



# ECO-TAKEDO<sup>®</sup>

## mod. 94

### INSTRUCTION MANUAL

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# 1 - FUNCTIONING DESCRIPTION

ECOTAKEDO mod.94 is an analogue control speed regulator for double-pole (4-16 or 6-24 poles) asynchronous three-phase lift motors.

The comfortable ride that distinguishes lifts fitted with this regulator is guaranteed by the special program curves designed to provide smooth speed variations, from start up to the electrical stop with the subsequent application of the mechanical brake.

ECOTAKEDO mod.94 lift speed regulator ensures excellent results even under particularly difficult conditions, e.g. with high speed lifts (2.0 - 2.2 m/sec) or for heavy weights.

The torque applied to the lift motor is controlled by three pairs of SCR which regulate the voltage of the high speed winding (4 or 6 poles).

In the single-phase braking model, braking is obtained by feeding single-phase rectified direct current to the low speed winding (16 or 24 poles); in the three-phase braking model, three-phase rectified direct current is fed in.

The feed-back signal become from a tachodynamo 0.06 V/rpm signal or an encoder 60 or 100 pulses/revolution.

## ADVANTAGES OF THREE-PHASE BRAKING

The three-phase braking system provides several advantages as compared with the mono-phase system used on most other speed regulators on the market:

- Braking current is uniformly distributed over the three phases with consequent reducing of 1.7 times the current consumption.
- Distributing the braking current over the three phases prevents power supply imbalances and this reduces power supply network disturbances.
- The braking current has less ripple; this also benefits the motor which is less noisy during braking. Comparative laboratory tests have demonstrated that the three-phase system reduces the noise produced during the braking phases by about 50% as compared with single-phase systems.

## SATURATION MODE FUNCTIONING

The great innovation that distinguishes ECOTAKEDO mod.94 from the other speed regulators on the market is its saturation functioning mode.

Thanks to this particular functioning mode, ECOTAKEDO mod. 94 reduces motor heating to a minimum. The only phases controlled are the departure and the arrival, while the motor is fed with a full voltage supply in the sectors covered at high speed; in so doing the motor heats less, it does not make noise and runs at its possible maximum speed.

All these new features do not interfere with the precision of the system that is always very high under all load conditions.

# 2 - INSTALLATION

**2.1** Unpack the speed regulator unit and check it for any signs of damage which may have been caused during transport and delivery.

ECOTAKEDO mod.94 is box-shaped, open on the top and bottom sides (single-phase braking model) to facilitate air circulation for the cooling of the components. The dimensions of this model are 350x200x200 mm. The three-phase model has the bottom side fully open, to allow the passage of air for cooling, and the top side partially open to allow the passage of air and the power supply cables. The dimensions of this model are 350x300x240 mm.

Before connecting up, check that your mains power supply matches that of the ECOTAKEDO mod.94 indicated on the attached test certificate and on the unit's rating plate.

The SCR and the fuses are mounted on an aluminium heat sink; mounted above these is the card with the SCR switches and the filters R, C and Z. The regulator board is fitted to the cover. For access, unscrew the 2 top securing screws on the sides and lift the lid.

The regulator unit can be fitted on new plants and on existing ones, since the modifications that need to be made to the control panel are very simple (APPENDIX 1).

**2.2** Connect the unit to the mains power supply following the indications given in the circuit diagram (APPENDIX 2). Connect the ECOTAKEDO mod.94 upstream of the contactors. When the unit is connected up, turn it ON and check that the green FAULT LED (L6) lights up. If not, invert the two input phase wires. If the LED still does not light up, check the power supply, the condition of the three power input fuses (on L1, L2 and L3), the three power up board fuses (F1, F2, F3) and the two fuses (F1 and F2) on the regulator board, to protect the +15 Vdc and -15 Vdc power supplies. The status of these two power supplies is displayed by the two LEDs L12 (+15) and L13 (-15), if one of these is OFF then L6 will also be OFF.

**2.3** The panel command connections must be made on the terminal board M1 of the regulation board (APPENDIX 3).

- Connect the speed command to their inputs:

LOW SPEED	terminals	1-2	(V0)
MAINTENANCE SPEED	terminals	3-4	(VM)
HIGH SPEED	terminals	5-6	(V2)

The LEDs that display these inputs are:

LOW SPEED	led	L1
MAINTENANCE SPEED	led	L2
HIGH SPEED	led	L3

These LEDs are ON when the relative command contact is closed.

**When the two speed levels are used together, a set speed is obtained that is the sum of the two used (e.g. V2+V0 or VM+V0); wherever possible avoid using this type of setting, or take it into account during plant speed regulation. The V2+VM entry must be avoided at all costs. To command ECOTAKEDO mod.94 correctly, refer to APPENDIX 7.**

- Connect the pilot contactor auxiliary contact (N.O.) or the direction contactors auxiliary contacts parallel (N.O.) to the run command **CM** input (terminals **10** and **11**). If the above contacts are not available, arrange for an additional relay, in parallel with the pilot contactor, with an N.O. contact that acts as the run command.

The LED that displays this input is: L5

The LED is ON when the relative command contact is closed.

- Connect the stop switch to the stop command **CF** (terminals **12** and **13**) input. If normally closed (N.C.) contact switches are used on the floors, connect SEL1 in the N.O. position (upwards). If normally open (N.O.) contact switches are used on the floors, connect SEL1 in the N.C. position (downwards).

The LED that displays this input is: L4

The LED is ON when the contact at terminals 12-13 is closed.

**In the event of an N.C. switch, it is ON during travel, in the event of an N.O. switch it is ON at the floor.**

**2.4** Terminal block M1 has the exchange contacts of the FAULT, V80, AP and RF relays (5A-250Vac). These relays operate as follows:

**FAULT** relay (terminals **14**, **15** and **16**).

This relay is energised (green L6 LED ON) when the actuator is OK. If the LED is not ON, and this relay is not energised, this may be due to the following:

- If the input phase cycle direction is wrong or a phase is missing (see point 2.2);
- If a power supply fuse is blown (see point 2.2);
- If no feedback signal is detected (tachogenerator or encoder);
- If the run command (CM) is present but one of the speed commands is absent for a few seconds;
- If the input combination VO+CM+CF is present for more than three seconds thus causing the electric braking of the motor.

When one of the last three events occurs, as well as the LED L6 going OFF, signalling that the FAULT relay is not energised, the LED L11 << TACHOMETRIC ALARM>> lights up.

A fault caused by the blowing of a fuse can only be remedied by replacing the fuse; a <<TACHOMETRIC ALARM>> can be remedied in two different ways.

The first is <<manual>> resetting. This is done by turning the ECOTAKEDO mod.94 OFF and then ON again.

The second is <<automatic>> resetting. This is done by connecting the RES jumper and checking the resetting of the ECOTAKEDO mod.94 approximately one second after the alarm signal.

**Take care however, since whatever the reason for the ECOTAKEDO mod.94 alarm signal, this will not be resolved by merely turning the unit OFF and then ON again. Check the connections to the tachogenerator or the encoder, dealt with further on in this manual, and the speed and start and stop commands. If possible, avoid using the RES jumper as this causes uncontrolled resetting of the equipment.**

When the FAULT relay is energised, the contact 14-15 is closed. In the event of a fault, this contact opens and the regulator is blocked, i.e. it is unable to supply power to the motor. **The lift should not therefore move because the motor can no longer be piloted by ECOTAKEDO mod.94.** The contact 14-15 should therefore be used as a signal of a fault on the panel stopping the lift functioning.

**AP** Relay or the open door relay (terminals **17**, **18** and **19**).

This relay also acts as a speed detector, its status is displayed by LED L8 that is ON when the relay is energised. When the lift is at a standstill the relay is energised and therefore closes the contact between terminals 17-18 on terminal board M1. The AP relay switches when the motor exceeds the speed level defined by the value of resistance R148 (the value of R148 is 1 Kohm, corresponding to a trigger level of 200 rpm). R148 can be identified on the regulator board because it is fitted on turrets. Relay AP is used in the arrival phase as the lift approaches the floor and is used to advance the time of door opening. The EN-81 Standard stipulates that the maximum speed at which advance door opening should take place is 0.30 mt/sec. The resistance R148 must be changed if the speed at which the detector is triggered is not correct. For further details refer to the table in APPENDIX 4 at the end of the manual.

The AP relay can also be used as a general speed detector. The only change required is that of the resistance R148.

**RF** relay or brake delay relay (terminals **20**, **21** and **22**).

The RF relay commands the closing of the mechanical brake when the car stops at the floor. The motor is first blocked electrically by ECOTAKEDO mod.94, then the RF relay closes the mechanical brake and inhibits that passage of braking current. The RF status is displayed by LED L7, while on the terminal board M1 of the regulation board an exchange contact is available for this relay. The contact 20-21 is closed when the RF relay is energised (LED L7 ON).

The RF relay is commanded, after a delay, by the stop contact CF, the delay can be calibrated by means of the trimmer P3 from a minimum of 0.2 sec to a maximum of 1.5 sec.

**2.5** After panel connections have been completed, prepare the cable for wiring the encoder or tachogenerator.

The tachogenerator should be of the type 0.06 Vdc per rpm (60V at 1000 rpm) and be connected to the terminals 1 and 2 of M2 terminal board of the speed regulation board, without worrying about signal polarity.

The encoder may be of the 60 pulses per revolution type or the 100 pulses per revolution type and be connected to the terminals 7, 8 and 9 of M1 terminal board.

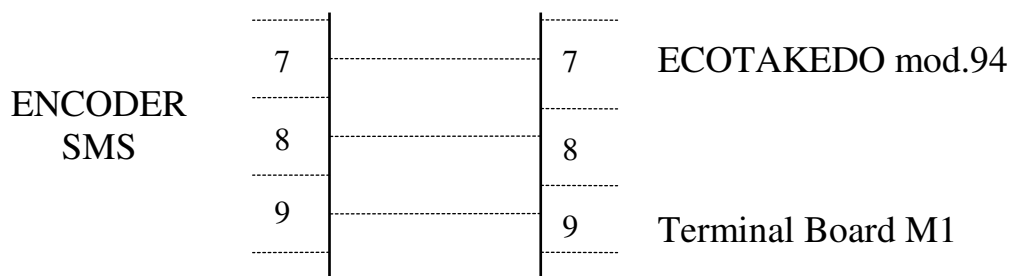
When using the encoder, remember that the following power supplies are available for it on the terminal board M1 of the speed regulation board:

- at terminal 7 of M1 +15 Vdc
- at terminal 8 of M1 -15 Vdc
- at terminal 9 of M1 uscita encoder
- at terminal 23 of M1 0 Vdc or GND

When using an encoder with 100 pulses/revolution it is necessary to solder the two SP1 bump contacts.

The lead that carries the frequency signal from the encoder must be connected to terminal 9 on terminal board M1.

When using the SMS encoder (60 pulses per revolution) the following connection should be made:



When using other types of encoder, refer to the wiring diagram.

If the tachogenerator is used, connect selector SEL2 on the speed regulation board in position T, i.e. towards the right. If an encoder of whatever type is used, connect SEL2 in position E, i.e. towards the left.

**The connection between the tachogenerator or encoder and ECOTAKEDO mod.94 should be made with a screened multiconductor cable. The shield should be connected to the motor earth (it should not be connected to ECOTAKEDO mod.94).**

**2.6** In the case of a 6-24 pole motor, connect the jumper J1 on the speed regulator board.

**2.7** If you are using a power supply with a frequency of 60 Hz, solder together the two bump contacts on the SP2 (60 Hz for pulses) and remove the soldering between the two bump contacts for SP3 (50 Hz for generator or encoder).

**2.8** If, when the motor is first switched on, it rotates in the opposite direction to that required, invert the two phase wires connected between the ECOTAKEDO mod.94 output and the high speed winding, 4 or 6 poles (e.g. invert U and V).

**2.9** The slowing down commands in the lift shaft, should be fitted at the same distance from each floor, for ascent and descent. To establish the correct distance refer to the table in APPENDIX 5 at the end of the manual.

**2.10** The ECOTAKEDO mod.94 has already been calibrated by SMS. We advise against making any radical changes to these adjustments which should be adapted to suit your particular lift requirements. It is advisable to make a note of any calibration variations made so that it is possible to restore the initial conditions.

## **3 - ADJUSTMENTS**

### **3.1 TRIMMER ADJUSTMENTS**

**P1** Adjusts the encoder feedback.  
DO NOT ADJUST THIS TRIMMER.

**P2** Phase control circuit sensitivity.

Turn in a clockwise direction to increase sensitivity, i.e. the possibility of tripping the FAULT relay even due to a minimum drop in the mains voltage. This should only be adjusted after consulting SMS.

**P3** Mechanical brake delay.

This trimmer adjusts the delay between the stop command (CF) and the switching of the RF relay, i.e. the closing of the mechanical brake. Turn in a clockwise direction to increase the delay between the stop command and the RF switching. To avoid unnecessary overheating of the motor, this delay should not be too long. The correct setting envisages the closing of the brake as soon as the motor stops.

**P4** Departure torque.

This setting prevents counter-rotation of the motor in case of the most unfavourable lift departure conditions (e.g. starting from the top floor in descent with an empty car). Turn the trimmer in a clockwise to increase the starting torque setting, avoid exaggerated adjustments that can cause abrupt lift departure under favourable start conditions.

**P5** Braking overlap.

This adjustment makes it possible to have very rapid change over from the phases in which ECOTAKEDO mod.94 pilots the motor to the braking phases. It should only be adjusted after consulting SMS.

**P6-P7-P8** Pulse settings.

DO NOT ADJUST THESE SETTINGS.

**P9** High speed (V2).

This trimmer sets the high speed level. There are two possible settings. In <<regulation>> functioning, it directly controls the motor speed, whereas in the <<saturation>> functioning, it is calibrated at a fixed value.

In the <<regulation>> functioning, the high speed is normally set at 1350 rpm with a 4-16 pole motor (900 rpm with a 6-24 pole motor), corresponding to a voltage between TP8 and GND of approximately 8.6 Vdc. For a more precise adjustment if the tachogenerator is used, check the return voltage on terminal board M2. In the case of 1350 rpm this voltage will be 81 Vdc, in the case of 900 rpm this voltage will be 54 Vdc.

Turn the trimmer in a clockwise direction to increase the speed value.

In <<saturation>> functioning, with the SAT jumper connected, the high speed trimmer should be set to have a voltage of 10.5 Vdc between TP8 and GND. This adjustment should only be made during transformation for <<saturation>> functioning.

**P10 Maintenance speed (VM).**

This trimmer adjusts the maintenance speed level, turn it in a clockwise direction to increase speed.

The maintenance speed value is set at approximately 750 rpm with 4-16 pole motors (500 rpm with 6-24 pole motors). The EN-81 regulations stipulate a maximum maintenance speed of 0.63 m/sec and therefore the speed set must not exceed this. For more information on this setting, refer to the table in APPENDIX 6.

**P11 Low speed (V0).**

This trimmer regulates the low speed level, turn clockwise to increase the speed. For 4-16 pole motors this trimmer is set at 120 rpm (80 rpm for 6-24 pole motors). The real speed can be measured on the terminals of M2 if a tachogenerator is used. This gives a signal of 7.2 Vdc for 120 rpm and 4.8 Vdc for 80 rpm. The usual low speed values are between 100 and 150 rpm for 4-16 pole motors (70-100 for 6-24 pole motors).

**P12 Braking Intensity.**

When there is an input combination V0+CM+CF (open or closed contact according to the cases already mentioned) when approaching a floor stop, ECOTAKEDO mod.94 generates a negative value on the programme curve that causes the <<electric>> stopping of the motor. This value establishes the braking intensity, i.e. the force with which the regulator restrains the system at the stop.

Turn the trimmer in a clockwise direction to increase the intensity of braking. Normally it is advisable to leave this intensity at the setting fixed by SMS, i.e. at 1.0 Vdc measured between TP8 and GND. This setting guarantees excellent stopping precision under all load conditions.

**The electrical stop is only obtained with the input conditions: VO+CM+CF and not in any other situations.**

**P13 Acceleration.**

This trimmer adjusts the acceleration ramp. Turn clockwise to provide a "smoother" start.

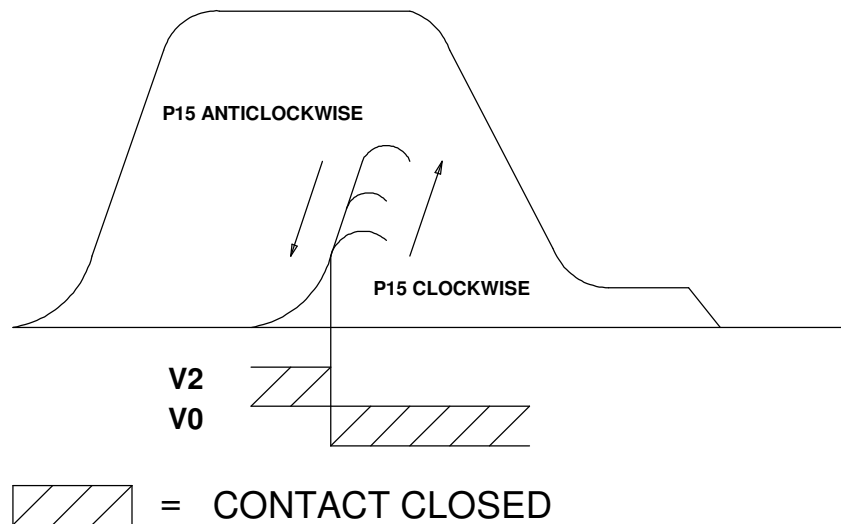
**P14 Deceleration.**

This trimmer adjusts the deceleration ramp. Turn clockwise to provide a "smoother" deceleration. The setting of this trimmer depends on the slowing-down distance envisaged in the lift shaft. For optimum travel comfort, maintain a distance equal to that indicated in APPENDIX 5.

**P15 Slowing down delay.**

This trimmer is used in the fast plants to adjust the travel between each floor. Turn in a clockwise direction to increase the slowing down delay with respect to the re-opening of the high speed command (V2), if the plant is still in the acceleration stage.

It should be set to obtain the same low speed distance in the travel between one floor and the next and between floors distant from one another. It can be disabled or the delay zeroed (turn P15 in an anticlockwise direction until a click is heard, indicating the minimum), or merely remove the CMP jumper.



**P16** Slowing down delay disable level.

Sets the speed at which the possibility of delaying slowing down with respect to the opening of the high speed contact is disabled. This should never be touched.

**P17** Tachogenerator or encoder offset signal.

This is normally set at 0, i.e. with the trimmer turned completely in an anticlockwise direction. It should only be used if there are anomalies in the feedback signal, which can only be checked with an oscilloscope. It should never be touched.

**P18** Slowdown start level.

This is used when the plant functions in the <<saturation>> mode, with the SAT jumper connected.

Turn the trimmer in a clockwise direction to increase the rapidity of the regulator response when slowdown is commanded. If this level is excessive (i.e. the trimmer is turned too far in a clockwise direction) slowdown may appear to take place in two phases. Vice versa, if the setting is insufficient, the slowdown will be delayed too long. It is normally set at a level of 7.0 Vdc measured between TP9 and GND.

**P19** Stability.

This is used to adjust the stability circuit intensity, turning it in a clockwise direction eliminates the tendency of the motor to stop and start again at the end of deceleration. If the intensity is increased too much, this generates fastidious vibrations. It is normally set at 1/4 a turn, this guarantees a precise slowdown without vibrations in the majority of plants. It should be adjusted at the same time as P20.

**P20** Speed regulator dynamic gain.

This adjusts the accuracy between the plant speed and the theoretical speed curve. Turn clockwise to increase the accuracy of the system, but this may cause annoying motor vibrations due to a not very "clean" tachogenerator or encoder signal. It is normally set at minimum (anticlockwise direction) and in most cases does not require any calibration adjustments. It should be set at the same time as P19.

**For a summary of the adjustments, refer to APPENDIXES 8, 8A, 8B and 8C at the end of the manual.**

**3.2 INDICATOR LEDS**

**L1** Low speed (VO).

When this is ON, it indicates that the low speed input contact is closed (1-2 terminal board M1)

**L2** Maintenance speed (VM).

When this is ON, it indicates that the maintenance speed input contact is closed (3-4 terminal board M1).

**L3** High speed (V2).

When this is ON, it indicates that the high speed input contact is closed (5-6 terminal board M1).

**L4** Stop contact (CF).

When this is ON, it indicates that the stop contact (CF) is closed (12-13 terminal board M1). In the event of a N.C. switch, this is ON during travel, in the case of a N.O. switch, this is ON at the floor.

**L5** Run command (CM).

When this is ON, it indicates that the run command input contact is closed (10-11 terminal board M1).

**L6** FAULT (green LED).

When this is ON it means that the speed regulator is OK. If it is OFF, refer to points 2.2 and 2.4.

**L7** Mechanical brake delay (RF).

When it is ON it indicates that the RF relay is attracted and that the stop command delay set with P3 has expired.

**L8** Door opening (AP).

When it is ON it signals that the AP relay is attracted and that therefore speed is lower than the reference value from R148.

**L9** Slowdown delay.

This LED goes OFF when the input contacts of command V2+CM are closed and only comes ON again at the end of acceleration, or when the slowdown delay set with P15 has expired.

**L10** Saturation.

The LED lights up when the plant is able to function in <<saturation>>. The SAT jumper must be connected and the motor must be at the end of acceleration, it goes OFF when contact V2 opens and slowdown starts.

**L11** <<Tachometric>> alarm.

Normally this LED is OFF. It lights up when one of the conditions described in point 2.4 occurs. If LED L11 is ON, FAULT LED L6 goes OFF. The alarms indicated with LED L11 can be reset with the jumper RES, but it is better to avoid this.

**L12** +15 Vdc power supply.

When this is ON it indicates the presence of the internal +15 Vdc power supply. If it is OFF, FAULT LED L6 is also OFF.

**L13** -15 Vdc power supply.

When this is ON it indicates the presence of the internal -15 Vdc power supply. If it is OFF, FAULT LED L6 is also OFF.

### **3.3 TEST POINT**

**GND** Internal circuit ground.

This is the main circuit test point, it is used as a reference for all the voltage measurements that can be made on the regulation board.

+28 Internal +28 Vdc power supply.  
+15 Internal +15 Vdc power supply, is indicated by LED L12.  
-15 Internal -15 Vdc power supply, is indicated by LED L13.  
-28 Internal -28 Vdc power supply.

**TP1-TP4-TP5** Synchronism signals.

**TP2** DRIVE channel signal.

**TP3** BRAKE channel signal.

**TP6** Error signal.

This signal is only active during slowdown from high to low speed.

**TP7** Speed regulator response signal.

This signal is proportional to the DRIVE and BRAKE lighting up signals.

**TP8** Programme signal.

This is the ECOTAKEDO mod.94 theoretical speed signal. It varies with the settings of the various speed levels and the acceleration and deceleration ramps.

**TP9** Slowdown start level

This signal follows the calibration made with P18.

**TP10** Shunt or stability response signal.

This signal is active during the accelerations and decelerations.

**TP11** Tachogenerator or encoder response signal.

This signal is proportional to the real speed of the plant. Between TP11 and GND a negative voltage will always be measured. The greater the negative signal the higher the real speed of the plant. When a tachogenerator is used, the voltage on TP11 is approximately one tenth of that measured on terminal board M2. A normal high speed voltage value is around -9 Vdc.

### 3.4 SETTINGS

A list is given below of the significance of the various settings that can be made on ECOTAKEDO mod.94 and the adjustment of these.

**SEL1** Setting that depends on the stop contact used in the plant. If the contact is normally open (closed at the floor), place the jumper in position NO, if the contact is normally closed (open at the floor), place the jumper in the NC position. Unless otherwise specified, this is normally connected in position NC.

**SEL2** Tachogenerator or encoder setting.

If the tachogenerator is used, place the jumper in position T, if the encoder is used, place the jumper in position E. Unless otherwise specified, this is normally connected in position T.

**J1** Jumper connected for 6-24 pole motor (1000 rpm).

Unless otherwise specified, this is not connected.

**CMP** Jumper connected (in plants requiring a slowdown delay between floors). If connected it activates the slowdown delay circuit. Unless otherwise specified, this is connected.

**RES** Jumper that allows automatic reset of <<tachometric>> alarm. If connected allows alarm reset. It is better not to use this to avoid uncontrolled resetting of the apparatus. It is not connected.

**SAT** Jumper allowing ECOTAKEDO mod.94 <<saturation>> functioning. If connected allows saturation functioning. It is not connected. See point 4.2.

**SP1** Soldered selector for 60 or 100 pulses/revolution encoder. When soldered selects the encoder with 100 pulses/revolution. Unless otherwise specified, this is not soldered.

**SP2** Soldered selector for 60 Hz frequency power supply. Unless otherwise specified, this is not soldered.

**SP3** Soldered selector for 50 Hz frequency power supply. Unless otherwise specified, this is soldered.

In the event of a 50 Hz frequency SP3 will be soldered and not SP2.

In the event of a 60 Hz frequency SP2 will be soldered and not SP3.

## 4 - SETTING UP THE PLANT

4.1 ECOTAKEDO mod.94 leaves SMS after testing and setting.

A few tips are given below for the optimum setting up of the plant.

It should be remembered that in the lift shaft, the slowdown commands must all be kept at the same distance from the floors (see APPENDIX 5), and the electric stop commands should be positioned so that they intervene at approximately 3-5 cm from the floor.

The first travel should always be made in maintenance mode, to check that the motor does not have any unusual noises and that the feedback signal from the encoder or the tachogenerator is present (otherwise ECOTAKEDO mod.94 signals a <<tachometric>> fault). During the first travels, avoid arrivals at extreme floors and immediately adapting the various settings to the plant requirements. The settings prepared by SMS are usually suitable for all plants. The only one that cannot be foreseen during testing is the deceleration setting. This is important to avoid the lift decelerating too slowly and going beyond the floor without stopping at the desired level.

The <<typical travel>> of a lift regulated with ECOTAKEDO mod.94 involves:

- departure with motor acceleration to high speed
- high speed section
- slowdown (commanded at the distance indicated in APPENDIX 5)
- low speed section (the lift must cover 5 to 10 centimeters at low speed to arrive accurately at the floor level)
- <<electric>> stop at the floor and closing of the mechanical brake.

It is set for <<regulation>> functioning.

The speed parameters are set as follows:

		4-16 POLES 50 Hz MOTOR	6-24 POLES 50 Hz MOTOR
HIGH SPEED	(V2)	<b>1350 rpm</b>	<b>900 rpm</b>

MAINTENANCE SPEED	(VM)	<b>750 rpm</b>	<b>500 rpm</b>
LOW SPEED	(V0)	<b>120 rpm</b>	<b>80 rpm</b>

The braking intensity is controlled by the value of **-1.0 Vdc**.

Acceleration and deceleration are set at approximately **two seconds**.

The starting torque is set at **0 Vdc**.

The slowdown delay, already described, is set at the minimum (trimmer fully anticlockwise). The slowdown delay selector (CMP) is not connected. For slowdown delay adjustment refer to point 3.1.

The selector for the N.O. or N.C. stop contact is set at **N.O.** (SEL1).

The timer controlling mechanical brake delay (**P3**) is set at **minimum**.

The stability trimmer is set at 1/4, with the regulator trimmer is set at minimum. Normally these two settings are appropriate for all plants.

The settings for the correct functioning of ECOTAKEDO mod.94 are customised on the basis of customer requests, otherwise they remain as described in point 3.4.

#### **4.2 SETTINGS FOR <<SATURATION>> MODE**

Before running ECOTAKEDO mod.94 in the <<saturation>> mode, check that the plant functions correctly with ECOTAKEDO mod.94 in the <<regulation>> mode, i.e. with the speeds set by SMS.

To transform the ECOTAKEDO mod.94 functioning from <<regulation>> to <<saturation>> mode, proceed as follows:

- Make the deceleration ramp steeper to avoid the lift going beyond the floor level at the higher speed. Avoid arrivals at the extreme floors during these adjustments.
- Connect the jumper for the SAT setting.
- Increase the high speed level until the value measured between TP8 and GND is 10.5 Vdc.
- Adjust the slowdown start level to avoid delays at the beginning of slowdown. Take care not to lower the start of slowdown too much as this could cause a stroke at the beginning of the slowdown operation and split it into two phases.
- After adjusting the slowdown start, reset the deceleration setting so that the lift covers the previously mentioned 5-10 centimeters at low speed. Check that the space covered at low speed is the same in ascent and in descent.

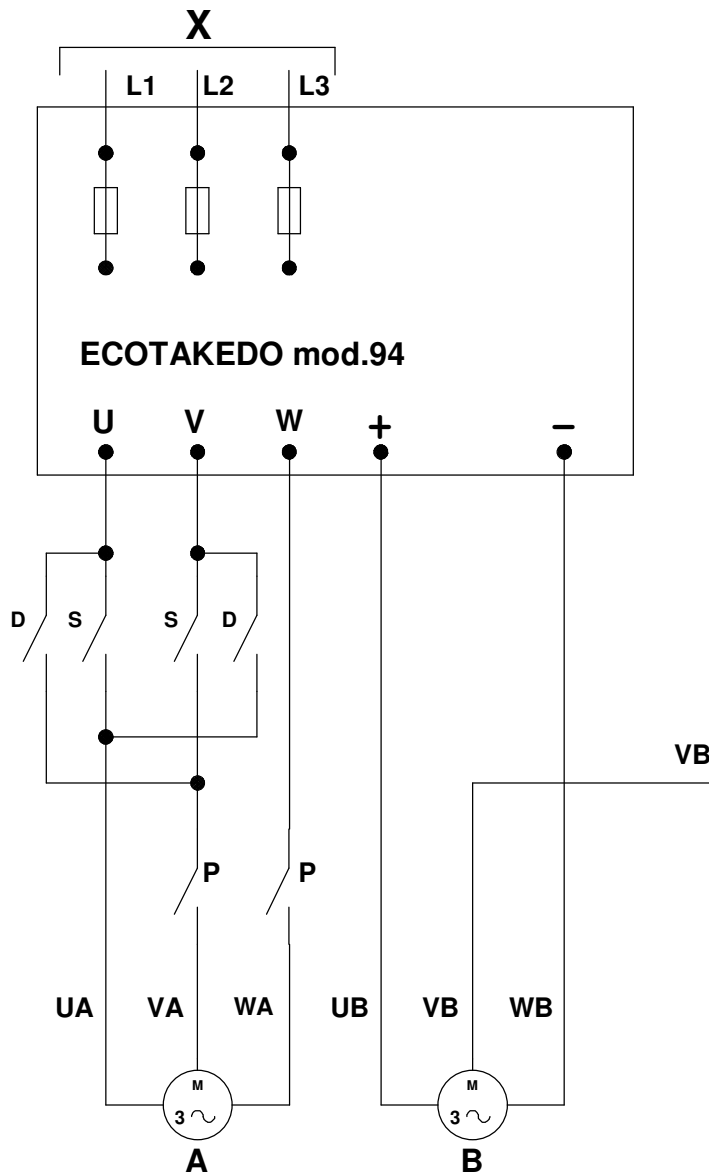
**For any further information contact:**

**SMS Sistemi e Microsistemi**

**Tel. : +39-51-969037 Fax : +39-51-969303**

**Crespellano ( Bologna ) ITALY**



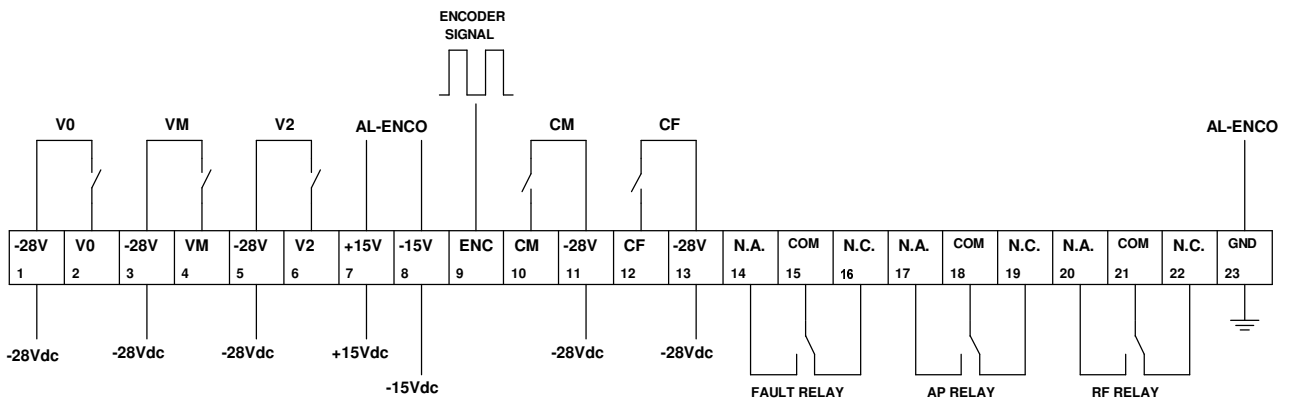


### LEGEND

- A = 4 / 6 POLES 50 Hz MOTOR
- B = 16 / 24 POLES 50 Hz MOTOR
- D = DOWNWARD CONTACTOR
- P = MAIN CONTACTOR
- S = UPWARD CONTACTOR
- VB = LEAVE FREE
- X = 3-PHASE LINE

### APPENDIX 2

## TERMINAL BOARD M1

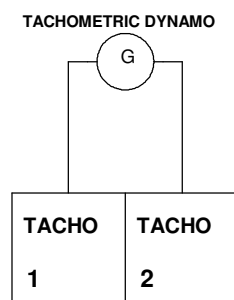


### SPECIFICATION :

- AL-ENCO = Power supply for encoder (possible).
- Contact 14 - 15 closed if ECO TAKEDO is O.K..
- Contact 17 - 18 closed for speed below door opening speed.
- Contact 20 - 21 closed with delay at the floor.

**NOTE:** Terminals 1, 3, 5, 11 and 13 of the terminal board M1 internal connection -28 Vdc.

## TERMINAL BOARD M2



## APPENDIX 3

TABLE OF THE MAXIMUM SPEEDS ALLOWED FOR  
ADVANCE DOOR OPENING

LIFT SPEED m/sec	4-16 POLES 50 Hz MOTOR	6-24 POLES 50 Hz MOTOR
	MAX DOOR OPENING SPEED rpm	MAX DOOR OPENING SPEED rpm
1.0	450	300
1.2	375	250
1.4	320	215
1.6	280	185
1.8	250	165
2.0	225	150
2.2	200	135

R 148 = 1K  
 AP RELAY TRIP LEVEL 210 rpm  
 R 148 = 1K2  
 AP RELAY TRIP LEVEL 250 rpm  
 R 148 = 1K5  
 AP RELAY TRIP LEVEL 300 rpm  
 R 148 = 1K8  
 AP RELAY TRIP LEVEL 350 rpm  
 R 148 = 2K2  
 AP RELAY TRIP LEVEL 420 rpm

APPENDIX 4  
TABLE OF RECOMMENDED SLOWING DISTANCE

## FOR ECOTAKEDO mod.94

LIFT SPEED	DECELERATION 0.8	DECELERATION 0.9	DECELERATION 1.0
m/sec	m/sec <sup>2</sup>	m/sec <sup>2</sup>	m/sec <sup>2</sup>
1.0	1.4	1.3	1.2
1.2	1.8	1.7	1.6
1.4	2.3	2.2	2.0
1.6	2.9	2.7	2.5
1.8	3.5	3.2	3.0
2.0	4.2	3.9	3.6
2.2	4.9	4.5	4.2

### APPENDIX 5

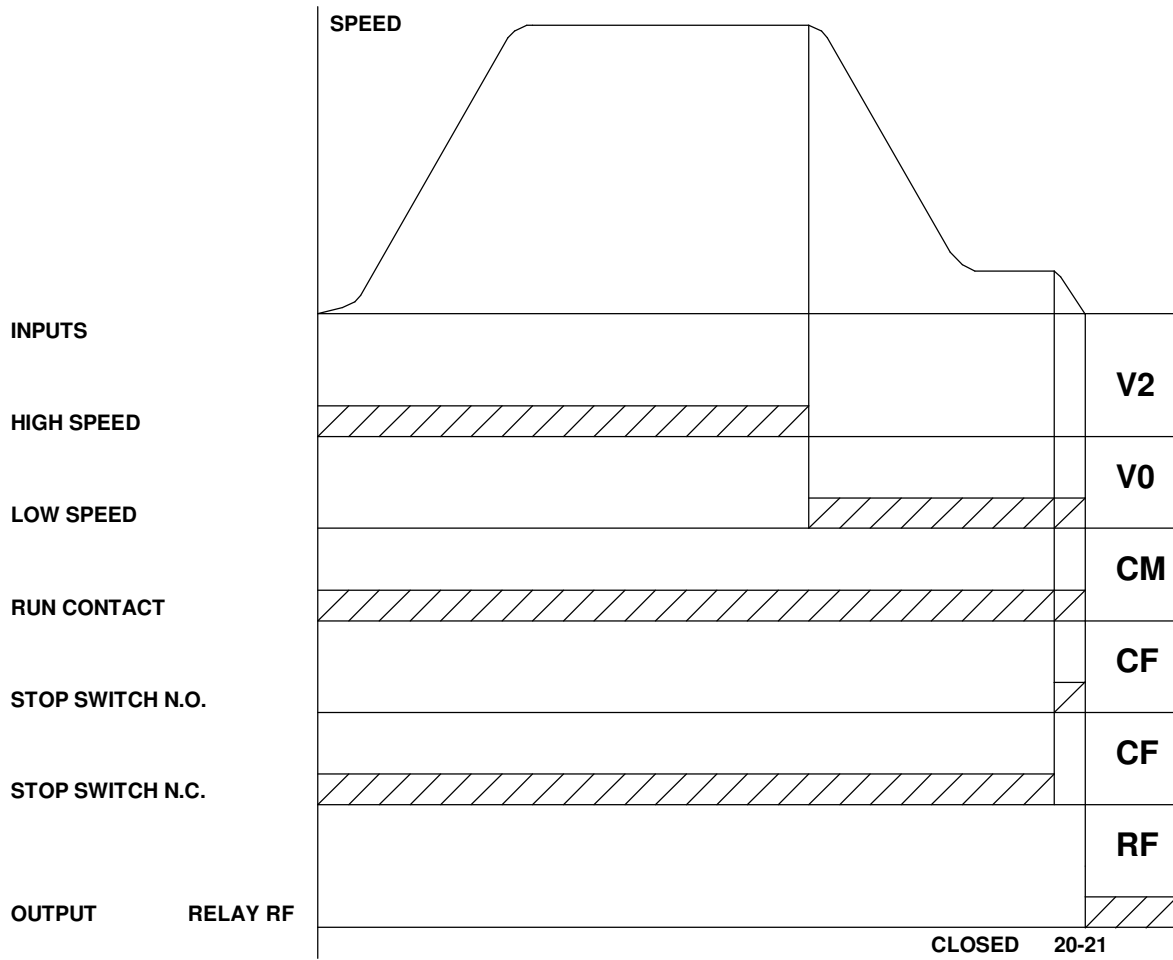
## TABLE OF THE MAXIMUM MAINTANCE SPEEDS ALLOWED

LIFT SPEED m/sec	4-16 POLES 50 Hz MOTOR	6-24 POLES 50 Hz MOTOR
	MAX MAINTANCE SPEED rpm	MAX MAINTANCE SPEED rpm
1.0	900	600
1.2	750	500
1.4	640	430
1.6	560	370
1.8	500	330
2.0	450	300
2.2	400	270

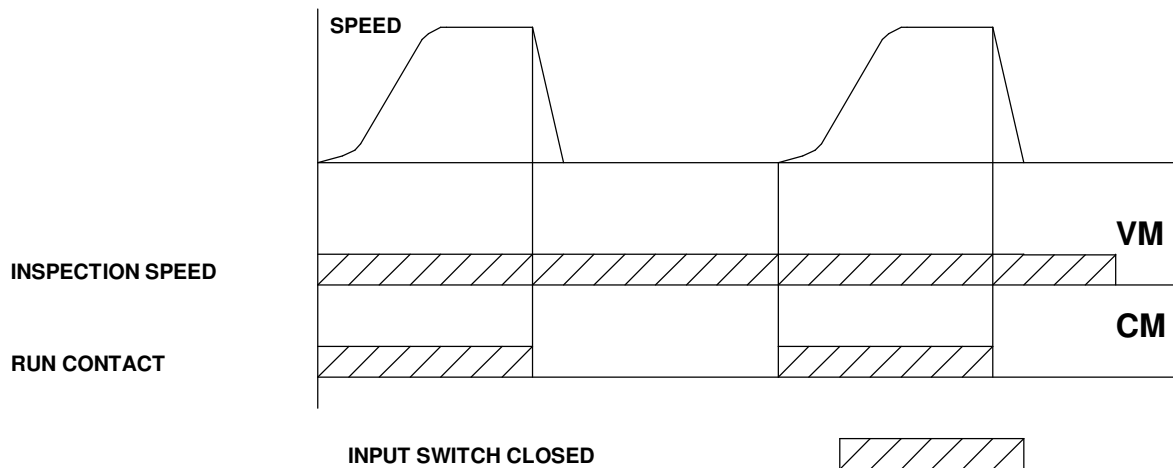
### APPENDIX 6

# COMMANDS SEQUENCE FOR ECOTAKEDO mod.94

## NORMAL WORKING



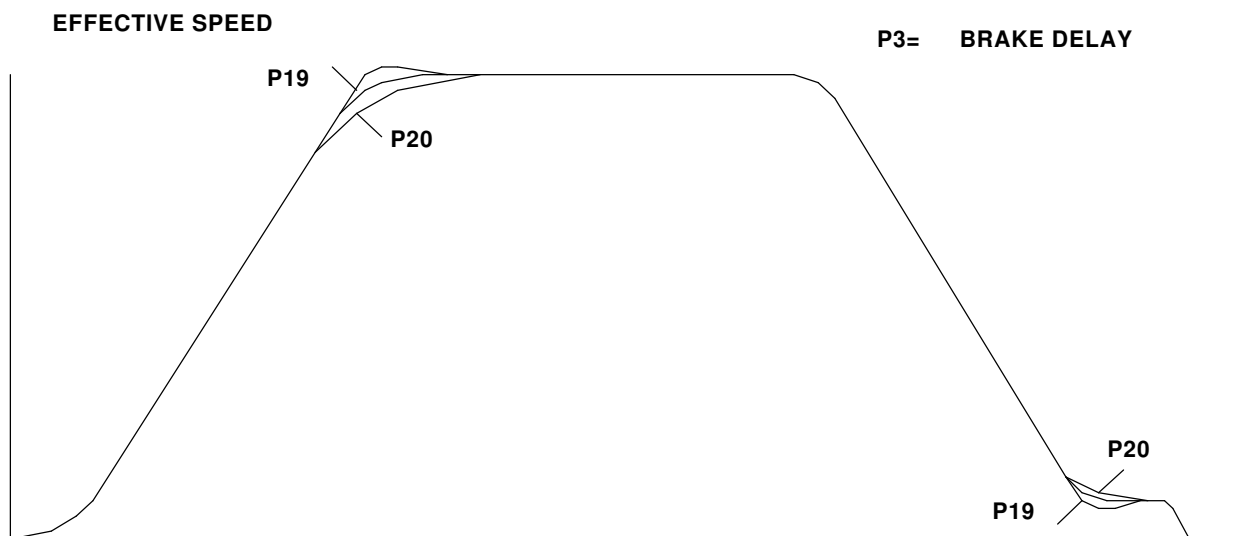
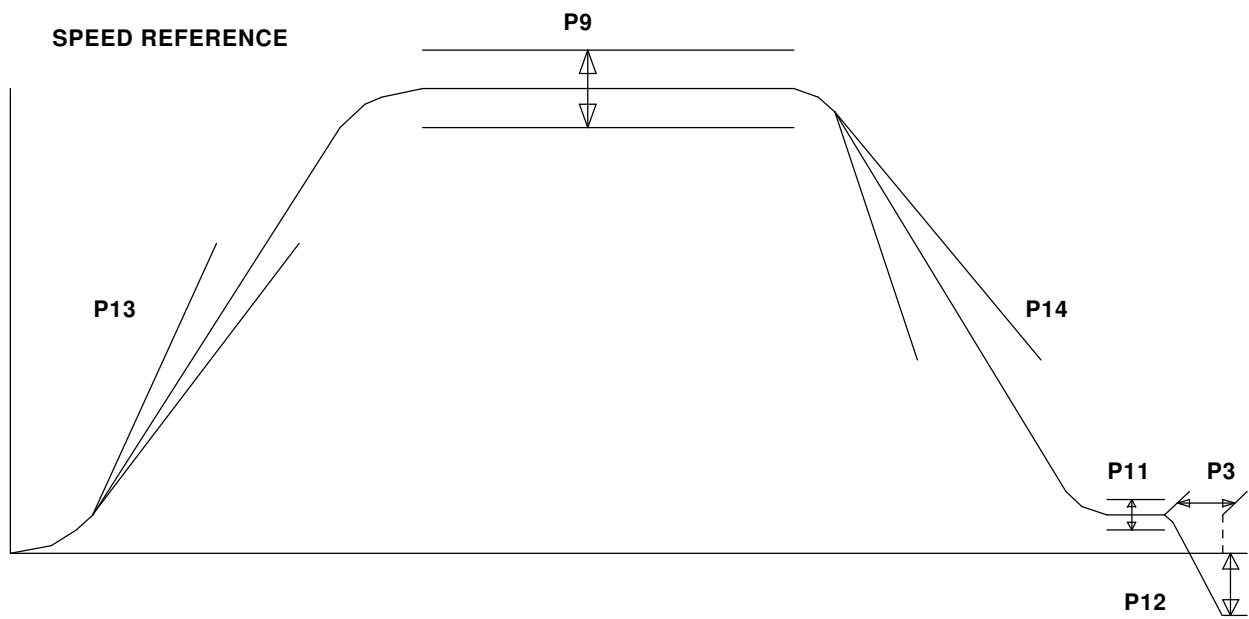
## INSPECTION WORKING



### APPENDIX 7

# ADJUSTMENTS

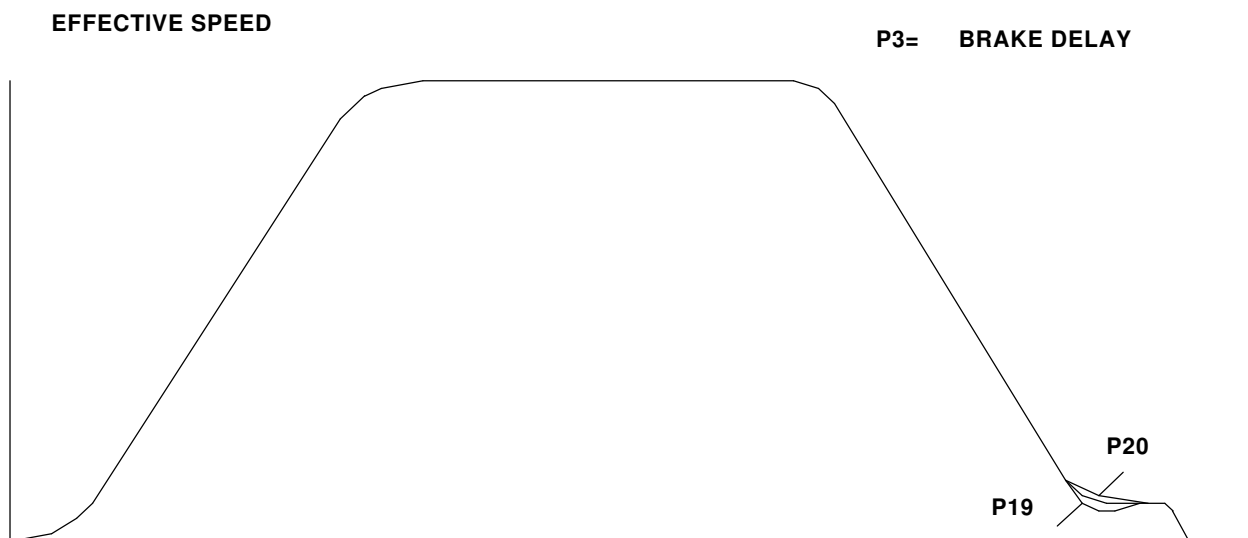
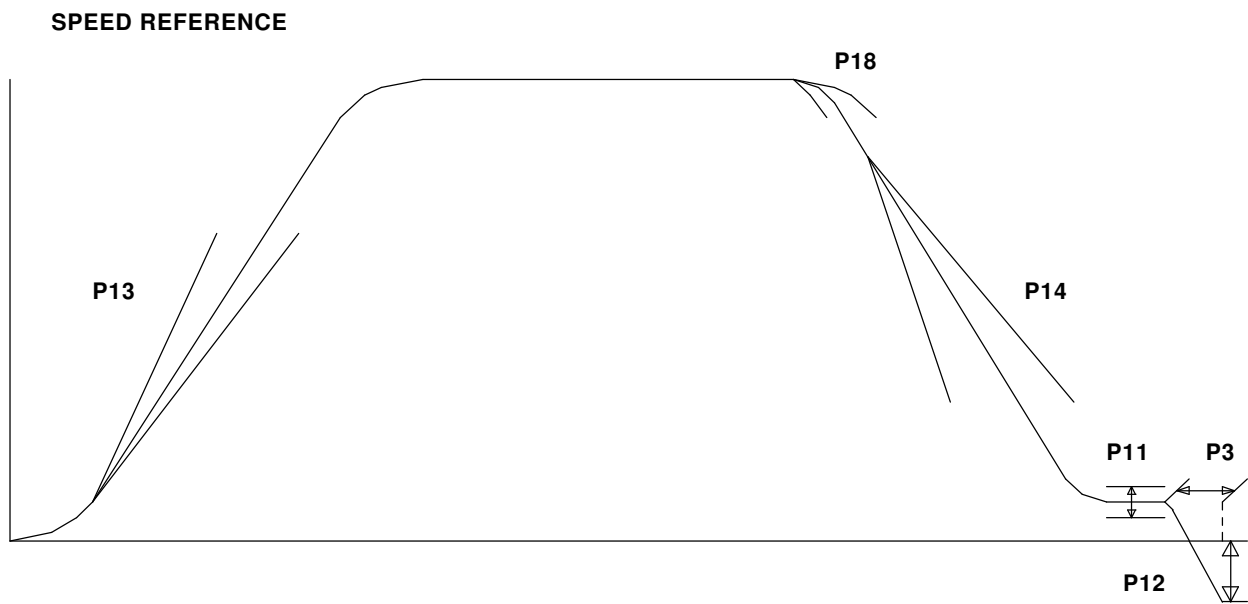
## REGULATION WORKING



### APPENDIX 8

# ADJUSTMENTS

## SATURATION WORKING



## LEGEND ECO-TAKEDO mod.94 REGULATION BOARD

### REGULATION

<b>P2</b>	PHASE CONTROL CIRCUIT SENSIBILITY	<b>P3</b>	MECHANICAL BRAKE DELAY
<b>P4</b>	DEPARTURE TORQUE	<b>P9</b>	HIGH SPEED (V2)
<b>P10</b>	MAINTENANCE SPEED (VM)	<b>P11</b>	LOW SPEED (V0)
<b>P12</b>	BRAKING INTENSITY	<b>P13</b>	ACCELERATION
<b>P14</b>	DECELERATION	<b>P15</b>	SLOWING DOWN DELAY
<b>P18</b>	SLOWDOWN START LEVEL	<b>P19</b>	STABILITY
<b>P20</b>	SPEED REGULATOR DYNAMIC GAIN		

### LEDS

<b>L1</b>	LOW SPEED (V0)	<b>L2</b>	MAINTENANCE SPEED (VM)
<b>L3</b>	HIGH SPEED (V2)	<b>L4</b>	STOP CONTACT (CF)
<b>L5</b>	RUN COMMAND (CM)	<b>L6</b>	FAULT (GREEN LED)
<b>L7</b>	MECHANICAL BRAKE DELAY (RF)	<b>L8</b>	DOOR OPENING (AP)
<b>L9</b>	SLOWDOWN DELAY	<b>L10</b>	SATURATION
<b>L11</b>	<TACHOMETRIC> ALARM	<b>L12</b>	+15 VDC POWER SUPPLY
<b>L13</b>	-15 VDC POWER SUPPLY		

### TEST POINT

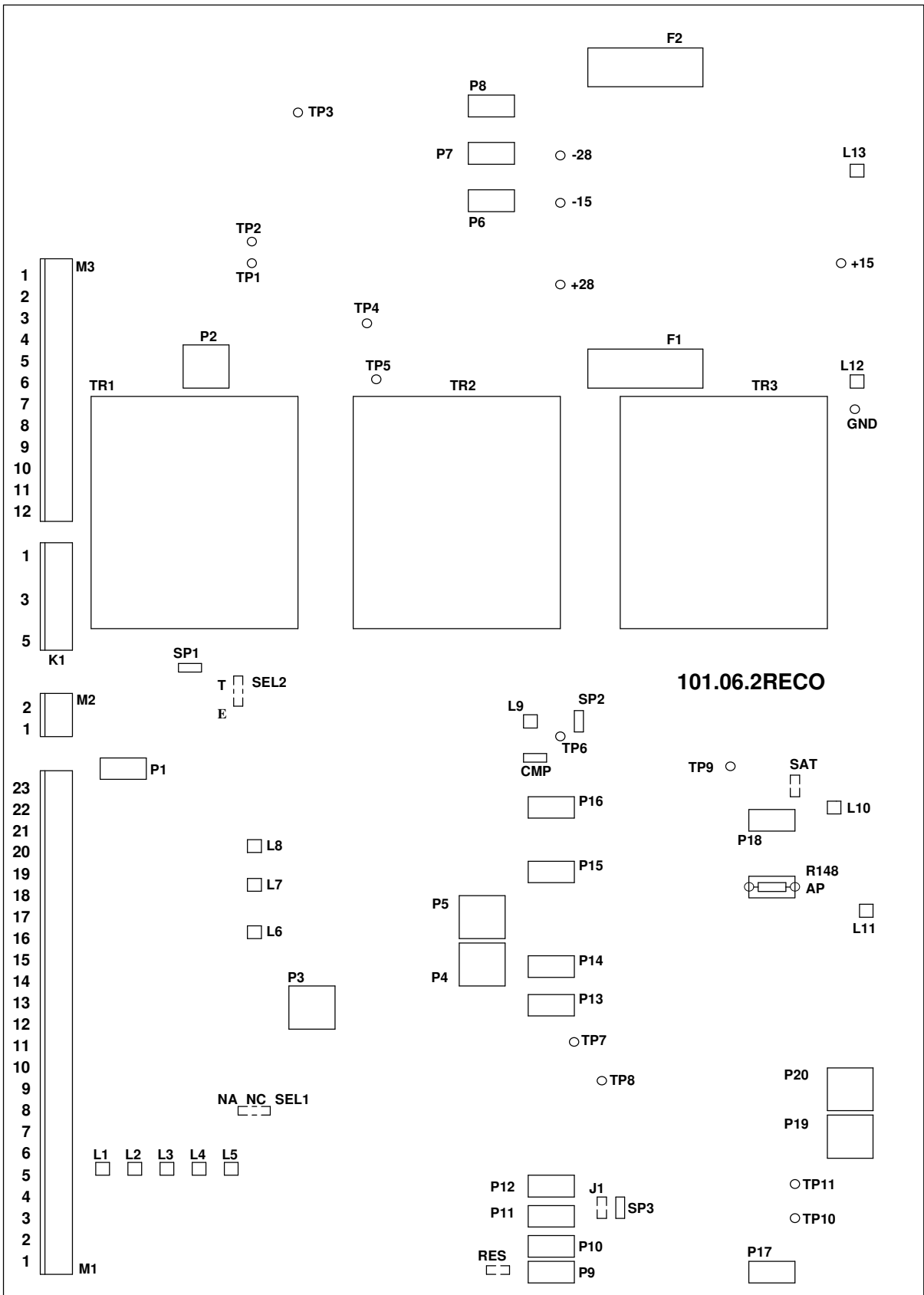
<b>GND</b>	INTERNAL CIRCUIT GROUND	<b>+28</b>	+28 VDC INTERNAL POWER SUPPLY
<b>+15</b>	+15 VDC INTERNAL POWER SUPPLY	<b>-15</b>	-15 VDC INTERNAL POWER SUPPLY
<b>-28</b>	-28 VDC INTERNAL POWER SUPPLY	<b>TP1</b>	SYNCHRONISM SIGNALS
<b>TP2</b>	DRIVE CHANNEL SIGNAL	<b>TP3</b>	BRAKE CHANNEL SIGNAL
<b>TP4</b>	SYNCHRONISM SIGNALS	<b>TP5</b>	SYNCHRONISM SIGNALS
<b>TP6</b>	ERROR SIGNAL	<b>TP7</b>	SPEED REGULATOR RESPONSE SIGNAL
<b>TP8</b>	PROGRAMME SIGNAL	<b>TP9</b>	SLOWDOWN START LEVEL
<b>TP10</b>	SHUNT OR STABILITY RESPONSE SIGNAL	<b>TP11</b>	RISPOSTA TACHIMETRICA O ENCODER

### JUMPER

<b>SEL1</b>	STOP CONTACT N.O. OR N.C.	<b>SEL2</b>	TACHOMETRIC DYNAMO OR ENCODER
<b>J1</b>	FOR 6-24 POLES MOTOR 1000 rpm	<b>CMP</b>	FOR SLOWING DOWN DELAY ENABLE
<b>RES</b>	RESET TACHOMETRIC ALARM	<b>SAT</b>	FOR <SATURATION> FUNCTIONING
<b>SP1</b>	FOR 60 OR 100 pulses/revolution ENCODER	<b>SP2</b>	FOR 60 Hz FREQUENCY POWER SUPPLY
<b>SP3</b>	FOR 50 Hz FREQUENCY POWER SUPPLY		

### APPENDIX 8B

## ECOTAKEDO mod.94 101.06.2RECO REGULATION BOARD STENCILLING



APPENDIX 8C