

PWM DC DRIVERS FOR DIRECT CURRENT MOTORS

serie: **ITE-CH.**

models: **Ch8/24 - Ch8/48**

INSTALLATION MANUAL

ITE REFERENCE CODE : **CH8-M2G.DOC (paper)**
CH8-M2G.PDF (digital)
ISSUE DATE **february 2, 1998**
NR. / DATE LAST REVISION : **Rev.0.0 / november 14, 1998**
This manual is a translation of the italian issue CH8-M2 (rev.0.2 / oct. 5, 1998)

SUMMARY:

1) PRODUCT DESCRIPTION	pag.2
2) RECALL TO SAFETY INSTRUCTIONS.....	pag.2
3) GENERAL SPECIFICATIONS.....	pag.3
4) INSTALLATION INSTRUCTIONS.....	pag.3
5) MECHANICAL INSTALLATION.....	pag.4
6) ELECTRICAL INSTALLATION (TERMINAL WIRINGS).....	pag.4
7) MOTOR RATINGS ..	pag.4
8) EMC PROTECTION	pag.5
9) REMOVAL OF DRIVER.....	pag.5
10) ELECTRICAL ADJUSTMENTS.....	pag.5
11) OPERATION METHOD	pag.6
12) CONFORMITY TO THE STANDARDS	pag.7
13) DRAWINGS AND DIAGRAMS	pag.9

ITE - INDUSTRIALTECNOELETTRICA S.r.l.

40133 - Bologna -Italy - via Segantini, 34
Phone:+39/51/386610 - Facsimile:+39/51/313449
internet website = <http://www.ite.it> [mailto: info@ite.it](mailto:info@ite.it)

This manual consisting of 9 pages (this one included).

1 - PRODUCT DESCRIPTION:

Ch8/24 e Ch8/48 drivers are designed to allow speed regulation of permanent magnet direct current motors.

Ch8/24 e Ch8/48 drivers are designed, made and sell as a component that must be installed only in industrial apparates, only by professional manufacturers or personnel familiar with technical qualification necessary for the correct installation of these products.

This documentation is the only valid guide for the installation and operation of ITE-Ch drivers. All informations are valid, if not differently specified for both Ch8/24 and Ch8/48 Drivers.

ITE give to Manufacturers and its personnel this manual to allow to reach, relatively and within certain limits regardings only ITE-Ch driver, previsions described in 89/336/EEC Dirctive (about ELECTOMAGNETIC COMPATIBILITY) and installing in compliance with EN60204-1 Standards.

The Manufacturer of devices/apparate that mounts Ch drivers is the only responsable of the final performances regarding electromagnetic compatibility (also in depending from the European Directives applies to his apparates); then the Manufacturer can decides to find other methods using alternative solutions to install Ch drivers in compliance with above mentioned Standards and Directive.

2 - RECALL TO SAFETY INSTRUCTION :

FOLLOWING SYMBOLS OF WARNING USED IN THIS MANUAL INDICATES INSTRUCTIONS THAT MUST BE READ WITH ATTENTION FOR YOUR SAFETY.

Symbol:



Indicates informations about presence of dangerous voltages that can cause serious damages or even death.

Symbol:



Indicates generic warnings or very important notices for correct usage of drivers.

3 - GENERAL SPECIFICATIONS:

<i>Specification</i>	<i>Ch8/24 Serie</i>	<i>Ch8/48 Serie</i>
Supply:	a.c. 24V \pm 10% / 50 Hz. or: d.c. 24 up to 36 V	a.c. 48V \pm 10% / 50 Hz. or: d.c. 48 up to 60 V
Limits:	a.c. from 18 up to 26,5 V frequency from 42 up to 60 Hz	a.c. from 43 up to 66 V frequency from 42 up to 60 Hz
Output voltages:	Armature: 0 to 24 V	Armature: 0 to 48 V
Maximum armature voltage:	Equal to input voltage (if supplied in a.c.) 90% of input voltage (if supplied in d.c.).	
Wirings:	on to 6 mm "faston" pins	
Self-protections:	Against overcurrent (ultra-fast protection against short circuits between A1-A2 terminals).	
Type of regulation:	Pulse Width Modulation. Frequency 12 kHz. Armature feedback as standard.	
Speed variation:	By linear potentiometer 5 kOhm / 2 Watt. Disableable input for start/stop operations (motor stop "type 2" as previous of EN 60204-1 standard).	
Speed range:	Up to 30/1 (armature feedback) Up to 100/1 (tacho-generator feedback, only on request).	
Displays:	LED1: Overcurrent trip. LED2: Presence of voltage on DC-rail.	
Ambient temperature:	from 0° up to 40°C during operation (100% rated current). from -25° up to 55°C during storage (limit: 70°C - 24hrs max)	
Permissible humidity:	95% max. relative, no condensation.	
Altitude:	max. 1000m on sea level (100% rated current).	
Deratings:	-3% each °C from 40° up to 50°C max. -5% above 1000m each 1000m up (on sea level).	
Degree of protection:	IP00.	
Optionals (on request):	Tacho feedback arrangement.	
<i>Code of optionals :</i>		
5k Ω Potentiometer	IPOT5K-C	
Tacho feedback	ICH8-24DT	ICH8-48DT

4 - INSTALLATION INSTRUCTIONS:

Ch driver must be mounted only vertically on a firm, flat surface, alone or together with other machine-related electrical equipments, with recommended components for EMC protection into electrical enclosures which have characteristic in compliance with predictions about "enclosure" description of EN 60204-1 standards.



Warning: Not any operation is allowed on to any part of Ch8 driver. Specially is not allowed to divide print circuit board from heat-sink and is not allowed to tamp, modify, replace or remove any electronic component mounted on the driver.

5 - MECHANICAL INSTALLATION (ref. fig. 1 - page 8):

Mount Ch driver only with heat-sink in vertical position for the best heat dissipation.

Fix heat-sink to the panel using screws provided as standard with the driver.

Leave at least 50 mm of free space above and below terminals as in figure. Be ensure that there is not any obstacles for air flow around the heat-sink. If cooling air arrive from external ambient and is contaminated with smoke, any type of dust, corrosive gas or grease Ch8 driver can to be damaged. In these cases, must be adopted appropriate measures: filters in the air passages, periodical cleaning and all the other operations that is consider good to prevent dirt accumulation on p.c.b., terminal blocks or heat-sink.

6 - ELECTRICAL INSTALLATION (ref. fig. 3 and 4 - page 9):**Power:**

<i>point of wiring:</i>	<i>terminal::</i>	<i>function:</i>
Faston on bridge rectifier	AC	AC supply
	AC	AC supply
Faston 6 mm	A2	Armature (+)
	A1	Armature (-)

Controls:

Faston 6 mm	P1	0V reference potentiometer
	P2	Central point of potent. (input 0-5V)
	P3	+V ref. potentiometer (output 5V)
	BK	Disable (closed on P1=disabled)
	DT	Tacho feedback in (if provided)

Supply trafo:

Supply must be given to driver using a dedicated trafo.

Power of trafo must be calculated using this formula:

$$P \text{ [VA]} = V_{\text{supply}} \times I_{\text{motor}} \times 1,1$$

where: V_{supply} = Secondary voltage of trafo
(typically = 220, 230 or 240 V).

I_{motor} = Motor rated current.

Electrical protections:

FUSE (Size = T12A).

Instead of fuse it can be used a protection switch choosen in proper size.

Warning: at the power-on, peak current due to charge of condenser can cause the intervention of electrical protection not correctly sized. Consider the power choosen for the supply trafo to establish the correct size of protection switches.

Not any protection switches must be fitted between "A1"/"A2" terminals and the motor.

7 - MOTOR RATINGS : (see also paragrph 10 - "ELECTRICAL ADJUSTMENTS")

To adjust Ch8/24 and Ch8/48 drivers to motors of different rated powers are provided several the following factory adjustments. Please specify at order the adjustment needed:

Motor rated current [A] :	driver adj.	24 V driver code	48 V driver code
up to 2,0	2A	Ch8/24-2A	Ch8/48-2A
fm 2,1 up to 4,0	4A	Ch8/24-4A	Ch8/48-4A
fm 4,1 up to 8,0	8A	Ch8/24 (standard)	Ch8/48 (standard)

Please contact our technical service if the ajustement of you driver and the motor ratings not corresponding.

8 - EMC PROTECTION.

List and order-code of external components necessary :

Motor rated current	up to 2 A	from 2 up to 5 A	from 5 up to 8 A
RCL=Main filter	IRC1(5A)	IRC05(5A)	IRC11(10A)

Positioning filter nearly Ch8 driver. If incoming power cables (connected to "AC" terminals of the driver) are longer than 10cm or if cables are not kept separated from other cables or if cables cross any other wiring is necessary to use screened cables of appropriate size. Only mains cable must be kept into the screen. Power cables must be kept separated from signal cables.

Never break screening of connections between driver and motor. The screen of motor cables must have into only motor-supply cables. If an external circuit for motor field supply is provided the screen of motor cables can keep also field supply wirings. All power connections must be grounded. Ground must be external and run side by side to motor screened wirings.

The part of cables not screened must be kept as short as possible.

For signals must be used only screened as indicated in figure 3, page 9. Is not allowed any break of the screen.

Connect all screens to PE bar; only one side must be earthed. If the disable input is used, screen wires. Connect the screen of disable contact to PE bar; only one side must be earthed.

Never connect in any case "P1" and "0V" to earth. Never put signals wirings (even if shielded) in the same canalizations containing power cables. Parts of cables not protected by shield near terminal contacts must be ever kept as short as possible.

9 - REMOVAL OF DRIVER:



Do not execute any operations of modify or removal of wirings if the driver is supplied-on.

Also after the switching-off do not operate until L1 is not completely lighted-off.

10 - ADJUSTMENTS : (see also paragraph 7 - "MOTOR RATINGS")

WARNING: Adjustments as standard for Ch8/24 e Ch8/48 make these drivers suitable for general purpose in coupling with motors which have power range as shown at the paragraph 7. There is no necessary operations using trimmers on to p.c.b.

However any operation must be carried out only by qualified personnel who have to follow operation instructions provided from the Firma (ITE) only on request.

Adjustments or special settings (included the arrangement for run using tacho feedback) must be ordered exclusively to ITE, that will provides driver suitably setted.

In the following are given some informations about trimmers functions.

I_{max} (T3) = Current limit. Current provided to the motor do not exceed, usually, 110% of motor rated current. In case of mechanical overload on the shaft, armature current will be limited to the value setted by this trimmer. An effect of the overload and of the intervention of current limit is the speed decrease with constant voltage on reference input, or a not increase of motor speed with an increase of reference voltage. There is not any attachments between this setting and "Overcurrent trip protection".

Vmax (T1) = Maximum speed setting. Trim allows an excursion of maximum speed, when reference potentiometer is setted to 100%, as indicated as follow:

<i>Driver</i>	<i>Supply:</i>	<i>Minimum voltage</i>	<i>Maximum Vltage</i>
Ch8/24	24 V ac	15÷16 Volt	30 Volt
	24÷36 V dc	15 Volt	Supply V - 10%
Ch8/48	48 V ac	28÷30 Volt	60 Volt
	48÷60 V dc	30 Volt	Supply V - 10%

The armature voltage obtained rotating full to zero the reference potentiometer is always 0V.

Comp.Rxl (T2) = Armature voltage compensation. At low speed (until 30% of rated speed) this settings allows to maintain unchanged motor speed when the load at the shaft goes from empty to full load. This adjustment, using some motors, can cause an increasement of speed when an load growth occurs. This condition si not regular and often cause instability in the speed control. Please contact our technical services if this trouble occurs.

11 - OPERATION METHOD:

Presence of condensation:

If condensation is present on the driver or into the enclosure do not give main supply.

Overspeed prevention:



WARNING: In a particular case of fault (short circuit in the final power stage) motor can goes in overspeed. If overspeed can causes an hazard must be expected the use of an external precautions that consent to power-off the driver and allows to stop the motor running.

Motor start stop:

Is not opportune to do start-stop operations switching-off main supply. The stop of motor run switching-off mains ("category 0" stop as described in EN-60204-1 standard) is possible in case of emergency intervention. If, for the safety of system, persons or animals, the stop of the motors must be do switching-off main supply (start/stop frequency less than 3 per minute) is necessary to respect the following sequence:

Switch on :	phase:	operation:
	1	Switch-on main switch (main supply). Contact between "P1" and "DISAB" must be still closed.
	2	Wait for 0,3 seconds (at least).
	3	Open contact between "P1" and "DISAB".

Notice: Switch-on of main switch when contact between "0V" and "AB" already closed and with reference potentiometer not in "zero" position, imply a delay of about 0,3 seconds before motor starts.

Switch-off, suggested operations:	phase:	operation:
	1	Close contact between "P1" and "DISAB".
	2	Wait for 0,1 seconds.
	3	Open main switch.

Switch-off, allowed op.:	phase:	operation:
	1	Open contact between "0V" and "AB" and, at the same time, open main switch.

Motor ever goes stop for inertia; adopt right brake system if safety of the system need a fast stop.

Motor speed regulation:

Operate manually on speed knob of reference potentiometer (connected to P1, P2 and P3 terminals as shown in N°3 figure - page 9).

“Overcurrent” protection intervention:

Lighting-on of LD2 led indicates the intervention of ultra-fast protection against short circuit between “A1” and “A2” terminals. This can occurs while motor runs as well as when the motor starts.

Intervention of this protection switches-off immediately controls circuit and breakdown and switches-off armature voltage so short circuit effects can not damage the power stage of driver. The only sensible effect of “overcurrent protection” intervention is simply the motor coast to rest. But beware: short circuit between A1 and A2 terminals is ever a very critical condition and is a risk for the safety of driver. Then is not allow try to do any short-circuit voluntarily and in case of accidental short-circuit is not advisable try to reset before it be removed the cause of short-circuit. Trip condition is made permanent by latch. When fault have been corrected the driver must be reset. Reset is obtainable switching-off main supply for few seconds. If the cause of short circuit have not been removed there will be another intervention of protection at the power-on.

“Overcurrent” has not any attachment with the “current limit” adjustmant setted by ITE using “TR3” trimmer (ref. page 5).

Operations with drivers setted for tacho feedback.

On request Ch8/24 and Ch8/48 drivers can be provided already setted for the tachogenerator feedback, for a best drive control.

Please refer to figure 4, page 9 for the wirings instruction.

12 - CONFORMITY TO THE STANDARDS:**“LOW VOLTAGE” EEC DIRECTIVE**

Ch8/24 and Ch8/48 drivers, used in a machine following prescriptions of this manual, allows an installation in compliance to previsions of EN60204-1 Standards and then can satisfy previsions of 73/23/EEC Directive (“Low Voltage”), also if this directive is not applicable to the devices supplied with voltages below 48 Vac or 60 Vdc.

“ELECTROMAGNETIC COMPATIBILITY” EEC DIRECTIVE

Ch8/24 and Ch8/48 can satisfy protection requirements of 89/336/EEC about electromagnetic compatibility if installed in strict compliance with all prescriptions of this manual.

Standard references are the followings:

i) Immunity.

Generic Standard: Subject:

EN 50082-1 Generic Standard for noise immunity, residential areas, commercial premises and small business.

Basic Standard: Phenomena:

IEC 801-4 Burst on control cables

IEC 801-4 Burst on power supply cables

IEC 1000-4-3 High frequency electromagnetic fields

IEC 1000-4-5 Surges (line to line) and (line to earth)

IEC 1000-4-8 Magnetic field (50 Hz).

Limit:

severity 3

severity 3

10V/m

severity 2

200A/m

ii) Emissions.

Generic Standard: Subject:

EN 50081-2 Generic Standard for noise emissions, industrial premises.

13 - FIGURES:

figure 1: MECHANICAL INSTALLATION

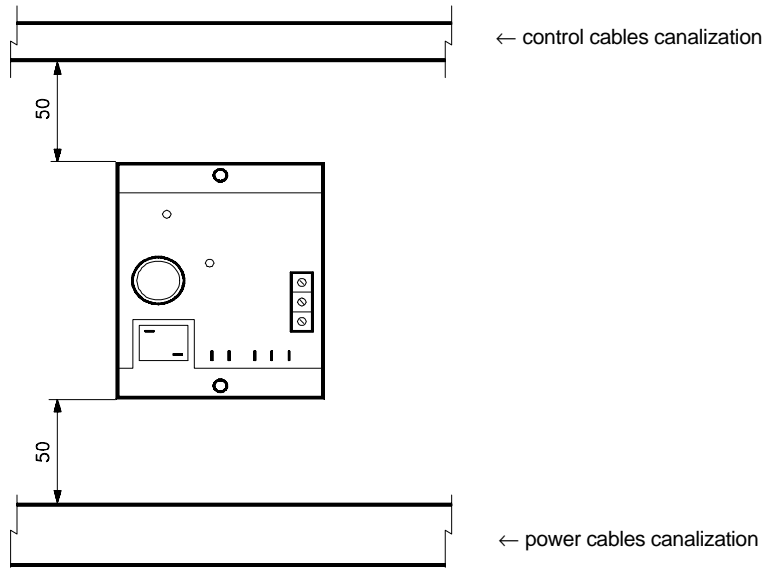
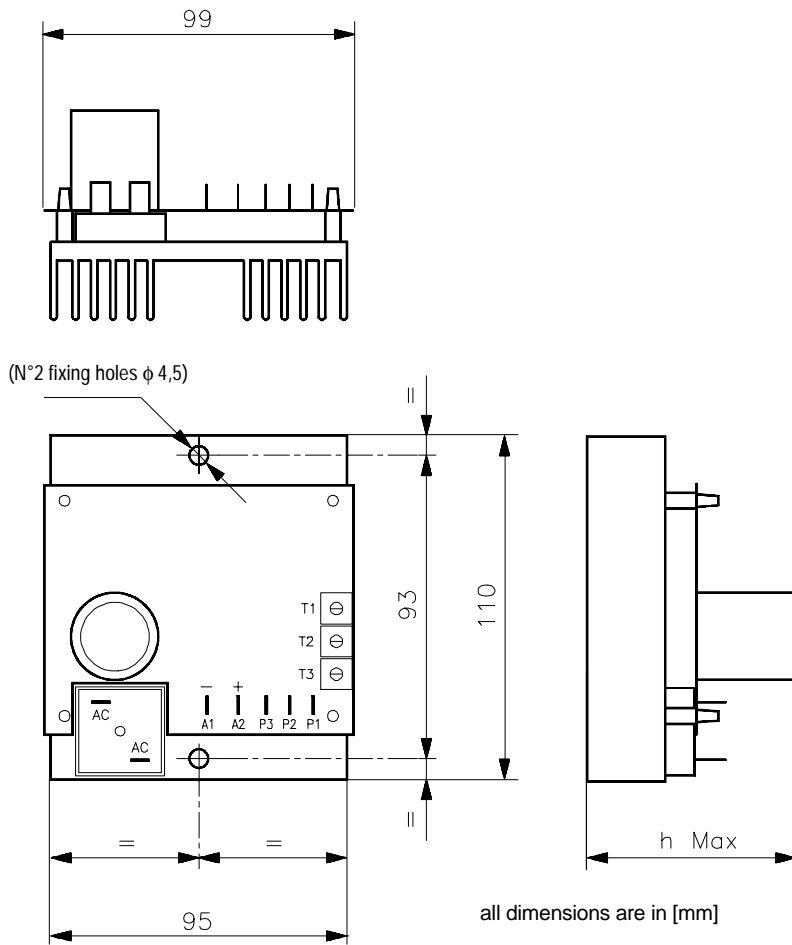


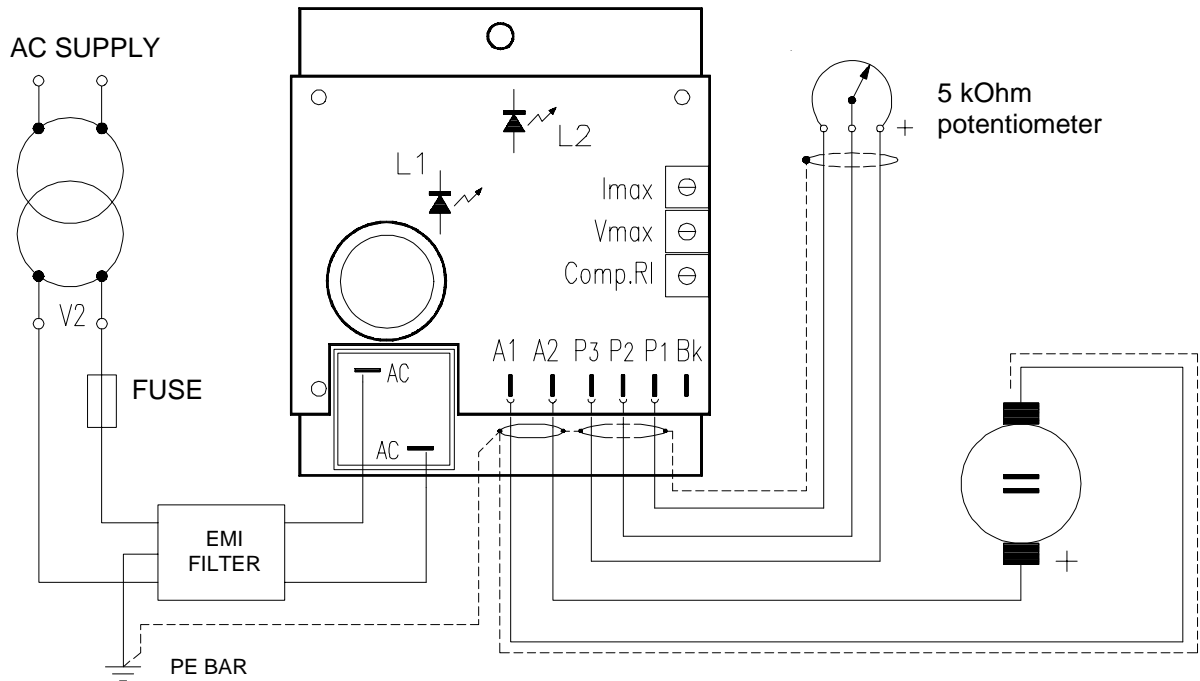
figure 2: OVER ALL DIMENSIONS



all dimensions are in [mm]

dimension "h Max"	88
-------------------	-----------

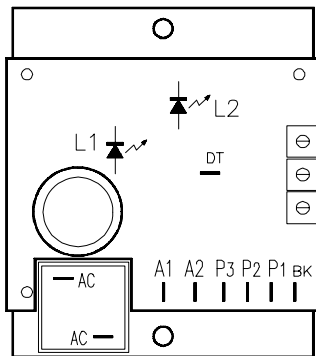
figure 3: WIRINGS



- V2 = Secondary voltage of trafo (24 or 48 Vac)**
- RCL = Line filter (see also page 5)**
- L2 = "OVERCURRENT" led (see page 7)**
- L1 = Presence of dc rail voltage**
- Imax = Max. current adjustment.**
- Vmax = Max. armature voltage adjustmen.**
- Comp.RI = Rxl compensation adjustment (see pag.6)**
- FUSE = T10A (see also notice at page 4).**

figure 4: TACHO FEEDBACK WIRINGS (optional, only for special versions Ch8/24-DT and Ch8/48-DT)

TERMINAL WIRING:



CONNECTIONS:

