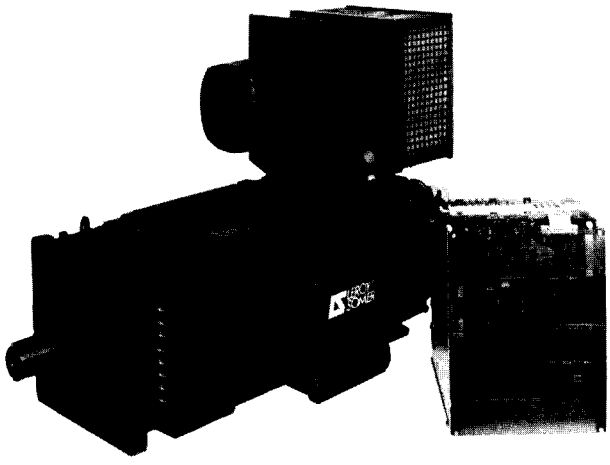
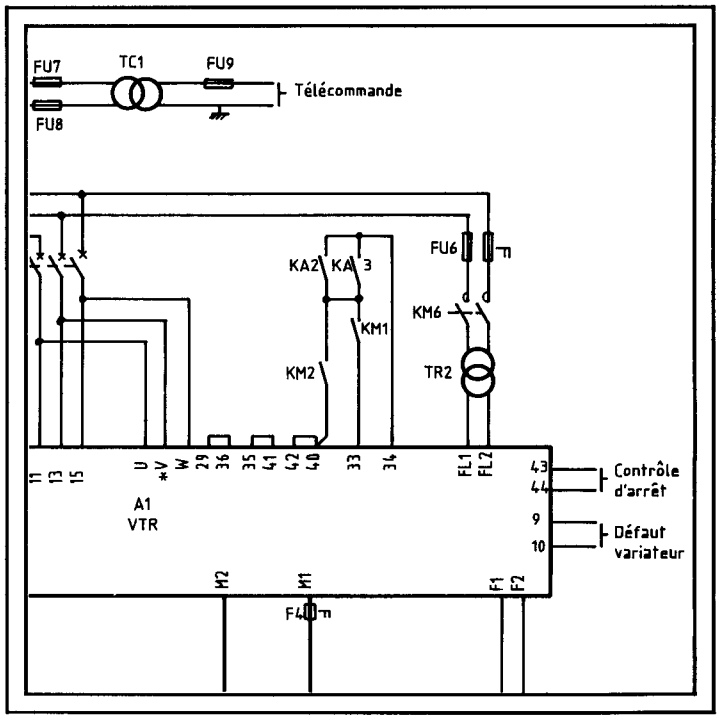
LEROY SOMER®





Référence 6E-238/1 - juillet 87 - 4510

VTR

reversible three phase speed controller for D. C. Motors

Installation and maintenance manual

CONTENTS

NOTE

LEROY SOMER reserves the right to modify the specifications of its products at any time, to take advantage of the latest technical developments. The information contained in this bulletin is therefore liable to change without notice.

LEROY SOMER gives no guarantee, whether express or implied, covering the information contained in this bulletin, and accepts no responsiblity for any errors contained therein, nor for damage occasioned by its use.

WARNING

The controller is fitted with safety devices which can, in the case of certain faults, stop the controller and the motor. The motor itself can be jammed by mechanical means. Finally, voltage fluctuations, and particularly power cuts can also cause the controller to switch off.

The removal of the cause of the shutdown can lead to restarting, with consequent danger for certain machines or installations, particularly those complying with the decrees of 15th July 1980 concerning safety.

In these cases, therefore, it is important for the user to protect against such risks of restarting, by fitting a zero speed detector which will cut the supply to the controller, in the case of unprogrammed stoppages.

As a general rule, any work on the machine or installation, whether electrical or mechanical, should only be carried out after the power supply to the controller has been switched off.

① GENERAL CHARACTERISTICS

SELECTING A CONTROLLER

The part number of the controller, which is printed on the delivery note and on the identification plate situated on the left hand side of the unit, should be quoted in all communications with the manufacturer.
Using the table below, check the compatibility :

MAINS - CONTROLLER - MOTOR

The controller is characterised by a permanent maximum current (I max) at steady speed allowing no overload even for a short time.
For an operation in cyclical mode, see following page.
Values given for ambient temperature of 40°C, above this and up to 60°C, values should be derated by 1,2% per °C.

Mains voltage Un (± 10V)	Mains current I eff (A)	max. controller current (A)	MOTOR CHARACTERISTICS					
			MAXIMUM POWER CD/CN = 1,2		U Induit (V)	FIELD		
			P (kW)	I M (A)		U ex (V) mains voltage 220	U ex (V) mains voltage 380	Current max (A)
380V 50 Hz	27	36	11	30	400	190	340	10
	54	72	22	60				10
	112	150	45	125				10
	225	300	90	250				15
	450	600	180	500				15
440V 60 Hz	27	36	12,5	30	460	190	340	10
	54	72	25	60				10
	112	150	52	125				10
	225	300	105	250				15
	450	600	210	500				15

NOTES :

* 220V / 50 Hz and 440V/60 Hz supplies, see possible adaptations page7.

* For ancillary equipment : settings page 7.

① GENERAL CHARACTERISTICS

OPERATION IN CYCLICAL MODE

Operation may be defined by current I peak (max.load) and I2 (min.load) and by time t1 (duration of max.load) and t2 (duration of min.load).

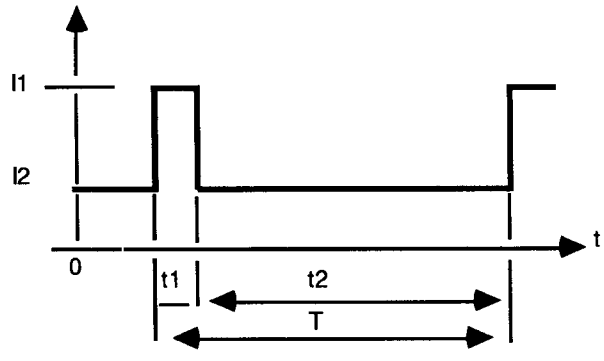
To avoid exceeding the thermal characteristics of the VTR the following limits should be observed :

I2 < 0,7 I current I peak of VTR

I1< 2 I

t2 > 7t1 with t1 < 1mn for VTR 36 to 72A

and t1 < 30s for VTR 150 to 6OOA



Values for I1 and I2 in Amps for different sizes of motors are as follow :

TYPE VTR	36	72	150	300	600
I max. permanent	36	72	150	300	6OO
I2	25	50	100	200	400
I1	50	100	200	400	800

① GENERAL CHARACTERISTICS

DYNAMIC CHARACTERISTICS

Speed range 1 to 300.

Operating tolerance	Permanent max.speed change
Load from 0,2 Nom Torque to Nom Torque	- 0,24% of displayed speed - 0,66% 10^3 of Max. N
Mains voltage ± 10%	± 0,2% of displayed speed
Ambient temperature 20°C ± 20°C Not including tachogenerator error	± 1% of displayed speed $\pm 10^{-3}$ of Max. speed
Cumulative effect : load from 0,2 Nom. Torque to Nom. Torque Mains voltage ±10% + ambient temp. 20°C± 20°C	+ 1,2%) of displayed speed + - 1,44%) $+10^{-3}$) $-1,66\ 10^{-3}$) of Max. speed

* Indicated % should be applied to the max. speed and to the displayed speed in rpm, adding these two results will give the maximum speed error.

(II) OPERATING CHARACTERISTICS

* Speed demand :

  - voltage 0 to ±10V (input impedance 30 Kohms).
  - current 0-20 mA or 4 - 20 mA.
  - standard 2,2 Kohms potentiometer, or midpoint potentiometer with total value 4,7 Kohms.

* Acceleration and deceleration ramp with separatately adjustable slope :

  - 3 settings ranges 4 - 15 - 60s.
  - can be controlled by external signal.

* Speed servo-operation with feedback signal :

  - using tachogenerator (input impedance 0,2 Kohms/V).

  - using a pick-up with max.voltage of ±10V.

  - 5 settings 10 - 60 - 90 - 120 - 180V.

* Control voltage and available currents :
  - ± 15V : maximum capacity 50mA
  - ± 26V : maximum capacity 20mA
  - ± 10V : demand via standard 2,2 Kohms potentiometer, or midpoint potentiometer with total value 4,7 Kohms.

* Line and brake contactors (latter only if used) controlled by relays on control board, max. contact values : voltage 220V AC, pull in 300V holding 30 VA.

* Inputs to speed and current loops possible for additional servo systems : two Europa size adaptator boards can be plugged into the control board via the connector situated below the adjustment board.

II OPERATING CHARACTERISTICS

OPERATING VOLTAGES AND ADAPTATIONS

CONTROL ELECTRONICS

The control and interface PCBs with mains transformer and filters exist in two versions according to the frequency of mains supply.
In both cases, the supply is 220/380V.
For 440V mains a three phase 20 VA autotransformer should be provided.

POWER SECTION BLOWER

. VTR 150A : single phase blower with shunt resistance* built into the controller.
380V 50 Hz or 440V 60 Hz supplies, power consumption 75W.
* Shunt resistance for 220V mains.

. VTR 300 and 600A : Three phase blower, in two versions according to the frequency :

- 50 Hz mains : 220/380V supply, power 245W.
current consumption 0,4A at 380V.
- 60 Hz mains : 440V supply, power 195W.
current consumption 0,26A.

ANCILLARY EQUIPMENT

FUSES

300 and 600A high speed thyristor fuses are built into the controller.

36 to 150A high speed thyristor fuses are supplied separately.

VTR TYPE	Fuses Main characteristics	Size
36	6,621 CPURD 225850 (50A) (1)	22 x 58
72	6 Bod KC3URGK30Ttc (100A) (2)	30
150	6 Bod KC3URGG30Ttc (200A) (2)	30

(1) Order one base, part n° SP 58.216.36 with each microswitch.
(2) Order four brackets, part n° DV 91442.

(II) OPERATING CHARACTERISTICS

LINE CHOKES

Line chokes are necessary when several controllers are connected in parallel to the same supply line.

The table below sets out the recommended chokes.

VTR REFERENCE	LINE CHOKES Characteristics		
VTR 36	(1)	25 u H	40A
VTR 72	(1)	10 u H	63A
VTR 150		68 u H	140A
VTR 300		29u H	330A
VTR 600		17 u H	540A

(1) single phase chokes (3 are required for each controller)

LINE CONTACTOR

The sizing of the equipment in the circuit (isolator or circuit breaker, line contactor, cable) is carried out by determining the effective current flowing through it.
This is related to the mean motor current Im in the following way : effective line current = 0,9 Im, taking form factor into account.

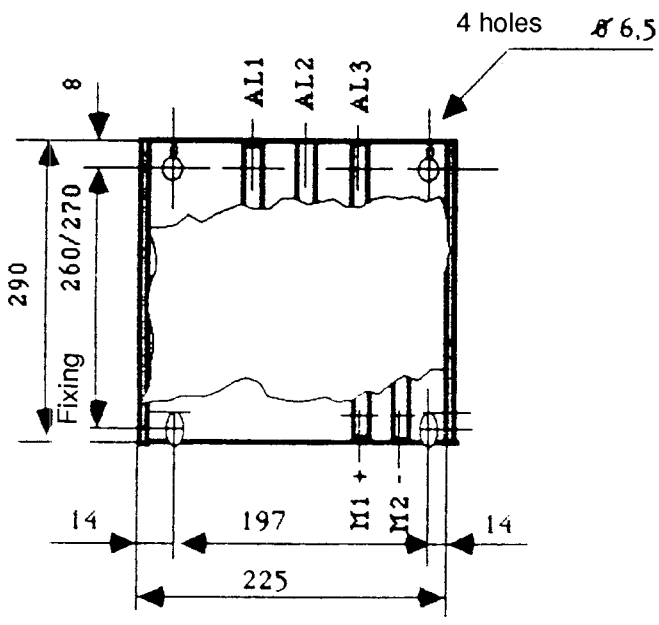
The line contactor normally switches at zero current, and only opens when the supply to the equipment is cut.
This requires thermal characteristics to be taken into account, and sizing should be based on the effective line current.
Also take into account wiring possibilities, according to the type of conductor (cable or bar) and the electrical supply range to the controller.

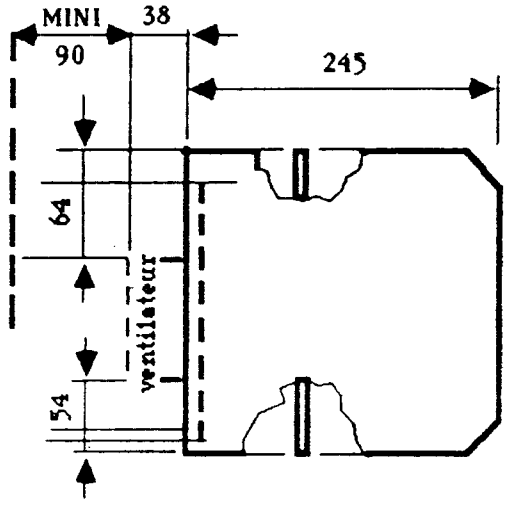
FIELD TRANSFORMER

Used, the transformer power in VA should be at least equal to 1,5 times the power of the field in Watts, with the motor hot.

III DIMENSIONS

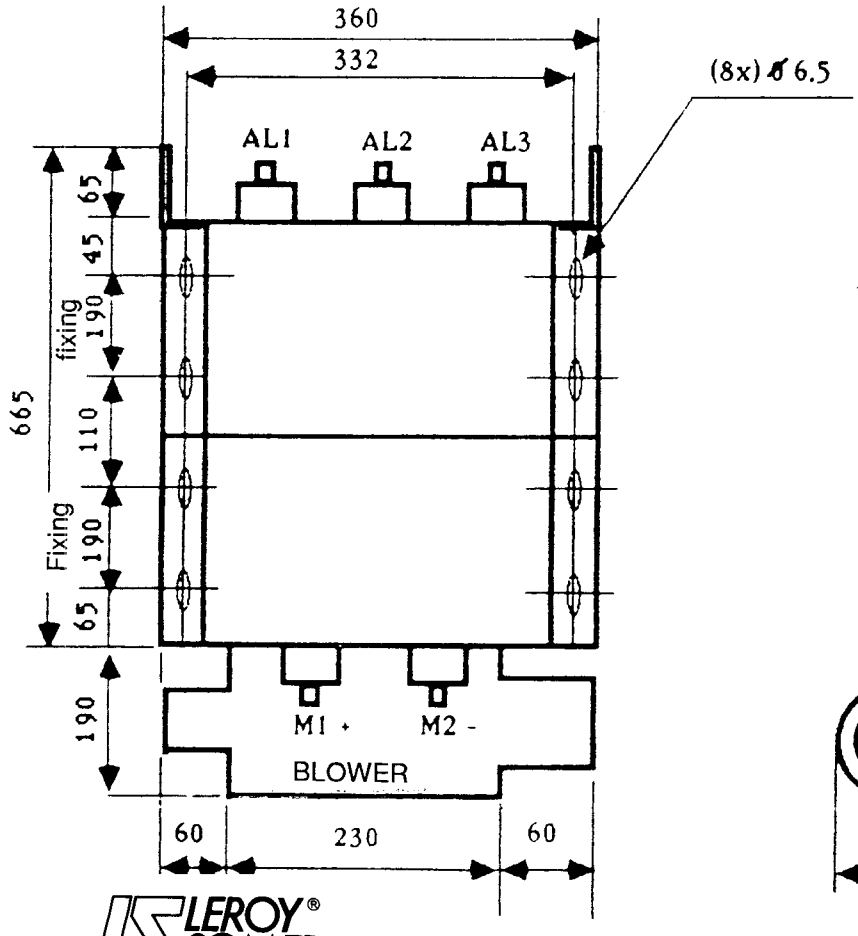
VTR 36 TO 150A

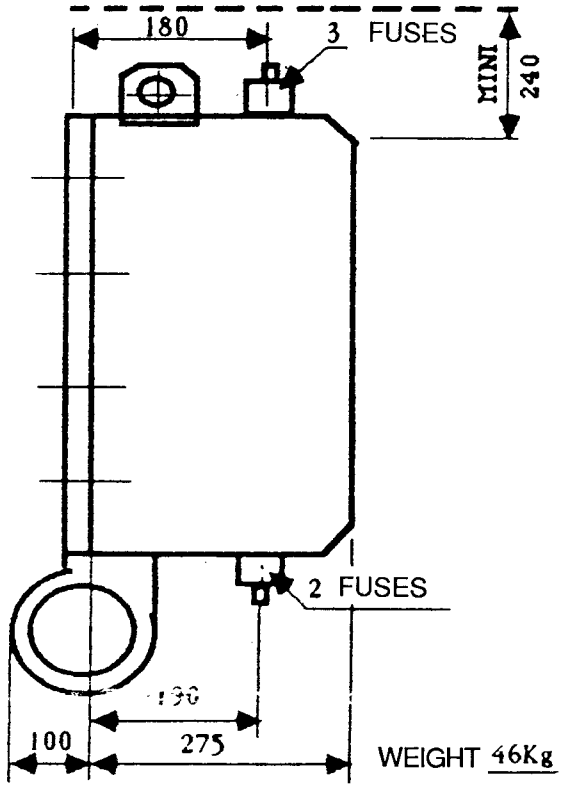




WEIGHT 10Kg

VTR 300 - 600 A





WEIGHT 46Kg

LEROY® SOMER

Ⓘⓥ RECOMMENDATIONS

INSTALLATION

Fit the controller in a vertical position.
Avoid placing next to a source of heat.
If the controller is to be fitted in a cabinet, louvres to allow a flow of cooling air should be included, and in the case of forced ventilation, an opening on the top fitted with a hood.

CONNECTIONS

No wire connected to a circuit board terminal block should be connected to earth. .

External speed reference and return circuits (transducer or tachogenerator) should be wired with stranded (< 5 cm pitch) or shielded wire, with the shield free in the air (connect together the various shields at the equipment end).

Control contacts in the inductive circuits (field, contactor coils, operating brakes...) should be fitted with an RC snubber circuit or other suitable protection device.

TERMINAL BLOCKS

POWER

Bars	AL1) AL2) AL3)	Three phase supply to converter
	M1+) M2-)	Motor armature
Terminals	FL1) FL2)	Single phase field supply
	F1+) F2 -)	Motor field

(IV) RECOMMENDATIONS

OTHER TERMINALS

VTR 36 to 150A

7) 8) Blower (for VTR 150)

9) 10) Thermal cutout

220V : 11,12,15)
380V : 11,13,15) Supply to control electronics

VTR 300 - 600A

U,V,W) X, Y, Z) Blower : connection according to voltage

9) 10) Thermal cutout in series with fuse protection

220V : 11,12,15)
380V : 11,13,15) Supply to control electronics

Ⓘⓥ RECOMMENDATIONS

CONTROL BOARD - Terminal functions

21-22 Speed reference : current demand 4-20mA
(input impedance 250 Ohms)

23 Polarity control of speed reference signal
(if current controlled) via logic signal :
- level 1 (+ 12V to + 48V) no reversal
- level 0 (<1V) reversal
- input 23 unconnected = level 1

24-25 Speed reference : voltage demand +10V
(input impedance 30 Kohms)

26 0V
27 Speed reference : current demand 0-20 mA
(input impedance 200 Ohms)
28 0V
29 Common, decoupling circuits
30 + 15V
31 0V
32 - 15V
33 Auxilliary, line contactor KM1
34 KM1 enable
35 Auxilliary, brake contactor
36 - 26V
+15V 37 Tachogenerator input impedance 0,2 Kohms/V
-15V 38 Supply speed reference potentiometer
39 Standard potentiometer : total value 4700 Ohms
Refer to circuit diagrams
40 + 26V
41-42 Contacts, brake contact control relay

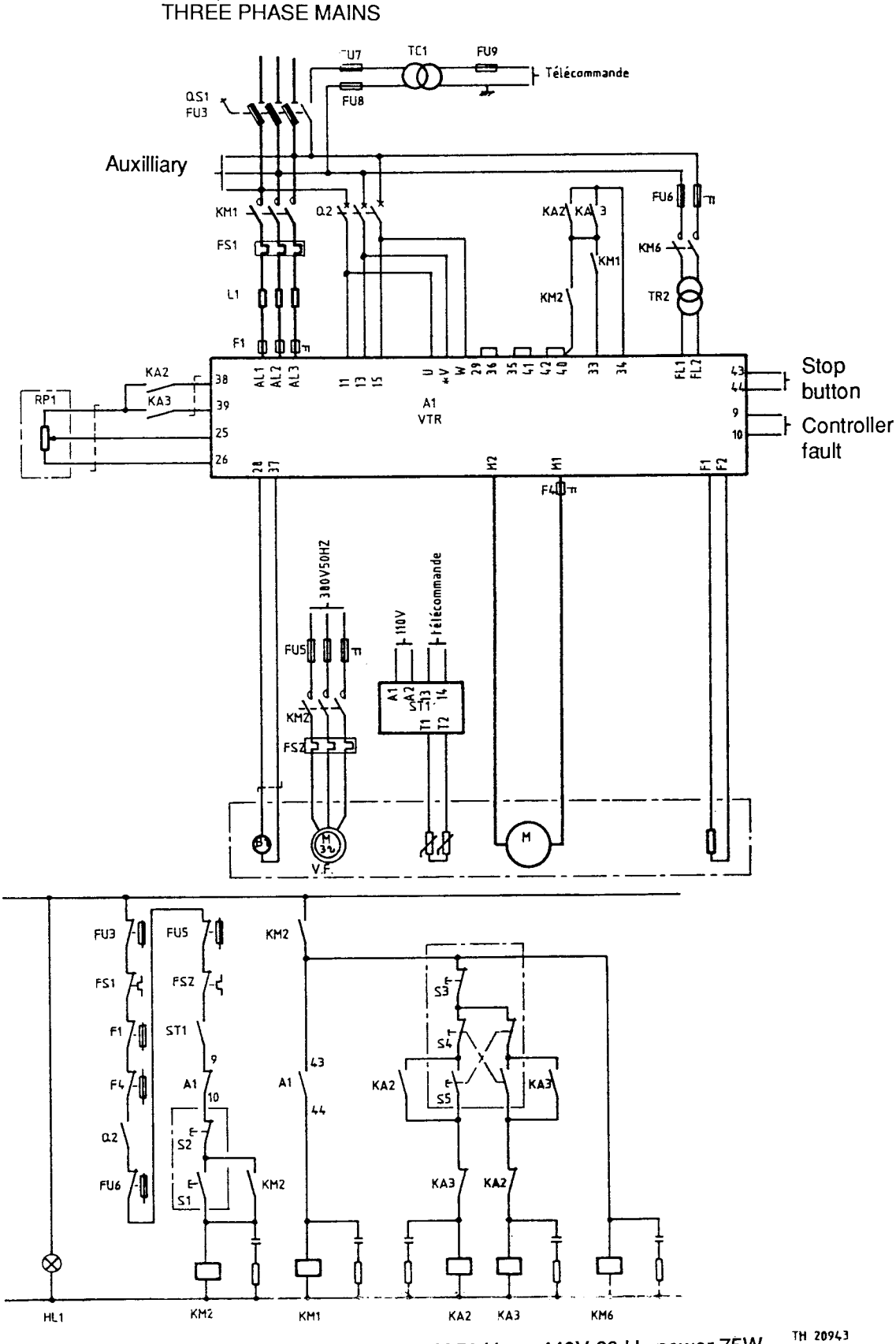
43-44 Contacts KM1 control relay

Contact characteristics) 220V three phase max. pull in current 300VA, max. holding current 30 VA

Current values available for adaptations

+ 26V terminal 40 : 20 mA
- 26V terminal 36 : 20 mA
+ 15V terminal 30 : 50 mA
- 15V terminal 32 : 50 mA

Ⓥ BLOCK DIAGRAM



TH 20943

ower with built in resistance 380V 50 Hz or 440V 60 Hz power 75W.

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Ⓥ BLOCK DIAGRAM

Thyristor cooling blower :
VTR 150A : single phase, connection terminals 7-8.
VTR 300 to 600A : three phase, connection terminals U - V - W.

Safety devices :
VTR 36 to- 150A : terminals 9 - 10 : thermal cut out.
VTR 300 to 600A : terminals 9 - 10 : thermal cut out in series with the fusion contacts of the fuse.

KEY

A1	VTR controller
B1	Tachogenerator
F1) F4	High speed fuses 36 to 150A
F3	Control circuit fuse
FS1	Auxilliary and blower relay
KA2	Forward rotation relay
KA3	Backward rotation relay
KM1	Line contactor
KM6	Field contactor
L1	Chokes (line choke if necessary)
M	Motor
ST1	Motor temperature probe relay
QS1	General isolator or circuit breaker
Q2	Electronics power supply circuit breaker
VF	Motor blower
RP1	Speed reference potentiometer
TC1	Control circuit transformer
TR2	Field transformer or auto transformer if applicable

Ⓥ BLOCK DIAGRAM

OPERATION

The operating principles described below refer to voltage control by means of a speed reference potentiometer.

Operating principles

When power switched on : check on presence of mains supply phases and phase order with LED display on control board.

* Preparation. Sequence initiated by pressing start button, VTR remains clamped.

* VTR enables by operating Forward or Reverse control, and selecting speed via the reference potentiometer RP1.

* Reverse direction of rotation. Changing from forward rotation to reverse, or vice versa, causes the motor to stop by regenerative braking, and then to rotate in the opposite direction.

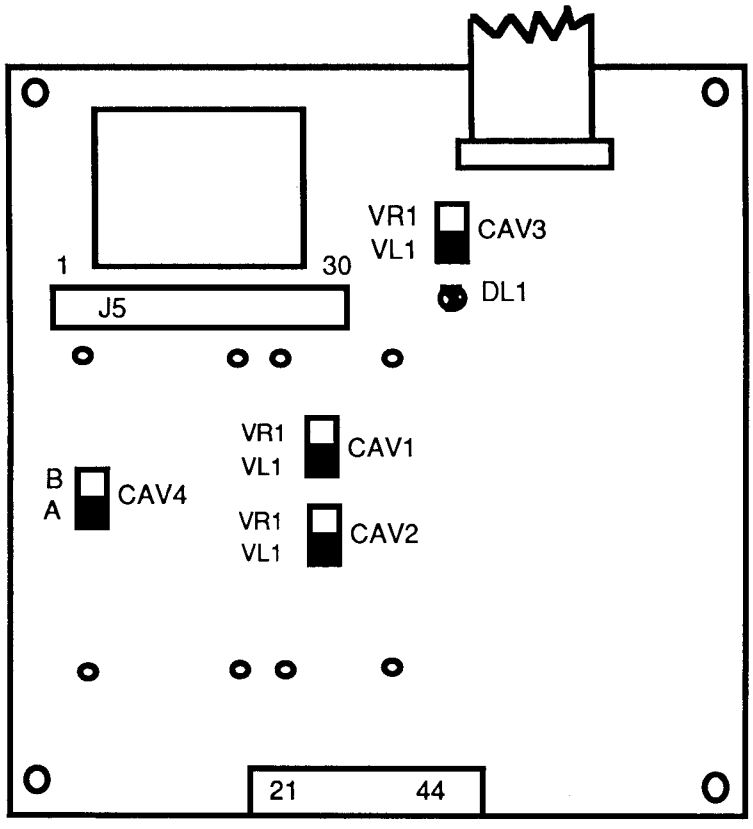
* Norma l stopping. Pressing the stop button causes de-energisation of direction relay KA2 or KA3, and the controller to go into braking mode controlled by the ramp, until the motor stops.
When speed is nearly zero, internal contacts 41-42 open, and the VTR locks out.
During normal stops, line contactor KM1 is held in by contacts 43-44.

*Safety devices. A safety circuit built in the controller detects the presence of the field current. If the latter disappears or falls below a preset value, the VTR locks out, and contact 43-44 opens, causing the line contactor to open.

The safety cut outs built in to the control sequence of relay KM2 (auxilliary circuit breaker contacts, blown fuses .....) stop the drive by deenergising KM2 which cuts off the current, locks out the VTR and open the line contactor.

(VI) INSTALLATION

CONTROL PCB



Jumpers 1 to 4 are factory set.
The above diagram indicates their positions and indicates the connections made in black.

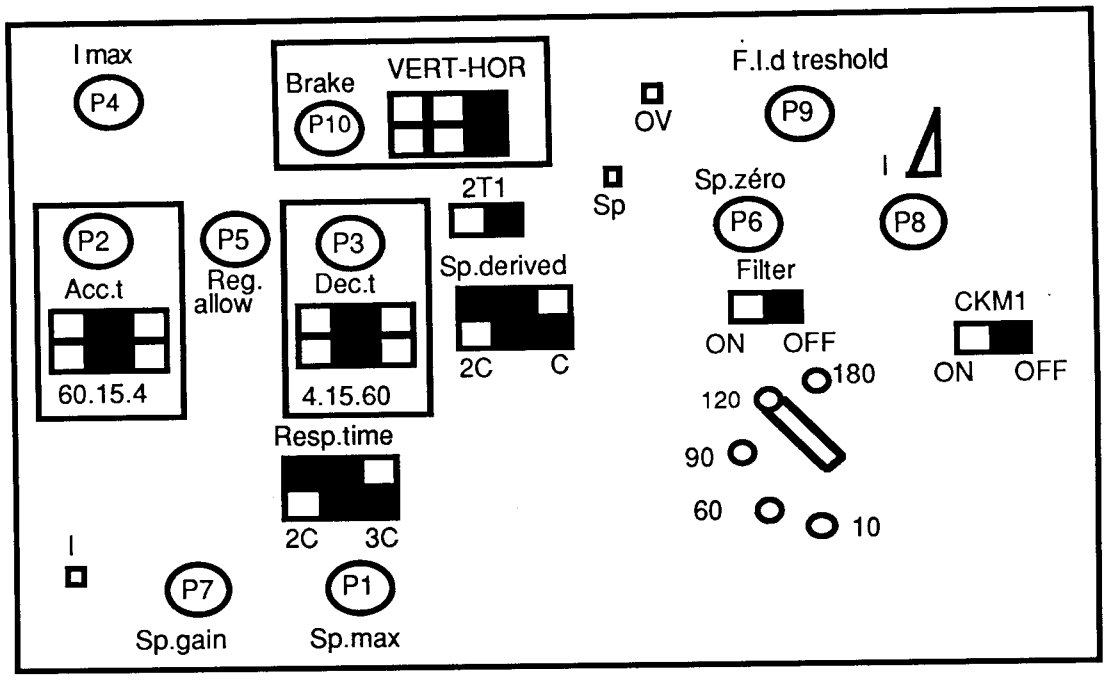
Jumpers 1, 2 and 3 precondition firing synchronisation.

Jumper 4 is normally in position A, position B is only used in special applications.

LED DL1 when power switched on : indicates presence and correct phases rotation.

(VI) INSTALLATION

ADJUSTMENT BOARD



Jumpers

The above diagram indicates their positions and indicates the connections made in black.

Brake VERT-HOR according to applications :

- VERT : used in lifting, vertical movement.
- HOR : used in handling, horizontal movement and standard applications.

  In this position, the make-impulse prior to brake operation is removed.

Do not use the central position which clamps the controller.

Speed feedback signal : 5 position voltage selector :
10 - 60 - 90 - 120 - 180V.

Ⓥ INSTALLATION

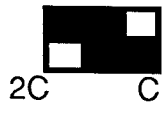
Jumper T :
- position 1 : normal position
- position 2 : reduced input impedance if speed feedback signal is less than 10V.

Filter : inclusion of a filter on the speed feedback signal.

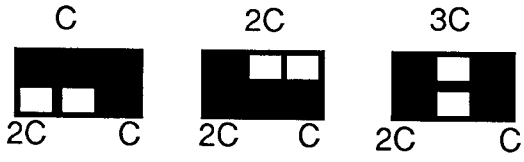
Sp derived : enables the scaled speed feedback signal to be applied to the speed control.
1,2 or 3 capacitors can be switched in or out.

Possible configuration :

No scaling



Scaling with capacitance values



Acc.t : Selection, acceleration ramp time : 4 - 15 - 60s.

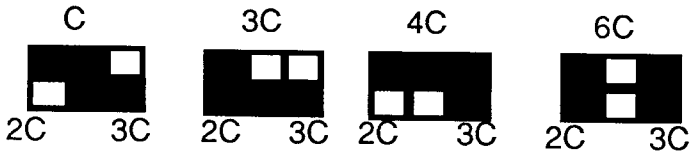
Dec.t : Selection, decceleration ramp time : 4 - 15 - 60s.

CKM1 : Enables servo control of line contactor KM1 :

- ON : KM1 drops out when stopped.
- OFF : KM1 held in when stopped.

Resp.time : Sets the speed control response time by adjusting the integral capacitance in the speed loop.

1, 3, 4 or 6 capacitance values can be included in the circuit.



VI INSTALLATION

Test points

0V : 0V
Sp : speed feedback signal
I : current feedback signal

Adjustment pots
P1 Sp.max : Max. speed
P2 Acc.t : acceleration ramp time
P3 Dec.t : decceleration ramp time
P4 I max : current limit
P5 Reg.allow : time delay between pulling in of brake contactor and validation of ramp signal. This delay should be set according to the response time of the brake.
P6 Sp.zéro speed amplifier zero setting. Potentiometer factory preset.
P7 Sp.gain : proportional + integral speed loop gain.
P8 I : integral current loop gain. Adjusts rate of increase of armature current.
P9 F.I.d treshold : field current threshold. According to the field characteristics of the drive, sets the current threshold which enables the line contactor to control the drive.
P10 Brake : operates only if the jumper is in the GREEN position. Sets the value of the make-impulse in the armature prior to release of the brake.

Potentiometers fully anticlockwise : minimum setting values.

(VII) COMMISSIONING

TEST EQUIPMENT

- Multimeter preferably 20000 Ohms/Volt.
- Moving coil ammeter with shunt.
- Double track oscilloscope if possible.
  Oscilloscope must be insulated from the mains.
  Do not connect the earth of the oscilloscope to that of the installation.
- Specific block diagram of the equipment.

PRELIMINARY CHECKS

Power supply switched off.

. Check identification plates and labels of the equipment for compatibility of mains supply, controller and motor.

. Check that the wiring complies with the block diagram in the preceding section and with the diagram of the equipment.

. Check connections and terminal blocks for tightness, and that push-on connectors on the controller are fully home and locked in position.

. If a speed demand voltage is used, check the connection of the speed reference potentiometer, and measure its resistance using a multimeter.

Recommended values :

- Standard potentiometer : 2200 Ohms, measured after disconnecting terminals 26 and 38 (or 39).
- Mid-point potentiometer : total value : 4700 Ohms after disconnecting terminals 38 and 39. Check connections, particularly the slide contact and the mid-point.

. Check the position of jumpers :
- On the control PCB (see page 16) : CAV 1, CAV 2, CAV 3 in position VL1, CAV4 in position A (position B is used only for special applications, and in such cases is refered to in the equipment manual).

- On the adjustment PCB : refer to page 16 and 17 where their positions and functions are detailed, together with the various potential configurations.

(VII) COMMISSIONING

Initial positions

- jumper T in position 1,

- jumper Filter in OFF position,

- jumper SP derived, no scaling,

- jumper CKM1 :

in OFF position if standard application,
in ON position if handling/lifting application,

- jumper BRAKE in position HOR,

- jumper Resp.time in single capacitance position,
- to simplify adjustments, place jumpers Acc.t and Dec.t in 4s position.
- on interface PCB : a jumper enables the current transformer charging circuit to be selected. Check position as folloow :

VTR 36A : jumper position 40A
VTR 72A : jumper position 80A
VTR 150A : jumper position 160A
VTR 300-600A : single position 320/640A for both ratings.

These jumpers are usually factory preset, however their position should be checked.

VII COMMISSIONING

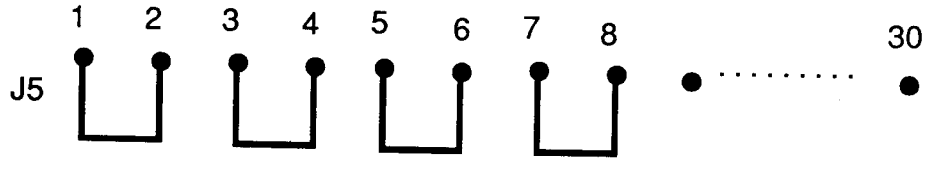
Fot the VTR 300 and 600A, as well as the control module, the 2 selector jumpers VL1/VR1 should be in position VL1.

Potentiometers on adjustment PCB :

- P1, P2, P3, P4, P5, P7, P8, P10 : fully anticlockwise.
- P6 : factory preset.
- P9 : fully clockwise.

. On connector J5 of the control PCB :

If no adaptor card if fitted to the controller, check that the first 8 pins are connected as follows :



ADJUSTMENT AND TEST PROCEDURE

STATIC ADJUSTMENT, MOTOR STOPPED.

Voltage checks.

Clamp controller by disconnecting terminal 33.

On connector J5 of the control PCB sited below the adjustment PCB, the pins are numbered from 1 to 30, from left to right.

Connect pins 12 and 21 to shunt the field current detection circuit.

Connect pins 11 and 22 to shunt the speed amplifier integration capacitance.

Manually close QS1 and Q2.

For the following measurements using a multimeter, the 0V can be taken from terminal 31 or the 0V test point on the adjustment PCB.

VII COMMISSIONING

. Controller voltage :

Reading should be
- +15V at terminal 30
- -15V at terminal 32
- +26V at terminal 40
- -26V at terminal 36

. Reference voltages :

The following values should be obtained on terminal 25 (terminal 24) :
+ 11V with the reference at maximum in direction 2
- 11V with the reference at maximum in direction 3

This measurement should be made as follows :

- Mid-point potentiometer connected to a controller : push control level fully in direction 2, then in direction 3.

- Standard potentiometer : with this at minimum setting, manually close relay KA2 and turn the potentiometer to max. reference, return to minimum and repeat the operation with relay KA3.

Checking phase rotation

Disconnect supply to inductor circuit on the AC side, terminal FL1 ou FL2.

Switch on the electromechanical start-up sequence by pressing the start button, and initiate rotation as long as necessary for the measurements to be caried out by keeping relay KA2 or KA3 pulled in.

Using multimeter, check supply phase rotation between power and control sections.

VII COMMISSIONING

The connections are correct if the voltage measured comply with those in the adjacent table, where n is the mains voltage. If these are not correct, modify the connection of terminals 11, 13, 15.

Terminal	Bar		
	AL1	AL2	AL3
11	0	Un	Un
13	Un	0	Un
15	Un	Un	0

Diode DL1 situated on the control PCB should be lit, if not, reverse 2 phases of the power supply, at the input L1, L2, L3.

Release relay KA2 or KA3.

For VTR 300 and 600A, ensure that the blower is rotating correctly with the air circulating from bottom to top and with the outlet at the upper part of the thyristor converter.
If this is not the case, reverse 2 of the supply wires at terminals U, V, W.

Switch the equipment off.

SETTING THE CURRENT LIMIT

This setting should be carried out according to the starting torque required. The corresponding current should be less than the peak current of the controller, and this should be derated if the temperature in the immediate vicinity of the thyristors exceed 40°C.

With the AC side of the field still disconnected, mechanically lock the motor shaft. If a brake is fitted to the shaft, it is enough to disconnect its power supply.

Reconnect the wire to terminal 33.
Connect the ammeter to the armature, using a shunt if necessary. Leave in place for further adjustments.

Switch the equipment on, initiate start up and select maximum speed using the reference potentiometer.

Set the current limit on the ammeter by turning potentiometer P4 clockwise until the desired value is obtained.

Avoid maintaining current limit for longer than necessary to prevent overheating commutator segments in contact.

Check that the set value is identical in both directions of rotation.

Switch the equipment off.

Unclamp the motor, or reconnect the power supply to the brake.

APPENDIX : Adjustment of armature current waveform.

This adjustment is carried out for certain applications requiring very rapid increase in current (of the order of 3 or 4 ?) according to the specification of the motor supplied by the manufacturer.

This is carried out using a storage oscilloscope with the probes being connected between the 0V and test point I on the adjustment PCB..
Adjust using potentiometer P8.

CHECKING FIELD CIRCUIT

Disconnect terminal 33.

Connect multimeter to the DC side of the excitation circuit (or a second ammeter if the current to be measured exceeds the capacity of the multimeter).

Reconnect the AC side of the supply to the field.

Switch on, press start button to pull in contactor KM6 and check the field current value.
As the measurement is made with the motor cold, the value obtained will be higher than that indicated marked on the motor.

ADJUSTMENT OF FIELD CURRENT DETECTION CIRCUIT

Switch the power off.

Remove the link between pins 12 and 21 of connector J5.
Leave terminal 33 disconnected.

Switch the power on, and initiate rotation for the duration of the adjustment. Turn potentiometer P9 anticlockwise until line contactor KM1 closes, then turn a fraction further to compensate for the reduction in field current due to the heating of the windings.

VII COMMISSIONING

Switch the power off.

Reconnect terminal 33 as per diagram.

DYNAMIC ADJUSTMENTS

VERIFICATION OF POLARITY OF SPEED FEEDBACK SIGNAL

Connect multimeter with the - to 0V (terminal 31 or 0V testpoint on adjustment PCB) and the + to terminal 37.

Remove voltage selection jumper 10 - 60 - 90 - 120 - 180.

Switch the equipment on.

Select rotation with positive reference, i.e direction 2, with low amplitude and for a short time (a very slight movement of the control knob will suffice).

When the motor starts, note the direction of rotation and the polarity of the voltage from the tachogenerator.

. The motor rotates in the right direction (direction 2) :
  - tachogenerator voltage negative → correct,
  - tachogenerator voltage positive → reverse connections to tachogenerator, and to DC side of field.

. The motor rotates in the wrong direction :
  - tachogenerator voltage negative → reverse connections to tachogenerator, and to DC side of field.
  - tachogenerator voltage positive → reverse connections of DC side of field.

ATTENTION : Before reversing field connections the power to the inductors must be switched off at FU6.

VII COMMISSIONING

Switch the power off.

Replace the voltage selection jumper in the correct position.

Lifting applications, vertical movement.
Adjustment of the make-impulse prior to removal of the brake.
Place Brake jumper in GREEN position.
Disconnect terminal 35 to set reference ramp to zero.

Switch the power on. Under these conditions, a speed demand from the controller will cause a current to flow in the armature for approx. 1 second, limited by a delay built-in to the controller.

Adjust this current to the nominal value of the motor by turning potentiometer P10 clockwise.
As the make-impulse is extremely short, this will have to be done in stages.
Later on, this value can be adjusted with the winch under full load to prevent surging or dropping of the hook when the brake is released.
Switch the power off. Reconnect terminal 35.
Leave Brake jumper in GREEN.

VII COMMISSIONING

MAXIMUM SPEED ADJUSTMENT

This adjustment, as well as the speed loop adjustment in the following paragraph will be carried out with the motor uncoupled from the load.

Remove the link between pins 11 and 22 of connector J5. Leave the multimeter connected as before.

Switch power on. Initiate start and increase speed reference progressively to maximum.
Adjust speed by turning potentiometer P1 clockwise until the correct value is obtained on the multimeter.

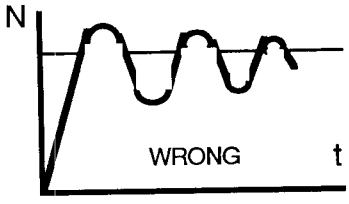
e.g : For a tachogenerator of 0,06V/rpm coupled to a 1750 rpm motor.

The max. speed should be equivalent to 105V on the multimeter.

Return the speed reference to zero, reverse the direction of rotation and check that the maximum voltage obtained is the same.

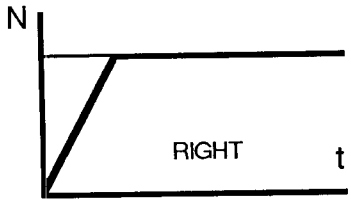
VII COMMISSIONING

ADJUSTMENT OF SPEED LOOP GAIN

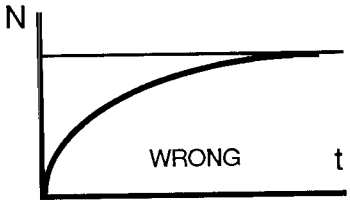


Leave the multimeter connected as before, and apply step changes in speed, noting whether oscillations are present on the approach to the selected speed. (see adjacent sketch)

If this is the case, increase the speed integral capacitance by moving the Resp.time jumper.



Following this operation, if the speed increase obtained is two slow (see bottom diagram) increase the speed loop gain by turning P7 progressively clockwise to obtain the best compromise between fast response and stability.



If a very fast response of the speed control loop is required, leading to transient but short term overshoot (top diagram) this stability can be improved by adjusting the scaling of the speed feedback signal.

In this case, use the various configurations of jumper Sp.derived, resetting potentiometer P7 if necessary.

These adjustments should be made using an oscilloscope.

RAMP TIME ADJUSTMENT

Repeat the above adjustments with the motor underload.
Position the jumpers to obtain the required settings.
Initiate start-up, select max.speed reference and note acceleration time.
Adjust using potentiometer P2 . For decceleration time, adjusted using potentiometer P3, start with max.speed and return speed reference to zero.
Check that in transient conditions the armature current, remains below the current limit.

VII COMMISSIONING

BRAKE RELEASE ADJUSTMENT

In applications with a brake fitted to the motor shaft, the acceleration ramp can be delayed with reference to the operation of the brake contactor, using potentiometer P5 Reg.allow.

The brake release signal is given on terminal 35 by the closure of an auxilliary contact on the brake contactor.
According to the response time of the electromagnetic brake, a sudden surge in torque may occur if the ramp has obtained a significant value by the time the brake is effectively released.

If this is the case, carry out a series of start-up with the speed reference set to max. and turn potentiometer P5 progressively clockwise until all jerkiness disappears.

VIII REPLACEMENT PART

DESCRIPTION			APPLICATION	PART N°
2 THYRISTOR MODULE			VTR 2.36 . 3. 36	NO PART NUMBER
			VTR 4.36	
			VTR 2.72 . 3. 72	
			VTR 4.72	
			VTR 2.150 3. 150	
			VTR 4.150	
Thyristors			VTR 2.300 . 3. 300	AVAILABLE
			VTR 4.300	
			VTR 2.600 . 3. 600	
			VTR 4.600	
Power fuses	Outside VTR	40A	VTR 2.36 . 3. 36	CONTACT
		100A	VTR 2.72 . 3. 72	
		200A	VTR 150	
	Inside VTR	315A	VTR 300	
		750A	VTR 600	
Fuse with microswitch			VTR 300 600	
Blow indicator 1				
Power transformers			VTR 36 72 150	US
			VTR 300	
			VTR 600	
Blower	Single phase + résistance		VTR 150	
	Tree phase	50 Hz	VTR 300 600	
		60 Hz	VTR 300 600	
Thermal cut out			VTR 36 to 600	

VIII REPLACEMENT PART

DESCRIPTION		APPLICATION	PART N°
Field rectifier		VTR 36 to 600	NO PART NUMBER AVAILABLE
Cylindrical fuses	6x32 16A		
	6x32 4A		
	5x20 2A		
Adjustment board			
Control board	50Hz	VTR 36 to 600	
	60Hz		
Mains protection board		VTR 300 600	CONSULT
Power interface board		VTR 2.36 3.36 VTR 2.72 3.72 VTR 2.150 3.150	US
		VTR 4.36 4.72 4.150	
		VTR 2.300 3.300 VTR 2.600 3.600	
		VTR 4.300 4.600	

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