24 Vdc ELECTRONIC CONTROL UNIT FOR SWING GATES
USE INSTRUCTIONS - INSTALLATION INSTRUCTIONS

1. GENERAL CHARACTERISTICS

This 24 Vdc control unit for swing gates offers high performance and a wide range of adjustments: opening and closing decelerations, possibility of managing one or two motors, management of opening and closing limit-switches, and the possibility of managing two GATECODERS.
A sophisticated electronic control constantly monitors the power circuit and disables the control unit in the event of malfunctions that could impair efficiency of the electronic clutch.
The parameter settings and the operating logics are set and shown on a handy display, which indicates gate status during normal operation.
Operating times are adjusted by self-learning during programming.
The water-tight enclosure is designed to house the control unit, the toroidal transformer and any buffer batteries (optional) having the characteristics and dimensions indicated in the table below.

2. TECHNICAL SPECIFICATIONS

Supply voltage of transformer	230/115 V~ (+6 -10%) - 50/60 Hz.
Supply voltage of control unit	24 V~ (+6 -10%) - 50/60 Hz.
Absorbed power	3 W
Motor max load	70 W x 2
Accessories max load	24Vdc 500mA
Flashing lamp/Courtesy light max. load	24Vdc 15W max.
Operating ambient temperature	-20°C +50°C
Protection fuses	4
Function logics	Automatic / Stepped Automatic / Semiautomatic / Stepped Semiautomatic / Condo type
Opening / closing time	Through self-learning during programming
Pause time	Through self-learning during programming
Thrust force	Four levels adjustable on display
Decelerations	Opening and closing
Terminal board inputs	Power supply 24V~ / Battery supply / Encoder Total opening / Pedestrian opening / Opening-closing safety devices / Stop / Opening-closing limit-switch
Radio connector	Rapid 5-pin connector
Terminal board outputs	24Vdc power supply to accessories / 24 Vdc Motors / 24 Vdc Courtesy light-Flashing lamp / 12 Vdc/~ Electric lock
Board dimensions	165 x 130 mm.
Characteristics of 230V~ toroidal transformer	prim. 230V~ / sec. 22V~ / 120VA
Characteristics of 115V~ toroidal transformer	prim. 115V~ / sec. 20V~ / 120VA
Characteristics of optional batteries	12V - 4 Ah / dimens. 90 x 70 x 108 mm.
Characteristics of outdoor enclosure	305 x 225 x 125 mm. - IP55

ATTENTION: Different output values can be obtained on the 24V~ voltage depending on the mains voltage value. Before start-up, always check the transformer output voltage. This must not exceed 26V~ for both 230V~ and 115V~ power supply. Voltage must be measured load free, i.e. with the transformer powered and disconnected from the board.

3. PRELIMINARY SETTING-UP

ATTENTION: To ensure people's safety, all warnings and instructions in this booklet must be carefully observed. Incorrect installation or incorrect use of the product could cause serious harm to people.
Make sure there is an adequate differential switch upstream of the system as specified by current laws, and install an all-pole thermal breaker on the power supply mains.
To lay electric cables, use adequate rigid and/or flexible pipes.
Always separate the connection cables of low voltage accessories from the 115/230 V~ power cables. To prevent any interference whatever, use separate sheaths.
Maximum length of power cables between control unit and motors must not exceed 10 m, using cables of 2.5mm² diameter.
Procedure for securing components inside the water-tight enclosure.

1- Secure the support for the toroidal transformer in position **A** with 3 Ø4.2x13 self-tapping screws (supplied), placing the supplied spacers between the transformer support and the guides of the water-tight enclosure.
2- Secure the transformer to the support with 2 clamps (supplied).
3- If using buffer batteries, secure the relevant support in position **B** with 4 Ø3.5x9.5 self-tapping screws (supplied), fastening the screws in the crossover holes of the enclosure guides.
N.B.: the support is sized to house 2 batteries (not supplied) with the dimensions specified in the table in paragraph 2.
4- Position the batteries on the support and secure them with plastic clamps.
5- Secure the control unit in position **C** with the 4 Ø4.2x13 self-tapping screws (supplied), placing the supplied spacers between the control unit and the enclosure guides.
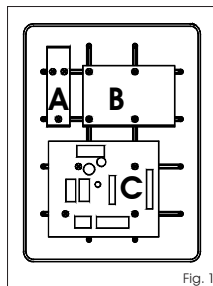

Fig. 1

4. CONNECTIONS AND OPERATION

4.1. TERMINAL BOARD CN1

4.1.1. Power supply 22V
"**VAC-VAC**" terminals. The secondary circuit of the 24V~ 50/60 Hz transformer should be connected to this input. Power supplied by the transformer is signalled by the lighting of the "**ALIM**" LED located under the terminal board.

4.1.2. Batteries
"**+BAT - -BAT**" terminals. Connect the power cables of the buffer batteries (optional) to these terminals. The control unit is designed to operate with two buffer batteries, with the minimum characteristics shown on the table in paragraph 2. During normal operation, the unit keeps the batteries charged and these start operating if no power is supplied to the transformer.
N.B.:
 • Power supplied by batteries only should be considered an emergency situation. The number of possible manoeuvres is linked to the quality of the batteries, the structure of the gate to be moved, the time elapsed since power cut occurred, etc, etc.
 • Observe the battery power supply polarity.

4.1.3. Accessories
"**+24V - -24V**" terminals. The accessories power cables should be connected to these terminals.
N.B.:
 • The maximum load of the accessories must not exceed 500 mA.
 • The output of these terminals is DC - observe the power supply polarity of the accessories.

4.1.4. Earth
" ⏚ " terminal. The control unit earthing cable should be connected to this terminal.
N.B.:
 • This connection is absolutely necessary to ensure a correctly operating control unit.

4.2. TERMINAL BOARD CN2

4.2.1. Gearmotor 1
"**APM1 - CHM1**" terminals.   For double leaf applications, connect to these terminals the gearmotor fitted on the leaf which must move first. For single leaf applications, the gearmotor must be connected to these terminals. The maximum load of the gearmotor must not exceed 70W.

4.2.2. Gearmotor 2
"**APM2 - CHM2**" terminals. For double leaf applications, connect to these terminals the gearmotor fitted on the leaf which must move last. For single-leaf applications, nothing should be connected to these terminals. The maximum load of the gearmotor must not exceed 70W.

4.2.3. Electric lock
"**ELS - ELS**"terminals. The electric lock, if any, with 12 Vdc/~ power supply, should be connected to these terminals. To facilitate release of the electric lock, the over-pushing stroke can be input by enabling parameter "**F**" (see paragraph 9).
N.B.:
 • In double-leaf applications, install the electric lock on the leaf where gearmotor 1 is installed.

4.2.4. Flashing lamp / Courtesy light
"**LAMP - LAMP**" terminals. Both a flashing lamp and a courtesy light can be connected to these terminals, both with 24 Vdc power supply and maximum 15W. To make this output operational, select parameter "**G**", see paragraph 9.
Flashing lamp operation:
During normal operation, the flashing lamp provides a fixed pre-flashing of 1.5 seconds during both opening and closing. When the gate is open, and the closing safety devices are tripped, the lamp flashes to indicate that a manoeuvre is taking place in the gate movement area. We advise you to connect the flashing lamp before programming, because it indicates its phases. Use a fixed light flashing lamp; flashing is controlled by the control unit.
Courtesy light operation:
The courtesy light stays lighted for a fixed time of 90 seconds from the OPEN pulse, after which it goes OFF. Use a lamp with 24 V power supply and maximum 15W.

4.3. TERMINAL BOARD CN3

4.3.1. Motor 1 closing limit-switch
"**COMF - FCC1**" terminals. Normally closed contact. This is tripped and stops the closing motion of motor 1. The status of this input is signalled by LED **FCC1**.

4.3.2. Motor 1 opening limit-switch
"**COMF - FCA1**" terminals. Normally closed contact. This is tripped and stops the opening motion of motor 1. The status of this input is signalled by LED **FCA1**.

4.3.3. Motor 2 closing limit-switch
"**COMF - FCC2**" terminals. Normally closed contact. This is tripped and stops the closing motion of motor 2.The status of this input is signalled by LED **FCC2**.

4.3.4. Motor 2 opening limit-switch
"**COMF - FCA2**" terminals. Normally closed contact. This is tripped and stops the opening motion of motor 2. The status of this input is signalled by LED **FCA2**.
N.B.:
 • If no limit-switch is used, jumper connect the inputs.
 • The limit-switches cannot be used as the start of the decelerated section.

4.3.5. Motor 1 encoder
"**ENC1**" terminal. The signal received from the encoder installed on gearmotor 1 must be connected to this terminal. For operation and activation of the encoder, see paragraph 6. If no encoder is used, the input need not be jumper connected.

4.3.6. Motor 2 encoder
"**ENC2**" terminal. The signal received from the encoder installed on gearmotor 2 must be connected to this terminal. For operation and activation of the encoder, see paragraph 6. If no encoder is used, the input need not be jumper connected.
Attention: In two-motor applications, the encoder must be installed on both motors.

4.4. TERMINAL BOARD CN4

4.4.1. Total opening

"**COM - OPEN A**" terminals. Normally open contact. Connect, to these terminals, any pulse generator (e.g. push-button, key selector, etc.) which, by closing a contact, generates a gate total opening or closing pulse. The operation of this generator is defined by parameter "**D**", see paragraph 9.

N.B.:
• A total opening pulse always has priority over pedestrian opening.
• To connect several pulse generators, connect the devices in parallel.

4.4.2. Pedestrian opening

"**COM - OPEN B**" terminals. Normally open contact. Connect, to these terminals, any pulse generator (e.g. push-button, key selector, etc..) which, by closing a contact, generates a gate partial opening or closing pulse. In double leaf applications, pedestrian opening corresponds to total opening of leaf 1. In single leaf applications, pedestrian opening corresponds to about 30% of memory-stored total opening.

N.B.:
• A total opening pulse always has priority over pedestrian opening.
• To connect several pulse generators, connect the devices in parallel.

4.4.3. Stop

"**COM - STOP**" terminals. Normally closed contact. Connect, to these terminals, any safety device (e.g. pressure switch, safety edge, etc.) which, by opening a contact, immediately stops the gate and disables all automatic functions. The status of this input is signalled by the "**STOP**" LED. The gate resumes its memory-stored cycle only by means of another total or partial opening pulse.

N.B.:
• If no STOP devices are connected, jumper connect the input.
• To connect several STOP commands, connect the devices in series.

4.4.4. Closing safety devices

"**COM - FSW CL**" terminals. Normally closed contact. Connect, to these terminals, any safety device (e.g. photocell, safety edge, pressure switch etc..) which, by opening a contact, affects the gate's closing motion, reversing it to the mechanical stop, or to the opening limit-switch. The status of this input is signalled by LED "**FSW-CL**".

4.4.5. Opening safety devices

"**COM - FSW OP**" terminals. Normally closed contact. Connect, to these terminals, any safety device (e.g. photocell, safety edge, pressure switch etc..) which, by opening a contact, affects the gate's opening motion, causing it to stop immediately. When the safety device has been reset, the gate resumes its memory-stored cycle. The status of this input is signalled by LED "**FSW-OP**".

N.B.:
• If no safety devices are connected, jumper connect the inputs.
• To connect several safety devices, connect the devices in series.

5. INSTALLING THE RADIO CONTROL RECEIVER BOARD

The control unit is designed to house a 5-pin radio-receiver module. Installation procedure: turn off power and fit the module in connector **CN5** on the control unit.

ATTENTION: To avoid damaging the receiver and thus irreparably compromising its operation, the receiver must be installed while observing the fitting direction specified in paragraph 13 (connection lay-out).

This done, observe the radio-receiver instructions to store the radio control in the memory.

6. OPERATION WITH ENCODER OR AMPEROMETRIC OPERATION

The control unit has 4 DIP SWITCHES, which enable selection of either amperometric operation or operation with Encoder.
**Operation with encoder** provides greater safety in detecting obstacles and greater repeatability of the deceleration point.

N.B.: Operation with encoder requires mechanical stops, or limit-switches, for both opening and closing.

To select operation with encoder, position **DIP-SWITCHES 1** and **2** to **ON** and **DIP-SWITCHES 3** and **4** to **OFF** (Fig.02).
To select amperometric operation, position **DIP-SWITCHES 1** and **2** to **OFF** and **DIP-SWITCHES 3** and **4** to **ON** (Fig.03).

ATTENTION: For a correct programming procedure of the control unit, carry out this operation before programming the control unit because it radically modifies its operation.

Operation with Encoder	Amperometric operation
ON OFF AMPERO ENCODER ON 1 2 3 4	ON OFF AMPERO ENCODER ON 1 2 3 4
Fig. 2	Fig. 3
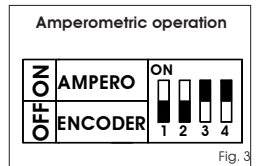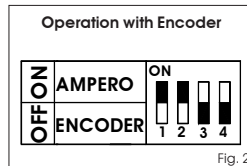
7. CONTROL LEDS

| LEDS	ON	OFF
ALIM	**Power supply by toroidal transformer**	Power supplied by batteries or no power supplied
FCC 1	Motor 1 closing limit-switch not tripped	**Motor 1 closing limit-switch tripped**
FCA 1	**Motor 1 opening limit-switch not tripped**	Motor 1 opening limit-switch tripped
FCC 2	Motor 2 closing limit-switch not tripped	**Motor 2 closing limit-switch tripped**
FCA 2	**Motor 1 opening limit-switch not tripped**	Motor 2 opening limit-switch tripped
STOP	**Stop command not activated**	Stop command activated
FSW-CL	**Closing safety device not tripped**	Closing safety device tripped
FSW-OP	**Opening safety device not tripped**	Opening safety device tripped

N.B.:
• Indicated in bold: status of LEDs with gate closed, control unit powered, and both limit-switches installed.
• If the limit-switches are not used, the relevant contacts must be jumper connected and LEDs FCC1 - FCA1 - FCC2 - FCA2 must be lighted.
• If no STOP devices are connected, jumper connect the input. The STOP LED must be lighted.

8. OPERATION OF DISPLAY

The control unit has a handy display for viewing and programming the operating parameters. Furthermore, it constantly shows gate status during normal operation.
When operating parameters are being displayed and programmed, the display shows the selected parameter on the left, and its set value on the right. Fig. 04 shows the viewing example of parameter "A" at value "2".
During normal operation, the display shows gate status. The displayed values are indicated on the following table:

Fig. 4
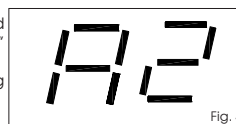
DISPLAY VALUE	GATE STATUS
$- -$	Gate at rest
OP	Gate opening
tc	Gate open in pause status (Only with automatic re-closure enabled - see next paragraph)
CL	Gate closing

9. ADJUSTING THE OPERATING PARAMETERS

N.B.: Before you begin adjusting the operating parameters, select the type of operation for the control unit: with or without encoder (see paragraph 6).
To access operating parameter adjustment, follow the instructions below:
1- When you have made all the necessary connections, power up the system and check if all the signalling LEDs are in the situation specified in paragraph 7.
2- The display shows value " $- -$ ".
3- Press and hold down push-button **P2** until the display shows the name and value of the first parameter.
4- Press push-button **P1** to change the value of the parameter.
5- To move on to the next parameter, press push-button **P2**.
6- When 60 seconds have elapsed without any key being touched, the control unit exits the adjustment mode. You can manually exit the adjustment mode by scrolling all the parameters with push-button P2. When the display shows value " $- -$ ", you have returned to normal operation.

The following table summarises all settable parameters and the assignable values.

DISPLAY	DESCRIPTION
Adjusting the sensitivity of the electronic clutch	
$A\,1$	Minimum motor force
$A\,2$	Medium-low motor force
$A\,3$	Medium-high motor force
$A\,4$	High motor force
Leaf 2 delay: this parameter enables you to select the offset time of the two leaves.	
$b\,1$	1.5 seconds offset
$b\,2$	3 seconds offset
$b\,3$	6 seconds offset
$b\,4$	10 seconds offset
Automatic Reclosure: this function enables or disables automatic gate reclosure.	
$c\,0$	Disabled
$c\,1$	Enabled
Operation of OPEN A command: this function determines the behaviour of the OPEN A (total opening)push-button.	
$d\,0$	Opens / Closes / Opens.....
$d\,1$	Opens / Stops/ Closes / Stops / Opens......
Condo function: if this function is enabled while the gate is being opened, the start command is inhibited.	
$E\,0$	Disabled
$E\,1$	Enabled
Over pushing stroke: if you enable this function, at every OPEN pulse, the leaf on which the electric lock is installed starts its closing movement for a few seconds. This facilitates release of the electric lock.	
$F\,0$	Disabled
$F\,1$	Enabled
Courtesy light/ Flashing lamp: with this parameter, you can select the type of output from the LAMP - LAMP terminals, selecting from among flashing lamp and courtesy light.	
$G\,0$	Flashing lamp
$G\,1$	Courtesy light (active for 90 seconds)
Deceleration point percentage: this parameter is used to set the length of the decelerated section, selecting from the two set values.	
$H\,0$	10% of maximum memory-stored opening
$H\,1$	20% of maximum memory-stored opening
Speed during deceleration phase: this parameter is used to set motor speed during the deceleration phase, selecting it from the two values.	
$i\,0$	High
$i\,1$	Low
Limit-switch operation: this parameter enables you to select operation with or without the limit-switch.	
$L\,0$	Operation without limit-switch
$L\,1$	Operation with limit-switch
Number of motors: this parameter is used to select the type of gate: with one leaf or with two leaves	
$n\,1$	Single-leaf gate, only one motor connected
$n\,2$	Double-leaf gate, two motors connected

10. PROGRAMMING

N.B.:
• Before you begin programming, select the type of operation for the control unit: with or without encoder (see paragraph 6).
During the programming procedure, the control unit memory-stores the opening, closing mechanical stop points and any pause time before re-closure.

1- Release the gearmotors, locate the leaves at half open point, and re-lock the operators.
2- Power up the control unit and check if value " – – " is shown on the display.
3- Press and hold down push-button **P2** until the display shows the first parameter and relevant value.
4- Give an **OPEN A** command with any device connected to this input: the display shows value "Pr", and the leaves begin to move. The first manoeuvre performed by the leaves must be closing. If this does not happen, gate movement must be stopped with a reset pulse. To reset, touch, with a screwdriver, the two PINS of the JMP "**RESET**" or cut power. Then change over the wires of the motor/s which performed the opening manoeuvre. Repeat the programming procedure from point 1.
5- When the closing mechanical stop point is reached, the gearmotors pause for about 2 seconds, and then restart with a total opening manoeuvre up to the opening mechanical stop point or up to the relevant limit-switch.
6- If automatic reclosure was not enabled, this means programming has finished, otherwise the control unit begins counting pause time.
7- When the required time has elapsed, give another **OPEN A** pulse, and the gate will begin to close.
8- When the closing stop has been reached, programming has terminated, and the display shows value " – – ".

N.B.:
• The display shows value "Pr" during the entire programming procedure.
• The flashing lamp stays lighted on a fixed light during the entire programming time.
• Leaf movement is decelerated during the programming procedure.

11. OPERATION OF ELECTRONIC CLUTCH

This is a very important device for reasons of safety. Its setting stays unchanged long-term, without wear. It is active during both closing and opening. When it operates, it reverses gate movement without disabling automatic closing if activated.
If the clutch operates several consecutive times **during the closing movement**, the control unit goes into **STOP** status, disabling any automatic command. If the clutch operates several consecutive times, this means that the obstacle remains and it could be dangerous to perform any manoeuvre. To restore normal operation, the user must give an **OPEN A** / **OPEN B** pulse.

12. PROTECTION FUSES

FUSE	PROTECTION	FUSE	PROTECTION	FUSE	PROTECTION	FUSE	PROTECTION
F1=T10A 250V - 5x20	Power supply 24V~	**F2**=T0.63A 250V - 5x20	Supply to accessories and battery-charger	**F3**=R0.63A 250V - 5x20	Flashing lamp output	**F4**=R3.15A 250V - 5x20	Electric lock output

13. CONNECTION LAY-OUT

14. FUNCTION LOGICS

Automatic "A" logic C=1 d=0 E=0

Gate status	Pulses				Closing safety devices	OP/CL safety device
	Open A	Open B	Stop	Opening safety devices		
Closed	Opens the leaf and re-closes after pause time	Executes leaf partial opening and re-closes after pause time	No effect (OPEN disabled)	Disables OPEN commands	No effect	Disables OPEN commands
Open on pause	Reloads pause time	Closes the gate immediately	Stops operation	No effect	Locks pause time, and when released, closes after 5 sec.	Locks pause time, and when released, closes after 5 sec.
Closing	Reverses gate motion	No effect	Stops operation	No effect	Reverses motion	Stops operation and reverses on release
Opening	Reverses gate motion	No effect	Stops operation	Stops operation and resumes on release	No effect	Stops operation and resumes on release

Stepped Automatic "AP" logic C=1 d=1 E=0

Gate status	Pulses				Closing safety devices	OP/CL safety device
	Open A	Open B	Stop	Opening safety devices		
Closed	Opens the leaf and re-closes after pause time	Executes leaf partial opening and re-closes after pause time	No effect (OPEN disabled)	Disables OPEN commands	No effect	Disables OPEN commands
Open on pause	Reloads pause time	Closes the gate immediately	Stops operation	No effect	Locks pause time, and when released, closes after 5 sec.	Locks pause time, and when released, closes after 5 sec.
Closing	Stops gate motion and opens on next pulse	No effect	Stops operation	No effect	Reverses motion	Stops operation and reverses on release
Opening	Stops gate motion and closes on next pulse	No effect	Stops operation	Stops operation and resumes on release	No effect	Stops operation and resumes on release

Semi-automatic "E" logic C=0 d=0 E=0

Gate status	Pulses				Closing safety devices	OP/CL safety device
	Open A	Open B	Stop	Opening safety devices		
Closed	Opens the leaf	Executes partial opening	No effect (OPEN disabled)	Disables OPEN commands	No effect	Disables OPEN commands
Open	Closes	Closes the gate	No effect (OPEN disabled)	No effect	Disables OPEN command and, on release, re-closes after 5 sec..	Disables OPEN command and, on release, re-closes after 5 sec..
Closing	Reverses gate motion	No effect	Stops operation	No effect	Reverses gate motion	Stops operation and reverses on release
Opening	Reverses gate motion	No effect	Stops operation	Stops operation and resumes on release	No effect	Stops operation and resumes on release

Stepped Semi-automatic "EP" logic C=0 d=1 E=0

Gate status	Pulses				Closing safety devices	OP/CL safety device
	Open A	Open B	Stop	Opening safety devices		
Closed	Opens the leaf	Executes partial opening	No effect (OPEN disabled)	Disables OPEN commands	No effect	Disables OPEN commands
Open	Closes	Closes the gate	No effect (OPEN disabled)	No effect	Disables OPEN command and, on release, re-closes after 5 sec..	Disables OPEN command and, on release, re-closes after 5 sec..
Closing	Stops gate operation and opens on next pulse	No effect	Stops operation	No effect	Reverses gate motion	Stops operation and reverses on release
Opening	Stops gate operation and opens on next pulse	No effect	Stops operation	Stops operation and resumes on release	No effect	Stops operation and resumes on release

Condo "D" logic C=1 d=0 E=1

Gate status	Pulses				Closing safety devices	OP/CL safety device
	Open A	Open B	Stop	Opening safety devices		
Closed	Opens the leaf and re-closes after pause time	Executes leaf partial opening and re-closes after pause time	No effect (OPEN disabled)	Disables OPEN commands	No effect	Disables OPEN commands
Open on pause	Reloads pause time	Closes the gate immediately	Stops operation	No effect	Locks pause time, and when released, closes after 5 sec.	Locks pause time, and when released, closes after 5 sec.
Closing	Reverses gate motion	No effect	Stops operation	No effect	Reverses motion	Stops operation and reverses on release
Opening	No effect	No effect	Stops operation	Stops operation and resumes on release	No effect	Stops operation and resumes on release