BRH DRIVE
USER MANUAL

INDEX

General characteristics

Mechanics characteristics

The drive is wholly contained in metallic chassis, fixed to the radiator of cooling that functions how support for all the component. The book format consents of obtain an extremely finite encumbrance, prearranged for have mounted singularly in the frame with or without ventilation or in rack of two or three drive with common ventilation. The interface to the drive has realized by means of 2 power connectors of 3 poles respectively for the three-phase power supply and the phases of the motor and one connector of 14 poles for the control signal and a connector of 9 poles for the feedback signal of speed and of position. In figure bring again the physical dimensions of the drive.

BRH drive type

200

273

A

253

BRH 10,20,30
Without ventilation A = 68
With ventilation   A = 98

BRH 40
Without ventilation A = 100
With ventilation   A = 130
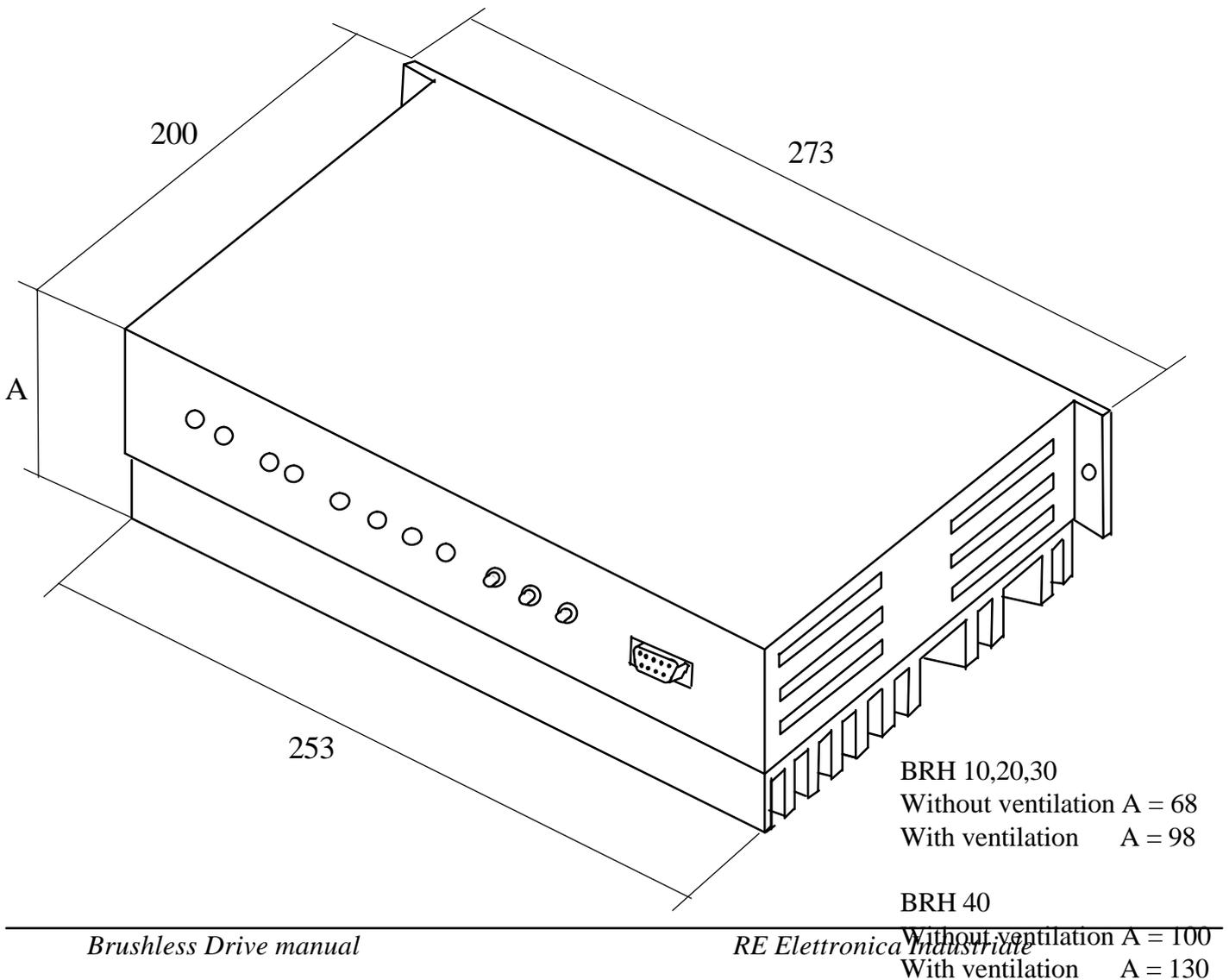
Available size (*)

TYPE OF DRIVE	Nominal I	Peek I	Vdc max	Feeding	Filters
	(Ampere)	(Ampere)	motor (Volt)	Vac three-phase	EMI
BRH 10	**10**	**20**	**180**	**170±10%**	**832010V**
BRH 20	**20**	**40**	**180**	**170±10%**	**832030V**
BRH 30	**30**	**60**	**180**	**170±10%**	**832030V**
BRH 40	**40**	**80**	**180**	**170±10%**	**832050V**

(*)All the drives could to be requested with feedback from tacho generator or from encoder.

Electric characteristics

- Switching drive with PWM modulation realized by a three-phase H bridge.
- Trapezoidal operation.
- Unique three-phase power supply 200Vac ±10%.
- PI control loop for current & speed.
- Hall sensor for position feedback.
- Speed feedback from tacho generator or encoder.
- Speed signal ±10V products from N.C., from potentiometer or from other signal generator.
- Frequency of work 20khz. (doesn't utter an audible whistle during the operation).
- Bandwith > 600 Hz (response time<16ms).
- Differential input for speed.
- Offset zero speed setting.
- Input impedance 20Kohm.
- Temperature range from 0° to 40°C.
- Current of blunt (peak current) equal to the double of the normal current for the duration of 2 seconds.
- Capability of the insertion of ramps on the reference of speed.

Protections

- Break of the IGBT.
- Internal power supply fault.
- Motor short circuit.
- Overtemperature.
- Minimal voltage rating.
- Overvoltage.

- Break of the braking circuit or insufficient braking.

The intervention of a protection has displayed from the lighting of the red LED of fault, and brought again out by means of the opening of a fototransistor normaly closed place among the 1 and 2 terminal.

LED of message

The diagnoses has realized by means of three LED that have the following meaning:
- GREEN LED- The drive has fed, function correctly (drive is OK) and the enable switch is on.
- YELLOW LED- The drive is in current reduction state, after have reached the peak current has returned to the nominal current.
- RED LED- A fault was occurred.

Description of connectors

Control connectors (14 poles)

1. Emitter of the fototransitor that give the drive ok signal (opens in concomitance to the intervention of a protection)
2. Collector of the fototransistor.
3. Drive enable
4. Power supply +24Vcc, 20mA max
5. Current limitation signal.
6. Positive power supply +10V
7. Negative power supply -10V
8. 0V signal
9. Ramp circuit input
10. Ramp circuit output
11. Inverting input of speed signal.
12. Non inverting input of speed signal.
13. Signal proportional to the current on the motor.
14. Signal proportional to the speed of the motor.

9 poles connector

1. Tacho generator signal. (Not connected)
2. Tacho generator signal. (Not connected)
3. Tacho generator signal. (signal of encoder phase B)
4. 0V signal (Signal of encoder phase A)
5. Power supply +12V (GND)
6. Hall sensor signal. (position signal)
7. Hall sensor signal. (position signal)
8. Hall sensor signal. (position signal)
9. 0V signal. (+5V)

Power supply connector(3 poles)

R. R Phase from the secondary of the supply transformer.
S. S Phase from the secondary of the supply transformer.
T. T Phase from the secondary of the supply transformer.

## Motor power connector (3 poles)

U. U Phase of the motor
V. V Phase of the motor
W. W Phase of the motor

Frontal view of the drive

View of connectors

Three-phase power supply

Control connector

Phase of moto
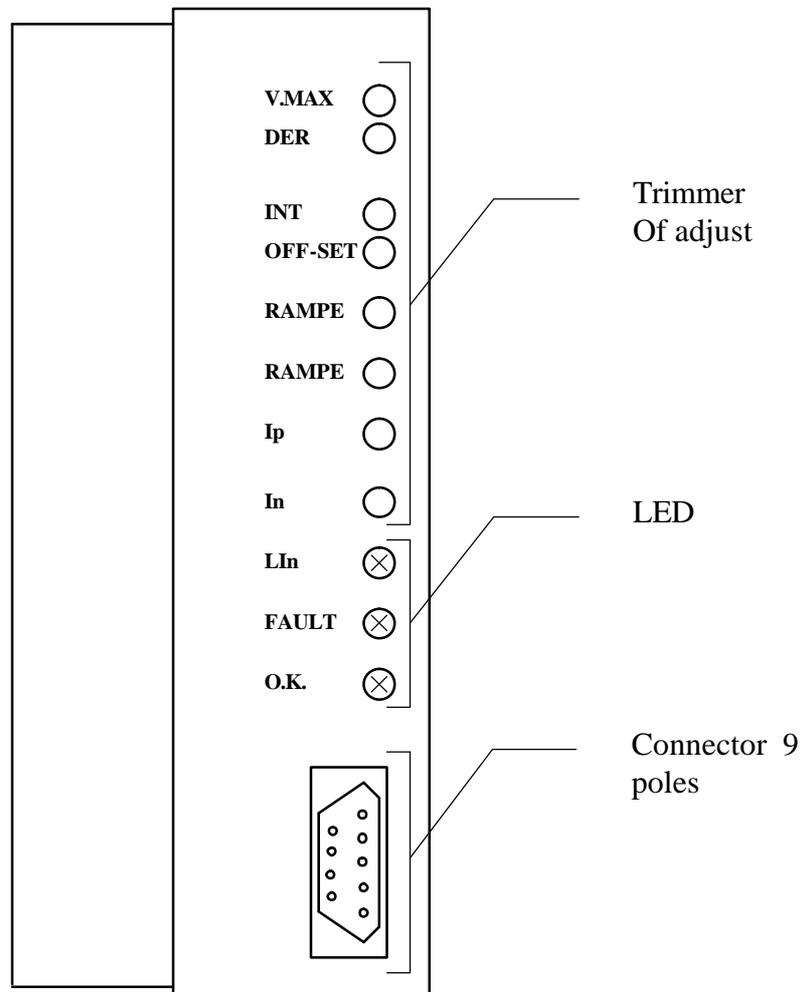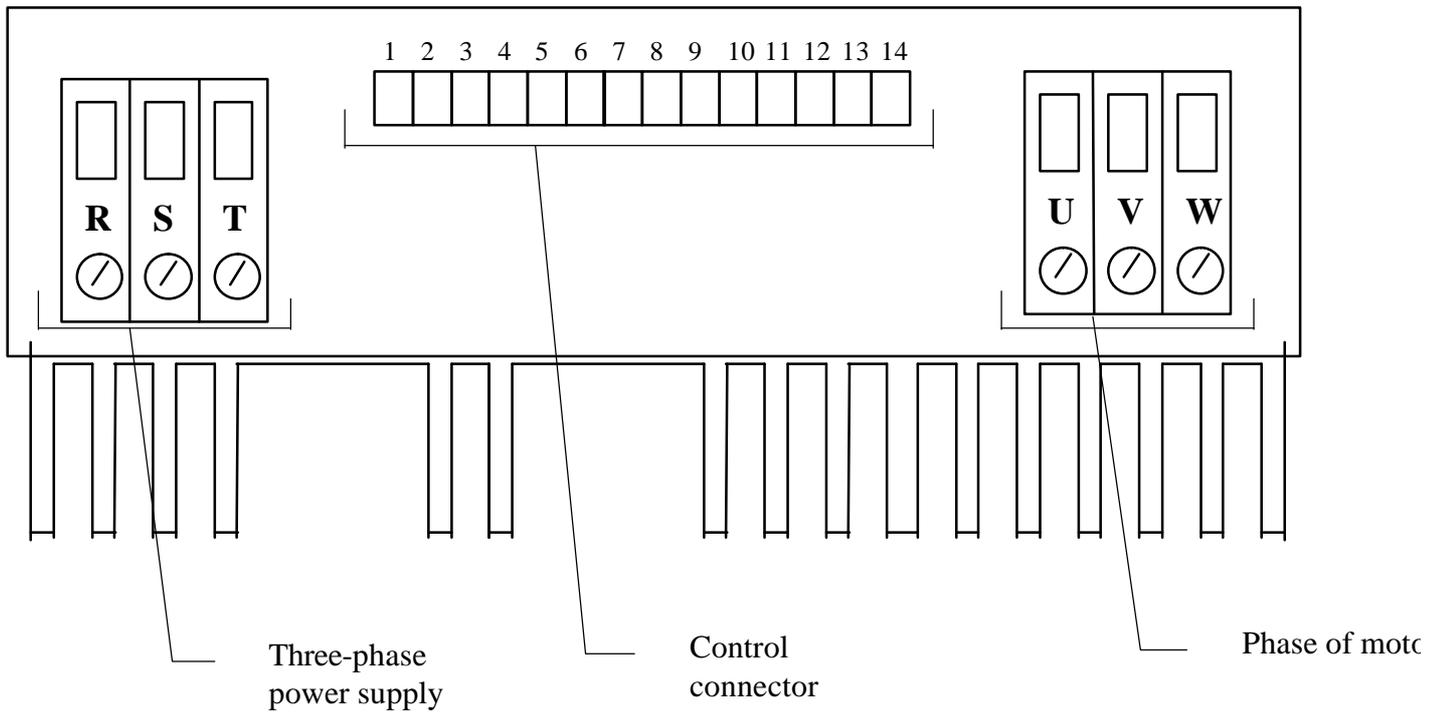
Trimmer of adjustment

V.max.

Regulate the maximum speed of the motor, the speed that is obtained bringing the reference of speed to 10V.

Der.

Regulate the gain of the derivative action of the speed control loop. Revolving the Der trimmer. in hour-sense, increasing the derivative gain, becomes the more control "fidgety," in other terminus more reactive to the abrupt changes of speed of the motor. It could be used for reduce the ampleness of the "overshoot" due to an elevated gain of the integrative action.

Int.

Is the fundamental trimmer for the adjusting the gain of speed loop (integrative and proportional action), and then for the determination of the band width of the feedback system, turn in antihour sense incrase the gain.

Offset

Used to bring to zero the speed of the motor with a speed input of 0V.

Ramps

The two trimmer of ramp regulates the inclination of the ramp on the speed reference in both the senses of march.

Ip

Adjust the peak current, the max current that the drive can give out.

In

Adjust the nominal current. The In is normally equal at the half of Ip

Sizing of the external components

Power supply transformer

The primary of transformer depend of the line voltage.
The secondary give an out voltage of:

Vac= V nominal motor* 0.88

The power of the transformer has given from the following:

P= 1.5* motor power

For sizing a transformer that feeds more drives perform the calculation of the power on the individual drive and add these powers.

N.B. The current of setting of the drive could to be a 10% higher than the current nominal of the motor.

Fuses

Power supply fuses:

Normal fuses I= 1.5 * I nominal drive

Fuses to protection of the motor:

Extrarapid fuses I= 4 * I nominal motor

Connections

Insertion with speed reference from potentiometer without ramps
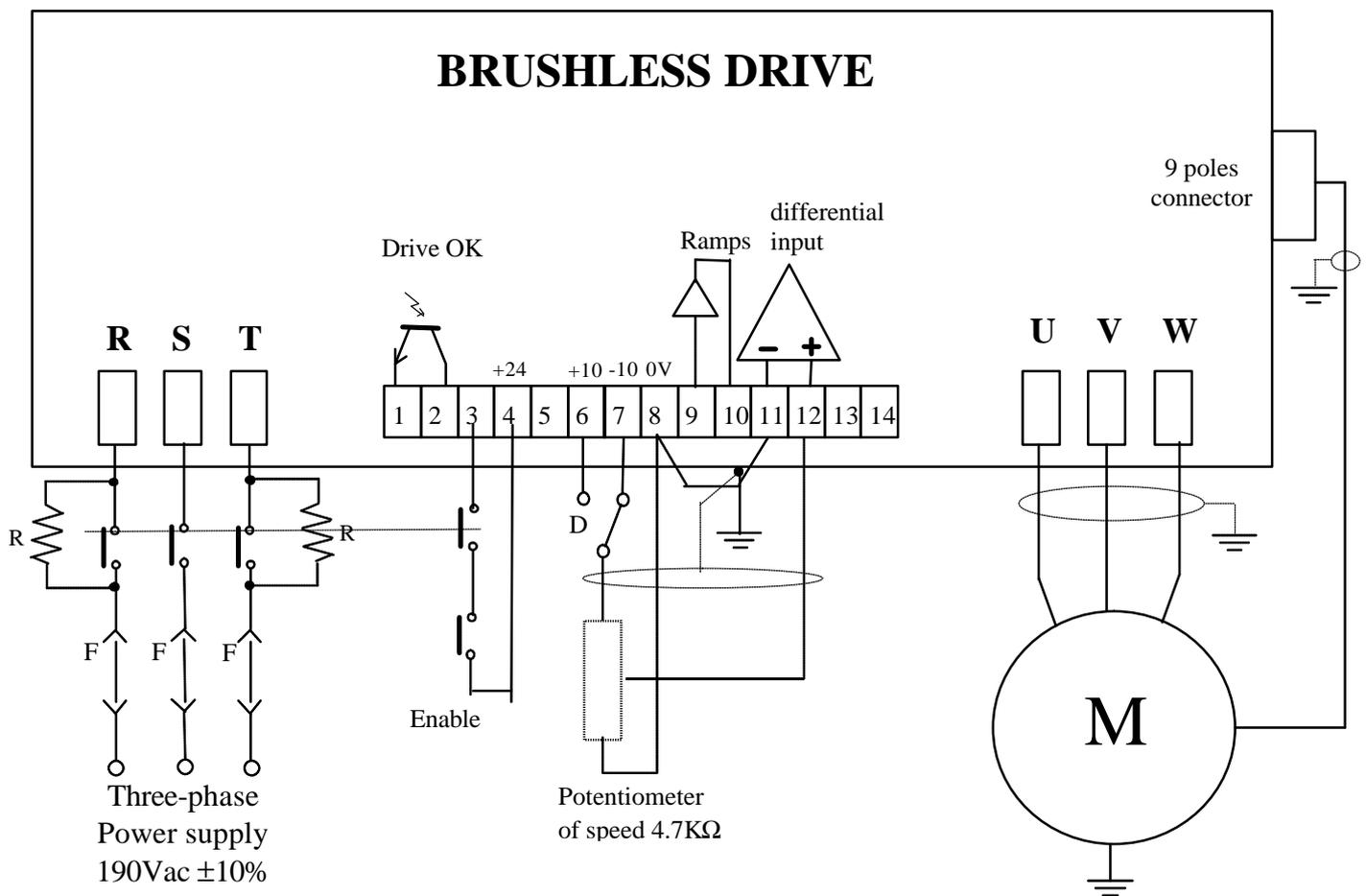
BRUSHLESS DRIVE

9 poles connector

differential
input

Drive OK   Ramps

R   **S**   **T**   +24   +10 -10 0V   **U**   **V**   **W**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

R   R

D

F   F   F

Enable

Three-phase
Power supply
190Vac ±10%

Potentiometer
of speed 4.7KΩ

M

D: Decide the direction of rotation
R: Preload resistance 47Ω 15W
F: Extrarapid fuses

Insertion with speed reference from potentiometer and ramps inserted
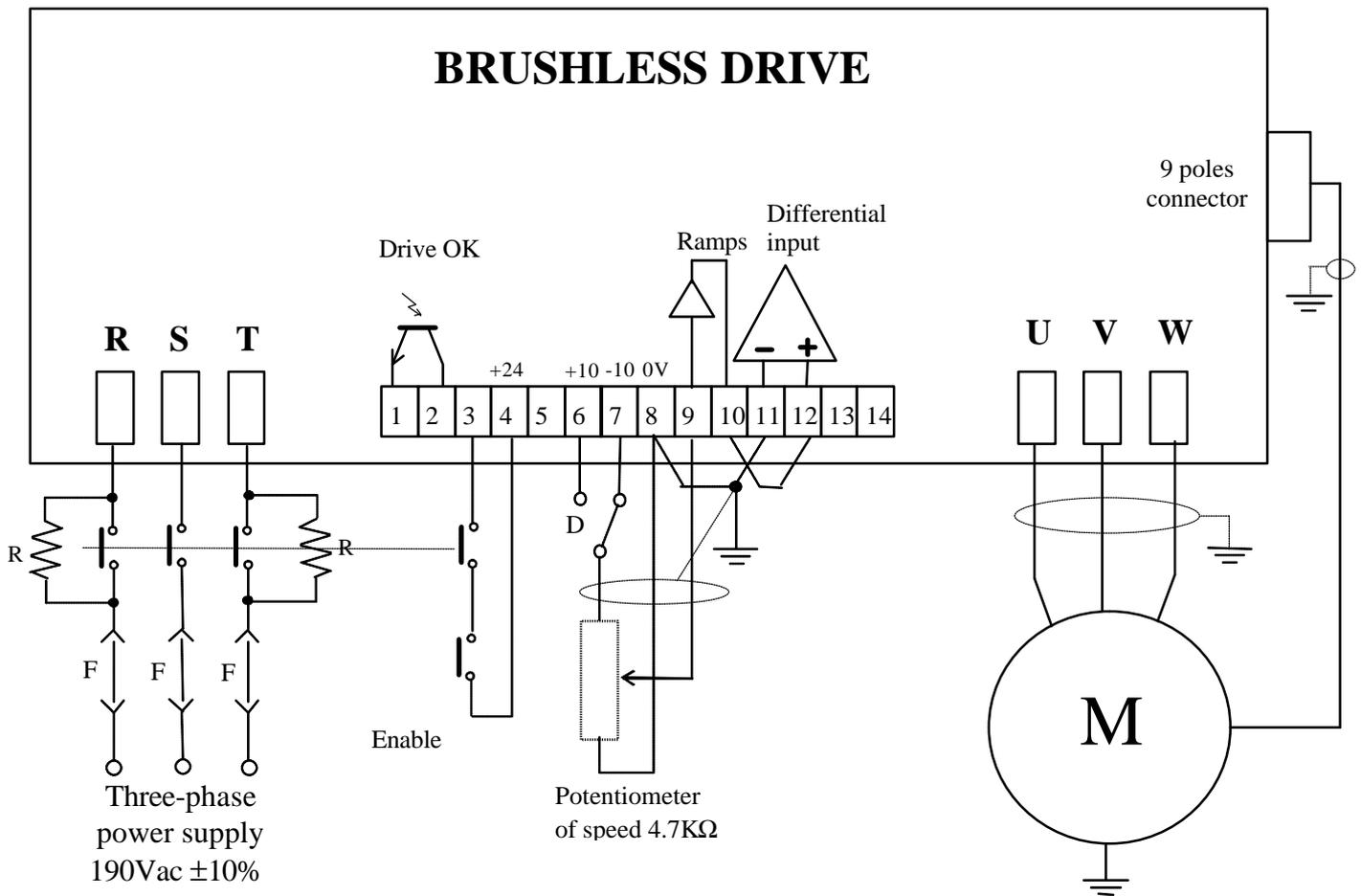
BRUSHLESS DRIVE

Drive OK

Ramps

Differential input

+24   +10 -10 0V

1	2	3	4	5	6	7	8	9	10	11	12	13	14

R   S   T

U   V   W

9 poles connector

D

R

R

F   F   F

Enable

Three-phase power supply 190Vac ±10%

Potentiometer of speed 4.7KΩ

M

D: Decide the direction of rotation
R: Preload resistance 47Ω 15W
F: Extrarapid fuses

Insertion with torque potentiometer
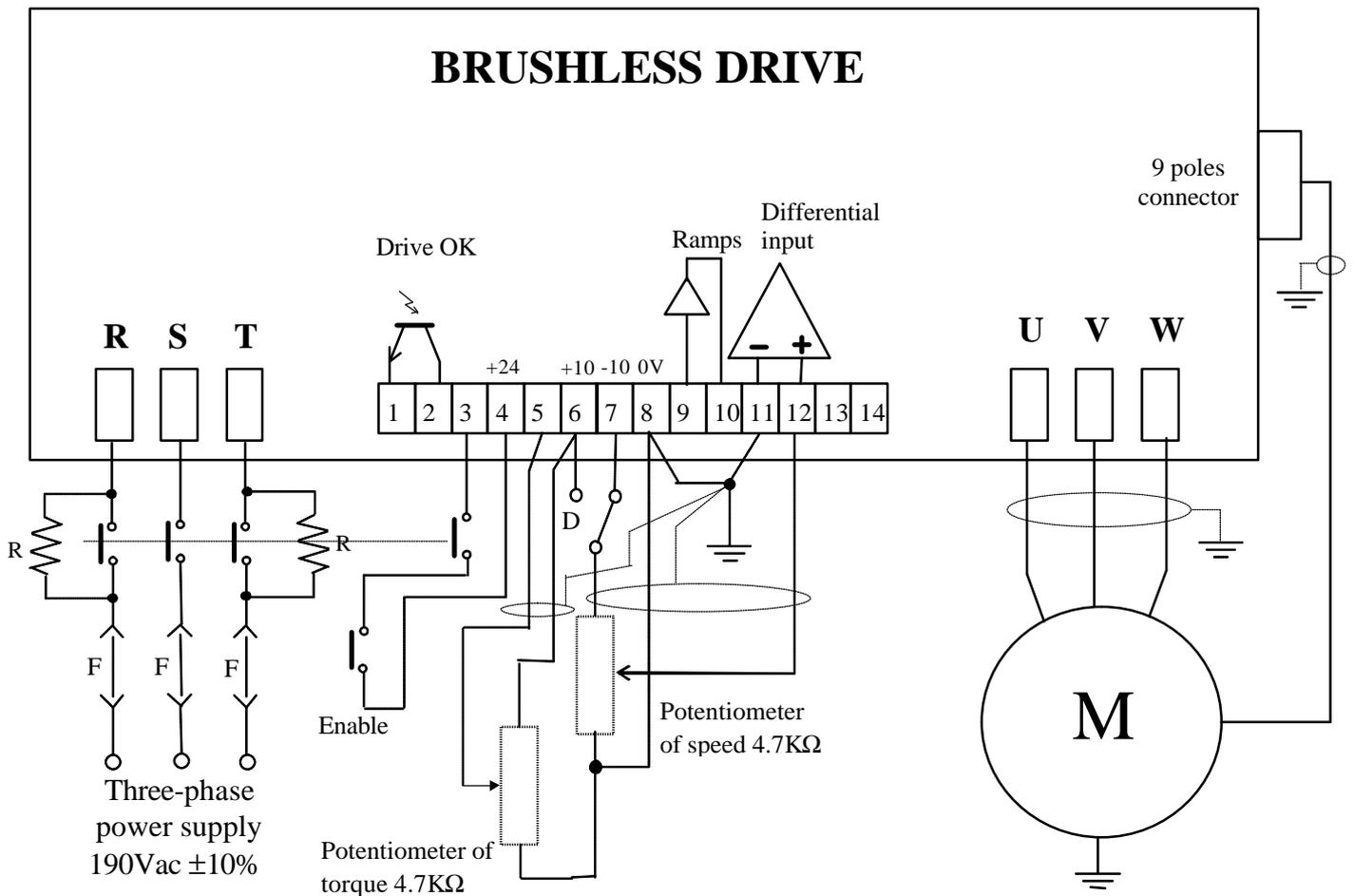
BRUSHLESS DRIVE

9 poles connector

Differential input

Ramps

Drive OK

R **S** **T**

+24 +10 -10 0V

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

U **V** **W**

D

R

R

F F F

Enable

Three-phase power supply 190Vac ±10%

Potentiometer of torque 4.7KΩ

Potentiometer of speed 4.7KΩ

M

D: Decide the direction of rotation
R: Preload resistance 47Ω 15W
F: Extrarapid fuses

Insertion with speed reference from numeric control

BRUSHLESS DRIVE

9 poles connector

Differential
Drive OK   Ramps   Input

R **S** **T**   **U** **V** **W**

+24   +10 -10 0V

1	2	3	4	5	6	7	8	9	10	11	12	13	14

R   R

F   F   F

Enable

M

Three-phase
power supply
190Vac ±10%

Differential
Reference of
speed from
NC
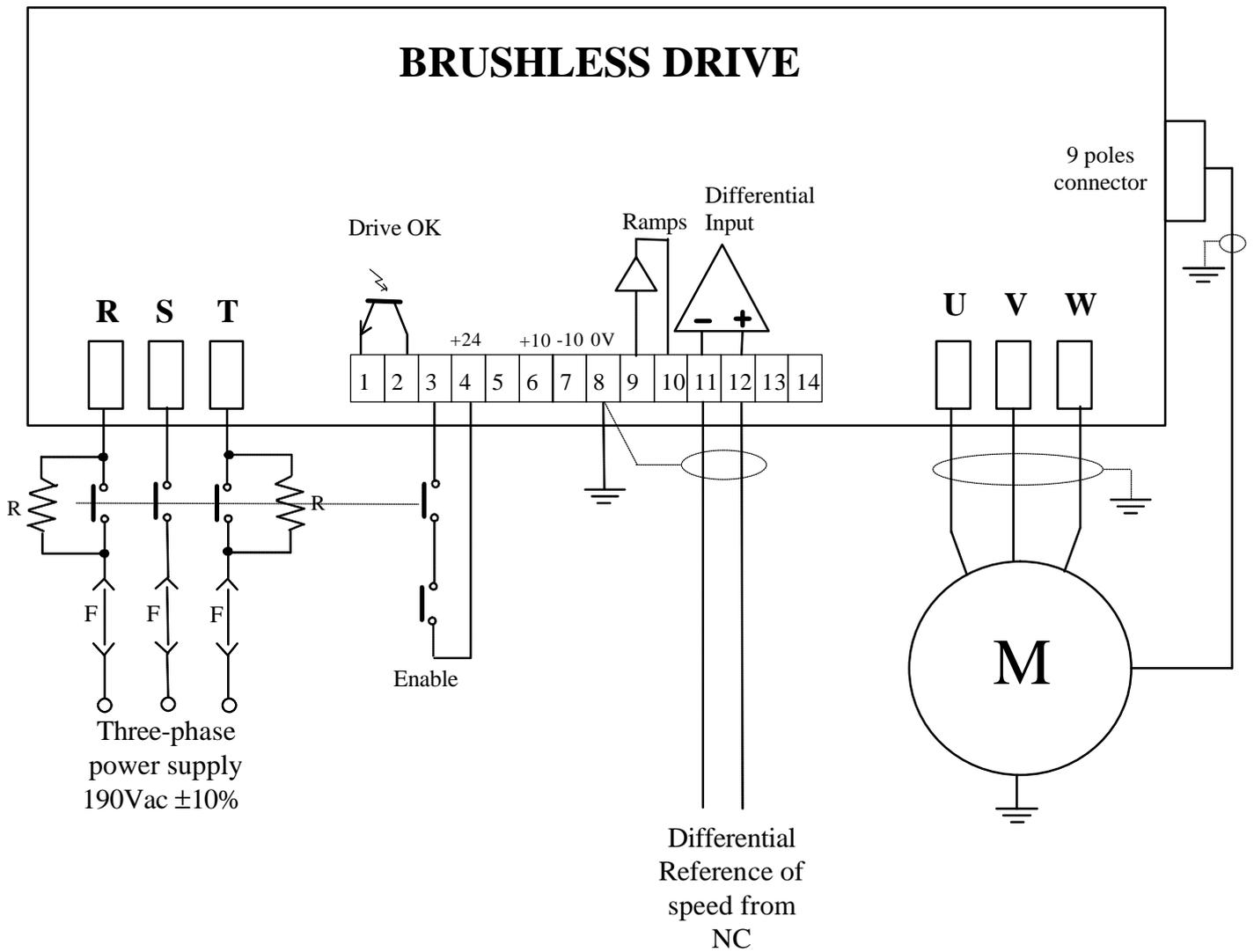
R: Preload resistance 47Ω 15W
F: Extrarapid fuses

Multi axes system
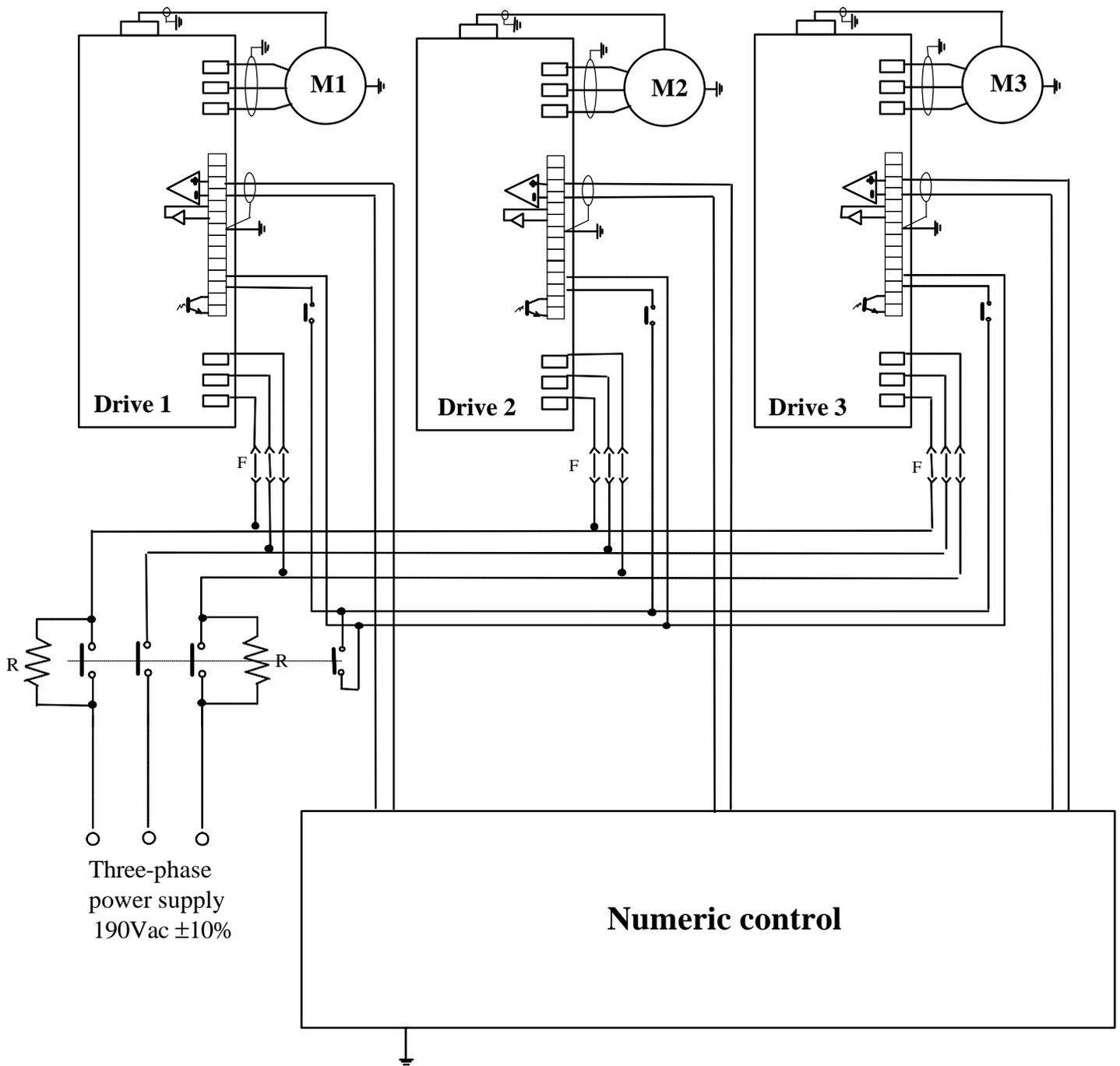
R: Preload resistance 47Ω 15WxN°Drive
F: Extrarapid fuses

Motor connections

Brusatori motors (tacho generator)

Motor Connectors
12 poles female

Connector drive
9 poles female

GND

0V	6	9
+12	5	5
HALL	7	8
HALL	8	6
HALL	9	7
0V	4	4
AT	1	2
AT	2	3
AT	3	1
PT	10	
PT	12	
GND	11	

GND
Metallic side of 9 poles
connector
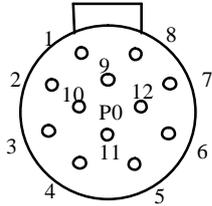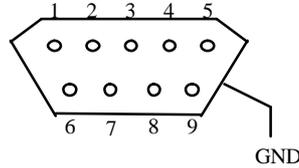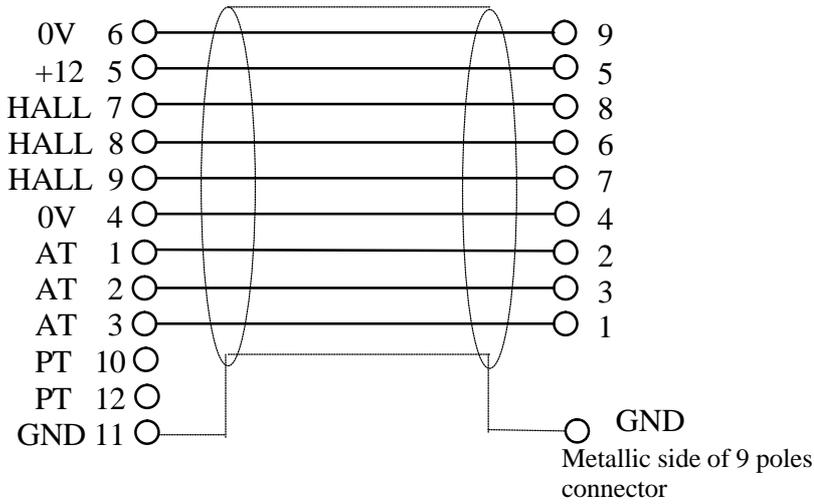
Power connection

A	○	W
B	○	U
C	○	V
D	○	GND
E	○	+Break
F	○	N.C.
G	○	-Break

Baumuller motors (tacho generator)

Motor Connectors
12 poles female

Connector drive
9 poles female

GND

0V	1	9
+12	2	5
HALL	3	8
HALL	4	6
HALL	5	7
0V	6	4
AT	10	3
AT	7	2
AT	9	1
0V	8	
0V	11	
GND	12	

GND
Metalic side of 9 poles
connector
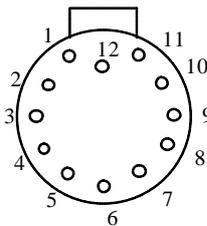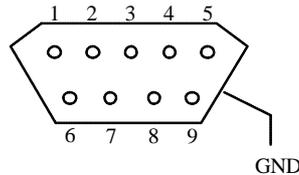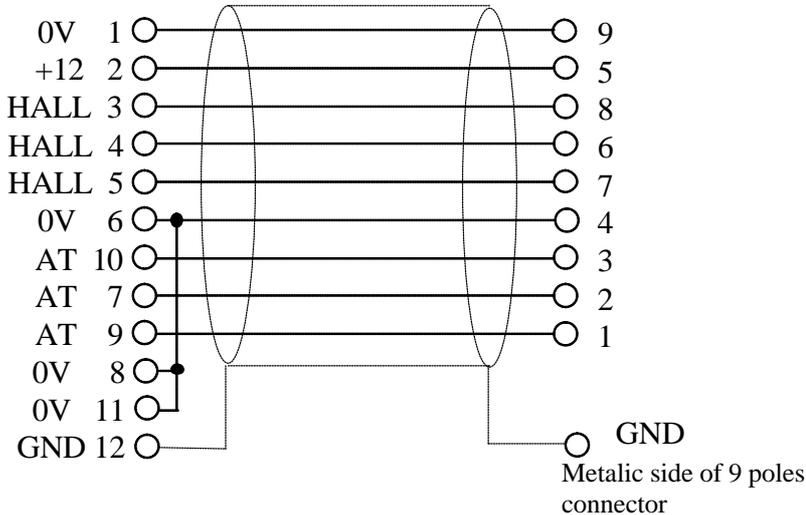
Siemens motors
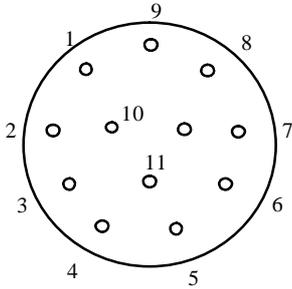
Motor connector
12 poles female
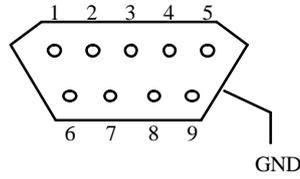
Drive connector
9 poles female

GND

Hall 1	—	8
Hall 2	—	7
Hall 3	—	6
+Vcc4	—	5
0V 5	—	9
0V 6	—	4
a.t. 7	—	3
a.t. 11	—	2
a.t. 12	—	1
9		
10		

GND

Metallic side of
9 poles connector
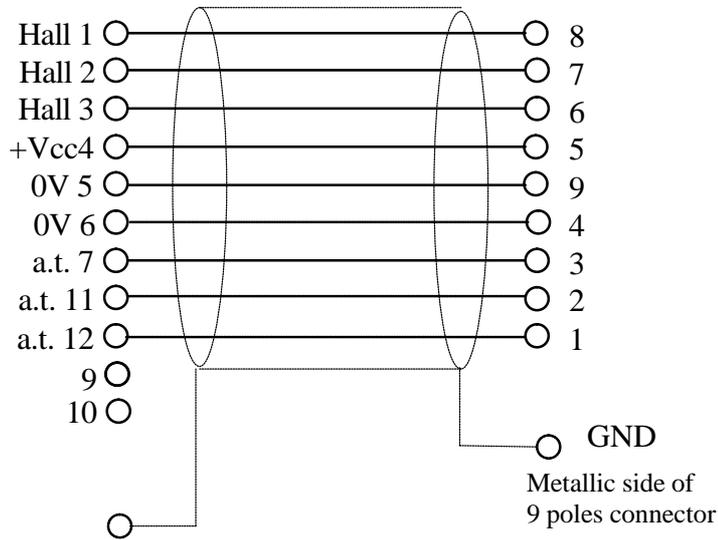
Encoder feedback motors

Motor Connectors
12 poles female

Connector drive
9 poles female

GND
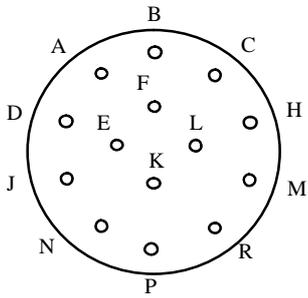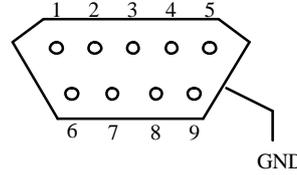
N.B.: •ENC = negative encoder signal

+5V	E	9
POSIZ.	C	8
POSIZ.	P	7
POSIZ.	D	6
PTC & 0V	A	5
ENC-A	J	4
ENC-B	M	3
•ENC-A	F	2
•ENC-B	K	1
ENC-I	L	
•ENC-I	H	
PTC	B	
Freno	R	
GND & Freno	N	

GND

Metallic side of 9 poles
connector
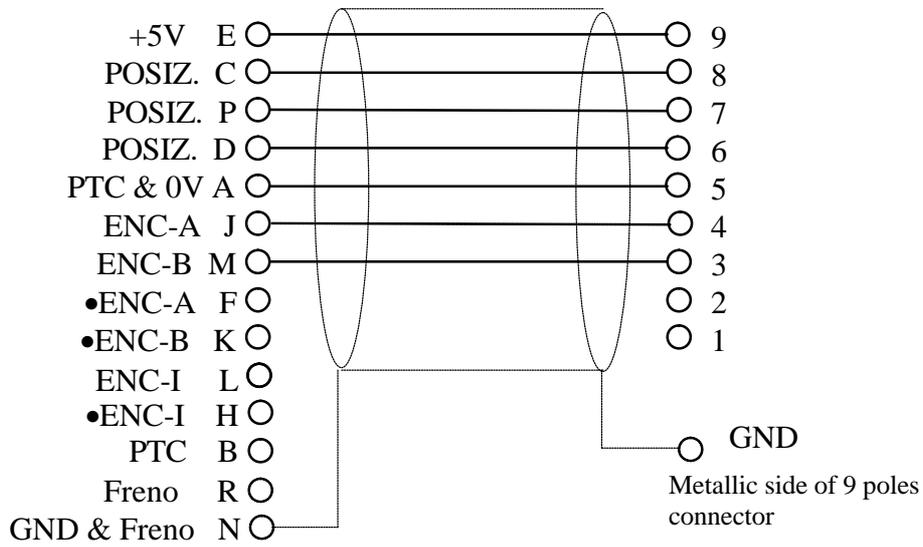
Power Connector

Side of the contact

A	U
B	V
C	W
D	GND
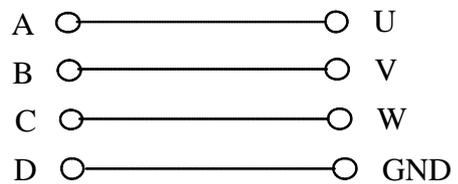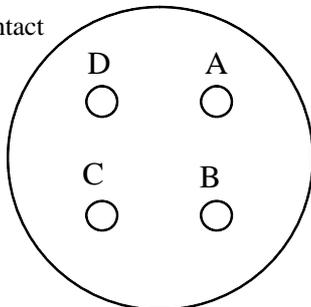
Trouble shooting

Malfunction	Liable cause	Remedy
• The fuses burned (*)	• Drive in short circuit	• Replace the drive
	• Fuses not correctly dimensionated	• Dimensioning correctly the fuses
• The drive go in fault state just it is powered	• Power supply voltage too high.	• Provide for decreasing it.
• The drive supplied and enabled, but anyone led lights	• Missing connection of any signal of position.	• Restore the lacking connection
• The drive go in fault state just enabled	• External short circuit	• Remove the short circuit
	• Inside Short circuit	• Replace the drive
• The drive go in fault state during the deceleration of the motor	• The system of braking don't work	• check the correct connection of the resistance of braking
	• The system of braking is insufficient	• Incrase the power of braking
• The motor turns in anomalous way and sometimes is blocked	• Connections on the hall signal is inverted or the phase of the motor is inverted	• Check the connections
• The motor goes at the maximum speed	• The connection from encoder or tacho generator is inverted or interrupted	• Check the connections between alternator or encoder and motor
	• Alternator or encoder not efficient.	• Check the efficiency of the alternator or encoder
• The drive go in fault state (red LED lighting) after a certain period of operation and the heat-sink is very hot	• Intervention of the thermical protection	• Wait the fanning to cool (characterize the cause of the overheating)

(*) Is absolutely essential the presence of fuses of protection on the power supply, in contrary case in presence of short circuit the drive can burned.