



PWM 3-PHASE INVERTER FOR RESCUE OPERATION

INSTRUCTION MANUAL

03	08-06-2010	<i>J. Cavali</i>
REL.	DATE	T.M. Check and Approval
PWM BOARD SOFTWARE : R03		

1 – DESCRIPTION

The device is used in rope lift systems, in order to supply the main motor during the rescue operation.

When it is supplied by a battery voltage of appropriate value, it provides the motor a 3-phase supply with adjustable voltage and frequency.

It is available in 2 sizes:

Device	Product Code	Motor Power 380/415Vac (both VVVF and 1 or 2 speed)	Recommended Batteries
PWM 050	202.06.PWM050_	3,5kW ÷ 16,9kW 7A ÷ 35A nominal	N.4 12V 7Ah
PWM 080	202.06.PWM080_	17,0kW ÷ 28,0kW 36A ÷ 60A nominal	N.4 12V 12Ah

When the device is activated (RUN command goes ON), it makes the motor move in both the run directions, testing the absorbed current; if in the second test the current is lower, the motor continues to move in that direction, otherwise it stops then moves in the first tested direction (if the current flows from the motor to the batteries (regenerated current), the run direction can be chosen even at the first trial).

If the overcurrent protection trips during the first test, the device stops, reverses the run direction, then starts again its operation; if the overcurrent protection trips even in the second test, the protection trip is memorized and to reset it you must cut off the power supply or the run command from the device.

The overcurrent level adjustment is set during the device test in the factory, and it mustn't be modified.

If you want to force the run in a definite direction, instead of choosing it depending on the lower current absorption, you must supply PWM with batteries 72V or 96V, in order to allow the motor to have the nominal torque; this option is only available for the PWM 080 device. In this case it's necessary to activate also the UP or DOWN command, together with the RUN command.

The output short-circuit protection is only ensured if a 3-phase choke is connected between the inverter PWM output and the motor.

The device carries out the brake coil supply, through a rectifier and a control relay, activated by the inverter run.

There is a minimum current control, to avoid the motor is pulled by the load: if the current absorbed by the motor goes down under the value set by trimmer I (P2), the emergency run is carried on with "jogging" operation (the brake opens and closes with a set frequency).

This type of operation is done for safety reason, in order to avoid both the reaching of a dangerous speed, and the possible damage to the PWM inverter (due to the excessive increase of the voltage on the output, because of the motor regeneration).

2 – TECHNICAL CHARACTERISTICS

- Battery Voltage (Vbat): 24 – 36 – 48 – 60Vdc for PWM 050
24 – 48 – 72 – 96Vdc for PWM 080
- 3-phase Output Voltage: from 0.32Vbat to 0.75 Vbat
(Example: from 15 to 36 Vac with 48V batteries)
- Output Frequency: 1 ÷ 10 Hz.
- Maximum Peak Output Current: 55A for PWM 050
85A for PWM 080

Software protections:

- Current limit (peak) absorbed from batteries: 55A (PWM 050) and 85A (PWM 080)
- Battery check: discharged at -25%, overcharged at +25%, referred to the nominal voltage
- Minimum motor current detector
- Detector of the current regenerated towards batteries
- Voltage check on the brake circuit

Hardware protections:

- PTC for short-circuit protection on the OUP and ODN run direction signals.

Accessories:

- 3-Phase Choke 35 – 50A for PWM output protection

3 – CONNECTIONS

The PWM device must be supplied with the necessary battery voltage at terminals PA – NA (M2 terminal board) for the power part, and with 24Vdc (referred to NA) at the terminal P24 on the M5 terminal board, for the operation logic.

The device switch on is controlled through the commands on the terminal board M5:

- +CM Command common
- RUN Run command
- UP Up Run command
- DN Down Run command

The RUN command makes the device to start its operation; if you need to force the run in a definite direction, it's necessary to activate also the UP or DOWN command, together with the RUN command.

The output voltage for the motor is located on the M1 terminal board (UA, VA, WA).

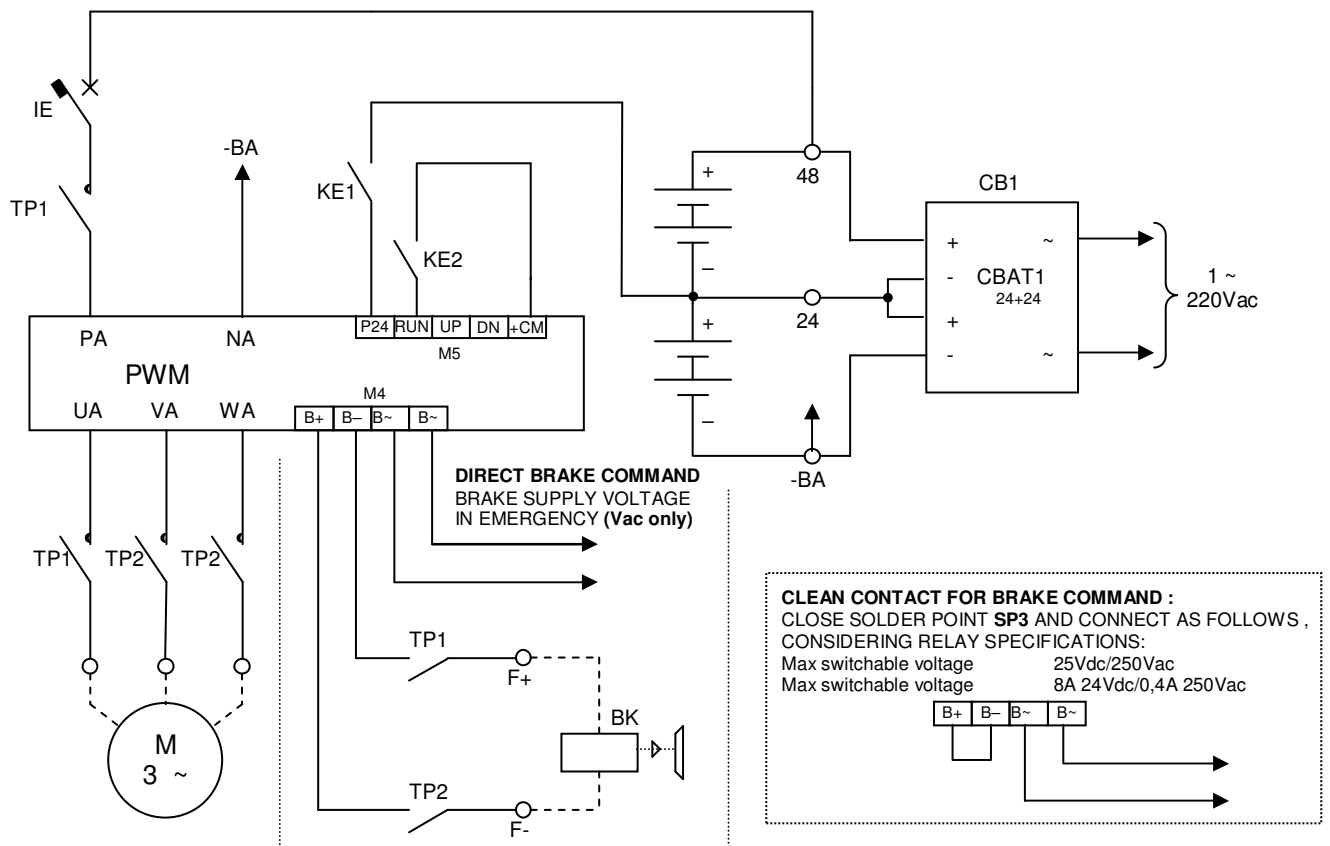
The brake control is located on the M4 terminal board (B~, B~ input voltage; B+, B- output).

There are three open collector outputs (24V 250 mA) at terminals OUP-ODN-ORS on the M5 terminal board:

- OUP Up run direction signal command (OUP - +CM)
- ODN Down run direction signal command (ODN - +CM)
- ORS Extra, not currently used

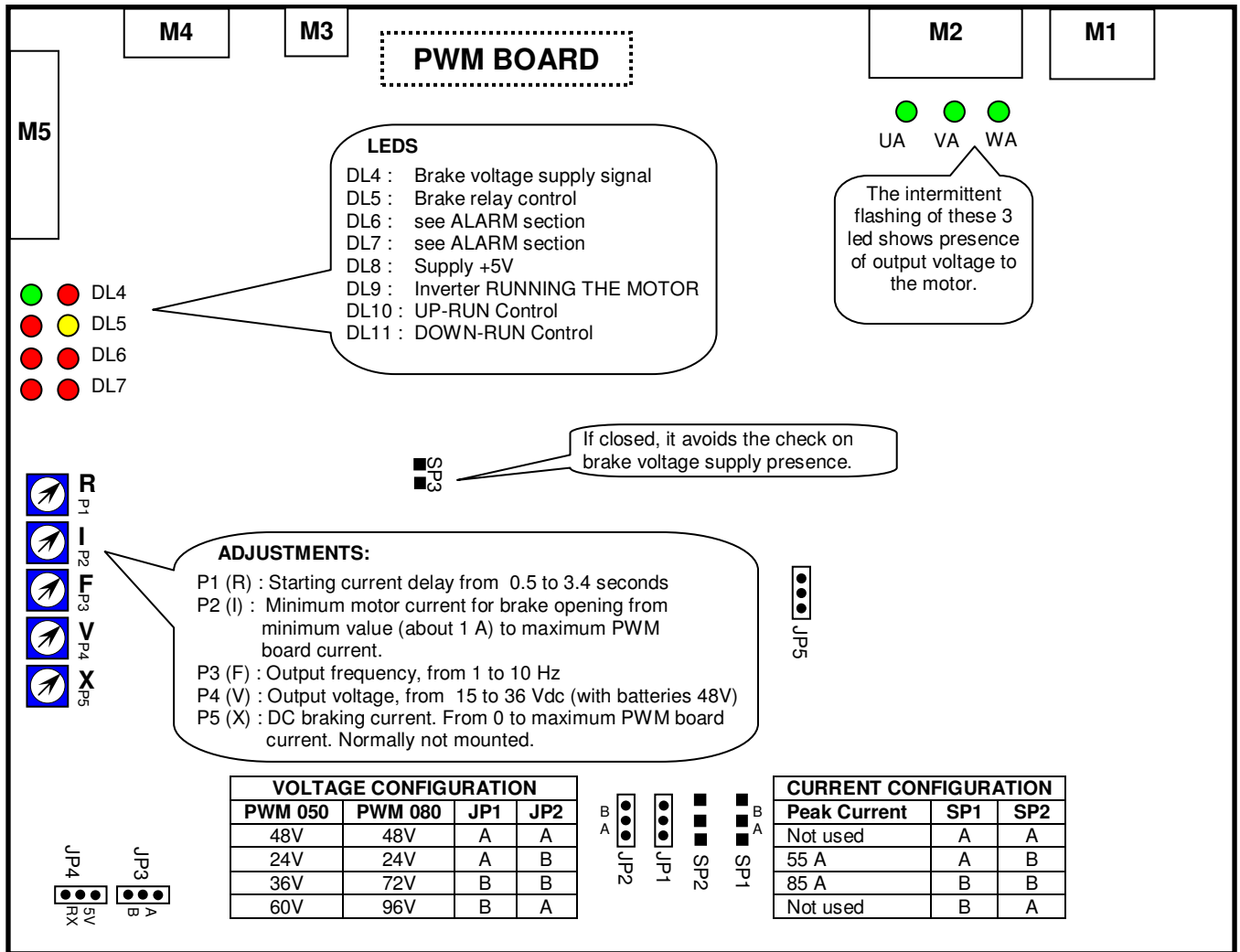
For a complete summary of the functions, adjustments a signals of the PWM inverter, see paragraph 4.

EXAMPLE OF DRAWING FOR RESCUE OPERATION WITH PWM INVERTER - 48V



- M motor
- BK brake
- CB1 battery charger 24+24V
- IE main switch
- TP1,TP2 motor contactors in rescue operation
- KE1 rescue operation start command
- KE2 PWM inverter switch-on command (it must be activated at least 100msec after the TP1-TP2 energization and it must be cut off at least 100 msec before the TP1-TP2 de-energization)

4 – FUNCTION, ADJUSTMENT AND SIGNAL SUMMARY



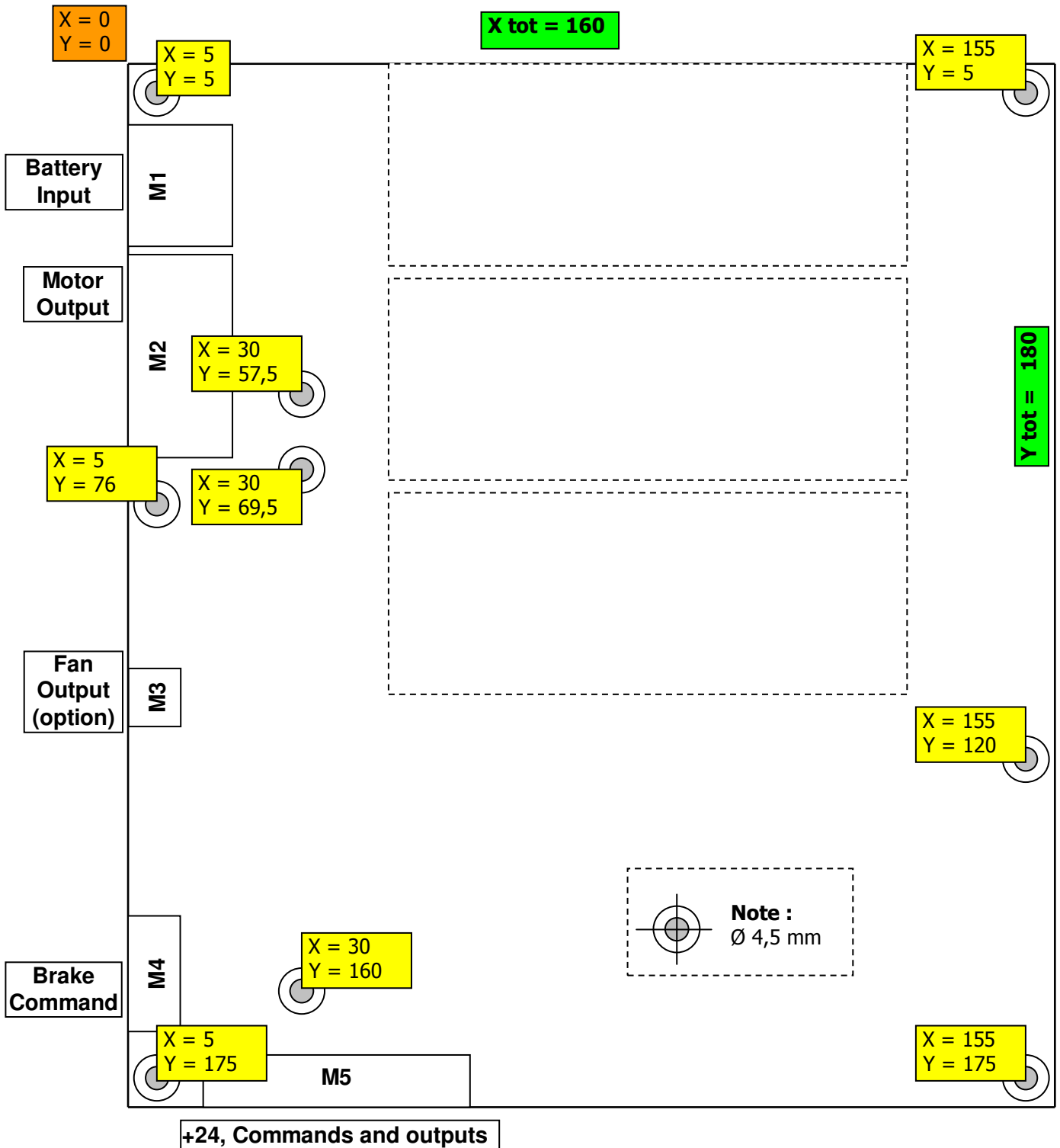
TERMINAL BOARDS	
M1 : Motor Inverter Output UA, VA, WA	M5:
M2 : Power Supply Input PA (+), NA (-)	P24 PWM logic part supply
M3 : Fan Supply Output (option)	RUN 24V Input – Run control
M4 : Brake – Supply (B~, B~) and command (B+, B-)	UP 24V Input – Forced UP-RUN
	DN 24V Input – Forced DOWN -RUN
	+CM PWM command common
	OUP Open Collector Output for up-run signal
	ODN Open Collector Output for down-run signal

OTHER JUMPERS
 JP3 : SVM MODULATION. POS 'A' = DISABLED, POS. 'B' = ENABLED.
 To be used for asynchronous motors to increase output voltage, and therefore the motor torque, adding the third harmonics .
 JP4 : DON'T USE
 JP5 : DON'T USE

ALARMS		Description	Note:
Led DL6	Led DL7		
●	○	Battery voltage too low	Note: ○ = Led off ● = Led on * = Led flashing
○	●	Battery voltage too high	
●	●	Brake voltage missing	
*	○	Output current too low	
○	*	Output peak current too high	
*	*	Output average current too high	

5 – DIMENSIONS AND MOUNTING HOLES

DEVICE	Width (mm)	Height (mm)	Depth (mm)	Weight (kg)
PWM 050	160	180	60	0,7
PWM 080	160	180	80	1,0



For further information please contact:

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