

ALTER

ALTER ELETTRONICA S.R.L.
CASALE MONFERRATO (Italy)

4 QUADRANT
I.G.B.T. P.W.M.
BRUSHLESS
DRIVE

4QBR

GENERAL FEATURES

The drivers type 4QBR have a three-phase 6 I.G.B.T. bridge with a 18 KHz P.W.M. control circuit.

The control of the Brushless motor is made in all 4 quadrants.

The Brushless Motor must be equipped with resolver

Their utilize is advised in applications with very high response quickness.

They permit to the motor to work as a brake, only for a short time, with energy recovery to the ballast circuit.

The drivers can inside receive the speed ramp generator card 01/249 (OPTIONAL).

TECNICAL FEATURES

- Modular structure, maximum compactness, minimum faying on the panel board.
- IP00 Protection rating.
- Connections: Power to terminal board
Signals to screwed connector
- Power supply: Threee-phase 220 V a.c.±10%
- Auxiliary supply: Single-phase 110/220 V a.c.±10% - 100/50 mA
- Power and Service supply frequency: 50÷60Hz.
- Output rated currents: 10/20/30/40/50 A d.c. (continuous duty)
- Peak currents: 40/40/60/80/100 A d.c.
- Continuous power of ballast circuit: 80/80/120/160/160 W.
- Mass: 4Kg (10 A continuous duty type only) - 5,5 Kg.(all other types)
- Insulation between power and control circuits
- Ventilation: natural (10 A continuous duty type only)
by built-in electric fan (all other types)
- Operating temperature: 0 to +45°C. (32 to 113°F)
- Storage temperature: -20 to +60°C (-4 to 140°F)
(relative humidity 95% max without condensate)
- Maximum altitude: 1000 m. (3280 feet) a.s.l.
- Regulation feature: constant torque
- Control loops: current/speed
- Speed reference differential input stage
(10V max. - input resistance 100 KΩ)
- Output reference supplies: +10V and -10V - 5mA max
- Output supply: 24Vd.c. - 50mA max.
- Optocoupled logic controls: 15 to 30Vd.c. - 10mA max.
- Encoder Simulation (OPTIONAL)
(1024 Pulses per revolution - Output A-A-B-B-Z-Z - Supply 5Vdc)
- Seven segment DISPLAY for status and faults monitoring
- Driver OFF in case of the following faults:
 - Auxiliary supply fault
 - Power supply fault.
 - Motor connections fault.
 - Resolver fault.
 - IGBT bridge overtemperature.
 - Reached maximum time of rated current in the motor.
 - Overcurrent in the motor.
 - Overvoltage in the IGBT bridge.
- "DRIVE OK" ouput contact (breaking capacity: 110Va.c. - 200mA max)

SETTING AT WORK

Read carefully this instruction book in all his parts.

Accurately check that:

- The driver underwent no damage while the transport or the set up.
- The supply voltage does not exceed that of the plate.
- The connections correspond to that indicated in this instruction book.
- The ground connections not form closed loops.
- Spykes suppressors (RC snubber for ac supply and diodes for dc) are mounted in parallel to the coils of: remote control switches, relays, selenoid valves, clutches, brakes, and single or three-phase a.c. motors.
- Standing installation and enough room for a good air circulation.
- Jumper JA cutted off if optional card 01/249 is plugged in.

Carry out the following setting:

- Auxiliary supply 110/220 Va.c. by the voltage changer.
- Rotate the "MAX SPEED" trimmer till counterclockwise limit.
- Switch on auxiliary and power supply ("CO.EN." control in off state) and check that "d" letter appear on the display.
- Set on the "RA.CU." T.P. by the "RATED CURRENT" trimmer the voltage correspondent to the motor rated current.(see page 4)
- Set on the "PK.CU." T.P. by the "PEAK CURRENT" trimmer the voltage correspondent to the motor peak current. (see page 4)
- Enable the driver by the "CO.EN." control and check that "e" letter appear on the display.
- Set the max. speed reference to the driver and adjust by the "MAX SPEED" trimmer the max speed wanted of the motor.

If the motor shaft rotation is in opposite direction to that wanted, take away all supplies and reverse the links of the speed reference (REFH with REFL)

- Adjust by the "GAIN" trimmer the quickness of motor answer.
- Adjust the "SPEED OFFSET" trimmer to stop the slow rotation of the motor shaft with zero speed reference.
- Enable the speed reference ramp generator by the "RA.EN" control on the card 01/249 (OPTIONAL)
- Adjust the speed reference ramp time by the "RAMP TIME" trimmer on the card 01/249 (OPTIONAL)

FUSES ON THE THREE-PHASE SUPPLY

DRIVER CURRENT	FUSES RATING CURREN
10/40 A	16 A
20/40 A	25 A
30/60 A	32 A
40/80 A	50 A
50/100 A	63 A

ALPHANUMERIC DISPLAY INFORMATIONS

anything Auxiliary supply fault or switched off.

d

Driver disabled (Motor not driven)

e

Driver enabled (Regular Working).

NOTE: The following numerical values are flashing and correspond to ALARMS

1

Power supply cutted off or not sufficient.

NOTE: The corrispondent opening of the contact "DRIVE OK" is possible only if the converter is enabled.

2

Motor connections fault

The alarm is latched and the reset is possible cutting off the CO.EN. control. For this alarm check:

- Motor connections.

3

Overtemperature of the IGBT bridge.

For this alarm check:

- The room temperature of the elactric cabinet.
- The good ventilation of the converter.

4

Exceeding max time of working to the rating current.

The alarm is latched and the reset is possible cutting off the CO.EN. control. For this alarm check:

- Motor load
- Motor and Resolver connections

5

Overcurrent.

The alarm is latched and the reset is possible cutting off the CO.EN. control. For this alarm check:

- Motor connections
- Motor winding

6

Overvoltage on the IGBT bridge supply

The alarm is latched and the reset is possible cutting off the CO.EN. control. For this alarm check:

- The three-phase supply do not exceed the rated value.

LED

RA.EN.

Enable of the speed reference ramp generator
(Only with optional card 01/249)

TEST POINTS (T.P.)

BRL.TACH.	Motor speed (8 V correspond to 3000 RPM of motor shaft)
SP.RE.	Speed reference
AR.CU.	Motor current (The peak current correspond to 10 V on the T.P. and it's indicated on the driver plate.
RA.CU.	Voltage reference correspondent to the Rated Current on the motor.(adjusting by "RATED CURRENT" trimmer) (The Rated Current correspond to 5 V on the T.P. and it's indicated on the driver plate.
PK.CU.	Voltage reference correspondent to the Peak Current on the motor.(adjusting by "PEACK CURRENT" trimmer) (The Peak Current correspond to 10 V on the T.P. and it's indicated on the driver plate.
+ 15 V	Stabilized supply +15V
- 15 V	Stabilized supply -15V



Common supplies

REGULATION TRIMMERS

NOTE: The clockwise rotation increase the adjusted value.

MAX SPEED Maximum motor speed.

SPEED OFFSET Zero setting of the speed offset.

GAIN Quickness of motor answer to the variations of the speed reference and of the motor load.

Note: Exceeding on the regulation bring to speed motor shaft vibrations.

PEAK CURRENT Peak Current on the motor.
(The setted voltage is available on T.P."PK.CU")

RATED CURRENT Rated Current on the motor.
(The setted voltage is available on T.P."RA.CU")

RAMP TIME Acceleration and deceleration motor time (OPTIONAL)
(Range time: 0.1 to 1 sec)

INPUT / OUTPUT LOGIC CONNECTIONS

NOTE: To use them see the connection diagram.

OKD 1-2 Relay contact which is closed when the driver is regularly working.
(NO ALARM)

LO.CO. Common of the logic controls.

CO.EN. Converter enable.
(Control voltage: 15÷30Vd.c. - 10mA max).

ZERO Common of external logic controls supply.

+24V External logic control supply. (24Vdc - 50mA max)

RA.EN. Speed ramp generator enable (OPTIONAL)
(Control voltage: 15÷30Vd.c. - 10mA max).

INPUT / OUTPUT ANALOG CONNECTIONS

NOTE: To use them see the connection diagram.

+10V +10V - 5 mA max output

-10V -10V - 5 mA max output

REF.L. Cold input for the speed reference (10V max)

REF.H. Hot input for the speed reference (10V max)

AN.CO. Analog connections common

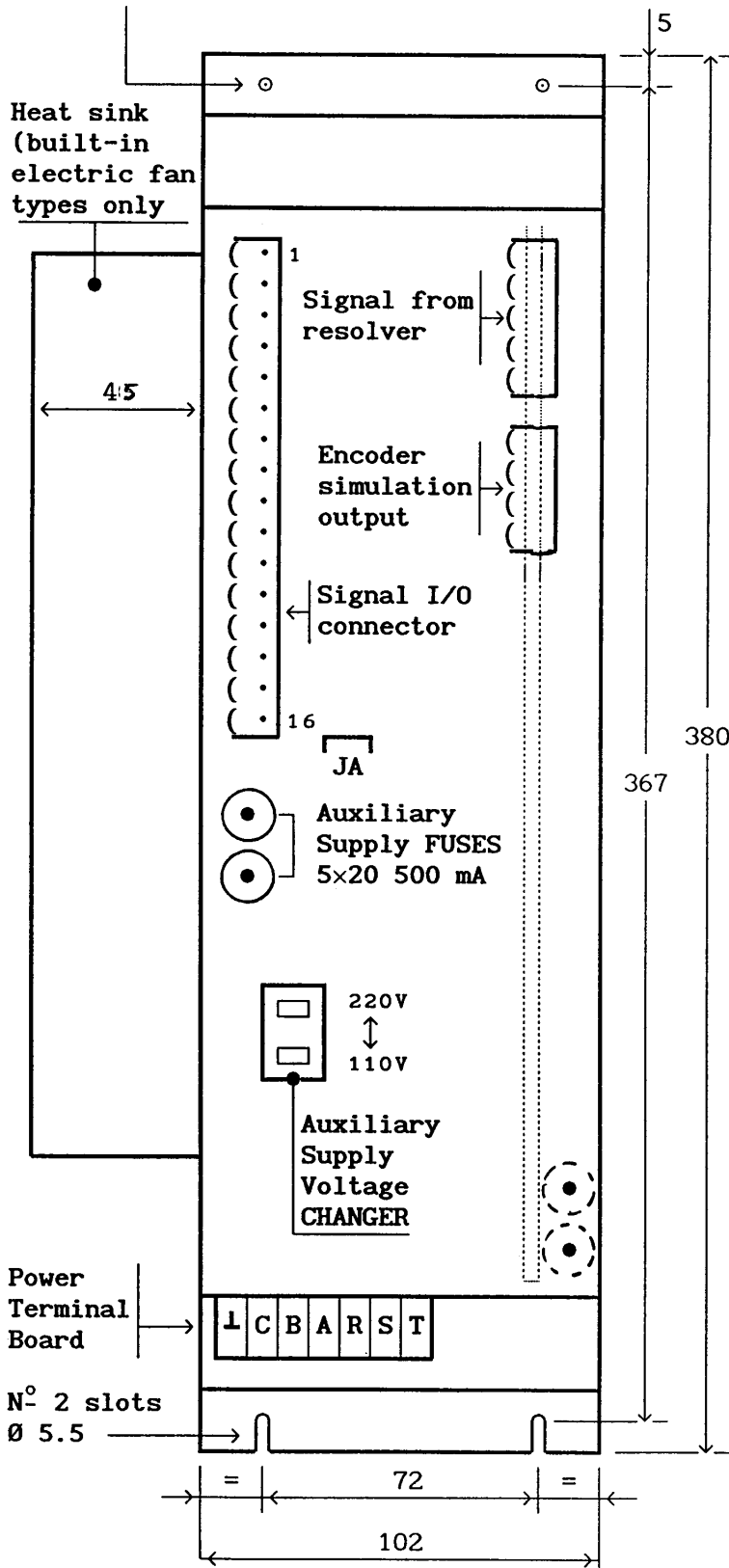
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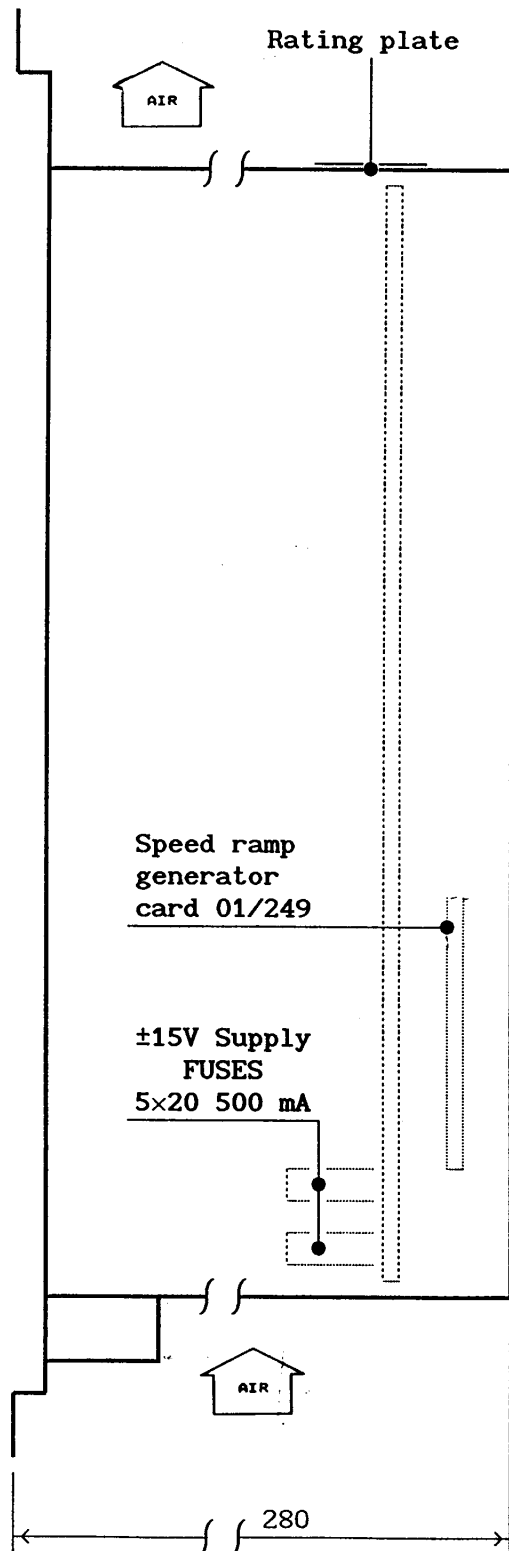
OUTLINE DIMENSIONS

N° 2 holes Ø 5.5

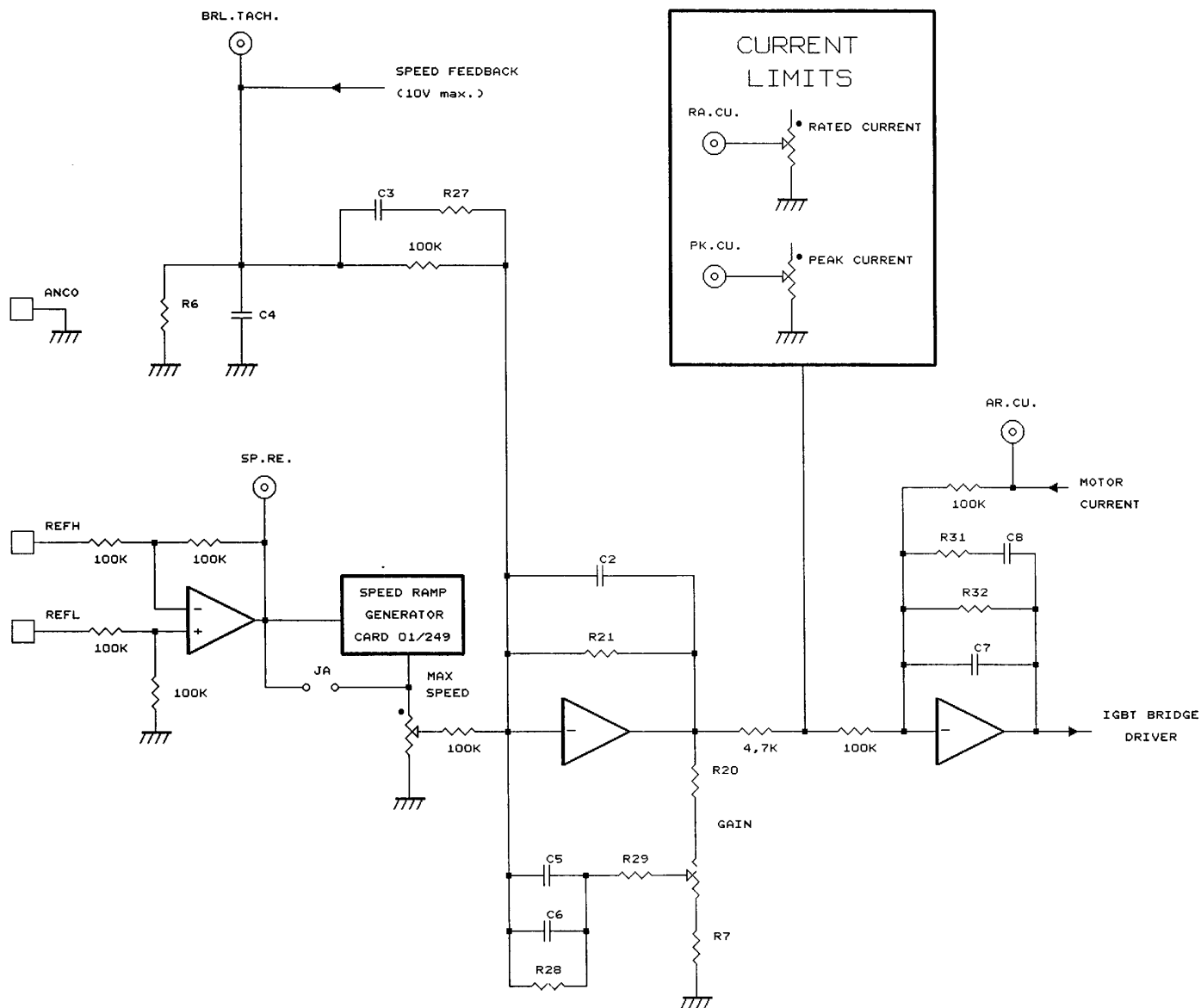
Heat sink
(built-in
electric fan
types only)



Rating plate



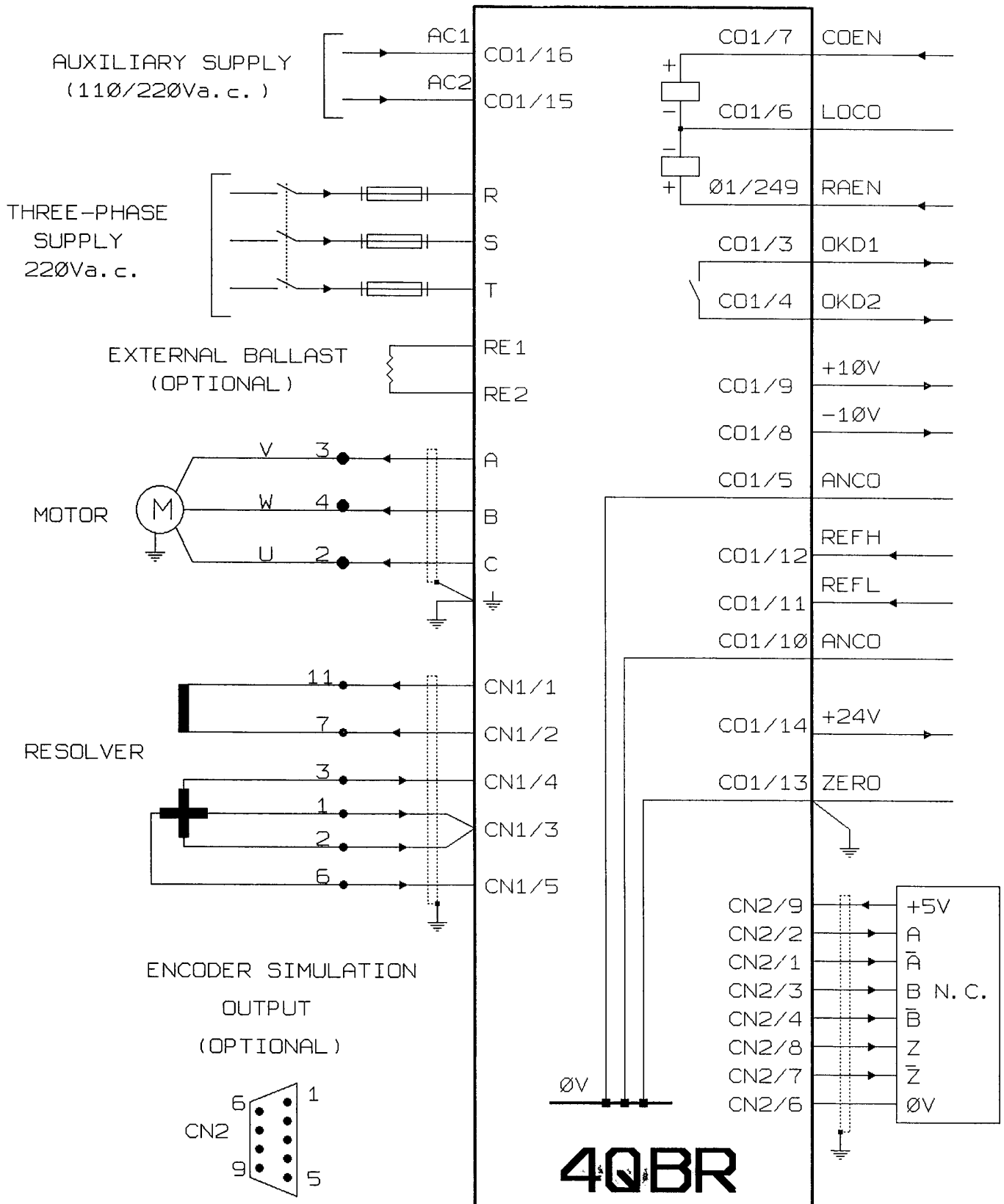
SPEED AND CURRENT LOOPS



NOTE: IF THE SPEED RAMP GENERATOR (CARD 01/249) IS PLUGGED IN IS NECESSARY TO CUT THE JUMPER JA PLACED NEAR THE I/O SIGNAL CONNECTOR

OUTSIDE CONNCTIONS

CLOCKWISE SHAFT ROTATION
AND POSITIVE SPEED REFERENCE CONNECTED TO "REF H" INPUT



CONNECTION EXAMPLES

