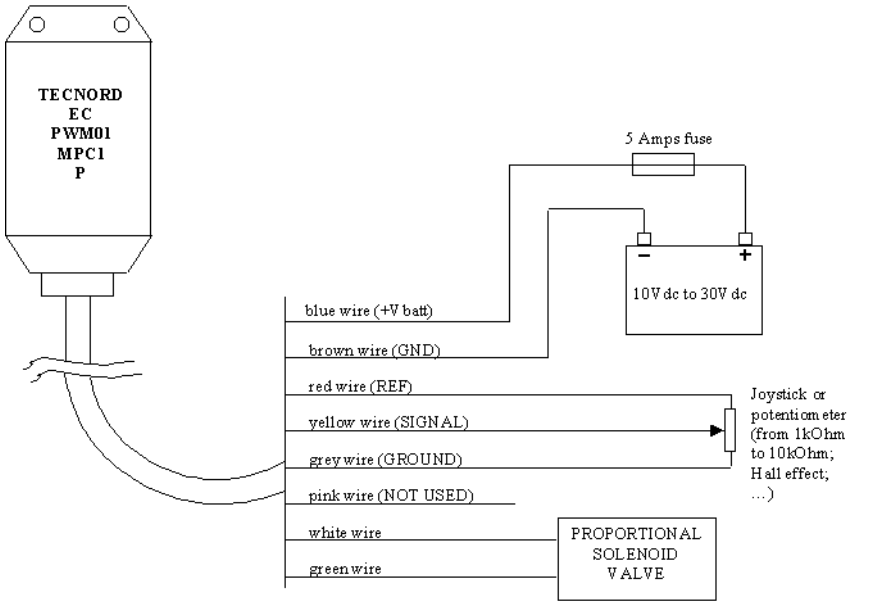
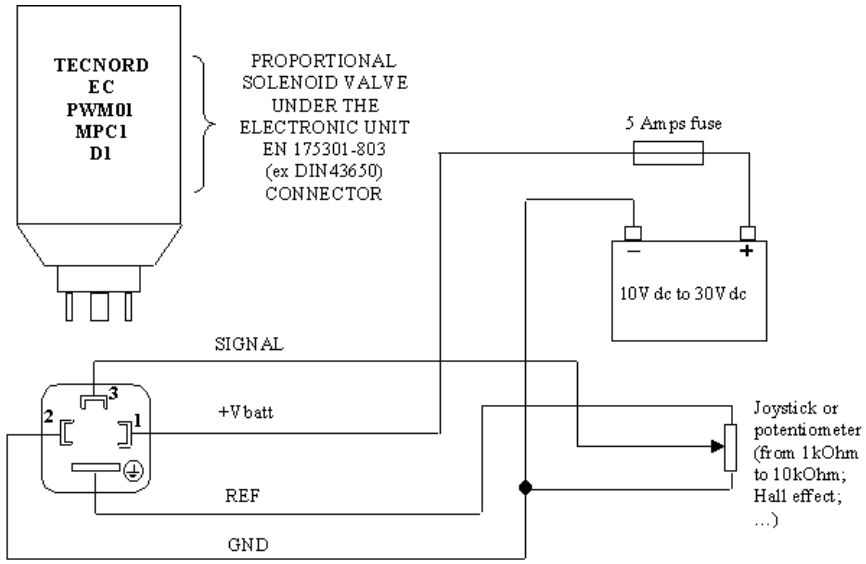
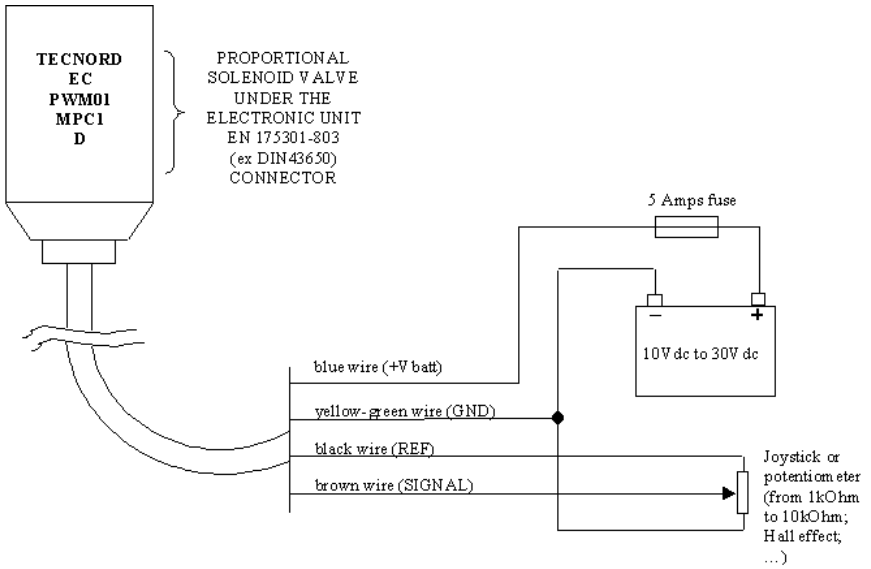
INSTALLING INSTRUCTIONS



EC-PWM -A1-MPC1-P



EC-PWM-A1-MPC1-E



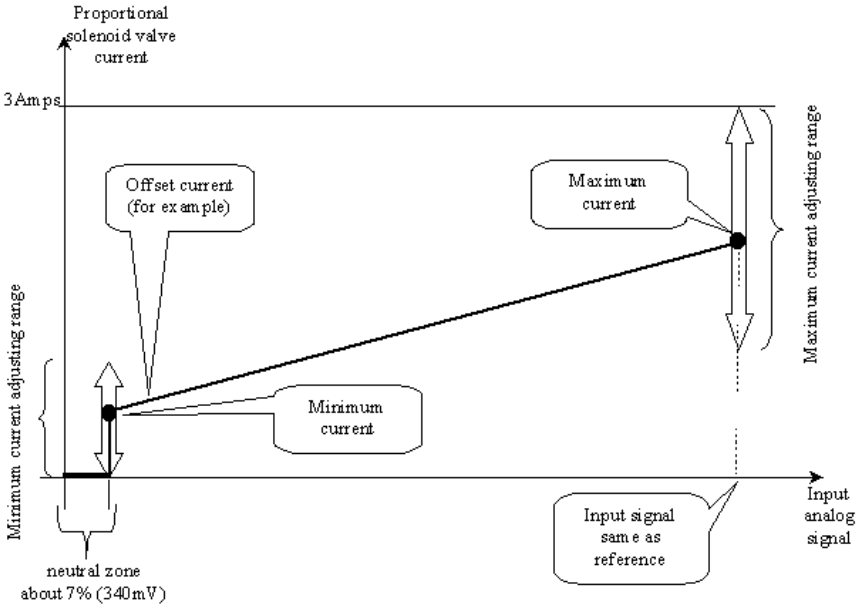
EC-PWM-A1-MPC1-D

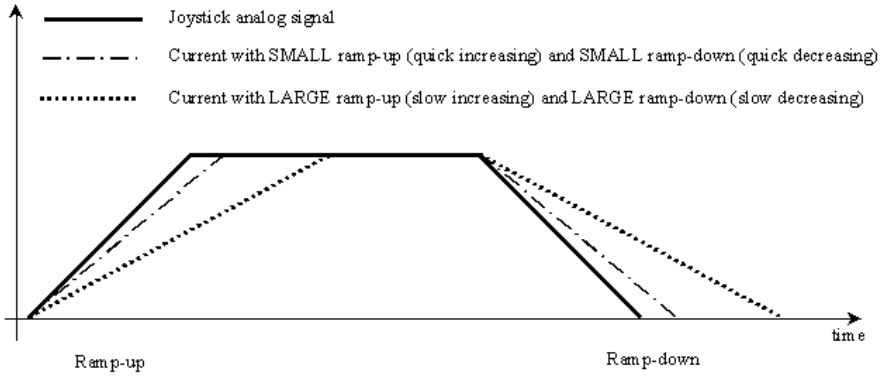
EC-PWM-A1-MPC1 drives one proportional solenoid valve by means of one input analog signal ranging from 0 to 5V or from 0 to REF (supplied by the unit).

Proportional solenoid valve is driven when the analog signal is greater than about 340mV (7%); thereafter the current flowing in the proportional solenoid valve (spanning from minimum current to maximum current) is set by the input analog signal magnitude.

Proportional solenoid valve is switched off when analog input signal is less than 340mV; that means there is a neutral zone at the beginning of input signal range.

- Offset current is the current that starts to move the function controlled by the valve and minimum current is the current, smaller than offset current, that guarantees to stop function controlled by the valve putting joystick (or analog signal) at rest. Thanks to proportional solenoid valve switch off in neutral zone, minimum current can be almost the same as offset current allowing to start function just outside neutral zone.
  This is very helpful in many application where, because of quite large valve hysteresis, minimum current would be very smaller than offset current, to perfectly close the valve, and avoid that a small oil leakege does not interrupt the function controlled by the valve.
- Maximum current is the current at which the hydraulic parameter controlled by the valve reaches its maximum magnitude.
- Ramp-up parameter is the speed at which the proportional solenoid valve current follows input analog signal when it is increased (it goes away from neutral position)
- Ramp-down parameter is the speed at which the proportional solenoid valve current follows input analog signal when it is decreased (it goes towards neutral position).
- Dither (frequency and amplitude) provides the necessary effect on the mechanical parts of valve to prevent friction and stiction in their relative movement and, at the same time, prevents pulses on the hydraulic parameter regulated by the valve

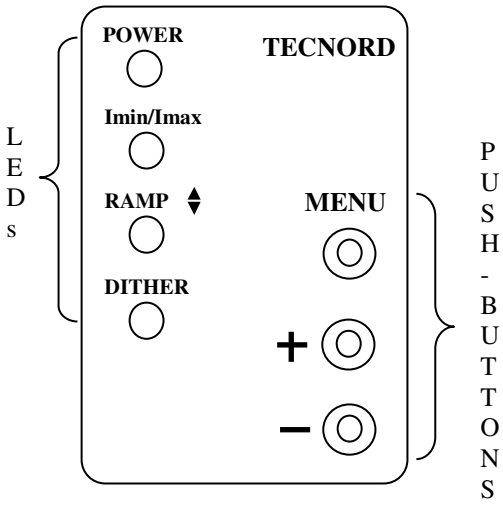




EC-PWM-A1-MPC1 allows to set minimum current, maximum current, ramp-up, ramp-down and dither by pressing push-buttons on the cover and using LEDs to identify which parameter is being modified and which mode is entered.

Definitions of symbols used in this manual

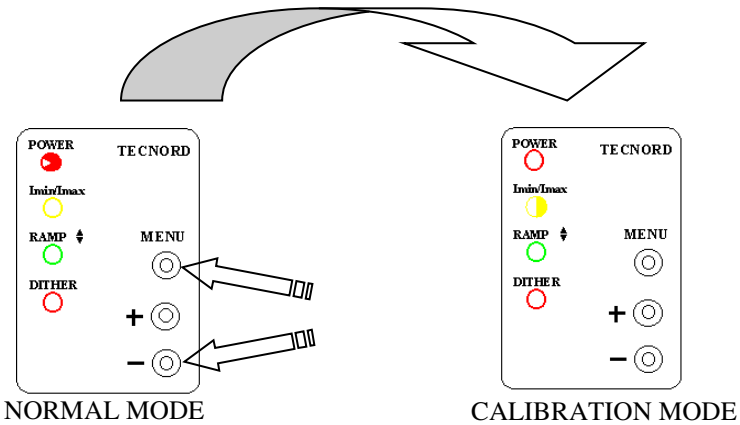
	LED switched on
	LED switched on with a short blink every 3 seconds
	LED blinking quickly
	LED blinking slowly
	LED blinking very slowly
	LED switched off



NORMAL MODE

- Unit is connected to power supply (10V to 30V), POWER LED is switched on and every 3 seconds is switched off for 0.25second (short blink); Imin/Imax, RAMP and DITHER LEDs are switched off
- the unit drives proportional solenoid valve depending on input analog signal
- depressing MENU and MINUS pushbuttons together for about 3 seconds, when POWER LED is switched off and Imin/Imax LED blinks slowly CALIBRATION MODE is entered (now MENU and MINUS pushbuttons have to be released)

PRESS MENU AND MINUS TOGETHER

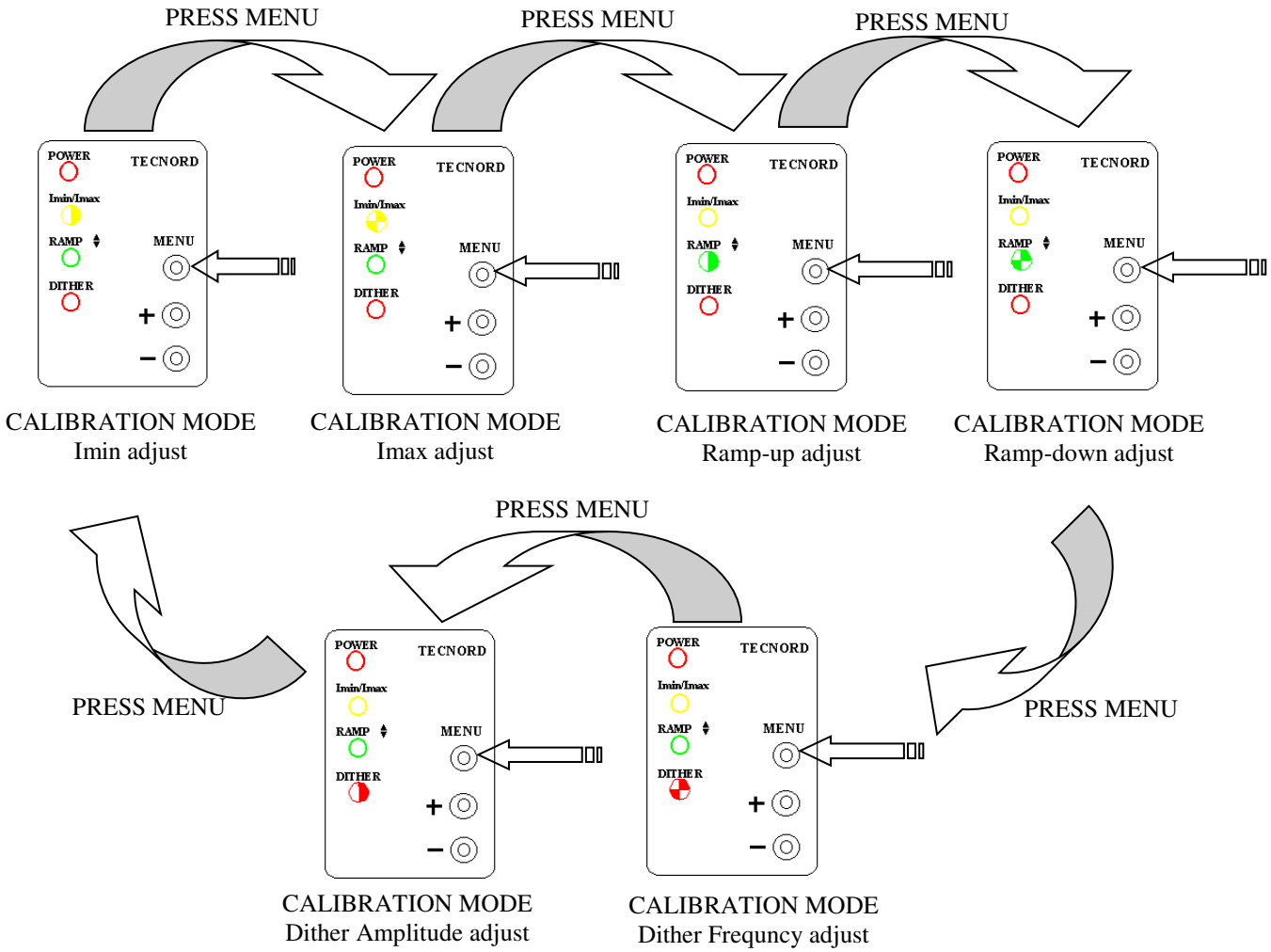


NORMAL MODE

CALIBRATION MODE
Imin adjust

CALIBRATION MODE

- Once in calibration mode, MENU pushbutton allow to pass from one parameter to another, following this sequence



- Once selected the parameter to be adjust, by pressing MENU until the correct one is reached, press PLUS and MINUS to increase or decrease it respectively.

- To **escape** from Calibration mode, and return to normal mode, simply press together MENU and MINUS until POWER LED will be switched on with the short blink every 3sec.

Imin / Imax Adjust

- DITHER LED is switched on if the proportional solenoid valve is driven (input analog signal not in neutral zone)
- Every time PLUS or MINUS is depressed (or keeping it depressed) POWER LED flashes to show that parameter is being changed. If POWER LED does not flashes depressing PLUS/MINUS, then Imax has reached its maximum value (3Amps) or Imin has reached its minimum value (0Amps) or Imax has reached Imin or Imin has reached Imax.
- New parameter is stored in a permanently way (in order to be always used) by the system when the proportional solenoid valve is switched off or by pressing MENU to pass to the next parameter adjust

Ramp-up / Ramp-down Adjust

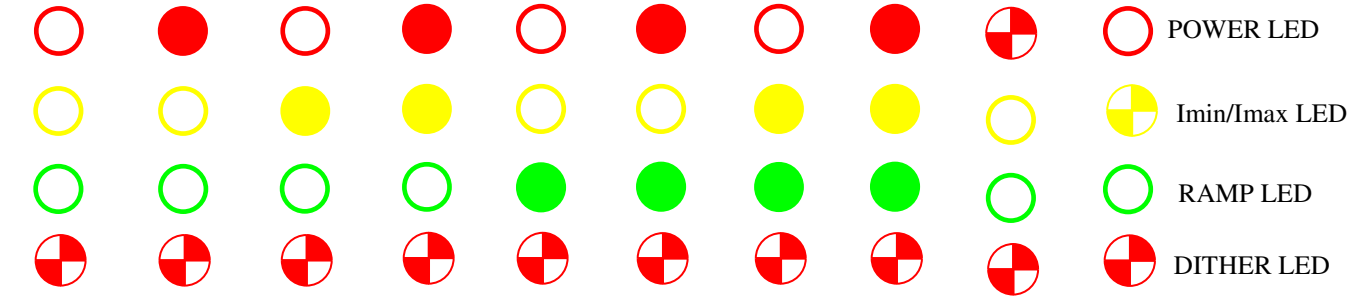
- Every time PLUS or MINUS is depressed (or keeping it depressed) POWER LED flashes to show that parameter is being changed. If POWER LED does not flashes depressing PLUS/MINUS then Ramp-up/Ramp-down has reached its maximum value (5sec) or its minimum value (0,05sec).
- New parameter is stored in a permanently way by the system (in order to be always used) when the proportional solenoid valve is switched off or by pressing MENU to pass to the next parameter adjust

Dither Adjust

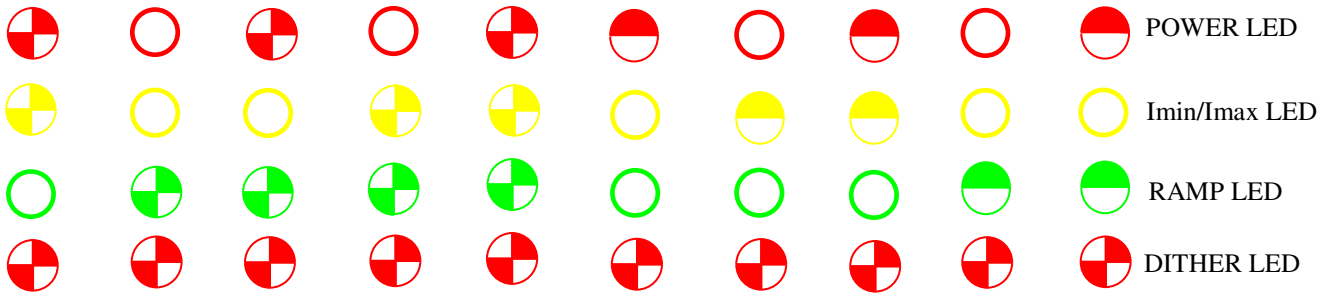
- DITHER LED blinking quickly or slowly shows if adjustable parameter is frequency or amplitude; the other three LEDs (POWER, Imin/Imax and RAMP) are used to code either the frequency value or the dither effect (amplitude).
- Press PLUS or MINUS to pass to the next or the previous value, respectively, according to the following table

Dither Frequency Coding Table

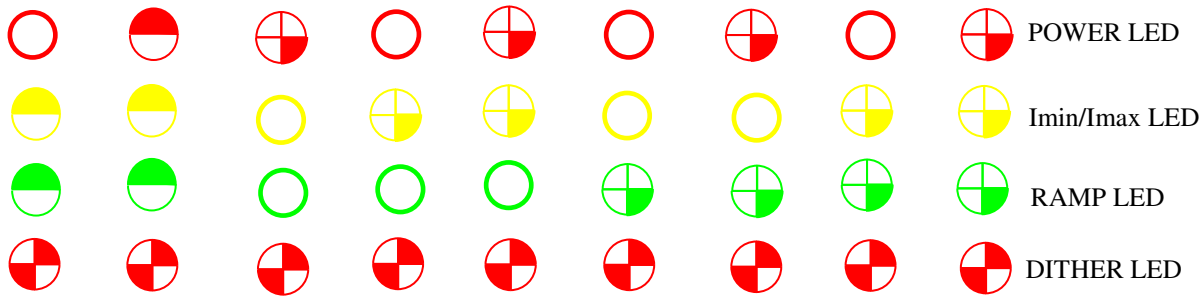
55Hz	60Hz	65Hz	70Hz	75Hz	80Hz	85Hz	90Hz	95Hz	100Hz



105Hz	110Hz	115Hz	120Hz	125Hz	130Hz	135Hz	140Hz	145Hz	150Hz

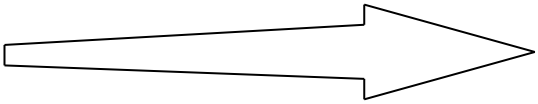


155Hz	160Hz	165Hz	170Hz	175Hz	180Hz	185Hz	190Hz	195Hz



Dither Amplitude Coding Table

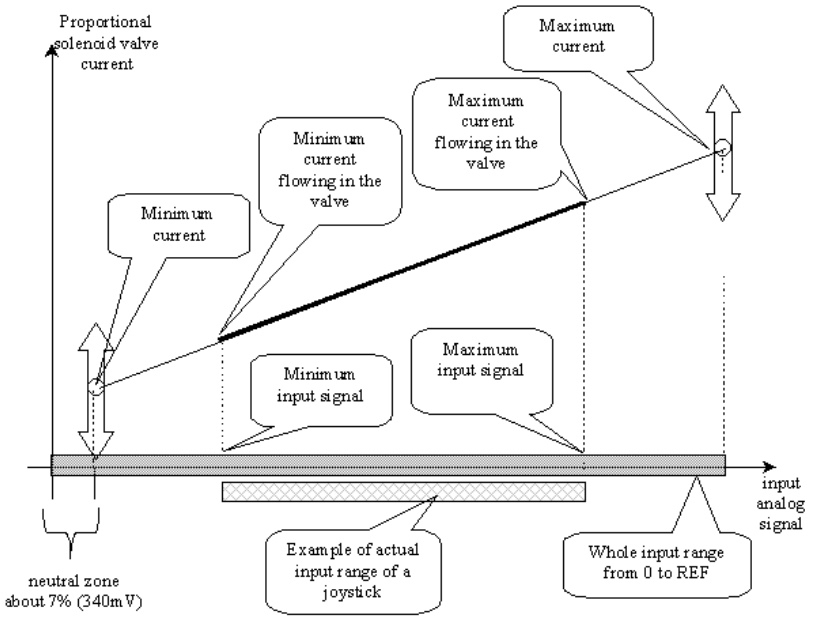
Effect increasing



EFFECT 1 (minimum dither amplitude)	*EFFECT 2*	*EFFECT 3*	*EFFECT 4*	*EFFECT 5*	*EFFECT 6* (maximum dither amplitude)	
○	●	○	●	○	●	POWER LED
○	○	●	●	○	○	Imin/Imax LED
○	○	○	○	●	●	RAMP LED
◒	◒	◒	◒	◒	◒	DITHER LED

"Teach-In" input analog range

In case an input analog signal with reduced range is used (i. e. smaller than 0V to REF, for example using TECNORD FTC-L1S joystick), it is possible to switch off proportional solenoid valve with input analog signal at the lower end (e.g. joystick at rest) even if it is outside the neutral position zone. In addition it is also possible to reach maximum current of 3Amps in case of reduced input analog signal allowing to vary from minimum current to maximum current with input analog signal varying in its range.



EC-PWM-A1-MPC1, by means of the "Teach-In" mode, is able to learn the installed joystick:

- In normal mode, press PLUS and MINUS buttons together for about 5 seconds until POWER LED is switched off and RAMP and DITHER LEDs blink quickly and alternatively.

- Now, that Teach-In mode in entered, move joystick from minimum stroke to maximum stroke few times; in this way the electronic unit will detect the real range of the input signal.

- To return in normal mode, press PLUS and MINUS buttons together until POWER ON LED is switched on; now unit will store in a permanent way the real course learned. It will always add 340mV of neutral position starting from minimum stroke learned; in neutral zone proportional solenoid valve is switched off.