italsea
SISTEMI ELETTRONICI

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7CH4Q100_E_4_S	DATE : 08/01/2007	REV. 4.0

7CH4Q100

MICROPROCESSOR FOUR QUADRANT CONTROLLER FOR PM DC MOTORS

- USER'S GUIDE -

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- INTRODUCTION -

The controller 7CH4Q100 is a 4 quadrant chopper for PMDC motors powered by battery 24/36V for traction applications.
The chopper is equipped with a powerful microprocessor for digital control of the speed, current regulation and failures of the motor ; an efficient diagnostics of the failures and wrong wiring connections, programmability of the main parameters .
The MOSFET power stage is an “H bridge” configuration operating with PWM.
The ripple of the current is very low so the efficiency of the system is very high .
The chopper is designed in accordance with the most important EC standards.

- FEATURES -

POWER SUPPLY BATTERY	24 – 36 V
RATED CURRENT	30A
MAX CURRENT (Ta = 25°C)	120
FREQUENCY	16 KHz
MAX HEATSINK TEMPERATURE	90 °C
OPERATING TEMPERATURE	-10°C / 40°C
SPEED REFERENCE	POTENTIOMETER 1-10 KΩ
ON BOARD MAIN CONTACTOR	24V-80A CONTINUOS
REGENERATIVE BRAKING	
PARAMETERS PROGRAMMABLE	

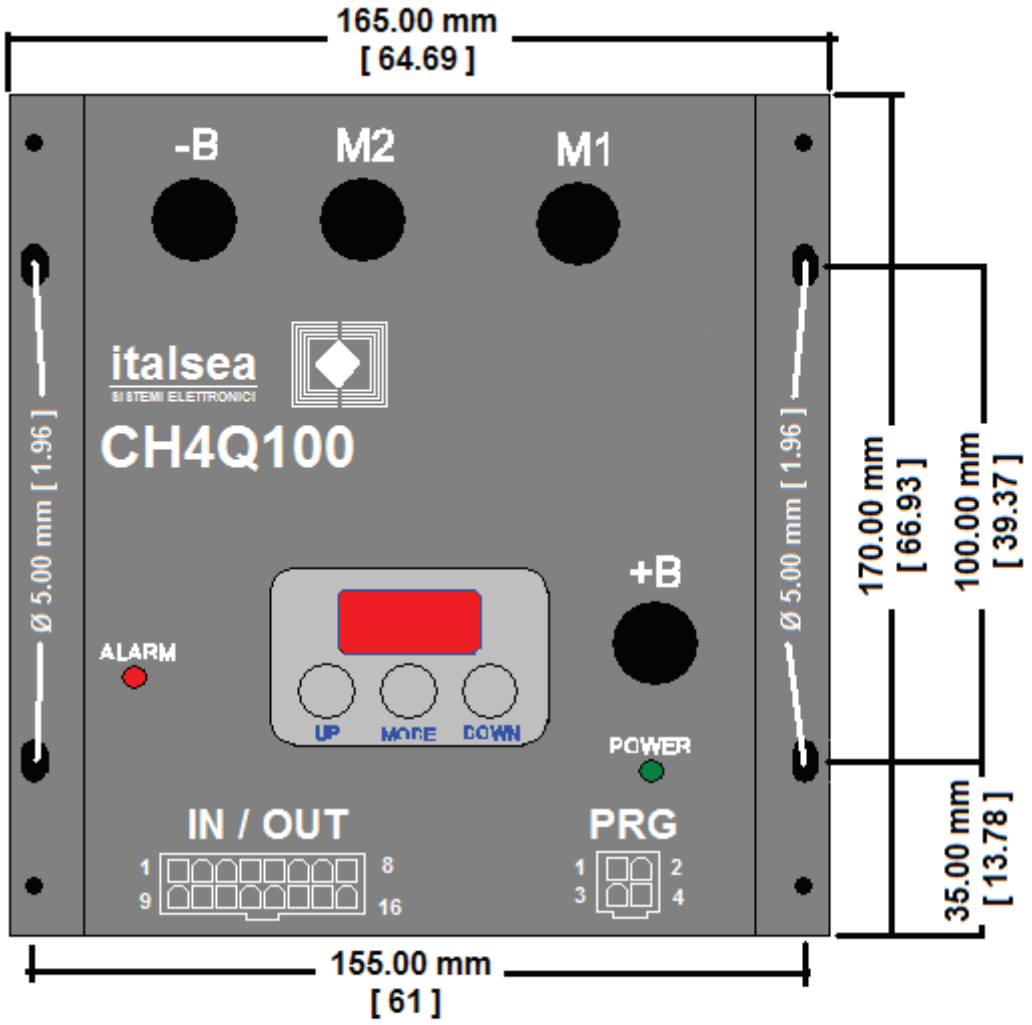
SAFETY:

- **OUTPUT SHORT CIRCUIT PROTECTION**
- **MOSFET SHORT CIRCUIT PROTECTION**
- **THERMAL PROTECTION**
- **LOW VOLTAGE AND OVERVOLTAGE PROTECTION**
- **REVERSE BATTERY PROTECTION**
- **OVERCURRENT PROTECTION FUNCTION OF TEMPERATURE**
- **POTENTIOMETER AND WIRINGS FAULT**

MODELS:

CODE – P/N	IMAX	PROGRAMMER TYPE
7CH4Q100	120 Ampere	ON BOARD
7CH4Q105	120 Ampere	EXTERNAL

- MECHANICAL DRAWING -



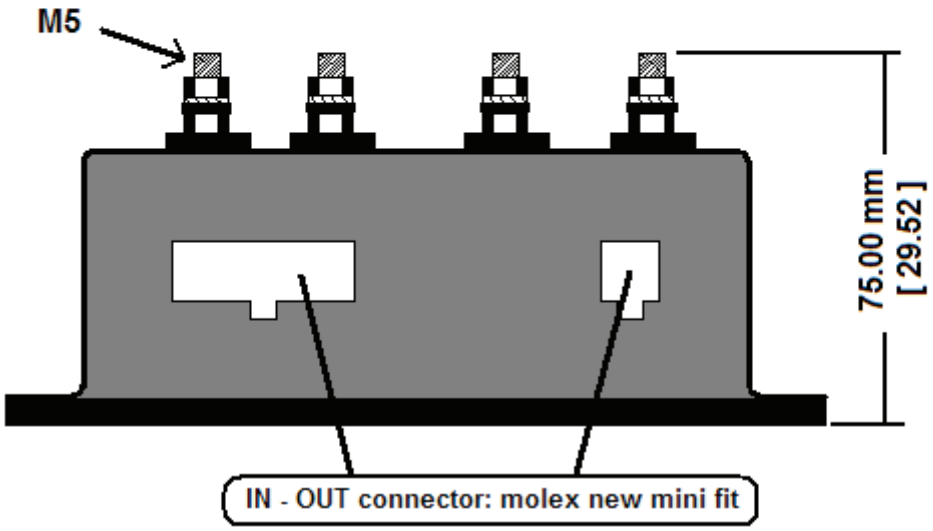


fig.1

- COMPLETE WIRING DIAGRAM -

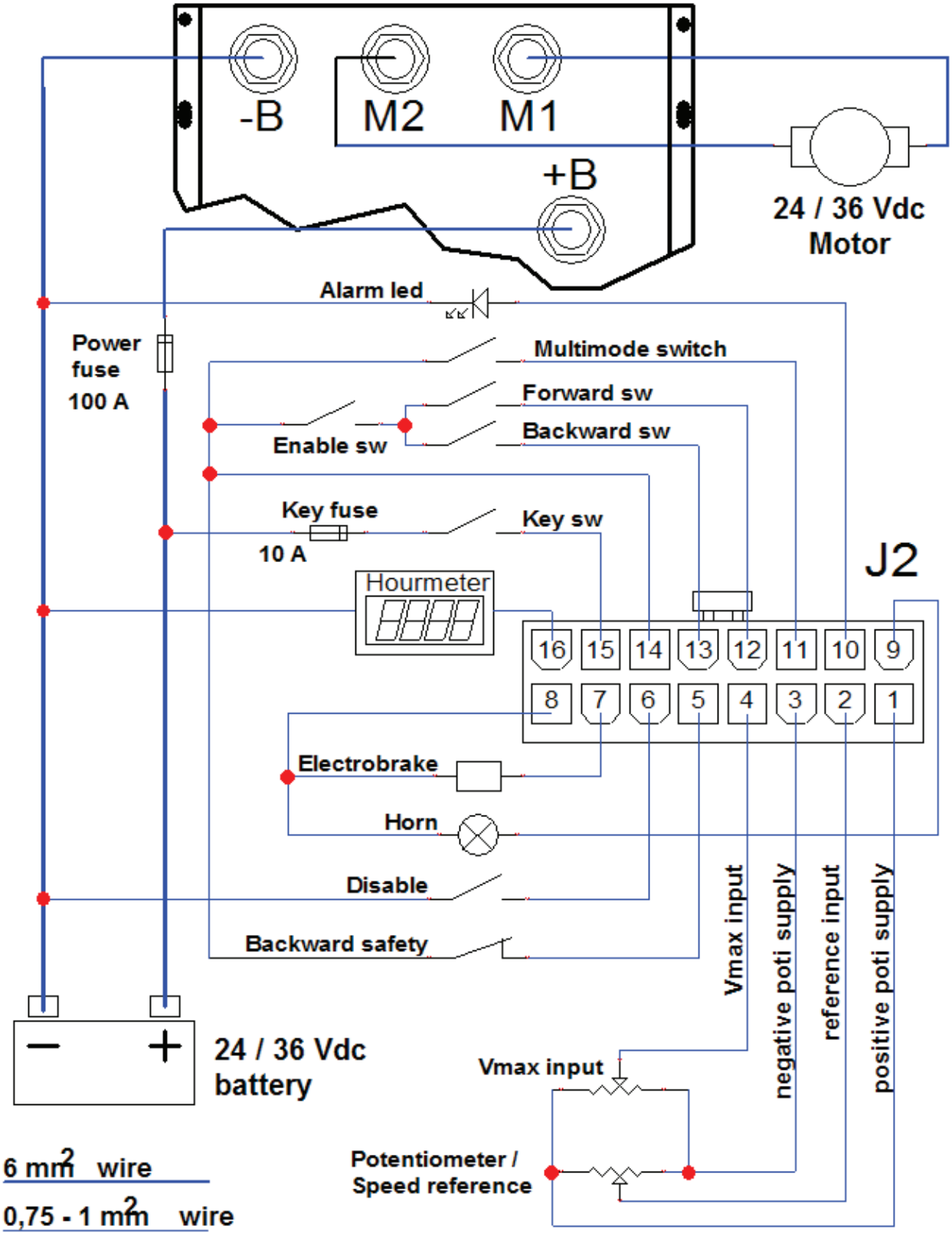


fig.3

- I/O CONNECTOR -

16v Molex connector (Molex p/n.39012160, contacts p/n.39000038)

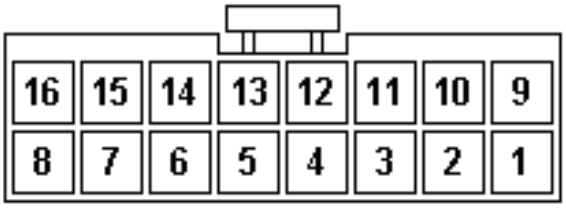


fig.4

Pin 1: HI –POT. INPUT
Positive Potentiometer Supply

Pin 2: C-POT.INPUT
Central Potentiometer, or Voltage (0,5-4,5Vdc) Speed Reference Input

Pin 3: LO-POT.INPUT
Negative Potentiometer Supply, or Gnd Voltage Speed Reference Input

Pin 4: Pin 2:V_MAX (OPTIONAL)
Max speed input potentiometer (>100 KΩ).

Pin 5: PUSH (IF NOT USED MUST BE CLOSED TO PIN14)
Default N.C. input contact (+V_Batt/Pin14) for Backward safety. This input is active when open.

Pin 6: DISABLE
When the contact is closed the controller will decelerate (Neutral Ramp) , will check if the motor voltage is near zero (motor stopped) and after the electro-brake delay will inhibit the motor : appear the alarm A12 (to reset switch-off and on again the key). If the contact will be open before the motor stop , the machine will restart at the desired speed.

Pin 7: ELECTROBRAKE COIL (-)
Output active low 2 Amps max (short circuit protected) and internal diode.

Pin 8: ELECTROBRAKE / HORN COIL (+)
Common +V battery for electro-brake and horn coils.

Pin 9: HORN (-)
Output active low (close to –Battery) for the horn or light backward direction (2 Amps max, short circuit protected, and internal diode).

Pin 10: ALARM
Connection for the diagnostic Blinking Led indicator (5Vdc-10mA) output : the number of blinks means the alarm type (example 5 blinks means Alarm 5).

Pin 11: MODE 1
Default N.O. input to +V battery.

Pin 12: FORWARD SWITCH
N.O. input to +V battery.

Pin 13: BACKWARD SWITCH
N.O. input to +V battery.

Pin 14: COMMON HIGH
+V battery output for switches.

Pin 15: KEY IN
Key switch input (+V battery).

Pin 16: HOURMETER
Hour-meter output (+V battery when running, 100mA max).

4v Molex connector (Molex p/n.3901240, contacts p/n. 39000038)

Used for handheld programmer

M5 power screws (M5)

+ B: **Positive DC power supply input,**
- B: **Negative DC power supply input,**
M1: **Positive Motor output** ***(in forward direction)*****,**
M2: **Negative Motor output** ***(in forward direction)***

F1: **Power fuse 150A.**
F2: **Fuse 10A.**

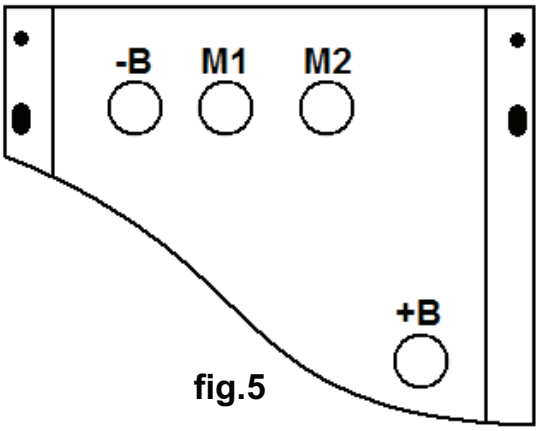


fig.5

PARAMETERS

Parameter		Default	Min	Max	Description
F0		**0**	0	2	Default parameters (F0=2)
F1	*	**50**	0	999	IGSL
F2	*	**100**	0	999	PGSL
F3	*	**70**	0	999	IGCL
F4	*	**600**	0	999	PGCL
F5		**30**	5	50	Acceleration ramp (10=1 sec)
F6		**15**	5	50	Reverse deceleration ramp (10=1 sec)
F7		**10**	5	50	Neutral deceleration ramp (10=1 sec)
F8		**120**	0	120	Current limit [A] - Imax
F9		**60**	0	100	Backward speed reduction [%]
F10		**0**	0	2	Speed reference 0=single ended potentiometer with FW,BW switches 1=wig-wag potentiometer with EN switch 2=wig-wag potentiometer without EN switch
F11	*	**---**	**---**	**---**	LPOT
F12	*	**---**	**---**	**---**	CPOT
F13	*	**---**	**---**	**---**	HPOT
F14		**0**	0	9	Tester mode: 0=nothing 1=motor current [1=1A] 2=motor voltage [10=1V] 3=potentiometer voltage [10=1V] 4=mosfet temperature [°C] 5=battery voltage [10=1V] 9=software release
F15		**20**	0	100	Brake delay (10=1s)
F16		**0**	0	20	Min speed (% of max speed)
F17		**25**	0	40	Motor's rated current – **In**
F18		**60**	0	60	Motor's overload time [s] – **t**
F19		**20**	5	50	Dead band of the speed reference (10=0,1V)
F20		**0**	0	1	Enable potentiometer calibration 0=disabled / 1 = enabled
F21		**0**	0	100	Backward safety time
F22		**100**	0	100	Forward maximum speed [%]
F23		**0**	0	2	Multimode input: 0=input disabled, 1=speed reduction, 2=current limit
F24		**50**	0	100	Multimode input = speed reduction [%]
F25		**60**	0	120	Multimode input = current limit [A]
F26		**0**	0	100	RxI [100=10% at 120A (5% 60A)]
F27		**0**	0	100	Backward safety speed [% of max speed]
F28		**0**	0	1	Battery voltage [0 = 24V ; 1 = 36V] **AFTER CHANGE SWITCH-OFF AND ON THE KEY**
F29	*	**---**	**---**	**---**	I_TAR
F30	*	**0**	0	1	Access key for engeneering parameters *