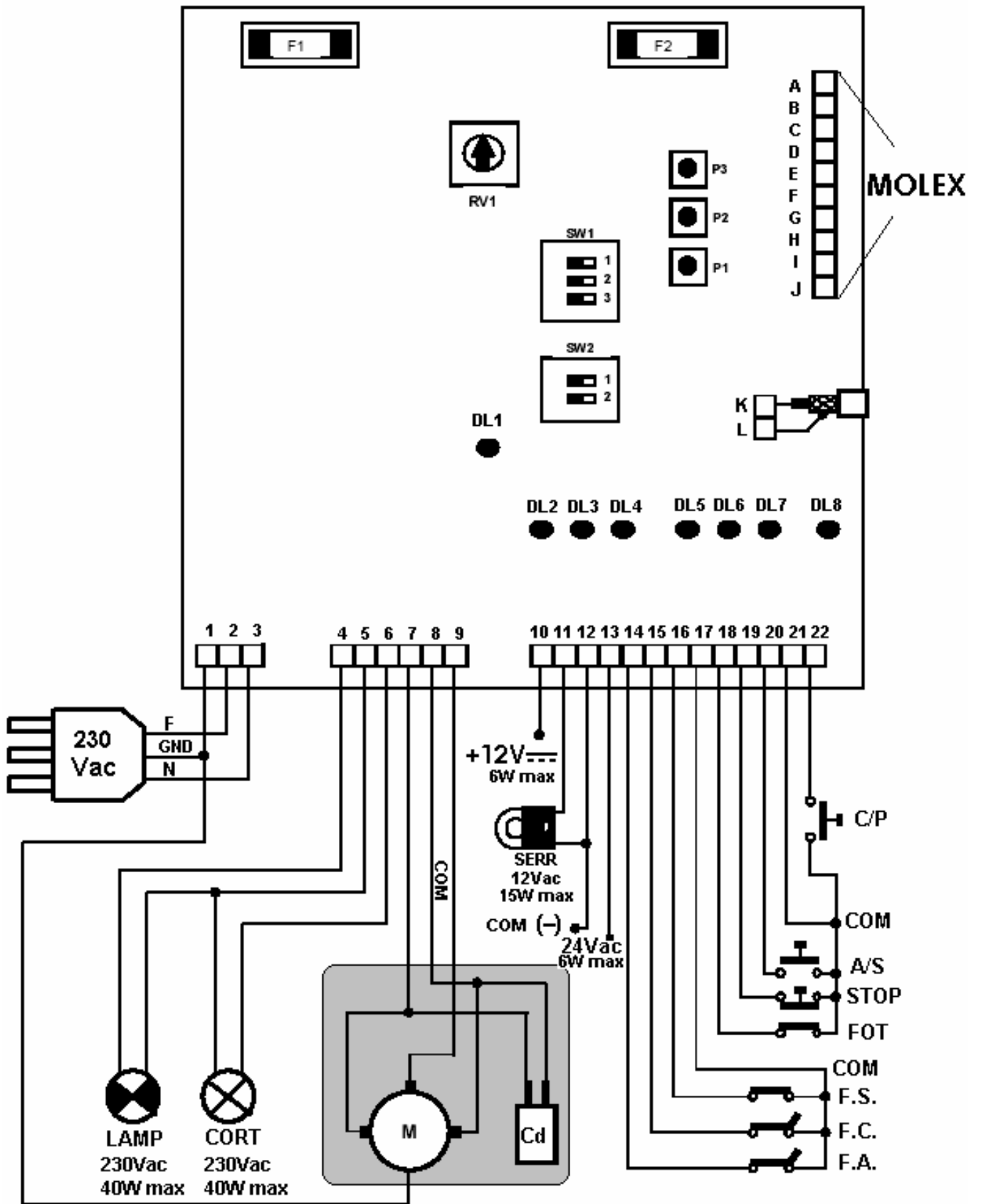


The SH20xx control unit for electromechanical gear motors

# HERCULES 230V



## WIRING DIAGRAM





## Attention!

- This manual is for qualified installers only and not for the end user. It is the installer's job to explain to the user how the automatism works, about possible hazards related to it and the need for periodical maintenance.
- Installation must be carried out by qualified personnel only, in compliance with current standards concerning automatic closing mechanisms; particularly the installation has to comply with the 89/392 directive and the EN 12453 and EN12445 regulation.
- Use original components only. Stagnoli is not liable for damages if any other components are used.
- Make absolutely certain the power is disconnected before carrying out any work on the control unit.
- Do not work on the control unit if your hands or feet are damp or wet and do not leave it outdoors exposed to the weather.
- Be particularly careful when evaluating the safety devices to install and their location. Always install an emergency stop device that will cut power off in the case of necessity.
- Connect the power lead only to supply lines with adequate electrical protection; more specifically mount a device to guarantee disconnection of all phases from the mains that has a distance of at least 3.5 mm between the contacts.
- Ensure that there is a differential switch up-line of the electrical system.
- This control unit must only be used for the purpose it has been expressly designed, any other use is considered improper and therefore dangerous.
- Only qualified personnel must be allowed to service the unit, including changing the courtesy light bulb whenever needed.
- In case of damage or working anomaly of the control board the operator might work at maximum speed; for this reason make sure that if the operator works at maximum speed ( in case of direct power tension connection) the motor does not have a higher thrust than envisaged by the latest automation norms. Particularly the installation has to comply with the 89/392 directive and the EN 12453 and EN12445 regulation.
- Maintenance work, which includes changing the courtesy light bulb if necessary, must be carried out by qualified personnel only.
- Regularly check operation of the unit and safety devices.
- All maintenance checks must be carried out with the power off.

## TECHNICAL DESCRIPTION AND WIRING DIAGRAM (Pag.3)

Stagnoli's electronic control unit for HERCULES 230V electromechanical gear motors is suitable for controlling single-phase asynchronous motors used to move sliding gates weighing up to 500 Kg, whether they are fitted with limit switches or not.

### ELECTRICAL CONNECTIONS

1. Earth connection
2. Mains supply power phase (230 V ~ +/- 10%)
3. Mains supply power neutral (230 V ~ +/- 10%)
  
4. Flashing light supply power phase (230 V ~ )
5. Flashing light and courtesy light supply power neutral (230 V ~).
6. Courtesy light supply power phase (230 V ~).
7. 230 V ~ motor supply power phase (opening).
8. 230 V ~ motor supply power phase (closing).
9. 230 V ~ motor supply power neutral.
  
10. Positive pole auxiliary supply: +12Vdc - 6W max.
11. 12 V ~ electric lock (SERR) supply power phase
12. Electric lock supply power common and auxiliary output common.
13. 24 V ~ auxiliary supply power phase (max. 6W).
14. Opening limit switch N.C. electrical contact (F.A.)
15. Closing limit switch N.C. electrical contact (F.C.)
16. N.C. electrical contact of the photoelectric barrier (FotoStop).
17. Common of the limit switch electrical contacts and of the photoelectric barrier.
18. N.C. electrical contact of the optic-eye (FOT).
19. N.C. electrical contact of the stop push button (STOP).
20. N.O. electrical contact of the Open/Start command (A/S).
21. Common of the optic-eye electrical contacts, Open/Start, Close/Pedestrian, Stop
22. N.O. electrical contact of the Close/Pedestrian (C/P) command

### MOLEX: Radio card connections (SH2000)

- |    |   |
|----|---|
| A. | N.O. contact for the open/start command.              |
| B. | N.O. contact common for the open/start command.       |
| C. | N.O. contact for the close/pedestrian command.        |
| D. | N.O. contact common for the close/pedestrian command. |
| E. | Negative supply power: 12 Vdc                         |
| F. | Positive supply power: 12 Vdc                         |
| G. | Positive supply power: 12 Vdc                         |
| H. | Negative supply power: 12 Vdc                         |
| I. | Antenna input (braiding).                             |
| J. | Antenna input (signal).                               |

## DEFINITION OF THE CONTROL UNIT COMPONENTS

F1- MAINS FUSE (F5A, 250V):

F2 – LOW VOLTAGE FUSE (F1A, 250V):

RV1 – POWER ADJUSTING TRIMMER:

P1 – BUTTON FOR STORING OR DELETING RADIO CODES.

P2 – BUTTON FOR SETTING MOTOR WORKING TIMES.

P3 – BUTTON FOR SETTING PAUSE TIME.

SW\_ – DIP SWITCHES TO SELECT THE FUNCTIONS:

SW1 – 1 for setting the Condominium Mode (ON) or the mode specified by SW1 – 2 (OFF).

SW1 – 2 for setting the Automatic Mode (ON) or the step-by-step mode (OFF)

SW1 – 3 excludes slowing in opening (ON).

**SW2 – 1 establishes if the unit has to work in the Pedestrian Mode (ON).**

SW2 – 2 ineffectual.

LD – SIGNALLING LEADS:

DL1 – PROGRAMMING LED (RED): it turns on to signal the control unit programming phase and gate motion.

DL2 – OPENING LIMIT SWITCH (YELLOW): it turns off when the limit switch is pressed.

DL3 – CLOSING LIMIT SWITCH (YELLOW): it turns off when the limit switch is pressed.

DL4 – FOTOSTOP LED (YELLOW): it signals activation of the optical barrier; it turns off when the barrier detects an obstacle.

DL5 – OPTIC-EYE LED (YELLOW): it turns off when the optic-eye detects an obstacle.

DL6 – STOP LED (RED): it turns off when a Stop command is given.

DL7 –START/OPEN LED (GREEN): it turns on when a Start/Open command is given

DL8 - PEDESTRIAN/CLOSE LED (GREEN): it turns on when a Pedestrian/Close command is given.

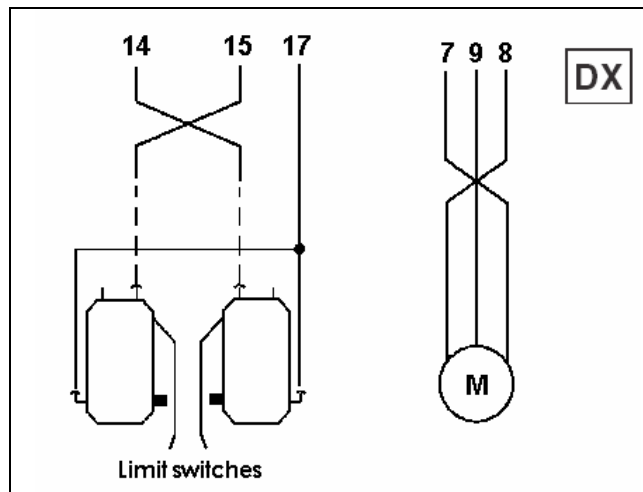
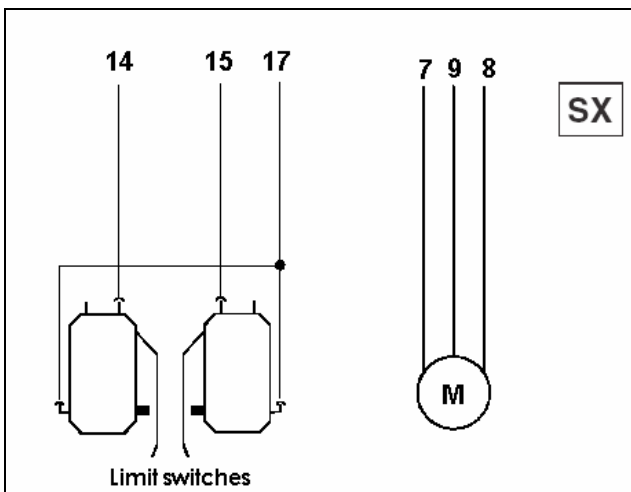
## DEFINITION OF THE INPUTS AND OUTPUTS

- *Supply power input (230V~ +/- 10%)*
- *Flashing light output (230V~, 40W max):* we know gate status thanks to the flashing light, more specifically, opening phase (fast flashing), closing phase (slow flashing) and if there is an obstacle along the path of the optic-eye system (fixed light). A pre-flash signals the motor is about to start (warning).
- *Courtesy light output (230V~, 40W max):* the light stays on during the pause in opening and for about two minutes after the manoeuvre cycle has finished.
- *Single-phase asynchronous motor output: 230V ~, 10μF.*
- *Opening limit switch input (N.C.):* this input is normally connected to an external switch that is operated when the gate has finished its opening travel, stopping it instantly.
- *Closing limit switch input (N.C.):* this input is normally connected to an external switch that is operated when the gate has finished its closing travel, stopping it instantly.
- *Fotostop input (N.C.):* this input is normally connected to an optical barrier that, when an obstacle is detected during a manoeuvre (in either direction) or in the phase that precedes the start of a work cycle, temporarily stops the gate (the flashing light signals the anomalous situation with a fixed light). As soon as the obstacle is removed an opening cycle is always the first to start. If the fotostop device trips during pause time this time is retriggered, prolonging the time preceding automatic closing.

- *Optic-eye input (N.C.):* it is ineffectual only during closing and pause time. If an obstacle covers the optic-eye during closing, the gate stops and reverses direction after about 2 seconds. If the optic-eye is engaged during the pause time, this time is retriggered.
- *Stop input (N.C.):* If the stop command is active it prevents any cycle from being started and renders all start commands ineffectual. If a STOP command is given during motion it causes the gate to stop instantly, interrupting the work cycle; this condition persists all the time this command is active. If a STOP command is given during pause time it interrupts the work cycle until a new closing command is given.
- *Open/Start input (A/S):* this input is normally connected to an external push button to control gate opening and, **in the pedestrian mode**, the closing too.
- *Closing/Pedestrian input (C/P):* this input is normally connected to an external push button to control gate closing and, **in the pedestrian mode**, the partial opening and closing of the gate.
- *Input for radio connector (molex):* the unit is set for the connection of an accessory radio receiver card. Channel 1 of the card is connected in parallel with the Open/Start input while Channel 2 is connected in parallel with the Close/Pedestrian input.

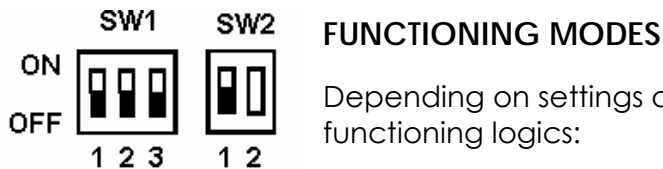


- When using the auxiliary output to supply the POLIFEMO PHOTOCELLS you **MUST** use the 12Vdc output (connections 10 and 12)
- We strongly recommend that you **DO NOT** use, simultaneously, both auxiliary outputs ( 12Vdc or 24Vac).
- The normally closed contacts (N.C.) that are not used must be short circuited.
- The normally open contacts (N.O.) that are not used, must be open circuited.
- The polarities of the mains supply voltage must be scrupulously observed.
- For the unit's correct operation, the wires connected to it must not be longer than 10 mt.
- For low voltage connection devices, use double-coating cables.
- To abide to "low voltage safety standards" (EN 60335-1) 230V single-coating connecting cables must have an additional 1 mm thick coating with at least 4 mm distance from low voltage ones.
- If, during the first functioning test, you see that the electric motor is turning in the direction opposite that of the limit switch rod (gate with opening on the right) you will have to reverse the electric motor phases on the control unit by moving the wire of terminal 8 to terminal 7 and the wire of terminal 7 to terminal 8. Once this has been done, the two wires of the limit switches must be reversed as well, moving the wire of terminal 14 to terminal 15 and the wire of terminal 15 to terminal 14.



## PROGRAMMING

- Make sure the gate is completely closed; if it isn't close it by hand.
- Press button **P2** until the gate starts opening at a reduced speed (the DL1 LED turns on with a fixed light). In this phase adjust the speed with the **RV1** trimmer to have the slowing down speed required during gate travel.
- When the gate is completely open, press button **P2** to stop the gate (DL1 LED and flashing light are fixed). If a limit switch is used in opening there will be no need to press **P2** again as gate will stop after the limit switch is pressed.
- Press **P2** once to start motor closing.
- Press **P2** during gate travel when you wish to start the slowing down phase.
- Press **P2** to stop motor when the gate has reached the closing point; if a limit switch is used in closing there is no need to press **P2** to stop the motor.
- Select the required functioning mode.
- **To set pause time** press button **P3** until the DL1 LED turns on; let the pause time wanted elapse and then press **P3** again.
- **To store the radio codes in the unit with the built-in receiver (SH2041),**
  - Press **P1** once to enter the code for the opening command; press **P1** twice to enter the code for the closing command (wait at least 1 second between each time you press **P1**).  
**Attention:** if the gate is in the **pedestrian mode**, the codes will be assigned to the start and start pedestrian commands respectively.
  - When the DL1 LED turns on with a fixed light, transmit the code you wish to store. To make sure that radio codes have been correctly stored, send radio codes once more and make sure that the gate starts moving and DL1 LED turns off.
- **To delete stored radio codes**, press button **P1** until the DL1 LED goes out (about 10 seconds).
- While the gate is moving at normal speed, adjust trimmer **RV1** so as to comply with the thrust limits laid down by the relative standards in force



**Semi-automatic (SW1-1=OFF, SW1-2=OFF):** with the gate closed, a Start command starts the work cycle that opens the gate either until the work time has elapsed or until the relative limit switch trips. The gate stops if an open or close command is given while it is still moving.

**Automatic (SW1-1=OFF, SW1-2=ON):** with the gate closed, an open command starts the work cycle that opens the gate until either the work time has elapsed or when the relative limit switch trips. When the opening phase is finished, a length of time must elapse equal to that set as the pause time before the gate starts the closing manoeuvre which finishes when the work time has elapsed or when the relative limit switch trips. The gate stops if an open or close command is given while it is still moving; on the other hand, if the command is given during pause time it interrupts the work cycle and the gate will not close automatically.

**Condominium (SW1-1=ON):** with the gate closed, an open command starts the working cycle that opens the gate either until the work time has elapsed or until the relative limit switch trips. When the opening phase is finished, a length of time must elapse equal to that set as the pause time before the gate starts the closing manoeuvre which finishes when the work time has elapsed or the relative limit switch trips. If an open or close command is given during the opening

manoeuvre it is ineffectual. During closing, only the open command is operative which stops the gate and reverses direction after about 2 seconds. An open or close command given during pause time retriggers this time, prolonging the period preceding automatic closing.

### **Opening Slow -Down Exclusion Mode: (SW1-3=ON)**

**Pedestrian (SW2-1=ON):** In the pedestrian mode, the open and close commands become the start and pedestrian start functions respectively. Each time a command start is activated we have an alternating movement in opening and in closing following the Open – Stop – Close – Stop sequence. Each time a pedestrian start command is activated we have an alternating movement in opening and closing following the Open – Stop – Close – Stop sequence for a limited work time of 7 seconds.

## **NOTES**

- The first Start input after supplying the control board always determines gate opening regardless of the functioning mode.
- Motor working time is controlled by a digital Timer: if a command (of any nature) interrupts gate travel before it reaches the end, the Timer stops and the time elapsed is stored. The unit is therefore able to establish, approximately, the partial working time necessary to complete gate travel when it starts moving again. This feature prevents the motor from being powered for a long period of time after the end of the travel, minimising the overheating effect. **Important: If power is interrupted to the electronic card the position stored will be lost. The first Start input after supplying the control board always determines gate opening till working time expires regardless of the standing point of the gate.**
- Both the functioning logic and programming pause time must be set only when the work cycle has finished (gate closed).
- The flashing light is off during pause time in the automatic mode.
- If gate opening is controlled by a clock the condominium functioning logic has to be enabled.
- When the motor starts, the unit supplies maximum power for about 1 second after which the power regulator intervenes.
- The electronic unit can house a dual-channel radio receiver (**SH2041**) for controlling the gate remotely; the receiver is the self-learning type and can store up to 12 different codes coming from different radio controls with the possibility of being able to address each code to the channel wanted. The 1<sup>st</sup> channel is associated to the open/start command while the 2<sup>nd</sup> channel is associated to the close/pedestrian command. The codes stored in the memory will remain stored even in the case of a power failure. Alternatively, the unit is set for a radio receiver card (**SH2000**) to be plugged in, where channel 1 is connected to an unpolarised electrical contact (relay) connected directly to the open/start input while channel 2 is connected to an unpolarised electrical contact (relay) connected to the close/pedestrian start input.

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