outputs
- * 1 On board programmable LED indicator
- * 1 Piezo buzzer
- * 2 mode selection links
- * 1 Buffered serial port with indicator LED's
- * Onboard 5V regulator
- * Low voltage reset circuit
- * 12K ROM, 256B RAM, 256B EEPROM

DGC1 features:

- * Accepts AC or DC power (12V to 30V)
- * 0.5A Fuse on power supply input
- * Reverse polarity protection
- * Onboard 12V regulator
- * 4 Output relays (230V 8A)
- * 8 Digital inputs
- * 3 0.05A open collector outputs
- * Screw terminals for all connections

The 4 relay outputs are normally-open contacts with arc suppression components.

Connections to GPCPU1:

1	+12V power supply input	13	0V common
2	0V power supply common	14	0V serial port common
3	0V common	15	serial data input to GPCPU1
4	input 1	16	serial data output from GPCPU1
5	input 2	17	output 1 0.05A (piezo buzzer)
6	input 3	18	output 2 0.05A
7	input 4	19	output 3 0.05A
8	0V common	20	output 4 0.2A
9	input 5	21	output 5 0.2A
10	input 6	22	output 6 0.2A
11	input 7	23	output 7 0.2A
12	input 8	24	+12V com for outputs (0.1A MAX)