

VE

electronic controllers for MVE drives

Installation and maintenance manual

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① GENERAL CHARACTERISTICS

VE CONTROLLERS ARE CONTROLLED RECTIFIERS INCORPORATING DIODES AND THYRISTORS IN A MIXED BRIDGE DESIGNED TO SUPPLY DC MOTORS FROM A SINGLE PHASE AC MAINS.

THESE CONTROLLERS ARE PROTECTED AGAINST OVERVOLTAGE BY RC SNUBBER CIRCUITS AND AMPLITUDE LIMITERS AND AGAINST OVERCURRENT BY CURRENT LIMITING. TOGETHER WITH MFA SERIES DC MOTORS, THEY MAKE UP THE MVE HIGH PERFORMANCE DRIVES.

1.1 POWER OUTPUT TABLE

TYPE	SINGLE PHASE MAINS VOLTAGE 50 / 60 HZ	OUTPUT TO MFA MOTOR		MFA MOTOR NOMINAL POWER
		ARMATURE VOLTAGE	ARMATURE CURRENT	KW
VE 37	220 V ± 10%	180V	2,6 A	0,37
VE 55	220 V ± 10%	180V	3,7 A	0,55
VE 75	220 V ± 10%	180V	5,1 A	0,75
VE 100	220 V ± 10%	180V	7,3 A	1,1

MVE DRIVES WILL TOLERATE TRANSIENT OVERLOADS WHICH ARE AUTOMATICALLY LIMITED BY THE DRIVE TO 1,5 TIMES THE NOMINAL CURRENT, FOR 10 SECONDS.

THE USER SHOULD ENSURE THAT OVERLOADS DO NOT EXCEED 30 PER HOUR (ONE EVERY TWO MINUTES).

THESE OVERLOADS CAN OCCUR ON START UP OR DURING OPERATION, HOWEVER IN THE LATTER CASE, THE MOTOR MUST HAVE OPERATED FOR A CERTAIN TIME AT LOW LOAD.

I GENERAL CHARACTERISTICS

1.2 OPERATING PRINCIPLES

EXPLANATORY DIAGRAM

A02 IS THE SPEED ERROR AMPLIFIER WHICH COMPARES ARMATURE VOLTAGE WITH THE SPEED REFERENCE INPUT (APPROX. 10V, 30 Kohms), THE LATTER BEING CORRECTED BY THE CURRENT SIGNAL (TO COMPENSATE FOR THE SPEED LOSS DUE TO THE INTERNAL RESISTANCE OF THE MOTOR) AND BY THE MAINS VOLTAGE (TO COMPENSATE FOR THE VARIATIONS IN FIELD VOLTAGE).

Q4 IS THE CURRENT AMPLIFIER AND CHARGES C2 AT A SPEED DETERMINED BY THE MAINS SYNCHRONISATION OF Q3, SO THAT THE TIMING OF THE CROSSOVER Q1-Q2 BECOMES VARIABLE AND THE FIRING PULSE IS SENT TO THE THYRISTORS. CURRENT MEASUREMENT IS CARRIED OUT ACROSS A SHUNT ON THE CIRCUIT BOARD, THE CURRENT IS AMPLIFIED BY A01/1 - A01/2 DETECTS THE CURRENT PEAK AND AFTER THE DELAY DEFINED BY R18 CROSSOVER OCCURS ON CR3, THEREBY REVERSING THE INPUT TO A01/1, AND LOWERING THE LIMIT THRESHOLD TO THE NORMAL CURRENT VALUE.

THE VARIOUS ADJUSTMENTS (MAX. VOLTAGE, MAX. CURRENT, RATED CURRENT) ARE FACTORY PRESET ON TEST RIGS.

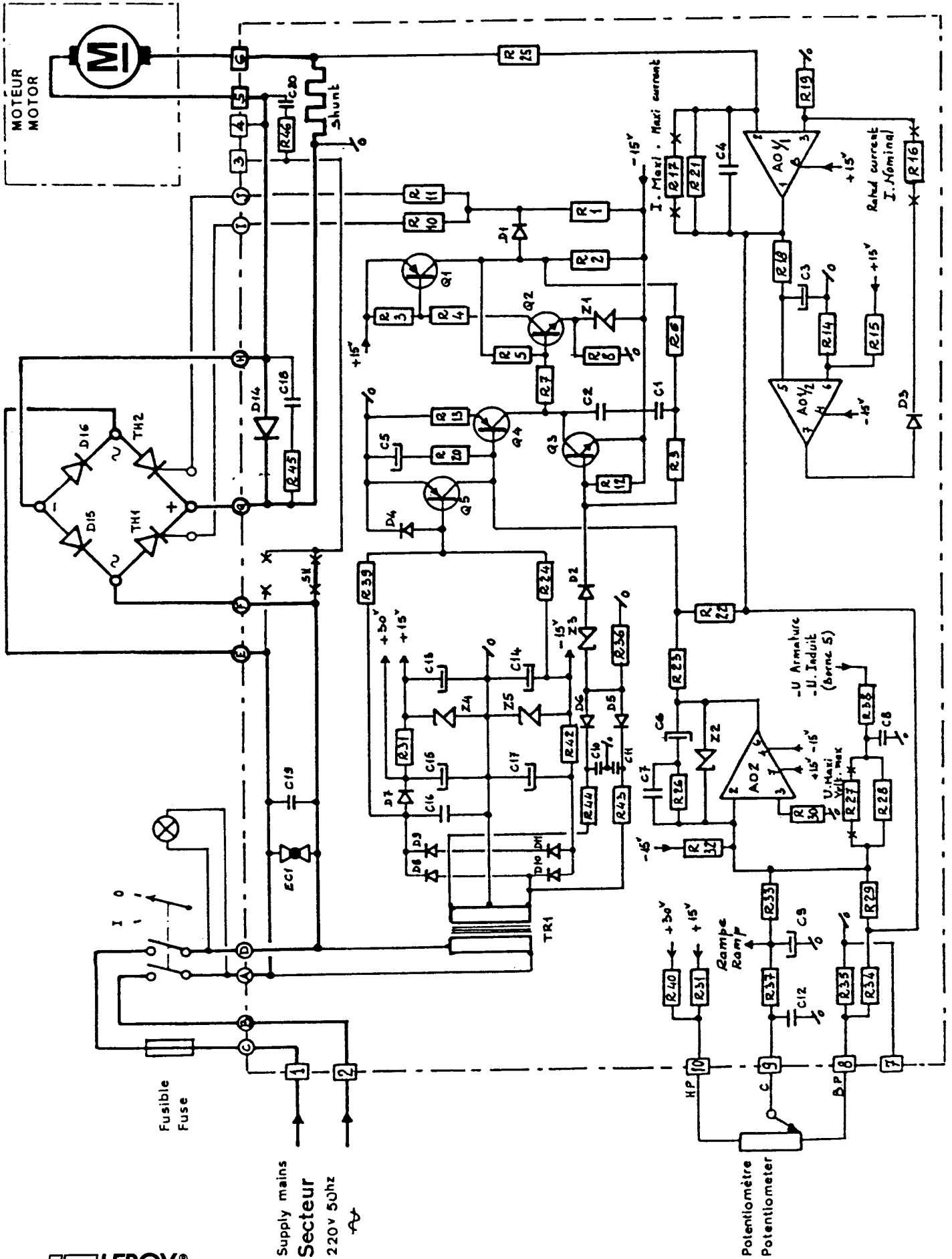
N.B.

NOTE THAT THE EMITTERS OF THE THYRISTORS ARE ALL WIRED TO THE 0 V LINE OF THE CONTROL ELECTRONICS WHICH ARE THEREFORE AT MAINS POTENTIAL. THIS MEANS THAT INTERCONNECTION OF VE CONTROLLERS IS IMPOSSIBLE, ESPECIALLY THE SPEED REFERENCE SIGNALS.

1.3 CIRCUIT DIAGRAM

VE 37 - 100

ELECTRONIC BOARD
N° : 819 D5





PERFORMANCE

- ON THE VE CONTROLLER, SPEED FEEDBACK IS ONLY POSSIBLE BY MEASUREMENT OF ARMATURE VOLTAGE.

IN OPERATION, THE CONSTANT SPEED RANGE IS 1 TO 15, OVER WHICH RANGE THE MOTOR CAN DELIVER ITS RATED TORQUE.

- SPEED STABILITY :
 - STABILITY AS A FUNCTION OF $\pm 10\%$ SUPPLY VOLTAGE VARIATIONS :
 $\pm 1,5\%$ OF DISPLAYED SPEED.
 - FREQUENCY VARIATIONS : NO EFFECT.
 - STABILITY AS A FUNCTION OF TEMPERATURE : APPROX. 0,1% PER DEGREE, AFTER THERMAL STABILISATION OF MOTOR AND CONTROLLER (30 to 60 mn.)
 - STABILITY AS A FUNCTION OF LOAD : $\pm 1,5\%$ OF NOMINAL SPEED.



ELECTRICAL CONNECTION

3.1 PRE-INSTALLATION CHECKS

CHECK THAT THE CLEARANCE AROUND THE CONTROLLER AND THE MOTOR IS SUFFICIENT TO ENSURE ADEQUATE COOLING. THE AMBIENT TEMPERATURE SHOULD NOT EXCEED 40 °C.

3.2 TYPICAL WIRING DIAGRAMS

3.2.1 STANDARD : = EFFECTIVE CURRENT

- 220V - 50 HZ VE 37 (4,2 A)
- VE 55 (6 A)
- VE 75 (8,2 A)
- VE 100 (11 A)

CROSS SECTION OF CABLE IN mm²

	MAINS	EARTH	ARMATURE
	1-2	I	5-6
VE 37 TO VE 100	1,5	1,5	1,5



ELECTRICAL CONNECTION

FIG. 1

CLOCKWISE ROTATION VIEWED FROM SHAFT END

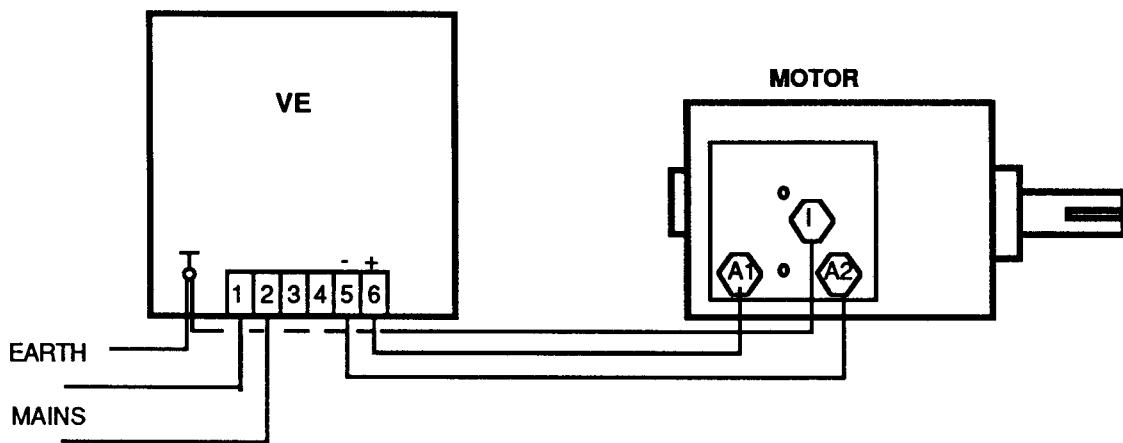
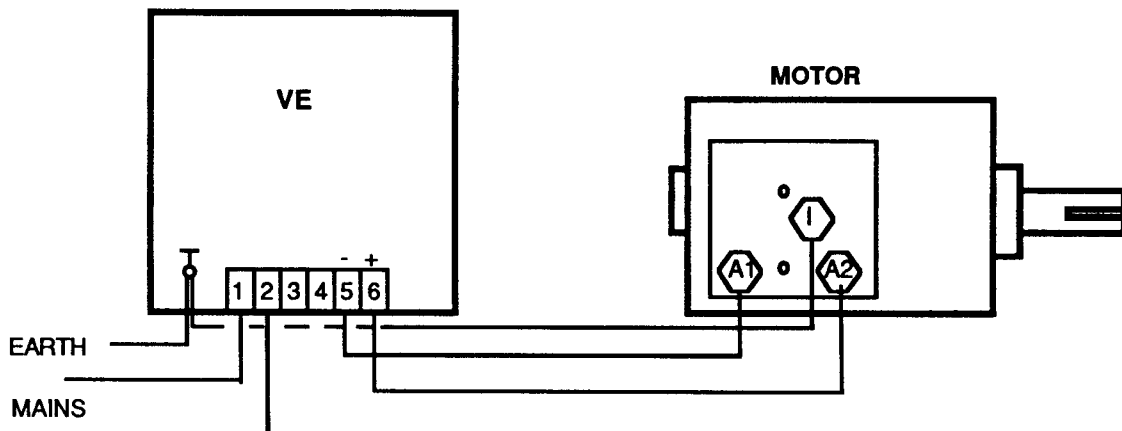


FIG. 2

ANTICLOCKWISE ROTATION VIEWED FROM SHAFT END



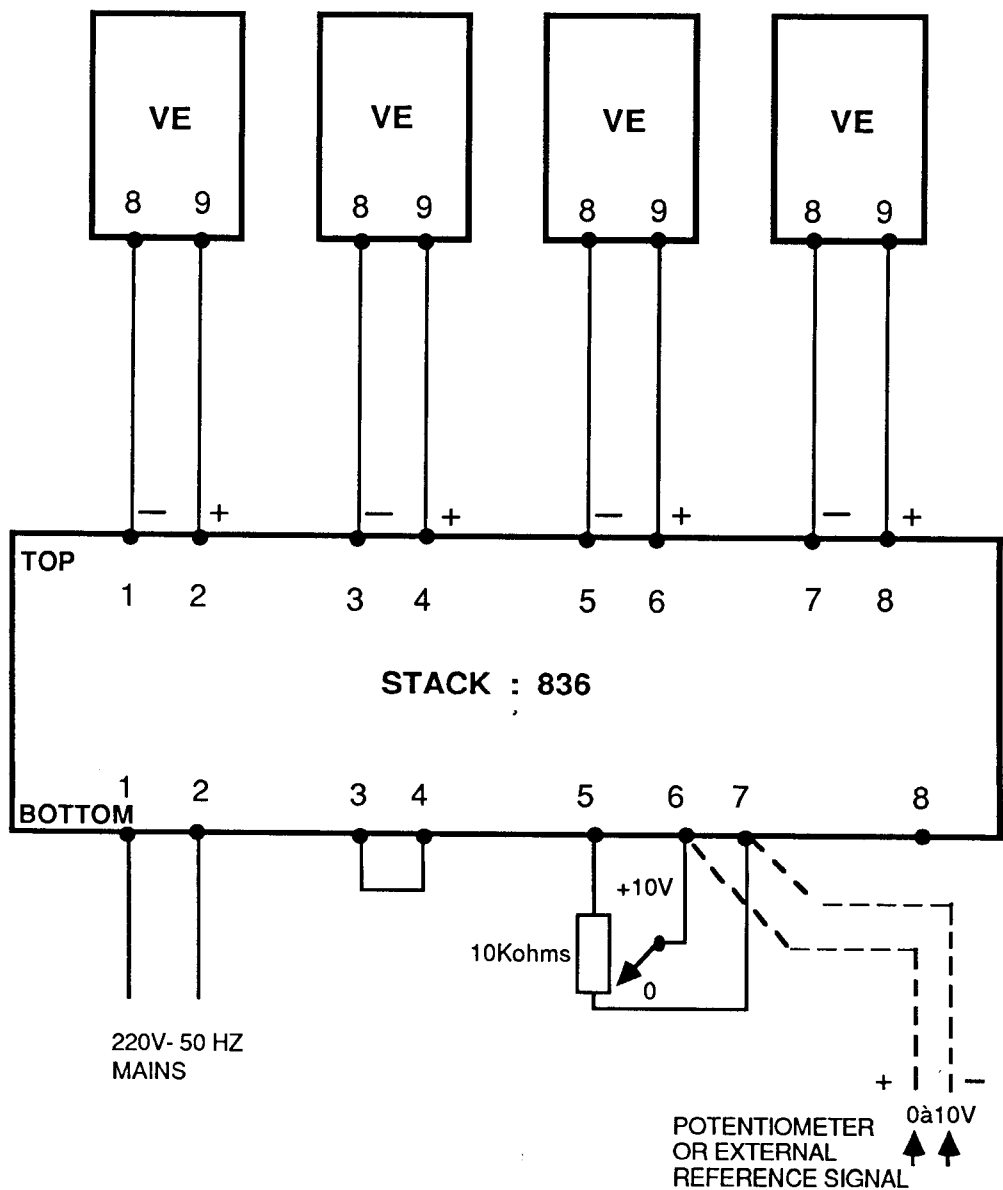
III

ELECTRICAL CONNECTION

3.3 DRIVING SEVERAL VE CONTROLLERS FROM A SINGLE SPEED CONTROL UNIT

THE 836 STACK SUPPLIES 4 REFERENCE VOLTAGES INSULATED FROM EACH OTHER. THIS INSULATION IS ESSENTIAL TO ENSURE CORRECT OPERATION OF VE CONTROLLERS.

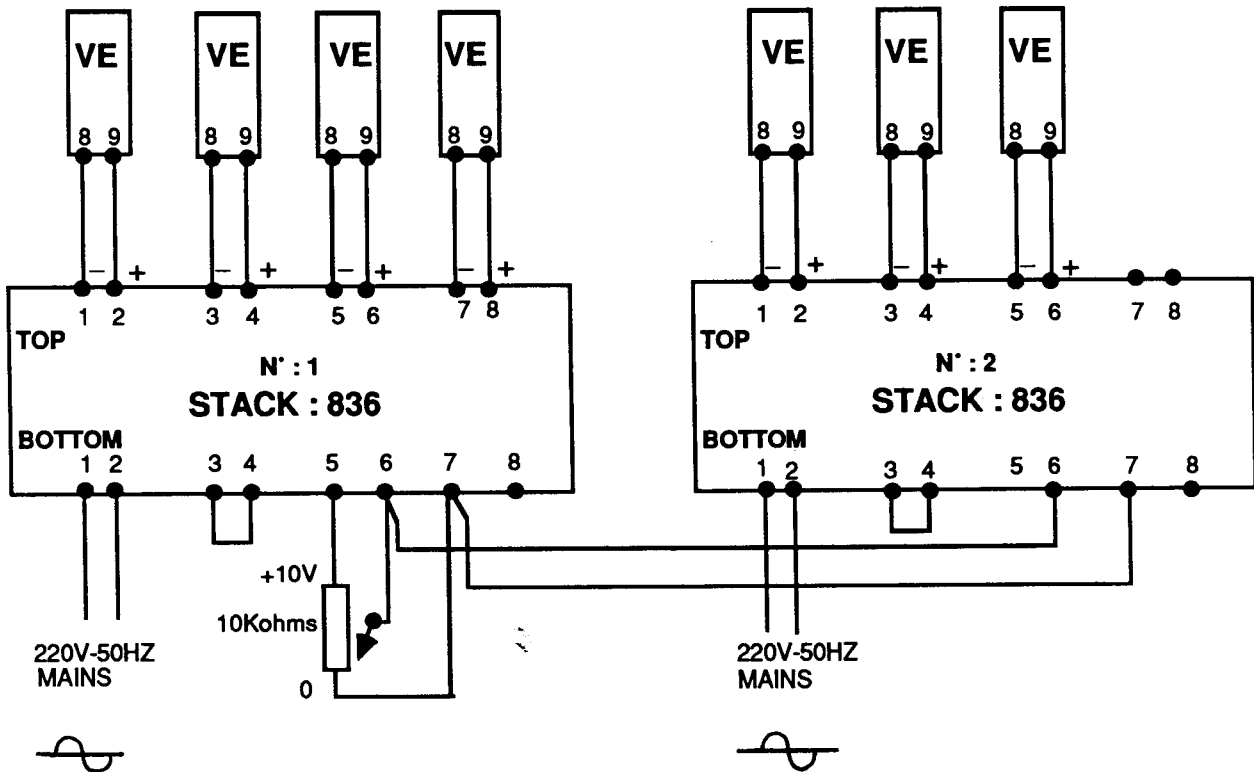
3.3.1 METHOD FOR MAX. 4 VE CONTROLLERS





ELECTRICAL CONNECTION

3.3.2 METHOD FOR MAX.7



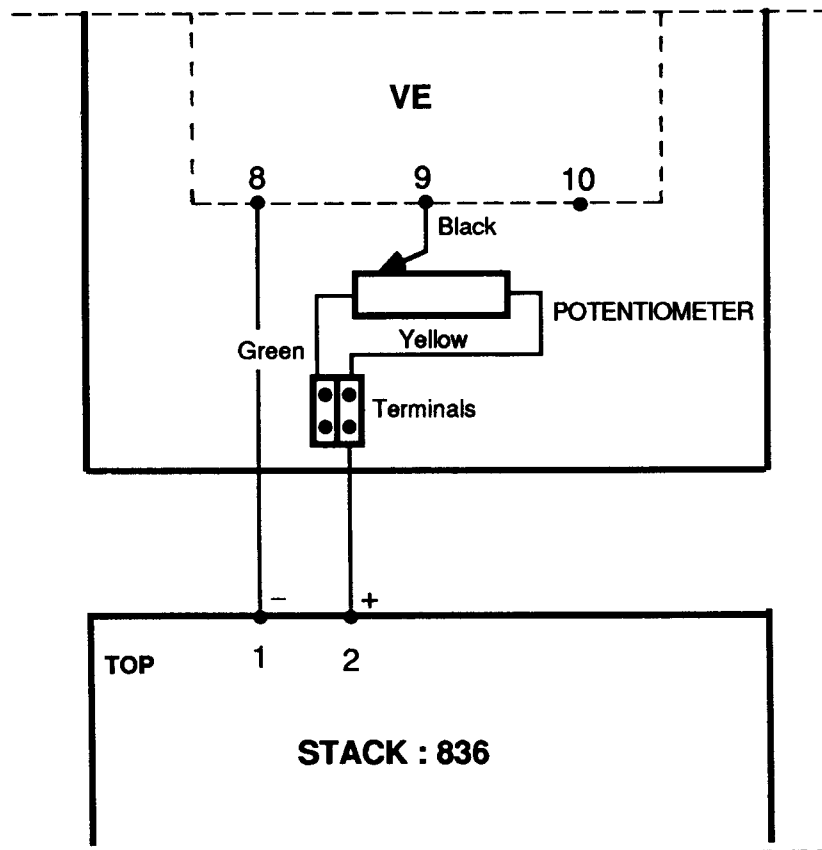
NOTE :

DISCONNECT THE POTENTIOMETERS FITTED TO THE VE. CONTROLLER CABINETS FROM
TERMINAL 8,9 AND 10

DO NOT REMOVE THE POTENTIOMETERS, SIMPLY INSULATE THE WIRES.

III ELECTRICAL CONNECTION

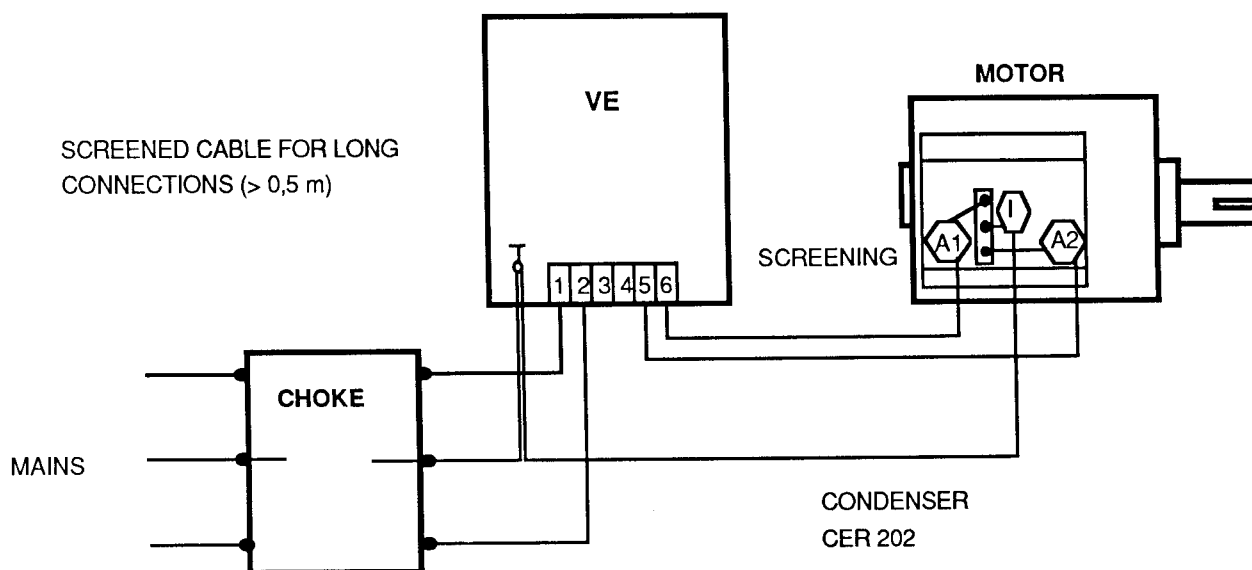
3.3.3 : ADJUSTMENTS



THE ABOVE ARRANGEMENT ENABLES THE SPEED OF EACH MOTOR TO BE ADJUSTED BY INSERTING POTENTIOMETER P IN SERIES WITH THE CONTROL UNIT. THIS ENABLES THE MOTOR SPEED TO BE REDUCED BY UP TO 30%.

III ELECTRICAL CONNECTION

3.4 INTERFERENCE SUPPRESSION OF DRIVES AND MOTORS.



CHOKE REFERENCE

MVE 37)
A MVE 100) EURO ABB 10

THE FITTING OF A CHOKE REDUCES INTERFERENCE FEED BACK TO THE MAINS. THE LEVEL OF RESIDUAL INTERFERENCE REMAINS LOWER THAN C I S P R REQUIREMENTS (SPECIAL INTERNATIONAL COMMITTEE FOR RADIO ELECTRIC INTERFERENCE) VIZ. 2mV AT 0.15 MHz.

RADIATION FROM WIRING IS VIRTUALLY NEGLIGIBLE ON CONDITION THAT THE CHOKE IS FITTED AS CLOSE AS POSSIBLE TO THE CONTROLLER CABINET AND ALL COMPONENTS ARE ADEQUATELY EARTHED.

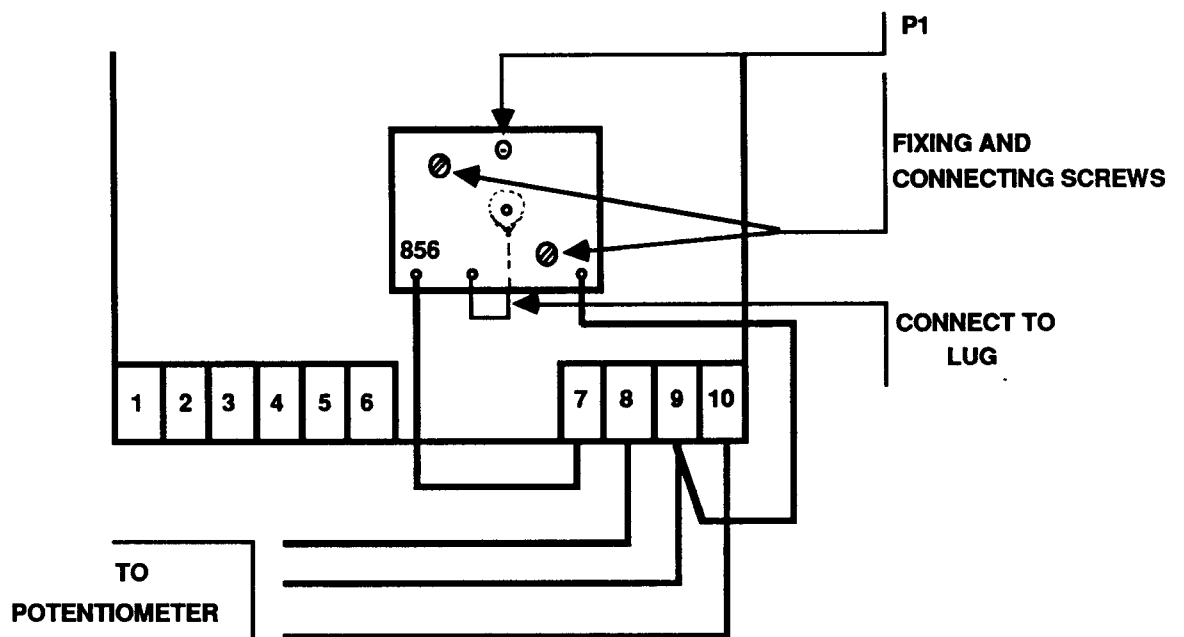
TO ELIMINATE ANY RISK OF INTERFERENCE BY RADIATION THE CONNECTION BETWEEN THE CONTROLLER AND THE MOTOR SHOULD BE MADE WITH SCREENED CABLE, (OR ORDINARY CABLE INSIDE AN EARTH METAL CONDUIT).

IN CERTAIN EXTREME CASES WHERE THE CHOKE APPEARS INSUFFICIENT (HIGH IMPEDANCE SUPPLY) THE SUPPLY TO THE CHOKE SHOULD BE SCREENED FOR SEVERAL METRES.

III ELECTRICAL CONNECTION

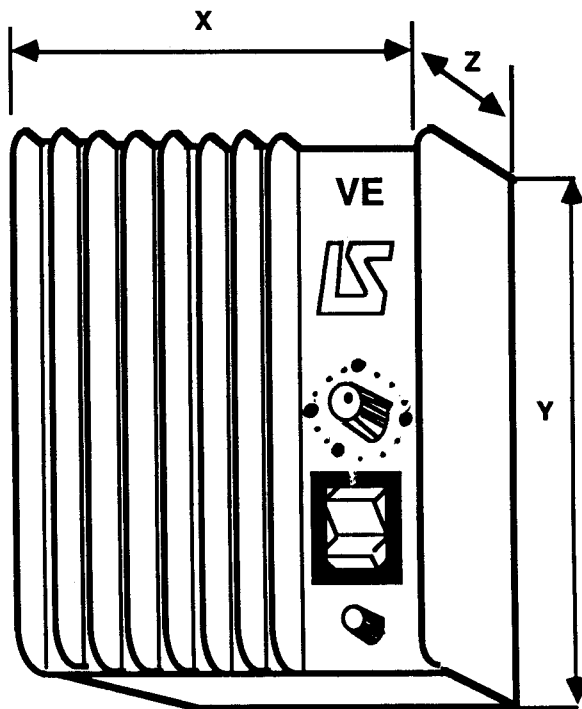
3.5 USE OF RAMP

ON VE 37 - VE 100 CONTROLLERS, CIRCUIT 856 MUST BE ADDED AND CONNECTED ACCORDING TO THE DIAGRAM.



IV DIMENSIONS

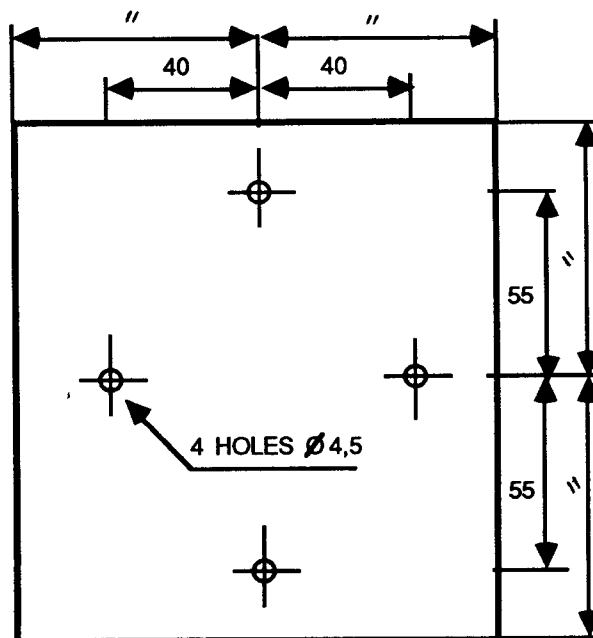
DIMENSIONS



DIMENSIONS	VE 37 TO 100
X	136
Y	190
Z	80
WEIGHT	1,7 Kg

MOUNTING

VE 37 to 100



(V) SPARE PARTS

	FUSE (1)	DIODE	THYRISTOR (2)	POTENTIOMETER (1)
VE 37	5 X 20 5A	P 6010 (3)	T 10 N 600 OR 2 N 690 NY ISO	P 11 VAY 10 Kohms 1 W
VE 55 TO VE 100	5 X 20 10 A	P 6010 (2) RP 8020 X	T 10 N 600 OR 2N 690 NY ISO	P 11 VAY 10 Kohms 1 W

(...) QUANTITY



MOTEURS LEROY-SOMER - 16015 ANGOULÊME CÉDEX - FRANCE
Tél. (33) 45 91 90 90 - Télex 790 244 - FAX (33) 45 91 66 29

AGENCE A CONTACTER :