

## MATRIX/CP.BULL Control Unit

The **MATRIX/CP.BULL** electronic control unit can be used to control 1 230Vac motor, with power not exceeding 1000W. It is provided with "Single fault test" function, in compliance with the Machinery Directive 98/37/EC.

### GENERAL WARNINGS

- a) The electrical installation and the operating logic must comply with the regulations in force.
- b) The leads fed with different voltages must be physically separate, or they must be suitably insulated with additional insulation of at least 1 mm.
- c) The leads must be secured with an additional fixture near the terminals.
- d) Check all the connections again before switching on the power.
- e) The unused N.C. inputs must be bridged.

### INPUT/OUTPUT FUNCTIONS

MATRIX/CP.BULL Control Unit		
Terminal No.	Function	Description
1-2	Power supply	Input, 230Vac 50Hz (1-Phase/2-Neutral)
3	GND	Connection to ground (compulsory)
4-5	Aerial	Connection of the insertable radio receiver card (4-signal/5-display).
6-7	RX 2° Ch	Output, second radio channel of the receiver. N.O. voltage-free contact. This output is not available in CP.BULL-RI and MATRIX control units with built-in receiver.
8-9	24Vac	Output: power supply of accessories, 24Vac/500mA max.
10-11	SCA o Service light	Normally Open (N.O.) free contact. Configuration like SCA (open gate warning LED) or timed service light (see 5ErL Logic). In CP.BULL-RI and MATRIX control units with built-in receiver, this contact can be preset as output of second radio contact (see 2chLogic).
12-13	PHOTO TEST	N.O. free contact. It is used to power photocell transmitters in TEST operating mode. See diagram "Connection of tested safety devices" and 5t1 and 5t2 Logic.
14	COM	Common for control inputs.
15	OPEN	Input, OPEN push-button (N.O. contact).
16	CLOSE	Input, CLOSE push-button (N.O. contact)
17	Step-by-Step	Input, step-by-step push-button (N.O. contact)
18	PED	Input, pedestrian push-button (N.O. contact). It controls the partial opening. Configuration is through parameter tPEd. When TCA time has elapsed (if activated) a closure control signal is sent.
19	COM	Common, for limit switches and safety devices
20	STOP	Input, STOP push-button (N.C. contact)
21	PHOT O	Input, (N.C. contact) for safety devices (e.g. photocells). In the closing phase: the contact opening causes the motor stop. Common: when the photocell is released, the motor inverts the movement direction (open). In the opening phase: the contact opening causes the motor stop. When the photocell is released, the motor re-starts the opening operation.
22	SWO	Input, OPEN limit switch (N.C. contact)
23	SWC	Input, CLOSE limit switch (N.C. contact)
24	PHOT C	Input (N.C. contact) for safety devices (e.g. photocells). In the closing phase: Configuration through PHTC Logic. In the opening phase: Configuration through PHTC Logic.
25-26	DAS	Input, safety edge Resistive edge: "DAS" Jumper closed Mechanical edge: "DAS" Jumper open When the edge is activated, the gate movement is stopped and reversed for about 3s. If the edge is not in use: "DAS" Jumper open, 25-26 terminals are short-circuited.
27-28-29	Motor	Connection of motor 230Vac - single-phase: 27-Phase/28-Common/29-Phase
27-30	Capacitor	Connection of capacitor
31-32	Blinker	Connection of blinker, 230Vac 40W max.

### To check connections:

- 1) Cut-off power supply.
- 2) Manually release the wing, move it to approx. half-stroke and lock it again.
- 3) Reset power supply.
- 4) Send a step-by-step control signal by pressing the button or the remote control key.
- 5) The wing should start an opening movement. If this is not the case, invert the movement wires (27< >29) of the motor and the limit switch wires SWO-SWC (22< >23).

## Fuses

- F1** Output protection fuse for motor and blinker
- F2** Protection fuse of transformer
- F3** Output protection fuse of accessories and signals

## Programming

The programming of the various functions of the control unit is carried out using the LCD display on the control unit and setting the desired values in the programming menus described below.

The parameters menu allows you to assign a numerical value to a function, in the same way as a regulating trimmer.

The logic menu allows you to activate or deactivate a function, in the same way as setting a dip-switch.

Other special functions follow the parameters and logic menus and may vary depending on the type of control unit or the software release.

The CP.BULL-RI and MATRIX control units are equipped with a built-in radio module to receive both fixed code and variable code control signals with a frequency of 433.92MHz, able to store up to 64 different codes in memory. The RADIO menu and the *zch* and *cur* logic are available in these control units only.

The CP.BULL and MATRIX-RE control units are equipped with connector for extractable receiver.

### To access programming:

- 1 Press the button <PG>, the display goes to the first menu, Parameters "PAR".
- 2 With the <+> or <-> button, select the menu you want (*PAR* >> *LCU* >> *rad io* >> *nPRn* >> *rE5*)
- 3 Press the button <PG>, the display shows the first function available on the menu.
- 4 With the <+> or <-> button, select the function you want.
- 5 Press the button <PG>, the display shows the value currently set for the function selected.
- 6 With the <+> or <-> button, select the value you intend to assign to the function.
- 7 Press the button <PG>, the display shows the signal "PrG" which indicates that programming has been completed.

### Notes:

Simultaneously pressing <+> and <-> from inside a function menu allows you to return to the previous menu without making any changes.

Simultaneously pressing <+> and <-> when the display is switched off shows the card software release.

Hold down the <+> key or the <-> key to accelerate the increase/decrease of the values.

After waiting 30s the control unit quits programming mode and switches off the display.

## Parameters, Logic and Special Functions

The tables below describe the individual functions available in the control unit.

	MENU	FUNCTION	Settable values MIN-MAX-(Default)	MEMO
PARAMETERS	<i>tCR</i>	Automatic closure time. It is activated only with "tCR"=ON logic. At the end of the preset time, the control unit controls a closure operation.	1-240-(40s)	
	<i>tPEd</i>	The area covered by the gate during its partial opening movement (pedestrian) is adjusted.	20-250-(50 cm)	
	<i>tSN</i>	The area covered by the gate during the braking phase is adjusted. 0 = braking disabled	0-250-(0 cm)	
	<i>PNo</i>	The torque applied to the motor in the opening phase is adjusted.*	1-99-(50%)	
	<i>Pnc</i>	The torque applied to the motor in the closing phase is adjusted*.	1-99-(50%)	
	<i>PSo</i>	The torque applied to the motor during braking in the closing phase is adjusted.*	1-99-(50%)	
	<i>PSc</i>	The torque applied to the motor during braking in the opening phase is adjusted*.	1-99-(50%)	
	<i>SEAU</i>	The intervention threshold of the anti-crashing device (Encoder) during the phase at normal speed is adjusted.* 1: maximum sensitivity - 99: minimum sensitivity	1-99-(10%)	
	<i>SEAr</i>	The intervention threshold of the anti-crashing device (Encoder) during braking is adjusted*. 1: maximum sensitivity - 99: minimum sensitivity	1-99-(10%)	
	<i>tLS</i>	Activated only with <i>SErL</i> :ON Logic. The activation time of the service light is adjusted.	1-240-(60s)	
	<i>ibrA</i>	The force of the motor brake is adjusted. 0: disabled braking - 1: minimum braking - 99: maximum braking	0-99-(50%)	

### \* WARNING:

**An incorrect setting of these parameters may result in a danger. Comply with regulations in force!**

	MENU	FUNCTION	Settable values ON-OFF-(Default)	MEMO
LOGIC	<i>t c A</i>	The automatic closure is enabled or disabled On: enabled automatic closure Off: disabled automatic closure	(ON)	
	<i>i b L</i>	The multi-flat function is enabled or disabled. On: enabled multi-flat function. The P.P. (Step-by-step) impulse or the impulse of the transmitter have no effect in the opening phase. Off: disabled multi-flat function.	(OFF)	
	<i>S c L</i>	The rapid closure is enabled or disabled On: rapid closure is enabled. When the gate is open or moving, the photocell activation causes the automatic closure of the gate after 3 s. It is activated only with <i>t c A</i> :ON Off: rapid closure is disabled.	(OFF)	
	<i>PP</i>	The operating mode of "P.P. Push button" and of the transmitter are selected. On: Operation : OPEN > CLOSE > OPEN > Off: Operation: OPEN > STOP > CLOSE > STOP >	(OFF)	
	<i>P r E</i>	Forewarning flashing light enabled or disabled. On: enabled forewarning flashing light. The flashing light is activated 3 s before the starting of the motor. Off: disabled forewarning flashing light.	(OFF)	
	<i>L t c A</i>	During the TCA time, the blinker is enabled or disabled. On: Activated blinker. Off: De-activated blinker.	(OFF)	
	<i>c L o c</i>	The OPEN input mode is selected On: OPEN input with WATCH function. To be used for the connection of timed opening/closing. (CLOSED contact - open gate. OPEN contact - normal operation). Off: OPEN input with OPEN function.	(OFF)	
	<i>h t r</i>	The Operator function is enabled or disabled. On: Operator function enabled. During operation, the OPEN/CLOSE push-buttons must be kept pressed. Off: Automatic operation.	(OFF)	
	<i>i b c A</i>	During the TCA phase, the PP and PED controls are enabled or disabled. On: PP and PED controls are disabled. Off: PP and PED controls are enabled.	(OFF)	
	<i>E n c</i>	The Encoder is enabled or disabled. On: enabled Encoder, braking activated. Off: disabled Encoder, braking deactivated	(ON)	
	<i>t r I</i>	The TRIAC test is enabled or disabled. On: Test on: if TRIAC is faulty the motor does not start. Off: no test on TRIAC is performed.	(OFF)	
	<i>c u A r</i>	The code programmable transmitters is enabled or disabled. On: Radio receiver enabled only for rolling-code transmitters. Off: Receiver enabled for rolling-code and programmable code transmitters (self-learning and Dip Switch).	OFF	
	<i>2 c h</i>	The second radio channel is enabled or disabled on terminals 10/11 (it can be used only for control units with built-in receiver). On: 10/11 output, preset as second radio channel. The <i>5 E r L</i> logic should be OFF. Off: 10/11 output, preset by the <i>5 E r L</i> Logic.	(OFF)	
	<i>5 E r L</i>	The service light function to output 10-11 is enabled or disabled. On: At every operation, the contact is closed for the time preset with <i>t L 5</i> parameter Use the auxiliary relay to control the light. Off: the output is provided with SCA function, open gate LED: open contact with closed gate - flashing light in closing phase - closed contact in opening phase and open gate. See wire diagram.	(OFF)	

	MENU	FUNCTION	Settable values ON-OFF-(Default)	MEMO
LOGIC	$t5t1$	The test of photocells to PHOT O input is enabled or disabled. On: Test is enabled. If the test is negative, no operation is performed. Off: Test is disabled.	(OFF)	
	$t5t2$	The test of photocells to PHOT C input is enabled or disabled. On: Test is enabled. If the test is negative, no operation is performed. Off: Test is disabled.	(OFF)	
	$Phtc$	The operating mode of the PHOT C input is selected. On: PHOT C input is activated in both opening and closing phases. In the opening phase: the contact opening causes the motor stop. When the photocell is released, the motor restarts in the opening phase. In closing phase: the contact opening causes the motor stop. When the photocell is released, the motor inverts the movement direction (open). Off: The PHOT C input is activated in the closing phase only. In the closing phase: the contact opening causes the motor stop and the immediate reversion of the operation direction (open).	(OFF)	

	MENU	FUNCTION
RADIO	$pp$	By selecting this function, the receiver awaits ( $PUSH$ ) for a transmitter code to be assigned to the step-by-step function. Press the transmitter key to be assigned to this function. If the code is valid, it is stored in memory and OK appears. If the code is not valid, the wording $Err$ is displayed.
	$2ch$	By selecting this function, the receiver awaits ( $PUSH$ ) for a transmitter code to be assigned to the second radio channel. Press the transmitter key to be assigned to this function. If the code is valid, it is stored in memory and OK appears. If the code is not valid, the wording $Err$ is displayed.
	$clr$	By selecting this function, the receiver awaits ( $PUSH$ ) for a transmitter code to be erased from memory. If the code is valid, it is erase and OK appears. If the code is not valid or is not in memory, the wording $Err$ is displayed.
	$rtr$	Completely erase the receiver memory. Confirmation of operation is required.

MENU	FUNCTION
$nna$	Displays the number of complete cycles (open+close) carried out by the automation. When the <PG> button is pressed for the first time, it displays the first 4 figures, the second time it shows the last 4. Example <PG> $0012$ >>> <PG> $3456$ : made 123.456 cycles.
$res$	RESET of the control unit. ATTENTION!: Returns the control unit to the default values. Pressing the <PG> button for the first time causes blinking of the letters RES, pressing the <PG> button again resets the control unit. Note: The transmitter codes are not erased from the receiver.

### Operating mode with enabled/disabled Encoder

#### With $E_{nc}$ =ON LOGICS:

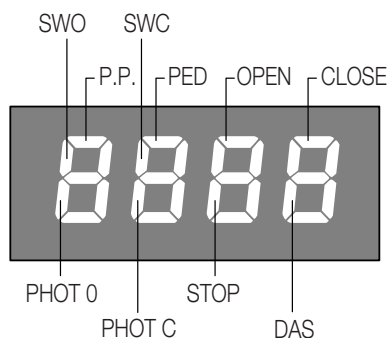
- the anti-crashing sensor is activated. Adjust the sensitivity through parameters  $SE_{Rl}$  and  $SE_{Rr}$  in compliance with regulations in force. An accurate adjustment of the motor brake (  $lb_{rA}$  parameter) can help to comply with regulations in force.
- if the parameter  $t5n>0$  (braking activated), the first opening and closing operations are carried out at reduced speed to permit the self-learning of the gate leaf stroke. If self-learning is not required, the first operation is carried out at normal speed. Once the stroke is recorded, the control unit will automatically control braking in both opening and closing phases. Braking space can be increased or decreases through  $t5n$  parameter.  
This recording phase is carried out also in case of power failure or activation of braking ( $t5n$  from 0 to  $>0$ )

#### With $E_{nc}$ =OFF LOGICS:

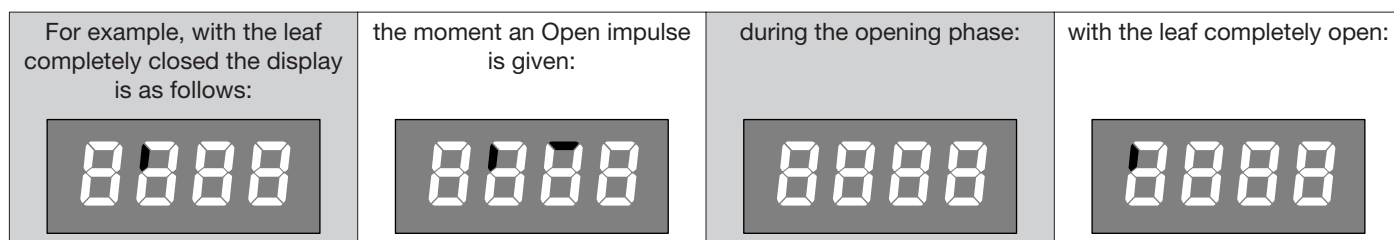
- the anti-crashing sensor is deactivated.
- if the parameter  $t5n>0$  (braking activated), the first operation is carried out at normal speed to permit the self-learning of the gate leaf stroke.

## Diagnostics

In the event of malfunctions, by pressing key + or - the status of all inputs (limit switches, control and safety) can be displayed. One segment of the display is linked to each input. In the event of failure it switches on according to the following scheme.



N.C. inputs are represented by the vertical segments. N.O. inputs are represented by the horizontal segments.



## Error messages

The control unit checks the correct operation of the safety devices. In case of failure, the following messages may appear on the display:

- Err1* Error, check photocells at **PHOT O** input.
- Err2* Error, check photocells at **PHOT C** input.
- Err3* Error, **ENCODER**
- Err4* Error, **TRIAC**

## Example of programming

Let us suppose it is necessary to:

- set an automatic closing time (TCA) of 100s
- activate pre-blinking

Perform the operations described below step by step:

Step	Press	Display	Notes
1	PG	PRr	First menu
2		tcr	First function of the first menu
3	PG	040	Value currently set for the function selected
4	+↑ -↓	100	Set the desired value with the <+> and <-> keys
5	PG	PrG	The value is programmed
		tcr	When programming has been made, the display goes to the function just set
6	+ -	PRr	Press <+> and <-> simultaneously to go to the higher menu
7	-	LoG	Second menu
8	PG	tcr	First function of the second menu
9	-	PrE	Press <-> several times to select PRE logic
10	PG	oFF	Value currently set for the function selected
11	+↑ -↓	on	Set the desired value with the <+> and <-> keys
12	PG	PrG	The value is programmed
		PrE	When programming has been made, the display goes to the function just set
13	+ -	PRr	Press <+> and <-> simultaneously to go to the higher menu and quit programming or wait 30s.